REVIEW DRAFT

I-5 Columbia River Crossing Partnership:
Traffic and Tolling Analysis

Traffic Performance for 6-lane Freeway Plus Two 2-lane Arterial Roadways

Working Paper 12.32

Prepared by

David Evans and Associates, Inc.
Parisi Associates

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OVERVIEW

In the "Final Strategic Plan, June 2002" of the Portland/Vancouver I-5 Transportation and Trade Partnership project(hereinafter I-5 Partnership), one of the recommendations within the Bridge Influence Area (BIA) was to: "Evaluate whether or not a 6-lane freeway plus two, 2-lane arterials, one in the vicinity of the I-5 corridor and one in the vicinity of the railroad bridge, is a viable alternative for consideration in the EIS." This working paper (WP) reviews the potential traffic performance of a scenario that retains the I-5 mainline crossing at six lanes and includes two, 2-lane arterial bridges across the Columbia River. This WP is based on travel demand modeling and traffic operational assessments conducted as a part of the ~~Portland/Vancouver I-5 Transportation and Trade Partnership~~ I-5 Partnership study. This WP contains four sections:

1. Description of Scenario: A description of an option that includes an arterial bridge west of the I-5 mainline and a western arterial bridge and roadway near the existing Burlington Northern-Santa Fe (BNSF) railroad line.

2. Travel Demands for Both Arterial Bridges: A discussion of estimated future travel demands that each arterial bridge ~~would~~ could serve.

3. I-5 Traffic Performance: A description of the scenario's impacts to I-5 traffic performance.

4. Conclusions: A recap of conclusions related to the scenario.

1.0 Description of Scenario

The scenario, which was not explicitly studied as a part of the ~~Portland/Vancouver I-5 Transportation and Trade Partnership~~ I-5 Partnership study, would consist of the following Columbia River crossing components:

- I-5 consisting of three lanes in each direction, either in the form of the existing Interstate Bridges, or through replacement of one or both of the bridges;

- An "arterial bridge" with one lane in each direction, likely located just west of the I-5 mainline and connecting downtown Vancouver, Hayden Island, and Marine Drive; and

- A "western arterial" bridge and roadway (hereinafter, western arterial) with one lane in each direction, located near the existing BNSF railroad bridge west of I-5, and connecting Mill Plain Boulevard, Marine Drive, and Columbia Boulevard.

The ~~Portland/Vancouver I-5 Transportation and Trade~~ I-5 Partnership study considered two scenarios that included combinations of the above components.

"Option Package No. 8: New Arterial Corridor/Columbia River Crossing" included I-5 with three lanes in each direction plus a western arterial bridge and roadway parallel to the railroad tracks (see **Figure 1** titled "Option Package No. 8"). This option originally extended the western arterial roadway to US 30, but the arterial corridor was "shortened" by the Governor's Task Force due to several issues associated with the southern segment, including sensitive cultural and environmental

resources and low traffic demands projections for along this segment. The Mill Plain Boulevard-Columbia Boulevard segment was retained for analysis since it would provide port and industrial access. However, it should be noted that neither of the western arterial segments (i.e., those north and south of Columbia Boulevard) are included in currently adoptedcurrent transportation plans for Vancouver or Portland.

Traffic operation assessments were also conducted for a different scenario that consisted of I-5 with three lanes in each direction, plus an arterial bridge with one lane in each direction just west of I-5. The arterial bridge would connect downtown Vancouver, Hayden Island, and Marine Drive.

In addition to the above two scenarios, the Portland/Vancouver I-5 Transportation and Trade Partnership study analyzed another scenario concept that included an arterial bridge with one lane in each direction, but with I-5 reconstructed with four lanes in each direction. It did not include a western arterial bridge and roadway near the BNSF railroad tracks. This scenario was titled "Option Package 7" or "Concept 7" (see **Figure 2** titled "Concept 7").

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2.0 Travel Demands for Both Arterial Bridges

Although the the Portland/Vancouver I-5 Transportation and Trade Partnership study did not consider a scenario that included both the arterial bridge adjacent to I-5 and the western arterial and roadway near the railroad, analysis of year 2020 projected traffic demands and travel patterns show that provision of just the arterial bridge next to I-5 (without the western arterial bridge and roadway near the railroad) would serve both the western arterial's bridge and roadway's travel shed as well as many local vehicle-trips between downtown Vancouver, Hayden Island, and Marine Drive. S (see **Figure 3** titled "An Arterial Bridge Can Provide Transportation Benefits." need to fix this graphic so the SR14 arrow is larger than the Vancouver CBD arrow). In other words, many of the vehicle-trips between the ports and industrial areas on either side of the Columbia River and west of I-5 would be inclined to use the new any arterial bridge just west of I-5, and not the I-5 mainline, if such an arterial bridge were developed, whether it be the western arterial bridge and roadway parallel to the railroad tracks found in Concept 8 or the arterial bridge found in Concept 7did not exist.

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With provision only of the arterial bridge, year 2020 peak hour two-way traffic volumes along this bridge would be up to 1,500 vehicles per hour, resulting in at-capacity to over-capacity conditions. It should be noted that while the 2-lane arterial bridge would serve "local" trips across river, due to I-5's congestion under a 6-lane scenario (see next section), the arterial bridge would also be serving some vehicle-trips that would normally use an uncongested I-5 (see **Figure 3**).How does Figure 3 illustrate the underlined idea? This needs more exposition to connect the dots.

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Because both bridges would serve similar travel sheds and because the arterial bridge by itself could accommodate most (how close is "most") of the traffic demands of both arterial bridges, traffic operations along I-5 within the BIA (the BIA is defined as the segment of I-5 between and including SR-500 and Columbia Boulevard)(define the BIA somewhere else rather than in this sentence it makes it too hard to read and understand) would likely be similar for a scenario that included only the arterial bridge west of I-5 and for a scenario that included both arterial bridges. Therefore, the remaining discussion is valid for a scenario that includes the provision of both an arterial bridge adjacent to I-5 and the western arterial and roadway near the railroad tracks.(This is not very clear. I think it needs to be illustrated with more data or explained more clearly. How many vehicles would

use the west arterial AND the arterial bridge if both were in place. How much traffic would they draw off I-5? I assume, the data would show that one or the other would be significantly underused, thus modeling that had only one would be similar to modeling that had both.)

3.0 I-5 Traffic Performance

Provision of both an arterial bridge adjacent to I-5 and a western arterial ~~and roadway near the railroad (each with one lane in each direction)~~ could benefit traffic operations along I-5. The arterial connections would provide a linkage for short trips that would be able to avoid the freeway and its ramps. However, analysis of the trips using the I-5 corridor indicates these arterial connections would not provide as much relief to congestion on the I-5 bridge as other options.

Although prior analysis conducted during the ~~Portland/Vancouver~~ I-5 ~~Transportation and Trade~~ Partnership ~~project~~ study revealed that 70 to 80 percent of weekday vehicle-trips using I-5 within the BIA enter or exit I-5 within the BIA, the majority of trips across the Columbia River are not local in nature. The average trip length for vehicles using the I-5 Interstate Bridges is 16 miles, compared to an average regional trip length of just six miles. Furthermore, year 2020 peak period travel demands along I-5 in the BIA, excluding the localized trips that would use the arterial bridges, would still exceed the capacity provided by four(? Is this the correct #? If so, we need to emphasize it so the reader picks up that in the next paragraph we are talking about 3 lanes each way) freeway lanes in each direction.

~~The "Final Strategic Plan" recommended limiting the total supply of lanes across the river to a maximum of five lanes in each direction. The recommendation stated: "For vehicles, there should be three through lanes (and not more than three) in each direction and up to two auxiliary and/or arterial lanes in each direction across the Columbia River (total five lanes in each direction)." A signalized arterial lane has an optimum peak hour capacity of about 1,000-1,200 vehicles per hour. A freeway lane can serve about 2,000 vehicles per hour. By trading arterial lanes for I-5 lanes, not only would the two 2-lane arterials be underutilized, but the demand on the existing six freeway lanes would be far greater than its capacity.~~

~~Therefore, u~~Under a scenario with both arterial bridges but only three lanes in each direction on I-5 in the BIA, motorists along the freeway would experience substantial congestion and delays. In fact, by 2020, motorists would experience substantially greater delays and vehicular queuing than is experienced under current conditions. (This paper doesn't say much to me and what it says it says in a conclusory fashion. The lane capacity data deleted from this paragraph and the idea that this concept trades mainline capacity for arterial capacity and doesn't work well is more instructive than the unsupported statements in the paper

As noted previously, Bridge Option No.7 (Figure 2) ~~the Portland/Vancouver I-5 Transportation and Trade Partnership study~~ analyzed a scenario that included an arterial bridge with one lane in each direction, but with I-5 reconstructed with four lanes in each direction. ~~This scenario was called Bridge Option No. 7.~~ Although this option would provide additional I-5 mainline capacity (four lanes in each direction instead of three) plus an arterial bridge across the Columbia River, it would still result in substantial congestion and slow travel speeds throughout the BIA (see **Figure 4** titled "Average Speed"). Based on travel demand and traffic operations analysis, in order to maintain or improve today's level of performance for I-5 by the year 2020, up to two additional lanes of freeway

capacity in each direction across the Columbia River would be needed. ~~According to~~ This data collected for the ~~"Final Strategic Plan for the Portland/Vancouver~~ I-5 ~~Transportation and Trade~~ Partnership,~~"~~ demonstrates that arterial-only bridge concepts do not show promise for addressing the corridor's problems.

4.0 Conclusions

This WP reviews the traffic performance of a scenario that includes two, 2-lane arterial bridges across the Columbia River and maintaining I-5's crossing at six lanes. This WP is based on travel demand modeling and traffic operational assessments conducted as a part of the Portland/Vancouver I-5 Transportation and Trade Partnership study. The following is a summary of key conclusions:

- Within the BIA, the I-5 mainline with three lanes in each direction would operate similarly if both arterial bridges were provided or if just the arterial bridge west of I-5 was provided.

- With the provision of one or both arterial bridges and without providing additional mainline capacity to I-5, motorists using the freeway would experience substantial congestion and delays. In fact, by 2020 motorists would experience substantially greater delays and vehicular queuing than is experienced under current conditions.

- To maintain or improve today's level of performance for I-5 by the year 2020, up to two additional lanes of freeway capacity in each direction across the Columbia River would be needed. The data collected for~~According to~~ the "Final Strategic Plan for the Portland/Vancouver I-5 Transportation and Trade Partnership," demonstrates that arterial-only bridge concepts do not show promise for addressing the corridor's problems.