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Metro

PLANNING AND PROGRAMMING COMMITTEE
FEBRUARY 16, 2011
MEASURE R PROJECT DELIVERY COMMITTEE
FEBRUARY 17, 2011

SUBJECT: PUBLIC-PRIVATE PARTNERSHIP PROGRAM

ACTION: RECEIVE AND FILE

RECOMMENDATION

Receive and file Public-Private Partnership Program preliminary costing information for the SR-710 North gap project, in response to Motion by Director Najarian at the December 9, 2010 Board meeting.

ISSUE

At the December 2010 meeting, Director Najarian submitted a Motion for full Board consideration, directing staff to update the funding estimates for the SR-710 North gap project. InfraConsult LLC and its subcontractors (KPMG LLP, Halcrow Inc., Nossaman LLP, Sharon Greene + Associates and Englander & Associates) (Consultant) conducted two independent estimates of costs for the tunnel and have also completed an analysis of comparable tunnel construction costs at a tunnel which will utilize design and technology similar to that proposed for the SR-710 North gap project. An initial draft report of interim findings describing the results is appended (Attachment A).

DISCUSSION

The Consultant has been monitoring the procurement and bid award for the Alaskan Way Tunnel (AWT) in Seattle, a project that compares technically to the SR-710 North gap concept and elements of the Westside extension project. Washington State DoT awarded the contract for the project in January 2011, providing us with a unique opportunity to undertake comparative costing of our estimates with current market data.

We have extrapolated the data from the Alaskan Way Tunnel project and conducted two independent estimates of cost for our tunnels, with particular emphasis at this point on the SR-710 North gap project, in response to the Director's motion. Our preliminary findings, utilizing the actual bid cost for the AWT deep bore tunnel, validates the updated cost estimates for the SR-710 North gap tunnel project that we have developed at this early stage.

NEXT STEPS

We will return to the Board with the Final SR-710 North Gap Project Tunnel Cost Analysis report within the next two months.

ATTACHMENTS

A. Summary of interim findings on SR-710 North tunnel project cost estimate

Prepared by: Kathleen Sanchez, Transportation Planning Manager

Roger S. Moliere
Chief, Real Property Management and Development

Arthur T. Leahy
Chief Executive Officer

ATTACHMENT A

SR-710 North Gap Project Tunnel Cost Analysis

Interim Draft Report

January, 2011

Introduction

This report is in response to Metro Task Order 4A-2(a) under Metro's Public-Private Partnership Advisory Services contract with InfraConsult, LLC. The Report presents a preliminary summary of a cost assessment for the SR- 710 North gap tunnel, as defined in the Final Draft Report entitled *Recommendations for Business Case Development* (Attachment B). It is an Interim Draft Report; the Final Report will be provided by early March, 2011.

In December, 2010, the Washington State Department of Transportation (WSDoT) opened bids on the first large bore highway tunnel in North America using state-of-the-art tunnel boring machine (TBM) technology. The Alaskan Way tunnel in Downtown Seattle will be built using design and technology similar to that proposed for the SR-710 North gap project. This Report provides a summary comparison of the accepted bid price for the WSDoT tunnel to the proposed SR-710 North gap tunnel as defined conceptually by Metro and the InfraConsult Team. It should be noted that this comparative assessment has been prepared for the nominal tunnel alignment currently under study for SR-710 North gap project, and thus represents a baseline with respect to the other alternatives that will be fully assessed by Metro in the pending environmental and engineering work. That baseline is fully described in the Attachment B Report.

WSDoT received bids from ACS/Dragados and FCC, both major European contractors with large bore tunneling experience. Using large diameter tunnel boring equipment is a relatively recent technological advance in underground civil works. The bid prices were very close to one another, and both were below the WSDoT estimate. While ACS/Dragados' price was slightly higher, it was awarded the contract by WSDoT on January 6, 2011, based on a comprehensive evaluation of best value. The contract is a design-build contract, with the contractor assuming substantial design and construction risk. As noted in various documents prepared for Metro's PPP Program, the appropriate transference of risk from the public sector to the private sector is a key advantage of a design-build/PPP approach. This would also be the case with the SR-710 North gap tunnel under a PPP project delivery approach. The WSDoT requirement for the acceptance of such risk transference, as well as previous experience designing and constructing large bore tunnels, assured that competition was effectively limited to those contractors able to meet the contractual and performance criteria.

Basis of Comparison

While there are many similarities between the Alaskan Way Tunnel and the proposed SR-710 North gap representative tunnel alignment, there are also key differences which must be taken into account in undertaking a comparative cost assessment. The most obvious difference is tunnel length. The Seattle tunnel is 9,500 feet in length, while the proposed SR-710 North tunnel alignment is 21,000 feet long and currently anticipated to be a dual bore tunnel, creating a total center-line length of 42,000 feet.

Efficiencies improve as tunneling progresses. These likely efficiencies are not included in this high-level assessment, as the comparative boring costs for the SR-710 North gap tunnel are an extrapolation of the per mile boring costs for AWT. Other key differences include the following:

- The soils along the Seattle tunnel alignment present a greater geotechnical challenge than the soils in the vicinity of the SR-710 North gap tunnel.
- The Alaskan Way Tunnel alignment under downtown Seattle encounters numerous high rise buildings, as well as a number of historic buildings of substantial footprint. Certain special mitigation actions were therefore included in the AWT which are unlikely to be needed for SR-710 North gap. (One of the AWT bids included $36M for these costs, while the other bid carried $138M for such mitigation, as shown in the accompanying table).
- The ventilation requirements for the AWT are less substantial than for the SR-710 North gap tunnel, owing to its shorter length. No interim vent stacks were necessary in Seattle, and horizontal ventilation is contained within the bore itself. For SR-710 North gap, this is not the case. For the purposes of this comparative analysis, the SR-710 North gap tunnel cost assessment incorporated $90 million for a parallel small bore tunnel to accommodate horizontal ventilation and to serve as a pilot bore.
- Both tunnels are in seismically vulnerable areas. The SR-710 North gap tunnel alternative considered here would dissect the Raymond Fault at nearly a perpendicular angle. While this is not considered particularly problematic, for the purposes of this assessment $50M has been included for special handling of the fault crossing.
- The portals in Seattle must be newly constructed in dense urban areas. For the SR-710 North gap, there are stub freeway connections at both ends. Thus, no change in the previous cost estimates for the tunnel portals for SR-710 North gap has been made at this point, although this is an area that is in need of a more developed conceptual design.

Interim Results

As noted above, the principal purpose of this comparative cost assessment is to determine whether the SR-710 North gap tunnel construction cost estimate being carried forward in the PPP business case development phase is a realistic and market-based cost. When compared in detail to the actual construction bids received by WSDoT for the Alaskan Way Tunnel project, the initial analysis indicates that the tunnel cost model for SR-710 North gap is both reasonable and realistic. While no two projects are completely alike and the contracting and risk environment changes over time, it appears that the information displayed in the accompanying table is appropriate and indicative of the current marketplace at this stage of project development.

It is important to note that for purposes of this construction cost analysis, only the tunnel construction costs were compared for consistency. Other costs carried in the overall project cost estimate in addition to the tunnel construction costs include design, project management, right-of-way acquisition, financing costs, and a variety of other elements that together represent the total project cost.

The primary conclusion to draw from this comparative analysis is that the tunnel cost estimate for the representative SR-710 North gap alignment derived for the earlier strategic assessment work is reflective of current market pricing. The actual bids received for a very similar project validate the total and per-mile construction cost that Metro is using for its preliminary engineering and environmental work on the proposed tunnel.

The accompanying table presents the results of the comparison made for this interim report. The AWT tunnel construction cost, as bid, supports the value used in the analysis at approximately $358 million per tunnel mile, with the prospect of a further reduction when additional refinements are made to the cost estimate. The more significant refinements to be included in subsequent analysis include:

- Accounting for the efficiencies of scale in boring costs for 42,000' of tunnel compared to 9,500'
- Improving conceptual configuration and cost for the north and south portals
- Evaluating the cost of a single bore tunnel with fewer lanes of traffic on an interim basis as a Phase 1 project.
- Providing a "range estimate" to bracket the probable costs and provide a higher level of certainty.

COMPARATIVE ANALYSIS OF ALASKAN WAY TUNNEL CONSTRUCTION BIDS AND PROPOSED SR-710 NORTH GAP ESTIMATED CONSTRUCTION COSTS

Cost Element Description	SR 710N Tunnel Original Estimate 2006[1]	SR 710N Tunnel Estimate 2010[2]	SR 710N Tunnel Revised Estimate 2011[3]	Alaskan Way WSDoT Estimate 2010	Alaskan Way FCC Bid 2011	Alaskan Way Dragados Bid 2011
Civil - Portals	$139,000,000	$156,000,000	$156,000,000	$0	$324,000,000	$340,000,000
Civil - Tunnels, ventilation, finishes, roadworks, mechanical	$2,350,000,000	$2,642,000,000	$2,464,000,000	$1,050,000,000	$630,000,000	$557,000,000
Civil -Ventilation/Pilot Tunnel	$0	$0	$90,000,000	$0	$0	$0
Civils - Special Treatment at Raymond Fault	$0	$0	$50,000,000	$0	$0	$0
Toll Collection Systems	$0	$16,000,000	$16,000,000			$0
Operational Control Center	$25,000,000	$28,000,000	$28,000,000	$60,000,000	$98,500,000	$55,000,000
Geological and Geotechnical Surveys	$0	$2,000,000	$2,000,000	$0	$0	$0
Environmental Mitigation	$0	$5,000,000	$5,000,000			
Utility Diversions and Relocations	$0	$0	$0	$60,000,000	$0	$0
Special Building Settlement Mitigation	$0	$0	$0	$0	$35,802,000	$137,700,000
TOTAL CONSTRUCTION COST	**$2,514,000,000**	**$2,849,000,000**	**$2,811,000,000**	**$1,170,000,000**	**$1,088,302,000**	**$1,089,700,000**
Facts and Figures						
Overall Length (Includes both bores for SR 710N) (miles)	7.96	7.96	7.96	1.8	1.8	1.8
Excavation Diameter (feet)	57	57	57.4	54	54	57.4
Internal Liner Diameter (feet)	-	-	52	50	50	52
Construction Cost per Tunnel Mile ($millions/mile)	$316	$358	$353	$650	$605	$605
Construction Cost per Project Mile ($millions/mile)[4]	$632	$716	$706	$650	$605	$605

Notes: (1) Cost estimate by PB for Caltrans

(2) Cost estimate by InfraConsult for Metro PPP Program

(3) Cost estimate by InfraConsult using Alaskan Way Tunnel bid price analysis

(4) Includes twin bores for future traffic