

South Site Location

**TREND NOTICE**

**ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**



**Washington State  
Department of Transportation**

Trend Title: <b>Establishment of Roadway Configuration - Bored Tunnel Alternative</b>		Date: 12/17/2009	
Trend Log Number/Rev. <b>C0004</b>		Segment Name: Central Waterfront	
Prepared By: <u>Dawn McIntosh, 12/17/2009</u> <i>Dawn McIntosh</i> Name / Date		Approval Level / Authority: <input type="checkbox"/> Director of Engineering & Administration Support	
Preparer's Supervisor <u>Alec Williamson, 12/17/2009</u> <i>Alec Williamson</i> Name / Date			
Nature of Change:	<input type="checkbox"/> Scope	<input type="checkbox"/> Schedule	<input type="checkbox"/> Budget
Does Trend Impact Legislative Funding Allocation? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		Does Trend Affect Biennium Aging? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	

**Level of Approval Requested:**

- Full Approval
- Approval for Scope Only; Additional Study / Justification to follow

**Description of the Trend (Use Continuation Sheets as Needed):**

Approval of this trend will establish the basis for design and the geometric configuration for the Bored Tunnel Alternative.

- Basis for Design: See Attachment #1
  - The Bored Tunnel Alternative extends from a point between S. Royal Brougham Way and S. King Street, in the south, to Roy St., in the north
  - Functional Classification: Principal Arterial
  - Design Classification:
    - Holgate St. to Thomas St.: P1- Urban (Full Limited Access)
    - Thomas St. to Mercer St.: Urban Managed Access Class 1
    - Mercer St. to Roy St.: match existing Urban Managed Access Class 3
  - Design Speed:
    - The design speed and posted speed will be 50 MPH between S. Holgate Street and Thomas Street.
    - The design speed and posted speed will be 40 MPH from Thomas Street to the northerly project Terminus at Roy Street.
  - Horizontal and vertical Stopping Sight Distances will be met
- Bored Tunnel Alternative Geometric Configuration: See Attachment #2, Roadway Configuration, and Attachment #3, Bored Tunnel Alternative Alignment Study
  - Horizontal alignment:
    - South End: See Attachment #4 for South End Key Assumptions
      - The southerly end of the project limits will be located on Alaskan Way, between S Royal Brougham Way and S. King Street.
      - South Ventilation building will be located east of SR 99 between Dearborn Street and S. King Street.
      - The cut and cover section that transitions from the surface highway system to the bored tunnel will span from near Charles St. to S. King Street

**TREND NOTICE****ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**
**Washington State  
Department of Transportation**

Page 2 of 14

- Two cross streets may be constructed. The new cross streets, Charles Street and Dearborn Street, will provide connectivity across the new SR 99 alignment between the city street grid system and the waterfront.
  - The number of intersections to be included in the project will be determined through an engineering analysis, the urban design approval process, and the results of a benefit-cost analysis. In order to match up the roadway configuration with the recently completed CEVP estimate of cost, a risk will be assumed in proceeding with two intersections in the baseline.
- All entering and exiting ramps will be right-on or right-off, except the Southbound Off ramp, which will be left-off.
- The Tunnel Bore:
  - The tunnel bore will begin on Alaskan Way, at the eye-wall, at the south side of the S. King Street intersection
  - The tunnel bore will traverse northwesterly under the Alaskan Way street right-of-way, between S. King St. and Yesler Way
  - The alignment will leave Alaskan Way street right-of-way near Yesler Way, travel beneath the existing Viaduct foundations, and traverse northwardly, under the 1<sup>st</sup> Avenue right-of-way near University Street
  - The tunnel bore will extend under the 1<sup>st</sup> Avenue right-of-way, from University Street to Stewart Street
  - Leaving 1<sup>st</sup> Avenue near Stewart St., the tunnel bore would traverse in a northerly direction, diagonal to the city street grid system, until it reached the 6<sup>th</sup> Avenue street right-of-way, near Denny Way
  - The northerly tunnel eye-wall will be located in 6<sup>th</sup> Avenue north of Thomas Street
- The North End:
  - The north cut and cover section will extend along 6<sup>th</sup> Ave between Thomas and Harrison
  - The north vent building will be located in the southeast quadrant of 6<sup>th</sup> Avenue and Harrison Street
  - All entering and exiting ramps will be right-on or right-off, except the Northbound On ramp and Southbound Off ramp, which will be left-on and left-off, respectively.
  - 6th Avenue will be extended from Harrison Street to Mercer Street with a curved alignment paralleling the west side of SR 99.
    - A second option for the 6<sup>th</sup> Avenue extension is under consideration, a straight alignment following the vacated City of Seattle right of way through the Gates Foundation parcel
  - Portions of 6<sup>th</sup> Avenue and Harrison Street will be reconstructed following completion of the cut and cover section.
  - Three cross streets, John Street, Thomas Street, and Harrison Street, will be reconnected across Aurora Avenue following opening of the bored tunnel.
  - Broad Street, through the project limits, will be vacated by the city of Seattle
  - The northerly terminus of the retained cut and connections back into the surface street grid system will occur in the vicinity of Mercer Street
- Tunnel cross section:
  - For estimating purposes, the inside diameter of the tunnel will be approximately 49 feet.
  - The tunnel will be in a stacked arrangement with two northbound travel lanes on the lower deck and two southbound lanes on the upper deck.
  - The travel lanes will be 12.0' in width, minimum
  - The 4.0' (minimum) shoulders in both the northbound and southbound directions will be located on the same side of the tunnel as the emergency exits and egress corridor to provide safe passage to the emergency stairwells in the event of an emergency
  - The 2.0' (minimum) shoulders in both the northbound and southbound directions will be located on the plenum side of the tunnel

**TREND NOTICE****ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**
**Washington State  
Department of Transportation**

Page 3 of 14

- The tunnel vertical clearance for each deck will be a minimum of 15' over the travel lanes and 14.5' minimum over the shoulders.
- Vertical Alignment: See Attachment #5: Tunnel Profile Memo
  - Maximum grade will be +/- 6.0%.
  - Minimum vertical clearance of 0.5 Tunnel Diameter will be provided under the Elliott Bay Interceptor and Burlington Northern Santa Fe railroad tunnel.
  - Minimum vertical clearance between the tunnel and the pile tips of the existing Alaskan Way Viaduct will be 10.0 feet.
  - Since alternative tunnel profiles are under consideration, a future Trend may be necessary to address the selection of the baseline vertical profile.

**Justification for the Trend (Use Continuation Sheets as Needed):*****Why are we requesting approval of this Trend, and what are the benefits?***

This trend is being requested to establish the Bored Tunnel Alternative geometric configuration resulting from the Value Engineering (V.E.) and Cost Estimation Valuation Process (CEVP) studies that occurred from October 24, 2009, to November 30, 2009.

The benefits of establishing the Bored Tunnel Alternative geometry is to finalize the horizontal and vertical alignments and tunnel cross section so that the Supplemental Draft Environmental Impact Statement (SEIS) can be completed and the Tunnel Design-Build Request for Proposals (RFP) can be completed. These processes need to be completed in a timely manner, so as to maintain schedule adherence.

***If the Trend is approved, what are the drawbacks? Identify and discuss any negative impacts.***

Prior to the completion of the recent VE and CEVP Studies, the project was being designed to primarily follow the 1<sup>st</sup> Ave alignment. Thus, all Engineering studies and Supplemental Draft EIS Discipline Studies, and associated plan sets, were prepared based on the 1<sup>st</sup> Ave alignment. Approval of this Trend will adopt the VE and CEVP studies recommendation to shift the alignment onto Alaskan Way Blvd. to mitigate cost and risk issues associated with the earlier alignment.

**Drawbacks include:**

- Re-working of EIS Discipline Reports and EIS Snap Shot Plans
- Re-working of Engineering Technical Reports and Tunnel Design-Build RFP Reference Plans sets
- Increase cost of Preliminary Engineering to perform the re-work,
- Completion of the Tunnel Design-Build RFP needs to be delayed slightly to allow the time needed to perform the preliminary engineering re-work.
- The project will meet the overall program schedule

**Impacts of this Trend:**

Improved Maintenance of Traffic during construction

Overall schedule impact reductions

Reduction to the overall project costs

Reduction in the overall project risks have been mitigated by shifting the alignment from 1<sup>st</sup> Ave to Alaskan Way.

***Schedule Impacts to QPR Milestones:***

Since this trend is only for the purpose of establishing the Bored Tunnel Alternative geometric configuration, there are no overall project schedule impacts anticipated as a result of this trend. Delays associated with the RFP will be absorbed within the overall schedule. The schedule for this alignment will become the new baseline schedule for the project. The table below identifies the key milestones associated with WIN U09903A.

**TREND NOTICE**

**ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**



**Washington State  
Department of Transportation**

<u>Milestone Description</u>	<u>Date Before Trend*</u>	<u>Date After Trend</u>	<u># Calendar Days Impact</u>
Project Definition Complete	31-Jul-09	31-Jul-09	0
Begin Preconstruction Engr.	1-Oct-09	1-Oct-09	0
Environmental Doc. Compl.	31-Mar-11	31-Mar-11	0
RW Certification	NA	May 2010	NA
Advertisement Date (DB- RFP)	NA	May 2010	
Operationally Complete	24-Dec-15	24-Dec-15	0

\* "Date Before Trend" from Trend CW0011R1 (2009 Legislative Final Budget Based on Single Bored Tunnel Alternative)

**Schedule Impacts to Other Milestones:**

<u>Milestone Description</u>	<u>Date Before Trend</u>	<u>Date After Trend</u>	<u># Calendar Days Impact</u>
Bid Opening	NA	October 2010	NA
Award		January 2011	
Execution		TBD	
Construction Start (NTP)	3-Jan-11	January 2011	NA
Final Contract Completion	TBD	TBD	

**Cost Impacts (x \$1,000)**

Since this trend is only for the purpose of establishing the Bored Tunnel Alternative geometric configuration, there are no cost impacts anticipated as a result of this trend. The cost of this alignment will become the new baseline estimate for the project.

<u>Project Phase</u>	<u>Baseline Target Estimate*</u>	<u>Trend Estimate</u>	<u>Variance from Trend</u>
PE	268,170,000	TBD	TBD
RW	181,370,000		
CN	1,041,130,000		
Total	1,490,670,000		
Total Estimated Impact			

\* "Baseline Target Estimate" from Trend CW0011R1 (2009 Legislative Final Budget Based on Single Bored Tunnel Alternative)

**TREND NOTICE**

**ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**



**Washington State  
Department of Transportation**

**Business Management/Project Controls Review:**

***Aging Summary Table (x \$1,000)***

Phase	Cost	Prior	09-11	11-13	13-15	15-17
Preliminary Engineering	Current Trended Budget	-	-			
Right of Way	<b>P E N D I N G</b>					
Construction						
Total						
	Budget	-	-	-	-	-
	This Trend Estimate	-	-	-	-	-
	Revised Budget	-	-	-	-	-
This Trend Estimate v. Current Trended Budget						

**Mitigation(s) for the Trend:**

Since this trend is only for the purpose of establishing the Bored Tunnel Alternative geometric configuration, there is no mitigation proposed as a result of this trend.

**List and Description of Attachments:**

- Attachment #1: SR 99 Program Corridor - Basis for Design
- Attachment #2: Bore Tunnel Alternative - Plan, Profile, and Cross Section
- Attachment #3: Bored Tunnel Alternative - Alignment Study
- Attachment #4: South End Key Assumptions
- Attachment #5: Bored Tunnel Alternative - Profile Memo and Profile Criteria Spreadsheet

**Acknowledgement Status (Name / Date):**

- AWW&SRP Director of Operations \_\_\_\_\_ / \_\_\_\_\_
- AWW&SRP Director of Program Management Shirley Green / 12-18-09
- AWW&SRP Director of Central & North Projects [Signature] / 12/18/09
- AWW&SRP Director of South End Projects \_\_\_\_\_ / \_\_\_\_\_

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**ALASKAN WAY VIADUCT & SEAWALL REPLACEMENT PROGRAM**



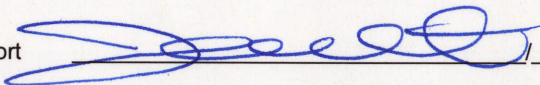
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**Approval Status:**

- Fully Approved
- Elevate to Program Administrator
- Approved for Scope Only; Additional Study / Justification Required (See "Instructions" Below)
- Defer Approval Pending Receipt of Additional Information (See "Instructions" Below)
- Rejected

Instructions:

**Approval Authority (Name / Date):**

- Director of Engineering & Administration Support  / 12/18/09
- Program Administrator \_\_\_\_\_ / \_\_\_\_\_

**Instructions:**

- Does Fully Approved Trend require a PCRf?  Yes  No
- Does Fully Approved Trend require a 603 Form?  Yes  No

**If Approved; Updating of Project Cost / Schedule Basis/Baselines:**

- Cost Basis / System Updated
- Schedule Basis/ System Updated

Project Controls Manager Name / Signature / Date \_\_\_\_\_

**If Approved; Updating of Project Cost / Schedule with PCRf Submittal:**

- PCRf Submitted

Business Manager Name / Signature / Date \_\_\_\_\_