

Response to Questions from Mayor Adams

QUESTION 1:

What is the value of the investments that have been made approaching the bridge in Oregon (specifically the I-5 Delta Park-Lombard widening and extension of light rail to Expo Center)? Have those expenditures been considered in decisions about how to apportion the proposed cuts?

RESPONSE 1:

The Interstate MAX LRT Project (Yellow Line) cost \$350 million and the Delta Park/Lombard cost \$ 81 million.

Previous expenditure in the corridor, whether in Oregon or Washington, was not a factor in identifying cost savings opportunities. The overriding focus was on identifying the most cost-effective scope reductions, value engineering solutions, and phasing opportunities that do not unduly reduce project benefits and still achieve significant cost reductions. Examples of factors that were considered include:

- Less expensive engineering/design solutions for same project scope (i.e. value engineering solutions)
- Optimizing the transit component, including ensuring adequate access to park-and-rides
- Providing needed access to Port industrial properties on both sides of river.
- Traffic safety
- Reducing traffic capacity in ways that avoided imbalances or complex weaving motions,
- Environmental impact considerations
- Seismic vulnerability
- Bicycle and pedestrian access
- Constructability

The resultant cost reduction program proposes a larger cost reduction in Oregon than in Washington simply because there is a significantly more construction in Oregon, and therefore greater opportunity for cost savings. Even with the proposed cost reduction program there is \$190 million more construction in Oregon than in Washington.

QUESTION 2:

Can you raise the I-5 facility on Hayden Island and still achieve cost savings by building a higher berm rather than a structure, keeping the Tomahawk Drive elevation at or close to what is proposed in the LPA?

RESPONSE 2:

Yes, the CRC Project Team has identified design concepts to raise Tomahawk Drive to elevations that are close to (or at) LPA levels while still maintaining much of the projected cost savings. There appear to be ways to accomplish this elevation improvement without materially increasing the height of the fill walls (i.e. berm). We are currently working with City staff on these design concepts and will provide a refined plan in mid-January. After reaching agreement on the revised design concept, the CRC Project Team will continue to work with City staff and the community during final design to optimize the design and achieve the maximum elevation of Tomahawk Drive possible.

QUESTION 3:

Assuming a total highway/interchange project cost of \$2.55 billion, what is the finance plan? How much is projected to come from a) tolls; b) the federal government; and c) state government.

RESPONSE:

The conceptual finance plan below shows a range of CRC Project cost estimates based on the proposed project refinement recommendations and the latest results of the Cost Estimate Validation Process (CEVP). Costs and revenues are shown in year-of-expenditure dollars. The finance plan is preliminary; refinements are in process based on the recent results from the toll sensitivity, CEVP, and other analyses. The finance plan may be adjusted based on legislative, DOT, FHWA/FTA, public, and PSC reviews.

**Preliminary Finance Plan Scenarios
In Billions of Year-of-Expenditure Dollars**

	60% Probability	90% Probability
Cost		
Highway	\$2.40	\$2.65
Transit	\$0.79	\$0.89
Total	\$3.19	\$3.54
Revenues		
Tolls	\$1.15-\$1.29	\$1.25-\$1.49
Federal Highway	\$0.40	\$0.40
ODOT and WSDOT	\$0.75-\$0.85	\$0.90-\$1.00
New Starts	\$0.75-\$0.79	\$0.75-\$0.89
Total	\$3.19	\$3.54

The plan calls for securing \$400 million in Projects of National and Regional Significance funding from the upcoming federal transportation reauthorization act. While the toll rate structure for the CRC Project will not be established until after tolling is authorized by the Washington legislature, the range of financial capacity from tolls that are shown above are based on the Tolling Study Committee analysis, which found a variety of rate structures capable of providing the amounts shown; no specific toll rate structure is assumed in the finance plan. The amount shown for the DOTs is subject to an intergovernmental agreement between the DOTs allocating cost responsibility and legislative approvals of the required funding, and could vary depending on final disposition of other elements of the finance plan. The New Starts funding presumes the recent statutory language secured by Senator Murray, and requires FTA approval of a Full Funding Grant Agreement based on the New Start rating regulations.

QUESTION 4:

What is the breakdown of the \$30 million cost for the cap on the Washington Side?

RESPONSE 4:

The cap over I-5 in Vancouver is proposed mitigation for the right-of-way impacts and other adverse effects of CRC on the historic-designated Fort Vancouver, as required by Section 106 of the National Historic Preservation Act (NHPA). The \$30 million cost estimate for the cap primarily pays the cost of a structural bridge platform over I-5. The cost estimate also includes a small allowance for features on the cap that are required by the mitigation plan resulting from the Section 106 Review. The actual features and the costs required to mitigate the project's historic

impacts will remain uncertain until the Section 106 review is complete, as required by Federal law. The cost of any features or amenities incorporated onto the cap that are beyond those required to mitigate impacts will be born by third parties.

QUESTION 5:

What would be the cost savings of going to an 8-lane bridge capable of accommodating 10-lanes? A 6-lane bridge that could accommodate 8-lanes?

RESPONSE 5:

Compared to the proposed ten-lane bridge, an 8-lane bridge capable of accommodating 10-lanes in the future could save \$25 million in initial construction costs – but in its permanent 10-lane configuration would have sub-standard shoulders that would cause disabled vehicles in the shoulder areas to impact traffic flows in abutting travel lanes.

Compared to the proposed ten-lane bridge, a 6-lane bridge capable of accommodating 8-lanes in the future could save \$60 million in initial bridge construction costs. However, in its permanent 8-lane configuration, the 6-lane expanding to 8 lane design would have 10-15 percent less capacity than the proposed 10-lane bridge. The impact of this bridge design on the financial capacity of tolls has also not been investigated, but would likely be material, as a result of the increased congestion and auto diversion.

To ensure the questions are fully and clearly answered, included below are additional details that may help put these conclusions in context.

Additional Observations on Bridge Design and Cost Reduction

The conclusions above are premised on the open-web “box” bridge structure recommended by UDAG and supported by the PSC. There are several key implications of this bridge type, as it relates to this discussion:

- a. In its simplest form, the proposed bridge superstructure consists of a “box” and an “overhang.” The top of the box provides the deck for the highway travel lanes and the bottom of the box is the deck for light rail and the bicycle and pedestrian facilities. The width of the space for light rail (i.e. the bottom of the box) depends on the width of the top of the box.
- b. The “overhang” is that portion of the superstructure that connects to and extends outward from the box. The per-foot cost of the overhang is considerably less than that of the box; it is the most cost-efficient portion of the highway deck under a web box bridge type.
- c. Because the width of the box cannot be narrowed very much without losing the required width for the light rail deck and the structural support for the overhang, the narrowing of the bridge in the 8-10 lane and 6-8 lane scenarios is primarily accomplished by taking width from the overhang. Since the overhang is substantially less costly than other portions of the superstructure, the resultant superstructure cost savings are far less than proportionate width reduction of the bridge.
- d. The size and, therefore, cost of the bridge substructure (foundation and piers) is driven by the “seismic loads” (liquefaction being the primary determinant of the depth of the foundations), “live loads” (traffic, light rail operations, river forces, vessel impact loads, etc) and “dead load” (i.e. weight of the bridge itself). Some of these loads are not materially affected by the narrower widths in question here (i.e. liquefaction, vessel impact loads, etc) and the impacts of those that are affected (e.g. weight or ‘dead load’) are disproportionately less than the width reduction (e.g. the per-foot weight of the overhang is far less than

that of the box). So similar to superstructure savings, the substructure cost savings of the narrower bridge scenarios are far less than their proportionate width reduction.

8- Convertible to 10-Lane Bridge Concept

With the 10-lane concept currently proposed, the bridge has two structures; each about 92' wide consisting of inside and outside shoulders each at 14' wide, five lanes each at 12' wide, and 4' of additional width for traffic barriers. To convert this design into a narrower bridge that can ultimately provide ten 12' traffic lanes, the initial cross-section (8-lane configuration) for each span would consist of two 14' shoulders, four 12' wide travel lanes and 4' of width for traffic barriers.

To convert the 8 lane configuration to the 10-lane configuration, the shoulder widths on each span would be reduced to 8' wide and the 12-feet made available on each span from the shoulders narrowing would create a 12' lane. Thus, the total width of each span would be 80' wide, 12' (9%) less than the current 10-lane bridge design. The entire 12' of width would come from narrowing the overhang; resulting in very little impact on loads (and therefore substructure costs), only a modest impact on superstructure costs, and an initial estimated savings of about \$25 million. The disadvantages of this scenario when the 10-lane configuration is implemented are the narrow shoulders. While these shoulders would be better than those existing today, they would not provide sufficient width to get disabled vehicles far enough away from travel lanes to minimize their impact on traffic flow. The initial 8-lane configuration would also impact the financial capacity possible from tolls.

6- Convertible to 8-Lane Bridge Concept

The 6-to-8 Lane Bridge scenario is similar to that described above, except that each span would be 68' wide. In its initial 6-lane configuration, the cross-section of each bridge span would consist of two 14' wide shoulders, three 12' wide travel lanes, and 4' width for traffic barriers. To convert to an 8-lane facility, the shoulder widths on each span would be reduced to 8' each, and the 12' feet made available on each span would be restriped as an additional lane. As before the reduction in bridge width would come entirely from the overhang – and this scenario uses even less of the cost-efficient overhang space. Thus, while this scenario may produce greater savings than 8-to-10 lane scenario, it will be less cost-efficient in terms of cost per lane, provide less capacity, and suffer similarly from narrow shoulders. While initial savings in bridge substructure and superstructure costs are estimated to be about \$60 million, this estimate requires some caveats. This scenario diverges sufficiently from the current 10-lane bridge design as to create uncertainties in how it will function. There may have to be changes to the highway approaches that are not accounted for in this assessment. There would also have to be a different construction mobilization and operations plans, which is likely to add cost.

QUESTION 6:

Can you add non-structural cables to the base bridge design for the collector-distributor bridges over North Portland Harbor simulating a cable-stayed bridge, and, if so, at what additional cost? Are these drawings available?

RESPONSE 6:

Yes, it is possible to incorporate non-structural cables in the design of the bridges over North Portland Harbor. Because the UDAG recommended against such a design, the Project Team has not prepared a formal design or engineering-level cost estimate for it, and there are no drawings of the design. The Project Team has conceptually estimated the additional cost of incorporating non-structural cables in the North Harbor bridges at about \$17-\$20 million per bridge in year-of-expenditure dollars.