Hood River – White Salmon BRIDGE REPLACEMENT PROJECT

Final Vegetation and Wetland Technical Report

November 2020

Prepared for:

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LIST OF EXHIBITS

ACRONYMS AND ABBREVIATIONS

API	area of potential impact
BMPs	best management practices
EIS	environmental impact statement
ESA	Endangered Species Act
I-	Interstate
IPaC	Information for Planning and Consultation
lbs.	pounds
MATS	Mt. Adams Transportation Service
mph	miles per hour
NEPA	National Environmental Policy Act
NRCS	Natural Resource Conservation Service
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OHWM	ordinary high water mark
SR	State Route
the Port	Port of Hood River
the Project	Hood River-White Salmon Bridge Replacement Project
TS&L	type, size, and location
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Department of Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSDOT	Washington State Department of Transportation
WSMC	White Salmon Municipal Code

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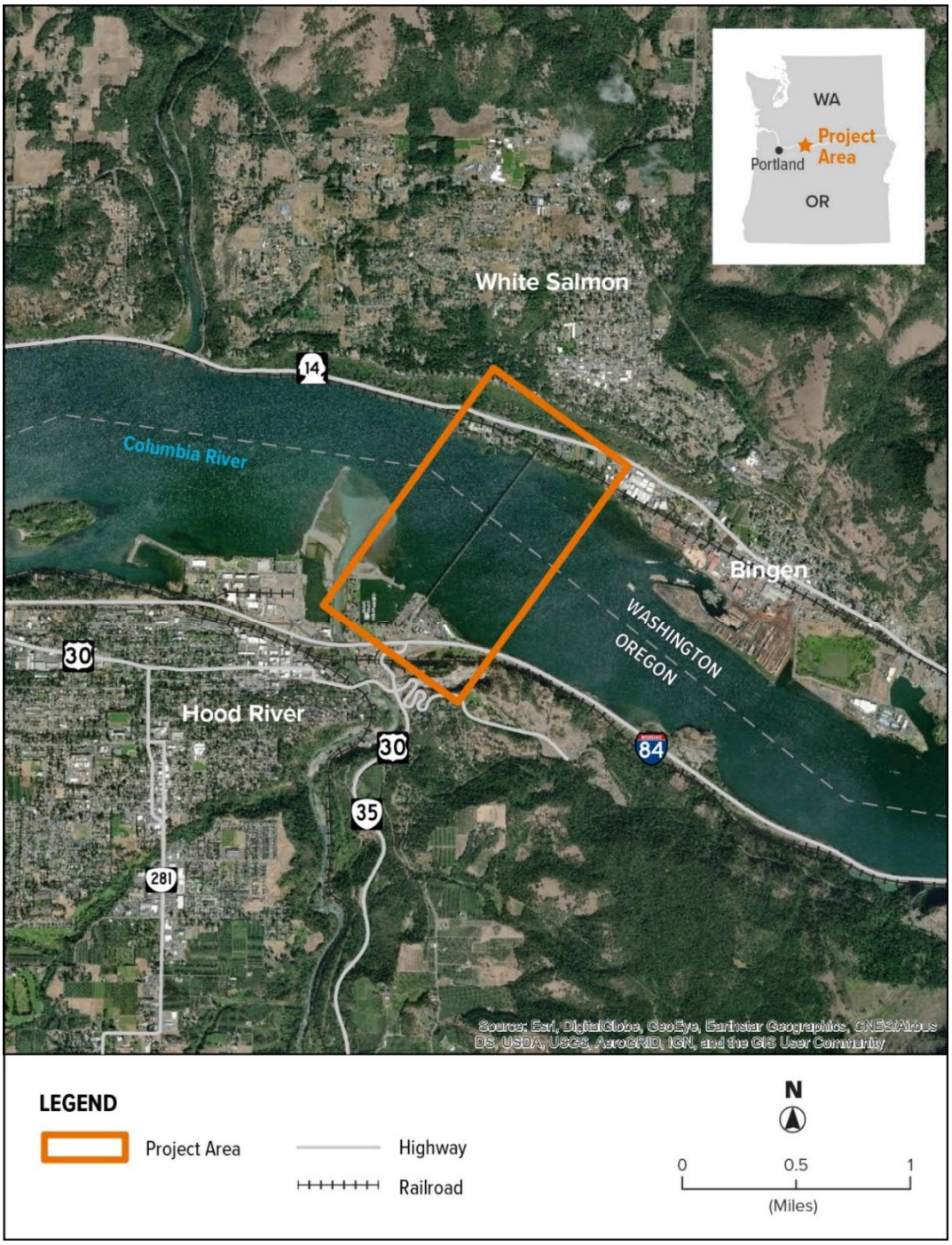
1. INTRODUCTION

The Hood River-White Salmon Bridge Replacement Project (the "Project," formerly named the SR-35 Columbia River Crossing Project) would construct a replacement bridge and then remove the existing Hood River Bridge between White Salmon, Washington, and Hood River, Oregon (Exhibit 1).The bridge is owned by the Port of Hood River (the Port), serving an average of over 4 million trips annually.

Exhibit 1. Project Area



The purpose of this Project is to improve multi-modal transportation of people and goods across the Columbia River between the communities of White Salmon and Bingen, Washington and Hood River, Oregon. The Project is intended to: a) improve traffic operations for current and future cross-river traffic and at connections to I-84 and SR 14; b) provide a cross-river connection for bicyclists and pedestrians; c) improve vehicle and freight travel safety by reducing real and perceived hazards; d) maintain and improve a transportation linkage between the White Salmon, Bingen, and Hood River communities, businesses, and services; e) fulfill the legislative directives tied to the Project funding; f) improve river navigation for vessels passing under the bridge; and g) improve the river crossing's seismic resiliency.

The overall need for the Project is to rectify current and future transportation inadequacies and deficiencies associated with the existing bridge. Specifically, these needs are to:

- Present Capacity: substandard width and operational issues are causing traffic congestion on the bridge and at both approaches
- Future Transportation Demand: the existing bridge is not designed to meet future travel demand for vehicles
- Bicycle and Pedestrian Facilities: lack of bicycle and pedestrian facilities limits multi-modal mobility
- Safety: narrow lanes and lack of shoulder create real and perceived safety hazards
- Social Demands/Economic Development: the existing bridge restricts the current and projected flow of goods, labor and consumers across the river
- Legislation: comply with federal funding obligation Transportation Equity Act for the 21st Century (TEA-21), the Washington State Legislature designation of the SR-35 corridor, and Oregon HB 2017
- River Navigation: the substandard horizontal clearance creates difficulties for safe vessel navigation
- Seismic Deficiencies: the existing bridge does not meet current seismic standards and is vulnerable to a seismic event

The Project began in 1999 with a feasibility study that ultimately resulted in the publication of the State Route (SR) 35 Columbia River Crossing Draft Environmental Impact Statement (EIS) in 2003, which identified the "EC-2 West Alignment" as the preliminary preferred alternative. In 2011, the Type, Size, and Location (TS&L) Study recommended a fixed-span concrete segmental box girder bridge as the recommended bridge type. In 2017, the Project was relaunched to complete the National Environmental Policy Act (NEPA) process. This report provides an update to the 2003 Vegetation and Wetlands Technical Report describing the existing conditions and anticipated construction, direct, and indirect impacts on vegetation and wetlands. Measures to avoid, minimize, and/or mitigate these impacts are also identified in this report.

2. PROJECT ALTERNATIVES

Four alternatives are being evaluated to address the Project's purpose and need:

- No Action Alternative
- Preferred Alternative EC-2
- Alternative EC-1
- Alternative EC-3

Exhibit 2 shows the alignment of the existing bridge, which represents the No Action Alternative, and the three build alternatives. The build alternatives connect to SR 14 in White Salmon, Washington, and Button Bridge Road in Hood River, Oregon, just north of the Interstate 84 (I-84)/United States Highway 30 (US 30) interchange (Exit 64).

Each alternative is summarized in Exhibit 3 and described in more detail in the following sections. Exhibit 4 illustrates the navigational clearance for the existing bridge and the replacement bridge (same for each build alternative).

Exhibit 2. Location of the Preferred Alternative EC-2, Alternative EC-1, and Alternative EC-3

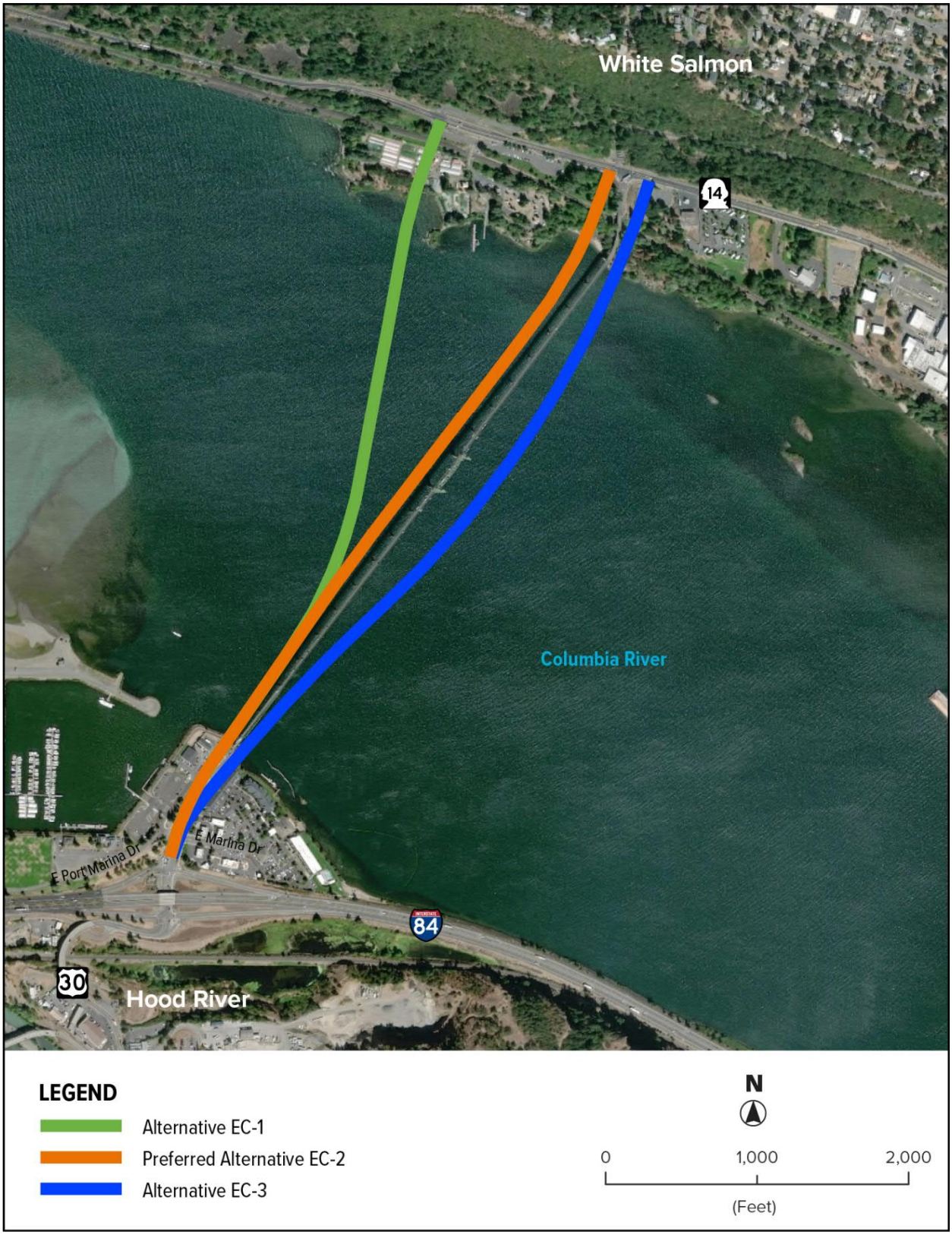
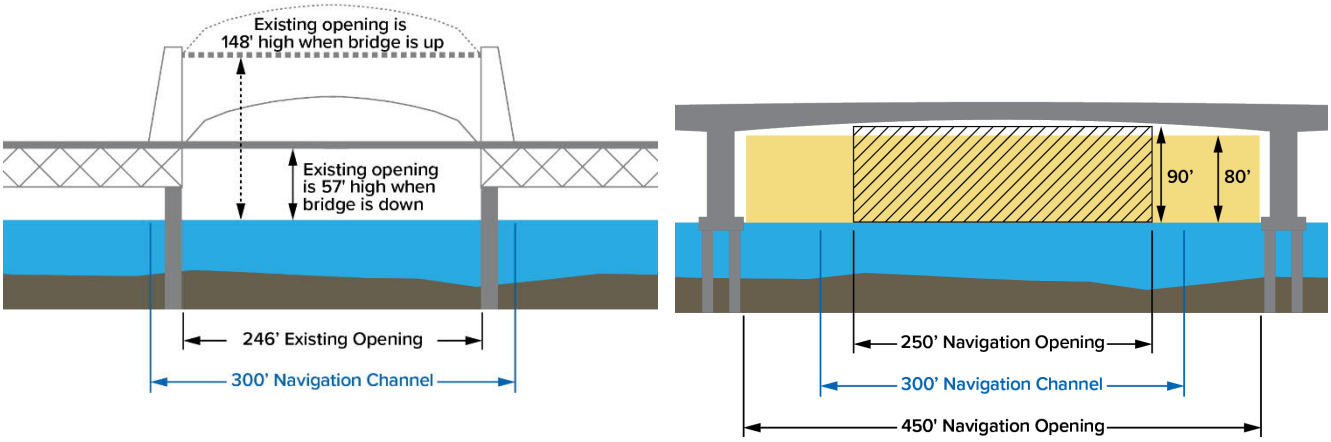


Exhibit 3. Summary Comparison of Key Elements of Alternatives

	No Action Alternative	Preferred Alternative EC-2	Alternative EC-1	Alternative EC-3
Bridge alignment	No change	Slightly west of existing	WA: West of existing OR: Slightly west of existing	Slightly east of existing
Bridge structure				
Bridge type	Steel deck truss bridge with vertical lift span	Segmental concrete box girder bridge (fixed span)		
Total number of piers (in water / on land)	28 (20 / 8)	13 (12 / 1)	13 (11 / 2)	13 (12 / 1)
Structure length	4,418 feet	4,412 feet	4,375 feet	4,553 feet
Travel lanes	9-foot 4.75-inch lanes	12-foot lanes		
Roadway shoulders	No shoulders	8-foot shoulders		
Vehicle height limit	14 feet-7 inches	None		
Shared Use Path	None	12-foot wide, only on west side with overlooks		
Bridge deck	Steel-grated	Concrete		
Vehicle Gross Weight Limit	80,000 pounds (lbs.); no trip permit allowance for overweight vehicles	> 80,000 lbs., with approved trip permit		
Design speed	Unknown	50 miles per hour (mph)		
Posted speed	25 mph	35 mph		
Toll collection	Toll booth on Oregon side	Electronic tolling/No toll booth		
Stormwater treatment	None	Detention and water quality treatment		
Navigation clearance	246 feet horizontal by 57 feet vertical when bridge is down and up to 148 feet vertical when lifted	450 feet horizontal x 80 feet vertical (maximum horizontal opening) 250 feet horizontal x 90 feet vertical (centered within maximum vertical opening)		
SR 14/Hood River Bridge intersection	Signalized intersection	Roundabout slightly west of existing intersection; SR 14 raised approximately 2 feet above existing road level	Roundabout with connection to N. Dock Grade Road west of existing intersection; SR 14 raised approximately 17 feet above existing road level	Roundabout slightly east of existing intersection; SR 14 remains at existing road level
Button Bridge Road/E. Marina Way intersection	Signalized intersection	Signalized intersection		
Anticipated construction duration	None	6 years (3 years to construct the replacement bridge and 3 years to remove the existing bridge)		

Exhibit 4. Navigation Clearance of Existing Bridge and Proposed Replacement Bridge



Existing Bridge

Proposed Replacement Bridge

2.1. No Action Alternative

The No Action Alternative would retain the existing bridge in its existing condition and configuration. Routine operations would continue and maintenance would be implemented to continue operations. Under the No Action Alternative, elements of the existing bridge include:

- Alignment: The bridge would continue to span the Columbia River between its northern terminus at the SR 14/Hood River Bridge intersection in White Salmon, Washington, and its southern terminus at the Button Bridge Road/E. Marina Way intersection in Hood River, Oregon, as shown in the aerial photograph in Exhibit 2.
- Type: The bridge would continue to be a 4,418-foot steel deck truss bridge with a vertical lift span. The bridge would continue to have 20 piers in the Columbia River.
- Ownership: The bridge will continue to be owned and operated by the Port.
- Vehicle lanes: The bridge will continue to have one narrow (9 feet, 4.75 inches) travel lane in each direction and no shoulders.
- Bicycle and pedestrian facilities: The bridge would continue to have no pedestrian or bicycle facilities, and signage would continue to prohibit pedestrians and bicycles on the bridge.
- Speed: The posted speed limit on the bridge would continue to be 25 mph.
- Vehicle restrictions: Vehicles would continue to be weight-restricted to 80,000 lbs.; vehicles with approved trip permits would still not be allowed to use the bridge. Wide loads would continue to be prohibited without special arrangements, and large vehicles would be encouraged to turn their mirrors in. The height limit for vehicles would continue to be 14 feet, 7 inches where the lift span occurs.
- Tolling: The bridge would continue to be tolled for all vehicles with a toll booth on the south end of the bridge and electronic tolls collected through the Port's Breezeby system. Plans to shift to all ETC are being considered, but there is no certainty they will be implemented.

- Navigational clearance: The horizontal clearance for marine vessels would continue to be 246 feet, narrower than the navigation channel width of 300 feet, as shown Exhibit 4. The vertical clearance would continue to be 57 feet when the lift span is down and 148 feet when it is raised; vessels would continue to be required to request bridge lifts in advance. The lift span section would continue to use gate and signals to stop traffic for bridge lifts.
- Seismic resilience: The bridge would continue to be seismically vulnerable and would not be cost effective to be seismically retrofitted.
- Stormwater: No stormwater detention or water quality treatment would be provided for the bridge. Stormwater on the bridge would continue to drain directly into the Columbia River through the steel-grated deck.
- Roadway connections: The bridge would continue to connect to SR 14 on the Washington side at the existing signalized SR 14/Hood River Bridge intersection. On the Oregon side, the southern end of the bridge would continue to transition to Button Bridge Road, connecting to the local road network at the existing signalized Button Bridge Road/E. Marina Way intersection north of I-84. The bridge would continue to cross over the BNSF Railway tracks on the Washington side and over the Waterfront Trail along the Oregon shoreline.
- Bicycle and pedestrian connections: The bridge would continue not to provide bicycle or pedestrian connections across the Columbia River. Bicyclists and pedestrians wanting to cross the river would continue to need to use an alternate means of transportation, such as the Mt. Adams Transportation Service (MATS) White Salmon/Bingen to Hood River bus (buses provide bicycle racks), or a private vehicle.

The Supplemental Draft EIS considers two scenarios for the No Action Alternative:

- End of bridge lifespan: assumes that the existing Hood River Bridge would remain in operation through 2045[1] and would be closed sometime after 2045 when maintenance costs would become unaffordable. At such a time, the bridge would be closed to vehicles and cross-river travel would have to use a detour route approximately 21 miles east on SR 14 or 23 miles east on I-84 to cross the Columbia River using The Dalles Bridge (US 197). Alternatively, vehicles could travel 25 miles west on SR 14 or 21 miles west on I-84 to cross the Columbia River via the Bridge of the Gods. When the bridge would be closed, the lift span would be kept in a raised position to support large vessel passage that previously required a bridge lift or the existing bridge would be removed.
- Catastrophic event: addresses the possibility that an extreme event that damages or otherwise renders the bridge inoperable would occur prior to 2045. Such events could include an earthquake, landslide, vessel strike, or other unbearable loads that the bridge structure cannot support.

[1] The year 2045 is the design horizon for the Project. The design horizon is the year for which the Project was designed to meet anticipated needs.

2.2. Preferred Alternative EC-2

Alternative EC-2 would construct a replacement bridge west of the existing bridge. The existing bridge would be removed following construction of the replacement bridge. Under Alternative EC-2, elements of the replacement bridge would include:

- Alignment: The main span of the bridge would be approximately 200 feet west of the existing lift span. The bridge terminus in White Salmon, Washington, would be located approximately 123 feet west of the existing SR 14/Hood River Bridge intersection, while the southern terminus would be in roughly the same location at the Button Bridge Road/E. Marina Way intersection in Hood River, Oregon, as shown in Exhibit 5 and Exhibit 6.
- Type: The bridge would be a 4,412-foot fixed-span segmental concrete box girder bridge with a concrete deck and no lift span. The bridge would have 12 piers in the Columbia River and one land-based pier on the Washington side of the river.
- Ownership: While the Port may own and operate the replacement bridge, other options for the ownership and operation of the replacement bridge that may be considered include other governmental entities, a new bi-state bridge authority, and a public-private partnership, depending on the funding sources used to construct the replacement bridge.
- Vehicle lanes: The bridge would include one 12-foot travel lane in each direction, an 8-foot shoulder on each side, as shown in Exhibit 7.
- Bicycle and pedestrian facilities: The bridge would include a 12-foot wide shared use path separated from traffic with a barrier on the west side, as shown in Exhibit 7. In the middle of the bridge the shared use path would widen an additional 10 feet in two locations to provide two 40-foot long overlooks over the Columbia River and west into the CRGNSA with benches; the overlook locations are shown in Exhibit 5 and Exhibit 6. The cross-section of the overlooks is shown in Exhibit 7.
- Speed: The design speed for the bridge would be 50 mph with a posted speed limit of 35 mph.
- Vehicle restrictions: Vehicles would no longer be limited by height, width, or weight. Vehicles exceeding 80,000 lbs. that have approved trip permits could use the bridge.
- Tolling: Tolls for vehicles would be collected electronically so there would be no toll booth on either side of the bridge. No tolls would be collected from non-motorized users (e.g., pedestrians, bicyclists) who travel on the shared use path.
- Navigational clearance: Vertical clearance for marine vessels would be a minimum of 80 feet. The horizontal bridge opening for the navigation channel would be 450 feet, greater than the existing 300-foot wide federally recognized navigation channel, as shown in Exhibit 4. Centered within this 450-foot opening, there would be a 250-foot wide opening with a vertical clearance of 90 feet. Similar to the existing bridge, the replacement bridge would cross the navigation channel at roughly a perpendicular angle as shown in Exhibit 5 and Exhibit 6.
- Seismic resilience: The bridge would be designed to be seismically sound under a 1,000-year event and operational under a Cascadia Subduction Zone earthquake.

- Stormwater: Stormwater from the entire Project area (bridge and improved roadways) would be collected and piped to detention and treatment facilities on both sides of the bridge as shown in Exhibit 6. On the Washington side, separate stormwater facilities would be used for the roadways and the bridge.
- Roadway connections: The bridge would connect to SR 14 on the Washington side at a new two-lane roundabout slightly west of the existing SR 14/Hood River Bridge intersection, as shown in Exhibit 6. On the Oregon side, the southern end of the bridge would transition to Button Bridge Road, connecting to the local road network at the existing signalized Button Bridge Road/E. Marina Way intersection north of I-84. The private driveway on Button Bridge Road north of E. Marina Way may be closed under this alternative. Like the existing bridge, the replacement bridge would cross over the BNSF Railway tracks on the Washington side and over the Waterfront Trail along the Oregon shoreline.
- Bicycle and pedestrian connections: The new shared use path would connect to existing sidewalks along the south side of SR 14 in Washington and to roadway shoulders (for bicyclists) on both sides of SR 14 at the new roundabout with marked crosswalks, as shown in Exhibit 6. On the Oregon side, the shared use path would connect to existing sidewalks, bicycle lanes, and local roadways at the signalized Button Bridge Road/E. Marina Way intersection.
- Cost: Total Project construction cost is estimated to be $300 million in 2019 dollars.

Exhibit 5. Preferred Alternative EC-2 Alignment

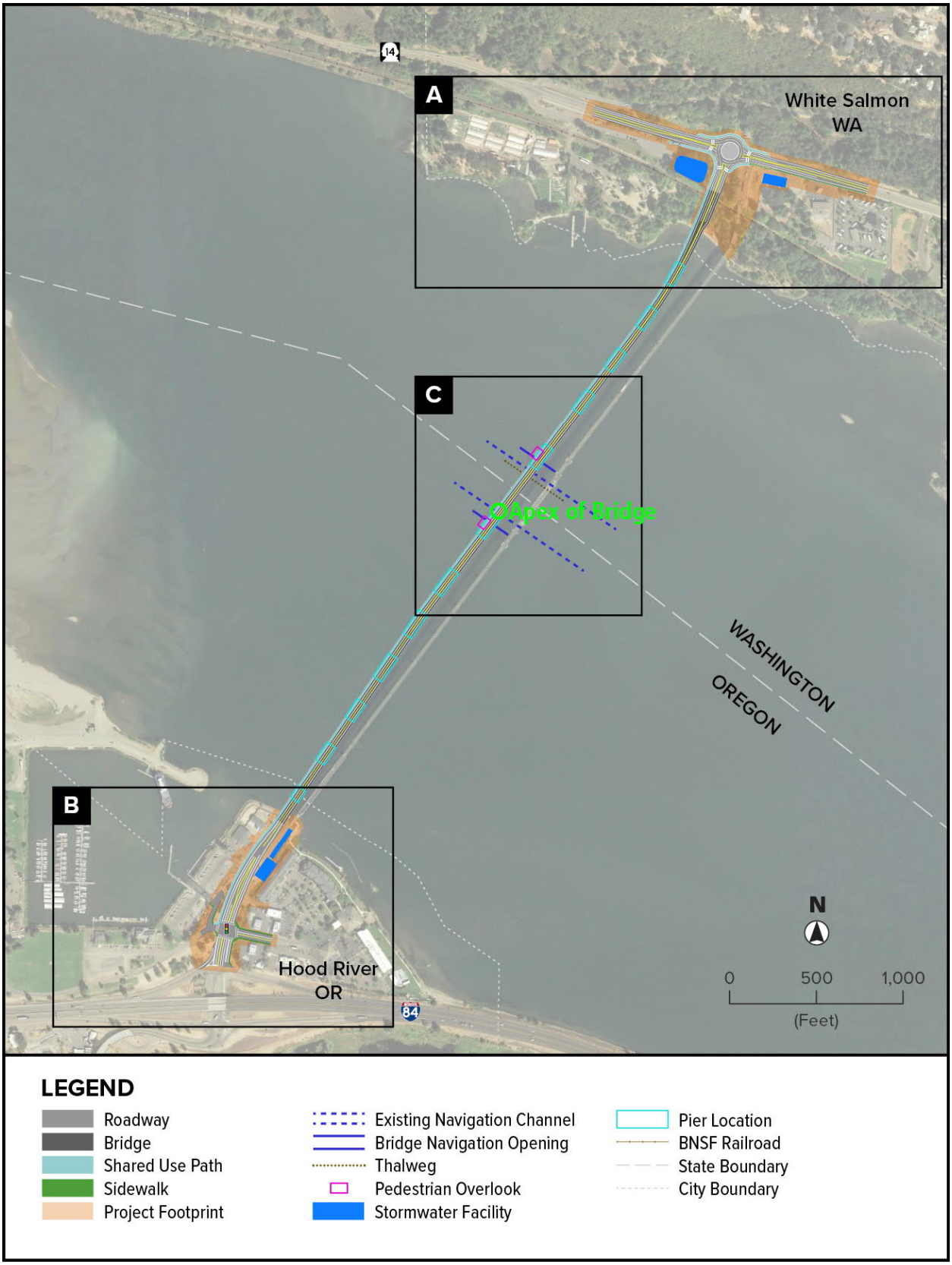


Exhibit 6. Preferred Alternative EC-2 Enlargements

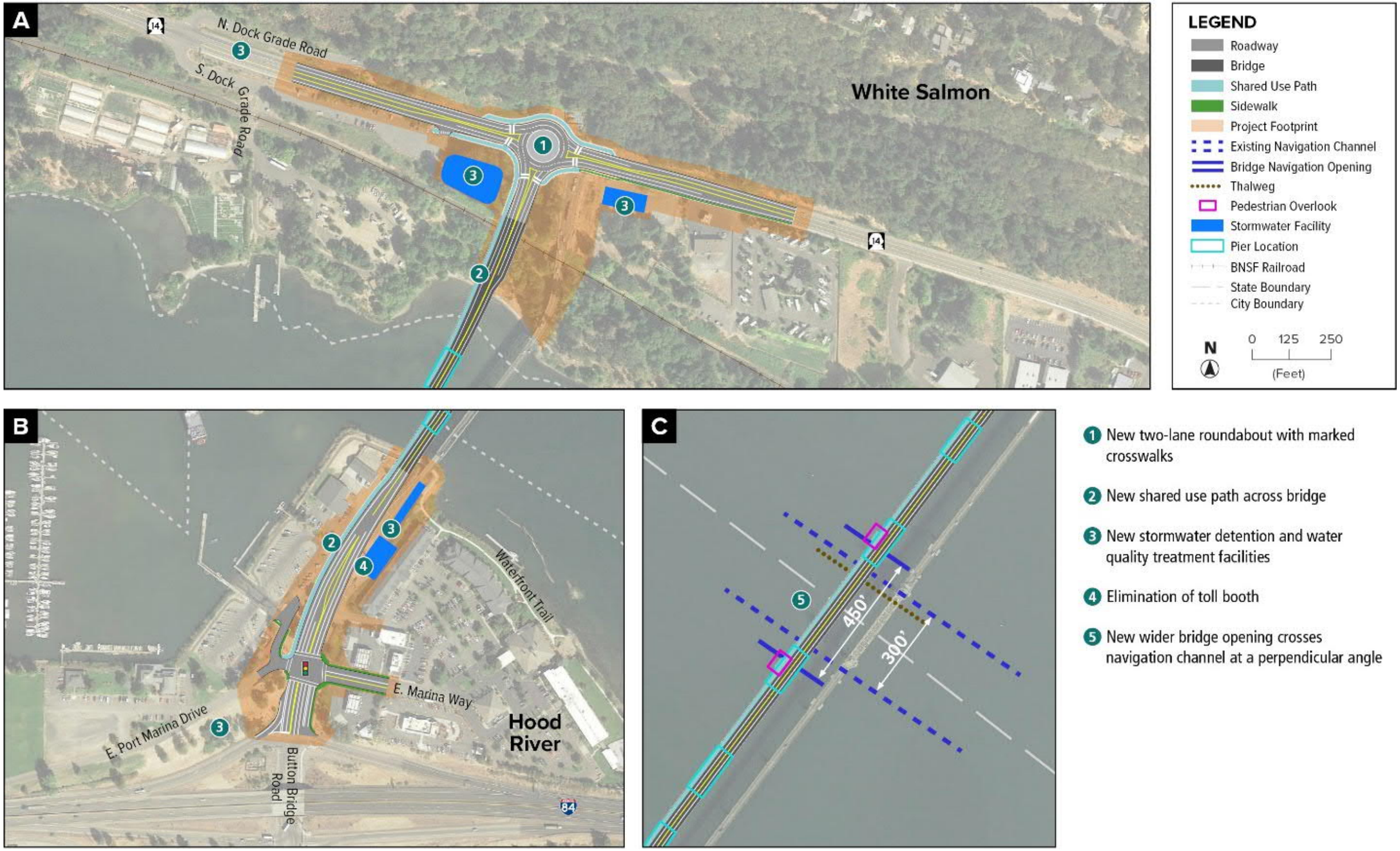


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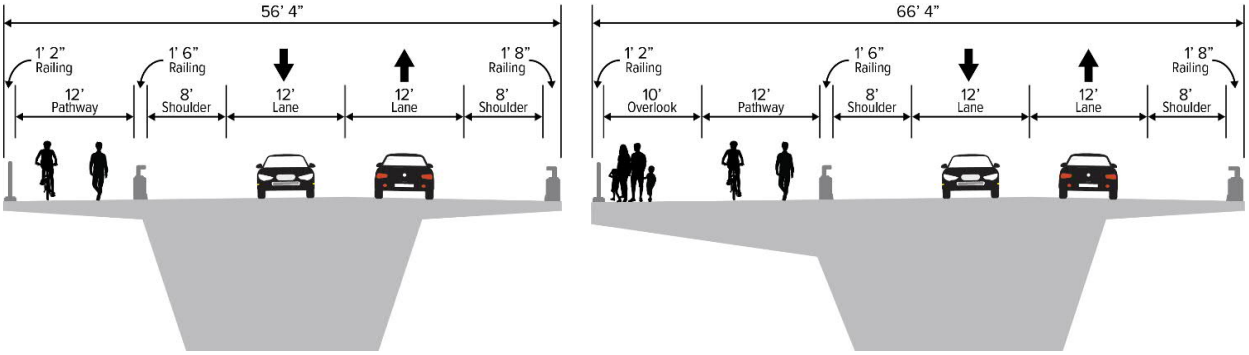
Exhibit 7. Replacement Bridge Typical Cross-Section



Typical

With Pedestrian Overlook

2.3. Alternative EC-1

Alternative EC-1 would construct a replacement bridge west of the existing bridge. Like Alternative EC-2, the existing bridge would be removed following construction of the replacement bridge. Exhibit 8 shows alignment of Alternative EC-1 and Exhibit 9 provides enlargements of the improvements that would be constructed under Alternative EC-1.

Like Preferred Alternative EC-2, the total Project construction cost for Alternative EC-3 is estimated to be $300 million in 2019 dollars. Under Alternative EC-3, elements of the replacement bridge would be the same as the elements described for Alternative EC-2 except:

- Alignment: The main span of the bridge would be approximately 700 feet west of the existing lift span. The bridge terminus in White Salmon, Washington, would be located approximately 2,309 feet west of the existing SR 14/Hood River Bridge intersection, while the southern terminus would be in roughly the same location as the existing terminus at the Button Bridge Road/E. Marina Way intersection in Hood River, Oregon.
- Type: The bridge would be a 4,553-foot fixed-span segmental concrete box girder bridge with a concrete deck and no lift span. Like Preferred Alternative EC-2, the bridge would have 12 piers in the Columbia River and one land-based pier on the Washington shore.
- Navigational clearance: The navigational opening would be the same as Alternative EC-2, but the bridge would cross the navigation channel at a more skewed angle than under Alternative EC-2.
- Roadway connections: Connections to roadways would generally be the same as Alternative EC-2, but the bridge would connect to SR 14 on the Washington side at a new two-lane roundabout at the SR 14/Hood River Bridge/N. Dock Grade Road intersection west of the existing bridge. Access to S. Dock Grade Road would be provided via the driveway east of the Mt. Adams Chamber of Commerce and Heritage Plaza Park and Ride.
- Bicycle and pedestrian connections: Connections to bicycle and pedestrian facilities would generally be the same as Alternative EC-2, but the roundabout intersection with SR 14 on the Washington side would be located further west at N. Dock Grade Road.

Exhibit 8. Alternative EC-1 Alignment

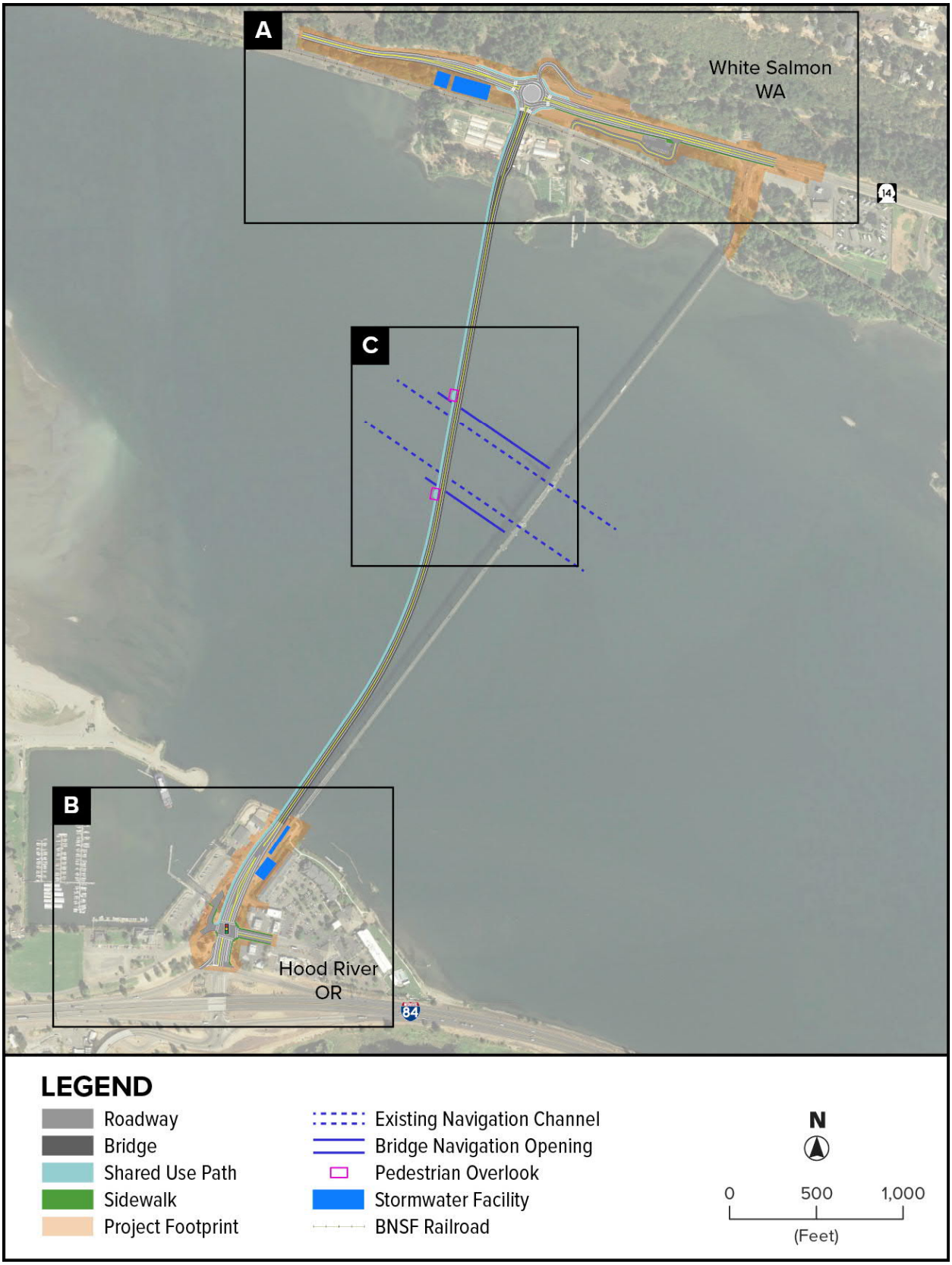
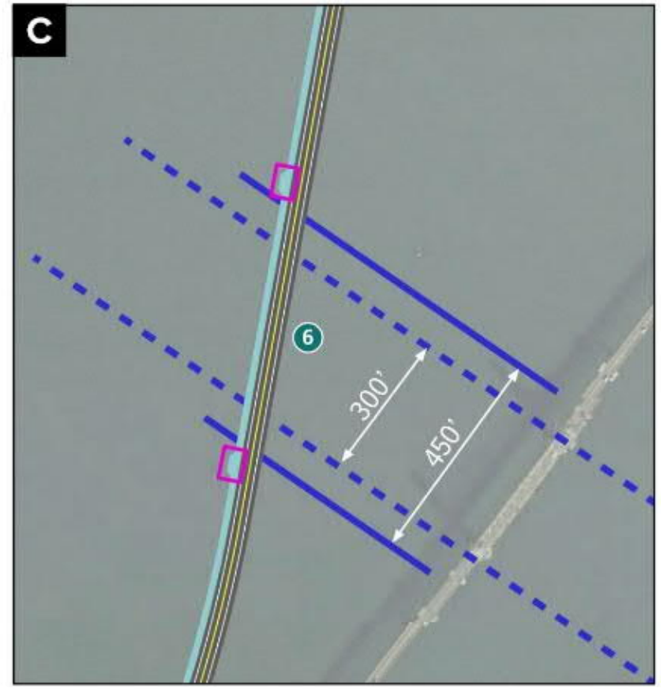


Exhibit 9. Alternative EC-1 Enlargements



1. New two-lane roundabout with marked crosswalks
2. New shared use path across bridge
3. New stormwater detention and water quality treatment facilities
4. Access to S. Dock Grade Road provided from eastern end of Heritage Plaza Park and Ride
5. Elimination of toll booth
6. New wider bridge navigation opening crosses navigation channel at a skewed angle

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2.4. Alternative EC-3

Alternative EC-3 would construct a replacement bridge east of the existing bridge. Like Alternative EC-2, the existing bridge would be removed following construction of the replacement bridge. Exhibit 10 shows alignment of Alternative EC-3 and Exhibit 11 provides enlargements of the improvements that would be constructed under Alternative EC-3.

Like Preferred Alternative EC-2, the total Project construction cost for Alternative EC-3 is estimated to be $300 million in 2019 dollars. Under Alternative EC-3, elements of the replacement bridge would be the same as the elements described for Alternative EC-2 except:

- Alignment: The main span of the bridge would be approximately 400 feet east of the existing lift span. The bridge terminus in White Salmon, Washington, would be located approximately 140 feet east of the existing SR 14/Hood River Bridge intersection, while the southern terminus would be roughly the same as the existing terminus at the Button Bridge Road/E. Marina Way intersection in Hood River, Oregon.
- Type: The bridge would be a 4,553-foot fixed-span segmental concrete box girder bridge with a concrete deck and no lift span. Like Alternative EC-2, the bridge would have 12 piers in the Columbia River and one land-based pier on the Washington side of the river.
- Roadway connections: Connections to roadways would generally be the same as Alternative EC-2, but the bridge would connect to SR 14 on the Washington side at a new two-lane roundabout slightly east of the existing SR 14/Hood River Bridge intersection. On the Oregon side, improvements extend slightly further south to the Button Bridge Road/I-84 on and off ramps. The private driveway on Button Bridge Road north of E. Marina Way would be closed under this alternative.
- Bicycle and pedestrian connections: Connections to bicycle and pedestrian facilities would generally be the same as Alternative EC-2, but the roundabout intersection with SR 14 on the Washington side would be located approximately 264 feet further east than under Alternative EC-2.

Exhibit 10. Alternative EC-3 Alignment

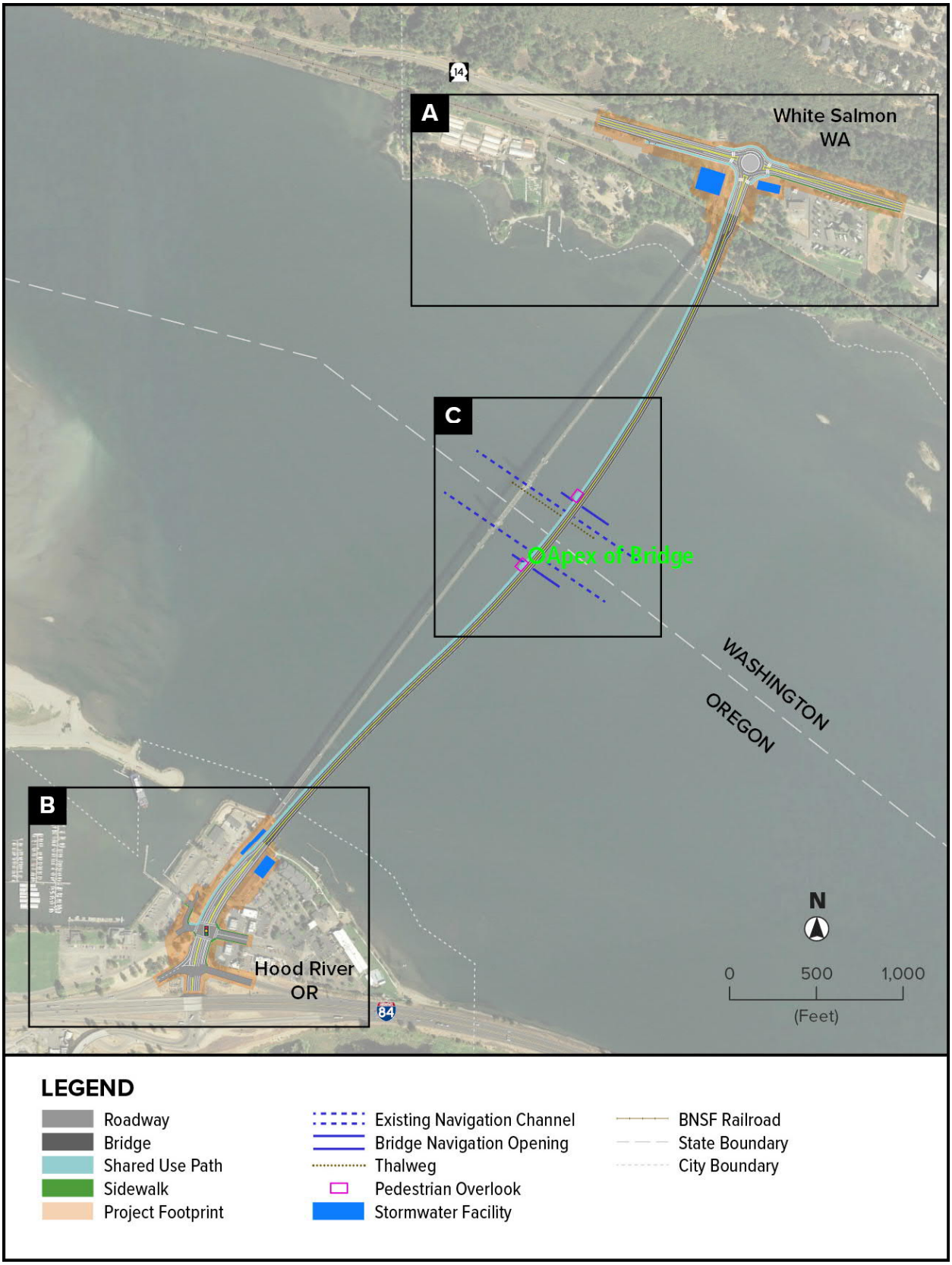
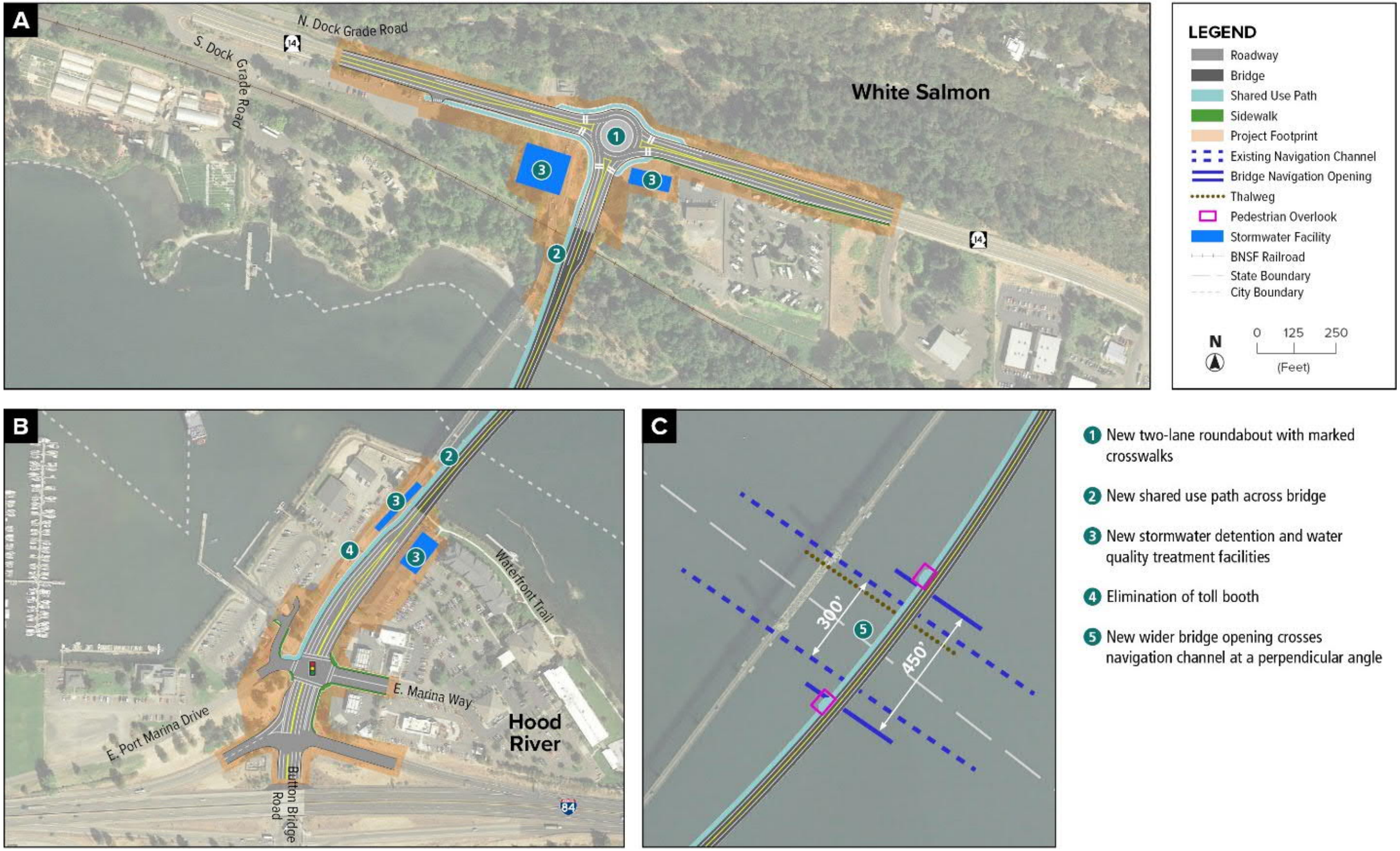


Exhibit 11. Alternative EC-3 Enlargements



1. New two-lane roundabout with marked crosswalks
2. New shared use path across bridge
3. New stormwater detention and water quality treatment facilities
4. Elimination of toll booth
5. New wider bridge opening crosses navigation channel at a perpendicular angle

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2.5. Construction of the Build Alternatives

Construction of the build alternatives would be similar in duration and approach.

- Timeline and sequencing: The NEPA process is anticipated to be complete in 2021; subsequent phases of the Project would be dependent on funding availability. Construction would take approximately 6 years and would require work during approximately six in-water work windows (IWWWs). Approximately three IWWWs would be necessary to construct the replacement bridge, and approximately three additional IWWWs would be necessary to complete the removal of the existing bridge.
- In-water work window: Certain construction and removal activities conducted below the OHWM of the Columbia River would be restricted to an IWWW established for the Project. The IWWW would be established in permits for the Project through inter-agency coordination including Washington Department of Fish and Wildlife (WDFW), Oregon Department of Fish and Wildlife (ODFW), NOAA Fisheries, and USFWS. Preliminary discussions with these agencies indicate that the authorized IWWW would likely be October 1-March 15 of each year. In-water work activities that would be restricted to this IWWW would include vibratory and impact pile installation, installation of drilled shaft casings, installation of cofferdams, and unconfined wiresaw removal of the existing pier foundations. Vibratory pile removal would not be restricted to the IWWW.
- Mobilization and site preparation: The contractor would likely mobilize equipment to the construction site via barges and trucks. Erosion control measures (e.g., silt fences, etc.) and debris containment devices (i.e., floating debris booms) would be installed and clearing and grubbing limits would be established prior to vegetation removal. Barges would require anchoring, tethering, and spudding.
- Construction staging: At least two staging areas would be necessary for staging and storage of materials and equipment; the location of these areas would be determined later in the design process, including obtaining all relevant environmental permits and land use approvals. It is estimated that a minimum of 2 acres would be necessary for staging and storage of materials and equipment. Materials arriving by barge may be offloaded to upland staging areas or may be temporarily stored on barges. All staging areas and equipment fueling areas would be located above the OHWM and outside of environmentally sensitive areas. Staging and temporary access areas will occur in upland locations, on areas that are either already disturbed or that will be restored post-Project.
- Temporary work structures: The Project would likely require the installation of several temporary in-water structures during construction and removal of the existing bridge. These structures would include temporary work bridges, cofferdams, drilled shaft casings, and temporary piles. These temporary features would be designed by the contractor after a contract is awarded, but prior to construction.

  Three temporary work bridges would likely be installed to support construction activities. One temporary work bridge would be installed at each end of the replacement bridge alignment. A third temporary work bridge would be constructed on the Washington side of the river to support the removal of the existing bridge. These temporary structures would likely be supported by 24-inch steel pipe piles.

Additional temporary piles would be necessary throughout construction and removal of the existing bridge for a variety of purposes, including supporting falsework and formwork, pile templates, reaction piles, and for barge mooring. These temporary piles would also likely be 24-inch steel pipe piles.

Barges would be used as platforms to conduct work activities and to haul materials and equipment to and from the work site. Three barges would typically be needed at each pier during drilled shaft construction, and at least one barge would remain at each pier after shaft construction to support column and superstructure construction.

Temporary cofferdams would likely be installed to create isolated in-water work areas for certain activities. A temporary cofferdam would likely be installed to create an isolated in-water work area for construction of a spread footing foundation on the Washington shoreline. Sheet pile cofferdams may also be installed at one or more piers on the existing bridge to create an isolated work area for removal of the existing bridge foundations.

Drilled shaft shoring casings would also be installed as temporary work structures to create isolated work areas for drilled shaft construction. An outer steel casing, with a diameter approximately 12-inches larger than that of the finished drilled shaft, would be installed to act as an isolation structure. The outer cases will be 84 inches in diameter for the 72-inch shafts, and 108 inches in diameter for the 96-inch shafts.

- Work area isolation and fish salvage: To minimize impacts to fish, fish salvage measures would be employed to remove fish from temporarily isolated in-water work areas during and after the installation of drilled shaft shoring casings and cofferdams. Fish salvage would follow the best management practices (BMPs) established in the biological opinion for FHWA and ODOT's Federal Aid Highway Program programmatic consultation and would be supervised by a fish biologist. A fish biologist with the experience and competence to ensure the safe capture, handling, and release of all fish will supervise all fish capture and release. To minimize take, efforts will be made to capture ESA-listed fish known or likely to be present in an in-water isolated work area using methods that are effective, minimize fish handling, and minimize the potential for injury. Attempts to seine and/or net fish, or the use of minnow traps shall precede the use of electrofishing equipment. Isolation structures will be installed such that they will not be overtopped by high water. A reasonable effort would be made to re-locate threatened or endangered fish using methods that minimize the risk of injury.
- Bridge foundation installation: The foundations for the replacement bridge would consist of three different foundation types: 1) pile-supported foundations; 2) drilled-shaft-supported foundations; and 3) spread footings. In general, pile-supported foundations would be used at locations where the depths to bedrock are relatively deep (greater than 50 feet below ground surface) while drilled shaft-supported foundations would be more economical in locations where depths to bedrock are nearer to the surface (less than 50 feet below ground surface). Spread footings would be used where bedrock is located at or near the surface and deep foundations are not required.

  Pile-supported foundations would be supported by 48-inch diameter steel pipe piles. The typical in-water foundation would require 25 piles, where-as smaller terrestrial pile-supported foundations would require fewer piles. Piles would be installed with a vibratory hammer to the extent practicable, as a means of minimizing impacts associated with underwater noise. An impact hammer would be used to drive the piles to the final tip elevation, and/or to proof the piles to verify load-bearing capacity.

Drilled shaft-supported foundations would be supported by either 72-inch-diameter drilled shafts or 96-inch-diameter drilled shafts. The larger-diameter drilled shafts would be used on the bents that flank the navigation channel. Installation of drilled shafts would be conducted by first oscillating an outer steel casing to a specified design depth. As the casing is being advanced to the design depth, soil would be removed from inside the casing using an auger and clamshell. Excavated soils would be temporarily placed onto a barge with appropriate containment and ultimately placed at an approved upland site. Once the interior of the casing has been excavated to the design depth, an interior steel casing of the finished diameter of the shaft would be installed. This casing would be installed either with an oscillator or vibratory hammer. Once the interior casing has been installed to final depth, a steel reinforcement cage would be installed within the casing, and the shaft would be filled with concrete.

Construction of spread footing foundations below the OHWM of the river would be conducted within a temporarily dewatered work area within a cofferdam. Once the cofferdam is installed and the work area established, formwork would be installed for the spread footing, steel reinforcing would be installed within the forms, and the concrete for the footing would be poured. The cofferdam would remain in place until the concrete is fully cured to allow the concrete to cure in a dewatered environment. Once the concrete for the footing is fully cured, the formwork would be removed followed by the temporary cofferdam.

- Bridge superstructure construction: Once the foundation piles and drilled shafts are installed, a concrete pile cap would be installed atop the shafts at the waterline, and the concrete pier and superstructure would be installed atop the pile cap. Pile caps may be either precast or cast-in-place.

  The superstructure would consist of both precast and cast-in-place concrete segments. Additional finish work would also be conducted, including surfacing, paving, and installation of other finish features, such as striping and signage.

  Work on the superstructure would be conducted either from the bridge deck, from the deck of temporary work bridges, or from barges. It is anticipated that the superstructure would be constructed using a balanced cantilever method that uses paired sets of form travelers to build outwards from each pier. It is assumed that a contractor may operate up to four pairs of form travelers at a given time to expedite the construction of the superstructure.

  Many of the bridge superstructure components would be composed of precast concrete. Precast elements would likely include bridge columns, beams, girders, and deck panels. Precast bridge elements would be constructed in upland controlled environments and would be transported to the Project site by either barge or truck.

- Dismantling and removal of the existing bridge: The existing bridge would remain open until the replacement bridge is constructed and operational, at which point it would be dismantled and removed. This work would be conducted via barges and/or temporary work platforms and may require in-water isolation.

  Removal of the superstructure would most likely be conducted by barge-mounted cranes. Removal of the superstructure would likely begin with removal of the counterweights, followed by the lift towers and the individual truss sections. The lift towers and truss sections would be cut into manageable pieces and loaded onto barges or trucks by a crane. Each section would then be either transported to an upland site for further dismantling or disposed of directly at an appropriately permitted upland facility.

Removal of the existing foundations would be conducted by one of the following two methods:

- Wiresaw removal to mudline, without a cofferdam. A diamond wire/wire saw would be used to cut the foundation into manageable pieces that would be transported to a barge and disposed of in a permitted off site upland location. The foundations would be removed to the mudline and the substrate would be naturally restored with surrounding sediments.
- Wiresaw or conventional pier removal techniques within a cofferdam. Conventional removal techniques consist of using a hydraulic ram to break the piers into rubble, and torches or other cutting methods to cut reinforcement. Materials would then be transported to a barge and disposed of in a permitted off site upland location. The foundations would be removed to the mudline and the substrate would be naturally restored with surrounding sediments.

It is assumed that the cofferdam removal option would be used at both piers that flank the navigation channel, but may also be used in other pier locations. At the two navigation channel piers, once cofferdams are installed and fish salvage has occurred, approximately 7,800 cubic yards of existing riprap would be removed. Riprap would be removed via a barge mounted clamshell, and loaded onto barges, and disposed of at an off-site permitted upland location. Once riprap has been removed, the existing piers would either be removed using one of the methods described above.

- Post-Project site restoration: Construction of the Project would result in temporary impacts to native and non-native vegetation on both the Oregon and Washington sides of the river. Areas temporarily disturbed during construction would be restored upon completion of the Project consistent with state and local regulations.

  On the Oregon side of the river, most temporary disturbance would occur within areas that are either impervious or already developed. Temporary disturbance would occur within areas that consist of landscaping, lawns, or similar heavily managed vegetation. Post-Project site restoration in these areas would likely consist of replacement landscaping with similar ornamental species. No native plant communities would be disturbed on the Oregon side of the river.

  On the Washington side of the river, vegetation would be cleared within temporary work zones to allow construction equipment to access the site, to construct the replacement bridge abutments and stormwater treatment facilities, and to remove the existing bridge. A portion of the area to be cleared would be within a forested riparian area that is within the 200-foot shoreline jurisdiction of the Columbia River, and is regulated by the City of White Salmon under its Shoreline Master Program (City of White Salmon 2016). A large oak tree that is present east of the existing bridge would be preserved and would not be affected.

  Temporarily disturbed areas within ODOT and WSDOT rights-of-way would be replanted consistent with applicable ODOT and WSDOT requirements and design standards. Temporarily disturbed vegetation within the riparian shoreline buffer on the Washington side of the river would be conducted consistent with requirements in the City of White Salmon Critical Areas Ordinance (White Salmon Municipal Code Chapter 18.10) (and Shoreline Master Program (City of White Salmon 2016).

- Compensatory Mitigation: The Project would result in permanent impacts to wetland and aquatic habitats, and a compensatory mitigation plan would likely be required by federal, state

and local regulations to offset these permanent impacts. The compensatory mitigation plan would be developed during the permitting phase of the project. The mitigation plan would identify the amount, type, and specific locations of any proposed compensatory mitigation actions, specific impact avoidance and minimization measures to be implemented, as well as the goals, objectives, and performance standards for measuring success. Full implementation of the compensatory mitigation plan would be a condition of the applicable permits of the agencies with jurisdiction (i.e., USACE Section 404 permit, the Oregon Department of Environmental Quality [DEQ] and the Washington State Department of Ecology [Ecology] Section 401 permits, the Oregon Department of State Lands [DSL] Removal-Fill permit, WDFW Hydraulic Project Approval, and City of White Salmon Shorelines and Critical Areas permits), and the mitigation would comply fully with all applicable permit terms and conditions.

The method of delivery for Project final design and construction has not been determined at this time. Traditional delivery methods, such as design-bid-build, and alternative delivery methods, such as design-build and public-private-partnerships to name a few, will continue to be considered by the Port. As part of Oregon's HB 2017, the Port was provided legal authority by the state to enter into a public-private-partnership.

3. METHODOLOGY

Vegetation and wetlands were previously analyzed in the Project's Draft EIS and Vegetation and Wetlands Technical Report (Entranco 2003).

3.1. Area of Potential Impact

The area of potential impact (API) for the vegetation and wetlands analysis is shown below in Exhibit 12. The API encompasses the area anticipated for direct and indirect impacts to vegetation and wetlands resulting from the Project.

In Oregon, the API includes the terrestrial area 300 feet on either side of the existing bridge and approach, including the Port offices, marina boat launch and parking, portions of E. Port Marina Drive, E. Marina Way, vacant land south of Department of Motor Vehicle offices and Hood River County Chamber of Commerce offices, and the I-84 interchange.

In Washington, the API includes the terrestrial area 500 feet east and west of the existing bridge and approach, a 600-foot-wide corridor from the river's edge directly north to the intersection of SR 14 and Dock Grade Road, and within the Washington State Department of Transportation (WSDOT) right-of-way along an approximately 5,000-foot-long section of SR 14 in White Salmon, Washington.

The larger API chosen is to incorporate bridge roadway impacts, stormwater facility impacts, temporary impacts associated with staging and grading areas, and indirect impacts to potential vegetation and wetland resources.

Exhibit 12. Vegetation and Wetlands API

3.2. Regulations, Standards, and Guidelines

The Project must obtain authorization from federal, state, and local agencies for any impacts to wetlands. Any activities that may affect vegetative species, or their habitat, that meet federal or state protected status must also receive authorization from federal, state, and local agencies. The following regulatory authorities pertain to vegetation and wetlands resources.

3.2.1. Vegetation

- Endangered Species Act (ESA) (U.S. Fish and Wildlife Service [USFWS] is responsible for administering the ESA for plants) – 16 U.S.C. § 1531 et seq.
- Klickitat County Critical Areas Ordinance – Klickitat County Code Chapter IV – Fish/Wildlife Habitat Conservation Areas
- City of White Salmon Shoreline Management Act – Shoreline Master Program
    - In 2018 the White Salmon Shoreline Master Program was updated that would afford greater protections to shoreline vegetation
    - City of White Salmon Critical Areas Ordinance – White Salmon Municipal Code (WSMC) 18.10
    - In 2012, the Critical Areas Ordinance was updated and includes provisions to protect Oregon white oak woodlands (WSMC 18.10.310) and heritage trees (WSMC 18.10.317). There are oak trees within the API that may meet the requirements of both oak woodlands and/or heritage trees.
- City of Hood River Land Use Review – Natural Resource Overlay section of the Hood River Municipal Code 17.22

3.2.2. Wetlands

- USACE Section 404 Permit for impacts to waters of the United States, including wetlands – 33 U.S.C. § 1344 et seq.
    - Since the Draft EIS was published, the definition of waters of the U.S. has had several revisions with the latest proposed change coming from the U.S. Environmental Protection Agency and Department of the Army on February 14, 2019. The 60-day public comment period closed on April 15, 2019. The proposed rule change may have an effect on what waters are regulated by the USACE and is being followed closely during the Supplemental Draft and Final EIS process.
    - Since the Draft EIS publication, the USACE has published regional supplements to the 1987 Wetland Delineation Manual. Wetlands within the Alternative EC-2 alignment were delineated in accordance with the 2010 USACE Regional Supplement to the USACE Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. A wetland reconnaissance level analysis was performed for Alternative EC-1 and Alternative EC-3.
- Washington Department of Ecology and Oregon Department of Environmental Quality Section 401 Water Quality Certifications for impacts to waters of the U.S., including wetlands – 33 U.S.C. § 1341 et seq.
- Oregon Department of State Lands Removal/Fill Permit for impacts to wetlands – OAR 141-85

- Klickitat County Critical Areas Ordinance – Klickitat County Code Chapter III – Wetlands
- City of White Salmon Shoreline Management Act Permit – Shoreline Master Program
    - In 2018 the White Salmon Shoreline Master Program was updated that would afford greater protections to wetlands.
    - City of White Salmon Critical Areas Permit – WSMC 18.10
- City of Hood River Land Use Review – Natural Resource Overlay section of the Hood River Municipal Code 17.22

3.3. Sources of Existing Data

Several studies, analyses, and technical memoranda were prepared for the Southwest Washington Regional Transportation Council, WSDOT, and Oregon Department of Transportation (ODOT) for the Draft EIS. These documents supported the environmental evaluation presented in the Draft EIS and include:

- Baseline Conditions Report for the SR-35 Columbia River Crossing Feasibility Study. January 8, 2001.
- Tier I Report for the SR-35 Columbia River Crossing Feasibility Study. July 10, 2001.
- Tier II Report for the SR-35 Columbia River Crossing Feasibility Study. June 2002.
- SR-35 Columbia River Crossing Project Purpose and Need Statement. November 2002.
- Bridge Construction Assumptions for the SR-35 Columbia River Crossing Project. February 2003.
- Project Description, Design Assumptions and Definition of Alternatives for the Draft EIS: A Technical Memorandum for the SR-35 Columbia River Crossing Project. February 2003.
- SR-35 Columbia River Crossing Vegetation and Wetland Technical Report. May 2003.
- SR-35 Columbia River Crossing Draft EIS and Section 4(f) Evaluation. December 2003.

As part of the Draft EIS, existing databases maintained by resources agencies were searched for the presence of known rare, threatened, or endangered plants, and priority habitats. The databases from the following agencies were accessed: Oregon Natural Heritage Program, WDFW, Washington Department of Natural Resources (WDNR), USFWS, and U.S. Forest Service. These databases are continuously updated and can be referenced for future analysis.

Soil information was collected from the Natural Resource Conservation Service (NRCS). The Soil Survey of Hood River County Area, Oregon, was accessed from the NRCS website at http://www.soils.usda.gov. Soil information for Klickitat County was obtained from the NRCS office in Spokane, Washington. In 2009, NRCS published the soil survey of Klickitat County Area, Washington, and can also be accessed from the NRCS website at http://www.soils.usda.gov. The survey data can be referenced in future analysis.

Existing documentation, data, and mapping were examined to determine the potential presence of wetland resources within the proposed alternative alignments. The information reviewed included National Wetland Inventory mapping, previously prepared environmental assessments, wetland delineations, local jurisdiction environmental compliance documentation, and USGS Soil Survey

mapping. A field review was conducted to verify the accuracy of the information gathered and identified additional wetland areas not identified.

3.4. Data Collection or Development

Land uses in the Project corridor have not materially changed since the Draft EIS, and a desktop review of aerial photographs indicated the vegetation is similar. The conditions of the Project corridor relative to vegetation and wetland resources are not expected to have changed substantially. However, to adequately address potential impacts from the Project on vegetation and wetland resources a plant survey and wetland delineation was conducted within the API defined above.

Prior to conducting the plant surveys, the lists of ESA-listed and sensitive plant species, critical habitat, and habitat requirements within the Project corridor were requested from USFWS, Oregon Institute for Natural Resources, and Washington Natural Heritage Program. Plant surveys for sensitive species, the species' habitat, and invasive species were conducted in May and July All species observed were identified and listed in the survey report, not just the targeted rare species.

In addition, a wetland delineation was conducted in accordance with the federal wetland delineation manual (1987) and the Western Mountains, Valleys, and Coast regional supplement (2010) in May and July 2019. Wetlands were flagged in the field for survey and recorded with a hand-held GPS unit. All identified wetlands in Washington were rated in accordance with the Washington State Wetland Rating System for Eastern Washington (2014). No wetlands were identified in Oregon; should the API change to include any wetlands they would be rated using the Oregon Rapid Wetland Assessment Protocol (Version 3.1, 2016).

3.5. Impact Analysis Techniques

3.5.1. Construction Impacts

Temporary impacts identified during the Draft EIS were evaluated for relevancy and accuracy based on any differences between past assumptions and current assumptions on construction impacts and techniques. Temporary impacts to vegetation and wetlands were assessed based on anticipated vegetation removal and soil compaction from construction activities, and temporary fills from construction access routes. Restoration of the temporary impacts were also evaluated.

3.5.2. Direct Impacts

Long-term direct impacts to vegetation and wetlands were assessed based on anticipated physical Project improvements. Direct impacts to vegetation and wetlands were assessed based upon the footprint of the Project, which is assumed to be the area in which permanent vegetation removal would occur, and in which permanent fill would be placed into wetlands. Long-term direct impacts identified during the Draft EIS were evaluated for relevancy and accuracy based on any differences between past assumptions and current assumptions of the physical location of the improvements (e.g., bridge footings and roadway locations) and determined if these assumptions were still valid.

3.5.3. Indirect Impacts

Long-term indirect impacts include impacts that are not a direct result of the Project but are often produced away from the direct impacts or as a result of a complex impact pathway. Indirect impacts to vegetation and wetlands were assessed based on how vegetation and wetlands may be affected by the built environment. It is anticipated that shade or shadows cast may indirectly impact vegetation by the

replacement bridge, as well as a reduction in rainwater intercepted by the proposed impervious surfaces that could impact the vitality of vegetative species. Any wetlands located in close proximity to the footings and bridge structure could experience the same indirect impacts as well as changes in hydrologic regime from the built environment. Long-term indirect impacts identified during the Draft EIS were evaluated for relevancy and accuracy based on any differences between past assumptions and current assumptions of the physical location of the alternatives (e.g., bridge footings and roadway locations) and determined if these assumptions are still valid.

3.6. Agency Coordination

USFWS was contacted to obtain an official list of ESA-listed species and/or critical habitat that are known or expected to be on or near the API. USFS was contacted to obtain a list of rare plants known to occur within the Columbia River Gorge National Scenic Area that may occur within the Project area. In addition, Oregon Institute for Natural Resources and Washington Department of Natural Heritage were contacted to request site-specific lists of rare, threatened, and endangered species in Oregon and Washington, respectively. Finally, the City of White Salmon was contacted to obtain a list of trees recognized as heritage trees within city limits.

4. AFFECTED ENVIRONMENT

The API comprises the Columbia River and areas landward that connect White Salmon and Bingen, Washington, to Hood River, Oregon. The northern end of the Hood River Bridge touches down in the southwestern portion of the City of White Salmon. The City of Bingen is located approximately 1 mile east of the City of White Salmon. Both cities are in Klickitat County. The major east/west highway on the Washington side of the Columbia River is SR 14.

The southern end of the Hood River Bridge touches down in the City of Hood River, which is in Hood River County. The major east/west highway on the Oregon side of the Columbia River is I-84.

There are limited potential staging areas directly adjacent to the bridge site. A minimum of 1 acre would be necessary to facilitate the Contractor's storage and staging area. Exact staging areas will be determined in coordination with contractors later in the design process. Several alternative staging areas may be considered. Priority would likely be given to areas that have been used previously for industrial or commercial purposes, thereby avoiding disturbance to vegetated areas. It is anticipated that most construction materials would arrive at the Project site by water.

4.1. Vegetation

This section describes the species that can be found in the API and how the Project could impact them and the habitats they depend on. The lists of species presented here are not all inclusive; other protected, common, and/or nuisance species could occur in the API.

The following sections identify rare, threatened, or endangered plant species as 'special-status plants' and are considered to be of high priority for conservation at the federal and/or state level. This Project examined the possible impacts the alternatives could have on the special-status plant species and the habitats they depend on.

4.1.1. Washington

A terraced bank rising from the Columbia River to an elevation of approximately 600 feet characterizes the north side of the Columbia River within the API (White Salmon, Washington). The area landward of the shoreline is characterized by two ecosystems –North Pacific Lowland Riparian Forest and Shrubland and North Pacific Oak Woodland (Rocchio and Crawford 2015). North Pacific Lowland Forests and Shrubland are found throughout low elevations west of the Cascades. These forests and tall shrublands are linear in character, occurring on low-elevation, alluvial floodplains that are confined by valleys and inlets or lower terraces of rivers and streams (Rocchio and Crawford 2015). The lowland riparian forest and shrubland overstory in the API consists mostly of black cottonwood (Populus balsamifera) and big-leaf maple (Acer macrophyllum), with scattered ponderosa pine (Pinus ponderosa) and Douglas fir (Pseudotsuga menziesii). Oregon grape (Mahonia nervosa) and patches of Himalayan blackberry (Rubus armeniacus) dominate the understory. This forested habitat type extends from the bank of the Columbia River to SR 14 west of the current bridge and between the BNSF Railway and SR 14 in the west end of the API. Exhibit 13 shows the general location of this forested habitat type.

North Pacific Oak Woodlands are associated with dry, predominantly low-elevation sites that experienced presettlement fires (Rocchio and Crawford 2015). The North Pacific oak woodland vegetation community is found throughout the rest of the northern portion of the API and is characterized by upland species, including Oregon white oak (Quercus garryana), ponderosa pine, Douglas fir, Oregon grape, poison oak (Toxicodendron diversilobum), and Himalayan blackberry (Exhibit 13). Oregon white oak woodlands are habitat for species that are state listed as sensitive, threatened, endangered, or candidates for these listings; however, there are no known occurrences of any rare vegetative species in the oak woodland habitat and no special-status plants were identified during the vegetation surveys.

Immediately east of the existing bridge is a notably large Oregon white oak. The tree measured approximately 59 inches at diameter breast height during the 2003 site visit and would be expected to be larger today (Entranco 2003). The tree has been referred to as a “heritage tree” by citizens and according the updated WSMC, an oak tree larger than 14-inches diameter breast height is considered a heritage tree (WSMC 18.10.317[B][1]).

SR 14 parallels the riverbank and intersects the existing Hood River Bridge crossing. Some developed areas punctuate the forest canopy: a visitor’s center, park and treaty fishing access site, and a private nursery are located west of the bridge. A gas station, trailer park, and medical center lie east of the bridge. BNSF Railway tracks run parallel along the Columbia River through the northern API.

According to the USFWS Information for Planning and Consultation (IPaC) there are no threatened or endangered plant species within the vicinity of the API in Washington (USFWS 2019a). A database maintained by the U.S. Forest Service does not identify threatened, endangered, special status or gorge endemic species within the Project’s footprint (Callaghan 2020). In addition, a search of WDNR Natural Heritage Program database revealed no record of rare plants in the vicinity of the API (Holt 2019). During the July 2019 plant survey, none of the historical rare plants or other special-status plants were identified and no potential habitat currently exists within the Project construction footprint where direct impacts would occur.

Exhibit 13. Vegetative Communities Found in the API

WDFW identified five priority habitats within the API (WDFW 2019). These habitats were reviewed for the potential to support special-status species. The mapped habitats include:

- Oregon white oak woodland
- oak/pine mixed forest
- cliffs/bluffs
- talus slopes
- wetlands

The Oregon white oaks woodland and oak/pine mixed forest priority habitats mapped by WDFW are located along the north shore of the Columbia River and among the bluffs along the City of White Salmon and the City of Bingen. Oregon white oak woodlands are defined by WDFW as stands of pure oak or oak/conifer associations (e.g., oak/pine mixed forest) where the canopy coverage of the oak component of the stand is 25 percent; or where total canopy coverage of the stand is less than 25 percent but oak accounts for at least 50 percent of the canopy coverage present. The latter is often referred to as oak savanna. In non-urbanized areas, east of the Cascade Mountains, priority oak habitat consists of stands 5 acres in size. In urban or urbanizing areas, single oaks or stands less than 1 acre may also be considered a priority when found to be particularly valuable to fish and wildlife (Larsen and Morgan 1998). Two stands of oak/pine forest are mapped within the API south of SR 14; mapping of these stands includes the location of the existing bridge. These forest stands may meet the definition for a mixed oak/conifer association in an urbanizing area and may be classified by WDFW as priority habitat. North of SR 14 there are large stands of oak forests and oak/pine mixed forests that would meet the acreage and percent coverage component requirements and the classification of priority habitat by WDFW.

Columbia River basalt cliffs/bluff and talus slope habitats are mapped north of SR 14 and are known to support plant species endemic to the Columbia River Gorge, however, there are no known occurrences of any rare vegetative species in the API and no special-status plants were identified during the vegetation surveys.

Wetlands habitats are mapped between SR 14 and the BNSF Railway tracks and south of the BNSF Railway tracks, west of S. Dock Grade Road (USFWS 2019b). Additional wetland habitats were mapped south of the BNSF Railway tracks east of the existing bridge (USFWS 2019b). The July 2019 wetland delineation determined that there are less wetlands than are mapped. None of the wetland habitats were found to support special-status plants during vegetation surveys.

Riparian habitats area also considered a priority habitat by WDFW, which are generally considered to be areas adjacent to rivers that contain elements of both aquatic and terrestrial ecosystems that mutually influence each other and occur as transitions between aquatic and upland habitats (Knutson and Naef 1997). While WDFW did not map the Columbia River shoreline as riparian habitat, this habitat occurs within the API; however, there are no known occurrences of any rare vegetative species in the priority riparian habitat and no special-status plants were identified during the vegetation surveys.

4.1.2. Oregon

The Oregon side is a highly developed urban area. Vegetation is sparse and consists mostly of non-native and ornamental species, with scattered native species. A public boat launch and parking area, retail and

office buildings, and the interchange with I-84 and SR 35 occupy the area. The riverbank is heavily armored with riprap. The vegetation dominating the bank is Himalayan blackberry (Rubus discolor), false-indigo bush (Amorpha fruticosa), Columbia River Willow (Salix columbiana), various lawn grasses, weedy herbaceous species, and a few landscaping plants.

The Port office and maintenance buildings and the Hood River County Chamber of Commerce occupy the bank west of the bridge. A few Douglas-fir (Pseudotsuga menziesii), ponderosa pine (Pinus ponderosa), locust trees (Robinia spp.), juniper bushes (Juniperus spp.), and landscape trees line Button Bridge Road on the west of the bridge.

Two gas stations, commercial and office buildings, and a hotel occupy the area east of the bridge. Lawn and landscaped areas dominate the east side of Button Bridge Road.

According to the USFWS IPaC there are no threatened or endangered plant species within the API in Oregon (USFWS 2019a).

A search of the Oregon Biodiversity Information Center database identified nine current and historic records of rare, threatened and endangered plant species within a 2-mile radius of the Project (ORBIC 2019). The historical records include Nevius' onion (Allium nevii), Hood River milk-vetch (Astragalus hoodianus), Suksdorf's lomatium (Lomatium suksdorfii), Dalles Mt. buttercup (Ranunculus triternatus), toothcup (Rotala ramosior), and violet suksdorfia (Siksdorfia violacea).

The current records include Oregon daisy (Erigeron oregana), white meconella (Meconella oregana), and Barrett's penstemon (Penstemon barrettiae) and are found within a 2-miles radius of the Project (Exhibit 14). White meconella is a federally listed "species of concern" species and all three are considered a state-listed "candidate" species (ORBIC 2019).

Exhibit 14. Special-Status Plant Species Reported to Occur within the Oregon API

Species	Federal Status	Oregon Status	Washington Status	Habitat Type	Suitable Habitat in the API?
Oregon daisy Erigeron oregano	Not listed	Candidate	Threatened	Moist, shady overhanging basalt cliffs	No
White meconella Meconella oregana	Species of concern	Candidate	Endangered	Open vernal-moist areas with sandy or gravelly soils	No
Barrett's penstemon Penstemon barrettiae	Not listed	Candidate	Threatened	Basalt cliff at low elevations	No

Oregon daisy, which can be found on steep cliffs, is endemic to the Columbia River Gorge area. Known populations of Oregon daisy have been documented 1.3 miles east of the API at Koberg Beach State Park (ORBIC 2019). The Oregon daisy is typically found in association with moist, shady, overhanging basalt cliffs. Suitable habitat does not occur at any of the alternative locations and Oregon daisy was not observed during the vegetative surveys.

White meconella, which can be found in open vernal-moist areas with sandy or gravelly soils, often hidden by grasses with which it grows with (Eastman 1990; Pojar and Mackinnon 1994). It is typically found in lower elevations from 100 feet to 450 feet. Fire probably played a historical role in maintaining suitable habitat by reducing tree and shrub invasion of habitat and by reducing competing grasses and forbs (WDNR 2019). There are no known observations of the white meconella within the API, and observations at the Project site do not suggest that suitable habitat is present. The closest known population of white meconella is mapped at Koberg Beach State Park, approximately 1.3 miles east of the API (ORBIC 2019).

Barrett's penstemon (or beardtongue) is endemic to the Columbia River Gorge in Hood River, Multnomah, and Wasco counties in Oregon and Klickitat County in Washington. It generally grows in crevices along basalt cliff faces and on ledges of rock outcrops, mostly at lower elevations (Eastman 1990). Based on the site visit, there is no potentially suitable habitat for Barrett's penstemon in the bridge touchdown area on the Oregon side. Additionally, no individuals were observed during the vegetative surveys.

4.2. Wetlands

Wetlands are areas where the presence of water, the cycling of nutrients, and the interaction of plants create unique ecosystems—making these areas very important features of a watershed.

Wetlands are defined by the presence of three essential characteristics: hydrophytic (water-loving) vegetation, hydric soils, and hydrology. Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop oxygen-free conditions in the upper 6 inches. Wetland hydrology is characterized by areas where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions.

Wetlands perform many vital functions within a watershed. The stems and intertwining roots of the plants physically slow down the water flowing into the wetland and act as filters to remove sediment and pollutants from the slow-moving water. Wetlands often contain significant amounts of decaying organic debris. This debris forms a silt-like layer on the floor of a wetland and increase the amount of organic matter in the soil. When floodwaters overflow the banks of streams and rivers, the organic soils and wetland plants soak up tremendous amounts of the excess water. Water from the wetlands seeps back into streams and recharges the groundwater. During dry periods, groundwater and/or adjacent bodies of water feed wetlands.

A wetland delineation was completed in July 2019 in accordance with the USACE Wetland Delineation Manual (Environmental Laboratory 1987) and the Western Mountains, Valleys, and Coast Regional Supplement to the delineation manual (USACE 2010) at the Washington and Oregon ends of the Project corridor to identify regulated wetlands. During the delineation, the team identified wetlands based on the plant species present, the classification of the plants on the National Wetland Plant List (Lichvar et. al. 2016), hydrologic conditions, and the presence of hydric soils.

4.2.1. Washington

On the Washington end of the Project, three wetlands (Wetlands A, B, and C) and several potentially regulated ditches were identified during the July 2019 wetland delineation that covered the API for Alternative EC-2 and Alternative EC-3. These wetland and ditches were identified between SR 14 and the BNSF Railway tracks, and between SR 14 and N. Dock Grade Road, in the northern portion of the API.

The wetlands are connected by culverts and ultimately discharge to the Columbia River. The wetland vegetation included common horsetail (Equisetum arvense), common cattail (Typha latifolia), and soft rush (Juncus effusus). Invasive Himalayan blackberry (Rubus armeniacus) is pervasive in all three wetlands, making them low-quality habitat for rare plant species. The ditches support cattail (obligate), horsetail (facultative), and floating emergents such as common duckweed (Lemna minor, obligate). Wetlands in the vicinity of Alternative EC-1 were identified using the USFWS online Wetland Mapper system. This online tool identified one palustrine emergent wetland and one palustrine forested wetland in the footprint of Alternative EC-1.

Wetlands and waterbodies in Washington and Oregon are currently defined in accordance with the 2015 Clean Water Rule (80 Federal Register 37053). The ditches identified during the 2019 wetland delineation may be jurisdictional under the Clean Water Rule. The ditches appear to have been created during construction of the BNSF Railway along the Columbia River to convey water coming off the steep bluff along the railway, through culverts under the tracks, and to the Columbia River. The ditches north of SR 14 and north of N. Dock Grade Road were likely created during road construction, and water is conveyed through culverts and grated drains. The wetlands and ditches determinations would be sent to the USACE for an approved jurisdictional determination to fully evaluate Project related impacts to the wetlands and ditches.

These ditches are not regulated wetlands under the City of White Salmon critical areas ordinance because they are ditches constructed in non-wetland areas. The definition section (18.10.800) of the Critical Areas Ordinance of the WSMC states that:

> Wetlands do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.

Regulated wetlands within the City of White Salmon jurisdiction are categorized using the state of Washington's four-tier wetland rating system (Hruby 2014). Wetland A, located west of the existing approach ramp and south of SR 14, is classified as a Category III wetland and is protected by an 80-foot wetland buffer requirement. Wetland B, located to the east of the existing approach ramp and north of SR 14, is classified as a Category IV wetland and is protected by a 50-foot wetland buffer requirement. Wetland C, located approximately 150 feet west of the existing approach ramp and north of SR 14, is classified as a Category IV wetland and is protected by a 50-foot wetland buffer requirement.

4.2.2. Oregon

The team found one area on the Oregon side with wetland vegetation located in an ODOT constructed stormwater facility, north of the I-84 westbound on-ramp. The wetland vegetation included American speedwell (Veronica americana), water parsley (Oenanthe sarmentosa), and California brome (Bromus carinatus). The wetland vegetation is supported by stormwater generated from I-84 impervious surfaces. According to the 2015 Clean Water Rule, stormwater control features constructed to convey, treat, or store stormwater are excluded from regulation (80 Federal Register 37053). Similarly, work in stormwater facilities is not regulated by the Oregon Removal-Fill Law when constructed in uplands. No other wetland features were identified in Oregon during the May 2019 wetland delineation field work.

5. ENVIRONMENTAL CONSEQUENCES

5.1. No Action Alternative

With the No Action Alternative, there would be no construction of a replacement bridge and no removal of the existing bridge. With no construction or demolition, no impacts to vegetation or wetlands are anticipated if this alternative is implemented.

In the event of a catastrophe such as an earthquake, landslide, or barge or vessel strike, the bridge could be damaged or collapse into the river. On the Washington side of the river underneath the bridge, there is vegetation and a ditch running parallel to the BNSF Railway tracks that may be regulated. During a catastrophe, the vegetation both in and outside of the potentially regulated ditch may be damaged by the bridge collapse. Following removal of the collapsed bridge, vegetation would regrow over a period of months or years.

5.1.1. Direct Impacts

No direct impacts to vegetation or regulated wetlands are anticipated from this alternative.

5.1.2. Indirect Impacts

No indirect impacts to vegetation or regulated wetlands are anticipated from this alternative.

5.2. Preferred Alternative EC-2

5.2.1. Construction Impacts

Construction impacts are those that would occur during construction and that would likely cease once construction is finished.

Vegetation

The Washington end of Alternative EC-2 is covered by relatively undisturbed North Pacific Lowland Riparian Forest and Shrubland and North Pacific Oak Woodland habitat from the shore of the Columbia River to SR 14. A work zone would be cleared temporarily to allow construction equipment to access the site to construct the replacement bridge abutment, and stormwater treatment facilities, and remove the existing bridge. Species in this area include, but are not limited to, Oregon white oak, black cottonwood, big-leaf maple, Ponderosa pine, Douglas fir, and Oregon grape. Approximately 196,891 square feet (3.18 acres) of Lowland Riparian Forest and 6,099 square feet (0.14 acres) of Oak woodland vegetation would be removed, 54,886 square feet (1.26 acres) of these habitats are within the 200-foot shoreline jurisdiction of the Columbia River. The oaks in this area may meet the definition of an Oregon white oak woodland and the area adjacent to the Columbia River meets the definition of priority riparian habitat, both WDFW priority habitats. The temporary impact to these priority habitats would be restored upon completion of the project, can be compensated for in accordance with local requirements, and would not result in the loss of significant habitat. The large heritage oak tree would not be impacted by the Project, preserving the heritage tree.

The soil in this access area would be compacted by the equipment driving over it. Compacting soil removes air pockets and water-holding spaces. Plants grow poorly in compacted soil, and these sites may take longer to revegetate if not tilled or loosened. The work zone would be considered to result in temporary impacts and would occur along the length of the construction area. In areas under the replacement bridge, the disturbed understory vegetation would be partly restored with native plants

that would likely survive with proper redirection of treated stormwater under the bridge. Exposed soil during construction could temporarily increase the presence of noxious and invasive weeds along the Project because these plants frequently colonize disturbed areas. Additional temporary vegetation removal is likely near interchanges where alterations are planned, where special status species are unlikely to occur.

In Oregon, temporary impacts would occur to maintained lawns and landscaped areas associated with commercial, recreational, and transportation land uses. No special status species were observed in these areas and no construction related impacts to special status species are anticipated.

Wetlands

Temporary impacts to wetlands, wetland buffers, and ditches would occur adjacent to locations where long-term impacts are anticipated. Temporary disturbances to wetland hydrology and water quality would be avoided as much as possible through the use of BMPs such as silt fences and construction fencing during the construction process. The Project might impact potentially jurisdictional roadside ditches, but any ditches impacted would be restored in place or new ditches would be created adjacent to widened roads.

5.2.2. Direct Impacts

Vegetation

In Washington, permanent impacts to North Pacific Lowland Riparian Forest and Shrubland and North Pacific Oak Woodland vegetation would result from the construction of the replacement bridge abutment, retaining walls, and stormwater facility north of the BNSF Railway totaling 68,265 square feet (1.57 acres). The vegetation in this area provides moderate habitat value as it is encumbered by invasive species. Direct impacts in Washington would be similar to Section 5.2.1. Similarly, the impact to this priority habitat can be compensated for in accordance with local requirements and would not result in the loss of significant habitat.

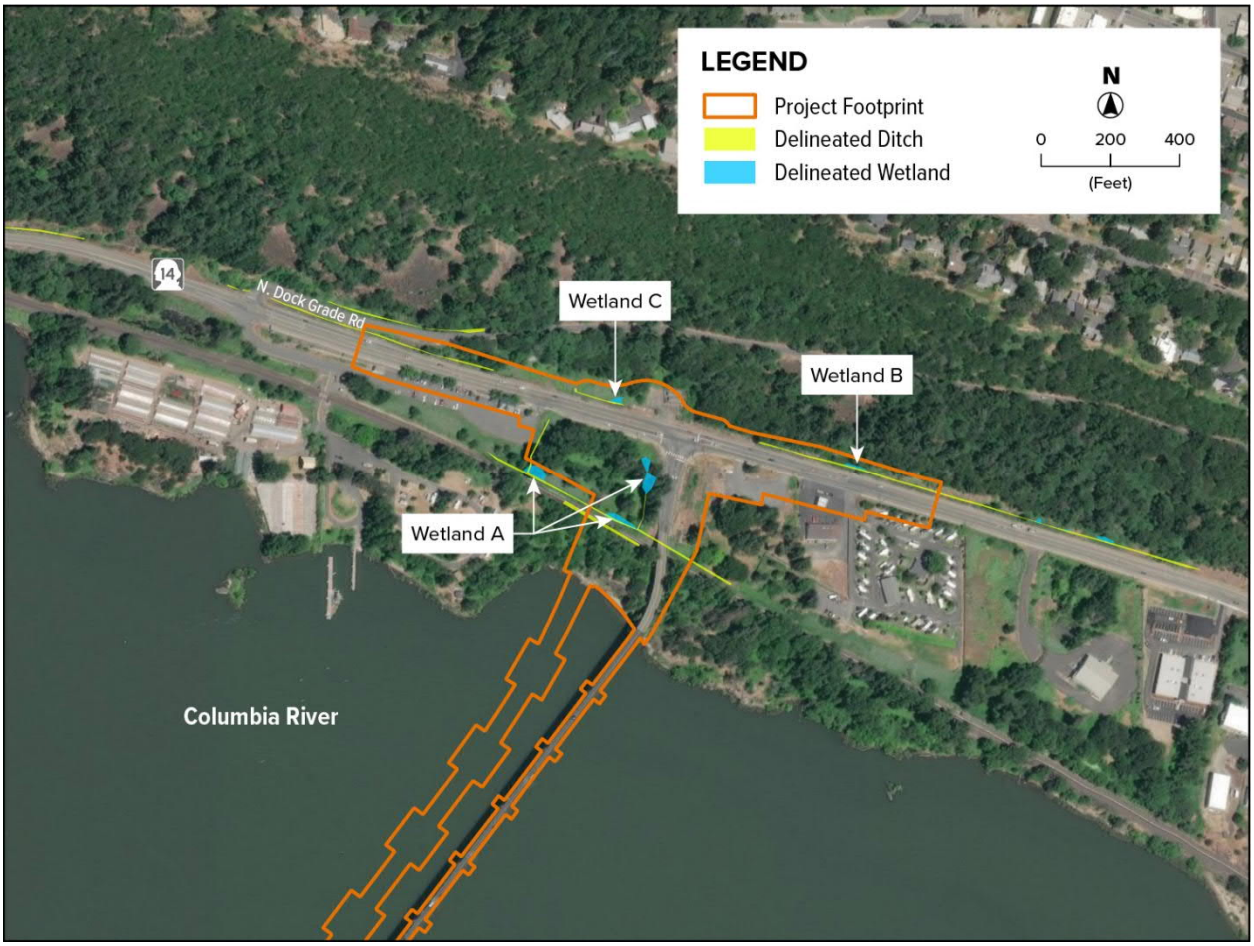
The alignment on the Oregon side of Alternative EC-2 places the replacement bridge approach overtop of a row of Douglas-fir, pine, juniper, landscape trees, and mowed vegetation west of the existing bridge. Approximately 32,670 square feet (0.75 acres) of vegetation would be permanently removed in this area. The trees and mowed lawn in this area provide very little habitat value.

Permanent impacts from Alternative EC-2 to vegetation would total 100,935 square feet (2.32 acres), and no permanent impacts to special status plant species are anticipated from this alternative.

Wetlands

Exhibit 15 shows how Alternative EC-2 would intersect and directly impact about 0.10 acres of moderate to low quality wetland resources in Washington. The north end of the API around Alternative EC-2 contains regulated wetlands and potentially regulated ditches, west of the existing bridge, between the Columbia River and SR 14. There are also wetlands located north of SR 14 that could be impacted from improvements to SR 14.

Exhibit 15. Wetland Resources Impacted by Preferred Alternative EC-2



Wetland A would need to be partially filled to construct the replacement bridge abutment and retailing walls, totaling approximately 3,450 square feet (0.08 acres). The palustrine forested/shrub-scrub/emergent wetland impacts would result in a loss of surface water storage, sub/surface transfer, flow variation, nutrient cycling, water quality, and chemical and thermal regulation functions. Wetland A is a Category III wetland and represents a wetland of moderate quality. However, the wetland has been manipulated in the past, most likely during the construction of the exiting bridge, and contains non-native vegetation. The impact to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

All of Wetland B within the API would need to be filled to construct improvements to SR 14 north of the highway, east of the existing bridge approach, totaling 436 square feet (0.01 acres). The linear wetland feature is hydrologically supported by hillside seeps north of SR 14. Impacts to the linear wetland feature would result in a loss of sub/surface transfer, flow variation, and nutrient cycling. Wetland B is a Category IV wetland characterized as a degraded wetland that provides limited functions. This wetland was likely created during the construction of SR 14. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

Wetland C would need to be completely filled to construct the proposed roundabout at the intersection of the replacement bridge and SR 14, totaling 436 square feet (0.01 acres). Impacts to this palustrine

emergent wetland would result in a loss of sub/surface transfer, flow variation, and nutrient cycling. Wetland C is a Category IV wetland characterized as a degraded wetland that provides limited functions. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

Alternative EC-2 would directly impact a total of 4,322 square feet (0.10 acres) of wetlands within the API. Although the impacted wetlands perform important functions, and are valuable because of their relative rarity, they are not of high quality. Additionally, mitigation for these impacts would at a minimum replace or possibly improve local wetland functions.

The Project would also permanently impact approximately 6,970 square feet (0.16 acres) of wetland buffer for Wetland A. The portion of the wetland buffer that would be impacted is within a moderately functioning portion of the buffer, consisting of black cottonwood and willows intermixed with Himalayan blackberry and Scotch broom growing on dredge sands. Wetland buffer impacts would be compensated for in accordance with federal, state and local requirements and through the implementation of the mitigation measures described in Section 6 below.

In accordance with relevant state and federal regulations, impacts to wetlands, wetland buffers, and jurisdictional waters (e.g., ditches) would be avoided where possible and minimized to the extent practicable in the design of Alternative EC-2.

5.2.3. Indirect Impacts

Vegetation

Vegetation may be indirectly impacted by shade or shadows cast by the replacement bridge, as well as a reduction in rainwater to plants growing under the bridge. The shade and rain shadow could impact the vitality of vegetative species through changes in hydrologic regime from the built environment.

The additional shade may reduce the growth of the plants or result in a more shade-tolerant population of plants in that area. Reduced rainfall may limit plant growth. Combined, these indirect impacts may result in a vegetative community different than what would be expected for this site. However, this alternative is subject to mitigation efforts to avoid, minimize, and mitigate for vegetative impacts and would include a landscape design that uses native species that can tolerate shade and reduced rainfall resulting in limited indirect impacts.

Indirect impacts could also result from new development on currently undeveloped properties that contain vegetation. However, the Project is not expected to generate new demand for development and any development would be subject to local regulations that require, avoidance, minimization, and mitigation for special-status plant species impacts and/or significant habitats and federal and state regulations for special-status plant species. Therefore, no indirect impacts to special-status plant species would be expected to occur as a result of Alternative EC-2.

Wetlands

Indirect impacts could result from new development on currently undeveloped properties that contain wetlands. However, the Project is not expected to generate new demand for development and any development would be subject to local, state, and federal regulations that require avoidance, minimization, and mitigation for impacts to wetlands. Therefore, no indirect impacts to wetlands would be expected to occur as a result of Alternative EC-2.

Although this alternative would result in more impervious surfaces in the vicinity of wetlands, the long-term impacts are expected to be small. The new impervious surface would not discharge untreated stormwater runoff into the wetlands and existing drainage patterns would not be altered where wetland hydrology could be severed.

5.3. Alternative EC-1

5.3.1. Construction Impacts

Vegetation

Alternative EC-1 aligns the replacement bridge across a developed parcel on the Washington shore of the Columbia River. Most of the native vegetation on the Alternative EC-1 proposed bridge landing site has been cleared and replaced with greenhouse structures. A few Oregon white oak trees and a large Douglas-fir tree would be removed between SR 14 and the BNSF Railway tracks to allow for the new replacement bridge abutment.

A work zone would be cleared temporarily to allow construction equipment to access the site. Approximately 147,668 square feet (3.39 acres) of Lowland Riparian Forest vegetation would be removed; 68,389 square feet (1.57 acres) of this area is within the 200-foot shoreline jurisdiction of the Columbia River. The area adjacent to the Columbia River meets the definition of priority riparian habitat, a WDFW priority habitat. The temporary impact to this priority habitat would be restored upon completion of the Project, can be compensated for in accordance with local requirements, and would not result in the loss of significant habitat.

Similar to Alternative EC-2, the soil in this access area would end up being compacted by the equipment driving over it. These areas are considered temporary impacts and would occur along the length of the construction area. Soils in areas of Alternative EC-1 alignment and associated temporary work areas are already covered by nursery buildings, access roads, and parking and are probably compacted. Exposed soil during construction could temporarily increase the presence of noxious and invasive weeds along the Project because these plants frequently colonize disturbed areas.

In Oregon, temporary impacts would occur to maintained lawns and landscaped areas associated with commercial, recreational, and transportation land uses. No special status species were observed in these areas and no construction related impacts to special status species are anticipated.

Wetlands

Temporary impacts to wetlands, wetland buffers, and ditches would occur adjacent to locations where long-term impacts are anticipated. Temporary disturbances to wetland hydrology and water quality would be avoided as much as possible through the use of BMPs such as silt fences and construction fencing during the construction process. Roadside ditches that might be considered jurisdictional waterways might be impacted during construction. Any ditches impacted would be restored in place or new ditches created adjacent to widened roads.

5.3.2. Direct Impacts

Vegetation

The Washington end of Alternative EC-1 has been disturbed substantially from the shore of the Columbia River to SR 14. Most of the native vegetation on the Alternative EC-1 proposed replacement bridge landing site has been cleared and replaced with greenhouse structures. A few Oregon white oak trees and a large Douglas-fir tree would be removed between SR 14 and the BNSF Railway tracks to

allow for the new replacement bridge abutment. Approximately 134,165 square feet (3.08 acres) of area would be required for two land-based footings, the abutment and retaining walls, and stormwater facility, permanently removing any vegetation in this area. A majority of this area has been disturbed in the past and vegetation is consistent with disturbed areas.

An additional 30,492 square feet (0.70 acres) of vegetation would be permanently removed north of the BNSF Railway to construct the roundabout and realign N. Dock Grade Road. The vegetation may meet the definition of an Oregon white oak woodland and consists of Oregon white oaks, with an understory encumbered by Himalayan blackberry, poison oak, and other non-native weedy species. However, if no retaining walls are built to construct N. Dock Grade Road, a larger portion of the hill may be graded to ensure slope stability, which would increase the oak woodland impacts.

The alignment at the Oregon end of Alternative EC-1 places the bridge approach overtop of the row of Douglas-fir, shore pine, juniper, and landscape trees west of the bridge, similar to Alternative EC-2. The bridge abutment and walls for the Oregon end would require 32,670 square feet (0.75 acres) of area. These trees and mowed lawn area provide very little habitat value. Additional vegetation removal is likely near interchanges where alterations are planned. However, no construction related impacts to special status plant species are anticipated at the interchange improvements from this alternative. Exposed soil during construction could temporarily increase the presence of noxious and invasive weeds along the Project because these plants frequently colonize disturbed areas.

Permanent impacts from Alternative EC-1 to vegetation totals 197,327 square feet (4.53 acres), however, no permanent impacts to special status plant species are anticipated from this alternative.

Wetlands

Exhibit 16 shows how Alternative EC-1 would intersect and directly impact about 0.34 acres of moderate to low quality wetland resources in Washington, including impacts to portions of Wetland A and Wetland B, and all of Wetland C. The reconnaissance wetland shown in Exhibit 16, located between SR 14 and the BNSF Railway, west of S. Dock Grade Road, would also be impacted. Potentially regulated ditches were observed north of SR 14 and north of N. Dock Grade Road that would be impacted from improvements to SR 14. Although the affected wetlands perform important functions and are valuable because of their relative rarity, they are not of high quality. Additionally, mitigation for these impacts would at a minimum replace or possibly improve local wetland functions.

A sliver of Wetland A would need to be filled for improvements to SR 14, south of the highway and west of the existing bridge, totaling approximately 437 square feet (0.01 acres). The palustrine forested/shrub-scrub/emergent wetland impacts would result in a loss of surface water storage, subsurface/surface transfer, flow variation, nutrient cycling, water quality, and chemical and thermal regulation functions. Wetland A is a Category III wetland and represents a wetland of moderate quality. However, the wetland has been manipulated in the past, most likely during the construction of the exiting bridge, and contains non-native vegetation. The impact to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

Exhibit 16. Wetland Resources Impacted by Alternative EC-1

Wetland C would need to be filled to complete the improvements to SR 14 north of the highway, totaling 1,307 square feet (0.03 acres). Impacts to this palustrine emergent wetland would result in a loss of subsurface/surface transfer, flow variation, and nutrient cycling. Wetland C is a Category IV wetland characterized as a degraded wetland that provides limited functions. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

The wetland identified during site reconnaissance between SR 14 and the BNSF Railway, west of S. Dock Grade Road, would be impacted to construct a stormwater facility totaling 13,068 square feet (0.3 acres). Impacts to this palustrine emergent wetland would result in a loss of subsurface/surface transfer, flow variation, and nutrient cycling. This wetland was not rated but would likely be a Category III or Category IV wetland based on its degraded characteristics and provides limited wetland functions. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

The Project would also permanently impact approximately 3,485 square feet (0.08 acres) of wetland buffer for Wetland A associated with SR 14 improvements. The portion of the wetland buffer that would be impacted is within a highly disturbed, low functioning portion of the buffer, consisting mostly of Himalayan blackberry and Scotch broom growing on fill prisms. Wetland buffer impacts would be

compensated for in accordance with federal, state and local requirements and through the implementation of the mitigation measures described in Section 6 below.

5.3.3. Indirect Impacts

Vegetation

Indirect impacts to vegetation would be the same as Alternative EC-2.

Wetlands

Indirect impacts to wetlands would be the same as Alternative EC-2.

5.4. Alternative EC-3

5.4.1. Construction Impacts

Vegetation

The Washington end of Alternative EC-3 is covered by relatively undisturbed North Pacific Lowland Riparian Forest and Shrubland and North Pacific Oak Woodland habitat from the shore of the Columbia River to SR 14. The alignment proposed under this alternative would run east of the existing bridge. A work zone would be cleared temporarily to allow construction equipment to access the site to construct the replacement bridge abutment, land based pier, and stormwater treatment facilities, and remove the existing bridge. Species in this area include, but are not limited to, Oregon white oak, black cottonwood, big-leaf maple, Ponderosa pine, Douglas fir, and Oregon grape.

Approximately 152,460 square feet (3.5 acres) of Lowland Riparian Forest and 18,731 square feet (0.43 acres) of Oak woodland vegetation would be removed; 22,651 square feet (0.52 acres) of these habitats are within the 200-foot shoreline jurisdiction of the Columbia River. The oaks in this area may meet the definition of an Oregon white oak woodland and the area adjacent to the Columbia River meets the definition of priority riparian habitat, both WDFW priority habitats. The temporary impact to these priority habitats would be restored upon completion of the Project, can be compensated for in accordance with local requirements, and would not result in the loss of significant habitat. The large heritage oak tree would also be impacted and would require compensation in accordance with WSMC 18.10.317(B)(1).

The understory in some of this area could remain undisturbed in areas under the replacement bridge decking. Species in this area include, but are not limited to, Oregon white oak, Ponderosa pine, Douglas fir, big-leaf maple, and Oregon grape. In areas between footings and the bridge abutment where vegetation is disturbed, the disturbed understory vegetation would be partly restored with native plants.

Similar to Alternative EC-2, the soil in this access area would end up being compacted by the equipment driving over it. These areas are considered temporary impacts and would occur along the length of the construction area. Soils north of the BNSF Railway have been disturbed in the past and are already covered by gravel access roads and a gravel parking area and are likely compacted. Exposed soil during construction could temporarily increase the presence of noxious and invasive weeds along the Project because these plants frequently colonize disturbed areas.

In Oregon, temporary impacts would occur to maintained lawns and landscaped areas associated with commercial, recreational, and transportation land uses. No special status species were observed in these areas and no construction related impacts to special status species are anticipated.

Wetlands

Similar to Alternative EC-2, temporary impacts to wetlands, wetland buffers, and roadside ditches-would occur adjacent to locations where long-term impacts are anticipated. Temporary disturbances to wetland hydrology and water quality would be avoided as much as possible through the use of BMPs such as silt fences and construction fencing during the construction process. Roadside ditches that might be considered jurisdictional waterways might be impacted during construction. Any ditches impacted would be restored in place or new ditches created adjacent to widened roads.

5.4.2. Direct Impacts

Vegetation

Similar to Alternative EC-2, the Washington end of Alternative EC-3 is covered by relatively undisturbed North Pacific Lowland Riparian Forest and Shrubland and North Pacific Oak Woodland from the shore of the Columbia River to the BNSF Railway. Permanent impacts to vegetation would result from the construction of one land-based footing near the Columbia River totaling 560 square feet (0.01 acres), and the replacement bridge abutment, retaining walls and stormwater facility north of the BNSF Railway totaling 23,586 square feet (0.54 acres).

The alignment at the Oregon end of Alternative EC-3 parallels the existing bridge approach to the east and places the replacement bridge approach overtop of a Douglas-fir and grassy lawn area. The replacement bridge abutment and walls on the Oregon end would require 17,425 square feet (0.4 acres) of permanent vegetation removal. This area provides very little habitat value.

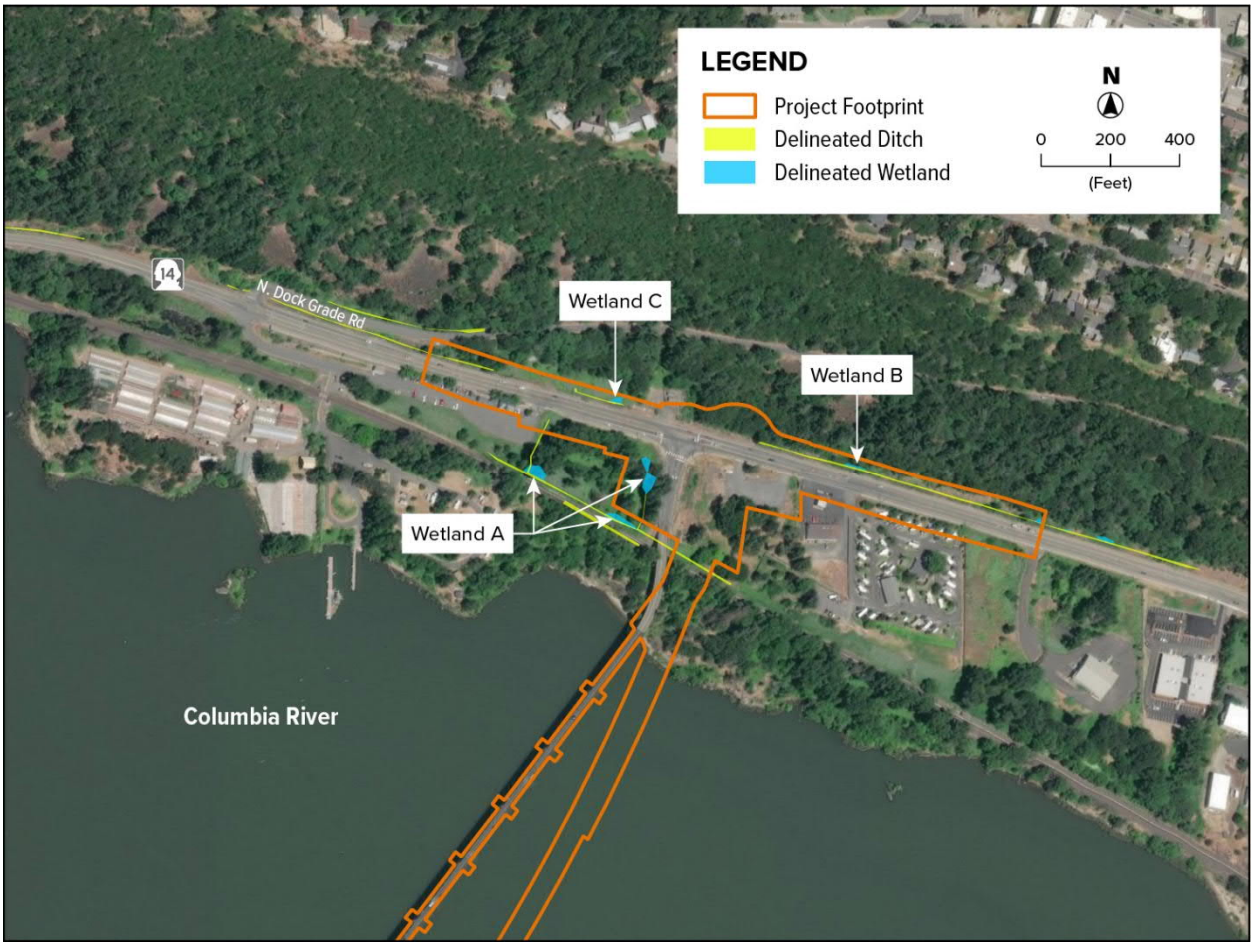
Permanent impacts from Alternative EC-3 to vegetation totals 41,071 square feet (0.94 acres), however, no permanent impacts to special status plant species are anticipated from this alternative.

Wetlands

The north end of the API around Alternative EC-3 contains regulated wetlands and potentially regulated ditches, north of SR 14. Impacts from Alternative EC-3 would directly impact a total of 4,487 square feet (0.10 acres) of moderate to low quality wetland resources in Washington. Exhibit 17 shows the wetland resources in relation to Alternative EC-3. Although the impacted wetlands perform important functions and are valuable because of their relative rarity, they are not of high quality. Additionally, mitigation for these impacts would at a minimum replace or possibly improve local wetland functions.

Wetland A would need to be partially filled for the construction of a stormwater facility located west of the existing bridge, totaling approximately 3,450 square feet (0.08 acres). The palustrine forested/shrub-scrub/emergent wetland impacts would result in a loss of surface water storage, subsurface/surface transfer, flow variation, nutrient cycling, water quality, and chemical and thermal regulation functions. Wetland A is a Category III wetland and represents a wetland of moderate quality. However, the wetland has been manipulated in the past, most likely during the construction of the exiting bridge, and contains non-native vegetation. The impact to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

Exhibit 17. Wetland Resources Impacted by Alternative EC-3



Most of Wetland B would need to be filled to complete improvements to SR 14 north of the highway, east of the existing bridge approach, totaling 523 square feet (0.012 acres). The linear wetland feature is hydrologically supported by hillside seeps north of SR 14. Impacts to the linear wetland feature would result in a loss of subsurface/surface transfer, flow variation, and nutrient cycling. Wetland B is a Category IV wetland characterized as a degraded wetland that provides limited functions. This wetland was likely created during the construction of SR 14. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

A sliver of Wetland C would need to be filled to construct the proposed roundabout at the intersection of the replacement bridge and SR 14, totaling 479 square feet (0.011 acres). Impacts to this palustrine emergent wetland would result in a loss of subsurface/surface transfer, flow variation, and nutrient cycling. Wetland C is a Category IV wetland characterized as a degraded wetland that provides limited functions. Impacts to this wetland can be compensated for in accordance with federal, state, and local requirements and would not result in the loss of significant wetland habitat.

The Project would also permanently impact approximately 3,100 square feet (0.07 acres) of wetland buffer for Wetland A. The portion of the wetland buffer that would be impacted is within a moderately functioning portion of the buffer, consisting of big-leaf maple intermixed with Himalayan blackberry growing on the cut slope down to the BNSF Railway. Wetland buffer impacts would be compensated for in accordance with federal, state and local requirements and through the implementation of the mitigation measures described in Section 6 below.

5.4.3. Indirect Impacts

Vegetation

Indirect impacts to vegetation would be the same as Alternative EC-2.

Wetlands

Indirect impacts to wetlands would be the same as Alternative EC-2.

5.5. Summary of Impacts by Alternative

Exhibit 18 provides a comparison of anticipated vegetation and wetland impacts by alternative.

Exhibit 18. Summary of Vegetation and Wetland Impacts by Alternative

Impacts	No Action Alternative	Preferred Alternative EC-2	Alternative EC-1	Alternative EC-3
Construction Impacts	• No impacts anticipated	• 3.18 acres of riparian lowland impact • 0.14 acres of oak woodland impact • Potential temporary impacts to wetlands, wetland buffers, and ditches	• 3.39 acres of riparian lowland impact • Potential temporary impacts to wetlands, wetland buffers, and ditches	• 3.50 acres of riparian lowland impact • 0.43 acres of oak woodland impact • Impact to heritage oak tree • Potential temporary impacts to wetlands, wetland buffers, and ditches
Direct Impacts	• No impacts anticipated	• 2.18 acres of permanent vegetation impacts, including 0.14 acres of oak woodland impact • 0.10 acres permanent wetland impact • 0.16 acres of wetland buffer impact	• 4.53 acres of permanent vegetation impacts, including 0.7 acres of oak woodland impact • 0.34 acres permanent wetland impacts • 0.08 acres of wetland buffer impacts	• 0.94 acres of permanent vegetation impacts • 0.10 acres permanent wetland impacts • 0.07 acres of wetland buffer impacts
Indirect Impacts	• No impacts anticipated	• Shading of vegetation from replacement bridge deck • Interception of rainwater		

6. AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

6.1. Construction Impacts

The following measures would be implemented by the bridge owner to avoid, minimize, or mitigate construction impacts to vegetation and wetlands:

- A Temporary Erosion and Sediment Control Plan would be prepared prior to the start of construction and adhered to throughout the process.
- Construction contract documents would specify that construction activities must comply with local and state regulation.
- Minimize vegetation removal by setting clearing and grading limits using high visibility construction fencing.
- Minimize grubbing and soil disturbance where not necessary to place permanent foundations.
- Till or loosen soil compacted by construction equipment before replanting.
- Revegetate areas temporarily disturbed by construction activities with appropriate native species.
- Revegetate the existing bridge alignment in Washington following removal of the existing bridge.
- Consider the use of retaining walls to the extent practicable to reduce the amount of vegetation clearing and/or wetland impacts.

6.2. Long-Term Impacts

The following measures would be implemented by the bridge owner to avoid, minimize, or mitigate long-term impacts to vegetation and wetlands:

- The Project would comply with all applicable regulatory and permitting requirements pertaining to wetland and shoreline vegetation impacts.
- Shoreline vegetation on the Washington banks of the Columbia River is regulated by the City of White Salmon under its Shoreline Master Program. Since the Project is located within 200-feet of a shoreline of statewide significance, it would meet the no net loss of shoreline functions approval criteria. Shoreline vegetation would be compensated on-site through enhancements if practicable.
- Compensatory wetland mitigation would meet the federal no net loss of wetland acreage requirement.
- Any regulated ditches impacted would be restored in place or new ditches created adjacent to road improvements.
- In the API in Washington, wetland buffers are regulated by the City of White Salmon under its critical areas ordinance (WSMC 18.10.700). Compensatory mitigation would be required to address affected functions by achieving a functional equivalency or improvement and providing a similar wetland or buffer function. Approval criteria require no net loss of functions or values for any activity impacting a critical area.

7. PREPARERS

Individuals involved in preparing this technical report are identified in Exhibit 19.

Exhibit 19. List of Preparers

Name	Role	Education	Years of Experience
Dustin Day	Primary Author; Senior Scientist - Wetland Delineation and Plant Survey	MS, Environmental Management BS, Biology	21
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Bridget Wojtala	Environmental Scientist - Wetland Delineation and Plant Survey	BS, Natural Resource Management	3
Angela Findley	Project Manager; QC	MS, Forest Resources BA, Mathematics	25
Scott Polzin	Environmental Task Lead; QC	MCRP, Planning BS, Finance	24

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