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of Transportation

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Administration**

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August 4, 2015

HMP-WA/WA646

Ms. Lynn Peterson
Secretary of Transportation
Department of Transportation
Olympia, Washington

Attention: Amy Arnis

**Adequacy Finding for SR 99 Alaskan Way
Viaduct Replacement Project 2015 Financial
Plan Annual Update**

Dear Ms. Peterson:

The Federal Highway Administration (FHWA) has reviewed the 2015 Financial Plan Annual Update (FPAU) for the SR 99 Alaskan Way Viaduct Replacement Project originally submitted by the Washington State Department of Transportation (WSDOT) on May 29, 2015. We have determined that the Plan meets the requirements of our 2014 Major Project Financial Plan Guidance. Your 2015 Updated Plan is therefore approved.

The current project cost estimate as stated in the 2015 FPAU, is \$2,240 million as compared to \$2,244 million in the 2014 FPAU.

The next scheduled FPAU should include all project information as of February 28, 2016, and should be submitted within 90 days of this date. We continue to look forward to working with you and your staff as the project progresses.

Please contact me at 206-220-7538 if you have any questions or need information or assistance.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator

By: Anthony Sarhan, P.E.
Major Projects Oversight Manager

Cc via email: Mia Waters ,WSDOT; Sajid Aftab, FHWA

Alaskan Way Viaduct **REPLACEMENT** PROGRAM



 U.S. Department of Transportation
Federal Highway Administration

 **WSDOT**

 King County

 Port
of Seattle

 City of Seattle

2015 Financial Plan Update

SR 99 Alaskan Way Viaduct Replacement Project **(Including the Bored Tunnel)**

Submitted May 29, 2015, Certified July 24, 2015

Federal Project Numbers: SAFETEA-LU PNRS-0099(096), SAFETEA-LU PNRS-0099(097), NHPP-BR-ER-STPF-NH-0099(111), ER-0101(314), HP-0099(095), STPF-0099(122), BR-0099(132)

Prepared for:
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US Department of Transportation
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Certified by:
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In funding partnership with the Port of Seattle and the City of Seattle



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¹ There is also a Final EIS for the Replacement Project, however, construction mitigation discussion is best captured in the SDEIS language identified in this Appendix.

² TEIS / LAPR = Last Approved Executive TEIS current WSDOT headquarters approved scope, schedule, and budget for programmed capital projects, direct project support, and project support activities.

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³ Please note that the Washington State Legislative Toll Authority is listed as SB 6444 in Appendix O. This similar numbering to the GCA is a coincidence.

Glossary

Term	Definition or Description															
ARRA	American Recovery and Reinvestment Act of 2009															
Base Case	The term “base case” describes the starting year of data from which we compare against future change financial plans.															
Biennium	<p>A two-year planning and funding cycle for Washington State that starts is an even number fiscal year and ends with an odd number fiscal year (e.g., 2013-15 biennium covers FY 2014 and FY 2015).</p> <p>In relation to calendar year dates the example of the 2013-15 biennium would start with an odd numbered year and end with an odd year, covering July 1, 2013 through June 30, 2015.</p> <table border="1" data-bbox="1023 483 1526 913"> <thead> <tr> <th>State Biennium</th> <th>Biennium in State Fiscal Year terms</th> <th>Biennium in Calendar Year Terms</th> </tr> </thead> <tbody> <tr> <td>2011-13</td> <td>= FY 2012 - FY 2013</td> <td>= July 1, 2011- June 30, 2013</td> </tr> <tr> <td>2013 -15</td> <td>= FY 2014 - FY 2015</td> <td>= July 1, 2013 - June 30, 2015</td> </tr> <tr> <td>2015-17</td> <td>= FY 2016 - FY 2017</td> <td>= July 1, 2015 - June 30, 2017</td> </tr> <tr> <td>2017-19</td> <td>= FY 2018 - FY 2019</td> <td>= July 1, 2017- June 30, 2019</td> </tr> </tbody> </table>	State Biennium	Biennium in State Fiscal Year terms	Biennium in Calendar Year Terms	2011-13	= FY 2012 - FY 2013	= July 1, 2011- June 30, 2013	2013 -15	= FY 2014 - FY 2015	= July 1, 2013 - June 30, 2015	2015-17	= FY 2016 - FY 2017	= July 1, 2015 - June 30, 2017	2017-19	= FY 2018 - FY 2019	= July 1, 2017- June 30, 2019
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2015-17	= FY 2016 - FY 2017	= July 1, 2015 - June 30, 2017														
2017-19	= FY 2018 - FY 2019	= July 1, 2017- June 30, 2019														
CE	Construction Engineering, the budget associated with construction management of a construction project that includes state work force and agreement costs.															
CEVP®	Cost Estimate Validation Process, trademarked in Washington State.															
CRA	Cost Risk Assessment. A less intensive version of CEVP®															
DBE	Disadvantaged Business Enterprise															
FHWA	Federal Highway Administration															
FPAU	FHWA Federal Financial Plan Annual Update															
FY	<p>Fiscal Year. Washington state fiscal year runs of July 1 – June 30. See example graphic to the right.</p> <p>One-half of a Washington State Biennium</p> <table border="1" data-bbox="1023 1302 1526 1543"> <thead> <tr> <th>State Fiscal Year</th> <th>Fiscal Year in Calendar Year Terms</th> </tr> </thead> <tbody> <tr> <td>FY 2012</td> <td>= July 1, 2011-June 30, 2012</td> </tr> <tr> <td>FY 2013</td> <td>= July 1, 2012-June 30, 2013</td> </tr> <tr> <td>FY 2014</td> <td>= July 1, 2013-June 30, 2014</td> </tr> <tr> <td>FY 2015</td> <td>= July 1, 2014-June 30, 2015</td> </tr> </tbody> </table>	State Fiscal Year	Fiscal Year in Calendar Year Terms	FY 2012	= July 1, 2011-June 30, 2012	FY 2013	= July 1, 2012-June 30, 2013	FY 2014	= July 1, 2013-June 30, 2014	FY 2015	= July 1, 2014-June 30, 2015					
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FY 2014	= July 1, 2013-June 30, 2014															
FY 2015	= July 1, 2014-June 30, 2015															
IFP	Initial Financial Plan															
Legislature	Washington State Legislature															
M/W/DBE	Minority and Women’s Business Enterprises and Disadvantaged Business Enterprises															
Major Project Office	FHWA staff in Washington DC who track and oversee transportation projects over \$500 million and include federal funding.															

NEPA	National Environmental Policy Act
NHPP	National Highway Performance Program
Nickel	A 5-cent motor vehicle tax increase approved by the Washington State Legislature starting in 2003 that provided funding for transportation projects in Washington.
OIPD	Office of Innovative Program Delivery - A branch of FHWA dedicated to provide tools, expertise and financing to help the transportation community explore and implement innovative strategies to deliver costly and complex infrastructure projects.
PE	Preliminary Engineering phase, includes Environmental work
PSRC	Puget Sound Regional Council, the Metropolitan Planning Organization (MPO) that includes King and adjacent Counties
PV	Partial Veto. An action taken by the Governor to reject a portion of a legislative proposal.
RCW	Revised Code of Washington
ROD	Record of Decision
SR	State Route
STP	(National) <u>Surface Transportation Program</u> , a federal funding source. It also stands for <u>Seattle Tunnel Partners</u> , WSDOT's contracted design builder. Use of the acronym depends on the context of the information.
	An FHWA term that equates to the term "Final Acceptance" as defined within WSDOT M 41-10, "Standard Specifications for Road, Bridge, and Municipal Construction", Division 1, 1-05.12, p. 1-28, dated January 2, 2012 (partial excerpt).
State Acceptance (Physical Completion)	"The Contractor must perform all the obligations under the Contract before a Completion Date and final acceptance can occur. Failure of the Contractor to perform all the obligations under the Contract shall not bar the Contracting Agency from unilaterally accepting the Contract as provided in Section 1-09.9. The Secretary accepts the completed Contract and the items of Work shown in the final estimate by signature of the Final Contract Voucher Certification. The date of that signature constitutes the acceptance date. Progress estimates or payments shall not be construed as acceptance of any Work under the Contract."
Substantial Completion⁴	Also referred to Operationally Complete, this term has several meanings depending on the agency and context. <u>For FHWA Major Project Office</u> : also linked to "Contract Acceptance". It is the point at the end of the project (or program) where all major work is complete, except for minor lingering requirements like monitoring of plant establishment. <u>For WSDOT Construction</u> : the day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, all the initial plantings are completed and only minor incidental work, replacement of temporary substitute facilities, plant establishment periods or correction or repairs remains for the Physical Completion of the total Contract.
TBM	Tunnel Boring Machine
TDM	Transportation Demand Management

⁴ Does not affect/change the terms for "substantial completion" defined in any construction contract.

TPA	Transportation Partnership Account, a 9 ½-cent motor vehicle tax increase approved by the Washington State Legislature starting in 2005 that provided funding for transportation projects in Washington
USDOT	US Department of Transportation
Utilidor	An enclosed corridor that may contain multiple utilities.
VE	Value engineering, an organized effort to analyze the design and constructability of a project in order to achieve maximum functionality in balance with cost and schedule requirements.
WSDOT	Washington State Department of Transportation
YOE	Year of Expenditure. A federal cost estimating requirement that started in 2004 with the federal SAFETEA-LU transportation funding authorization that required costs figures to account for inflation in future years up to the point of their expenditure on transportation projects. Also referred to as “nominal”

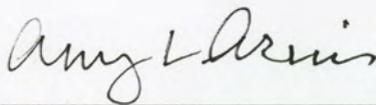
Letter of Certification

The Washington State Department of Transportation (WSDOT) has developed the fourth annual update of the 2011 Initial Financial Plan for the *SR 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) that includes the Bored Tunnel. The annual update was prepared in accordance with the requirements of Section 106, Title 23 US Code, and the December 2014 Financial Plan guidance issued by the Federal Highway Administration.

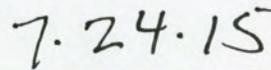
The financial data in this plan is a snapshot in time, incorporating the actions taken by the 2014 Washington State Legislature and adjustments proposed in the 2015 Legislative Session. The cost data in this annual update provides an accurate accounting of costs incurred through February 28, 2015 and includes a realistic estimate of costs including various risks, engineers estimates, existing contracts and planned activities, existing change orders, and expected construction cost escalation factors through May 2015.

The Replacement Project contains a mix of funding that includes direct sources as well as toll revenues. While the estimates of financial resources rely upon assumptions regarding future economic conditions and demographic variables, they represent our best current estimates of available monies to fully fund the Replacement Project.

To the best of WSDOT's knowledge and belief, the Financial Plan Update, fairly and accurately presents the financial position of the Replacement Project, cash flows and expected conditions for design and construction of the project. The financial forecasts in the Financial Plan are based on our judgment of the expected project conditions and our expected course of action. We believe that the assumptions underlying the Financial Plan Update are reasonable and appropriate. Further, we have made available all significant information that we believe is relevant to the Financial Plan and to the best of our knowledge and belief, the documents and records supporting the assumptions are appropriate.



Amy Arnis
Chief Financial Officer
Assistant Secretary, Financial Administration
Washington State Department of Transportation



Date

1. Executive Summary

This document is the fourth Annual Update for the *State Route (SR) 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) Federal Highway Administration (FHWA) Financial Plan. This financial plan is required by the FHWA because the total project size, including design, right of way, and construction, exceeds \$500 million and the Washington State Department of Transportation (WSDOT) is using federal funds in construction.

This project is part of a larger *SR 99 Alaskan Way Viaduct Replacement Program* (AWV Program) comprised of multiple projects within the corridor. The corridor needs to be replaced for safety purposes because the central waterfront viaduct is seismically unsound. For a background and history of the AWV Program see Appendix R.

Located in Seattle, Washington (Figure 1), the Replacement Project is comprised of seven components that will connect with the other projects within the AWV Program. Together, the projects form a connected roadway system through the west side of downtown Seattle. These components include the following (Figure 8 in Section 3 provides an overview):

1. Bored Tunnel Design-Build
2. North Access
3. North Surface Streets
4. South Access and Drilled Shafts
5. Viaduct Demolition (Removal)
6. Battery Street Tunnel Decommissioning
7. Mercer Street West (this component to be overseen and funded by the City of Seattle)⁵

Figure 1: AWW Replacement Project

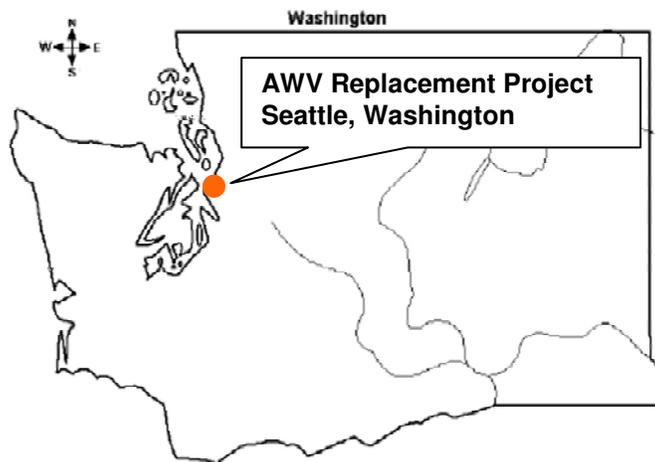


Figure 2: Tunnel Boring Machine (TBM) Certification



Work continues to progress since the Replacement Project Initial Finance Plan was submitted to FHWA in August 2011. Voters in the City of Seattle affirmed their support for the AWV Program in a September 2011 advisory vote. Notice to Proceed 2 was given to Seattle Tunnel Partners, the tunnel project's design-builder, contractor in August 2011. The Tunnel Boring Machine (TBM) (Figure 2) was delivered in April 2013 and excavation of the tunnel launch pit

⁵ Planning and implementation of the Mercer West project is the responsibility of the City of Seattle, of which the Dexter to 5th Avenue portion is described in the WSDOT FEIS and thus included in this federal financial plan (update).

was completed in spring 2013. Tunnel boring started in July 2013 but was then halted in December 2013. After engineering and constructing an access shaft, the TBM cutterhead and drive mechanism was disassembled and excavated in March 2015 (Figure 3). The TBM is now under repair. Meanwhile, work on the north and south portals and the North Access Connection project continues. The AWW Program has completed acquisition of all necessary rights of way, with 100 percent of interests now certified.

Cost

This update reflects some changes in the project budget, with the 2014 financial plan showing a budget of \$2.244 billion and this 2015 financial plan showing a budget of \$2.240 billion. This is a 0.2 percent decrease in the Central Waterfront component of the project is due to re-establishment of program reserves that separated the contingency between the bored tunnel project and the remainder of the AWW Program. The overall cost of the AWW Replacement Program has not changed.

The cost of the Replacement Project has remained stable to date despite issues with the TBM. In December 2013, STP stopped tunnel boring approximately 1,000 feet into the tunnel drive after experiencing increased temperatures in the machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing. As of May 2015, STP has completed an access pit, re-started the TBM and driven into the shaft to allow disassembly of the cutterhead and drive units and has begun repairs. The March 2015 STP construction schedule delays resumption of tunnel boring to late summer 2015 and the tunnel open to traffic by November 2017. WSDOT cannot verify any of the future dates in the STP schedule until the work to resume mining is further along. The responsibility for additional costs and delays associated with this work beyond the original date of November 2016 will be addressed in accordance with the SR 99 tunnel contract.

Funding and Toll Authority

There have been several changes in the way that WSDOT plans to pay for the Bored Tunnel. These modifications are due to an increase in availability of some fund sources and a decrease in others.

In 2012, the Washington State Legislature enacted authority to toll the Bored Tunnel. Preparation for this legislation identified a potential shortfall in the funding capacity of tolls on the Bored Tunnel due to diversion of traffic onto City of Seattle surface streets. The 2012 Legislature allocated \$200 million dollars of additional federal funding as a result.

The funding source distribution currently projected, as well as comparisons to prior years, is shown in Figure 4.

Figure 3: TBM Cutterhead Extraction

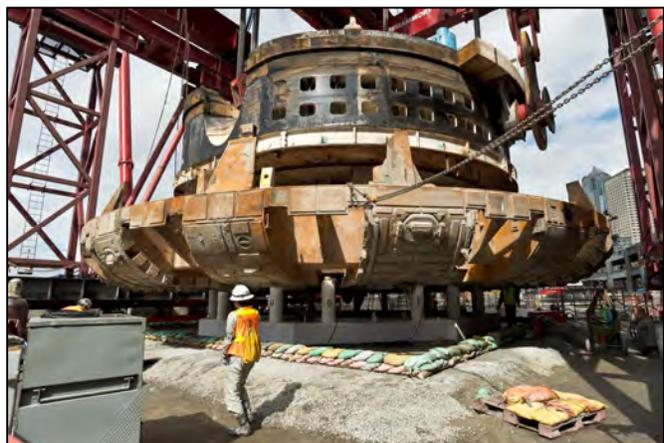


Figure 4: Changes in Funding, 2011 Base Case, 2014 Prior Year, and 2015 Current Year

2011 (Base Case)	2014	2015	Change 2011 Base Case vs 2015	Change 2014 vs 2015 (1 year)	Source
10.6%	21.8%	21.9%	+11.4%	+0.1%	Federal funding
61.6%	58.0%	58.1%	-3.6%	0.1%	State motor vehicle fuel tax
18.5%	2.8%	2.8%	-15.7%	0.0%	State tolling
9.2%	17.4%	17.2%	+7.9%	-0.3%	Local
			+3.7%	-0.2%	Total Change

Through February 2015, the project expended \$1.510 billion of the total \$2.240 billion budget (\$2.053 billion for the Central Waterfront component of the project and \$187 million for additional components described in the scope of the Replacement Project Environmental Impact Statement). WSDOT’s budget for the Replacement Project includes a contingency amount for potential cost overruns.

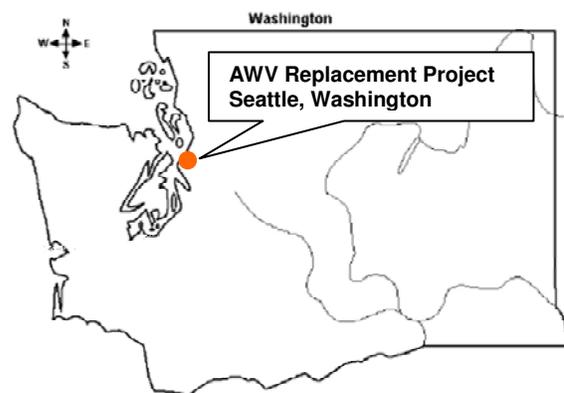
2. Introduction and Requirements

This document is the fourth Annual Update for the *State Route (SR) 99 Alaskan Way Viaduct Replacement Project* (Replacement Project) Federal Highway Administration (FHWA) Financial Plan. This financial plan is required by the FHWA because the total project size, including design, right of way and construction, exceeds \$500 million and the Washington State Department of Transportation (WSDOT) is using federal funds for construction.

Located in Seattle, Washington (Figure 5), the Replacement Project is part of a larger *SR 99 Alaskan Way Viaduct Replacement Program* (AWV Program) comprised of multiple projects that form a connected roadway system through the west side of downtown Seattle.

The corridor needs to be replaced for safety purposes because the central waterfront Viaduct is seismically unsound. For a background and history of the AWV Program, refer to Appendix R.

Figure 5: AWV Replacement Project



The purpose of FHWA financial plans and annual updates is to provide a comprehensive document that reports a snapshot of a project's cost estimate and revenue structure, and to provide an assurance that there will be sufficient financial resources available to implement and complete a project as planned.

This Annual Update for the Replacement Project Financial Plan describes the following:

- Cost estimates
- Delivery schedule
- Funding, revenues, and financing
- Projected cash flow needs
- Risk/mitigation management measures

Requirements

The requirement for Major Project financial plans was established in 2005. Section 1904(a)(2) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU) amended 23USC106(h). SAFETEA-LU identified that projects over \$500 million in total project cost shall develop financial plans and submit them for approval to the FHWA. Requirements are detailed in the *FHWA Financial Plan Guidance, January 2007 and were updated in December 2014*. The obligation to develop a financial plan remains under the new federal authorization, Moving Ahead for Progress in the 21st Century (MAP-21), with two amendments to the current law as shown in Public Law 112-141, section 1503(3)(4):

- (C) May include a phasing plan that identifies fundable incremental improvements or phases that will address the purpose and the need of the project in the short term in the event there are insufficient financial resources to complete the entire project. If a phasing plan is adopted for a project pursuant to this section, the project shall be deemed to satisfy the fiscal constraint requirements in the statewide and metropolitan planning requirements in sections 134 and 135; and
- (D) Shall assess the appropriateness of a public-private partnership to deliver the project. The full interim guidance on interpretation of MAP 21 guidance can be found at:

<http://www.fhwa.dot.gov/map21/guidance/guidemajorproj.cfm>

WSDOT develops a financial plan for the Replacement Project under the requirements listed above because the total project cost is over \$500 million and the project uses federal funds in the construction phase. Because the Replacement Project Initial Financial Plan was completed in 2011, prior to the passage of MAP-21 as well as the FHWA Interim Guidance dated in late 2012, items C and D above are listed for reference only, but are not applicable to this document.

Methodology

This Annual Update for the Replacement Project was prepared in accordance with the Financial Plans Guidelines established by FHWA. The Financial Plans Guidance presents an outline for the “Initial Financial Plan” and for “Annual Updates.” SAFETEA-LU requires that the Initial Financial Plan be based on detailed annual estimates of the cost to complete the remaining elements of the project and on reasonable assumptions of future increases in the cost to complete the project. The Initial Financial Plan provides information on the immediate and longer-term financial implications at the time of project initiation. The annual updates of the Initial Financial Plan provide information on actual expenditures in comparison to initial estimates, as well as updated estimates of future year's obligations and expenditures.

FHWA Financial Plan Review and Approval

Per the Requirements stated above, the Annual Update will be submitted to the FHWA Washington State Division Office for review and approval with OIPD concurrence. Review will include such items as the reasonableness of the cost projections, the viability of the identified funding sources including whether they are contained in the fiscally constrained Statewide Transportation Improvement Program (STIP)/Transportation Improvement Plan (TIP)/Long Range Plan, and the likelihood that the funding commitments will provide sufficient resources to complete the Project as planned. The FHWA review and a determination of acceptability are anticipated within 30 to 60 days from the date that the document is received by the FHWA Division Office, but may be extended based on the amount of coordination needed to resolve any issues.

FHWA Annual Update Timing

The Annual Update will be based on data collected from March to February over the course of a year and submitted to FHWA by June 1st of each construction year starting in 2012. Each update will reflect any changes in scope, risk, total and remaining project cost, and/or available funding. The final report will cover completion of the contract.

Data for the annual updates will specifically cover the following time periods shown in Figure 6.

Figure 6: Financial Plan Schedule

Plan Update	Time Period	Issued	Status
Initial Financial Plan	Project Start-Summer 2011	August 26, 2011	Approved
First Annual Update	August 2011-February 2012	June 1, 2012	Approved
Second Annual Update	March 2012-March 2013	June 15, 2013	Approved
Third Annual Update	April 2013-March 2014	May 30, 2014	Approved
Fourth Annual Update	April 2014-February 2015	May 29, 2015	Draft
Fifth Annual Update	March 2015-February 2016	May 31, 2016	Future
Sixth Annual Update	March 2016-February 2017	May 31, 2017	Future
Seventh Annual Update	March 2017-February 2018	May 31, 2018	Future
Eighth Annual Update	March 2018-State Acceptance 2019	May 31, 2019	Future

Two additional updates have been added to reflect the fact that the overall AWV Program schedule has been impacted due to the TBM stoppage. In December 2013, STP halted tunneling after experiencing increased temperatures in the machine subsequently determined to be an indication of damage to the machine's main bearing and seal system.

3. Project Description

The Replacement Project is comprised of seven components that will connect with the other projects within the AWV Program described in Appendix R to form a connected roadway system

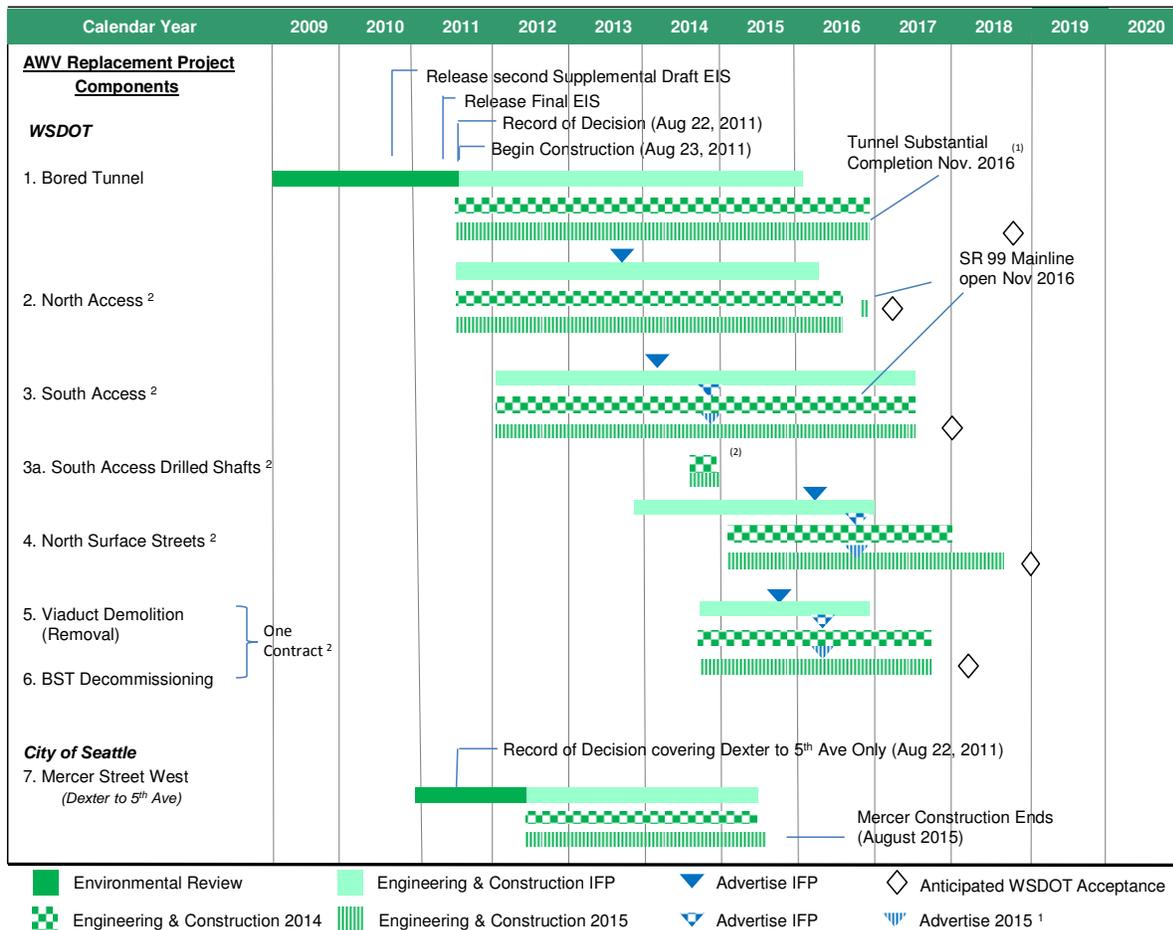
through downtown Seattle. These components will be delivered by contracts as noted. Figures 7 and 8 provide additional detail.

1. Bored Tunnel Design-Build
2. North Access
3. South Access and South Access Drilled Shafts (two contracts)
4. North Surface Streets
5. Viaduct Demolition (Removal) (one contract with components 5 and 6 combined)
6. Battery Street Tunnel Decommissioning
7. Mercer Street West (this component to be overseen and funded by the City of Seattle⁶)

The Replacement Project scope of work has been finalized through the completion of its Final Environmental Impact Statement (FEIS) in August 2011. The Bored Tunnel will replace SR 99 between South Royal Brougham Way and Roy Street. The tunnel will have two lanes in each direction. Access to and from the tunnel will be provided via ramp connections at the southern end, located north of South Royal Brougham Way and at the north portal near Harrison Street. In addition, the Project includes the removal of the viaduct along the Seattle waterfront and the decommissioning of the Battery Street Tunnel after the Bored Tunnel opens to traffic.

⁶ Planning and implementation of the Mercer West project is the responsibility of the City of Seattle, of which the Dexter to 5th Avenue portion is described in the WSDOT FEIS and thus included in this federal financial plan (update).

Figure 7: Replacement Project Component Anticipated Timeline



Notes:

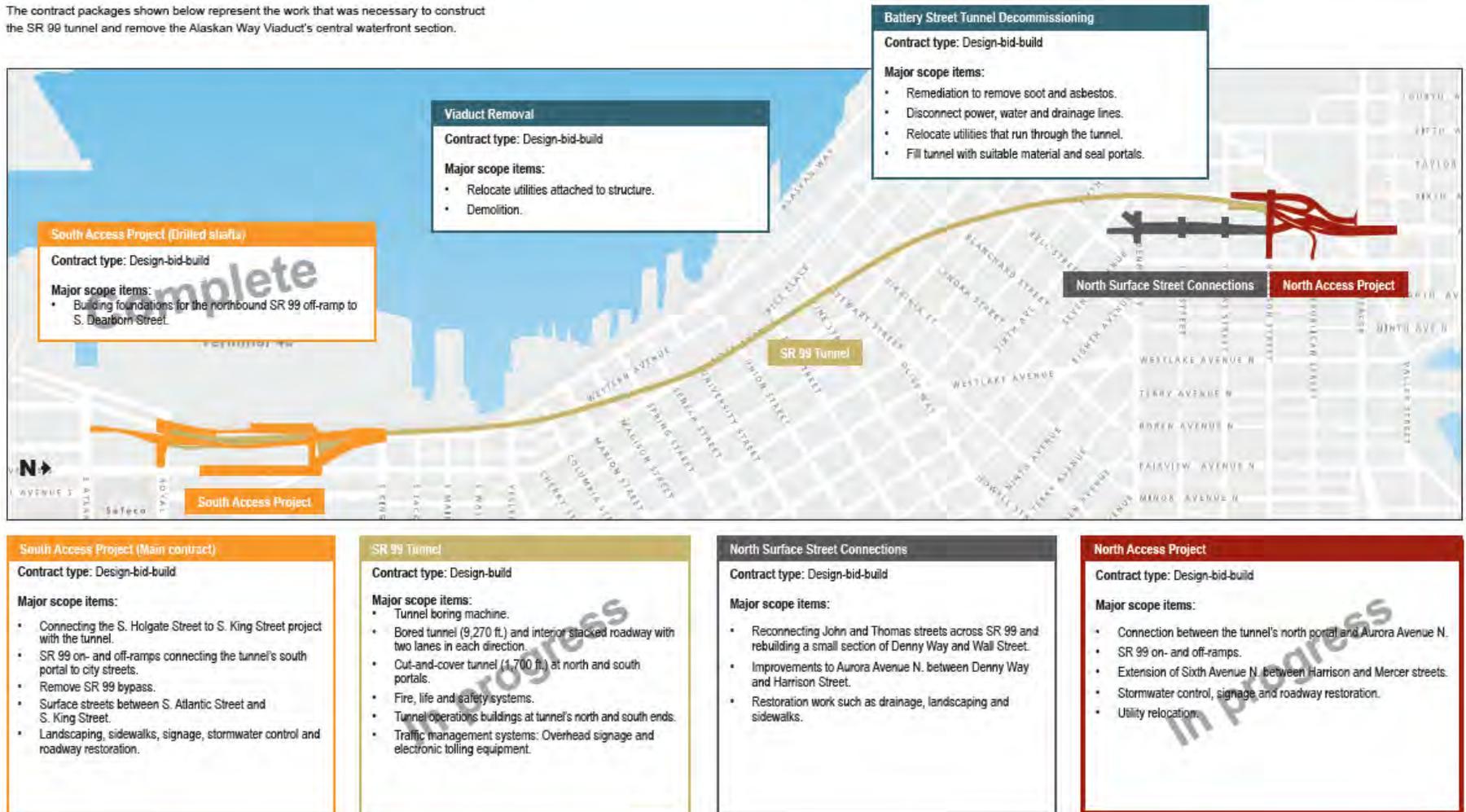
- 1) The schedule for this project changes frequently and does not account for the tunnel contractor's efforts to speed up the work. Durations and future Advertise milestones and durations for other components are for illustrative purposes only and are dependent on the tunnel contractor resuming mining and reaching Substantial Completion. Achievement of tunnel Physical Completion (not shown) is scheduled to occur approximately 8 months later.
- 2) Other contract schedules were summarized in the IFP, with the latest completion of the last scope originally planned for mid-2017. The South Access Drilled Shafts contract was not created until 2014 and did not exist in the Initial Financial Plan.

This timeline shows the relationship of schedule between components within the Replacement Project. In order to optimize interfaces between components as well as availability of design and construction staffing resources, the South Access Project drilled shaft work was separated into its own project. Additionally, the Viaduct Demolition and Battery Street Tunnel Decommissioning components have been combined into one proposed design effort. The North Surface Streets component will be designed concurrently and is now anticipated to be the last construction project completed within the Replacement Project.

Substantial Completion is when the State Engineer determines that WSDOT has full and unrestricted use and benefit of the facilities. As of this Plan's update, the Bored Tunnel, North Access Connection and South Access Connection Substantial Completion and mainline open to traffic is targeted for November, 2016. For the Viaduct Demolition/Battery Street Tunnel Decommissioning component, Substantial Completion is targeted for September 2017 and the North Surface Streets component is planned for one year later in September 2018. All of these estimates are predicated on the tunnel contractor's progress. The Mercer Street West project, led by the City of Seattle, is forecasted to be Substantially Complete by August 2015.

Figure 8: Components that Comprise the Replacement Project

The contract packages shown below represent the work that was necessary to construct the SR 99 tunnel and remove the Alaskan Way Viaduct's central waterfront section.



Bored Tunnel Design-Build

Status

In December 2013, STP stopped tunnel boring approximately 1,000 feet into the tunnel drive after experiencing increased temperatures in the machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing.

As of May 2015, STP has driven the TBM into the access pit from which the TBM cutterhead and main drive unit have been hoisted to the surface for repair. STP is repairing the seal system and will replace the main bearing allowing them to resume tunnel boring later in 2015.

Work continues on the cut-and-cover section in the area south of the launch pit and structural steel erection has begun for the south operations building. At the north end, the cut-and-cover area of tunnel containing the northbound and southbound roadways, mechanical plenums and utilidors was topped out with pre-cast concrete beams that will allow for the eventual completion of Harrison Street. Production of tunnel liner segments was completed, and the pre-cast facility was readied for production of the northbound road deck segments.

The March 2015 construction schedule update from STP states a resumption of mining in late July 2015 and the tunnel open to traffic by November 2017. WSDOT cannot verify any of the future dates in the STP schedule until the work to resume mining is further along. The responsibility for additional costs and delays associated with this work beyond November 2016 will be addressed in accordance with the SR 99 tunnel contract.

In fall of 2013, the FHWA investigated civil rights complaints regarding the Design Build Bored Tunnel Contractor, Seattle Tunnel Partners (STP), and DBE participation. As a result of an investigation, the FHWA determined that WSDOT was in noncompliance with its oversight obligations under the federal DBE regulations.

WSDOT declared STP to be in breach of contract and entered into a Conciliation Agreement with FHWA regarding the DBE complaint. This Conciliation Agreement outlined various crucial steps at a project and program level to achieve compliance.

WSDOT and STP resolved the breach of contract determination through the issuance of Change Order 91. Change Order 91, in part, established a DBE Contractual Requirement of not less than \$96 million dollars. Through February 2015, STP has claimed DBE commitments totaling \$92.3 million and DBE participation of \$56.0 million, or 4.9 percent of the STP contract total. The March 2015 WSDOT Disadvantaged Business Enterprise Program monthly report to FHWA is shown in Appendix S.

Description

This single contract design build (DB) procurement effort consists of cut-and-cover structures at the north and south portals; a large diameter (interior diameter 52 feet) bored tunnel; an interior concrete structure with stacked roadways for northbound and southbound traffic; two tunnel operations and ventilation buildings; and tunnel and traffic safety systems. The southern limit of the civil work will match with the South Access on SR 99 near South Royal Brougham Way, and the northern limit of the civil work will match with the North Access component, east of Sixth Avenue near Harrison Street.

The Bored Tunnel will have two lanes in each direction. The southbound lanes will be located on the top portion of the tunnel and the northbound lanes will be located on the bottom (Figure 9). The configuration for the design-build contract requires a minimum 32-foot roadway width and a minimum vertical clearance of 15 ½ feet within the traveled way. Travel lanes will be 11 feet wide, with a 2-foot-wide shoulder on the east side and an 8-foot-wide shoulder on the west side. The wider shoulder will provide emergency vehicle and maintenance access.

Figure 9: Bored Tunnel Cross-Section



The wider shoulder will also provide access to emergency tunnel exits, which will be provided at least every 650 feet. In an emergency, travelers would walk along the shoulders to reach a doorway that will lead into a secure waiting area called a refuge area, located between the tunnel's levels. Staircases inside the refuge area will provide access between the roadway levels. Signs will point travelers to the nearest exit where they would either wait for assistance or walk out of the tunnel. Refuge areas will contain emergency telephones. The tunnel will be equipped with ventilation, fire detection/suppression systems and drainage. Video cameras will provide real-time information to the operators at WSDOT's 24-hour tunnel control center and allow them to respond quickly to changing conditions and emergencies. The main tunnel control/operations center will be located at WSDOT's Northwest Region Traffic Management Center. The backup tunnel control/operations center will be incorporated into the tunnel ventilation building at the north tunnel portal between Thomas and Harrison Streets on the east side of Sixth Avenue North.

Figure 10: Bored Tunnel Alignment



Note: Bored Tunnel Alignment indicated by green oval.

North Access

Status

WSDOT awarded the contract to Guy F. Atkinson Construction LLC (Atkinson), executed the contract for this work on January 24, 2014 and work began on February 18, 2014. The project is expected to be completed in 2016 with exception of final tie-in work that requires substantial completion of the bored tunnel. WSDOT is working to ensure each ongoing contract sufficiently accounts for schedule changes associated with the design-build contract. The contract award amount to Atkinson was \$41.6 million excluding contingency, WSDOT construction engineering and third-party agreements.

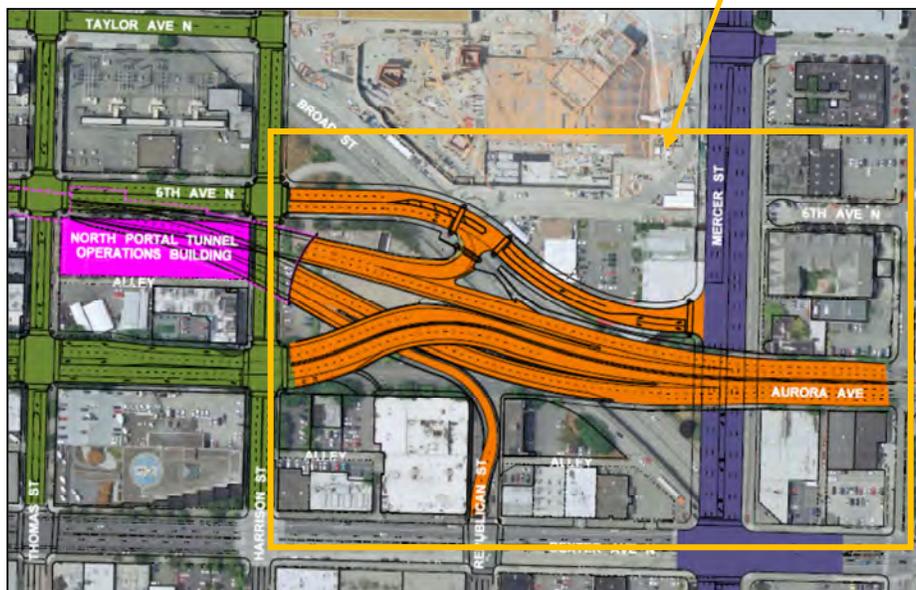
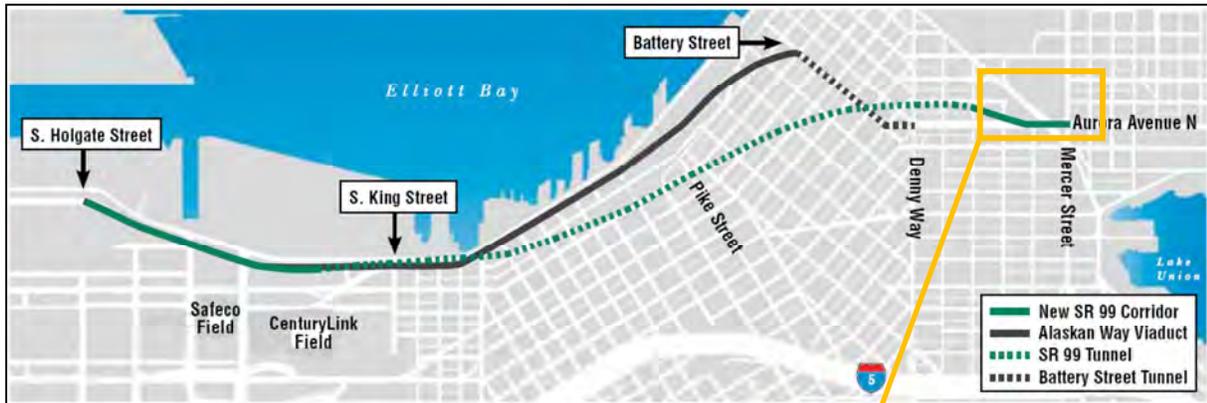
Through spring of 2015, much of the grading and excavation work has been completed as utility relocation work continues. The Aurora Avenue superstructure detour that passes over the north portal egress ramp has been formed and roadway deck is being reinforced. Harrison Street has been paved on the east side of existing SR 99 (Aurora Avenue).

Description

This design-bid-build contract is constructing the SR 99 mainline and ramps starting at the North Tunnel Portal area in the vicinity of Harrison Street, extending north to where it joins Aurora Avenue at Mercer Street. This contract includes on- and off-ramps in the vicinity of Republican Street and Sixth Avenue North that connect the mainline to the city streets and an extension of Sixth Avenue North from Harrison Street to Mercer Street. Other items of work include storm water controls, an Intelligent Transportation System (ITS), signing, structures, retaining walls, traffic control and roadside restoration. The installation of the advance signing and ITS extends north of Mercer Street (Figures 11 and 12).

Figure 11: North End Concept

(including Tunnel Operations Building, North Portal, North Access and Mercer Street)



Note: This image shows detail of orange box inset on above map.

Utility changes not associated with the north tunnel operations building and north cut-and-cover activities have been incorporated into the North Access construction project. The City of Seattle reimburses WSDOT for the relocation of electrical, water and transportation related-utilities that have been incorporated into the North Access construction project.

The roadway extending north from the tunnel portal at Harrison Street to the existing alignment of Aurora Avenue North will comprise the bulk of the North Access contract. There will also be surface roadway modifications to work with the new on- and off-ramps leading to and from the tunnel that connects to Sixth Avenue North and Republican Street, as well as the mainline merge with Aurora Avenue North.

At the north portal area, Sixth Avenue North will be extended from Harrison Street to Mercer Street. The new on-ramp to southbound SR 99 will intersect with the new Sixth Avenue North alignment midway between Harrison Street and Mercer Street. The new off-ramp from northbound SR 99 will connect to the intersection of Republican Street and Dexter Avenue.

Northbound on-ramps and southbound off-ramps to and from the intersection of Aurora Avenue North and Harrison Street will also be constructed.

Figure 12: North Access Design Concept and March 2015 Progress



- A. Mercer Street Widening and Bridge (by City of Seattle) and Southbound transition ramp
- B. Broad Street Closure and backfill; Gates Foundation Building (at left for reference)
- C. North Portal Area with Northbound and Southbound ramps to Bored Tunnel
- D. SR 99/Aurora Ave. N. Detour and Overpass across Northbound ramp from Bored Tunnel

North Surface Streets

Status

WSDOT continues to develop the design for this component concurrently with the Viaduct Demolition and Battery Street Tunnel Decommissioning component and is now anticipated to be the last project completed with the Replacement Project. The construction contract for the North Surface Streets component is anticipated to be advertised in late 2016. Figure 13 shows a design concept.

Description

This design-bid-build contract includes roadway work at the conclusion of the construction of the main roadway. This contract includes the reconstruction of Sixth Avenue and Harrison Street over the north portal cut-and-cover constructed as part of the Bored Tunnel. It will backfill the north portal of the Battery Street Tunnel; reconnect John, Thomas and Harrison Streets across Aurora Avenue North; make improvements to the Aurora Avenue surface street between Denny Way and Harrison Street; and complete minor restoration work, landscaping and sidewalks.

Figure 13: North Surface Street Design Concept



- A. Finish building new Aurora Ave. N. between Denny Way and Harrison St.
- B. Finish streetscape improvements to surrounding streets.

South Access and South Access Drilled Shafts

Status

In order to simplify construction sequencing, the South Access project has been divided into two contracts. The main contract retains the bulk of the work and will connect SR 99 south of downtown to the new tunnel. The South Access Drilled Shafts contract scope consists of drilled shafts for the southbound off-ramp at the future tunnel's south portal. This foundation work for the future south bound off ramp was pulled out and packaged as a separate construction contract. This construction contract was awarded on June 9, 2014 and all work was completed in December 2014.

Figure 14 shows the location of the project in relation to the overall tunnel project area. Figure 15 shows the current design concept.

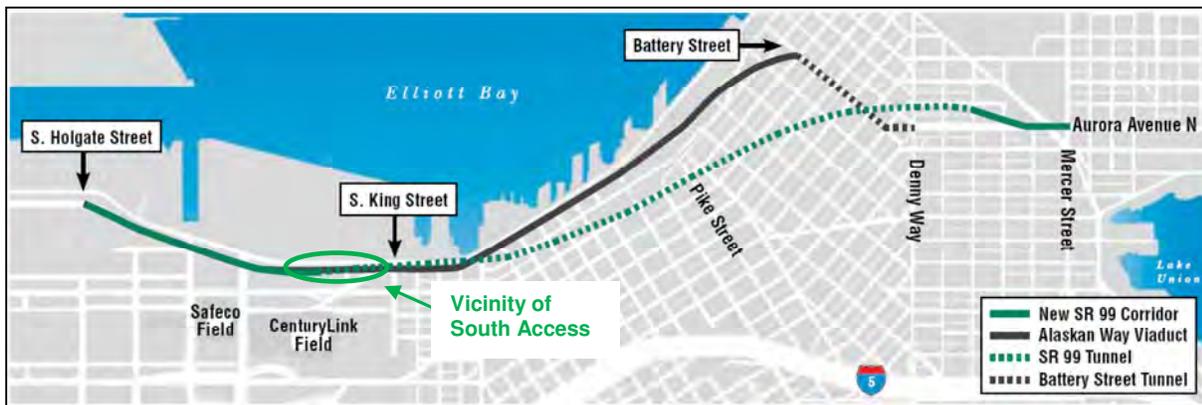
The main South Access contract which was originally planned to be advertised in early 2014, will be pushed back to January 2016 and begin construction later that year. Completion of the SR 99 Limited Access portion will coincide with the Tunnel open-to-traffic milestone and the remaining surface street elements will be re-forecasted when STP is able to provide more reliable schedule information.

Description

These design-bid-build contracts will provide the permanent connection of southbound SR 99 from the U-section of the bored tunnel on Alaskan Way in the vicinity of South Royal Brougham Way, to the Holgate to King Project, south of South Royal Brougham Way. The South Access contract will construct the southern 300 feet of the southbound off-ramp to the South Royal Brougham Way intersection. This contract will also construct the southbound on-ramp and the northbound off-ramp, which will include a bridge over the tunnel southbound off-ramp/northbound on-ramp construction, with the South Access Drilled Shafts contract having completed the foundation for the ramp. In Figure 15, the South Access contract starts around South Royal Brougham Way and ends at South King Street. South Royal Brougham Way is just north of Safeco Field.⁷

⁷ Safeco Field, located in South Seattle, is Washington's professional baseball stadium for the Mariners.

Figure 14: South Access Area of the Replacement Project



This contract includes the reconstruction of surface streets at both the South Royal Brougham Way and South Dearborn Street ramp terminals, and over the south portal cut-and-cover constructed by the Bored Tunnel Contractor. The surface street reconstruction includes the new Alaskan Way Boulevard, South Dearborn Street, and First Avenue South after the removal of the bypass and the East Frontage Road. This portion of the Replacement Project will construct the South Operations Building parking structure. It will also complete storm water control, ITS, signing, structures, retaining walls, traffic control and roadside restoration. The scope for the demolition of the viaduct south of King Street, including part of the Railroad Way ramp, has been shifted to the follow-on contract, the Viaduct Demolition and Battery Street Tunnel Decommissioning project.

Figure 15: South Access Design Concept



Note: Holgate to King and Bored Tunnel Project elements are also shown.

Viaduct Demolition (Removal) and Battery Street Tunnel Decommissioning

Status

A Cost Estimate/Value Engineering workshop was held in December of 2012. Preliminary concepts have been presented to the City of Seattle for both the Viaduct demolition and decommissioning of the Battery Street Tunnel. Design is progressing, and a Cost Risk Assessment (CRA) is planned in 2015. Demolition is slated to begin after the tunnel opens to traffic.

Description (Viaduct Demolition)

Demolition of the existing central and northern portions of the viaduct from just south of South King Street to the Battery Street Tunnel will start after the Bored Tunnel is open to traffic. The removal process is anticipated to take nine months. This contract will also remove the residual portions of the SR 99 construction bypass not reconfigured and removed by the Bored Tunnel Design Builder at the South Portal (Figures 14 and 15).

Viaduct Demolition will generate approximately 107,000 cubic yards of material, primarily broken concrete and reinforcing steel that would need to be hauled away and disposed. Utilities attached to the viaduct will be relocated before the viaduct is demolished. Utilities attached to the structure could be relocated underground, which will require excavation under the existing viaduct.

Most utilities buried beneath the viaduct are not expected to be affected by viaduct demolition or removal of the viaduct columns. Soil disturbances more than three feet below the existing grade have the potential to disturb deeper utilities. Mitigation measures, such as timber mats or gravel beds, would be used to ensure that utilities buried beneath the viaduct would not be damaged during viaduct demolition.

Description (Battery Street Tunnel Decommissioning)

The Battery Street Tunnel connects the existing SR 99 / Aurora Avenue North in the north end of downtown Seattle to the existing Alaskan Way Viaduct (Figure 16).

The Battery Street Tunnel will be decommissioned and closed after the Bored Tunnel opens to traffic and ends its utility as a construction debris haul route. As part of the Battery Street Tunnel decommissioning process, the tunnel may require remediation to remove soot containing high levels of lead and to remove asbestos within the tunnel. Decommissioning will also include disconnecting power, water and drainage lines. The necessary utilities that run through the tunnel will be relocated, and materials such as lighting fixtures will be removed. Then the tunnel will be filled with suitable material (such as the concrete rubble from the viaduct demolition), and all street access vents and both portals will be sealed. The rubble will be solidified with a concrete mix. The Battery Street Tunnel portals will be sealed with concrete and

Figure 16: Battery Street Tunnel



or earth embankment. This scope is currently planned to be combined with the viaduct demolition scope in one contract.

Mercer Street West (City of Seattle Contract)

Status

The construction contract for the Mercer West component was awarded in April 2013 by the City of Seattle to Guy F. Atkinson Construction for \$40.7 million and work is underway and is planned for substantial completion in mid-2015.

Description

The entire Mercer West Project includes improvements on Mercer Street between Fifth Avenue North and Elliott Avenue West (Figure 17). The improvements include reconfiguring Mercer Street, west of Ninth Avenue North, to accommodate two-way traffic. Mercer Street will become a two-way street and will be widened from Ninth Avenue North to Fifth Avenue North. The rebuilt Mercer Street will have three lanes in each direction with left-hand turn pockets. Broad Street will be filled and closed between Ninth Avenue North and Taylor Avenue North.

The project will improve access from SR 99 for drivers traveling to Uptown (Lower Queen Anne), Ballard, Interbay, and Magnolia neighborhoods. Although a piece of this component from Dexter to Fifth Avenue is included in the WSDOT EIS for the Replacement Project, it is entirely funded and administered by the City of Seattle as part of a larger package of Mercer Street improvements by the City.

Figure 17: City of Seattle Mercer Corridor Project



Project Historical Timeline and Current Schedule

In response to several large earthquakes in other parts of the world, WSDOT began to study the Viaduct in the mid-1990s. These studies showed that the 1950s-era viaduct was vulnerable to earthquakes and nearing the end of its useful life. In early 2001, a team of structural design and seismic experts began work to determine what to do about the viaduct. In the midst of this investigation, the 6.8-magnitude Nisqually earthquake shook the Puget Sound region on

February 28, 2001. The viaduct was slightly damaged, forcing WSDOT to temporarily shut it down for repairs.

In 2002, conceptual engineering for replacement of the viaduct began. Between 2002 and 2006, 176 alternatives were studied. By 2007, two alternatives were under consideration – a cut-and-cover tunnel and elevated structure alternative. Both alternatives were rejected as replacement options in an advisory vote by Seattle voters. In 2009, after a thorough public process, a bored tunnel was recommended for the replacement of the Central Waterfront section as part of the Replacement Project.

Over a period of time two Supplemental Draft Environmental Impact Statements (SDEISs) were released that studied the bored tunnel alternative. The Final Environmental Impact Statement was released in 2011. FHWA signed a Record of Decision (ROD) approving the project in August 2011. WSDOT executed a contract with Seattle Tunnel Partners (STP) to design and build the SR 99 tunnel, and directed the team to begin final design and construction shortly after the ROD.

Seattle Tunnel Partners signed a contract with Hitachi Zosen on October 12, 2011 to design and build the tunnel boring machine (TBM). The TBM was delivered to Seattle on April 2, 2013, assembled within the launch pit and then began tunneling on July 30, 2013. Between July 30, 2013 and December 6, 2013 the TBM had bored approximately 1000 feet into the tunnel and installed 149 of 1,426 rings.

In December 2013, STP stopped tunnel boring after experiencing increased temperatures in the machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing. As of May 2015, STP has begun to repair the seal system and replace the main bearing allowing them to resume tunnel boring later in 2015. The March 2015 STP construction schedule delays resumption of tunnel boring to late summer 2015 and the tunnel open to traffic by November 2017. WSDOT cannot verify any of the future dates in the STP schedule until the work to resume mining is further along. The responsibility for additional costs and delays associated with this work will be addressed in accordance with the SR 99 tunnel contract.

Significant work is ongoing at the tunnel's future north and south portals and excavation of the TBM extraction pit at the north portal of the alignment continues and is on schedule. Overall construction of the Replacement Project is approximately 70 percent complete.

Figure 18 highlights important decisions and construction activity regarding the Bored Tunnel Design-Build Contract.

Figure 18: Bored Tunnel Design-Build Contract Procurement Schedule

Action	Dates Identified in the 2011 Initial Financial Plan	Updated Schedule for 2015 Financial Plan	Notes
Request for Qualifications (RFQ) Issue Date	September 15, 2009	Same as 2011	
RFQ Voluntary Meeting	October 7, 2009	Same as 2011	
Statement of Qualifications (SOQ) Due Date Proposers	November 16, 2009	Same as 2011	
Voluntary Proposers Meetings	March 1- September 15, 2010	Same as 2011	
Issue Final Request for Proposals	May 26, 2010	Same as 2011	
Alternative Technical Concept (ATC) Submittal Deadline	August 31, 2010	Same as 2011	
Deadline for Submitting Proposer's Questions	September 15, 2010	Same as 2011	
Deadline for WSDOT's Response to Proposer's Questions	September 30, 2010	Same as 2011	
Proposals Date	October 28, 2010	Same as 2011	
WSDOT Requests for Information (RFIs) to Proposers	November 12, 2010	Same as 2011	
Proposer Presentations	November 15-19, 2010	Same as 2011	
Announce Apparent Best Value Proposer	December 9, 2010	Same as 2011	
Contract Award Date	January 6, 2011	December 20, 2010	
1st Notice to Proceed (NTP 1) (start design-build contract, allowed planning and preliminary engineering only)(see Appendix P)	February 7, 2011	Same as 2011	
FHWA Signed Record of Decision (ROD)	August 2011	August 22, 2011	ROD timing was finalized
2nd Notice to Proceed (NTP 2) (Begin Construction)(see Appendix P)	August 17, 2011	August 23, 2011	
Tunnel Boring Machine Delivery	--	April 2, 2013	Not available in 2011
Launch Tunnel Boring Machine	--	July 30, 2013	Not available in 2011
South Approach Cut/Cover Complete	--	Summer 2015	Not available in 2011
Tunnel Boring Resumption	n/a	TBD	Dependent on Tunnel Boring Machine Repair
Tunnel Boring Complete	--	TBD	Not available in 2011
Tunnel Interior and Systems Complete	--	TBD	Not available in 2011
Begin Battery Street Tunnel Decommissioning	--	Upon Tunnel Open to Traffic	Not available in 2011
North Approach Cut/Cover Complete	--	TBD	Not available in 2011
Substantial Completion	December 2015	November 2017 ⁽¹⁾	Dependent on TBM Repair
Facility Open to Traffic	January 2016	November 2017 ⁽¹⁾	

Source: WSDOT AWV Program

Figure Note:

(1) Forecast from Seattle Tunnel Partners (contingent on STP meeting its proposed schedule)

Federal NEPA Document and Decision Document

In compliance with the National Environmental Policy Act (NEPA), the Project filed a Notice of Intent (NOI) for studying the replacement in the Federal Register in July 2001. Preliminary engineering and the environmental process began soon after that time. The *Alaskan Way Viaduct and Seawall Replacement Project Draft Environmental Impact Statement* (Draft EIS) was signed by the lead agencies that included FHWA, WSDOT, and the City of Seattle in March 2004.

The environmental review process for the Bored Tunnel Alternative built on the five alternatives evaluated in the 2004 Draft EIS and cut-and-cover tunnel and elevated structure alternatives in the 2006 SDEIS. In June 2009, an updated NOI was published informing the public that an additional SDEIS would be prepared to evaluate the Bored Tunnel Alternative as a solution from the Partnership Process for replacing the viaduct along the Seattle waterfront.

The SDEIS for the Bored Tunnel Alternative was published for public review in October 2010. After publication and the opportunity for the public, agencies and tribes to comment on the 2010 SDEIS, FHWA, WSDOT and the City of Seattle prepared and published the Final EIS. After the Final EIS was published in July 2011, FHWA issued the ROD in August 2011, which is the NEPA decision document for the Replacement Project.

Tolling

The Washington State Legislature has identified that tolling can “provide a source of transportation funding and to encourage effective use of the transportation system”.^{8,9} In this dual role, it can be a means of revenue generation, it can be part of a facility-specific or regional demand management program, or it can be used for a combination of both. In the case of the AWW corridor, tolling would be implemented primarily for revenue generation, but it also provides some traffic management through the use of variable tolls.

On a typical tolling project, to optimize toll revenues, traffic diversion needs to be minimized. The SR 99 corridor has multiple parallel routes (city streets) in proximity of the facility that can serve as alternate routes for the tolled facility. Given the complexities and concerns with diversion and downtown Seattle traffic congestion, the state entered into an agreement with the City of Seattle (Appendix V of GCA 6486,) which included a provision to form the Advisory Committee on Tolling and Traffic Management (ACTT).¹⁰ The project’s Record of Decision also called for the formation of the committee. The 15-member committee was appointed by WSDOT, the Seattle Mayor and the Seattle City Council in late 2011 and was charged with three specific priorities:

1. Reviewing tolling assumptions for the SR 99 tunnel
2. Minimizing traffic diversion due to tolling
3. Mitigating traffic diversion effects on city streets and Interstate 5

⁸ RCW 47.56.805, regarding “Toll Facilities Created After July 1, 2008.”

⁹ FHWA has also concurred with tolling the facility, see Appendix E.

¹⁰ Formation of the ACTT was identified in the EIS and as a City of Seattle Resolution (Appendix N).

To view the complete language in the City of Seattle ACTT resolution, see Appendix N.

Early in 2014 the ACTT committee shared their advisory recommendations with the Governor, Legislature, State Transportation Commission, WSDOT, Seattle Mayor and Seattle City Council.

After studying eight potential toll scenarios, the ACTT Committee supported a tolling strategy which provided the \$200 million in funding for the AWV Program while minimizing traffic diversion. Under the supported scenario, toll rates would be \$1 tolls 24-hours per day with a \$1.25 toll during the 6 to 9 a.m. and 3 to 6 p.m. peak periods, which the ACTT committee anticipated could generate sufficient revenue to allocate in the following order:

1. Toll collection costs (operations and maintenance of toll collection system).
2. \$200 million capital costs (plus financing costs) for the SR 99 tunnel.
3. Operations and maintenance of SR 99 tunnel.
4. Annual funding for transit service on SR 99 corridor.

Given limited toll revenue, the ACTT Committee recommended that SR 99 tunnel repair and rehabilitation, tunnel insurance and additional transportation system improvements to mitigate the effects of diversion should come from other sources.

The committee will continue to be involved for two to three years after tolling begins to review SR 99 tolling and transportation system performance. Appendix D provides the ACTT's recommendations report.

In 2012 the Washington State Legislature enacted tolling authorization of the Bored Tunnel¹¹. Toll authorization was an important step toward meeting the financial commitments for completion of the SR 99 set of projects within the AWV Program. In a future legislative session, WSDOT will propose legislation requesting authority to sell general obligation bonds with debt service initially paid by the state gas tax and. Gas tax used to pay debt service will be repaid by the tolls collected on the tunnel.

In preparation for toll bond authorization and in conjunction with recommendations from the ACTT, the AWV Program will work with the WSDOT Toll Division on an investment-grade Traffic and Revenue analysis. This work also supports the Washington State Transportation Commission's future rate-setting process. The bonding authority request is planned for submittal in an upcoming legislative session and as the project's cash flow dictates the need for bond proceeds. The proposed legislation will consider the ACTT's recommendation and the recommendation of other stakeholders on the prioritized use of the toll revenue.

WSDOT is working to install a system that will collect tolls from users of the SR 99 tunnel. Construction of the toll infrastructure on the south end started in the fall of 2013 as part of the Seattle Tunnel Partners design-build contract. Construction of north end toll infrastructure will be conducted by the North Access contractor and is on schedule to be completed before the

¹¹ Chapter 83, Laws for 2012 (Substitute Senate Bill 6444), Appendix O.

tunnel opens. Once the infrastructure is in place, another contracted toll vendor (Telvent) will install cameras and other associated equipment to complete the system.

Transportation Improvement Program (TIP/STIP) and Regional Transportation Plan

Project approval in the Regional TIP by the Puget Sound Regional Council (PSRC) was one of the approvals previously needed to move forward toward construction authorization for the Replacement Project in 2011. The Replacement Project was included in the Metropolitan Transportation Plan (Transportation 2040) on September 28, 2011 (Appendix Ha). It was administratively updated in the TIP and STIP in July 2011, with the ROD issued in August 2011.

In January 2015, FTA and FHWA approved the Washington State 2015-2018 Statewide Transportation Improvement Program (STIP) and the Statewide Transportation Planning Process Certification. A copy of this approval is in Appendix Hb.

Public Outreach and Involvement

WSDOT continues to implement a comprehensive public involvement and communication effort for the AWV Program. The overall program plan, which encompasses several projects including the Replacement Project and the South Holgate Street to South King Street Viaduct Replacement Project, outlines goals and activities for outreach to the general public, SR 99 drivers, elected officials, media outlets, project neighbors, as well as minority, low-income and limited English proficient populations.

The project team has engaged the public through a range of activities that include:

- Community, agency, neighborhood and elected official briefings
- Stakeholder groups
- Door-to-door outreach to business and project neighbors
- Program website
- Handouts and brochures in multiple languages
- Informational posters and signage
- Informational displays and booths at community fairs and festivals
- Multi-agency traffic and construction coordination meetings
- Monthly email newsletters
- Social media, such as blogs and Twitter
- Media outreach
- Public meetings
- Program email and hotline to answer questions
- *Milepost 31* project information center

These tools were used most extensively around major project impacts or milestones. For example, in an effort to engage the public and provide progress updates regarding the SR 99 tunnel, the communications team coordinated with our partner agencies on the arrival of the

tunneling machine and the summer 2013 start of tunneling. These techniques continue to be used for current events such as the completion of the TBM Access Shaft, the mining of the TBM into the Access Shaft, the subsequent extraction of the TBM cutterhead, drive mechanism and bearing as well as the ongoing repairs. The team provided updates to project neighbors, made presentations to community groups, hosted news conferences and sent news releases, created graphics and visuals explaining how a tunneling machine works, used Twitter to engage people online, and continues to add content and maintain pages on the website to serve as a hub for current information.

To date, the project team has reached thousands of SR 99 corridor users, as well as businesses and residents affected by the project. Milepost 31 has seen nearly 40,000 visitors since it opened in December 2011. Public involvement and outreach will continue to be emphasized as the project moves forward. The public will continue to be invited to celebrate project milestones, receive frequent construction updates, and provide feedback that will be used to help WSDOT and its partners keep people and goods moving during construction.

Transportation Demand Management (TDM) / Transit

WSDOT, King County, and the City of Seattle have implemented a comprehensive traffic mitigation plan to help keep people and goods moving during construction in the SR99 corridor during construction. As part of the Alaskan Way Viaduct Program, WSDOT has invested \$125 million, which included funding for:

- Variable speed signs and travel time signs on I-5
- SR 519 improvements
- Spokane Street Viaduct widening
- New Spokane Street Viaduct off-ramp to Fourth Avenue South
- Added bus service
- New traffic management technology on SR 99
- Upgraded traffic signals and driver information systems on major arterials
- Trip reduction programs

The \$125 million funding for TDM is for reference only and does not make up part of the \$2.240 billion AWV Replacement Project cost in the scope of this financial report. Included in the \$125 million investment, WSDOT has invested \$1.7 million in the commute trip reduction programs, and King County Metro is adding more than \$1 million to supplement these programs. The strategically selected commute trip reduction programs are designed to remove more than 4,000 workday round trips from SR 99 and key alternate routes during construction. To develop this commute trip reduction plan, WSDOT assessed construction traffic impacts and locations, traffic origins and destinations and traffic counts. This led WSDOT to determine that investments should focus on:

- Rush Hours
- Workdays

- Routes between downtown Seattle and Burien, Federal Way, SeaTac, Seattle (Ballard/Interbay, Downtown, First Hill, Queen Anne, SoDo, South Lake Union, West Seattle) and Tukwila

Also included in the \$125 million investment, WSDOT provided \$30.2 million to King County Metro for all the Moving Forward Projects in the corridor (primarily the Holgate to King Project) to enhance transit and water taxi service, and improve bus monitoring equipment.

The AWW Replacement Project's contribution was completed in June 2014. Through the 2014 Transportation Budget (Engrossed Substitute Senate Bill 6001; Chapter 222, Laws of 2014), WSDOT continued to contribute up to \$9.0 million to King County from sources outside of the AWW Project through June 30, 2015 for public transportation mitigation. Funding beyond this date is dependent on Legislative approval.

4. Implementation Plan

This section is a summary of the information provided in the Project Management Plan and discusses how WSDOT will deliver the \$2.053 billion Central Waterfront as a component of the \$2.240 billion Replacement Project. The following topics include:

- WSDOT Directives and Management Tools to Monitor and Manage Risk
- Project Delivery Methodology for the Alaskan Way Viaduct Replacement (applicable to the Central Waterfront)
- Pre-Construction Requirements (Environmental, Right-of-Way, Regional Transportation Planning)
- Environmental Process and History
- Relationship of Financial Plan to Program/Project Management Plan

This section does not provide detail on the implementation plan for the Battery Street Decommissioning or Viaduct Demolition components of the Replacement Project because the planning is still underway and the work occurs in later years of the project.

WSDOT Directives and Management Tools to Monitor and Manage Risk

Risk Assessment Background

On July 1, 2008 (and reconfirmed in 2010), the Washington State Secretary of Transportation issued Executive Orders 1032.01 and 1042.00. In addition to the Executive Orders, Instructional Letter IL4071.01 provides guidance for developing risk-based estimating and how to manage risk reserves. These executive orders provide guidance to project offices on managing projects and using Project Management and Reporting Systems (PMRS). The PMRS includes the project Electronic Content Management (ECM) system to manage and report the status of transportation projects. The PMRS integrates schedule, contract management, ECM, cost control, and cost estimating with existing WSDOT legacy systems to better support management and delivery of capital projects.

Currently, the AWV Program Office uses Primavera Scheduler (contract and schedule management), PRISM (cost control) and tracking workbooks with bottom-up cost estimates. The Bored Tunnel Design-Builder provides price-loaded schedules. An analysis of those schedules is being used as the basis for progress payments to the design-builder.

For more information on risk related WSDOT Executive Orders and instructions, see the following WSDOT web link:

<http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/>

Project Delivery Methodology for the Alaskan Way Viaduct Replacement

*WSDOT Delivery Methods*¹²

WSDOT traditionally uses the design-bid-build method of delivering transportation improvement projects when development and project construction timing is less constrained. Design-bid-build entails completing all of the design and right of way procurement before a construction project is advertised for bid. However, projects that are complex, with more constrained timeframes, are evaluated for the best method to deliver a successful project, considering both design-bid-build and design-build. WSDOT chose the design-build method for the largest component of the Replacement Project (the bored tunnel).

The key benefits for employing the design-build methodology include:

- Assignment of risk to the party best able to manage it;
- Increasing the speed of delivering the project;
- Capturing innovative design approaches to complex construction involving the bored tunnel; and
- WSDOT workforce management.

For additional detail, the design-build process is described in WSDOT's *Guidebook for Design-Build Highway Project Development*:

http://www.wsdot.wa.gov/NR/rdonlyres/46196EB8-F9D0-4290-8F55-68786B1DA556/0/DesignBuild_GuidebookJun2004.pdf

In design-build methodology, WSDOT focuses on reporting performance rather than on how to obtain that performance. WSDOT identifies a conceptual plan and completes the preliminary design. This conceptual plan is put out for development of a design-build proposal. Each design-build team value engineers the preliminary plan and develops a cost estimate for their proposal. Each proposal reflects the product that the design-builder intends to deliver to meet WSDOT's

¹² For additional background on design-build and design-bid-build see Appendices I and J respectively.

objectives. WSDOT then chooses the design-builder with the best value combination of elements, technical proposal, and price.

The contract is a single contract between WSDOT and the design-builder for design and construction services to provide a finished product. The design-builder completes the design, with WSDOT involvement in the design process.

After selection of a design-builder and execution of the contract, WSDOT performs administrative functions and the design-builder performs design, construction, quality control (QC), and quality assurance (QA) functions. WSDOT's quality verification (QV) role during contract execution assures that the products being developed by the design-builder are in conformance with the contract requirements.

The QC/QA Program is a critical component of the design and construction of the Project. The focus of WSDOT's quality assurance program is on product compliance with contract documents, verification of the design-builder's quality control measures, and meeting Federal quality requirements. Quality assurance activities focus on monitoring contract execution with respect to a negotiated Quality Control Plan. WSDOT provides the quality verification and independent testing. The Contract Provisions require that the QC/QA Program submitted with the proposal be brought into conformance prior to execution of the contract.

Project-Specific Delivery Methods

The project delivery methods applied to the Replacement Project include the one large Bored Tunnel Design-Build and the smaller design-bid-build contracts. Refer to Appendices I and J for more information on design-build and design-bid-build methodologies.

By employing a design-build contract on the Bored Tunnel, the effort will benefit by:

- Relying on the contractor for innovation that could lead to a cost and time savings
- Experienced design-builders can handle more complex projects, which leads to better management of risks associated with Bored Tunnel construction

Figure 19 below shows the actual or proposed delivery method for each Project component.

Figure 19: Project Component Delivery Methods

Contract	Delivery Method	Current Phase
SR 99 Bored Tunnel	Design -Build	Construction
North Access	Design-Bid-Build	Construction
North Surface Street Connection	Design-Bid-Build	Design
South Access	Design-Bid-Build	Design
South Access Drilled Shafts	Design-Bid-Build	Construction (complete)
Viaduct Demolition and Battery Street Tunnel Decommissioning	Design-Bid-Build	Design
Mercer West	Design-Bid-Build	Construction

Pre-Construction Requirements

The Replacement Project is defined as a major project due to its size and cost to replace it. Before any construction can begin, the Federal NEPA process must be signed off by the FHWA. The project must obtain FHWA concurrence for WSDOT certification of Right of Way interests before tunnel boring can occur. A project also has to meet regional transportation guidelines before construction funding can be approved for use. As mentioned above, the Replacement Project was included in the Metropolitan Transportation Plan (Transportation 2040) developed by the Puget Sound Regional Council (PSRC). In 2011, WSDOT acquired both NEPA and right of way plan approvals prior to starting construction. Since then, FHWA concurrence has been obtained for Right of Way certification of all permanent property interests. See Figure 20 for phases and dates.

Environmental Process and History

Federal environmental clearance for the Replacement Project is complete.

Background

The environmental process for the replacement of the Alaskan Way Viaduct began in early 2001 after the Nisqually Earthquake damaged the aging structure. Over the next six years many alternatives were studied to replace the Viaduct. During that period, the replacement of the entire State Route 99 was analyzed as one project in a draft EIS and one SDEIS. By 2007, the replacement alternatives under consideration had been narrowed down to two—a Cut-and-Cover Tunnel and Elevated Structure. Seattle citizens voted no for both alternatives in an advisory vote in early 2007. As a result of the vote, the Governor, Mayor, and King County Executive unveiled the “Moving Forward Projects.” These projects could keep advancing the replacement of the southern mile of the viaduct, while the central waterfront section that is now part of the Replacement Project underwent further study.

The environmental process for the Central Waterfront component of the Replacement Project continued and changed in January 2009 when the Governor, Mayor, and King County Council Executive recommended the replacement of the Central Waterfront viaduct section with a bored tunnel.

The 2010 SDEIS identified the Bored Tunnel Alternative as the preferred alternative but did not state whether or not it would operate with tolls. Potential effects of the Bored Tunnel Alternative were compared to the updated Cut-and-Cover Tunnel and Elevated Structure Alternatives. Although the 2011 FEIS identified the Tolloed Bored Tunnel Alternative as the preferred alternative, potential effects of the Tolloed Cut-and-Cover Tunnel and Tolloed Elevated Structure Alternatives were also analyzed. Seattle Tunnel Partners continued the preliminary design from late January 2011 until the ROD was issued in August 2011. Construction began after the ROD was issued by FHWA. The timeline for the environmental approvals achieved is listed below:

- Publication of the 2010 SDEIS in October 2010
- Publication of the 2011 FEIS in July 2011
- Publication of the ROD in August 2011

FHWA and WSDOT have completed additional environmental documentation as needed since the ROD was issued to reflect project updates. Four additional environmental documents have been issued since ROD:

1. Re-evaluation for Frederickson tunnel segment manufacturing site signed February 2012.
2. Re-evaluation for 2-week closure for tunneling under the viaduct signed November 2013.
3. Re-evaluation for TBM access pit signed May 2014.
4. Supplemental Section 4(f) Evaluation – Installation for Settlement Monitoring north of Main Street signed February 2015.

Environmental Approvals (Permits, Approvals and Consultations)

The AWV Program has obtained a significant number of permits, approvals, and consultations for this project. Please see Appendix Q for a detailed listing.

Right of Way

WSDOT is responsible for completing the purchase of needed properties for the Replacement Project. Right of way (ROW) acquisition has been completed for the South Access and North Access design-bid-build contracts. For the bored tunnel, permanent acquisitions are completed, but various construction easements and rights-of-entry are being extended in time due to the previously-discussed delay in TBM boring. The responsibility for additional delays and costs associated with these extensions will be addressed in accordance with the SR 99 tunnel contract.

The bored tunnel acquisition schedule was divided into four ROW certification phases. Additional ROW certifications were established for the North Access and South Access design-bid-build contracts. The figure below indicates the project component and certification date for each phase.

Figure 20: Right of Way Certification Schedule

ROW Certification Phase ⁽¹⁾	Project Component Covered by Certification	Description	Estimated or Actual (A) Certification Date	Type of Certification
1	Bored Tunnel	Six total interests: Terminal 46 temporary tieback easement; two staging area leases and related temporary easements	10/16/13A	ROW Cert. 2
2	Bored Tunnel	Tunnel Settlement Mitigation; 13 Temporary Easements	10/16/13A	ROW Cert. 2
3	Bored Tunnel	North Portal. Six total interests: Three full acquisitions; three temporary tie-back easements	10/16/13A	ROW Cert. 2
4	Bored Tunnel	55 Subsurface interests	10/16/13A	ROW Cert. 2
6	North Access	Twelve total Interests: Three partial/full acquisitions; Limited Access rights from seven parcels; two temporary easements	11/21/13A	ROW Cert. 2
7	South Access	Three interests	12/12/13A	ROW Cert. 1

Source: WSDOT Real Estate Services office

Figure Notes:

- (1) ROW Certification Phase No. 5 was reserved but not used, and therefore, has been omitted from this table.
- (2) ROW Certifications No. 1 through 4 Actuals modified from 2013 Update due to Certifications type raised to a #2 Certification from a #3 Certification.

Relationship of Financial Plan to Program / Project Management Plan

Although Program/project management plans (PMPs) and financial plans overlap (both documents describe timing, anticipated risk, and estimated costs), PMPs emphasize project scope and schedule, while financial plans emphasize balancing project funding/budget and cash flows. Also, PMPs are updated when needed for a project, whereas financial plans are updated annually.

In relation to the Replacement Project, in December 2010 WSDOT developed a program management plan based on Washington State and FHWA guidelines for major projects that described the entire AWW corridor. The Replacement Project was covered by several major sections of that PMP. At that time WSDOT determined that the AWW FHWA-approved PMP and the Replacement Project Financial Plan was consistent and compatible. This PMP was updated in December 2012 and again in May 2015.

The Replacement Project has developed or updated contract-specific Project Management Plans, including the North Access; South Access; Bored Tunnel; North Surface; and Alaskan Way Viaduct Demolition / Battery Street Tunnel Decommissioning projects.

5. Current Cost Estimate

This section of the report outlines the Replacement Project cost estimate and the process for developing estimates. The sections that are discussed are:

- Project Costs
- WSDOT Cost Development and Risk Assessment
- Construction Cost Inflation Factors/Escalation
- Operating Period Costs (Bored Tunnel)
- Cost Estimate by Construction Segment

Project Costs

The Replacement Project is anticipated to cost \$2.240 billion (\$2.053 billion for the Central Waterfront and \$187 million additional components in the Replacement Project EIS (see notes below). A summary of the Replacement Project cost estimate is shown in Figure 21. Additional subsections provide detail on the estimated costs broken out by phase, state biennia and fiscal years, as well as by construction contract. First, however, is a description of WSDOT's methodology for developing costs and risks as background on how WSDOT developed its cost estimate.

Figure 21: Replacement Project Summary Cost Estimate

(\$ millions, year of expenditure)

Expenditure Component	FHWA Financial Plan Report Year Estimates					% Variance Between 2011 & 2015	% Variance Between 2014 & 2015	Spent to Date	% of 2015 Estimate Spent to Date	Notes
	2011	2012	2013	2014	2015					
Preliminary Engineering	146.8	135.7	135.8	136.8	136.7	-6.9%	-0.1%	133.3	97%	Adjustment to Local Funds from estimated to actual executed agreements
Right of Way	126.9	136.0	182.2	182.2	182.2	43.6%	0.0%	180.2	99%	Increase in parcel acquisition costs.
Construction	1,737.0	1,762.6	1,736.7	1,740.1	1,734.3	-0.2%	-0.3%	1,127.6	65%	<i>Detail Below</i>
<i>Bored Tunnel</i>	1,633.5	1,656.2	1,631.7	1,625.3	1,612.9	-1.3%	-0.8%	1,092.4	67%	<i>Change due in part to shift of contingency to Management Reserve</i>
<i>North & South Access, North Surface Streets</i>	103.5	102.5	103.5	110.4	107.6	-3.9%	-2.6%	32.8	30%	<i>Decreased due to in part to transfer of some demolition scope to Viaduct Removal project.</i>
<i>Yesler Street Widening</i>	--	0.8	1.5	0.5	0.5	N/A	-2.9%	0.5	100%	<i>\$0.5 M Yesler St. widening contract includes the construction phase cost in the 2014 FPAU the PE expenditure is included under Preliminary engineering.</i>
<i>Tolling Systems</i>	--	--	--	3.9	3.9	N/A	1.5%	1.9	49%	
<i>Management Reserve</i>	--	3.1	--	--	9.3	N/A	100%	--	N/A	<i>Management Reserve re-established as separate account from Tunnel contract unallocated contingency</i>
Central Waterfront Subtotal	2,010.7	2,034.3	2,054.7	2,059.1	2,053.2	2.1%	-0.3%	1,441.1	70%	
Viaduct Removal & Battery Street Tunnel Decommission	50	50	90	90	91.5	83.0%	1.7%	1.0	1%	<i>No detailed estimates existed in 2012. \$50M was an order of magnitude estimate. Increase in 2015 due to addition of demolition scope from South Access Connection project</i>
Mercer St. West (City of Seattle)	100	100	95.1	95.1	95.1	-4.9%	0.0%	67.6	71.0%	<i>See Figure note 4 below.</i>
Replacement Project Total	2,160.7	2,184.3	2,239.8	2,244.2	2,239.8	3.7%	-0.2%	1,509.7	67.3%	

Source: 2011 = WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN.

Source: 2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN.

Source 2013 = WSDOT assumed detail (13FEBDET) for WA State Legislature 2013-15 Biennial Budget with a technical correction to toll revenue and City of Seattle 2013-2018 Adopted Capital Imprvmt Prog.

Source 2014 = WSDOT assumed detail (14AWVDET) for Washington State Legislatively approved 2014 Supplemental budget.

Source 2015 = WSDOT assumed detail (15DOTAJ2) for 2015-2017 Proposed Legislative Budget Figure Notes:

(1) Expenditures through February 28 2015, except for Mercer St. West which is through December 2014.

(2) New contract in 2011 to widen Alaskan Way to accommodate ferry traffic from Colman Dock through construction of the bored tunnel. The Yesler Way Widening Project is covered under the Bored Tunnel Project.

(3) Viaduct Demolition and Battery Street Tunnel decommissioning are a subset of the \$290 million Surface Street Restoration effort. The figures shown here continue to be preliminary estimates that will be refined in subsequent financial plans. A CRA was held in December 2012.

(4) The Mercer Street West component, work to be paid for and performed by the City of Seattle, has been included in this report because a piece from Dexter to 5th Avenue is also cleared by WSDOT's final EIS. This project also contains \$14 million Federal TIGER funds and \$6.9 million Federal STP funds.

WSDOT Cost Development and Risk Assessment

The AWV Project followed the standard WSDOT design and construction procedures for all modes of project delivery, whether the Project is a design-build project or a traditional design-bid-build project. WSDOT conducts Value Engineering (VE) studies at appropriate stages of design, as required by the FHWA, and incorporates the results of those studies in the design process. To lower risk for design choices and project costs, WSDOT employs a process called Cost Estimate Validation Process[®] (CEVP[®]) as part of its program and project level cost risk assessment. This process is identified in WSDOT project management and cost risk documents described on the WSDOT risk assessment webpage.

<http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/>

WSDOT has conducted CEVP[®], Cost Risk Assessment (CRA) and VE studies to document cost estimates for the AWV Program (see Figure 22). The Bored Tunnel efforts have undergone these types of workshops in the past to estimate costs. Since the contract has been awarded, no further risk studies are planned for the Bored Tunnel. However, project components two through six will continue to undergo supplemental CRA evaluation through their design phases. Project component seven (Mercer West) is the responsibility of the City of Seattle.

Figure 22: VE Study and CEVP/CRA Study Workshops, June 2007 to December 2012

Item	Workshop Type	Date(s)	Topic
1	CEVP [®]	6/26- 7/10, 2009	SR 99 Bored Tunnel- Workshop #1-#7 (1- Tunnel Structure; 2- 1 st Ave Ground Improvements; 3- Tunnel Systems; 4- N&S Tunnel Access; 5- AWV Demo, BST Decommissioning, Surface St Restoration)
2	VE	7/20-24, 2009	SR 99 Bored Tunnel Alternative VE Study
3	CEVP [®]	8/4-5, 2009	SR 99 Bored Tunnel Alternative- modified CEVP process workshop
4	CRA	9/2-3, 2009	East Marginal Way Flyover Connection
5	ICE	9/16-17, 2009	Independent Cost Expert Panel Check in meeting
6	CRA	10/16, 2009	SR 99 Bored Tunnel Alternative- Cost and Schedule Validation workshop
7	CEVP [®]	10/19-23, 2009	SR 99 Bored Tunnel Alternative
8	VE	10/24- 11/30, 2009	SR 99 Bored Tunnel Alternative- Tiger Team Study
9	VE	4/6-7, 2010	Tunnel Operations Buildings
10	CRA	6/16-17, 2010	South Access
11	CRA	6/17-18, 2010	North Access
12	CRA-VE	9/26-30, 2011	South Access
13	CRA	10/20, 2011	North Access Cost and Risk verification workshop
14	CRA	9/4, 2012	North Access Cost and Risk verification workshop
15	VE	11/5-9, 2012	AWV Demo, BST Decommissioning & North Surface Street
16	CRA	11/20, 2012	South Access Cost and Risk verification workshop
17	CRA	11/26-29, 2012	AWV Demo, BST Decommissioning & North Surface Street

Construction Cost Inflation Factors / Escalation

Background and History

Typically, WSDOT develops cost estimates for highway capital projects and these estimates are based on current prices from recent bidding experience. This approach is used to estimate the various elements of the project. The project estimate is the sum of these individual elements or work items. The cost estimates are entered into the Capital Program Management System (CPMS) in current year dollars to support development of the capital budget. CPMS calculates year of expenditure dollars by applying inflation forecast assumptions to the estimates based on the project delivery schedule. The Replacement Project forecast is not inflated by CPMS, but instead went through the process listed below in the subsection for escalation. All forecasts are assumed to be year of expenditure values.

WSDOT's estimate basis for inflation rates are:

- Engineering (design) phase – Global Insight forecast for engineering, architectural, and surveying salaries which is also used for Operations and Maintenance assumptions below;
- Right of Way phase – Economy.com's forecast of the Federal Housing and Finance Administration housing price index for the state of Washington; and
- Construction phase – Global Insight Forecast of the Construction Cost Index. Though once a contract is awarded, construction inflation is typically halted, with costs tied to the contract award amount. This index is also used for the Tunnel Repair and Replacement assumptions below.

Escalation for the Replacement Project used the following method:

The Replacement Project forecast was not inflated by CPMS, but instead went through the CEVP[®] process in which the Escalation Input Assumptions were based upon WSDOT- inflation tables in effect at the time of the CEVP[®]. These tables are based upon the cost indices in effect for preliminary engineering, right of way and construction phases and are then applied to the base estimates and risks developed for each of these phases in order to provide a year-of-expenditure (YOE) forecast. This risk-based estimating process then provides WSDOT a range of probability (from 10 percent to 90 percent) of costs. For contracts over \$10 million, it is WSDOT policy to use the 60th percentile as the high end of the probability range.

Operating Period Costs

As a completed tolled section of roadway, the Replacement Project will be operated and maintained by WSDOT's standard processes and budget with anticipated funding coming from gross toll revenues. WSDOT takes full responsibility for the ownership, operation, and maintenance of the Bored Tunnel. The overall WSDOT budget, which includes provisions for operational and maintenance activities, is enacted biennially by the state legislature and the Governor. Interim year supplemental budgets may also be enacted.

In 2012, a draft SR 99 Bored Tunnel Operations and Maintenance (O&M) and Repair and Replacement (R&R) plan was developed. For 2015, the plan was updated, but remains a draft pending further review pending WSDOT senior management acceptance. The cost estimate from this draft plan was also updated.

The estimate elements (in both 2015 and Year of Expenditure (YOE) dollars) are shown in the following figure.

Figure 23: Operating Costs
(*\$ millions*)

Item	Draft Cost (2015 Dollars)	Draft Cost (YOE Dollars)	Basis
Tunnel Structure and Systems Operation & Maintenance Costs	3.8	6.6	annual
Tunnel Structure and Systems Repair & Replacement Costs	4.2	6.5	annualized
Tunnel Start Up Costs	6.2	N/A	one-time
Tolling O&M Costs	N/A	7.2	annual
Tolling R&R Costs	N/A	1.4	annualized

For Tunnel Structure and Systems Operations & Maintenance costs, a 50-year operating life was assumed. Applying the inflation index for WSDOT’s Engineering phase, the average annualized O&M costs are estimated at \$6.6 million at the mid-point (25-year) mark. The inflation rate for the Engineering phase is used due to the fact that the majority of the O&M costs are labor. The Tunnel O&M cost is based on 35 Full Time Equivalents (staff members).

For Tunnel Structure R&R costs, replacement of various capital items occurs on a periodic, but irregular basis. For this reason, the Year of Expenditure dollars are quoted over the entire 50-year period rather than at the 25-year mark. This amount is calculated at \$6.5 million per year. Inflation is based upon the Construction phase index.

Start-up costs include:

1. Advance hiring of key positions to be sufficiently knowledgeable to operate and maintain the tunnel immediately upon beneficial occupancy.
2. Labor, equipment, materials, and other for three months operation until tolling revenue starts.
3. Purchase of “Transportation Equipment Fund” equipment and shop tools.

Both the Tolling O&M and R&R costs have already been escalated using an assumed 2.5 percent per year annual inflation rate.

Cost Estimate by Construction Segment

The Replacement Project cost estimate information is detailed in this section. The \$2.010 billion cost estimate shown in the 2011 initial financial plan to replace the Central Waterfront portion of the Replacement Project was established by holding CEVP[®] and Value Engineering (VE) workshops that focused on the Bored Tunnel section of the corridor. These workshops that were held in late October 2009 validated the cost estimates at that time. Since then there have been minor cost increases to additional scope and sales tax calculations. The team has also worked on refining the cost estimates for Bored Tunnel efforts. Figure 24 shows the \$2.053 billion Central Waterfront work by phase and section for the current 2015 financial plan, as well as the full \$2.240 billion estimate that includes Viaduct Removal, Battery Street Decommissioning and Mercer Street West components.

Estimate by Major Project Element

The cost estimate information used in this report is the basis for the development of the 2015-2017 Legislative Budget. The total estimated budget for the Central Waterfront is \$2.053 billion, plus an additional \$186.6 million for the remaining components covered in the EIS. Through February 2015, the project has expended \$1,510 million of the total \$2.240 billion budget. The remaining budget is \$730 million.

The \$2.053 billion estimate is broken down into major project elements as shown in Figure 24. A project element is a category of work which will be conducted on some or all of the segments (i.e., design, construction, right of way, etc.). This data is based on the transportation budget as developed for the 2015-2017 Legislative Budget (Appendix G).

Figure 24: Replacement Project Summary Cost Estimate by Segment
(\$ million, year of expenditure)

Phase / Component	Report	State Biennia						Amount
		Prior	2009-11	2011-13	2013-15	2015-17	2017-19	
Preliminary Engineering	2011	23.7	107.3	15.1	0.7			146.8
	2012	23.7	98.4	9.7	3.9			135.7
	2013	23.7	98.4	7.1	6.5			135.8
	2014	23.7	98.4	7.5	6.5	0.7		136.8
	2015	23.7	98.4	7.5	4.7	0.9	1.5	136.7
Right of Way	2011	14.4	77.4	35.1				126.9
	2012	14.4	73.0	48.6				136.0
	2013	14.4	73.0	91.2	3.7			182.2
	2014	14.4	73.0	79.1	15.7			182.2
	2015	14.4	73.0	79.1	15.3	0.4		182.2
Construction	2011		110	696	795	136		1,737.0
	2012		89.3	700.8	776.9	195.6		1,762.6
	2013		89.3	635.02	782.8	229.6		1,736.7
	2014		89.3	667	774.9	201.7	7.2	1,740.1
	2015		89.3	667	468.3	490.0	19.7	1,734.3
<i>Bored Tunnel (CN)</i>	2011		110	696	707	120.5		1,633.5
	2012		89.3	699.8	701.6	165.5		1,656.2
	2013		89.3	633.5	709.4	199.5		1,631.7
	2014		89.3	665.7	710.2	160.0		1,625.3
	2015		89.3	665.7	423.2	434.7		1,612.9
<i>North & South Access, North Surface Streets (CN)</i>	2011				88	15.5		103.5
	2012				72.4	30.1		102.5
	2013				73.4	30.1		103.5
	2014			0.2	62.1	41.0	7.2	110.4
	2015			0.2	43.4	44.3	19.7	107.6
<i>Yesler Way Widening & Other Projects (CN)</i>	2011							
	2012			0.8				0.8
	2013			1.5				1.5
	2014			0.5				0.5
	2015			0.5				0.5
<i>Tolling Systems (CN)</i>	2011							
	2012							
	2013							
	2014			0.6	2.6	0.7		3.9
	2015			0.6	1.7	1.7		4.0
<i>Management Reserve (CN)</i>	2012			0.2	2.9			3.1
	2013		<i>Management Reserve combined with Identified Risks & Unallocated Contingency</i>					
	2014							
	2015					9.3		9.3
	Central Waterfront, Subtotal	2011	38.1	294.7	746.2	795.7	136	
2012		38.1	260.7	759.1	780.8	195.6		2,034.3
2013		38.1	260.7	733.3	793.0	229.6		2,054.7
2014		38.1	260.7	753.6	797.1	202.4	7.2	2,059.1
2015		38.1	260.7	753.6	488.4	491.2	21.2	2,053.2

Figure continued

Phase / Component	Report	Prior	State Biennia					Amount
			2009-11	2011-13	2013-15	2015-17	2017-19	
Viaduct Removal & Battery Street Tunnel Decommission	2011					50.0		50.0
	2012					50.0		50.0
	2013			0.3	10.7	79.0		90.0
	2014			0.3	4.0	85.7		90.0
	2015			0.3	2.6	59.6	28.9	91.5
Mercer Street West (City of Seattle)	2011					100.0		100.0
	2012					100.0		100.0
	2013			29.1	66.0			95.1
	2014			28.7	49.6	16.8		95.1
	2015			24.3	56	14.8	0.0	95.1
AWV Replacement Project Total	2011	38.1	294.7	746.2	795.7	286.0		2,160.7
	2012	38.1	260.7	759.1	780.8	345.6		2,184.3
	2013	38.1	260.7	762.7	869.7	308.6		2,239.8
	2014			782.6	850.7	304.9	7.15	2,244.2
	2015	38.1	260.7	778.2	547.0	565.7	50.1	2,239.8

Bored Tunnel Design-Build Contract

The bored tunnel segment includes the following major construction elements:

- Bored Tunnel, Cut/Cover Tunnels, Portal Buildings, Tunnel Boring Machine (TBM), and Tunnel Systems
- Site Preparations for the North and South Access
- Intelligent Transportation System (ITS) Integration Contract
- Miscellaneous Contracts (Landscaping and Utility Support)
- Relocation of utilities that are impacted by tunnel construction
- Construct tolling infrastructure

Figure 25 shows the Bored Tunnel design-build contract cost estimate for this update. The changes include change orders and recalculations of sales tax, construction engineering and contingencies. The decrease in Contingency and Allowances is due to funds that were transferred to Construction Engineering (\$23 million) and change orders to the contractor (\$8 million). The Port of Seattle Allowance drawdown was \$4 million of these changes between 2014 and 2015. (see Figure 36 for further breakout of Contingencies and Allowances).

Figure 25: Bored Tunnel Contract Construction Phase Engineering Cost Estimate
(\$ millions, year of expenditure)

Items	Risk Category ⁽¹⁾	2011 Ebase Init. Fin Plan	2011 Budget Estimate ⁽²⁾	2012 Budget Estimate	2013 Budget Estimate	2014 Budget Estimate	2015 Budget Estimate
Construction Contract		1,089.7	1,089.7	1,090.5	1,101.0	1,101.8	1,097.2
Sales Tax		36.0	20.0	38.5	38.4	38.5	38.6
Construction Engineering		50.5	50.5	54.7	54.7	64.2	87.1
Contingencies and Allowances ⁽¹⁾	B & C	189.3	205.3	204.5	169.6	152.8	122.0
Bidder Stipend Payments		8.0	8.0	8.0	8.0	8.0	8.0
South U-Section ⁽³⁾		50.0	50.0	50.0	50.0	50.0	50.0
Escalation Fund	D	110.0	110.0	110.0	110.0	110.0	110.0
Bond and Insurance Fund	B	100.0	100.0	100.0	100.0	100.0	100.0
Total Construction Phase, Bored Tunnel Contract		1,633.5	1,633.5	1,656.2	1,631.7	1,625.3	1,612.9

Source: 2011 = WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN.

Source: 2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN.

Source 2013 = WSDOT assumed detail (13FEBDET) for Washington State Legislature 2013-15 Biennial Budget with a technical correction to toll revenue and City of Seattle 2013-2018 Adopted Capital Improvement Program.

Source 2014 = WSDOT assumed detail (14AWVDET) for Washington State Legislatively approved 2014 Supplemental budget.

Source 2015 = WSDOT assumed detail (15DOTAj2) for 2015-2017 Proposed Legislative Budget

Figure Notes:

(1) See Section 8, Risk Identification, Mitigation and Other Factors, for more detail on contingency and risk items.

(2) This column was added to the First Annual Update to provide a cross-walk in assumptions related to sales tax and contingency budgeting.

(3) The South U-Section refers to design-build contract section 10.5.1. Specifically, it is the cut & cover section south of the South Portal. It was part of the original alignment in the RFP that all bidders bid on, and still remains as an item to be paid to the contractor as part of the contract total but now is included in the total contract price.

Contingency and Allowances Fund

Section 11 of the RFP Design-Build contract governs changes in the contract. The Design-Builder is responsible for errors in the design documents, errors in the schedule, actions of a subcontractor, cost of materials, correction of nonconforming work and failure to comply with contract requirements. Change orders are submitted to and evaluated by WSDOT. For unforeseen requirements and increases in construction costs (not due to escalation), the contingency for the design-build portion of the Replacement Project is currently 8 percent of Total Construction Phase, Bored Tunnel Contract (\$1,625.9 million). In 2014, contingency not already contractually obligated was divided into a portion (\$48 million) that was dedicated to the Bored Tunnel Contract, with the remaining contingency (\$22 million) transferred to a Program Reserve fund. The Program Reserve fund is also accessible to other components within the Replacement Project, and receives underruns or savings from projects outside of the Replacement Project but within the AWW Program.

- Transferred \$46.0 million to right of way (2012)
- Transferred \$14.1 million to other projects (2012-14)
- Transferred \$ 6.5 million to CE (2013)
- Transferred \$16.0 million to executed change orders (2012-2014)
- Transferred \$15.0 million from Holgate to King contingency (2014)
- Transferred \$22.0 million to Program Reserve (2014)

North Access, South Access, and North Surface Streets Design-Bid-Build Contracts

The North Access segment includes the following major construction:

- North SR 99 Mainline and on-/off-ramps
- Extension of Sixth Avenue from Harrison Street to Mercer Street
- Construction Budget Estimate: \$53.8 million

The North Surface Streets segment includes the following major construction:

- Reconstruction of surface streets over the north portal cut-and-cover tunnel
- Backfill the north portal of the Battery Street Tunnel
- City Surface Streets improvements between Denny Way and Harrison Street
- Construction Budget Estimate: \$9.7 million

The South Access Drilled Shaft contract includes the following major construction:

- Six drilled shafts comprised of reinforced concrete piers topped with a permanent steel casing above ground.
- Construction Budget Estimate: \$2.1 million

The South Access segment includes the following major construction:

- Provide Permanent Southern connection from the cut-and-cover tunnel provided by the Bored Tunnel segment to the Holgate to King Project at Royal Brougham Way.
- Reconstruction of surface streets over the south portal cut-and-cover tunnel.
- Construction Budget Estimate, \$44.8 million.

The Combined construction cost of, these contracts are anticipated to be approximately \$110.4 million (including local funds).

Figure 26: North Access Contract Construction Phase
(*\$ Thousands, Year of Expenditure*)

Items	Ebase Initial Finance Plan	Award
Construction Contract	45,767.6	41,640.7
Sales Tax	2,761.7	2,570.8
Agreements	1,549.6	1,529.6
Construction Engineering	6,009.5	6,009.5
Contingencies & Allowances	2,003.2	2,003.2
Total Construction Phase, North Access Connection	58,091.6	53,753.7

Figure 27: Drilled Shaft Contract Construction Phase
(*\$ Thousands, Year of Expenditure*)

Items	Ebase Initial Finance Plan	Award
Construction Contract	1,245.3	1,628.2
Sales Tax	72.6	95.3
Agreements	30.0	25.0
Construction Engineering	188.7	244.8
Contingencies & Allowances	53.9	69.9
Total Construction Phase, South Access Drilled Shafts Contract	1,590.6	2,063.2

6. Project Funding, Revenues and Financing

The Replacement Project will rely on a variety of fund sources from state, tolling, federal and local participants. State-secured funding comes primarily from State motor vehicle gas tax. Local contributions are mainly from proposed Port of Seattle funds.

State Funding — Transportation Partnership Account, Nickel Account, and Multimodal Account

The Transportation Partnership Act (TPA) was a state funding package passed by the Washington State Legislature in 2005 (RCW 46.68.290) to help finance specific projects and created the Transportation Partnership Account (TPA) in the Motor Vehicle Fund. The account is primarily funded by a 9 ½ cent motor fuel tax, license, permit and fees, treasury deposit earnings, and bond proceeds. The TPA provides the majority of the state funding for the Replacement Project in the amount of \$1.094 billion. By statute, expenditures from the account must be used only for projects or improvements identified as 2005 Transportation Partnership projects or improvements in the omnibus transportation appropriations act and debt service on bonds.

In 2003 the Washington State Legislature authorized a 5-cent motor fuel tax and license, permit and fees increase to help finance specific transportation projects (RCW 46.68.280). By statute, Nickel funds must be used for debt service on projects and by the Department of Transportation for operating and capital highway programs, including highway construction and maintenance, ferries, and support services. The Nickel package provides \$206 million in funding for the Replacement Project.

Other State funding sources that are financing the Replacement Project come from the Multi-Modal Account. This amount is \$2.8 million.

The changes in state funds between the 2014 Financial Plan and 2015 Financial Plan is due to availability of various States funds within the AWWV Program.

Toll and Bond Authorization

Toll Authorization - State

Under current law, the Legislature is the only entity with the authority to authorize tolls on an eligible toll facility. (RCW 47.56.820) An eligible toll facility is defined as "portions of the state highway system specifically identified by the legislature, including transportation corridors, bridges, crossings, interchanges, on-ramps, off-ramps, approaches, bi-state facilities, and interconnections between highways." (RCW 47.56.810). In early 2012 the Washington State Legislature (RCW 47.56.862) authorized tolling on the tunnel that replaces SR 99. A copy of this law is available in Appendix O.

The Legislature has designated the Transportation Commission as the state tolling authority with responsibility for setting toll rates, including variable pricing, and reviewing toll operations (RCW 47.56.850 and 47.46.100). Prior to the convening of each regular session of the Legislature,

the Commission must report to the transportation committees of the Legislature on any increase or decrease in toll rates approved by the Commission. Any proposal for the establishment of eligible toll facilities must consider specified policy guidelines which include: overall direction (purpose for toll); when to use tolling; use of toll revenue; setting toll rates; and duration of toll collection. (RCW 47.56.830)

Generally, current law requires that all revenue from an eligible toll facility be used only to "construct, improve, preserve, maintain, manage, or operate the eligible toll facility on or in which the revenue is collected" (RCW 47.56.820 and 47.46.110). The current statutes further restrict the use of toll revenue only for the following: to cover operating costs, including maintenance, preservation, administration, and toll enforcement by public law enforcement; to meet obligations for the repayment of debt; to meet any other funding obligations for projects or operations on the eligible toll facility; to provide for the operation of conveyances of people or goods; and to fund improvements to the eligible toll facility.

Toll Authorization - Federal

On June 1, 2011, WSDOT provided FHWA with an expression of interest and draft toll agreement requesting FHWA authorization of tolling on SR 99 in downtown Seattle. That request was approved by FHWA in August 2011 (Appendix E).

Bond Authorization

Authorization to generate construction funding secured by future toll revenue requires bonding authority from the Washington State Legislature. WSDOT does not anticipate the need for bonds for the AWV Corridor until later in the construction schedule. Therefore, the final investment grade studies to support bond issuance will not be developed until closer to the time when funding will be required.¹³ To achieve the \$200 million envisioned by the legislature, the following actions will be needed.

- Preliminary investment grade traffic and revenue study completed
- Bond authorization passed by the Legislature
- Toll rate setting completed by Washington State Transportation Commission
- Investment grade traffic and revenue study completed
- Bonds issued by the State Finance Committee
- Toll collection begins

The 2013-2015 Washington State Legislative budget (Chapter 222, Laws of 2014 PV¹⁴) assumes that the AWV Program is supported with \$200 million in toll funding, but only part of the funding (\$62.8 million) is planned for use on the Replacement Project (Figure 31). The risk for not receiving legislative bond authorization appears low since the legislature provided earlier direction

¹³ In addition, Washington State develops budgets on a two-year cycle approved by the Legislature. Bond authority is typically granted during the same session that the budget is passed for the biennium when bonds will be sold.

¹⁴ PV = Partial Veto

in ESSB 5768¹⁵ and the legislature passed SSB 6444 modifying 47.56 RCW to include this project as an eligible toll facility. However, if the authority to sell bonds paid by toll revenue is not granted, WSDOT will work with the legislature to find alternative sources of funding. Options may include reducing or deferring other WSDOT state-funded projects and/or federal-aid highway program funds. Most of the increase in federal funding can be attributed to an early recognition of the decreased funding capacity of tolls on this facility.

Federal Funding

The state plans to use seven different types of federal funding on the Replacement Project of which some amounts have changed from the 2014 Annual Update last year:

- \$ 96.8 million (continue same level since 2013) of National Highway System (NHS) funds.
- \$212.6 million from National Highway Performance Program (NHPP) funds (continued same level since 2014).
- \$123.2 million (up from \$122.7 million in 2014) in Surface Transportation Program funds. This change in funds is attributed to a cost savings on the SR 99/S. Holgate St. to S. King St. Viaduct Replacement project.
- \$ 45.0 million in Emergency Relief (ER) funds (continue same level since 2011)
- \$ 8.0 million in High Priority (HP) SAFETEA-LU Program funds (continue same level since 2011).
- \$ 4.2 million in Project of National and Regional Significance (PNRS) funds (continue same level since 2011).
- \$ 1.9 million of Bridge funds (added in 2015 plan). This is a transfer from the SR 99/S. Holgate to S. King St. Viaduct Replacement project in exchange for State TPA. The Bridge funds were used for the South Access Drilled Shafts component.

¹⁵ Chapter 458, Laws of 2009 (ESSB 5768), for full text see Appendix M.

Figure 28: 2014 Financial Plan Federal Funding Estimate
(\$ millions)

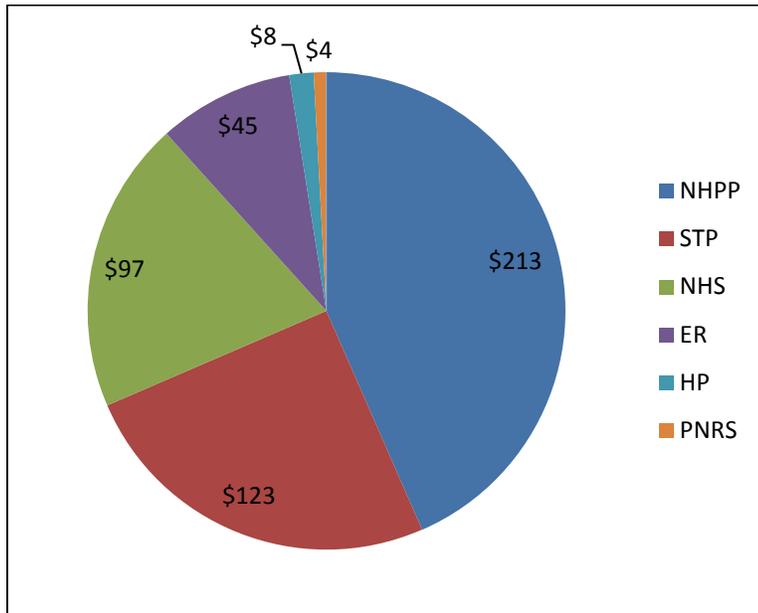
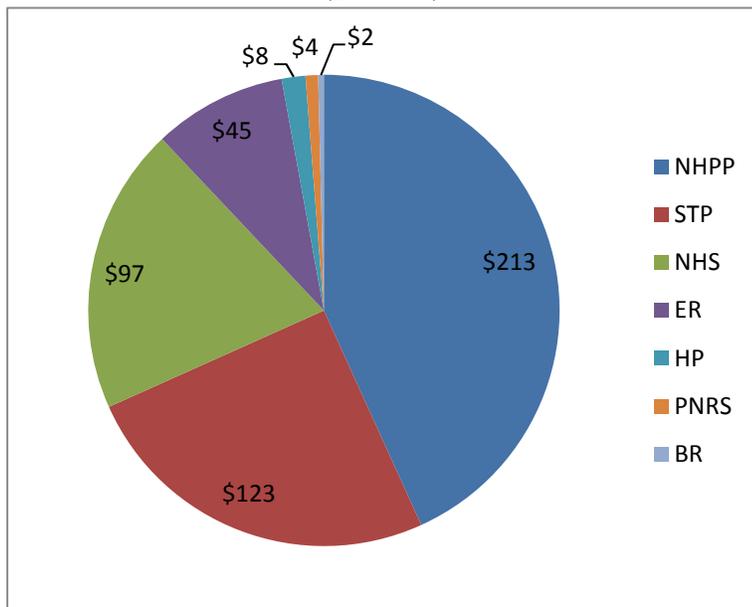


Figure 29: 2015 Financial Plan Federal Funding Estimate
(\$ millions)



Based on WSDOT’s current budget and estimates, the Replacement Project expects to use approximately \$491.7 million of the corridor’s federal funds for final design, right of way acquisition and construction (up from \$489.4 million last year). The increase in the Central Waterfront component of the Replacement Project is due to transfer of savings from the Holgate to King project. This transfer of federal funds is approximately \$2.3 million and it does not increase the overall Replacement Project budget. The Federal-Aid Highway Program is a reimbursable

program with reimbursements processed through the Washington State Motor Vehicle fund. Total federal funding for this project was \$229 million in the Initial (2011) Financial Plan. Most of the increase in federal funding can be attributed to an early recognition of the decreased funding capacity of tolls on this facility.

The Replacement Project did not receive any federal stimulus funding from the American Recovery and Reinvestment Act of 2009 (ARRA).

Advance Construction

Advance Construction is a technique which allows a state to initiate a project using non-federal funds while preserving the eligibility for future federal-aid funds. Under this approach, the AWW Program is authorized by FHWA without the obligation of federal funds and with no commitment by FHWA that funds will be available in the future. WSDOT will use its own funds to pay project costs. As federal funds are available, WSDOT may decide to convert the project and request that federal funds be obligated. There is no obligation of federal funds until the advance construction is converted, at which time the AWW Program may be reimbursed for the federal share of costs incurred from the original date of authorization.

FHWA allows the incremental conversion of advance construction projects, providing WSDOT the opportunity to manage its limited federal funding while potentially accelerating the delivery of the AWW Program through the most efficient use of the project's various funding sources.

Within the Replacement Project Federal Aid Agreement 0099(111) there is \$145,927,118 in authorized advance construction. The current conversion plan is as follows, with an update reflecting the introduction of STP funds along with NHPP funds.

Figure 30: Preliminary Advance Construction Conversion Plan

Source	Estimated Amount (\$)	Estimated Obligation Date	Actual Amount to Date (\$)	Actual Obligation Date(s)
STP	--	N/A	9,459,111	09/13/2013
NHPP	65,363,559	10/1/2013	55,904,488	10/16/2013
STP	--	--	500,000	7/11/2014
NHPP	65,363,559	10/1/2014	48,000,000	10/17/2014
NHPP	--	--	1,500,000	12/10/2014
NHPP	--	--	15,863,519	1/23/2015
NHPP	15,200,000	10/1/2015	--	
Total	145,927,118	--	131,227,118	

City of Seattle and other Local Funds

The Initial Financial Plan provided for an allowance of up to \$50 million for utility relocations. However, because the City of Seattle chose to conduct much of the work themselves, the current amount under agreement is \$17.7 million. This is an increase from the 2014 financial plan amount

of \$15.3 million for utility relocations within the footprint of the Bored Tunnel. Pending agreements for local funds are not reflected in the plan. When executed, these agreements are then included in the next annual financial plan update.

Approximately \$3.6 million of local funding has been provided by AT&T for cellular phone service in the tunnel as well as local private utility providers for relocation work performed on their behalf. An additional \$0.4 million has been provided by King County for work related to wastewater utilities.

Local funding of \$95.1 million by the City of Seattle shown in Figures 31 is solely used for the Mercer West Project. A portion of the funding of this project includes Federal TIGER funds and Federal STP funds.

Port of Seattle Funds

As shown in the Memorandum of Agreement GCA 6444 in Appendix K, the State of Washington and the Port of Seattle are committed to a replacement for the viaduct that will improve transportation access to and through the waterfront, including access for over eight million annual ferry riders; ensure connectivity between the Interbay, Ballard and Duwamish industrial areas and Seattle-Tacoma International Airport, including a corridor for oversized vehicles; provide access to port cargo, fishing and cruise facilities; minimize construction disruption; and increase opportunities for the public and freight to access the shoreline and waterfront.

In the fall of 2011, the Port of Seattle Commission adopted a plan of finance with \$281 million dedicated for the AWV Program. This dollar amount was later adopted by the Washington State Legislature in their 2012 Supplemental Transportation budget and remains the same for the 2014 Supplemental Budget. In August 2013, the Port Commission authorized \$267.7 million in funding, including credit for prior contributions to supporting projects outside of the AWV Program. This represents a \$13.3 million reduction from the amount shown in the 2014 Supplemental Budget. The change will allow the State to access a portion of the funds in 2015, rather than receiving payments from 2016 through 2018 as originally stated in the Memorandum of Agreement between the Port and the State.

The Port's contribution was adjusted to account for the additional costs associated with the benefit of the State receiving a portion of these funds early, which allowed for continuation of the bored tunnel construction based upon the planned schedule in effect at the time of the authorization. Payment is structured in two installments. The first of the two payments was made by the Port in the amount of \$120 million on May 1, 2015. The second payment of \$147.7 million is scheduled for May 2016 for a total of \$267.7 million. All of the Port funds will be used on the Replacement Project.

WSDOT may request that the \$13.3 million reduction of the Port contribution be replenished in a future Legislative session.

Financing

The Alaskan Way Viaduct is funded from various state, local, and federal funding sources. There are no GARVEE or TIFIA contributions to the project. State sources include cash and bond proceeds from the Transportation 2003 (Nickel) Package and 2005 Transportation Partnership (TPA) Package. The state's transportation highway bonds are first backed by gas tax revenues and are ultimately backed by the full faith and credit of the state (general obligation). They are exempt from statutory or state constitutional debt limits. In 2003, \$2.6 billion in bonds were authorized for a specific list of transportation projects backed by a five cent increase in the gas tax. In 2005, \$5.1 billion in bonds were authorized for selected projects and improvements identified as 2005 Transportation Partnership Projects. These bonds were backed by revenues from a phased-in 9.5 cent per gallon gas tax increase. In 2007, the bond authorization for Transportation 2003 (Nickel) projects were increased from \$2.6 billion to \$3.2 billion and the bond authorization for Transportation 2005 projects were increased from \$5.1 billion to \$5.3 billion. Currently, there is over \$0.4 billion in Nickel bond authorization and \$2.2 billion in TPA bond authorization available for new issuances. Bond proceeds assigned to expenditures on the Alaskan Way Viaduct Replacement Program represent approximately 6.3 percent and 35.4 percent of the current Nickel and TPA bond proceeds received, respectively.

The Washington State Legislature also programmed a contribution of \$200 million from tolls (see Bond Authorization section above and Figure 31). Under Washington law, the Legislature must provide explicit statutory authority to toll a state facility. The Legislature passed the necessary statutory authorization to toll the tunnel in 2012. Currently, the Legislature has not provided the authority to issue general obligation debt that will be supported by tolls on the SR 99 tunnel. The State's Constitution and enabling statutes authorize different means of incurring state general obligation debt, the payment of which is secured by a pledge of the state's full faith, credit and taxing power. General obligation bonds may be authorized by the affirmative vote of three-fifths of the members of each house of the Legislature, without voter approval; or when authorized by law for a distinct work or object and approved by a majority of the voters.

The finance plan for the Alaskan Way Viaduct Replacement Program assumes that the bonds supported by toll revenue will be issued in the 2015-17 biennium. Assuming this finance plan, it is necessary to pursue legislation in the 2016 Legislative Session for the tolling bond authorization to support the Alaskan Way Viaduct Replacement Program. Proceeds from the sale of the bonds will be placed in the Alaskan Way Viaduct Replacement Program account created under RCW 47.56.864. Bond proceeds can be used for the location, design, right-of-way, and construction of the Alaskan Way Viaduct Replacement Program, interim financing, capitalized interest, and bond issuance costs, including the costs of underwriting.

Under the proposal currently being considered by the department, bond principal and interest payments (debt service) will be transferred from the Motor Vehicle Account to the Highway Bond Retirement Fund. Any funds transferred from the Motor Vehicle Account will be repaid by tolls deposited into the Alaskan Way Viaduct Replacement Project Account. In addition to paying debt service, tolls will be on-going to pay for expenses as allowed under RCW 47.56.820 and to maintain sufficient reserves for toll equipment replacement and refurbishment costs and other uses as determined by the Office of the State Treasurer. This proposal does not require the department

to pledge toll revenue directly to the repayment of principal and interest, but does require tolls be set to pay for expenses and to repay principal and interest payments made from the Motor Vehicle Account.

In mid-2014, WSDOT hired a consultant to complete an “investment-grade” Level 3 toll traffic and revenue study for the tolled portion of the Alaskan Way Viaduct Replacement Program. The study will be conducted to inform and support the use of tolls to contribute to the project capital costs as required by the State Legislature. The process will use the tools and results of the previous study conducted in coordination with the Advisory Committee on Tolling and Traffic (ACTT) from late 2011 through early 2014. The objective is to analyze a range of toll scenarios, using updated versions of the existing ACTT study models and procedures, independent land use forecasts, and travel survey data analysis to develop more detailed traffic and revenue projections. These projections will be prepared to support legislation necessary for authorizing the issuance of bonds to complete the construction of the project and to support the Washington State Transportation Commission’s toll rate setting process. The investment-grade level analysis will help inform WSDOT, the Legislature, and the Washington State Transportation Commission regarding the trade-offs between tunnel use/traffic diversion and revenue generation/funding capacity.

7. Cash Flow

The specific schedule of payments for the Replacement Project is a function of existing plans for design and right of way, along with the contractual commitments into which WSDOT entered when it signed the contract with Seattle Tunnel Partners. Figure 31 shows the source of Replacement Project funding by source and biennium for this 2015 financial plan.

Figure 31: Summary Replacement Project Cash Flow by Source
(\$ millions, Year of Expenditure)

Funding Source	Fin Plan Yr	Prior	2009-11	2011-13	2013-15	2015-17	2017-19	Total
Federal Funding	2011	12.8	3.9	42.7	136.2	32.9		228.5
	2012	12.8	3.9	251.4	103.6	26.3		398.0
	2013	12.8	3.9	319.9	131.5	15.2		483.3
	2014	12.8	3.9	319.9	137.5	15.2		489.3
	2015	12.8	3.9	319.9	139.7	15.3		491.6
National Highway System	2011							
	2012			134.1	9.9			144.0
	2013			96.8				96.8
	2014			96.8				96.8
	2015			96.8				96.8
National Highway Performance Program (NHPP) ⁽¹⁾	2011							
	2012							
	2013			36.0	131.5	15.2		182.7
	2014			76.0	121.4	15.2		212.6
	2015			76.0	121.3	15.3		212.5
Surface Transportation Program (STP)	2011			14.7	30.0	6.6		51.3
	2012			76.8				76.8
	2013			146.6				146.6
	2014			106.6	16.1			122.7
	2015			106.6	16.6			123.2
Emergency Relief Funds (ER)	2011	3.0	1.5	28.0	12.5			45.0
	2012	3.0	1.5	40.5				45.0
	2013	3.0	1.5	40.5				45.0
	2014	3.0	1.5	40.5				45.0
	2015	3.0	1.5	40.5				45.0
Federal High Priority Funds (HP)	2011	5.6	2.4					8.0
	2012	5.6	2.4					8.0
	2013	5.6	2.4					8.0
	2014	5.6	2.4					8.0
	2015	5.6	2.4					8.0
Project of National & Regional Significance (PNRS)	2011	4.2						4.2
	2012	4.2						4.2
	2013	4.2						4.2
	2014	4.2						4.2
	2015	4.2						4.2
Bridge Replacement Program ⁽⁵⁾	2011				93.7	26.3		120.0
	2012				93.7	26.3		120.0
	2013							
	2014							
	2015					1.9		1.9

Figure continued

Funding Source	Fin Plan Yr	Prior	2009-11	2011-13	2013-15	2015-17	2017-19	Total
State Funding (Non-Toll)	2011	24.9	290.9	663.4	295.2	57.4		1,331.8
	2012	24.9	256.8	467.7	549.0	87.5		1,385.9
	2013	24.9	256.8	408.5	531.5	53.5		1,275.2
	2014	24.9	256.8	430.3	528.0	26.2	7.2	1,273.4
	2015	24.9	256.8	430.3	217.7	321.6	21.1	1,272.4
2003 Gas Tax (Nickel Funding)	2011	14.4	34.5	16.4	18.9	6.3		90.5
	2012	14.4	29.3	17.7	44.9	6.3		112.6
	2013	14.4	29.3	19.9	76.5	36.3		176.4
	2014	14.4	29.3	8.3	119.8	2.6		174.4
	2015	14.4	29.3	8.3	84.9	45.1	8.4	190.3
2005 Gas Tax (Partnership Funding)	2011	10.5	256.4	612.3	198.3			1,077.5
	2012	10.5	227.5	415.3	452.1	30.1		1,135.5
	2013	10.5	227.5	388.6	455.0	2.1		1,083.7
	2014	10.5	227.5	422.0	408.2	15.7		1,083.9
	2015	10.5	227.5	422.0	132.8	276.5	12.8	1,082.1
Other State Funding (Multimodal)	2011			34.7	78.0	51.1		163.8
	2012			34.7	52.0	51.1		137.8
	2013					15.1		15.1
	2014					7.9	7.2	15.1
	2015							
Local Funding⁽⁶⁾	2011	0.3		40.0	10.0			50.3
	2012	0.3		40.0	10.0			50.3
	2013	0.3		5.0	129.8	161.3		296.4
	2014	0.3		3.3	131.7	161.0		296.3
	2015	0.3		3.3	130.8	155.0		289.4
City of Seattle ⁽⁶⁾	2011	No detail in 2011						
	2012	No detail in 2012						
	2013	0.3		5.0	9.8	0.4		15.5
	2014	0.3		3.3	11.7			15.3
	2015	0.3		3.3	8.2	5.9		17.7
Port of Seattle	2011	No detail in 2011						
	2012	No detail in 2012						
	2013				120.0	160.9		280.9
	2014				120.0	161.0		281.0
	2015				120.0	147.7		267.7
Other Local Funding ⁽⁶⁾	2011	No detail in 2011						
	2012	No detail in 2012						
	2013	No detail in 2013						
	2014	No detail in 2014						
	2015				2.6	1.4		4.0
Toll Funding	2011				354.4	45.6		400.0
	2012				118.2	81.8		200.0
	2013							
	2014							
	2015							

Figure continued

Funding Source	Fin Plan Yr	Prior	2009-11	2011-13	2013-15	2015-17	2017-19	Total
Central Waterfront Subtotal	2011	38.1	294.8	746.1	795.8	135.9		2,010.7
	2012	38.1	260.7	759.1	780.8	195.6		2,034.3
	2013	38.1	260.7	733.3	792.7	229.9		2,054.8
	2014	38.1	260.7	753.5	797.2	202.4	7.2	2,059.0
	2015	38.1	260.7	753.4	488.2	491.8	21.1	2,053.4
State Funding (Non-Toll)	2011							
	2012							
	2013			0.3	10.7	16.2		27.2
	2014			0.3	4.0	22.9		27.2
	2015			0.3	2.6	25.1	0.6	28.5
2003 Gas Tax (Nickel Funding)	2011							
	2012							
	2013					14.5		14.5
	2014					14.5		14.5
	2015					15.4		15.4
2005 Gas Tax (Partnership Funding)	2011							
	2012							
	2013			0.3	10.7	1.7		12.7
	2014			0.3	4.0	5.6		9.9
	2015			0.3	2.6	6.9	0.6	10.3
Other State Funding (Multimodal)	2011							
	2012							
	2013							
	2014					2.8		2.8
	2015					2.8		2.8
Toll Funding⁽⁴⁾	2011							
	2012							
	2013					62.8		62.8
	2014					62.8		62.8
	2015					34.5	28.3	62.8
Viaduct Demolition and Battery Street Tunnel Decommissioning	2011							
	2012							
	2013			0.3	10.7	79.0		90.0
	2014			0.3	4.0	85.7		90.0
	2015			0.3	2.6	59.6	28.9	91.3

Figure continued

Funding Source	Fin Plan Yr	Prior	2009-11	2011-13	2013-15	2015-17	2017-19	Total
Port of Seattle & Other Funding (Local Funding)	2011					150.0		150.0
	2012					150.0		150.0
	2013			29.1	66			95.1
	2014			28.7	49.6	16.8		95.1
	2015			24.3	56.0	14.8		95.1
Viaduct Demo and BST Decommissioning ⁽³⁾	2011					50.0		50.0
	2012					50.0		50.0
	2013							
	2014							
	2015							
Mercer Street West (City of Seattle) ⁽²⁾	2011					100.0		100.0
	2012					100.0		100.0
	2013			29.1	66.0			95.1
	2014			28.7	49.6	16.8		95.1
	2015			24.3	56.0	14.8		95.1
Total Replacement Project	2011	38.1	294.8	746.1	795.8	285.9		2,160.7
	2012	38.1	260.7	759.1	780.8	345.6		2,184.3
	2013	38.1	260.7	762.8	869.4	308.6		2,239.8
	2014	38.1	260.7	782.5	850.8	304.9	7.2	2,244.2
	2015	38.1	260.7	778.0	546.8	566.2	50.0	2,239.8

Figure Notes:

(1) Originally designated as Bridge Replacement funds in the 2011 and 2012 Financial Plans. This was replaced with National Highway Performance Program (NHPP) funds in 2013. See footnote 5 below.

(2) The Mercer Street West component, work to be paid for and performed by the City of Seattle, has been included in this report because a piece of it from Dexter to 5th Avenue it is also cleared by WSDOT's final EIS. In 2013 the City of Seattle updated their overall Mercer Street West cost estimate downward from \$100 million to \$95 million due to favorable bids on the construction scope. This project also contains \$14 million Federal TIGER funds and \$6.9 million Federal STP funds.

(3) For years 2013 and beyond funding for this activity comes from State and Toll Funding shown earlier in this figure.

(4) Toll funding is from state bonds repaid from toll revenue.

(5) Re-introduced Bridge Replacement funds in 2014 due to a transfer from the SR 99/S. Holgate to S. King St. Viaduct Replacement Project. Bridge funds from 2011 and 2012 are now separated from NHPP funds.

(6) The basis for recognition of City of Seattle and other local funds changed in 2014 through the present update from an estimated amount to a committed amount based on executed agreements. The Port of Seattle is also now a committed amount.

Figure 32: 2014 Financial Plan Budget Estimate by Fund Type
(\$ millions)

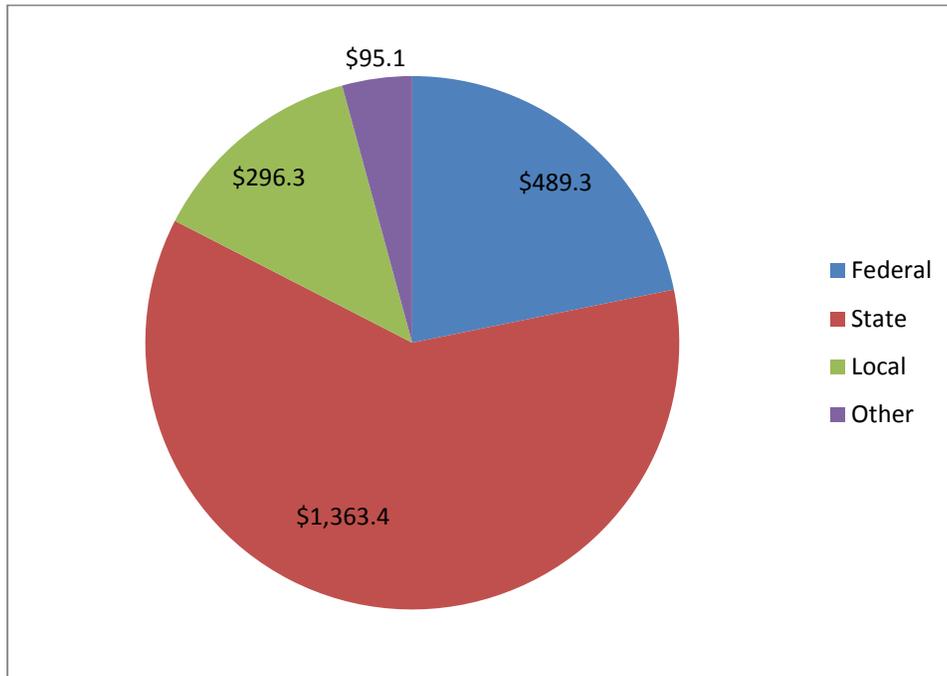
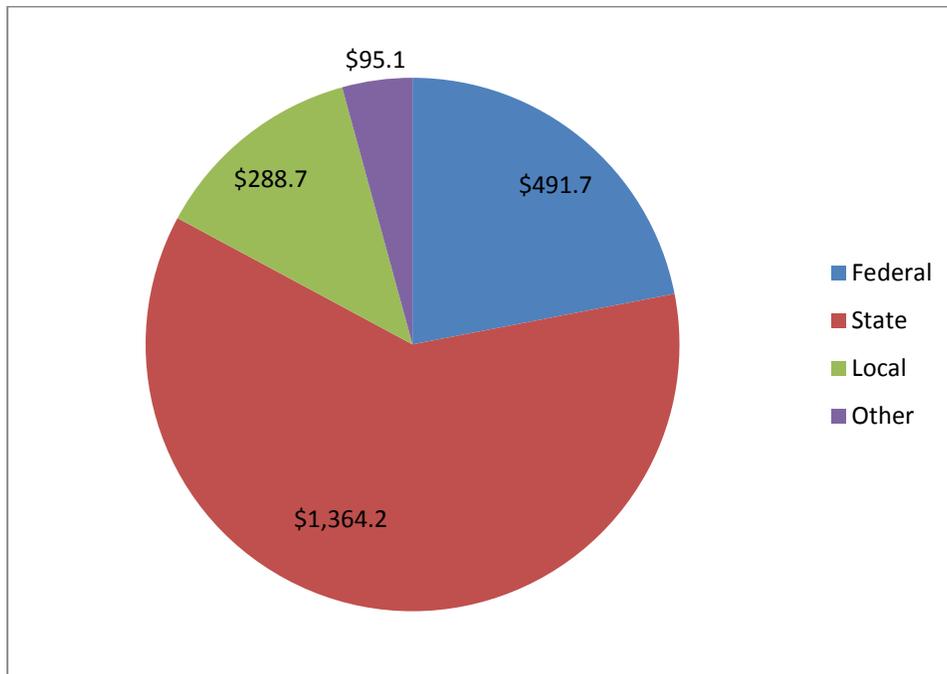


Figure 33: 2015 Financial Plan Budget Estimate by Fund Type
(\$ millions)



Spending Cap

The construction estimates for the Bored Tunnel described in Section 5 of this report reflect the base cost needed to deliver the Project. The base cost does not address risk and escalation. The development of the upset price for the Bored Tunnel Design-Build segment has a risk and escalation component added to the base cost.

Section 10.4.1 of the RFP Design-Build contract describes the maximum rate of payment to the Design-Builder. Due to the rate that funding will become available to the project, payments to the Design-Builder shall not exceed the payment schedule shown in Figure 34.

Figure 34: Cap on Payments to the Design-Builder
(*\$ millions, year of expenditure*)

Cumulative Payment Schedule Limits (through date)	Fiscal Year Maximum Payment	Cumulative Payable Amount
June 30, 2011	100	100
June 30, 2012	300	400
June 30, 2013	300	700
June 30, 2014	300	1,000
June 30, 2015	275	1,275
June 30, 2016	75	1,350
Total	1,350	N/A

Data obtained from Section 10.4.1 of the RFP. These numbers are fixed in the Design-Build contract and are not anticipated to change with each Financial Plan Annual Update.

The cap on payments to the design-builder has remained the same since the initial financial plan in 2011.

The spending cap provisions described in Figure 34 only apply to the Bored Tunnel Design-Build contract. The projected use of funds by state fiscal year for the Replacement Project is described in Figure 35.

Figure 35: Estimated Project Expenditures by State Fiscal Year
(\$ millions, year of expenditure)

State Biennial Reference	Program Expenditures by State Fiscal Year	Fin Plan Rpt Yr	Fiscal Year Estimate Amount	Cumulative Estimate Amount
2007-09	2008	2011	7.0	7.0
		2012	7.0	7.0
		2013	7.0	7.0
		2014	7.0	7.0
		2015	7.0	7.0
	2009	2011	31.1	38.1
		2012	31.1	38.1
		2013	31.1	38.1
		2014	31.1	38.1
		2015	31.1	38.1
2009-11	2010	2011	109.2	147.3
		2012	109.2	147.3
		2013	109.2	147.3
		2014	109.2	147.3
		2015	109.2	147.3
	2011	2011	185.6	332.9
		2012	151.6	298.9
		2013	151.6	298.9
		2014	151.6	298.9
		2015	151.6	298.9
2011-13	2012	2011	387.4	720.3
		2012	350.2	649.1
		2013	327.0	625.9
		2014 ⁽¹⁾	307.8	606.7
		2015	307.8	606.7
	2013	2011	358.7	1,079.0
		2012	408.8	1,057.9
		2013	435.7	1,061.6
		2014	474.7	1,081.4
		2015	470.3	1,077.0
2013-15	2014	2011	402.3	1,481.3
		2012	356.2	1,414.1
		2013	518.0	1,579.6
		2014	386.2	1,467.6
		2015	277.5	1,354.5
	2015	2011	393.5	1,874.8
		2012	424.6	1,838.7
		2013	351.7	1,931.3
		2014	464.6	1,932.2
		2015	269.5	1,624.0
2015-17	2016	2011	185.3	2,060.1
		2012	236.1	2,074.8
		2013	230.6	2,161.9
		2014	198.8	2,131.0
		2015	333.4	1,957.4
	2017	2011	100.6	2,160.7
		2012	109.5	2,184.3
		2013	78.0	2,239.9
		2014	106.0	2,237.0
		2015	232.3	2,189.7

Figure Continued

State Biennial Reference	Program Expenditures by State Fiscal Year	Fin Plan Rpt Yr	Fiscal Year Estimate Amount	Cumulative Estimate Amount
2017-19	2018	2011		
		2012		
		2013		
		2014	5.5	2,242.5
		2015	48.8	2,238.4
	2019	2011		
		2012		
		2013		
		2014	1.7	2,242.2
		2015	1.4	2,239.8
Total		2011	2,160.7	2,160.7
		2012	2,184.3	2,184.3
		2013	2,239.9	2,239.9
		2014	2,244.1	2,242.2
		2015	2,239.8	2,239.8

Source 2011 = WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN.

Source 2012 = WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN.

Source 2013 = WSDOT assumed detail (13FEBDET) for Washington State Legislature 2013-15 Biennial Budget with a technical correction to toll funding and City of Seattle 2013-2018 Adopted Capital Improvement Program.

Source 2014 = WSDOT assumed detail (14AWVDET) for Washington State Legislatively approved 2014 Supplemental budget.

Source 2015 = WSDOT assumed detail for (15DOTAj2) 2015-2017 Proposed Legislative Budget

Figure Note:

(1) The variance in project expenditures for State FY 2012 in 2013 update and 2014 update is due to the assumption made for the Mercer West project.

8. Risk Identification, Mitigation and Other Factors

WSDOT addresses risk through a systematic approach to project delivery, following the *WSDOT Project Risk Management Guidance for WSDOT Projects* guidance document. Project level risk management plans are developed and managed throughout the life of the project. Development and tracking of risks occur via risk registers that detail and quantify risk items specific to the project. In addition to identifying and describing SMART (Strategic, Measureable, Attributable, Relevant, and Time bound) risks, the risk registers include pre- and post- response quantifications for cost and schedule impacts, and the response strategy that will be used to either avoid or mitigate the risk. These risk registers are then monitored and updated on a routine basis. The AWV Program has created specific risk registers for each of the active contracts within the program. These risk registers are monitored and updated on a monthly basis. The AWV Program-Wide Risk Management Plan is updated on an as-needed basis when milestones are achieved and/or when the program-wide risk management needs change.

As mentioned in Section 5 of this report, WSDOT employs a CRA-CEVP[®] process to identify, quantify and determine avoidance and mitigation measures that will lower risk for design choices and project costs. Starting with the CRA-CEVP[®] process early in design development, WSDOT identifies potentially challenging project issues so that when the design-build contract is awarded,

there is less chance of surprise and subsequent cost overruns. WSDOT recognizes that not all risks can be avoided or mitigated. These types of risks are accepted and typically incorporated into the base cost or schedule of the project.

CEVP[®] is a workshop format, followed up with mathematical modeling, typically conducted at key stages of design on very large (\$100 million or more), very complex projects. These stages are triggered when costs or scope are completed during the preliminary design phase prior to release of the initial request for proposal for design-build projects. The Cost Risk Assessment (CRA) process follows the same format as the CEVP[®] process, but at a smaller scale. CRAs typically are performed on smaller (\$25 million to \$100 million), less complex projects.

The CRA-CEVP[®] process at WSDOT combines national and local area subject matter experts and experienced staff. Many of the participants have extensive first-hand experience in large project programming and delivery. The evaluation is enhanced by the application of computer modeling that applies risks identified by experts in the workshop and makes allowances for unknowns which are each assigned additional costs. The models then run Monte Carlo simulations, with hundreds of iterations to establish a robust probability curve. Each successive re-assessment allows for the development of a tighter cost range as previously identified risks are mitigated and more is known about the project. In depth details regarding the CRA-CEVP[®] process, as well as the Value Engineering (VE) process, may be found on the WSDOT website:

<http://www.wsdot.wa.gov/Projects/ProjectMgmt/RiskAssessment/>

As required by Engrossed Substitute Senate Bill (ESSB) 5768¹⁶ in November and December of 2009, the project team held a series of workshops that utilized VE to reduce cost and risk associated with the Holgate to King Project and the Central Waterfront portion of the Replacement Project. The focus of these workshops refined the base cost estimate and associated risks. In total, the VE team implemented several cost savings measures, for a total of \$310 million. The Holgate to King Project accounted for \$140 million of the savings and the remaining \$170 million was associated with the Central Waterfront portion of the Replacement Project. These savings were used to adjust the base cost of the Central Waterfront that was used in the January 2010 CEVP[®] run.

The results of the January 2010 CEVP[®] showed that the overall cost of the Bored Tunnel was forecasted to be \$1.54 billion at the 10 percent probability; \$1.80 billion at the 50 percent probability; and \$2.25 billion at the 90 percent probability. WSDOT project management directed the team to use the 60th percentile estimate of \$1.96 billion, as identified in WSDOT Instructional Letter IL4071.01. This estimate was \$60 million more than the previous CEVP[®] results. The net rise in the tunnel cost is due to moving the north and south portal locations to lessen the amount of curvature in the tunnel. This change added approximately 640 feet to the tunnel.

The savings gained from Holgate to King Project offset the increased cost of the Bored Tunnel and kept the overall cost of replacing the Alaskan Way Viaduct Program with the \$3.1 billion budget. No further CEVP[®] analysis was conducted for the Bored Tunnel after it was awarded in 2011.

¹⁶ ESSB 5768, Chapter 458, Laws of 2009, for full text see Appendix M.

Since that time, Cost Risk Assessments (CRAs) were performed for the South and North End Design-Bid-Build components of the Replacement Project (excluding the City of Seattle Mercer Street Widening component) in June 2010. This series of CRAs resulted in establishing the 60th percentile base cost for the Central Waterfront portion of the Replacement Project outside the Bored Tunnel and established the risk registers and profiles for each effort.

Also in June 2010, “The Basis and Amounts for Allocation of Risk” for the Central Waterfront component of the Replacement Project was written to establish program guidelines for allocating risk to the Bored Tunnel and portals. This document discusses four categories (A through D) of risk, with the last category being escalation.

Cost and risks verification exercises were held in the fall of 2011 for the Holgate to King Stage 3 project, and the North Access project. In addition, a VE study was performed on the South Access project. These efforts were undertaken to ensure that the Design-Bid-Build Projects were tracking to fit within the overall AWW Program budget allocations for the 2012 Supplemental Budget.

Cost and risks verification exercises were held in the fall of 2012 for the South Access project and the North Access project. A VE study and CRA was performed on the future projects (Alaskan Way Viaduct Demolition, Battery St. Tunnel Decommissioning, and North Surface St) during fall 2012. A CEVP[®] study was also performed, at that time, on the Alaskan Way Street Restoration (King to Pike) and Elliott Way Connector projects.

As of this 2015 update to this Finance Plan, there are 80 active risks for which mitigation plans are being developed. Significant among these risks and their mitigation measures include:

- Issue: Temporary Construction Easements costs exceed budget.
Mitigation & Control: Initiate negotiations for optional extension as soon as possible to attain price certainty. Monitor tunnel contract progress and determine an appropriate decision point to extend TCEs in advance of the work.
- Issue: Some North Access Connection work is on hold until Seattle City Light completes ductbank work.
Mitigation & Control: Work closely with the City of Seattle and the contractor to sequence the remaining work with as little delay as possible.
- Issue: Railroad Mitigation Costs are higher than expected (for Viaduct Demolition component)
Mitigation & Control: Continue to work with BNSF on access rules and dates to provide the contract documents clear rules of engagement with a goal to mitigate within established contract contingency.

- Issue: South Access contract cannot complete the end-of-contract traffic switch and commissioning work on schedule.
Mitigation & Control: Continued coordination with the Tunnel contract on access areas and handover dates in order to minimize delay.

Pro-active management of program risks has resulted in 120 risk issues being retired since the initial CEVP® / CRA workshops. Significant such retired or re-assessed issues include:

- South Operations Parking garage contract specifications would affect South Access Connection contract.
- Cost of Bored Tunnel schedule delay on beyond November 2016 (to be addressed in accordance with the contract)
- South Access Connection Project Development Approval changes delay project Advertisement date.
- Battery Street Tunnel Decommissioning Concept Changes Due to Structural of Geotechnical Issues.
- TBM Access Shaft design and construction take longer than expected.
- Seawall construction activities directly impact or delay tunneling activities.

While retired from the quantitative risk register in favor of a qualitative management methodology, some of the issues related to the retired risks are monitored on a regular basis.

In 2014, risk management associated with the Design-Build bored tunnel contract moved to a qualitative risk evaluation, rather than strictly a quantitative review. This project's risk register was further consolidated into a single joint risk register that included both WSDOT and Design-Builder risks.

Some of the top risks, risk owner and mitigations from this joint risk register are:

- Issue: Repair/Replacement of main bearing and main bearing seals take longer than expected (Design-Build Contractor)
Mitigation & Control: Develop plan for repair/replacement well in advance of the work, mobilize labor, equipment, parts and materials and perform repair/replacement, all in a timely manner.
- Issue: Viaduct is damaged due to tunneling (Design-Build Contractor)
Mitigation & Control: Viaduct strengthening measures; closure of the Viaduct during TBM passage; re-assessment of any possible settlement and structure after TBM passage.
- Issue: The \$40 million Shared Contingency Allowance is exceeded (WSDOT)
Mitigation & Control: Identify DSC's and mitigate impacts before incurring delays; follow TBM maintenance plan, performance issues and perform muck sampling when performance triggers are tripped.

- Issue: Port of Seattle \$20 million Allowance is exceeded and lease needs to be extended (WSDOT)
Mitigation & Control: Initiate discussions with Port of Seattle and determine least cost approach.
- Issue: Systems Installation and Commissioning takes longer than expected (Joint)
Mitigation & Control: Develop alternate sequencing plans that could shorten schedule duration; explore adding resources (crew, equipment, materials) in multiple areas on a concurrent basis.

Risk Categories

Category A defines risk over which the Design-Builder has the most control. Typical risk items include: design of the Tunnel Boring Machine (TBM), jobsite accidents, constructability of the bored tunnel, control of traffic and the contract schedule. Costs associated with this category are not reflected in Figure 36, as they are entirely assigned to the Design-Builder.

Category B risk is shared between the Design-Builder and WSDOT. Typical risk elements that require collaborative management such as the protection of buildings and structures, TBM pressure head conditions, and safety would be covered under this category.

Category C risk is all items that are managed by WSDOT for the Central Waterfront portion of the Replacement Project. Typical risk elements that require WSDOT management such as the issuance of the ROD, third party agreements, right of way acquisitions, differing site conditions and risks associated with the South and North Design-Build portions of the Replacement Project would fall under this category. Through the risk identification and monitoring process described above, probabilities of occurrence are established and risk dollars are allocated, or set-aside in the event that a risk is realized. For administrative purposes, this category of budget is carried within the Bored Tunnel budget.

Category D is the risks associated with inflation. The inflation rates that were derived in Section 5 of this report would be consistent with the rates referenced in the August 2011 Initial Financial Plan.

The risk categories associated with the Bored Tunnel are shown in Figure 36.

Figure 36: Remaining Annual Budgets for Risk / Inflation /Contingency
(\$ millions, year of expenditure)

Risk Categories	2011 Amount	2012 Amount	2013 Amount	2014 Amount	2015 Amount	Notes
Categories B: Risk Items (DB and WSDOT Shared Risks)⁽¹⁾						Contracted amount, not anticipated to change
Shared contingency allowance <i>(formerly identified as Work in Hyperbaric Conditions)</i>	40.0	40.0	40.0	40.0	40.0	\$20 million paid to date as change orders to contractor for Port of Seattle work
Deformation Mitigation and Repair Fund <i>(formerly identified as Building Settlement Mitigation)</i>	20.0	20.0	20.0	20.0	20.0	
Port of Seattle Allowance <i>(formerly identified as Lease Terminal 46)</i>	20.0	20.0	7.2	4.0	0	
Completion Incentive <i>(formerly identified as Early Completion Incentive)</i>	25.0	25.0	25.0	25.0	25.0	
Bond & Insurance Fund	100.0	99.3	63.9	41.7	26.0	
SUBTOTAL: Category B	205.0	204.3	156.1	130.7	110.9	
Category C: Identified Risk & Unallocated Contingency <i>(formerly identified as Unallocated Risk)</i>	100.0	99.3	77.5	57.6	37.0	Transfers for RW Transactions, Toll Systems and Construction Engineering
Category D: Inflation/Escalation	110.0	50.5	36.7	33.6	32.0	
TOTAL: Risk and Inflation Budget	415.0	354.1	270.3	221.9	179.9	

Source: 2011=WSDOT Cost Estimate to support Washington State Legislature approved 2011-13 budget, 11LEGFIN.

Source 2012=WSDOT Cost Estimate to support Washington State Legislature approved 2012 Supplemental budget, 12LEGFIN.

Source 2013=WSDOT assumed detail (13FEBDET) for Washington State Legislature 2013-15 Biennial Budget and Bored Tunnel Construction Monthly Report.

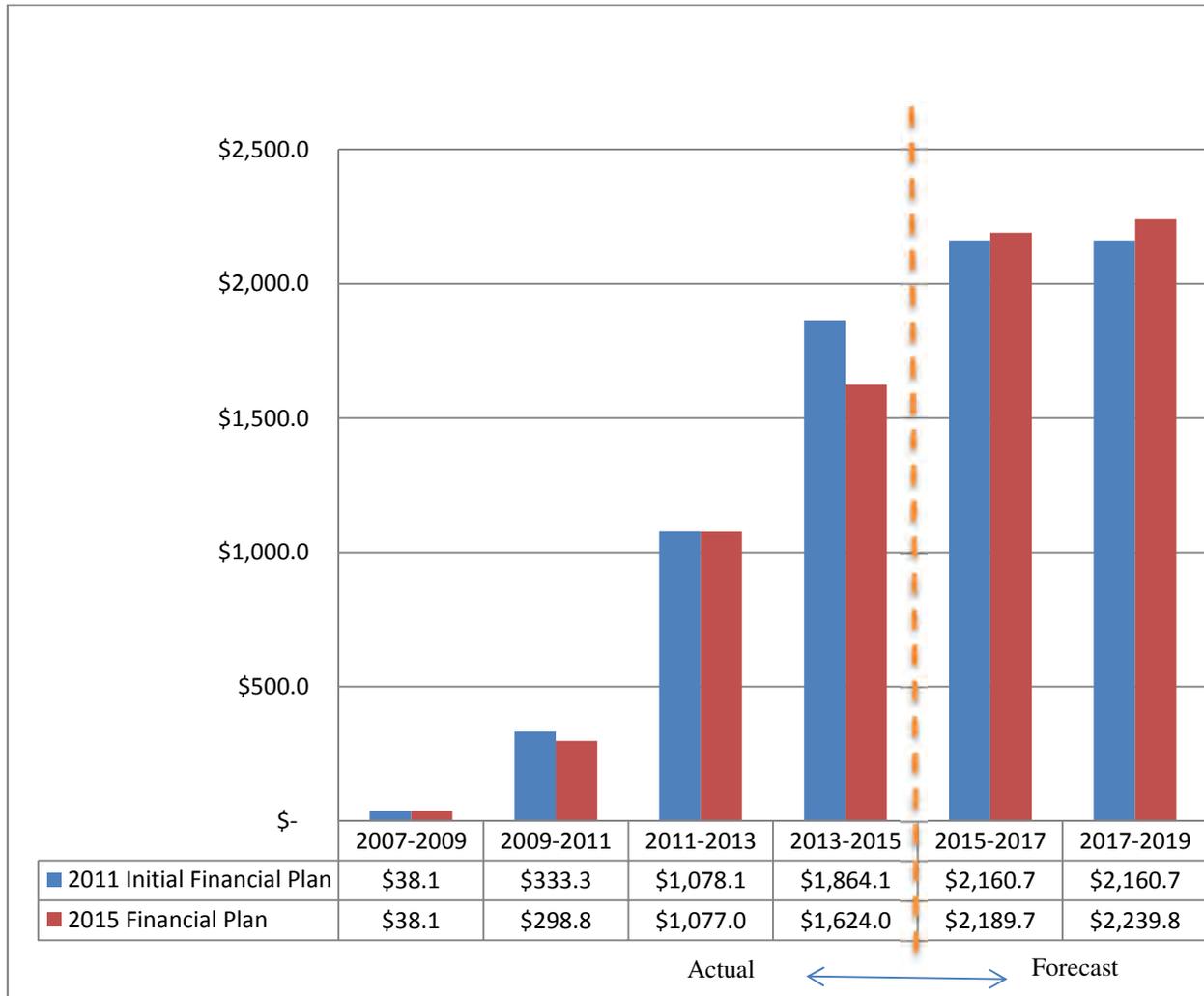
Source 2014 = WSDOT assumed detail (14AWVDET) for Washington State Legislatively approved 2014 Supplemental budget.

Source 2015 = WSDOT assumed detail (15DOTA)2 for 2015-2017 Proposed Legislative Budget

Figure Note:

(1) Figures 21 and 24: WSDOT reallocated \$24.4 million of unallocated risk held in the Bored Tunnel category to right of way because right of way increased to \$182.2 million due to updated real estate procurement costs.

Figure 37: Cumulative Expenditures-2011 Initial Finance Plan vs 2015 Finance Plan Update
(\$ millions)



Risk Events

TBM Stoppage and Schedule Delay Risk

In December 2013, STP stopped tunnel boring approximately 1,000 feet into the tunnel drive after experiencing increased temperatures in the machine. While investigating the cause of the high temperatures, STP discovered damage to the machine’s seal system and contamination within the main bearing. The TBM is being repaired as described previously in this update.

The March 2015 STP construction schedule delays resumption of tunnel boring to late summer 2015 and the tunnel open to traffic by November 2017. WSDOT cannot verify any of the future dates in the STP schedule until the work to resume mining is further along. The responsibility for additional costs and delays associated with this work beyond the original date of November 2016 will be addressed in accordance with the SR 99 tunnel contract. Risk impacts associated with the TBM stoppage and associated schedule delay includes:

- Resolution of claims filed by the contractor;
- Time related costs (“extended overhead”) experienced by WSDOT;
- Contract re-packaging in order to better synchronize contract schedules;
- Potential loss of favorable market conditions due to delayed future contract advertisement timeframes.

DBE Compliance

In fall of 2013, the FHWA investigated civil rights complaints regarding the Design Build Bored Tunnel Contractor, Seattle Tunnel Partners (STP), and DBE participation. As a result of an investigation, the FHWA determined that WSDOT was in noncompliance with its oversight obligations under the federal DBE regulations.

WSDOT declared STP to be in Breach of Contract and entered into a Conciliation Agreement with FHWA regarding the DBE complaint. This Conciliation Agreement outlined various crucial steps at a project and program level to achieve compliance.

WSDOT and STP resolved the breach of contract determination through the issuance of Change Order 91. Change Order 91, in part, established a DBE Contractual Requirement of not less than \$96 million dollars. Through February 2015, STP has claimed DBE commitments totaling \$92.3 million and DBE participation of \$56.0 million, or 4.9 percent of the STP contract total. The March 2015 WSDOT Disadvantaged Business Enterprise Program monthly report to FHWA is shown in Appendix S.

Risk Budgeting

The bulk of the risk budget for the Replacement Project resides in the Bored Tunnel contract. These amounts are either built into the contract or, as is the case with the unallocated risk category, contain in the same work order (bucket) as the Bored Tunnel. As shown in Figure 36, this project carries \$179.9 million in risk and escalation related budget in 2015.

WSDOT typically uses a construction contingency factor of four percent of the awarded contract amount to address normal, historical unknowns during the construction phase of project delivery. These unknowns can include items such as minor additional work, quantity overruns, missing unit bid items, and so forth. As the contingencies are exhausted, a funds request is typically submitted for additional funding. Since these unknown events cannot be identified in advance and there is no logical way to know if or when they will occur, contingencies are set aside to address these “unknown-unknowns.”

In the AWW Program, the construction contingencies also include funding for risks identified on the risk registers for the Tunnel Design-Build, South Access, North Access, and Holgate to King Stage 3. The contingencies allocated for risk are meant to address the large impact that “known unknowns” might have on the cost or schedule of a construction project. These are risk register items that have been identified during the design or construction phase as construction risks with large cost or schedule impacts. Thus, these items can be managed and mitigation strategies developed to address the risk.

The AWV Program will treat contingencies as follows:

- For the design-bid-build construction contracts, include the standard 4 percent contingencies.
- In 2014, contingency not already contractually obligated was divided into a portion (\$48 million) that was dedicated to the Bored Tunnel contract, with the remaining contingency (\$22 million) transferred to a Program Reserve fund. The Program Reserve fund is also accessible to other components within the Replacement Project, and receives underruns or savings from projects outside of the Replacement Project but within the AWV Program.
- Allocate risk funding (amount set aside equals the expected value of the risk, as determined on the risk register) for specific risks on the risk register and follow the Configuration Change Management/Trend or Change Order approval processes to obtain funding if the risk occurs.
- Identify the specific risk from the risk register in Trends/Change Orders and retire the risk when the Trend/Change Order is approved and funded.
- When Risk Trend/Change Orders are approved, move an appropriate level of unused funding risk dollars for retired individual risks (if any remains) back to the Construction contingency account.
- If the risk Change Order exceeds the expected value of the risk, the difference shall be funded out of the construction contingency dollars.
- Meet monthly to review risk, retired and remaining risks, risk mitigation strategies and the risk cash flow.
- In addition to the contingency, allowances established for the Design-Build Contract use construction contingency dollars to fund items that are not included on the risk register and normal historical unknowns.

With regard to contract contingencies for contracts other than the Design-Build contract, each contract must justify funding allocations for risks specific to that contract. The majority of the contingency funds will be allocated to specific risks identified from each contract specific risk register. The remainder of the contingency funds will be “unallocated” and carried in Program Reserve and is available for other risks or issues that are unforeseen within the AWV Program, as determined by AWV Replacement Program Senior Management.

The AWV Program employs formal processes called “Configuration Change Management” and “Trend Program Management” for developing and documenting major project decisions. The Configuration Change Management process is used to document changes in the overall configuration, or physical attributes of the project (essentially the scope of a project). The Trend Program Management process brings changes, above certain financial thresholds, to AWV Program senior management’s attention for review and adjudication. The Trend Program is an internal tool that identifies and formally documents changes to scope (when it does not involve a configuration change), budget, and schedule of the AWV Program. The response of AWV Program senior management formalizes the decisions on project changes. The Configuration

Change Management and Trend Management processes also serve as a history and record of key project decisions for the AWV Program.

The AWV Risk Management Plan underwent an update in late 2014 to include the use of qualitative risk management on construction projects. The quantitative method of ranking and evaluating risks is primarily a design tool, and the quantification is useful in setting contingency budgets early in the project. During construction, contingencies have already been set, and the focus is on managing to the budget. Use of quantitative risk management was continued early in the construction projects because it was the tool that had been used in design. It was also noted that the residual WSDOT risks were extremely difficult to quantify on the Design-Build project and therefore had questionable utility for accurately projecting contract costs. After consulting with experts in the risk management field, it was determined that qualitative risk management is commonly used for construction projects, and would be an appropriate tool for construction projects within the AWVR program. Moving to a qualitative risk management model focuses on strategic management of the highest ranked risks and is an appropriate tool for a joint risk register.

Risk Monitoring

Continuous monitoring and control of risk is necessary to ensure that appropriate progress and advancement of the work are being made towards meeting the project's ultimate goal. When properly administered, the risk monitoring and control process helps to ensure the proper execution of risk management plans, and evaluates their effectiveness in reducing risk. Risk monitoring and control is an ongoing process for the life of the project. A risk monitoring and control process is used to track identified risks; identify and monitor residual risks; and identify new risks.

Monitoring and control is the focus of components currently in design or construction phases. These components have already been through the formal CRA-CEVP[®] and VE Study processes and have well developed risk registers at this time. Thus, monitoring and control is essential to the success of these projects.

As project development continues, the project risk profile will change. Typically, as risks are successfully dispatched, and as knowledge of the project increases, the risk exposure diminishes. Risk reserves can be retired as risk events are successfully avoided or mitigated, or if the time has passed during which the risk is likely to occur.

Routine Risk Monitoring and Control

Project offices include a standing risk agenda item at their project team meetings. Project Engineers are aware of their project risk registers and act in a manner to avoid those risks. Review occurs at least monthly until the risks are no longer active. The intent is to aggressively monitor the risks on a routine basis to ensure that post response strategies are being followed and new risks and/or opportunities are being identified. The Project Managers are aware and thoughtful about the ramifications of project level risks and opportunities on the overall program.

Monthly Monitoring and Control

Monthly risk update meetings are conducted. The Risk Program Coordinator leads and facilitates the meetings which are designed to ensure that risk updates proposed by project teams have adequate justification and are consistently documented. Each of the Project Engineers is responsible for reporting on previously identified threats and opportunities to their projects. The Project Engineers are responsible for identifying new or emerging risks that are not on the project risk register.

Attendees of the meeting include project leadership such as the Engineering Manager and Project Engineer. Invitees will typically include at least one representative of the AWV Program executive management, selected environmental and Program support team members as available and applicable. A cross-section of the design team as well as outside technical experts will be invited as necessary.

The project risk threats are reported upon until the risk is either retired or its residual impact is accepted and accounted for in the Project Engineers cost to complete estimate.

Quarterly Monitoring and Control

There are two types of risk updates that will be performed on a quarterly basis. Due to the aggressive Program delivery schedule, the Holgate to King contracts and the Central Waterfront contract work will be overlapping, requiring aggressive risk management at the interface between contracts. There is also a need to review the contract risks, from a programmatic basis each quarter to ensure that the program is being delivered within budget.

Interface Risk Management

Risks at the interface between contracts are evaluated during the monthly risk update meetings. The individual risk items that are shared across contracts will be reviewed and discussed during the meeting. Consensus is desired to ensure that the risk is correctly identified and the quantifications are consistent and response strategies are acceptable across projects. The intent is to avoid double or triple counting the same risk when the risks are rolled up to the Program level and to be sure that the Project Managers are mindful of the abutting projects and how decisions on one project affect another project. This need is essential to the success to the overall program due to the significant risk that resides at the interface between contracts.

Cost-Risk Validation

Cost-risk validation exercises may be held on a project-by-project basis at the 30 percent, 60 percent and/or 90 percent design milestones as determined by senior management. The purpose of these exercises is to allow AWV Program senior management staff to comprehensively review the project risk register, and as appropriate, provide input regarding current risk status and response strategies. During the months in which these meetings are held, the regular monthly risk update meetings may not be held. The meeting will be an internal project cost and risk validation effort only, and thus, will not be a CRA or CEVP®.

The meeting is organized and facilitated by the Risk Program Coordinator. AWV Program senior management will decide whether or not to model the register again after the completion of the meeting. This decision depends on the significance of the changes and their timing. It is expected that the Program Estimator and Project Estimators will be available to discuss changes or potential changes to the base cost estimates as part of the quarterly meeting. This ensures that the assumptions of the lead estimators are aligned with the risks and response strategies identified by the project teams, and provides assurance that the project teams are actively responding to their project's threats and opportunities.

9. Conclusions and Summary

Work continues to progress since the Replacement Project Initial Finance Plan was submitted to FHWA in August 2011. The voters of Seattle affirmed their support for the AWV Program in a September 2011 advisory vote. The Bored Tunnel Design-Build Contractor ordered, assembled and launched the tunnel boring machine. Tunneling began in July 2013. In December 2013, STP stopped tunneling approximately 1,000 feet into the tunnel drive after experiencing increased temperatures in the machine. While investigating the cause of the high temperatures, STP discovered damage to the machine's seal system and contamination within the main bearing. As of May 2015, STP has completed an access pit, re-started the TBM and driven into the shaft to allow disassembly of the cutterhead and drive units. Work is underway to repair the seal assembly and replace the main bearing. The March 2015 STP construction schedule delays resumption of tunnel boring to late summer 2015 and the tunnel open to traffic by November 2017. WSDOT cannot verify any of the future dates in the STP schedule until the work to resume mining is further along. The responsibility for additional costs and delays associated with this work beyond the original date of November 2016 will be addressed in accordance with the SR 99 tunnel contract.

Between 2014 and 2015, there have been some minor changes in project cost, with the 2014 cost estimated at \$2.244 billion and the 2015 cost estimated at \$2.240 billion, with budget transferred from other parts of the AWV Program. This is a decrease of approximately 0.2 percent, due to a transfer of contingency to Program Reserve. Overall, the cost of the Replacement Project has remained relatively stable with the cost increases and decreases balancing to the updated project budget. The responsibility for additional costs and delays associated with the tunnel boring machine will be addressed in accordance with the SR 99 tunnel contract.

There have been several changes in the way WSDOT plans to pay for the Bored Tunnel. These modifications are due to an increase in the availability of some funds and a decrease in others.

In the 2012 Session, the legislature enacted authority to toll the Bored Tunnel. Preparation for this legislation revealed a potential shortfall in the funding capacity of tunnel tolls due to diversion of traffic onto City of Seattle surface streets.

The funding source distribution currently projected as well as the changes overtime since the 2011 base case are summarized in Figure 38.

Figure 38: Changes in Funding, 2011 Base Case, 2014 Prior Year, and 2015 Current Year

2011 (Base Case)	2014	2015	Change 2011 Base Case vs 2015	Change 2014 vs 2015 (1 year)	Source
10.6%	21.8%	21.9%	+11.4%	+0.1%	Federal funding
61.6%	58.0%	58.1%	-3.6%	0.1%	State motor vehicle fuel tax
18.5%	2.8%	2.8%	-15.7%	0.0%	State tolling
9.2%	17.4%	17.2%	+7.9%	-0.3%	All Local
			+3.7%	-0.2%	Total Change

Through February 2015, WSDOT's remaining budget for the Replacement Project includes allowances and contingencies in the amount of \$127.2 million for potential cost overruns.

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