

December 22, 2008

Mr. David Dye  
WSDOT  
PO Box 47300  
Olympia, WA 98504-7300

Dear Mr. Dye:

This letter responds to your request that we provide you our best thinking about deep bore tunnel costs. We would like to thank you for meeting with members of our team and for sharing information among colleagues. Much of our thinking has been presented in our previous letters and in last week's discussions with the stakeholder committee. The main conclusions are:

1. A bored tunnel option provides replacement through capacity while reducing construction and longer term community impacts.
2. Highway tunnels in these conditions are feasible and there is a large body of experience from within and outside the US.
3. Based on a survey of other tunnel projects both in the US and internationally the reported AWW replacement cost is higher than might be expected.
4. The 9.5 year construction schedule also appears long when compared with other projects.

We appreciate the opportunity to attend and present at the Stakeholders meeting last week, and thank you for providing a copy of your presentations. While we have not received a detailed breakdown of your estimate or schedule we have carried out an initial assessment of the figures provided and have compared these figures with those from other similar highway tunnels. Based on this analysis we continue to believe that the project cost estimates for the tunnel options are significantly higher than those of similar recent tunneling projects, and we explain some of the reasons we believe this to be the case below:

- **Cost comparison and Savings**

While we do not have your detailed cost breakdown, based on the information provided we have the following broad comments which are based on the twin bored option, although several hold true for the single bore:

It appears that the AWW Construction Estimate of \$1.2bn (which includes 25% design contingency and contractor mobilization, overhead and profit) is in line with consortia's construction bid prices for PPP projects of a similar nature. These hard bids were prepared on the basis of a preliminary design and include design and construction risk and contingency. Based on this analysis we would expect a construction estimate of between \$1.2 and \$1.4bn including risk and much of the contingency that has been included as separate line items in the estimate presented.

The design fee of 15.75% and the construction administration figure of 15.5% appear high in our experience. We would anticipate them to be of the order of 10% and 6% respectively. We would also not expect the uplift for risk, contingency and escalation to be applied to these items, or the uplift for risk to be applied to contingency.

Based on these observations we believe that the project can be competed for less than \$2Bn including the Right of Way costs.

As a comparison against a bid project, these figures assume that the project proceeds largely to the anticipated schedule and do not include the impacts of any substantial project delays or other extreme events.

It is not clear from the figures provided where the demolition of the existing viaduct is included in the estimate. We assume that this is not included in the tunnel costs.

- **Tightening the Estimated Construction Schedule.**

While the overall construction period is reported at 9.5 years we understand from your presentation that the tunnel construction will be of the order of 7.5 years (twin tunnel) and 6.5 years (single large tunnel). Our assessment is that construction of the tunnel (including portals, tunnel and highway) could reasonably be reduced to a maximum of 5 years for either option. A 5-year construction period is consistent with the Port of Miami tunnel proposal which also included the final design phase. In addition to reducing construction impacts this would have some reducing effect on construction cost (contractor's fixed costs and escalation) and construction impacts.

- **Mitigation costs**

While we have not been provided with details of the cost estimates for the other options we anticipate that mitigation costs for the bored tunnel would be comparatively low. The other options have impacts that will be extremely difficult to mitigate and these costs, we believe, are not included in the budget projections. Recent economic studies performed by the Waterfront Coalition suggest negative impacts to businesses would be lowered with the deep bore tunnel option, thereby reducing potential migration costs.

- **Holistic Costing**

As discussed in our presentation we would recommend that the whole life cost of the various alternatives be assessed. This would include annualized operations, maintenance and replacement costs, as well as the wider costs and benefits to the community including the cost of disruption during construction, the cost of additional travel time associated with the surface option and the increase in property values and potential for increased amenity as a result of removing traffic from the waterfront.

- **Alaskan Way / Western Avenue Couplet**

The Option F Scenario included for upgrading of Alaskan Way and Western Avenue to a 6 lane north-south route at a cost of \$190 million. The couplet does not appear as part of the elevated viaduct scenario and it is not clear why it is part of bored tunnel scenario, given that the bored tunnel provides similar throughput.

- **Continue Tunnel Hybrid Analysis in Environmental Impact Statement**

The Stakeholder Group and the community have come together to recommend the deep bore tunnel option be carried forward for further analysis in the EIS. In our considered opinion it would be beneficial to construct a deep bore tunnel before the current elevated structure is demolished, sustaining throughput, lessening the traffic impacts of demolition and lessening the impacts on local businesses.

In fact, if a deep bore tunnel were selected as a preferred alternative, the EIS process could be reduced significantly. Unlike the elevated alternative and the surface plus transit, the deep bore, has impacts limited to the portals and any shafts and may even be managed as a supplemental assessment to the original AWW EIS.

To this point we have not had the data, time or resources to complete a detailed line by line comparison of the cost estimate or schedule. The above conclusions are based on our experience of tunnels and highway projects both in Seattle and further afield and on comparisons with other projects. With full access to the technical project data so far collected by the independent project team, we estimate we could develop such a comparison cost estimate in 5 weeks.

We understand the importance of moving forward on a decision for AWW. We also fully understand the need to adequately address the full costs of a project, including potential risk. In light of these concerns, we respectfully offer the following recommendations:

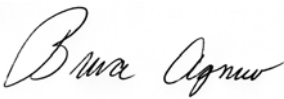
- Proceed to include Deep Bore Hybrid in next phase of the environmental analysis
- Fully develop a tunnel cost estimate to the same level that the currently selected hybrids will be, and include for mitigation costs.
- Concurrently pursue a "dual" design
- Issue a request for proposals

Such an approach would allow the industry to weigh in on costs, risks, inflation, etc. Their informed self-interest will provide the State and our region with actionable information that could provide a solution that really works for our city, our economy and regional mobility.

Respectfully,



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Associate Principal, Arup



Bruce Agnew  
Policy Director, Cascadia Center for Regional Development

Cc: Vladimir Khazak, Vice President, HNTB  
Dick Robbins, Founder, Robbins Company  
Kern Jacobson, Independent Transportation Engineering Consultant  
Gerhard Sauer, President, Sauer Corporation