Columbia River CROSSING

Component Findings

Columbia River CROSSING

Component Findings and Recommendations

River Crossing Findings

◆ Key Findings

➢ Value 1 – Community Livability and Human Resources (12 of 19 measures reported)

The alternatives with no new river crossings (Alternative Packages 1 and 2) would have the fewest direct adverse impacts to community resources. However, they would not address local or regional plans nor meet the project's Purpose and Need.

Of the Build Alternative Packages:

Property acquisitions in the river crossing area (from SR 14 to Marine Drive) are a function of several factors, only one of which is the river crossing option itself. Interchange designs at SR 14, Hayden Island, and Marine Drive interchanges are a major factor. River crossings require the acquisition of approximately 5 to 15 houseboats. This range varies largely on whether HCT is present and on the interchange configurations at Marine Drive and on Hayden Island. Supplemental and replacement bridges in all Build alternatives require acquisition of approximately 30 commercial parcels; most of these may only be partial, not full acquisitions.

A new supplemental arterial bridge (Alternative Package 3) would have the fewest impacts to historic, archaeological, and recreational 4(f) properties. Replacement bridges (Alternative Packages 8 - 12) would have the greatest historic impacts due to bridge removal. However, supplemental bridges (Alternative Packages 3 - 7) would also have impacts to the historic character of the bridge because they would likely require substantial seismic upgrades. Alternative Packages 4 - 12 would all impact the historic Apple Tree Park.

No neighborhood will be bisected by construction of a new replacement or supplemental bridge and no neighborhood will lose more than 10 percent of its total area for construction of the bridges. Upstream replacement bridges require complete acquisition of Safeway, the only grocery store on Hayden Island and a significant resource for the neighborhood. A downstream replacement bridge and supplemental interstate bridge would avoid the Safeway acquisition with some interchange options and would acquire with other interchange options. The supplemental arterial bridge (Alternative Package 3) would avoid direct impact to Safeway. Safeway could likely be relocated on Hayden Island.

A new bridge for LRT or BRT (Alternative Packages 3, 8, 9, and 10) would provide more reliable service and faster travel times, thus better supporting local plans than placing LRT or BRT on the existing lift span bridge (Alternative Packages 4 and 5) or options with BRT-Lite or Express Bus only (Alternative Packages 6, 7, 11, and 12).

➢ Value 4 – Safety (6 of 6 measures reported)

A replacement bridge (Alternative Packages 8 – 12) provides the greatest safety improvements because it would: provide separate facilities for bicycle and pedestrian travel; increase vehicle capacity over I-5 and provide full shoulders for incident response; eliminate bridge lifts which would alleviate both highway and marine conflicts and congestion; and, particularly for downstream replacement bridges (Alternative Packages 8, 9, and 11), reduce encroachment into the desirable clearance zone for Pearson Airpark. In addition, the replacement bridges would be constructed to current seismic standards. Overall, a replacement bridge would best enhance safety.

Using a new supplemental bridge for interstate traffic (Alternative Packages 4 – 7) would provide similar highway safety benefits as a replacement bridge except that the obstruction into Pearson Airpark's airspace would remain because the existing bridges would be reused. Also, unless the existing bridges are seismically retrofitted, they may not withstand an earthquake event.

Using a supplemental bridge for arterial traffic, and continuing to operate I-5 on the existing bridges (Alternative Package 3) would likely have a negative impact on highway safety as congestion would increase, which would also likely increase the "no bridge lift" periods and impact marine safety.

- **Value 5 – Regional Economy, Freight Mobility (1 of 8 measures reported)**

Replacement bridges (Alternative Packages 8 – 12) provide the greatest benefit to marine navigation because they eliminate the "no bridge lift" period, remove the S-curve maneuver for vessels, and increase the horizontal clearance between piers.

Supplemental bridges require seismic upgrades to the existing bridge piers that would narrow the horizontal clearance between piers. Furthermore, the new bridge would increase physical obstructions in the river by adding additional piers. These factors increase the size and number of piers in the navigation channel and thus adversely impact navigation operations and safety.

However, using a supplemental bridge to carry interstate traffic (Alternative Packages 4 – 7) and reusing the existing bridges for other modes of transportation could improve marine navigation over No-Build by removing or reducing the "no bridge lift" period.

Using a supplemental bridge for arterial traffic and continuing to operate I-5 on the existing bridges (Alternative Package 3) would likely negatively impact navigation. This is because interstate congestion would increase and likely cause extension of the "no bridge lift" period.

- **Value 6 – Stewardship of Natural Resources (10 of 11 measures reported)**

Alternative Packages 1 and 2 (No-Build and TSM/TDM) have the least direct impact on natural resources, but they would not meet the project's Purpose and Need. They would also likely continue to discharge untreated stormwater runoff from the existing bridge into the Columbia River.

Replacement bridges (Alternative Packages 8 - 12) would perform slightly better than supplemental bridges (Alternative Packages 3 - 7) due to smaller total footprint and greater ability to treat stormwater runoff. Replacement bridge options would also have fewer permanent in-water structure than supplemental bridges.

- **Value 7 – Distribution of Benefits and Impacts (1 of 5 measures reported)**

There is little distinction between alternatives from the standpoint of acquisitions.

Noise results are not complete.

- **Value 9 – Growth Management/Land Use (1 of 2 measures reported)**

A new bridge for LRT service (Alternative Packages 3, 8, and 9) best adheres to regional plans and policies because it provides more reliable and faster service than running LRT on the existing bridge, or providing BRT, BRT-Lite or Express Bus only. This favors replacement bridge options.

Supplemental bridges and No-Build alternatives better support Clark County planning policies that include historic preservation because replacement bridges remove the existing northbound bridge that is on the National Register of Historic Places.

- **Value 10 – Constructability (2 of 4 measures reported)**

Construction impacts would be less for the New Arterial bridge compared to the other Supplemental and Replacement bridge options. Designs are currently conceptual and therefore provide little basis or detail for distinguishing other aspects of constructability at this phase.

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Component Findings and Recommendations

Transit Findings

◆ Key Findings

➢ Value 1 – Community Livability and Human Resources

No-Build and TSM/TDM only options (Alternative Packages 1 and 2), followed by Express Bus only (Alternative Packages 7 and 11) would have the lowest direct impact on community resources but would not meet key policies in local plans.

Of the Build Alternative Packages, Express Bus only and BRT-Lite (in Alternative Packages 6, 7, 11, and 12) would have the lowest direct impact because they would be contained largely within the I-5 right-of-way. However, better transit and pedestrian access to Hayden Island and downtown Vancouver afforded by LRT and BRT (in Alternative Packages 3 - 5 and 8 - 10) would provide greater potential for commercial and residential vitality and community enhancement. None of the transit options would bisect neighborhoods or affect more than 10 percent of any neighborhood.

LRT and BRT (Alternative Packages 3 - 5 and 8 - 10) necessitate widening river crossings across the Oregon Slough which requires acquisition of approximately 5 additional houseboats for most bridge options. LRT and BRT also require acquisition of approximately 30 commercial properties; most of these acquisitions could be partial. BRT-Lite (Alternative Packages 6 and 11) and Express Bus only (Alternative Packages 7 and 12) impact few or no residential or commercial properties.

Alternative Packages with LRT or BRT meet local plans better than those with BRT-Lite or Express Bus only. Alternative Packages 8 and 9 appear to best meet local plans and uphold principles of multi-modalism.

➢ Value 4 – Safety

Transit modes that would operate on a guideway separate from vehicle traffic would help reduce conflicts and congestion in I-5 general purpose lanes. Therefore, providing LRT or BRT (Alternative Packages 3 - 5 or 8 - 9) would best enhance safety. However, introducing LRT or BRT at-grade crossings with arterial traffic in Vancouver would create potential new safety hazards.

➢ Value 5 – Regional Economy, Freight Mobility

Transit mode options have little effect on the freight-related measures evaluated to date.

➢ Value 6 – Stewardship of Natural Resources

LRT and BRT (Alternative Packages 3 - 5 and 8 - 10) have larger footprints which cause greater direct adverse impacts than transit options with smaller footprints such as BRT-Lite (Alternative Packages 6 and 11), Express Bus only (Alternative Packages 2, 7, and 12), and No-Build (Alternative Package 1).

LRT and BRT, as currently designed, would impact a buffer adjacent to Burnt Bridge Creek, City of Portland E-Zones, and habitat areas. However, these impacts are based on a sample alignment and could likely be reduced through design refinement. An additional consideration is that LRT and BRT are likely to increase transit mode share and better support regional growth management policies, which would lower secondary impacts to natural resources.

➢ Value 7 – Distribution of Benefits and Impacts

Not yet evaluated for transit options.

➢ Value 9 – Growth Management/Land Use

Alternative Packages 3, 4, 8, and 9 best support regional plans and policies because they include LRT. BRT (Alternative Packages 5 and 10) do not satisfy regional plans calling for LRT but would support multi-modalism and compact growth. BRT-Lite (Alternative Packages 6 and 11) is less supportive. Express Bus only options (Alternative Packages 2, 7, and 12) are the worst performing options.

➢ Value 10 – Constructability

LRT and BRT (Alternative Packages 3 - 5 and 8 - 10) would have the greatest amount of construction impacts.

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Value Performance

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Value Performance

Value 1 – COMMUNITY LIVABILITY AND HUMAN RESOURCES

◆ Best Performing Package(s) and/or Component(s)

The alternatives with the least physical improvements (Alternative Packages 1 and 2) have the lowest direct impacts on existing community resources. However, these packages can do little to enhance access or livability, do not support the community's future vision as expressed in local plans, and would do little to manage or address the impacts that future population and traffic growth will have on communities and livability.

The diversity of objectives within this value provides no clear winning component or package. Current evaluations have yielded the following conclusions among the Build alternatives:

- LRT, and to a lesser extent BRT, supports local planning goals and provides potential to improve vitality and access to downtown Vancouver and Hayden Island. However, these transit modes require more direct impacts to residential and commercial properties and potentially to existing historic and archaeological resources because of their exclusive ROW.
- Replacement bridges and the new arterial bridge better support LRT or BRT, and generally require slightly less ROW through downtown Vancouver and Hayden Island. However, a replacement bridge would entail removal of the northbound bridge that is a historic resource.
- Upstream replacement bridges require complete removal of the Safeway on Hayden Island, while design refinements may allow other bridge options to avoid or minimize impacts to the only grocery store on the island.

◆ Key Findings

➢ River Crossing

Alternatives using a replacement bridge (Alternative Packages 8 – 12) would have a greater adverse effect on historic resources because they would remove the existing northbound bridge which is on the National Register of Historic Places. Alternatives using a supplemental bridge (Alternative Packages 3 - 7) would also impact this existing bridge due to seismic retrofits and design upgrades. Only No-Build alternatives would avoid impact to the existing bridge. Alternative Packages 4 - 12 would all impact the historic Apple Tree Park.

All of the Build alternatives (Alternative Packages 3 - 12) could affect the recreational trails crossing under them.

Property acquisitions in the river crossing area (from SR 14 to Marine Drive) are a function of several factors, only one of which is the river crossing option itself. Interchange designs at SR 14, Hayden Island, and Marine Drive are a major factor. River crossings require the acquisition or relocation of approximately 5 to 15 houseboats. This range varies largely on whether HCT is present and on the interchange configurations at Marine Drive and on Hayden Island. Supplemental and replacement bridges in all Build alternatives require acquisition of at least portions of approximately 30 commercial parcels.

No neighborhoods will be bisected by new construction and no neighborhoods will lose more than 10 percent of their total area for construction. Upstream replacement bridges require complete acquisition of Safeway, the only grocery store on Hayden Island and a significant resource for the neighborhood. A downstream replacement bridge and supplemental interstate bridge may require partial or full acquisition of Safeway as well due to interchange improvements. Safeway could likely be relocated on Hayden Island.

➢ Transit Performance

LRT and BRT would have the greatest potential to affect unknown archaeological resources beneath downtown Vancouver roadways, as well as the locally-designated historic district, because they introduce a new transit ROW through Vancouver. They would also have the greatest opportunity to enhance this district.

LRT and BRT necessitate widening river crossings across the Oregon Slough which requires acquisition of approximately 5 additional houseboats for most bridge options.

LRT and BRT would affect up to 30 commercial properties, mostly partial acquisitions. BRT-Lite (Alternative Packages 5 and 11) affects fewer properties and Express Bus only (Alternative Packages 7 and 12) impacts no commercial properties.

None of the transit options would bisect neighborhoods or affect more than 10 percent of any neighborhood. LRT and BRT add high capacity transit to Vancouver and Hayden Island neighborhoods, helping to improve residents' access to resources.

Alternative Packages with LRT or BRT meet local plans better than those with BRT-Lite or Express Bus only. LRT performs best on a replacement bridge, making Alternative Packages 8 and 9 appear to best meet local plans and uphold principles of multi-modalism.

➢ Roadways North and South

Interchange configurations at SR 500 are the primary contributor to the limited range of residential acquisitions occurring from roadways north. Potential commercial property acquisitions from Roadways South options are smaller, ranging from 0 to 14 largely depending upon the interchange configuration on Hayden Island. Likewise, commercial acquisitions from Roadways North are also small, ranging from 5 to 15.

The SR 14 interchange is a key factor for effects on Fort Vancouver and on the Apple Tree Park. Impacts to these historic resources are largely determined by the design of this interchange. Designs seeking to minimize ROW requirements and include three levels of ramps would have less physical impacts but would cause visual impacts to Fort Vancouver. Conversely, interchange designs that expand outward and minimize vertical stacking of ramps could encroach further on Apple Tree Park and downtown Vancouver.

The interchanges at Marine Drive and on Hayden Island can affect the number of houseboats that would be acquired. A more extensive interchange at Marine Drive pushes the bridge over the Oregon Slough north slightly, impacting additional houseboats. Removing an I-5 interchange on Hayden Island, necessitates an arterial crossing over the Oregon Slough which would consume additional house boats.

➢ Other (Bike/Ped, Freight, TSM/TDM, Tolling)

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Value Performance

Value 4 – SAFETY

◆ Best Performing Package(s) and/or Component(s)

- With all modes of transportation (bicycle/pedestrian, highway, air, and marine), safety increases when points of conflict are removed and congestion is decreased.
- Overall, Alternative Package 10 includes the most improvements and components that would enhance safety such as providing a replacement bridge, a transit mode that would operate in a separate guideway, removing short weaving sections north and south of the river crossing, and adding freight bypass lanes at difficult merge locations.
- Alternative Packages 8 and 9 would next best enhance safety by providing a replacement bridge and HCT in a separate guideway.

◆ Key Findings

➢ River Crossing

Operating I-5 on a new supplemental or replacement bridge constructed to current seismic standards would best maintain a highway life-line connection across the Columbia River in the event of an earthquake. This connection would have adequate capacity and would maintain a direct connection through the I-5 corridor.

A replacement bridge (Alternative Packages 8 – 12) provides the greatest safety improvements because it would provide separate facilities for bicycle and pedestrian travel; increase vehicle capacity over I-5 and provide full shoulders for incident response; eliminate bridge lifts which would alleviate both highway and marine conflicts and congestion; result in fewer piers and bridges, thus further simplifying navigation; and, particularly for downstream replacement bridges (Alternative Packages 8, 9, and 11), reduce encroachment into the desirable clearance zone for Pearson Airpark. In addition, the replacement bridges would be constructed to current seismic standards. Therefore, overall, a replacement bridge would best enhance safety.

Using a supplemental bridge for interstate traffic (Alternative Packages 4 – 7) would provide some of the safety benefits as a replacement bridge except that the existing bridges would remain, thus maintaining the obstruction into Pearson Airpark's airspace and resulting in greater obstructions to marine navigation. Also, the existing bridges, even with seismic upgrades, will likely be more vulnerable to earthquake damage.

Using a supplemental bridge for arterial traffic and continuing to operate I-5 on the existing bridges (Alternative Package 3) would have a negative impact on highway safety as congestion would increase, which would also likely increase the "no bridge lift" periods and further impact marine safety.

➢ Transit Performance

Transit modes that would operate on a guideway separate from vehicle traffic would help reduce conflicts and congestion in I-5 general purpose lanes. Therefore, providing HCT with either LRT or BRT in an exclusive guideway (on a new supplemental or replacement bridge) would best enhance safety.

➢ Roadways North and South

North of the river crossing, a new supplemental or replacement bridge for I-5, which would include widening I-5 through the Bridge Influence Area, would increase safety because full highway shoulders along I-5 could be provided. Widening I-5 would also require reconstruction of the existing 39th Street over-crossing, which is a route to Discovery Middle School. The over-crossing would be constructed with a greater sidewalk width. Accessibility at SR 500 would also be improved because ramps would be added to and from the north.

At the 39th Street interchange removing the ramps to and from the north on I-5 would improve bicycle and pedestrian safety on 39th Street by reducing the number of ramp crossings. This improvement could be packaged with a new supplemental or replacement bridge for I-5; it is currently included as an option in four of the Alternative Packages.

Removing a short weaving section at Marine Drive and Hayden Island would improve safety. This improvement could be accomplished with the supplemental bridge options by eliminating the Hayden Island interchange, or with the replacement bridge options by adding braided ramps.

- **Other (Bike/Ped, Freight, TSM/TDM, Tolling)**

Bicycle and pedestrian safety would be best improved by providing separate facilities across the river and connections to the north and south.

Adding freight bypass lanes in areas where trucks currently have difficulty entering and exiting I-5 would enhance safety. This improvement could be packaged with a new supplemental or replacement bridge for I-5; it is currently included as an option in four of the Alternative Packages.

Re-striping I-5 (in both directions) between 39th Street and SR 500 to add a managed lane could improve safety by increasing capacity on I-5, however, it would also result in substandard shoulder widths which decrease safety.

Value 6 – STEWARDSHIP OF NATURAL RESOURCES

◆ Best Performing Package(s) and/or Component(s)

- Alternative Package 12 would have the least direct impact on natural resources but could miss potential indirect benefits associated with more robust high capacity transit options.
- BRT-Lite and Express Bus have a smaller footprint than BRT and LRT.
- Replacement bridges perform slightly better than supplemental bridges because of their smaller footprint in the water and greater ability to manage stormwater runoff.

◆ Key Findings

➢ River Crossing

Alternative Packages 1 and 2 (No-Build and TSM/TDM) have the least direct impact on natural resources but they would not meet the project's Purpose and Need. They would also likely continue to discharge untreated stormwater runoff from the bridge into the Columbia River.

Replacement bridges perform moderately better than supplemental bridges. Replacement bridges can better treat stormwater runoff and would have a smaller total footprint. Replacement bridges would also require fewer in-water piers than supplemental bridges. Short-term impacts are similar for replacement and supplemental bridge alternatives: the replacement alternatives require in-water work to deconstruct the existing bridges and remove piers and foundations, which would likely be accomplished quicker than pier and foundation seismic upgrades associated with the supplemental alternatives.

➢ Transit Performance

The Express Bus and BRT-Lite options would have a smaller footprint and less direct impacts than either BRT or LRT.

BRT and LRT, as designed, would impact the Burnt Bridge Creek riparian area, City of Portland Environmental Zones, Metro Goal 5 habitats, and habitats identified in field surveys. However, these impacts are based on a sample alignment and could likely be reduced through design refinement. LRT and (to a lesser extent) BRT are also likely to increase transit mode share and better support growth management, reducing secondary impacts to natural resources.

➢ Roadways North and South

The SR 500 Tunnel Access performs better than SR 500 Flyover Access because it impacts less of the Burnt Bridge Creek riparian and open space area.

Hayden Island Access and Hayden Island Folded Diamond Access perform slightly better than Hayden Island Arterial and Full Standard options because they have fewer crossings across the Oregon Slough, and do not come as close to the wetland area southwest of the Marine Drive interchange.

➢ Other (Bike/Ped, Freight, TSM/TDM, Tolling)

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Value Performance

Value 9 – BISTATE COOPERATION

◆ Best Performing Package(s) and/or Component(s)

Alternative Packages 8 and 9 perform the best because they include LRT as the transit mode, which is supported in regional plans, and would not result in cut-through traffic associated with separate arterial bridges (Alternative Packages 3 - 7). Alternative Packages 3 and 4 include LRT but also include arterial bridges.

◆ Key Findings

➢ River Crossing

Replacement bridges better support goals for regional economic development than supplemental bridges (Alternative Packages 3 – 7) because they require less total ROW on Hayden Island and in downtown Vancouver. Replacement bridges and the new arterial bridge option, because they would place LRT on a new bridge without a lift span, better support regional goals for provision of HCT.

However, supplemental bridges and No-Build alternatives better support Clark County planning policies that include historic preservation because replacement bridges remove the existing northbound bridge that is on the National Register of Historic Places.

➢ Transit Performance

Alternative Packages 3, 4, 8, and 9 best support regional plans and policies because they include LRT. BRT (Alternative Packages 5 and 10) does not satisfy regional plans calling for LRT but would support multi-modalism and compact growth. BRT-Lite (Alternative Packages 6 and 11) is less supportive. Express Bus only (Alternative Packages 1, 2, 7, and 12) performs the worst.

➢ Roadways North and South

There is no discernable difference between Alternative Packages for this criterion.

➢ Other (Bike/Ped, Freight, TSM/TDM, Tolling)

Alternative Package 3 is the best option from a bicycle and pedestrian standpoint because it provides the shortest distance to travel, provides easy access onto the facility, and places bikers and pedestrians next to low-speed traffic traveling locally on an arterial bridge.

All packages that provide full-width bike and pedestrian lanes on the new bridge would be a substantial improvement over existing conditions.

Value 10 – CONSTRUCTABILITY

◆ Best Performing Package(s) and/or Component(s)

- Alternative Packages 1 and 2 would have the least amount of construction impacts.
- Among the Build alternatives, Alternative Package 3 would have the least amount of construction impacts because work would occur in a smaller area and it would have the shortest construction period.
- Alternative Packages 4 - 12, which would provide a new supplemental or replacement bridge for I-5, would have a similar duration of construction and would include components that would provide comparable flexibility to accommodate future transportation system improvements. However, a seismic retrofit of the existing bridges (with supplemental bridge options) would take longer than removing the bridges (with replacement bridge options).

Note: Many aspects of constructability are a function of design details that will not be determined until later phases of the project.

◆ Key Findings

➢ River Crossing

Constructing a new supplemental arterial bridge and continuing to use the existing bridges for I-5 (Alternative Package 3) would have the least amount of construction impacts because work would occur in a smaller area and would have the shortest construction period. Its temporary impacts to navigation would be similar to the other Build alternatives.

The construction duration of a new supplemental bridge for I-5, which would include subsequent improvements to seismically retrofit the existing bridges, would be similar to constructing a replacement bridge for I-5, which would include the subsequent removal of the existing bridges. The construction impacts to traffic, navigation, and residences and businesses would be similar.

With a new supplemental or replacement bridge for I-5, future improvements to the transportation system could be constructed by either using the width of the highway shoulders or by constructing further additions to the width of the bridges (such as by cantilevering an additional section). Such flexibility will be determined by future design decisions.

➢ Transit Performance

An Express Bus and Local Bus transit system requires less infrastructure and modifications to the existing transportation network to operate and, therefore, would have lower construction impacts.

Those transit modes that require the construction of an exclusive guideway for operation (either a trackway for LRT or exclusive lanes for BRT) would have the greatest amount of temporary construction impacts. The construction of the guideway would impact a larger area (including the route streets in Vancouver) and would require more time to construct.

BRT-Lite includes infrastructure that would have construction impacts, but less than with LRT or BRT, especially in downtown Vancouver.

➢ Roadways North and South

Improvements at SR 500 would create construction impacts but make future transportation improvements easier to construct.

Construction of improvements at Marine Drive would have associated impacts, but would likely make future transportation improvements easier to construct.

- **Other (Bike/Ped, Freight, TSM/TDM, Tolling)**

Bicycle and pedestrian improvements would have associated construction impacts but would make future improvements easier to construct.

Constructing freight bypass lanes would have associated impacts but would likely make future transportation improvements easier to construct. This improvement could be packaged with a new supplemental or replacement bridge for I-5; it is currently included as an option in four Alternative Packages.