



February 27, 2013

Governor Jay Inslee
State of Washington
Office of the Governor
P. O. Box 40002
Olympia, Washington 98504-0002

Re: Alaskan Way Viaduct Replacement Program Expert Review Panel 2013 Report Update

Dear Governor Inslee and Washington State Legislature,

In accordance with the charge to the Expert Review Panel ("ERP") our February 27, 2013 report documenting our findings and recommendations to date is transmitted for your consideration.

The enclosed report update conveys the findings of the ERP constituted under the provisions of Bill 1175 to assess the viability and feasibility of the Alaskan Way Viaduct Replacement Program's ("Project") Finance Plan and to review key assumptions for the Project's schedules, risk identification and management, and cost estimates to assure they are reasonable.

Based on the ERP's independent review of the Project, the ERP continues to have confidence that the Project can be successfully completed. The ERP has identified certain specific findings and recommendations for the Governor and Legislature to consider, which are focused on enhancing attainment of the established Project goals and objectives as discussed in our Report update.

We appreciate the opportunity to assist you in this important initiative. The ERP would be pleased to provide further clarification on any of the points in this Report as needed in the future.

Sincerely,

Patricia D. Galloway, Ph.D.
CEO, Pegasus Global Holdings, Inc.
Chair, Alaskan Way Viaduct Replacement Program Expert Review Panel

WWW.PEGASUS-GLOBAL.COM

1750 EMERICK ROAD, CLE ELUM, WASHINGTON USA



TELEPHONE +1 (509) 857 - 2235 FAX +1 (509) 857 - 2237

Alaskan Way Viaduct Replacement Program Expert Review Panel Updated Report

February 27, 2013

THE ALASKAN WAY VIADUCT REPLACEMENT PROGRAM

Updated Report of the Expert Review Panel

February 2013

The enclosed Report conveys the findings of the Expert Review Panel (“ERP”) constituted under the provisions of Bill 1175 to assess the viability and feasibility of the Alaskan Way Viaduct (“AWV”) Replacement Program’s (“Project”) Finance Plan and to review key assumptions for the Project’s schedules, risk identification and management, and cost estimates to assure they are reasonable.

The ERP continues to have confidence that the Project can be successfully completed.

The Project is entering a critical phase as the Tunnel Boring Machine (“TBM”) is delivered and tunneling commences. While the ERP has identified potential risks to the schedule, it is too early to be certain that delays to Project completion will occur, and too early to know if such delays do occur that they would increase costs.

The next six months include several crucial milestones for the Project. Success in achieving these milestones will be cause for greater confidence, but missed milestones could materially delay schedules and increase costs. The ERP has identified actions that can reduce risks.

The ERP is increasingly concerned that important funding sources for the Project remain unsecured. Without action on tolling and on the contribution from the Port of Seattle, the Legislature lacks certainty that funds are available to complete all phases of the Project.

The ERP’s recommendations have been developed to enable the Governor and Legislature to take action as deemed necessary to allow the Project to continue to move forward efficiently, while at the same time enabling the Project to achieve its goals as envisioned by all who will benefit from the AWV Project at the local, regional and state levels.

Because of the number of significant action items and critical milestones facing the Project over the next six months the ERP strongly recommends that the Governor and Legislature consider a semi-annual ERP update on these action items and milestones in addition to approving a budget allowing the ERP to continue its more detailed annual reviews over the life of the Project as contemplated in the ERP’s charge.

We are appreciative to the Washington State Department of Transportation (“WSDOT”) for its responsiveness and support throughout our review. We were continually impressed with the skill and experience the WSDOT staff brought to this process. We also commend the Governor and the Legislature for their continued commitment to this Project since without their leadership, rebuilding this key public asset would be impossible.

Dr. Patricia D. Galloway, P.E., Chair

John Rose

Robert Goodfellow, P.E.

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Acronym and Abbreviation List

Acronym / Abbreviation	Full Definition / Listing
ACTT	Advisory Committee on Tolling and Traffic Management
AWV	Alaska Way Viaduct
CEVP	Cost Estimate Validation Process
City	City of Seattle
DMR	Deformation Mitigation and Repair Fund
DSC	Differing Site Condition Fund
ERP	Expert Review Panel
FHWA	Federal Highway Administration
FNTP	Full Notice to Proceed
GO	General Obligation
GSA	Federal General Services Administration
H2K	S. Holgate to King
ITIG	International Tunnel Insurance Group
LID	Local Improvement District
LOA	Letter of Agreement
MOU	Memorandum of Understanding
MP31	Milepost 31
MVFT	Motor Vehicle Fuel Tax
NTP	Notice to Proceed
POC	Project Oversight Committee
Port	Port of Seattle
Project	Alaska Way Viaduct Replacement Program
RMP	Risk Management Program
SDOT	Seattle Department of Transportation
STAT	Strategic Advisory Team
STP	Seattle Tunnel Partners
TBM	Tunnel Boring Machine
WSDOT	Washington State Department of Transportation

1. EXECUTIVE SUMMARY

This Report is an update of the Expert Review Panel’s initial (“ERP”) report published in February 2012, regarding the viability and feasibility of the Alaskan Way Viaduct (“AWV”) Program’s (“Project”) Finance Plan and key assumptions for the Project’s schedules, risk identification and management, and cost estimates.

The ERP was appointed in September 2011 by the Governor and Legislature under the provisions of Bill 1175. The ERP at that time was asked to update a previous expert review panel’s 2006 report and to conduct an independent financial and technical review of the Project’s key assumptions, Finance Plan and Risk Management Plan (“RMP”) which was submitted by the ERP to the Governor and Legislature in February 2012.

The \$3.1 billion AWV megaprogram is comprised of several individual project elements including:

- the central viaduct replacement project including a design-build deep-bored tunnel contract;
- other smaller projects including projects that tie-in the south and north end of the deep-bored tunnel contract; and
- demolition of the existing viaduct, de-commissioning of the Battery Street Tunnel and relocation of the Alaskan Way surface street.

The ERP has been tasked by the Governor and the Legislature to review the Project’s Finance Plan for its viability and feasibility and to identify risks that have the potential to impact the attainment of the continued Project goals and objectives. Specifically, in this update, the ERP was tasked with three main objectives:

1. Review the 2012 updated Federal Highway Administration (“FHWA”) Financial Plan for the Project submitted to the FHWA to ensure that it (a) clearly identifies secured and anticipated funding sources; and (b) is feasible and sufficient;
2. Review the Project’s key assumptions established for the schedules, risk identification and management, and cost estimates to assure they continue to be reasonable; and
3. Identify (a) the successes to date that have occurred on the Project including implementation of the ERP’s recommendations made in its 2012 report; (b) ERP recommendations made in its 2012 report not yet implemented; and (c) challenges currently facing the Project along with potential Project impacts and recommendations.

1.1 General Findings

The ERP continues to find that the Washington State Department of Transportation (“WSDOT”) AWV Project is progressing in a satisfactory manner. The ERP is confident the Project can be successfully completed based on its current course. However, this confidence should be tempered with the understanding that (a) the Project is still in its early stages, and the commencement of tunneling will present important challenges that may impact schedule and budget; (b) the Project’s success still

depends on successful relations with key stakeholders and government agencies; and (c) actions are still needed to secure important funding sources.

The primary findings of the ERP to date include:

1. The Project is currently proceeding within its overall approved budget.
2. WSDOT implemented several of the ERP's February 2012 recommendations and with its partners have achieved significant successes since the ERP's February 2012 report, including:
 - a. Completion of the S. Holgate to King ("H2K") project on time and within budget with Stage 2 Physical Completion achieved on October 29, 2012 and Stage 3 on track to complete by the end of 2013;
 - b. Substantial completion of the acquisition of needed rights of way including reaching agreement with the Federal General Services Administration ("GSA") for easement under the old Federal Building;
 - c. Reinforcing of the viaduct conducted as planned;
 - d. Near completion of the Tunnel Boring Machine ("TBM");
 - e. Voter approval of financing for the City of Seattle's ("City") Seawall project;
 - f. City of Seattle planning for the Local Improvement District ("LID") that allows the seawall to be completed in time to interface with the WSDOT projected schedule for the Alaskan Way surface street;
 - g. Improved communications between WSDOT and crucial partners including the City of Seattle;
 - h. Securement of Federal funds to offset the identified reduction in anticipated tolling revenues estimated in earlier projections as the result of new information and analysis;
 - i. Action by the Legislature to authorize tolls for the Project;
 - j. Improvements in WSDOT's risk management procedures and alignment of the design-build contractor's risk management report with that of WSDOT;
 - k. Resolution of the Western Building stabilization and costs therefor obtained from the Project's Unallocated Contingency Fund and not the Deformation Mitigation and Repair Fund ("DMR");
 - l. Clarification of expectations regarding access to building DMR monies;
 - m. Development of a WSDOT summary of potential financial and schedule risk exposure categorized by each category fund;
 - n. Receipt of five awards for the Milepost 31 ("MP31") information center as part of the Section 106 process environmental commitment;
 - o. Production of the Parking Mitigation Plan and tracking according to the plan;
 - p. Installation of settling monitoring stations and instrumentation for settlement monitoring of structures along the tunnel route nearly complete;
 - q. 98% completion of design-build bored tunnel final design through December 2012; and
 - r. Progression on the tunnel liner segment fabrication facility in Pierce County with projected completion by the end of February 2013.

3. While several Project milestones have been accomplished on or ahead of schedule, the Project's schedule is ambitious with several risk factors having the potential to impact the Project's completion date if mitigation measures are not accomplished.
4. Several ERP recommendations and observations, as well as Project milestones identified in last year's ERP report have not been satisfactorily resolved, and additional challenges have emerged as follows:
 - a. Important funding sources are still not secured, including:
 - i. Tolls:
 1. Revenue projections based on new tolling options will not be available during this Legislative session.
 2. Some stakeholders have expressed doubt that tolls are an acceptable source of revenue for the Project.
 3. Parties developing toll proposals may not be giving sufficient consideration to other state system-wide needs.
 - ii. The Port of Seattle ("Port"):
 1. The updated Financial Plan calls for a \$281 million contribution from the Port, but that source has yet to be documented in a binding agreement with WSDOT as was mutually contemplated to have been accomplished by June 2012.
 2. While Port personnel and Port Commissioners continue to affirm their commitment for the Project, the Port's financial circumstances have in some ways declined in recent months which may affect the Port's ability and willingness to meet contributions to future projects.
 3. Some stakeholders voice concerns as to whether the design and execution of surface street projects in combination with decisions about the regional transportation system, will adequately address the Port's freight mobility goals.
 - iii. Gas Tax related revenues:
 1. New projections affirm the ability of the State to use Motor Vehicle Fuel Tax ("MVFT") bonds to provide funds for the Project.
 2. However, those projections provide funding for the Project by diverting funds from maintenance needs.
 - iv. Transit funding:
 1. There has been no action to provide new funding for transit services to mitigate the reduced capacity that will result from replacing the viaduct with the deep-bored tunnel.
 - b. Progress is needed to improve the communication between important partners critical for the Project:
 - i. Failure to reconvene the Project Oversight Committee ("POC") increases the risk of confusion and failed commitments by the Project's partners.
 - ii. There has been significant improvement in WSDOT's cooperation with the City of Seattle on surface street projects, but there remains a need for a formal agreement regarding their respective expectations, roles and responsibilities.
 - c. Project Management has been successful to date, however:

- i. WSDOT staff changes and changes in partners' staffs may be obstacles to the Project's success.
- ii. WSDOT has not implemented the ERP's recommendation that a regular independent audit of the Project' risk registers and contingency funds be performed.
- d. Several critical milestones planned in the design-build tunnel contractor's project schedule face challenges which could, if mitigation plans are not successful, potentially impact the critical completion date of the deep-bored tunnel contract including:
 - i. TBM manufacture / testing completion: The milestone for loading the TBM on the ship in Japan is February 28, 2013.
 - ii. Transport to Launch Pit: It is imperative that the design-build contractor conclude negotiations with various labor groups so that transfer of the TBM from ship to shore can take place in a timely manner and that transport of tunneling muck to barges can be done in a cost-effective manner.
 - iii. Launch Pit Excavation: The Contractor's progress is slower than planned and based on current progress it is unclear if the launch pit will be ready to serve the TBM assembly for the current schedule of April 9, 2013.
 - iv. TBM assembly and commissioning completion: Delay of TBM assembly and commissioning could impact the planned TBM launch of June 18, 2013.

Based on its independent review, the ERP has identified the following actions to be monitored during the next six months to increase the probability of success. The most important of these include:

1. Funding Actions:
 - a. The Port and WSDOT should act quickly to enter into a written, binding agreement for the Port's financial contribution.
 - b. State officials should give policy direction to guide new analyses of tolling options, and those analyses and related decisions should be completed in sufficient time so that the 2014 Legislature can finally confirm the revenue sources committed to the Project.
 - c. The Legislature should review WSDOT's recent allocations of new Federal funds to the Project, considering the impact of these allocations on other State projects, on negotiations with the Port of Seattle, and on tolling decisions.
2. City and State Project Interface Actions:
 - a. The Governor should re-convene the POC so that important partners can affirm their institutional commitments and new participants can be well informed.
 - b. The City and WSDOT should continue to work together and enter into a written binding agreement memorializing their mutual understanding with respect to their respective roles, responsibilities, and scope for the design and construction of the tunnel follow-on projects, including the Alaskan Way surface street projects which is funded by the State for the State's obligation.
 - c. WSDOT should continue to monitor the City's implementation of the Mercer West and Seawall Replacement contracts.
3. Design-Build Contract Actions:

- a. WSDOT should continue to focus attention on all manufacturing, testing, shipping, unloading, re-assembly and site excavation and preparation activities to mitigate delay to start of tunneling. The current status of these tunnel project components is likely to result in a delay to the start of tunneling.
 - b. WSDOT should remain focused on obtaining and evaluating the validity of work plans related to post-TBM launch activities. The design-build tunnel contractor has identified systems installation and interior concrete structures as its #1 and #9 risks on the tunnel project. Such later activities will quickly impact the tunnel project schedule if not carried out effectively.
 - c. WSDOT should consider taking additional steps to further protect the State's contractual rights in advance of any potential disputes that may arise under the design-build tunnel contract.
 - d. Follow-on projects post tunnel construction must continue to proceed on schedule. Interaction with the follow-on projects will increase as the tunnel project proceeds. Liaison with these projects must continue and if possible increase in intensity to make sure that all points of intersection and mutual milestones are realized and disturbance to the stakeholders is minimized.
4. Reaffirm Stakeholder understanding of Project goals and objectives:
 - a. Stabilize the Project team after significant changes in the AWV Project Team, Project Stakeholders positions and government leader positions. Since the ERP's February 2012 report, changes have occurred in the following positions: Governor, State Legislature, Secretary of Transportation, FHWA representative, WSDOT, Port Commissioners, and Contractor. Such changes require re-calibration and in some cases re-education of the Project objectives and priorities. A mixed political or Project team message may result in a lack of alignment and at this stage in the Project could be highly counterproductive to the success of the Project.

1.2 Findings

1.2.1 Finance Plan

The Project's Finance Plan as reviewed by the ERP includes but is not limited to a review of the Finance Plan provided to the Federal government as part of the initial approval process for the Project.

FHWA Approval

The FHWA State Division approved the State's 2012 Finance Plan Annual Update via letter dated September 11, 2012, noting small changes in the Project's estimated expenses and schedule. The FHWA letter concluded that "the Plan continues to describe adequate resources to meet anticipated construction costs."

The FHWA's positive conclusion is not based on a complete review of the Project's finances. Importantly, the FHWA has verified to the ERP that all Federal sources for the Project are secured without need for

further Congressional or Administration action. However, FHWA's approval of the update Plan is of limited value to the Legislature because:

- It does not consider the absence of a legal commitment for the Port's funding;
- It does not recognize the political and practical challenges of achieving the currently planned \$165 million in construction funds from tolling;
- The ensuing four months since FHWA's letter has brought new information about the status of the Project; and
- FHWA's review considers in detail only those projects included in the Final Environmental Impact Statement for the Project (with an estimated cost of \$2,160,000,000) and provides less detail on other important elements of the overall Project (with an estimated cost of \$990,700,000) including:
 - The replacement and realignment of the Alaskan Way surface street.
 - The Moving Forward projects.
 - Transit enhancements.

Cost Estimates

The ERP reviewed changes in the Project's budget and affirms last year's ERP finding of "no evidence that would lessen the level of confidence assumed for that estimate as originally set at that time."

Minor changes in Project components are within expectations and leave the Project with contingency funds that are appropriate for this stage of the Project's life.

There are factors that may delay the completion of the Project; however, it is too early to estimate the cost impacts, if any, of such delays.

Funding Sources

The ERP reaffirms last year's finding that a significant amount of the funding for the Project is not secured, and that the Legislature should actively monitor the status of funding sources and be prepared to identify alternative funding sources if necessary.

The State has committed to substantial expenditures without securing the certainty of needed funding from sources identified in the Finance Plan. The State has already expended significant time and money on the Project and has entered into contracts for the largest components of the AWV Project, including the design-build contract for the deep-bored tunnel.

Steps have been taken to secure needed funds, but the problem of securing all necessary funding sources remains unresolved. The continued passage of time will reduce the ability of the Legislature to make thoughtful decisions; and without resolution of these issues, at some point the question will arise as to whether funds are available for projects to be completed after the tunnel is done, including the new Alaskan Way surface street restoration, viaduct demolition, Battery Street tunnel decommissioning, and connecting the restored surface street to Elliott Way.

With respect to the funding sources identified in the Finance Plan, the ERP finds the following:

1. Federal Funds: The ERP finds the Federal funds identified in the 2011 initial financial plan have been augmented by additional funds, replacing \$235 million previously to be provided by tolling. The Federal funds are committed and need no further Congressional or administrative approval.
 - a. The Federal funds most recently allocated to the Project may have also been available for the other State projects; it is not within the scope of the ERP's work to determine the appropriate priority for the use of these funds.
2. State Funds: The Legislature needs to secure the anticipated State funds with actions that provide MVFT and Toll bonding authority for the Project.
 - a. MVFT-related funds:
 - i. The majority of the State's funding is based on the sales of bonds as secured by MVFT revenue, and additionally by the State's full faith and credit.
 - ii. State officials express confidence in the ability to sell the bonds needed to support the Project. Historical indications are that the bond sales for such projects are generally very strong:
 1. The MVFT still appears to provide strong security to protect the State's General Fund. Recent updates represent an improvement over forecasts related to the State's 2012 Supplemental Budget deliberations; those forecasts predicted a deficit of \$211.4 million in the State's transportation accounts over the next six years. The latest forecasts available to the ERP now show those accounts to be balanced. **However, the ERP is advised that the adjustment which balanced the account is the result of under-funding of maintenance costs.** The ERP notes with interest that FHWA staff responsible for approving the Project's financial plan update was unaware that State funds for bond payments are only available at the expense of underfunding maintenance.
 2. The MVFT challenges related to the Project are part of a much bigger discussion about transportation funding that is beyond the scope of this ERP. The ERP recommends that bond revenue (and future expenditure) projections should be closely monitored so that forecasts relative to future MVFT revenue claims against those funds (including the operations of WSDOT, debt service on previously issued bonds, debt service on bonds to fund future construction on the Project and other projects) can be balanced with and evaluated based on the actual revenues received.
 - b. Toll Revenue:
 - i. **Toll funds available for the Project are not secured.**
 - ii. Last year's ERP report noted that the \$400 million of toll revenue as identified in the 2011 FHWA financial plan was "not yet secured".
 - iii. The Legislature did take action to authorize toll revenue bonds for the Project but has yet to authorize tolling authority.
 - iv. WSDOT has now reduced to \$165 million the amount of toll revenue needed to generate for the Project, but decisions to implement tolls have been delayed.

- v. Toll planning is now being led by the Advisory Committee on Tolling and Traffic Management (“ACTT”), formed out of a commitment in WSDOT’s Record of Decision for the Project.
 - vi. The schedule for completion of the ACTT’s work has been lengthened, making it unlikely that its recommendations will be available during the current Legislative session.
 - vii. ACTT is currently working to achieve certain “Guiding Principles” that may not give sufficient focus to system-wide goals, and the composition of the ACTT may reduce its focus on system-wide goals.
- c. Transit Funds:
- i. The ERP’s February 2012 report noted King County had requested, but not yet received, new legislative authority to implement local taxes to provide for longer-term transit enhancements which will affect the Project’s ability to meet all of its goals for moving people and freight. This is still the case.
 - ii. Without State action, King County will not be able to add transit enhancements to mitigate the impacts of the new tunnel.
3. Port of Seattle: The ERP notes with concern that there has been little progress in securing the \$300 million contribution to the Project from the Port of Seattle that is anticipated in both the 2011 Financial Plan and its 2012 update.
- a. The Port has been credited with a \$19 million contribution to the Project represented by its expenditure on south end improvements. **The remaining \$281 million is not yet secured.**
 - b. There continues to be evidence that the Port is committed to its planned contribution as currently documented by a Memorandum of Understanding (“MOU”) with WSDOT but the MOU is not a legally binding agreement.
 - c. The ERP finds the immediate finalization of the WSDOT and Port agreement to be in the best interest of the Project because:
 - i. The existing MOU includes contingent language that might provide a basis for the Port to contribute less than the \$281 million. There may not be agreement as to whether new revenues or reduced expenses will reduce the Port’s contribution.
 - ii. The plan to receive the Port’s funds towards the end of Project construction creates an additional risk. There may also be differing expectations as to when the Port’s contribution needs to be made.
 - iii. The Port’s current commitment could be changed by future Port Commissions; two or more of the Commissioners who participated in approval of the MOU will not be part of the decision to implement the expected financial contribution.
 - iv. There have been material changes in the Port’s operations in recent months that may reduce its ability or desire to contribute the planned amount.
 - v. Port Officials have expressed concern that decisions about other parts of the State’s highway system may have a negative impact on achieving the freight mobility goals that make this contribution appropriate for their mission.

City/State Relationship

The City is responsible for design, construction, and funding of several projects related to the replacement of the Alaskan Way Viaduct and interfacing with the tunnel project. These projects include:

1. The Waterfront Redevelopment Project;
2. The Seawall Replacement;
3. The Mercer Corridor, including Mercer East and Mercer West;
4. The Spokane Street Viaduct Widening Project; and
5. Public Utility Relocation.

Other work related to the replacement of the Alaskan Way Viaduct includes projects for which the State has a defined funding responsibility. The City and State are in agreement with respect to the defined State funding for these projects and with the City's lead in the conceptual design for the Alaskan Way surface street.

The ERP finds that City and WSDOT staff have worked well together in recent months, but they have yet to complete their discussions regarding their roles, responsibilities, and scope for the AWV projects that follow the completion of the deep-bored tunnel project, including the:

1. Alaskan Way surface street relocation;
2. Western/Elliott connection;
3. Viaduct removal;
4. Battery Street Tunnel decommissioning; and
5. Marion Street pedestrian overpass.

The ERP's review concludes that the City's progress on its projects is of interest to the State because:

1. The public may not differentiate these roles in their ultimate evaluation of the State's completion of its Project.
2. The successful completion of the State's Project is in many ways dependent on the City's timely completion of related projects.
3. The Waterfront Redevelopment project and the Seawall Replacement project are viewed by many in the public as part of the WSDOT AWV Project even though they are separate projects with separate funding sources.
4. The successful completion of the City's Mercer West project will impact the achievement of the freight and traffic mobility goals expected by the Port, major stakeholders, and the public at large. City officials are confident that funds are available for the Mercer West project, but stakeholders are concerned that important decisions still need to be made about project design that will affect freight mobility.
5. The City Seawall project is critical to the design and timing of the WSDOT viaduct demolition and Alaskan Way surface street projects.
6. The City has made significant progress on the Seawall project, including obtaining voter approval for needed funds, entering into a contract for the first phase of seawall construction, and

commencing work on a LID that will provide additional funding for the Waterfront project. The ERP's review also concludes that the City's Waterfront Redevelopment for the relocated Alaskan Way surface street will affect the Project's overall budget and mobility goals. The ERP notes that the Finance Plan calls for WSDOT to spend \$290 million on a set of projects including relocation of the Alaskan Way surface street, removal of the Viaduct, and decommissioning of the Battery Street Tunnel. The implementation of these projects merits special oversight. WSDOT should clarify what happens to this allocation if necessary costs are a lesser amount.

1.2.2 Implementation Plan

Tunnel Contract

The ERP finds the following to be evident after its review:

1. The AWV Project risk management processes are adequate to manage this megaprogram successfully.
2. The updated Risk Management Plan ("RMP") for both the design-build tunnel contractor and WSDOT shows an effort to incorporate the 2012 recommendations of the ERP and an acknowledgement that these comments were positive and supportive of their efforts.
3. There is a potential for significant political, financial, and reputational risk for WSDOT in all areas of the design-build contract, even where commercial risk has been contractually allocated to the design-build contractor. For this reason it is important that WSDOT continues to be proactive in leading the program-wide risk management process throughout design and construction.
4. Staff turnover on the WSDOT AWV Team could introduce risk into Project execution and should be managed closely in the coming months to ensure there is a seamless transfer of duties to replacement staff. Any additional turnover in Project leadership in the coming months would be disadvantageous to the Project as the tunnel project enters a critical phase of the Project execution schedule.
5. Project participants have identified risks and opportunities that could increase or decrease the tunnel project cost and schedule. The cumulative effect of these is an increased cost of \$42.5M and 13.8 months of schedule delays should the risks materialize. As described elsewhere in this Report, contingency funds exist to accommodate the anticipated cost of identified risks. WSDOT has not set up any similar level of contingency for project schedule.
6. The risk register format is quantitative in nature. Certain risks do not lend themselves to quantitative description, including risks such as: TBM function and first use of technology.
7. WSDOT has allocated sufficient amounts to contingency accounts to protect against budget overruns at this stage of the Project. The total contingency allowance for risk items has been broken out and is tracked carefully by the WSDOT AWV Project Team. The unallocated Contingency is available to support exposure in any other fund.
8. The design-build tunnel contractor reduced the original proposed contract schedule in its bid by nine months and provided a completion date of December 31, 2015 in its proposal. This date is very aggressive for opening of the tunnel.

9. The TBM and its associated risks of manufacture, testing, assembly and operation are the greatest potential source of increased cost and especially for schedule delay, providing 11 of the top 15 risks on the tunnel project according to the design-build tunnel contractor (data obtained in January 2013). Achieving the intermediate milestone of start of tunneling must consider many of these TBM risks.
10. In order to get to start of tunneling, many activities must be completed, for example: Launch Pit excavation and preparation; TBM manufacture, testing and acceptance; shipping and transfer to the Launch Pit; and TBM re-assembly final testing and commissioning. From examination of the preliminary schedule of December 2012, and discussion with the Project team, each of these activities is critical to the tunnel's on-time completion, and they are all threatened with various degrees of delay.
11. Given the confluence of these critical path activities surrounding the latter stages of TBM manufacture, delivery, site preparation, and re-assembly of the TBM in preparation, it is the ERP's opinion that the TBM launch date of June 18, 2013 will not be achieved.

Relationships with Stakeholders and Partners

The ERP interviewed a wide variety of parties with an interest in the AWV Project. The parties were unanimous in their praise for WSDOT's willingness to listen and to seek to solve problems as they are raised.

The ERP finds that strong leadership from a variety of elected and appointed officials has made it possible to achieve significant progress to date. As noted earlier, local elected officials including Port Commissioners could impact Project success if the leaders who have worked together and understand the vision and background of the Project are no longer in place to see the Project to completion. There have been many changes in the occupants of these positions since the Project commenced, and these changes pose a threat to the continued success of the Project.

Governor Gregoire, in accordance with industry best practices for megaprojects, appointed a Program Oversight Committee ("POC") in March 2010. The Committee's members as constituted by the Governor include:

- The Governor;
- The Co-chairs of the Legislature's Joint Transportation Committee;
- The Mayor, City of Seattle;
- A City Council member;
- The King County Executive;
- A King County Council member;
- The Port of Seattle Commissioner; and
- The Port of Seattle CEO.

The creation of the POC was an excellent and important step toward achieving the successful completion of the complex Alaskan Way Viaduct Replacement Program megaprogram. The inclusion of

important decision-makers and their representatives is an important tool to continue the momentum created by the initial agreements between governments and other stakeholders. The early phases of the Project did not necessitate the active oversight of the POC, but now the Project has reached a critical phase where reactivation of the POC is important.

Management Structure

The ERP's assessment of the management structure of the WSDOT AWV Project Team and the risk management planning and assessment of the Project remains the same as described in the ERP's February 2012 report attached as **Appendix A**.

1.3 Recommendations

The Project is entering a critical phase as the TBM is delivered and tunneling begins. The ERP has identified potential risks to the Project's successful completion. The potential risks are being managed well, but the ERP recommends some changes to improve process, and therefore outcome, as listed below.

The ERP's recommendations include action items, items to be monitored, and milestones against which the Project's progress can be measured.

1.3.1 Finance Plan

1. Actions:

Several important actions are required to secure the funds needed to bring the Project to a successful conclusion:

- a. Toll Funds: The Legislature will have to decide if it wishes to authorize the sale of toll bonds as a source of funds for the Project.
 - i. The ACTT expects to provide its analysis and recommendations in June 2013. The Legislature should determine if the ACTT's goals give due consideration to state system-wide concerns.
 - ii. Diversion policy. The Legislature should consider means to give the ACTT direction as to the amount of traffic diversion that is acceptable. Without such direction, subjective considerations may prevail, and those may not give due consideration to state system-wide concerns that may affect other important projects. The Diversion topic should include a focus on the regional system. For example, diversion from SR 99 to Seattle surface streets is an important consideration, but freight mobility goals may also be related to efforts to divert traffic away from I-5 and onto SR 99.
 - iii. Bond authorizations: The Legislature has given tolling authority for the Project. The Governor and Legislature will need to authorize the sale of toll-backed bonds for the Project. This action can take place in the 2014 session.
 - iv. The Transportation Commission, acting as the tolling authority, should work with the State Treasurer and Finance Committee to establish policies that will ensure that an

adequate amount of capital funds can be generated from toll revenues, if the Legislature authorizes the sale of bonds backed by toll revenues.

- b. Port Funds: WSDOT should move expeditiously to obtain a written binding agreement with the Port that will provide certainty as to amounts, timing, and any conditions pertaining to the Port's contribution.
 - c. Transit Funds: The Governor and Legislature should consider legislative authority for local taxes to provide transit enhancements that will allow the Project to meet its passenger and freight mobility goals.
2. Monitoring:
- a. State MVFT Funds: The Legislature should monitor updated projections to retain confidence that needed bonds can be sold without requiring inadvisable diversion of revenues from maintenance needs. Such projections should reflect MVFT projections and financing policies that support the sale of bonds in amounts and on the dates required to meet WSDOT's projected cash flow.
 - b. Expenses. As tunneling commences it will be highly important to monitor any factors that might result in schedule delays, design modifications or contractor claims that could result in increased expenses that must be covered with contingency funds.

1.3.2 Implementation Plan

1. Actions:

Several actions are recommended to strengthen management of the Project:

 - a. Program Oversight Committee ("POC"): **The ERP again recommends the reactivation of the POC.** The chances of the Project's ultimate success will be significantly increased by a strong working relationship with and between government agencies and cooperation with key stakeholders. The POC should reconvene and meet at least quarterly so that new members have a shorter learning curve and that they can understand the nature of the commitments that the various governments have made to each other and then effectively enforce those commitments.
 - b. WSDOT Executive level support for the Project needs to be maintained.
 - c. Staff Continuity: WSDOT should seek to minimize staff turnover for this Project that may be disruptive to the Project's success.
 - d. Relations with the City of Seattle: WSDOT should expeditiously complete formal agreements with the City of Seattle to confirm roles and responsibilities for surface street projects including the construction of a new Alaskan Way.
 - e. Risk Management: WSDOT should provide for a semi-annual independent third-party audit (i.e. an audit carried out by individuals who are outside the WSDOT AWV Project Team) to conduct a detailed review of the risk registers and contingency funds.
 - f. Contract Management: WSDOT should take actions that will enhance its ability to protect the State's rights under the Design/Build contract should disputes arise.

2. Monitoring:
 - a. Cost and particularly the contingency funds must continue to be managed closely. The contingency accounts are at satisfactory levels at this time. As the Project enters a critical phase, new risks will be identified, but swift mitigation can minimize cost impacts through the application of established management principles.
 - b. Contingency planning for high consequence risks is an important mitigation measure.
 - c. WSDOT should continue to monitor the City of Seattle's efforts so that the surface street projects will be completed when needed.
 - d. The tunnel project schedule is considered to be very aggressive intermediate milestones described below are important to monitor so that the State gets early warning of schedule slippage. This allows early mitigation of the issues if possible.
 - e. The follow-on projects should also be monitored closely for schedule slippage. A plan for mitigating impacts to the follow-on projects should be completed.

1.3.3 Milestones

The planned critical 2013 milestones should be monitored carefully as any delay has the potential to delay the Project and impact the Finance Plan. These milestones include:

- 2/28: Begin Load of TBM in Japan
- 3/6: Launch Pit Excavation Preparation Complete
- 4/8: Final Preparation of Launch Pit Complete
- 4/9: TBM Arrives on Site
- 6/7: TBM Assembled and Commissioning Complete
- 6/18: Launch TBM
- June: Finalize binding agreement with Port of Seattle
- June: Finalize agreement with City of Seattle
- June: Receive ACCT Report and Recommendation on Tolling
- Late fall: Safe Haven #3-activity immediately to be completed prior to tunneling under viaduct: official end of "tunnel in box" testing before proceeding at planned full production
- Fall: WSDOT completes and FHWA reviews updated Financial Plan, reflecting updated cost projections and updated information regarding tolls and Port revenues

1.4 Concluding Remarks

The ERP continues to have confidence that the Project can be successfully completed.

The Project is entering a critical phase as the TBM is delivered and tunneling commences. The ERP has identified potential risks to the schedule, but it is too early to be certain that delays to Project completion will occur, and too early to know if such delays do occur would increase costs.

The next six months include several crucial milestones for the Project. Success in achieving these milestones will be cause for greater confidence, but missed milestones could materially delay schedules and increase costs. The ERP has identified actions that can reduce risks.

The ERP is increasingly concerned that important funding sources for the Project remain unsecured. Without action on tolling and on the contribution from the Port of Seattle, the Legislature lacks certainty that funds are available to complete all phases of the Project.

The ERP's recommendations have been developed to enable the Governor and Legislature to take action as deemed necessary to allow the Project to continue to move forward efficiently, while at the same time enabling the Project to achieve its goals as envisioned by all who will benefit from the AWV Project at the local, regional and state levels.

Because of the number of significant action items and critical milestones facing the Project over the next six months the ERP strongly recommends that the Governor and Legislature consider a semi-annual ERP update on these action items and milestones in addition to approving a budget allowing the ERP to continue its more detailed annual reviews over the life of the Project as contemplated in the ERP's charge.

2. INTRODUCTION

2.1 Project History/Description

The Alaskan Way Viaduct (“AWV”) Replacement Program (“Project”) includes projects led by the Washington State Department of Transportation (“WSDOT”), the City of Seattle (“City”), King County and the Port of Seattle (“Port”). A more detailed history of the Project is included in the Expert Review Panel (“ERP”)’s February 2012 report, attached as **Appendix A**.

In 2006, the Governor, County Executive, and City of Seattle Mayor committed to a collaborative effort to develop a solution for the AWV Project. This collaborative effort, referred to as the Partnership Process, was created to resolve the needs of the AWV, Seawall, and related projects in a manner that could be broadly supported and implemented. The three parties formalized this effort in a Memorandum of Understanding (“MOU”) in December 2007. The Partnership Process analyzed a range of capital and operating improvements for a wider Systems Approach to transportation with a focus on six guiding principles:

- Improve public safety;
- Provide efficient movement of people and goods now and in the future;
- Maintain or improve downtown Seattle, regional, port, and state economies;
- Enhance Seattle’s waterfront, downtown, and adjacent neighborhoods as a place for people;
- Create solutions that are fiscally responsible; and
- Improve the health of the environment.

The Partnership Process evaluated a number of scenarios and recommended an approach to formulating a hybrid solution that included consideration for a large-diameter single-bored bypass tunnel. In January 2009, Governor Gregoire, King County Executive Sims, and Seattle Mayor Nickels signed a Letter of Agreement (“LOA”) declaring their joint decision to replace the central waterfront portion of the AWV and Seawall with a deep-bored tunnel, a new waterfront surface street, transit investments, and downtown city street and waterfront improvements. The January 13, 2009 LOA was grounded in the bored tunnel to meet the Project’s six guiding principles, based on the results of the technical analysis; the strong support of the diverse interests for the bored tunnel; the viability of a single-bored tunnel; and the willingness of the partners, with the support of the Port of Seattle, to develop a funding program that would supplement the State’s funding commitment.

Based on that LOA, the State is responsible for the following projects:

- Construction of a deep-bored tunnel;
- Viaduct demolition;
- Surface connection from approximately Yesler Way to Elliott Avenue;
- Battery Street Tunnel decommissioning;
- Relocation of the Alaskan Way surface street;
- Moving Forward projects:

- Column safety repairs;
- Electrical line relocation;
- Battery Street Tunnel maintenance; and
- Construction transportation mitigation.

The County is responsible for transit service investments.

The City is responsible for the following projects:

- Elliott Bay Seawall Replacement;
- City street improvements;
- A promenade along the central waterfront; and
- Utility relocation.

The Port is responsible for the East Marginal Way South Grade separation project.

The Seawall Replacement is a separate project led by the City with its own environmental review. The Seawall project is not a subject of the ERP’s review, with the important exception of any interface that will affect the schedule and budget for related projects, which are discussed later in this Report.

The total cost for the AWV Project is currently estimated to be \$3.14 billion. In the January 13, 2009 LOA, the State agreed to be responsible for funding components of the Project with an estimated cost of \$2.82 billion; King County to be responsible for funding components of \$190 million in capital and \$15 million annually in operating expenses (to be funded by new Legislative authorization of taxing authority); the City of Seattle to be responsible for an estimated cost of \$937 million; and the Port of Seattle commitment of \$300 million to the AWV Project.

WSDOT entered into a contract effective January 6, 2011 with Seattle Tunnel Partners (“STP”), a joint venture of Dragados USA and Tutor Perini Corporation, as the design-builder of the deep-bored tunnel. The design-build contract includes the following components:

- Tunnel boring machine;
- Tunnel boring;
- Roadway in tunnel;
- Portal construction;
- Two operations buildings;
- Ventilation, fire/life safety, and electrical systems; and
- Tunnel settlement mitigation.

The design-build contract by and between WSDOT and STP allowed certain work to proceed under a Notice to Proceed (“NTP”) in February 2011 to support preliminary design and the environmental process. Full Notice to Proceed (“FNTP”) 2 was provided to STP in August 2011 to support the final design and construction. Construction staging activities began in October 2011. Since the ERP’s February 2012 report, the tunnel groundbreaking event was held on October 15, 2012 and the TBM has been

manufactured in Japan with loading and transport to Seattle, Washington scheduled to begin February 28, 2013. The Launch Pit from where the TBM will begin boring is currently under construction with a planned completion in preparation for TBM delivery of April 8, 2013.

2.2 Independent Expert Review Panel Formation

The history of the ERP's formation is included in the ERP's February 2012 report attached as **Appendix A**.

The composition of the ERP remains the same. The ERP is chaired by **Dr. Patricia D. Galloway**, a civil engineer with expertise in megaprojects, transportation programs, and project delivery. Dr. Galloway has 35 years of megaproject experience, including major transportation projects around the world. Additional panel members include:

- **Robert Goodfellow** who has over 20 years of tunnel and underground design and construction experience on major projects all over the world, specializing in technical and contractual management of risk; and
- **John Rose** who has more than 30 years of experience in public sector budgeting and financing, including prior experience as King County Budget Director and as President and CEO of Seattle-Northwest Securities Corporation.

Detailed biographies are included in **Appendix B**.

2.3 Expert Review Panel Charge

The ERP has been directed by the Legislature to ensure that key project assumptions and delivery continues to be reasonable and feasible for the AWV Project. The ERP was tasked with three main objectives in this update (The ERP's work scope and charge to the ERP is contained in **Appendix C**):

1. Review the 2012 updated Financial Plan for the Project submitted to the Federal Highway Administration ("FHWA") to ensure that it (a) clearly identifies secured and anticipated funding sources; and (b) is feasible and sufficient.
2. Review the Project's key assumptions established for the schedules, risk identification and management, and cost estimates to assure they continue to be reasonable.
3. Identify (a) the successes to date that have occurred on the Project including implementation of the ERP's recommendations made in its 2012 report; (b) ERP recommendations made in its 2012 report not yet implemented; and (c) challenges currently facing the Project along with potential Project impacts and recommendations.

In summary, the ERP has been tasked by the Legislature to review the Project's Finance Plan for its continued viability and feasibility and to address any risks that would impact the successful completion of the Project. The success of the Project is largely dependent upon the Project's Finance Plan (which the ERP considers broader than the Financial Plan submitted to the FHWA), as well as the effectiveness of

the management structure of the Project, the risk management plan, the design-build contract of the deep-bored tunnel, and the Project's cost estimate, cash flows, and funding sources.

Managing public perceptions and expectations and communicating well are some of the keys to megaprogram success. The ERP finds that WSDOT continues to successfully manage both perceptions and communications, and we view our Report as an additional step in that process.

2.4 Key Project Assumptions

One focus of the ERP was to assess the soundness of the key project assumptions. This included an assessment of key assumptions for successful delivery of the Project by identifying any potential risks to both cost and schedule that could affect the AWV Project's Finance Plan and an assessment of ways to maximize the opportunities for successful delivery. Specific Project items that the ERP reviewed included the:

- Finance Plan;
- Risk Management Plan;
- Risk identification and assessment;
- Decision-making process and governance structure;
- Schedule;
- Cost Estimate;
- STP design-build contract and progress thereto; and
- Communication with Project stakeholders.

2.5 Process Followed by the Expert Review Panel

The ERP continued its work with update briefings and a review of relevant Project information to familiarize the ERP with the events that have occurred since the ERP's February 2012 report. The ERP also toured the Project area to provide context to the background material and to observe actual progress underway.

The format of the work of the ERP was left up to the chair and panel members. The ERP believes strongly that its work should be independent and thus the ERP made specific requests for Project materials, briefings, and meetings with stakeholders of the AWV Project. The ERP received thousands of pages of information in response to the panel requests¹. The meeting dates and subjects covered are presented in **Table 2.5-1** below:

¹ A listing of the documentation received and reviewed by the panel has been retained for comparison with future ERP reviews as contemplated in the ERP's charge.

Table 2.5-1 - ERP Briefings and Subjects Covered

Date	Subjects Covered
October 25, 2012	ERP Work Plan Update Schedule Current Program Overview Schedule Update Budget and Financial Management Update Tolling WSDOT Risk Management STP Risk Management
October 26, 2012	Seattle Department of Transportation (“SDOT”) Project Update Port of Seattle Update
November 27, 2012	Freight/Shipping (Port of Seattle) SR 99 Tunnel Settlement Analysis and Monitoring Program Real Estate and Right of Way
November 28, 2012	King County Update State Treasurer’s Office Update AWV Litigation Update
November 29, 2012	Project Controls and Reporting
December 10, 2012	Seattle Waterfront Committee Update STP Project Schedule WSDOT Risk Follow Up STP Risk Update
December 11, 2012	Freight/Shipping
January 14, 2013	Seattle Waterfront Businesses Update Downtown Seattle Association Update Port of Seattle Follow-up
January 15, 2013	Joint Strategic Advisory Team (“STAT”)/ERP Meeting and Field Trip

The ERP, as an independent panel, concluded it was important to meet with a wide variety of parties interested in the AWV Project so that the ERP might gain a full perspective and understanding of the Project’s status as well as any perceived threats to its successful completion. The ERP’s work was enhanced by talking with parties with differing perspectives. The individuals interviewed and dates of the interviews are shown in **Table 2.5-2** below:

Table 2.5-2 - ERP Interviews

Interview Date	Individuals Interviewed
October 25, 2012	Linea Laird, Alaska Way Viaduct Project Director
October 25, 2012	Matt Preedy, Deputy Program Administrator
October 25, 2012	Chris Dixon, STP Project Manager
October 25, 2012	Bob Chandler, Major Projects Division Director, Seattle Department of Transportation

Interview Date	Individuals Interviewed
October 26, 2012	Kurt Beckett, Chief of Staff, Port of Seattle
October 26, 2012	Dan Thomas, Financial and Administration Officer, Port of Seattle
November 27, 2012	Peter Hahn, Director, Seattle Department of Transportation
November 27, 2012	Dave Gering, Executive Director, Manufacturing Industrial Council
November 27, 2012	John Odland, Chairman, Manufacturing Industrial Council
November 27, 2012	Councilmember Sally Clark, Seattle City Council
November 27, 2012	Maud Daudon, Co-chair ACCT Committee
November 27, 2012	Larry Ellington, Risk Manager, Real Estate Services, Alaskan Way Viaduct
November 27, 2012	David Sowers, Alaskan Way Viaduct Engineering Manager
November 28, 2012	Ellen Evans, Deputy Treasurer, Debt Management, Office of State Treasurer
November 28, 2012	Amy Arnis, Assistant Secretary/Chief Financial Officer, Washington State Department of Transportation
November 28, 2012	Deborah Cade, Chief Environmental Counsel, Washington State Department of Transportation
November 28, 2012	Harold Taniguchi, Director, Department of Transportation, King County
November 28, 2012	Sung Yang, Chief of Staff, Office of King County Executive Dow Constantine
November 29, 2012	Randy Everett, Major Projects Oversight Manager, Federal Highway Administration
November 29, 2012	Tom Rasmussen, Councilmember, Seattle City Council
December 10, 2012	Chris Dixon, STP Project Manager
December 10, 2012	B. Gerald Johnson, Seattle Waterfront Committee
December 10, 2012	John Nesholm, Seattle Waterfront Committee
December 11, 2012	Warren Aakervik, President and General Manager of Ballard Oil Company, Inc. and Member of Neighborhood Planning Implementation Advisory Committee
January 3, 2013	Senator Curtis King, Senate Transportation Committee
January 14, 2013	Kate Joncas, President, Downtown Seattle Association
January 14, 2013	Bob Donegan, President Ivar's, Director of the Historic Seattle Waterfront Association and a member of the Central Waterfront Committee
January 14, 2013	Tay Yoshitani, Chief Executive Officer, Port of Seattle
January 15, 2013	Councilmember Richard Conlin, President, Seattle City Council
January 15, 2013	Brenda Bohlke, Chair, Strategic Advisory Team, Alaskan Way Viaduct
January 15, 2013	Rick Lovat, Member, Strategic Advisory Team, Alaskan Way Viaduct
January 15, 2013	Toby Wightman, Member, Strategic Advisory Team, Alaskan Way Viaduct
January 15, 2013	Gregg Korbin, Member, Strategic Advisory Team, Alaskan Way Viaduct
January 29, 2013	Representative Judy Clibborn, House Transportation Committee
January 29, 2013	Representative Ed Orcutt, Senate Transportation Committee
January 29, 2013	Senator Tracey Eide, Senate Transportation Committee
January 29, 2013	Senator Curtis King, Senate Transportation Committee
January 29, 2013	Paula Hammond, Secretary of Transportation, Washington State Department of Transportation
February 7, 2013	Tom Albro, Port of Seattle Commissioner
February 7, 2013	Bill Bryant, Port of Seattle Commissioner

The ERP reviewed and analyzed a vast array of material including responses to questions the ERP submitted to the WSDOT AWV Project Team. Based on the information received and reviewed, the

presentations made to the ERP, the interviews conducted, and the ERP's experience and expertise, the ERP has prepared this independent Report of its observations, findings, and recommendations. The Report represents the ERP's independent view of this very complex megaprogram and those activities that have brought it to its current status of on schedule and budget.

2.6 ERP Recommendations

The ERP's Report is divided into three main sections corresponding to the ERP's charge from the Governor and Legislature:

- Project Decision-Making Process and Governance Structure;
- Project Finance Plan; and
- Risk Management during Project Implementation.

Within each section are subsections that detail the topic areas reviewed in the AWV meetings described earlier, along with Project accomplishments, issue identification, potential challenges, and the ERP's recommendations.

3. PROJECT DECISION-MAKING PROCESS AND GOVERNANCE STRUCTURE

A functional and effective project management structure and efficient decision-making protocols are essential elements of successful public megaprograms. While the key component of the AWV Project is the deep-bored tunnel that is under a design-build contract with STP, the related issues associated with this Project, which involves multiple stakeholders, are complex at best. They require careful and deliberate coordination so that the diverse needs and objectives of all the associated stakeholders are met as appropriate.

The ERP's findings and recommendations relative to these key assumptions are discussed below. Key assumptions to the Project decision-making process and governance structures include:

- a. Key decision makers continue their successful engagement so that initial commitments are fulfilled and appropriate changes can be made as conditions change;
- b. Relations with partners continue to be successful so that all parties responsible for tasks related to the Project's success can coordinate their work and hold each other accountable for timely completion;
- c. Construction management procedures are properly designed and implemented; and
- d. Staff is assigned to the Project that has the necessary skills and experience.

3.1 Managing Relations with Project Partners

The Project partner stakeholders in the AWV Project include the State Legislature, WSDOT, FHWA, the City of Seattle, King County, and the Port of Seattle. Each of these partners recognizes the need for

extensive and effective partnering and coordination to deliver a successful project. In addition, the information “partnerships” for the AWW Project are much broader and involve local businesses, various working and interest groups, local communities, and the public at large.

Recognizing the importance of key stakeholder involvement and communication, Governor Gregoire, in accordance with industry best practices, appointed a Program Oversight Committee (“POC”) consisting of the following stakeholder members:

- The Governor;
- The Co-chairs of the Legislature’s Joint Transportation Committee;
- The Mayor, City of Seattle;
- A City Council member;
- The King County Executive;
- A King County Council member;
- The Port of Seattle Commissioner; and
- The Port of Seattle CEO.

The POC is a key component of aiding the successful and timely completion of the required actions discussed in the Executive Summary. The ERP recommended in its February 2012 report that the POC should reconstitute its meetings as quickly as possible and meet regularly until the Project is successfully completed, but no action has been taken.

Key decision makers joined together at the Project’s inception to collaborate and make decisions based on what was known to them at the time as to how the megaprogram would be funded, managed and coordinated amongst the key stakeholders. The POC was constituted to allow those key stakeholders to meet quarterly, at a minimum, and discuss challenges that may be facing the Project in order to arrive at mutually agreed solutions. Since the original formation of the POC, there have been changes in the occupants of many of those positions and it is likely that additional partners will be replaced by other individuals not involved in the initial LOA. As institutional knowledge is lost, the risk increases that pending agreements may not be finalized and/or that there will be an increased lack of understanding when challenges arise potentially making resolution more time consuming and costly. Thus, the ERP again recommends that the Governor take immediate action and reconstitute the POC as early as possible.

Successful project management includes management of the multiple agreements entered into with various stakeholders. The programmatic agreements entered into with the City, Port, County, utilities, and others address policies, procedures, funding commitments, and other topics. The Project agreements entered into with the City, Port, County, utilities, and others, also address Project specific activities, schedules, and funding responsibilities. The ERP finds that WSDOT continues to successfully monitor and carry out these agreements. Two important exceptions are:

1. Agreements between the City of Seattle and WSDOT regarding the roles and responsibilities for projects that will follow tunnel completion have not been finalized as of the date of this Report.

2. No binding agreement with the Port of Seattle has been completed as of the date of this Report. Such agreement would formalize the commitments made as part of the earlier Memorandum of Agreement (“MOA”) that outlines the plans for the Port to make a financial contribution to the Project.

3.2 Construction Management

The ERP continues to find that the construction management policies and procedures developed for the Project are being implemented and followed by the WSDOT AWW Project Team and are in accordance with industry standards for a megaprogram of this size and complexity.

3.3 WSDOT AWW Project Team

Day-to-day activities on the Project are managed at many levels as is appropriate for a megaprogram such as the AWW Project. Project leadership is provided by the WSDOT Project Director, with Deputies in specific areas of the Project. They are charged with oversight of the contractors, including the design-build tunnel contractor, and oversight of the Project staff, including consultants who bring specific expertise to the Project and the myriad day-to-day activities associated with the Project work. Decisions at a Project level are made under various departments divided by the construction contract and supported by several discipline leads.

The results demonstrated by the WSDOT AWW Project Team to date continue to confirm that the management team is experienced and highly competent. The senior personnel have sufficient relevant experience and, alongside consultant staff, have been organized to apply that experience adequately to supervise the contractors.

The ERP notes that there have been significant changes in WSDOT leadership personnel assigned to the Project. These changes have not had adverse consequences as of now, but staff continuity will be of increased importance as the Project enters a critical phase.

Stakeholders continue to tell the ERP without exception that WSDOT has been a good partner in the planning and implementation of the Project.

4. PROJECT FINANCE PLAN

The Project’s Finance Plan as reviewed by the ERP includes but is not limited to a review of the Financial Plan provided to the Federal government as part of the initial approval process for the Project.

The FHWA’s State Division approved the State’s 1012 Finance Plan Annual Update via letter dated September 11, 2012, noting small changes in the Project’s estimated expenses and schedule. The FHWA letter concluded that “the Plan continues to describe adequate resources to meet anticipated construction costs.”

It is important to recognize that the FHWA's positive conclusion is not based on a complete review of the Project's finances. The FHWA has importantly verified to the ERP that all Federal sources for the Project are secured without need for further Congressional or Administration action.

The FHWA approval of the update Plan is of limited value to the Legislature because:

- It does not consider the absence of a legal commitment for the Port's funding;
- It does not recognize the political and practical challenges of achieving the currently planned \$165 million in construction funds from tolling;
- The ensuing four months since FHWA's letter has brought new information about the status of the Project; and
- FHWA's review considers in detail only those projects included in the Final Environmental Impact Statement for the Project (with an estimated cost of \$2,160,000,000) and provides less detail on other important elements of the overall Project (with an estimated cost of \$990,700,000) including:
 - The replacement and realignment of the Alaskan Way surface street;
 - The Moving Forward projects; and
 - Transit enhancements.

The ERP's 2013 update includes a review of current cost estimates, identified funding sources, and the State's relationship to projects where the City or County have responsibilities that may affect the State's Finance Plan.

4.1 Costs

Projected Project costs are described below in **Table 4.1-1**:

Table 4.1-1
Estimated Alaskan Way Viaduct Replacement Program Costs
 (Year of Expenditure, Millions of Dollars)

Project	Revised Amount (1)	Prior Amount (2)
Moving Forward	698.0	745.7
Central Waterfront	2,052.0	2,010.7
Bored Tunnel	1,650.6	1,656.3
North and South Access	103.8	121.7
ROW Acquisition	161.9	126.9
Preliminary Engineering	135.7	105.7
Other Components	320.0	320.0
Surface Street Restoration	290.0	290.0
Construction Mitigation	30.0	30.0
Program Management	75.0	75.0
Total	\$3,145.0	\$3,151.4

(1) Source: WSDOT 1013-15 Budget submittal as described in 2/1/13 email from WSDOT to ERP panel member John Rose

(2) Source: Initial 2011 Financial Plan, Figure 4

The ERP concludes the revised cost estimate of \$3,145,000,000 is valid. While amounts have been and will likely continue to be moved between Project components, the ERP's confidence in the overall numbers is the result of five findings:

1. As noted in the ERP's February 2012 report, the costs for the tunnel projects are based on WSDOT's Cost Estimate Validation Process ("CEVP"), and the ERP finds that this is a valid basis for the cost estimates.
2. Results to date have been favorable. Changes in estimated costs are relatively minor and within the range that can be expected at this stage of the Project.
3. Budget allowances for projects not subjected to the CEVP process are likely sufficient to meet the State's goals.
4. No major new risks have been identified that would cause changes in the overall estimate; however, the ERP observes that potential delays in the schedule remain a significant potential risk to the Project's overall costs.
5. The Project's budget continues to provide for an appropriate amount of unallocated contingency funds. The contingency amounts have been adjusted over recent months as some

risks are retired and new ones identified, but the balance remaining is appropriate for this stage of the Project.

The total contingency allowance for risk items (including DSC Fund, DMR Fund, and the unallocated risk contingency from **Table 4.1-2** below) is \$137.2 million. The bored tunnel represents the biggest cost uncertainty for the Project; the current unallocated risk contingency is approximately 11.9% of the overall remaining tunnel budget of \$1.15 billion. The current contingency allocation is less than the original amount, but has been appropriately reduced as work is completed. The original contingency was approximately 12% of work remaining, and the new amount is consistent with that practice. The current contingency is a prudent amount for this type of complex project.

**Table 4.1-2
Design-Build Tunnel Risk Allocation Summary
(As of January 2013)**

Name of Allocation, Fund, or Amount	Amount	Comments
Insurance and Bonding Fund	\$100M	Contractual Allocation: Provided to Contractor to defer insurance payments. Whatever is not spent will be given to the Contractor upon project substantial completion. No change from 2012.
Escalation Fund	\$110M	Contractual Allocation: Provided to the Contractor during the contract on the basis of percent complete. No change from 2012.
South End Open Cut Section	\$50M	Contractual Allocation: Scope moved from South Access Contract into Tunnel Contract. Paid as work at South end is completed. No change from 2012.
Schedule Incentive	\$25M	Paid if proposed schedule is met. Erodes as completion becomes progressively delayed. No change since 2012.
Port of Seattle Lease for Pier/Terminal 46	\$20M	Contractual Allocation: Expenditure for the Contractor's staging area. To be paid directly from WSDOT to the Port during the project term. No change since 2012.
Differing Site Condition and Unanticipated Intervention Risk Contingency (DSC Fund)	\$40M	Risk Fund: Paid if any intervention is required over the 1440 hours included in the bid. Also, provides the contingency fund to mitigate impact of any differing site condition during tunneling. No change since 2012.
Deformation Mitigation and Repair Risk Contingency (DMR Fund)	\$20M	Risk Fund: Provides mitigation fund under certain circumstances for unanticipated deformation of structures or utilities due to tunneling. No change since 2012.
Unallocated Risk Contingency for Tunnel Contract	\$0M	Contingency Amount: Unallocated reserve held by WSDOT to cover risk on the tunnel project. All sums allocated to this contingency have been transferred to Program-wide unallocated contingency (see below)
Program-wide Unallocated Risk Contingency	\$77.2M ²	

² The unallocated contingency amount of \$77.2M is reflected in the Design Build Summary Table, CTC-2-7-2013, sent via a February 7, 2013 email by WSDOT to ERP panel member, Dr. Patricia D. Galloway .

4.2 Funding Sources for State Projects

Projected sources of funds for the AWV Project are summarized below in **Table 4.2-1**:

Table 4.2-1
Funding for the Alaskan Way Viaduct Replacement Program
(Year of Expenditure, Millions of Dollars)

Source	Revised Amount (1)	Prior Amount (2)
Federal	752.4	483.0
State (non-toll)	1,854.1	1,911.2
Tolling	200.0	400.0
Port of Seattle	281.0	300.0
Other Local Funds	57.5	57.2
Total	\$3,145.0	\$3,151.4

(1) Source: WSDOT 1013-15 Budget submittal as described in 2/1/13 email from WSDOT to ERP panel member John Rose

(2) Source: Initial 2011 Financial Plan, Figure 5

The above does not reflect information provided to the ERP in late January 2013, that WSDOT plans to allocate an additional \$35 million in Federal funds to the Project, resulting in a \$35 million reduction in the amount anticipated from tolling.

4.2.1 Federal Sources

The ERP finds the Federal funds identified in the 2011 initial Financial Plan have been augmented by additional funds, replacing \$235 million previously to be provided by tolling. The FHWA has confirmed that these funds are indeed committed and need no further Congressional or administrative approval.

\$235 million in Federal funds have been allocated to the Project since publication of the original Finance Plan, offsetting a like amount of funding from tolls. These funds may have been eligible for allocation to other State projects; it is beyond the scope of the ERP's work to determine if this was an appropriate prioritization of these funds.

4.2.2 State Sources

4.2.2.1 Tolling

The ERP finds that toll funds for the Project are not secured. Important tolling decisions have not been made. Important information related to those decisions will not be available to assist the current Legislature in reviewing the Project's financing. An important source of recommendations may be using guidelines that do not fully reflect the State's priorities.

The ERP's February 2012 report anticipated that new analyses would cast doubt on the ability of tolling to produce the planned \$400 million for the Project, and that has proved to be the case.

WSDOT has advised that the most current plans anticipate that tolling will produce \$165 million for the Project's capital costs.

New analyses are underway as to how tolls might be used to generate this sum, and if the tolls necessary to do so are advisable.

The focus of current work on tolling is the Advisory Committee on Tolling and Traffic Management ("ACTT").

The ACTT is seeking to balance the capital needs of the Project with concerns that tolls will cause traffic to be diverted from SR 99 to surface streets and thereby cause undesirable traffic problems. The ERP finds that the ACTT is taking a thoughtful and analytical approach in evaluating these matters.

However, current tolling discussions raise several areas of concern.

Tolling recommendations will not be complete in time for Legislative consideration in drafting the 2013-15 budget. The ACTT first met in December 2011 and was expected to submit its initial recommendations by December 2012. It now expects to complete its recommendations in June 2013. This leaves the Legislature with no certainty as to the amount of toll revenues that will be available for the Project. This problem is somewhat alleviated by the fact that the tunnel can be completed without toll money; under any circumstances, the receipt of toll funds will come at the end of the Project, at which time the tunnel is to be completed and remaining expenditures will be incurred for surface streets and viaduct de-commissioning. That said, the Project as a whole, is not done until all phases are complete.

The Legislature and other State officials may have policy perspectives that will not be fully reflected in the work of the ACTT. The ACTT's perspective is primarily focused on the Project's impact on local City streets, whereas the State's perspective may assign heightened concern for the Project's impact on the State-wide transportation system.

The possibility that the ACTT's focus may not be exactly the same as the State's comes from four observations:

1. The ACTT's "Guiding Principles" do not address system-wide concerns.

The ACTT has settled on "Guiding Principles" against which to evaluate tolling options. As described in its April 2012 meeting materials, these Principles are as shown in **Table 4.2-2**:

**Table 4.2-2
ACCT Guiding Principles**

1.	Minimize diversion from the tunnel onto city streets
2.	Minimize diversion from the tunnel onto I-5
3.	Mitigate the anticipated adverse effects of traffic diversion
4.	Meet the State’s funding obligation for the AWW Replacement Program
5.	Identify funding for mitigation of diversion impacts
6.	Support Seattle’s “Complete Streets” policy goals to make city streets function for bicycles, pedestrians, freight, transit and automobiles in strategies that are proposed to mitigate and minimize diversion impacts.
7.	Support Seattle’s waterfront and Center City policy goals to make the waterfront and downtown an enjoyable place for people to live, work, shop and play.
8.	Support and maintain efficient use of city streets and I-5 for transit access into, within, out of and through downtown.
9.	Support a vibrant maritime and industrial sector by maintaining efficient use of city streets and I-5 for freight access into, within, out of and through downtown.
10.	Ensure that ACTT recommendation(s) provide an effective integrated transportation solution across modes.

These Principles are thoughtful and appropriate, but they do not emphasize consideration for the impact of tolling decisions for this Project on the State’s transportation system as a whole. They do not readily lend themselves to topics such as:

- What precedent will tolling decisions on the Project create for other potential tolling opportunities?
- What would the benefit of tolling this Project be on helping to pay for the administrative costs of tolling other State routes?
- Does the use of the new \$35 million in Federal funds to reduce the amount needed from tolls make it more or less likely that tolling can be implemented in other parts of the State’s road systems?

2. The composition of the ACTT may not lead to prioritizing State System-Wide concerns.

The ACTT is composed of an impressive list of community leaders, but 10 of the 15 members were chosen by City of Seattle elected officials, and the backgrounds of most of the members appear to be largely Seattle-based.

3. No policy direction has been given as to how much traffic diversion is acceptable.

The ACTT has neither been given nor has defined for itself a quantifiable goal for the amount of traffic diversion that is acceptable. The ERP asked many key stakeholders to define an acceptable amount of diversion, and no one offered a metric that could be used to objectively evaluate tolling options. This may lead to decision making that is overly subjective. Several stakeholders expressed the view that no level of diversion is acceptable; if that standard is used, then the State may be unable to implement tolling, even if it determines that tolling for this Project is a useful tool for accomplishing system-wide goals.

4. No policy direction has been given as to the appropriate definition of diversion.

The Guiding Principles refer to diversion from the tunnel to I-5, and from the tunnel to surface streets. Port officials have suggested that freight mobility goals might be enhanced if, for example, traffic can be diverted from I-5 to SR 509 and SR 99. If this is a correct perspective,

then federal funds used to reduce the SR 99 tolling requirement might alternatively be used on other projects and in so doing achieve better traffic patterns when viewed on a system-wide basis.

This is an opportune time for State officials to consider the State-wide goals that might be used to evaluate SR 99 tolling options. Early consideration of these goals, and their communication to the ACTT might reduce the chance for future confusion and disagreement.

The value of tolls for the Project may be unnecessarily reduced by the assumption that they will be used to support revenue bonds

Tolling analyses performed to date have assumed that tolls will produce capital funds for the Project as they are used to pay debt service on revenue bonds. These analyses have been thoughtful and appropriately cautious, but the State may wish to consider alternatives.

The bond-focused analyses have used extremely conservative assumptions about toll revenue growth. They have also reduced funds available for the Project by allocating toll revenues to fund reserve accounts and to provide for coverage on bond payments. These assumptions are likely required to persuade outside parties to assign a high credit rating to the bonds, but they may not reflect the real opportunities available to the State.

The State may wish to consider using toll revenues in other ways, with options including but not limited to:

- Using toll revenues as a source to make payments on Motor Vehicle Fuel Tax (“MVFT”) bonds, without a specific pledge that would require expensive credit features. The State’s full faith and credit backing of those bonds may make it unnecessary to provide the extra security of pledged reserve accounts and coverage requirements.
- Use toll revenues as cash without borrowing to support WSDOT’s capital expenditures. SR 99 tolls might be used in the future as a support for state system-wide tolling bonds.

4.2.2.2 Motor Vehicle Fuel Tax Bonds

The ERP continues to find that funds to be provided by the sale of MVFT bonds are adequately secured.

Most of the cash that will pay for the Project will come from the sale of bonds primarily secured by the MVFT tax bonds backed first by MVFT and second by the State’s General Obligation (“GO”) pledge. Such bonds have become the customary method of generating State funds for WSDOT capital projects. The SR 520 bond sales added “Triple Pledge” bonds, with the additional security of toll revenues, as a means to enhance the value of State funding sources.

The ERP’s February 2012 report noted that the State’s 2012 Supplemental budget included a six-year forecast for the accounts that support highway construction, preservation, maintenance, and operations. That forecast anticipated combined ending balances at the end of the six-year period as a deficit of \$211.4 million.

The ERP is advised that new projections show that these accounts are balanced, or, in other words, sufficient MVFT funds are available to secure the bond sale proceeds needed to pay for the Project. However, the ERP is advised that this balance is achieved by underfunding maintenance. The ERP noted with interest that the FHWA representative interviewed was unaware of this underfunding, and FHWA's approval of the Project's updated Finance Plan did not take this into consideration.

4.2.3 Port Funds

The Finance Plan and all public statements anticipate a contribution to the Project from the Port in the amount of \$300 million. The written basis for this anticipated source is the April 2010 MOA between the Port and the State. WSDOT and the Port agree that \$19 million has already been provided in support for early projects, and therefore the unpaid balance is \$281 million.

The ERP's February 2012 report noted that there is strong evidence of the Port's intentions to contribute the funds as described in the MOA, but the MOA is not a legally binding document and therefore the ERP found that this contribution was not yet secured.

The ERP now finds that the Port's contribution is still not secured, and that concern over the contribution is heightened.

The Port's intentions are documented in two ways:

1. The ERP interviewed two Port Commissioners, the Port's CEO, and Port Staff, all of whom affirmed the commitment.
2. As was the case last year, Port staff provided the ERP with the Port's adopted 2013 budget, an updated "Draft Plan of Finance", and a paper entitled "Preliminary Tax Levy Funding Plan", all of which anticipate a 2016 payment and identify a reasonable source of funding for the Port's payment. It is also noted that the Port has already set aside \$31 million towards its planned 2016 payment.

The identified source of funding for the Port's contribution is its statutory property tax levy. Port staff recommended that the Port Commission approve increases in that levy in order to fund currently projected uses. The Commission declined to increase the levy at this time, but it also directed the deposit of an additional \$6 million towards the AWV Project commitment.

There continue to be good and objective reasons for the Port to contribute to the Project. For example, the MOA notes that, *"a failure to maintain the Viaduct capacity would result in unacceptable congestion for freight and other traffic within the harbor and industrial areas."*

The ERP does not doubt the Port's intentions; however, the ERP finds that:

1. There is the potential for disagreement over whether the Port's contribution should be reduced if new funds become available for the Project (for example, increased federal funding) or if actual expenses are less than planned.

2. The existing agreement includes contingent language that might provide a basis for the Port to contribute less than the \$300 million. For example, the MOA says, *“Of critical importance is the ability of the 15th/Elliott and Mercer corridors to provide sufficient capacity for the purposes listed above.”* It also says, *“The central waterfront segment from Pine Street to Colman Dock will have two lanes in each direction plus a turning lane; the segment south of Colman Dock will have three lanes in each direction plus a turning lane.”* The referenced projects will be designed and constructed by the City of Seattle. Port officials have advised that they are satisfied that the early designs will meet their goals.
3. The MOA says Port payments will be made *“to the extent feasible and authorized by the Port Commission”* and that *“the Port will take steps to obtain funding as described herein while retaining at all times the strategic financial capability to meet its overarching public obligations: maintaining current assets, responding to emerging customer or market demands; continuing significant environmental remediation and restoration projects; and maintaining sufficient transportation access in and around its facilities.”* This language creates the possibility that the Port will find it has higher priorities in the future than the funding of its contribution to the AWW Project.
4. There is a need to secure the timing of the Port’s contribution. There is currently room for confusion as to whether timing and amount of the contribution is tied to specific projects. The plan to receive the Port’s funds at the end of the Project creates an additional risk, if only because the Port’s commitment can be changed by future Port Commissions.
5. Port Commissioners noted several important matters that have adversely impacted the Port’s finances since the original commitment was made.
 - a. Recently concluded negotiations with a major tenant (Hanjin) resulted in reduced revenues from that tenant, and will likely also result in reduced revenues from other tenants.
 - b. Another major tenant (the “Grand Alliance”) has left the Port and relocated its operations to Tacoma.
 - c. Competitive pressures with the Port of Tacoma and others are a negative factor for future revenues.
 - d. The diversion of Model Toxics Control Act funding takes away a source the Port had anticipated for use in environmental clean-up efforts.
 - e. Local land use decisions (e.g. the proposed new Arena) increase the need for mitigating transportation projects.

The ERP recommends that WSDOT and the Port assign a high priority to concluding their negotiations and finalize a binding agreement no later than June 2013.

4.3 King County Projects

King County’s role in the Project is to implement transit improvements that will respond to the short-term impacts of the Project and to contribute to the long-term ability of the Project to meet goals for moving people and freight. There are no financial contributions from King County to the AWW Project.

The ERP's February 2012 report noted that the State has successfully met its commitment to King County to provide funds for the short-term transit enhancements. However, this construction mitigation funding ends in 2014.

King County has not yet obtained a funding source for longer-term transit enhancements to enable the Project to meet all of its goals for moving people and freight. The January 13, 2009 LOA ties the County's long-term transit enhancements to a new countywide 1% Motor Vehicle Excise Tax to be imposed by the King County Council.

The Governor and Legislature have yet to adopt legislation authorizing such a tax.

Transit improvements have been identified as a major mitigation for the fact that the Tunnel's capacity is substantially less than that of the Viaduct that it will replace. Absent transit improvements, the Project will not achieve its transportation goals. Traffic diversion to city surface streets is likely increased, presenting an additional obstacle to tolling.

4.4 City of Seattle Projects

Projects related to the replacement of the viaduct include certain projects that are the responsibility of the City of Seattle. These related City projects include:

- Elliott Bay Seawall Project;
- Mercer East;
- Mercer West and Parking Program;
- South Spokane Street Viaduct Widening Project;
- Waterfront Redevelopment Project; and
- Public Utility Relocation.

The State has committed \$290 million of funding for projects not related to the deep-bored tunnel portion of the Project, including the demolition of the viaduct, the decommissioning of the Battery Street tunnel, and the relocation of the Alaskan Way surface street. The implementation of these projects merits special oversight. WSDOT should clarify what happens to this allocation if necessary costs are a lesser amount.

The City's progress on these projects is of interest to the State because:

- The public may not differentiate these roles in their ultimate evaluation of the State's completion of its Project; and
- The successful completion of the State's Project is in many ways dependent on the City's timely completion of related projects.

4.4.1 Alaskan Way

The City has taken the lead in the design of the Alaskan Way surface street relocation/replacement. The City has in recent months published preliminary design concepts. Various stakeholders have expressed

concerns to the ERP as to whether these preliminary designs meet their goals, especially as related to transit and freight mobility.

The City and the State are currently in discussions regarding how their respective future roles and responsibilities will be defined regarding the Alaskan Way surface street replacement. In the meantime, it appears that City and WSDOT staffs are successfully working together on the various surface street projects.

The ERP previously recommended that WSDOT memorialize its relationship with the City in a written binding agreement. This has not yet happened, and the ERP reaffirms its recommendation. While current relations are good, there remains the possibility for disagreement about the amount of the State's contribution for City surface streets, and the ability of the State to require designs that meet system-wide mobility goals.

4.4.2 Mercer West

The successful completion of this City project will impact the achievement of the freight and traffic mobility goals expected by the Port, major stakeholders, and the public at large. City officials are confident that funds are available for the City project, but stakeholders are concerned that important decisions still need to be made about project design and take special interest in the connection between West Mercer and Elliot Avenue West.

4.4.3 Seawall Replacement

Voter approval in the November 2012 election of funding for the City's Seawall project is a major accomplishment. The ERP is advised that the City is moving expeditiously to commence construction, removing a potential risk to the Project schedule.

The ERP's February 2012 report noted the importance of a proposed City Local Improvement District ("LID") as an element of the financing plan for waterfront improvements. The seawall vote greatly reduces the State's interest in the progress of the LID.

The Seawall project does not directly relate to tunnel project start or completion dates, but rather is directly related to the viaduct demolition start date, as it has been assumed that demolition cannot occur prior to completion of seawall construction

The timely completion of the seawall will depend on the City's successful receipt of a variety of long-lead federal, state, and local permits prior to major construction (September 2013). The City advises that it has applied for permits including:

- USACE Section 404/10: August 2013
 - ESA BiOp: April/May 2013
 - Section 106 Concurrence on Adverse Effects: April 2013
 - Section 106 MoA Executed (if required): July/August 2013
- Ecology Section 401 Water Quality Certification and CZMA: June/July 2013

- DPD/Ecology Shoreline Permit: May 2013
- WDFW Hydraulic Project Approval: May 2013
- DNR Easement/Right-of-Entry: August/September 2013
- NOAA Marine Mammal Protection Act Letter of Authorization: September 2013

Additional state and local permits for early construction (April 2013) and major construction (September 2013) will be applied for and obtained prior to construction. These include, but are not limited to, building/grading permits, noise variance(s), NPDES Construction Stormwater General Permit, and Historic District Certificate of Approval(s).

At this time, the City reports no known obstacles to obtaining the necessary permits for the Seawall project. The City recognizes that this is a high risk item in terms of meeting the construction schedule.

5. RISK MANAGEMENT DURING PROJECT IMPLEMENTATION

Risk is defined as the result of an uncertain event or condition that, if it occurs, has a consequence. (The consequence can be negative or positive. Positive outcomes are usually called “opportunities.”) Risk is quantified as the combination of the probability of an event and the resulting consequence.

The ERP finds that the WSDOT AWW Project Team is abiding by the established risk management plan (“RMP”) for the Project and that this RMP is in conformance with or exceeds industry standards for risk management.

In reviewing and updating the ERP’s opinion on the sufficiency of the risk management processes for the AWW Project, the tunnel contract was used as a primary example of how risk will be managed because the potential exposure to risk is highest within this specific component. Three aspects of management of risk were examined for this update:

1. Review of the risk management tools used;
2. The risk management plan content for both WSDOT and STP; and
3. The execution of those plans to this point of the AWW Project.

These discussions will present observations and findings, followed by conclusions and, where appropriate, recommendations for consideration.

5.1 Review of Contractual Cost and Risk Management Tools

As previously discussed in the ERP’s February 2012 report, WSDOT has one of the best risk management programs of any state for major infrastructure projects. The planning, design, bidding, and risk allocation processes are proven and successful in delivering major projects within the planned budget and schedule. The ERP finds that the AWW Project risk management processes are adequate to manage this megaprogram successfully.

Additional detail on the risk management tools employed by the AWV Project team is included in the ERP's February 2012 report, attached as **Appendix A**.

5.2 Review of Deep-Bored Tunnel Project Risk Management Plan

The International Tunnel Insurance Group ("ITIG") published a Code of Practice for Risk Management of Tunnel Projects (the "Code") in 2006. The Code has become the industry standard for risk management and is referenced in the design-build tunnel contract. WSDOT is adhering to this Code; given the magnitude and urban location of the tunnel project, the ERP finds this to be prudent. In accordance with the Code, both WSDOT and STP have established an RMP that has been issued and revised periodically since the beginning of construction.

The updated RMP for both STP and WSDOT shows an effort to incorporate the ERP's February 2012 recommendations and an acknowledgement that these comments were positive and supportive of their efforts.

The responsibility for overall management of AWV Project risk lies with WSDOT. STP manages its risk as a subset of the overall tunnel project. Even where commercial risk has been allocated to STP, there is the potential for significant political, financial, and reputational risk for WSDOT in all areas of the design-build contract. For this reason, it is important that WSDOT continue to be proactive in leading the Project-wide risk management process throughout design and construction. This leadership also has the associated advantage of providing consistency of approach to the management of risk.

5.3 Execution of the Risk Management Plan

The ITIG Code of Practice emphasizes that the presence of experienced practitioners on the team is an important factor in mitigation and management of project risk. After a review of resumes of the AWV Project risk management team, the ERP concludes that the AWV Project team is experienced in major transportation projects and has been supplemented by personnel with technical experience in major urban tunnel projects.

There is concern that staff turnover on the WSDOT AWV Project Team could introduce risk into Project execution. This should be managed closely in the coming months to ensure there is a seamless transfer of duties to replacement staff. Any additional staff turnover in the coming months would be disadvantageous to the Project as it enters a critical phase of execution.

The exposure in execution of the Project is divided into three areas:

1. Risk
2. Cost and
3. Schedule

5.3.1 Project Risk

Risk registers for the Project and the tunnel project exist and as stated above are managed well in a thorough and collaborative process between the STP and WSDOT teams. The risk exposure identified in the design-build contractor’s risk register has increased since the ERP’s February 2012 report at least in part due to acting on the ERP’s 2012 recommendations to more realistically identify and categorize the risks of the tunnel project. The expected post-mitigation cost and schedule exposure identified by STP in its tunnel project risk register (January 2013) is \$27.5M and 7.5 months. This compares with the early 2012 expected post-mitigation cost of \$10M and 3.5 months schedule exposure.

Risks subject to WSDOT’s direct control total \$15M and 6.3 months for the tunnel project. Thus the total expected impact on the tunnel project of all identified risks after mitigation activity is: \$42.5M and 13.8 months.

The ERP notes that the TBM and its associated risks of manufacture, testing, assembly and operation form 11 of the top 15 risks on the tunnel project according to STP (data obtained in January 2013). The ERP also notes that the WSDOT risk register does not feature the TBM at all (see **Table 5.3-1** below).

The top risk in January 2013, according to STP, is not a tunnel risk but is the schedule risk associated with installation and commissioning of systems inside the tunnel after tunneling boring is completed. This reflects the very tight tunnel project schedule discussed below. An example of the active risk management being practiced on the tunnel project is the evolution of the risk of timely installation of the tunnel’s interior concrete structure. This was the #1 risk on the STP register from February to November 2012. It has now been planned and mitigated, dropping it to #9 on the current STP risk register. This is consistent with one of the ERP’s primary recommendations that the top tunnel project risks are not ignored when dealing with the “problem of the day” that will inevitably arise.

It is evident that the risk register format is quantitative in nature and certain risks do not lend themselves to quantitative description. The risk of the TBM not functioning as anticipated is a good example of this type of risk. **Table 5.3-1** below describes other risks of this type that should be tracked by the WSDOT AWV Project Team.

**Table 5.3-1
Risks to Tunnel Project Not Lending Themselves to Quantitative Description**

Number	Risk	Consequence to Project	Possible Mitigation Measures
1	TBM does not function as anticipated – overall slow progress and/or components fail during operation	Significant delays that contractually apply to STP – but reputation/ political fallout impacts all parties	Carry out all testing and use all available expertise and extensive communication between all parties in preparation for start of TBM tunneling
2	Expected Schedule delay does occur from STP and WSDOT risk registers	Total (January 2013) of 13.8 months. This expected delay is currently in excess of the original WSDOT bid schedule before STP reduced this schedule in its best value bid.	Work through issues to mitigate this delay as much as possible. Track intermediate milestones closely; and request recovery schedule when applicable

Number	Risk	Consequence to Project	Possible Mitigation Measures
3	Expected Cost Increases manifests from STP and WSDOT risk registers	Total (January 2013) of \$42.5M	Contingency funds have been specifically set up, analyzed, and are adequate to absorb this expected increase due to risk
4	First Time use of technology (i.e. application of a TBM of this size)	Schedule delays with an extended learning curve with new technology	Employ industry expertise as much as possible; thorough testing of components, extend learning curve for start of tunneling
5	Lack of team alignment (WSDOT and STP) with teaming partners or between owner and contractor	Acrimony, lack of communication and cooperation on risk mitigation and solving issues in the field.	Continued teaming efforts, contractually enforced communication and risk management protocols that are well established. Management of changes in team to make sure that protocols survive team personnel changes

Successful execution of the RMP depends on strict adherence to the RMP with constant attention to the progress of the Project in order to monitor and provide feedback on the RMP to ensure that it is still relevant. The essence of risk management is to use an established process to closely monitor each identified risk. The intent of this process is to minimize the likelihood of occurrence of each risk and to mitigate as much as possible the impact of those risks that do occur. Prudent management of risk requires the WSDOT AWV Project Team to continue monitoring that:

- All Project team members know what the Project risks are;
- All Project team members are empowered to identify new risks and suggest mitigation actions;
- All front line supervision are aware of the required mitigations and implement them within their teams;
- The risk management team update risk registers at appropriate intervals and oversee implementation of mitigation plans; and
- All senior management is aware of the current status of major Project risks and mitigation measures.

Current contingency plans are not sufficiently clear for high consequence risks. It is common for each risk of very high consequence (and perhaps selected risks of high consequence) to have detailed written contingency plans of what should be done if these risks occur. Details such as who to call and what immediate steps are required to reduce and mitigate impacts would be contained in these plans.

5.3.2 Cost

This section is primarily concerned with the contingency funds applied to the AWV Project, their sufficiency and exposure with current risks.

Table 5.3-2 shows that the contingency funds are sufficient to absorb the expected “post-mitigation” level of risk identified. It remains to work through each issue on a day-by-day basis and mitigate each risk thoroughly so that none of the identified risks exceed these values. It is also prudent to expect that the constant application of the established WSDOT and project risk management protocols by experienced practitioners will identify new and previously unforeseen risks promptly for analysis and mitigation by the team.

**Table 5.3-2
Project Contingency Fund Summary Update**

Name of Contingency Fund	Original Amount	Changes Currently Experienced	Expected Change due to Risk	Forecasted Balance of Fund
Schedule Incentive	\$25M	\$0M	-\$25M	\$0
Port of Seattle Lease for Pier/Terminal 46	\$20M	-\$12.3M	-\$7.7M	\$0
Differing Site Condition and Unanticipated Intervention Risk Contingency (DSC Fund)	\$40M	\$0M	-\$35M	\$5M
Deformation Mitigation and Repair Risk Contingency (DMR Fund)	\$20M	\$0M	-\$17.5M	\$2.5M
Unallocated Risk Contingency for Tunnel Contract (includes deposits from adjacent contract savings)	\$100.3M	-\$23.1M	-\$23.3M	\$53.9M
Totals	\$205.3	-\$35.4M	-\$108.5M	\$61.4M

The total contingency allowance for risk items has been broken out and is tracked carefully by the WSDOT AWV Project Team. Each fund does not appear to have serious exposure to identified risks and WSDOT is demonstrating continued close attention to management of risk throughout the tunnel project. These two factors lead to a positive prognosis for cost control on the Project. The ERP notes that the Unallocated Contingency is available to support exposure in any other fund.

5.3.3 Schedule

The ERP considers the projected tunnel completion date of December 31, 2015 to be very aggressive. STP's "Best Value" proposal is the basis for that schedule. STP's proposal is for a completion date that is nine months earlier than originally proposed to bidders by WSDOT. THE ERP notes that no contingency funds have been allocated to the risk of delayed tunnel completion. There exist several major intermediate milestones on the tunnel schedule's critical path. Because of the linear nature of tunnel construction schedules, these milestones are important indicators of progress and can provide early notice of issues with the overall Project schedule. One significant near-term milestone is the start of tunneling, currently scheduled for June 18, 2013 (according to the STP December 2012 schedule).

In order to get to the start of tunneling, many other activities must be completed. These critical activities include but are not limited to launch pit excavation and preparation; TBM manufacture, testing and acceptance; shipping and transfer to the launch pit; and TBM re-assembly final testing and commissioning. The ERP examined the preliminary schedule of December 2012, and discussed the schedule with the AWV Project team - it is clear to the ERP that each of these activities is critical to the tunnel project's schedule and that each of these activities is threatened with various degrees of delay.

Important intermediate milestones exist that will indicate whether tunneling will begin as scheduled, including:

1. Shipping of TBM from Japan (February 28, 2013)
2. Launch pit excavation is complete (March 6, 2013)
3. Launch pit is finally prepared for TBM (April 8, 2013)
4. TBM arrives at launch pit for assembly (April 9, 2013)
5. Start of Tunneling (June 18, 2013)

There are several issues and challenges in meeting the scheduled date of start of tunneling on June 18, 2013. These can be encapsulated in four major categories as follows:

1. TBM manufacture, testing and commissioning – This step is being carried out in a dry dock in Japan and has experienced minor issues and delays that are not unusual in TBM manufacture. The testing and commissioning ceremony in late December 2012 was not a success due to the TBM not being sufficiently complete to carry out the system tests. Additional delays are expected after discovering a significant fault during testing that required disassembly and reassembly prior to repeating the system testing. These factors make it unlikely that the TBM will be completely assembled and fully tested prior to shipping. While not an ideal situation, it is considered necessary to mitigate other schedule issues outlined below. Carrying out certain but as yet unspecified tests on systems would in that case occur upon assembly in Seattle. These activities are being monitored closely by the AWWV Project team and their experts.
2. Shipping, unloading and transport to the launch pit in Seattle – The TBM is scheduled to be disassembled for shipping on February 28, 2013 with the ship leaving Japan on March 15, 2013. There is no other ship scheduled in Japan that is large enough to carry the TBM components until six months later. It is imperative that the TBM be loaded and shipped as scheduled to maintain the tunnel project schedule; the ERP is advised that both STP and the TBM manufacturer (Hitachi-Zosen) are committed to shipping the TBM per the current schedule.
3. Launch pit excavation – Excavation is proceeding slower than anticipated according to the design-build tunnel contractor's work plan. Installation of the sidewall support is proceeding at a slower rate than presented in the work plan. Excavation rate of soil is also slower than anticipated in the work plan. This excavation activity is a critical path activity that must be completed before the TBM can be transported to the launch pit. Even if the TBM shipping activities are completed on schedule, it is unlikely based on current progress that the launch pit will be ready to receive the TBM for assembly on April 9, 2013.
 - a. There has been a differing site condition "notice of claim" submitted by the design-build tunnel contractor for unanticipated soft ground and groundwater conditions that are claimed to have impacted the progress of this excavation. While WSDOT sees no merit in this claim the issue is not resolved. Unsuccessful resolution might have a negative effect on the Project budget.
4. Re-assembly of the TBM in Seattle is a critical path activity that may also now have to consider first time assembly and testing of some components along with a much greater level of effort from the TBM manufacturer's personnel and additional spares and tools shipped to Seattle so

that additional delay is not experienced. Even if this process goes as planned, additional testing activities increase the likelihood of lengthening this activity leading to schedule delay.

Given the confluence of these critical path activities surrounding the latter stages of TBM manufacture, delivery, site preparation, and re-assembly of the TBM in preparation for launch, the ERP finds it to be extremely unlikely that the TBM launch date of June 18, 2013 will be maintained.

While the revised baseline schedule has not yet been issued by STP, based on the ERP's discussions with STP and the WSDOT AWW Project Team, the ERP notes the following with regard to the tunnel project December 2012 schedule:

1. The overall schedule is aggressive.
2. The learning curve³ planned for TBM tunneling is very lengthy compared to a "normal" tunnel project and provides an opportunity to maintain schedule.
 - a. The learning curve is typically highly aggressive and is a place where time is conventionally lost to schedule.
 - b. This TBM with its unique features and size will need a longer than usual learning curve for operation so the approach taken by STP is considered reasonable and prudent.
3. The reduction in hyperbaric interventions⁴ due to TBM design features provides an opportunity to maintain the preliminary schedule.
4. Once the internal concrete and systems installation plans are established and scheduled, additional schedule benefits may be generated by reducing the overall time needed for this activity.
5. Any additional time obtained from refining plans for later activities should be preserved for as long as possible or continued schedule slippage to manage issues arising is inevitable.

Due to the linear nature of tunneling schedules and the need to continuously adapt to geotechnical and equipment-related issues on the tunnel project schedule's critical path, it is difficult to recover lost time on tunnel projects. For example, opportunities to make up for lost time on the tunnel project are limited as current plans already call for tunnel production to take place 5 days a week with weekends reserved for maintenance of the TBM.

The type of detailed planning that STP and WSDOT is currently undertaking coupled with an eye on the bigger picture maintained by the risk management program and risk registers is critically important to mitigate the potential for significant schedule delay.

³ A Learning Curve is a colloquial term used in construction scheduling to describe the period of expected reduced productivity at the beginning of a new activity.

⁴ A Hyperbaric Intervention is a period of tunnel mining downtime, normally to repair and/or maintain TBM cutting tools, where access to the TBM face is achieved at a higher than atmospheric pressure.

6. CONCLUDING OBSERVATIONS

The ERP continues to have confidence that the Project can be successfully completed.

The Project is entering a critical phase as the TBM is delivered and tunneling commences. While the ERP has identified potential risks to the schedule, it is too early to be certain that delays to Project completion will occur, and too early to know if such delays do occur that they would increase costs.

The next six months include several crucial milestones for the Project. Success in achieving these milestones will be cause for greater confidence, but missed milestones could materially delay schedules and increase costs. The ERP has identified actions that can reduce risks.

The ERP is increasingly concerned that important funding sources for the Project remain unsecured. Without action on tolling and on the contribution from the Port of Seattle, the Legislature lacks certainty that funds are available to complete all phases of the Project.

The ERP's recommendations have been developed to enable the Governor and Legislature to take action as deemed necessary to allow the Project to continue to move forward efficiently, while at the same time enabling the Project to achieve its goals as envisioned by all who will benefit from the AWW Project at the local, regional and state levels.

Because of the number of significant action items and critical milestones facing the Project over the next six months the ERP strongly recommends that the Governor and Legislature consider a semi-annual ERP update on these action items and milestones in addition to approving a budget allowing the ERP to continue its more detailed annual reviews over the life of the Project as contemplated in the ERP's charge.

APPENDIX A

Alaskan Way Viaduct Replacement

Program Expert Review Panel

Report

February 6, 2012



February 6, 2012

Governor Chris Gregoire
State of Washington
Office of the Governor
P.O. Box 40002
Olympia, Washington 98504-0002

Re: Alaskan Way Viaduct Replacement Program Expert Review Panel Final Report

Dear Governor Gregoire and Washington State Legislature,

In accordance with your charge to the Expert Review Panel our February 6, 2012 report documenting our findings and recommendations to date is transmitted for your consideration.

The enclosed report conveys the findings of the Expert Review Panel constituted under the provisions of Bill 1175 to assess the viability and feasibility of the Alaskan Way Viaduct Replacement Program's Finance Plan and to review key assumptions for the program's schedules, risk identification and management, and cost estimates to assure they are reasonable.

Based on the Expert Review Panel's independent review of the Alaskan Way Viaduct Replacement Program ("Project"), we concluded that the Project is moving ahead as planned, on schedule and budget. The Expert Review Panel is confident that based on the course of action to date that the Project has the ability to be successfully completed. The Expert Review Panel has identified certain specific findings and recommendations for the Governor and Legislature to consider, which are focused on enhancing attainment of the established Project goals and objectives as discussed in our report.

We appreciate the opportunity to assist you in the important initiative. The Expert Review Panel would be pleased to provide further clarification on any of the points in this report as needed in the future.

Sincerely,

Dr. Patricia D. Galloway, PE
Chair



Alaskan Way Viaduct Replacement Program Expert Review Panel Report

February 6, 2012

THE ALASKAN WAY VIADUCT REPLACEMENT PROGRAM

Report of the Expert Review Panel

February 2012

The enclosed report conveys the findings of the Expert Review Panel constituted under the provisions of Bill 1175 to assess the viability and feasibility of the Alaskan Way Viaduct Replacement Program's Finance Plan and to review key assumptions for the program's schedules, risk identification and management, and cost estimates to assure they are reasonable.

Based on the Expert Review Panel's independent review of the Alaskan Way Viaduct Replacement Program ("Project"), we concluded that the Project is moving ahead as planned, on schedule and budget. The Expert Review Panel is confident that based on the course of action to date that the Project has the ability to be successfully completed.

Specifically, the Expert Review Panel found that:

- The Project is well managed by an experienced and competent team;
- The Project is, at this early point, on schedule and within budget;
- The Governor and Legislature should work diligently to assure that their proposed actions are taken to secure several of the planned sources of funds;
- The Washington Department of Transportation ("WSDOT") should work diligently to assure that proposed actions are taken to improve coordination of the State's Project with projects being undertaken by the City of Seattle and King County; and
- WSDOT has strong project implementation practices, with some recommended improvements, to manage changes without adverse impacts to the Project.

We are appreciative to WSDOT for its responsiveness and support throughout our review. We were continually impressed with the skill and experience the WSDOT staff brought to this process. We also commend the Governor and the Legislature for their continued commitment to this Program since without their leadership, rebuilding this key public asset would be impossible.

Dr. Patricia D. Galloway, P.E., Chair

John Rose

Robert Goodfellow, P.E.

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1 EXECUTIVE SUMMARY

In September 2006, the Washington State Governor and Legislature’s appointed expert review panel released its report on the Alaskan Way Viaduct and SR 520 Bridge Projects. In September 2011, the Governor and Legislature appointed a separate Expert Review Panel (“ERP”) to update the 2006 panel’s report and to conduct an independent financial and technical review of the Alaskan Way Viaduct (“AWV”) Replacement Program’s (“Project”) key assumptions, Finance Plan, and Risk Management Plan (“RMP”). The \$3.1 billion AWV megaproject is comprised of several individual projects including:

- A \$1.96 billion central viaduct replacement project consisting of a design-build deep-bored tunnel contract;
- Other smaller projects including projects that tie-in the south and north end of the deep-bored tunnel contract; and
- Projects concerning the viaduct demolition and re-location of the Alaskan Way surface street.

The ERP has been tasked by the Governor and the Legislature to review the Project’s Finance Plan for its viability and feasibility and to identify risks that have the potential to impact the attainment of the Project goals and objectives. Specifically, the ERP was charged with two primary tasks:

- Review the Federal Highway Administration (“FHWA”) financial plan for the Project to ensure that it (a) clearly identifies secured and anticipated funding sources and (b) is feasible and sufficient; and
- Review the Project’s key assumptions established for the schedules, risk identification and management, and cost estimates to assure they are reasonable.

1.1 General Findings

The ERP concludes that the WSDOT AWV Project is progressing as planned and is confident the Project can be successfully completed based on its current course. However, the ERP also acknowledges that: (a) the Project is in its early stages; (b) the Project must continue to interface with key stakeholders and government agencies; and (c) actions necessary to secure all funding sources identified in the Finance Plan remain to be undertaken.

The primary findings of the ERP to date include:

1. The Project is currently proceeding on schedule and within budget.
2. The AWV projects undertaken to date, for which WSDOT has been responsible, have been well managed under a unified and competent Project team with components of the overall Project being completed within or under budget and earlier than planned. A key example is the demolition of the south end of the viaduct where stakeholders, different government agencies, and contractors worked collaboratively to complete that section of the overall WSDOT project under budget and in less time than planned.

3. Not all of the Project's funding sources planned for the Project are as yet secured; important decisions must be made by the Legislature, WSDOT, and others within the next few months to ensure that committed funds will be available when needed. To that end:
 - a. The Port of Seattle's ("Port") planned \$300 million contribution should be secured with a written binding agreement;
 - b. Work currently underway needs to be completed to verify the amount of toll revenue that will be available for construction;
 - c. The availability of Motor Vehicle Fuel Tax ("MVFT") related revenues should be monitored; and
 - d. The Governor and Legislature should consider new taxing authority for King County's transit services.
4. WSDOT and the City of Seattle ("City") should continue their discussions regarding the best approach for the management, design, and construction of the Alaskan Way surface street and memorialize their understanding in a written binding agreement as so contemplated under the existing agreements between WSDOT and the City.
5. The Program Oversight Committee ("POC") comprised of the decision-makers of the key stakeholders and government agencies established by the Governor when this Project began should reconstitute its meetings as quickly as possible and continue to meet regularly until Project completion. Such action will continue to provide the decision-makers of the key stakeholders and government agencies the opportunity to discuss plans and actions necessary for the successful Project completion.

Based on its independent review, the ERP identified the following actions to be monitored during the next six months to increase the probability of success:

1. Funding Actions:
 - a. The Legislature adopts tolling authority for the AWV Project;
 - b. The Port and WSDOT continue to work together to achieve the self-imposed deadline of approximately June 2012 to enter into a written binding agreement for the Port's financial contribution; and
 - c. Revised toll revenue projections are completed that update the estimate of toll revenues as a source of capital funds for the Project.
2. City and State Project Interface Actions:
 - a. The City and WSDOT continue to work together and enter into a written binding agreement memorializing their mutual understanding with respect to their respective roles, responsibilities, and scope for the projects contained within the \$3.1 billion Alaskan Way Viaduct Replacement Program, which follow the completion of the deep-bored tunnel contract;
 - b. The Mercer West and Seawall Replacement contracts to be let by the City proceed as planned;
 - c. Utility relocations proceed as planned;

- d. The City should be prepared to put the seawall proposition on the ballot by spring 2013 (the latest date that appears to allow the seawall to be completed in time to interface with the WSDOT proposed schedule for the Alaskan Way surface street); and
 - e. The City should continue to work diligently planning for the Local Improvement District (“LID”) on a schedule that allows the seawall to be completed in time to interface with the WSDOT proposed schedule for the Alaskan Way surface street.
3. Design-Build Contract Actions:
- a. Project team continues to work diligently to complete right-of-way acquisition as planned;
 - b. Analysis predicting building deformation predictions is completed as scheduled;
 - c. The Pioneer Square Western Building structural mitigation is completed as scheduled;
 - d. Design, manufacture, and delivery of the Tunnel Boring Machine (“TBM”) proceeds as scheduled;
 - e. Insurance for the design-builder that does not contain exclusions that expose the Project to additional financial risk is obtained; and
 - f. The design-builder insurance policy contains references to contractually specified codes of practice for tunnel projects.

The ERP has identified certain specific findings and recommendations for the Governor and Legislature to consider, which are focused on enhancing attainment of the established Project goals and objectives as discussed below.

1.2 Findings

1.2.1 Finance Plan

The ERP conducted a comprehensive view of the Project’s Finance Plan, beginning with a review of the August 2011 initial financial plan as approved by FHWA for the basis of federal funding for the Project, updates to plans, and factors outside of the FHWA financial plan that might potentially impact the Project.

Cost Estimates

The ERP reviewed the Project’s approved estimate and control budget, including a review of the Independent Cost Estimate (“ICE”) Review Panel’s February 2010 report, and found no evidence that would lessen the level of confidence assumed for that estimate as originally set at that time.

The Project cost estimate is based on the WSDOT Cost Estimate Validation Process (“CEVP”), which has identified potential risks to the Project and allocated funds to address those risks. The CEVP process remains a valid methodology for evaluating the variability of cost and schedule predictions due to risk and opportunities, which may arise over the course of the Project’s execution. Through use of the CEVP process, the Project has to date successfully mitigated and retired (because they did not materialize) some of the major risks to the Project’s goals and objectives.

Funding Sources

The Finance Plan is based on the assumption that all funding sources will be secured. The ERP finds that a significant amount of the assumed funding for the Project has not yet been secured. The Legislature should actively monitor the status of funding sources and be prepared to identify alternative funding sources if necessary.

Currently the State has committed to a substantial expenditure of funds without fully securing the certainty of needed funding from all the sources identified in the Finance Plan. Therefore, it is important to continue to focus on securing the needed funds. The safe, speedy rebuilding of the roadways and infrastructure to be addressed by this Project is critical, both to the Puget Sound Region and the entire State transportation system, in order to prevent catastrophic damage in the event of a major earthquake. The State has already expended significant time and money on the Project and has already initiated execution of the largest components of the AWW Project, including execution of the design-build contract for the deep-bored tunnel. With respect to the funding sources identified in the Finance Plan, the ERP found the following:

1. Federal Funds: The ERP finds the federal funds identified in the 2011 initial financial plan have been secured;
2. State Funds: The Legislature needs to secure the anticipated State funds with actions that provide bonding authority and tolling authority for the Project:
 - a. MVFT-related funds:
 - i. The majority of the State's funding is based on the sales of bonds as secured by MVFT revenue, including revenue authorized by voted referendums approved in 2003 and 2005; and
 - ii. Recently updated forecasts provided in the State's 2012 Supplemental Budget deliberations predict a deficit of \$211.4 million in the State's transportation accounts over the next six years. While the State's plan indicates confidence in the ability to sell the bonds needed to support the Project and historical indications are that the bond sales for such projects are generally very strong, the ERP recommends that bond revenue (and future expenditure) projections should be closely monitored so that forecasts relative to future MVFT revenue claims against those funds (including the operations of WSDOT, debt service on previously issued bonds, and debt service on bonds to fund future construction on the Project and other projects) can be balanced to the actual revenues received.
 - b. Toll Revenue:
 - i. The \$400 million of toll revenue as identified in the FHWA financial plan is not yet secured. As a result, the ERP concludes that the risk remains that the projected \$400 million in toll revenues will not be realized. The securing of these revenues will require Legislative approval of both tolling authority and bonding authority for the Project. The amounts that can be realized for the Project from tolls will be dependent on updated revenue projections based on work currently underway and a set of policy decisions that will need to be made by the Treasurer and the Finance Committee.

- c. Port of Seattle:
 - i. The Port's planned contribution of \$300 million is not yet secured. Although there is strong evidence that the Port is committed to its planned \$300 million contribution as currently documented by the Memorandum of Understanding ("MOU") with WSDOT, this contribution has not yet been authorized in the Port's adopted 2011 Budget. Pending finalization of the agreement between the Port and WSDOT, these funds remain unsecured. The ERP finds the immediate finalization of the WSDOT and Port agreement to be in the best interest of the Project because:
 - 1. The existing MOU includes contingent language that might provide a basis for the Port to contribute less than the \$300 million;
 - 2. The Port's Budget denotes \$19 million of the contribution to be "in-kind," whereas the 2011 financial plan assumed all cash. The ERP has been advised that WSDOT has identified additional federal funding to compensate for the \$19 million reduction in cash contribution from the Port;
 - 3. The plan to receive the Port's funds towards the end of the Project creates an additional risk; and
 - 4. There is a risk that the Port's current commitment could be changed by future Port Commissions.

City/State Relationship

The ERP's review of various agreements between the City and the State finds that the City is responsible for design, construction, and funding of several projects related to the replacement of the Alaskan Way Viaduct. These projects include:

- 1. The Waterfront Redevelopment Project
- 2. The Seawall Replacement
- 3. The Mercer Corridor, including Mercer East and Mercer West:
 - a. The Spokane Street Viaduct Widening Project; and
 - b. Public Utility Relocation.

Other work related to the replacement of the Alaskan Way Viaduct includes projects for which the State has a defined funding responsibility. The City and State are in agreement with respect to the defined State funding for these projects and with the City's lead in the conceptual design for the Alaskan Way surface street. The City and State have not concluded their discussions regarding their roles, responsibilities, and scope for the AWV projects that follow the completion of the deep-bored tunnel project, including the:

- 1. Alaskan Way surface street relocation
- 2. Western/Elliott connection
- 3. Viaduct removal
- 4. Battery Street Tunnel decommissioning
- 5. Marion Street pedestrian overpass

The ERP's review concludes that the City's progress on its projects is of interest to the State because:

1. The public may not differentiate these roles in their ultimate evaluation of the State's completion of its Project;
2. The successful completion of the State's Project is in many ways dependent on the City's timely completion of related projects;
3. The Waterfront Redevelopment project and the Seawall Replacement project are viewed by many in the public as part of the WSDOT AWV Project even though they are separate projects with separate funding sources;
4. The successful completion of the Mercer West City project will impact the achievement of the freight and traffic mobility goals expected by the Port, major stakeholders, and the public at large. City officials are confident that funds are available for the project, but stakeholders are concerned that important decisions still need to be made about project design that will affect freight mobility;
5. The City Seawall project is critical to the design and timing of the WSDOT viaduct demolition and Alaskan Way surface street projects. The City's plans for funding seawall improvements are not complete and face potential risks in their implementation. Issues to consider include:
 - a. Potential delays may arise in the permitting process with the Army Corp of Engineers;
 - b. Decisions need to be made in a timely manner, including the date and contents of an expected ballot measure to authorize new property tax revenue;
 - c. It is expected that a Local Improvement District ("LID") will allow benefiting property owners to pay for a significant portion of the costs of the Seawall and/or Waterfront Redevelopment. However, State law and good process indicate that the implementation of the proposed LID will require substantial lead-time before funds are available; and
 - d. Voter approval of new property tax funds for the seawall may not be obtained or may be delayed.

The ERP's review also concludes that the City's Waterfront Redevelopment plans make assumptions about the design for the relocated Alaskan Way surface street that may not be consistent with the Project's overall budget and mobility goals. The ERP notes that the Finance Plan calls for WSDOT to spend \$290 million on a set of projects including relocation of the Alaskan Way surface street, removal of the Viaduct, and decommissioning of the Battery Street Tunnel. The implementation of these projects merits special oversight as:

- The current cost estimate should be reviewed and, if necessary, updated based on current economic conditions and assumptions, and
- Responsibility for overall management, design, and construction is still under discussion between WSDOT and the City. While the ERP finds that WSDOT and the City are working cooperatively together, other Project stakeholders may not understand or know the status of the WSDOT and City discussions, which could lead to potential impacts to the Project if not resolved. For example, while the State and the City agree that the City is taking the lead for the conceptual design of the Alaskan Way surface street relocation, the City has recently published "Waterfront Street Design Considerations" for review. While these considerations are

preliminary, they begin to build public expectations about the street’s design, but they may not reflect the State’s goals for a specific issue, such as freight mobility. They may also result in costs that exceed the State’s allocation. Thus, it is critical for the City and the State to continue their discussions and memorialize those discussions in a binding agreement regarding roles, responsibilities, and expectations for the State’s funding in order to avoid any potential impact to the follow-on projects of the deep-bored tunnel.

King County

King County’s role in the Project is to implement transit improvement that will respond to the short-term impacts during construction of the Project and to contribute to the long-term ability of the Project to meet its goals for moving people and freight. The State has successfully met its commitment to King County to provide funds for the short-term transit enhancements. King County (“County”) has requested, but not yet received, new legislative authority to implement local taxes to provide for longer-term transit enhancements which might have a ripple impact on the Project’s ability to meet all of its goals for moving people and freight.

1.2.2 Implementation Plan

The ERP assessed the overall management of the Project including the relationships with stakeholders and partners, the management structure, adherence to the Final Environmental Impact Statement (“FEIS”), risk management, and management of the design-build deep-bored tunnel contract.

Relationships with Stakeholders and Partners

The ERP interviewed a wide variety of parties with an interest in the AWV Project. The parties were unanimous in their praise for WSDOT’s willingness to listen and to seek to solve problems as they are raised.

The ERP finds that strong leadership from a variety of elected and appointed officials has made it possible to achieve significant progress to date. Changes in the occupancy of these positions, including Legislature leaders, Governor, Secretary of Transportation, and local elected officials including Port Commissioners, could impact Project success if the leaders who have worked together and understand the vision and background of the Project are no longer in place to see the Project to completion.

Governor Gregoire, in accordance with industry best practices for megaprojects, appointed a Program Oversight Committee (“POC”) in March 2010. The Committee’s members as constituted by the Governor include:

- The Governor
- The Co-chairs of the Legislature’s Joint Transportation Committee
- The Mayor, City of Seattle
- A City Council member
- The King County Executive

- A King County Council member
- The Port of Seattle Commissioner
- The Port of Seattle CEO

The creation of the POC was an excellent and important step toward achieving the successful completion of the complex Alaskan Way Viaduct Replacement Program megaproject. The inclusion of important decision-makers and their representatives is an important tool to continue the momentum created by the initial agreements between governments and other stakeholders. The early phases of the Project did not necessitate the active oversight of the POC, but now the Project has reached a phase where reactivation of the POC is important.

Management Structure

The ERP concludes that the WSDOT Project team is competent and sufficiently experienced to manage the AWWV Project. The ERP also finds that the Project team has benefited from WSDOT Executive level support, which is evident in the current management structure and Project team leadership. The Project team consists of both WSDOT employees and consultant personnel. The team has been working together for several years resulting in efficient operations. However, given the recent cutbacks in WSDOT personnel and consultant contracts, there is a risk that key personnel with a direct knowledge of the day-to-day issues of the Project may be lost if efforts are not made to secure and maintain their services.

FEIS Adherence

The Project continues to successfully fulfill the commitments set forth in the FEIS, including its commitments to environmental and parking mitigation.

Risk Management

The ERP finds that WSDOT has one of the best risk management programs of any state for major infrastructure projects. The planning, design, and risk allocation process are proven and successful in delivering major projects within the planned budget and schedule. The ERP concludes that the Project's overall Risk Management Plan ("RMP") is compliant with industry standards and provides for proper coordination with the management of the design-build tunnel contractor.

With respect to the deep-bored tunnel contract, the ERP finds that processes and procedures developed for risk management by both WSDOT and the design-build tunnel contractors are consistent with industry standards and practice and provide a reasonable basis and process from which to execute the Project.

Overall, the execution of the RMPs to date is successful. The continued successful implementation of the RMPs, as is discussed in our report, will be critically important to both monitoring and mitigating Project risk.

Tunnel Contract

The tunnel design-build contract includes several risk mitigation and risk sharing allowance items. This structure of contractual payment is positive for satisfactory completion of the tunnel project. However, WSDOT and the design-build contractor appear to have different interpretations with respect to the use of the building deformation and repair fund identified in the design-build contract, which could lead to unanticipated allocation of responsibility for that risk. It is important that WSDOT and the design-build tunnel contractor reach an agreement on how the contractual allowances will be used.

1.3 Recommendations

Current trends forecast that the deep-bored tunnel and north and south access projects will be constructed within budget and schedule. However, there remain potential risks, as is true in any megaproject during execution, both to these projects and to the follow-on viaduct removal and Alaskan Way surface street projects. These potential risks include known decisions that have yet to be made and the “unknowns” that are often experienced during construction. The potential risks are being managed well, but the ERP recommends some changes to improve process, and therefore outcome, as listed below.

1.3.1 Finance Plan

1. Several important actions are required to secure the funds needed to bring the Project to a successful conclusion:
 - a. Toll and Bond authorizations: The Governor and Legislature need to authorize tolling and bonding for the Project in order to assure there are no significant issues with meeting contractual funding commitments;
 - b. Toll Funds: Tolling is likely to be an important component of the Project even if new projections and policies reduce the amount of toll revenue that can be used for the Project’s construction. The timely completion of new revenue projections is of critical importance to the preparation of a revised Finance Plan. The Transportation Commission, acting as the tolling authority, should work with the State Treasurer and Finance Committee to establish policies that will ensure an adequate amount of capital funds can be generated from toll revenues;
 - c. State MVFT Funds: The Legislature should base its bonding authority for the Project on a comprehensive plan that shows:
 - i. Amounts that can be financed with toll bonds, thereby reducing the need for MVFT sources for the Project, and
 - ii. MVFT projections and financing policies that support the sale of MVFT bonds in amounts and on the dates required to meet WSDOT’s projected cash flow.

- d. Port Funds: WSDOT should move expeditiously to obtain a new written binding agreement with the Port that will provide certainty as to amounts, timing, and any conditions pertaining to the Port’s contribution;
- e. City Funds: The Program Oversight Committee should assign a high priority to obtaining increased certainty for the City’s timely completion of the Seawall and Mercer West Projects;
- f. County Funds: The Governor and Legislature should consider the County’s need for legislative authority to implement local taxes to provide transit enhancements that will allow the Project to meet its passenger and freight mobility goals; and
- g. The Project Finance Plan should be updated to reflect current understanding of funding sources and Project implementation.

1.3.2 Implementation Plan

1. The ERP recommends the reactivation of the Program Oversight Committee. Continued momentum of the Project’s success to date and increasing the probability of successful completion requires a strong working relationship with and between government agencies and cooperation with key stakeholders. The POC should reconvene and meet at least quarterly so that any new occupants of positions on the committee have a shorter learning curve and can understand the nature of the commitments that the various government entities have made to each other and effectively enforce those commitments;
 - a. The ERP also recommends the addition of the minority ranking members of the Joint Transportation Committee to the POC in order to include all stakeholder representatives Statewide.
2. WSDOT Executive Level support for the Project needs to be maintained;
3. The Project team key positions and capabilities, including those filled by WSDOT consultants, need to be protected from potential WSDOT and consultant cutbacks to assure no disruption to the unified team approach that has been established to date;
4. The Project team needs to be more engaged in the City’s Seawall, Waterfront Development, and Mercer West projects to fully understand the interfaces of these City projects with the AWW Project. Building and maintaining a strong working relationship between the City, the Port, and WSDOT is critical for the successful completion of the later stages of the AWW Project once the deep-bored tunnel component of the AWW Project is complete since these City projects could directly impact the budget and schedule of State projects as well as stakeholder satisfaction;
5. Steps should be taken to improve the process and execution of the risk management plans of WSDOT and the design-build tunnel contractor to better align with WSDOT risk policies;
6. The WSDOT Project team should communicate clearly with the design-build tunnel contractor on expectations for access to the building deformation mitigation fund monies, specifically regarding how payment will be handled for the Western Building located in Pioneer Square, and confirm WSDOT’s expectations as to rights, responsibilities, and obligations;

7. Risk registers for the Project are not sufficiently detailed as to the number of potential risks identified and how each will be mitigated; the financial impact of these identified risks is considered to be optimistically low for the magnitude of the potential risk and the Project. As mobilization continues, additional effort between the parties is recommended to provide more detail in the risk registers and to provide more realistic financial and schedule impacts should these risks manifest;
8. WSDOT staff should develop a summary of the potential financial and schedule risk exposure categorized by each contractual contingency fund to clarify whether each fund is sufficient for the remaining exposure and track the performance of construction with respect to management of these risks; and
9. WSDOT should consider that, in addition to the monthly risk meetings, a semi-annual independent third-party audit be carried out (that is, an audit carried out by individuals who are outside the Project team) to conduct a detailed review of the risk registers and contingency funds addressing the detailed issues noted by the ERP.

1.4 Concluding Remarks

The Project is moving ahead as planned, on schedule and budget. The ERP is confident that based on the course of action to date that the Project has the ability to be successfully completed. For reasons we explain in our report, key assumptions for the Project schedule, risk identification and management, and cost estimates are reasonable, but can be further strengthened with improvements to the risk management plans as noted herein. The ERP also finds the Finance Plan can be feasible and viable when the identified funding sources are secured.

The ERP's recommendations have been developed to enable the Governor and Legislature to take action as deemed necessary in order to allow the Project to continue to move forward efficiently, while at the same time increasing the opportunity for the Project to achieve its goals as envisioned by all who will benefit from the AWV Project at the local, regional, and state levels. Because of the number of significant action items and identified potential risks forecasted to be retired over the next six months, the ERP strongly recommends the Governor and Legislature consider a semi-annual ERP update on these action items and retired risks in addition to the more detailed annual reviews contemplated in the ERP's charge.

2 INTRODUCTION

2.1 Project History/Description

The Alaskan Way Viaduct (“AWV”) Replacement Program (“Project”) includes projects led by the Washington State Department of Transportation (“WSDOT”), the City of Seattle (“City”), King County (“County”), and the Port of Seattle (“Port”).

The AWV Project includes a deep-bored tunnel, approximately two miles long, that will replace State Road 99 (“SR 99”) between South Royal Brougham Way and Roy Street in Seattle, Washington, and remove the existing viaduct from approximately South King Street to the Battery Street Tunnel. The bored tunnel is based on state-of-the-art safety systems and is designed to a 2,500 earthquake standard that approximates the range of a 9.0 magnitude earthquake. Damage sustained by the viaduct during the 2001 Nisqually earthquake compromised the viaduct’s structural integrity. This past damage, along with the age, design, and location of the existing viaduct, makes this structure vulnerable to sudden and catastrophic failure in an earthquake.

The stacked large tunnel will have two lanes in each direction. Access to and from the tunnel will be provided via ramp connection at the southern end, located north of South Royal Brougham Way, and at the north portal near Harrison Street. The AWV Project also includes the Alaskan Way surface street project, which will take place at the conclusion of the construction of the bored-tunnel project.

SR 99 and Interstate 5 (“I-5”) are the primary north-south access routes through downtown Seattle, making the AWV a vital link in the region’s highway and freight mobility system and thus critical to the region’s economy.

WSDOT and the University of Washington first conducted a study in 1995 of the AWV that determined the viaduct was vulnerable to soil liquefaction in the event of an earthquake. In the midst of a 2001 study to consider various options for the viaduct, a 6.8 magnitude earthquake, called the Nisqually earthquake, struck on February 28, 2001. FHWA, WSDOT, and the City of Seattle published a Notice of Intent (“NOI”) to begin the process of evaluating alternatives as required under the National Environmental Policy Act (“NEPA”) on June 22, 2001.

WSDOT commissioned outside experts in 2005 to conduct a study evaluating the condition of the viaduct. The study found that the viaduct’s deterioration has accelerated since the Nisqually earthquake. Additional studies in 2006 and 2008 also looked at the deterioration of the AWV structure and its seismic capacity and concluded that the viaduct needed to be replaced. Ongoing inspections have revealed that the viaduct has moved and settled and that the seawall, which holds the soils around the foundations of the AWV, is being eaten away by tiny marine crustaceans called gribbles. These inspections confirmed the prior studies’ conclusions for replacement.

Various alternatives for replacement have been studied and evaluated. After the submission of the 2006 expert review panel report, the Governor, County Executive, and City of Seattle Mayor committed to a collaborative effort to develop a solution for the AWV Project. This collaborative effort, referred to as

the Partnership Process, was created to resolve the needs of the AWW, Seawall, and related projects in a manner that could be broadly supported and implemented. The three parties formalized this effort in a Memorandum of Understanding (“MOU”) in December 2007. The Partnership Process analyzed a range of capital and operating improvements for a wider Systems Approach to transportation with a focus on six guiding principles:

- Improve public safety;
- Provide efficient movement of people and goods now and in the future;
- Maintain or improve downtown Seattle, regional, port, and state economies;
- Enhance Seattle’s waterfront, downtown, and adjacent neighborhoods as a place for people;
- Create solutions that are fiscally responsible; and
- Improve the health of the environment.

The Partnership Process evaluated a number of scenarios and recommended an approach to formulating a hybrid solution that included consideration for a large-diameter single-bored bypass tunnel. In January 2009, Governor Gregoire, King County Executive Sims, and Seattle Mayor Nickels signed a Letter of Agreement (“LOA”) declaring their joint decision to replace the central waterfront portion of the AWW and seawall with a deep bored tunnel, a new waterfront surface street, transit investments, and downtown city street and waterfront improvements. The January 13, 2009, LOA was grounded in the potential for the Bored Tunnel Alternative to meet the Project’s six guiding principles, based on the results of the technical analysis; the strong support of the diverse interests for the bored tunnel; the viability of a single-bored tunnel; and the willingness of the partners, with the support of the Port of Seattle, to develop a funding program that will supplement the State’s funding commitment.

Based on that LOA, the State is responsible for the following projects:

- Construction of a deep-bored tunnel
- Viaduct demolition
- Surface connection from approximately Yesler Way to Elliott Avenue
- Battery Street Tunnel decommissioning
- Relocation of the Alaskan Way surface street
- Moving Forward projects:
 - Column safety repairs
 - Electrical line relocation
 - Battery Street Tunnel maintenance
 - Construction transportation mitigation

The County is responsible for transit service investments.

The City is responsible for the following projects:

- Elliott Bay Seawall Replacement
- City street improvements

- A promenade along the central waterfront
- Utility relocation

The Port is responsible for the East Marginal Way South Grade separation project.

In April 2009, the Legislature passed Senate Bill 5768, which urged the State to expedite environmental review and authorized funds to build a replacement tunnel and remove the existing structure. On May 12, 2009, Governor Gregoire signed a bill that committed \$2.8 billion in state funding for the tunnel alternative. The Seawall Replacement is a separate project led by the City with its own environmental review. The Seawall project is not a subject of the ERP's review, with the important exception of any interface that will affect the schedule and budget for related projects, which are discussed later in this Report.

The total cost for the AWW Replacement Program is currently estimated to be \$3.1 billion. In the January 13, 2009, LOA, the State agreed to be responsible for funding components of the Project with an estimated cost of \$2.82 billion; King County is to be responsible for funding components of \$190 million in capital and \$15 million annually in operating expenses (to be funded by new Legislative authorization of taxing authority); the City of Seattle is to be responsible for an estimated cost of \$937 million; and the Port of Seattle has committed \$300 million to the AWW Project.

WSDOT was directed by the Washington State Legislature to develop a large-diameter bored tunnel in downtown Seattle, King County, Washington, to replace the AWW. The Project legislation, codified in RCW 47.01.402, requires the Project to be developed as a matter of urgency for the safety of Washington's traveling public and because of the need for the transportation system in central Puget Sound. WSDOT determined that the legislative mandate to expedite completion of the Project, within budget, is feasible if the design-build delivery methodology is used. WSDOT issued a Request for Proposal ("RFP") for such a design-build contract on May 26, 2010. On October 28, 2010, WSDOT received two proposals in response to the RFP and, following an evaluation of the proposals, WSDOT selected Seattle Tunnel Partners ("STP"), a joint venture of Dragados USA and Tutor Perini Corporation, as the best value proposer. The \$1.35 billion design-build contract includes the following components:

- Tunnel boring machine
- Tunnel boring
- Roadway in tunnel
- Portal construction
- Two operations buildings
- Ventilation, fire/life safety, and electrical systems
- Tunnel settlement mitigation

A design-build contract was entered into (effective as of January 6, 2011) by and between WSDOT and STP, which allowed certain work to proceed under a Notice to Proceed ("NTP") 1 in February 2011 to support preliminary design and the environmental process. Full Notice to Proceed ("FNTP") 2 was

provided to STP in August 2011 to support the final design and construction. Construction staging activities began in October 2011.

The bored tunnel was not evaluated in the initial 2004 environmental documents and was studied in a 2010 Supplemental Draft Environmental Impact Statement (“EIS”). The FEIS was issued in July 2011. A full description of the AWV Replacement Project is identified therein. The Record of Decision (“ROD”) was issued for the AWV Project in August 2011 and FNTP-2 was given to STP shortly thereafter.

2.2 Independent Expert Review Panel Formation

In early 2006, the Washington State Legislature passed new legislation that required an expert review panel to provide an independent financial and technical review of the financial and implementation plans of the AWV and Seawall Replacement Project and the State Route 520 Bridge Projects. In June 2006, an expert review panel was selected by the Governor, the chairs of the State Senate and House Transportation Committees, and WSDOT’s Secretary of Transportation. The panel’s study provided an independent evaluation as to 1) the projects’ financing plan to ensure that the finance plan clearly identified the secured and anticipated funding sources and was feasible and sufficient, and 2) the projects’ implementation plans covering all state and local permitting and mitigation approvals to ensure that they offered the most expeditious and cost-effective delivery of the projects. The expert review panel presented its findings and recommendations on September 1, 2006.

The purpose of the current ERP, which was appointed by the Legislature in September 2011, is established in engrossed second substitute Bill 1175 as follows:

“...for the purpose of updating the work that was previously completed by the panel on the Alaskan Way Viaduct replacement project and to ensure that an appropriate and viable financial plan is created and regularly reviewed.”

On September 13, 2011, Washington Governor Gregoire, the Secretary, and the Joint Transportation Committees announced the appointment of three nationally recognized transportation and finance experts to the Expert Review Panel to review the key aspects of the Alaskan Way Viaduct Replacement Project.

The ERP is composed of experts with national and international experience with many years of experience and specific expertise in:

- Tunnel design and construction
- Schedule development
- Cost estimation
- Risk identification, assessment, and management
- Project financing and delivery
- Large urban transportation project management
- Megaproject management in general

The ERP is chaired by **Dr. Patricia D. Galloway**, a civil engineer with expertise in megaprojects, transportation programs, and project delivery. Dr. Galloway has over 30 years of megaproject experience, including major transportation projects around the world. Additional panel members include:

- **Robert Goodfellow** who has over 20 years of tunnel and underground design and construction experience on major projects all over the world, specializing in technical and contractual management of risk; and
- **John Rose** who has more than 30 years of experience in public sector budgeting and financing, including prior experience as King County Budget Director and as President and CEO of Seattle-Northwest Securities Corporation.

Detailed biographies are included in **Appendix A**.

2.3 Expert Review Panel Charge

The ERP has been directed by the Governor and Legislature to ensure that key Project assumptions and delivery are reasonable and feasible for the AWV Project. The ERP was tasked with two main objectives (The ERP's work scope and charge to the ERP is contained in **Appendix B**):

- Review the 2011 Initial Financial Plan for the Project submitted to the FHWA to ensure that it clearly identifies secured and anticipated funding sources and is feasible and viable, and
- Review the key assumptions for the Project schedules, risk identification and management, and cost estimates to assure they are reasonable.

In summary, the ERP has been tasked by the Governor and Legislature to review the Project's Finance Plan for its viability and feasibility and to address any risks that would impact the successful completion of the Project. The success of the Project is largely dependent upon the Project's Finance Plan (which the ERP considers broader than the financial plan submitted to the FHWA), as well as the effectiveness of the management structure of the Project, the risk management plan, the design-build contract of the deep-bored tunnel, and the Project's cost estimate, cash flows, and funding sources.

The ERP views the AWV Project as a megaproject. Megaprojects are generally defined as any undertaking that cost more than \$1 billion, span a number of years to complete, and involve multiple stakeholders. Megaprojects may be considered some of the more complex projects undertaken by human beings.

There is a perception in the public domain that large, complex programs are always delivered late, over budget, and with deficiencies. While that may be true for some projects, it is not for all. The ERP would like to emphasize that there have been, and continue to be, many large complex megaprojects that have been delivered successfully. This means that they meet stakeholder expectations, function efficiently, and have been delivered under, at, or close to the initial budget and schedule. Megaprojects can be

successfully delivered within tight cost and schedule constraints, in dense urban environments, while working with political and community stakeholders.

Managing public perceptions and expectations and communicating well are some of the keys to megaproject success. The ERP finds that WSDOT has successfully managed both perceptions and communications, and we view our report as an additional step in that process.

2.4 Key Project Assumptions

One focus of the ERP was to assess the soundness of the key project assumptions. This included an assessment of key assumptions for successful delivery of the Project by identifying any potential risks to both cost and schedule that could affect the AWV Project's Finance Plan and an assessment of ways to maximize the opportunities for successful delivery. Specific Project items that the ERP reviewed included the:

- Finance Plan
- Risk Management Plan
- Risk identification and assessment
- Decision-making process and governance structure
- Schedule
- Cost Estimate
- STP Design-Build Contract

2.5 Process Followed by the Expert Review Panel

The ERP began its work with background briefings and a review of relevant Project information to familiarize the ERP with the history and events leading up to the bored tunnel alternative and current Project status. The ERP also toured the Project area to provide context to the background material.

The format of the work of the ERP was left up to the chair and panel members. The ERP believes strongly that their work should be independent and thus the ERP made specific requests for Project materials, briefings, and meetings with stakeholders of the AWV Project. The ERP received thousands of pages of information in response to the panel requests¹. The briefing dates and subjects covered are presented in **Table 2.5-1** below:

¹ A listing of the documentation received and reviewed by the ERP has been retained for comparison with future ERP reviews as contemplated in the ERP's charge.

Table 2.5-1 - ERP Briefings and Subjects Covered

Date	Subjects Covered
September 21, 2011	<ul style="list-style-type: none"> Kick-off meeting issues (introductions, organization, formalities, communication) Draft work plan Information walk-through
October 10, 2011	<ul style="list-style-type: none"> Program history Program organization Program delivery Change management and risk management STP change management and STP risk management Communication Tolling
October 11, 2011	<ul style="list-style-type: none"> Program management Scheduling Project controls and reporting process flow Reviews with project teams / reporting Cash flow management Consultant agreements and task orders Program agreements Commitment tracking Document management Financial management Tolling Site tour
October 17, 2011	<ul style="list-style-type: none"> City of Seattle Department of Transportation Elliott Bay Seawall Mercer corridor project Utilities Seattle Public Utilities (“SPU”), Seattle City Light (“SCL”), and Seattle Department of Transportation (“SDOT”) agreements
October 18, 2011	<ul style="list-style-type: none"> Right of way presentation Noise and vibration Subsurface property rights
November 15, 2011	<ul style="list-style-type: none"> Parking mitigation Funding availability and resource allocation Litigation Agency agreements

Date	Subjects Covered
December 7, 2011	Port of Seattle budget
December 8, 2011	Tolling Legislative inquiry STP organization
January 9, 2012	Freight Mobility West Seattle Chamber of Commerce King County and transit
January 10, 2012	Central Waterfront projects City of Seattle project interfaces

The ERP, as an independent panel, concluded it was important to meet with a wide variety of parties interested in the AWV Project so that the ERP might gain a full perspective and understanding of the Project's status as well as any perceived threats to its successful completion. The ERP's work was enhanced by talking with parties with differing perspectives. For example, the City of Seattle retained an independent consultant in 2010 to advise the City regarding potential risks on the AWV Project. The ERP considered that report and found that many of the findings of the City consultant's report have been taken into consideration by WSDOT and that several of the risks identified in the consultant's report have been retired, including receipt of the Record of Decision ("ROD") and many of the Right of Way ("ROW") acquisitions. The ERP concurs with the City's independent consultant's observation regarding the management of the building deformation (settlement) shared contingency fund as is discussed elsewhere in this ERP report. The individuals interviewed by the ERP and the dates of the interviews are shown in **Table 2.5-2** below:

Table 2.5-2 - ERP Interview Meetings

Interview Date	Individuals Interviewed
October 10, 2011	Randy Everett, Major Projects Oversight Manager, Federal Highway Administration
October 17, 2011	Bob Chandler, Major Projects Division Director, Seattle Department of Transportation
October 17, 2011	Eric Tweit, Project Manager, Seattle Department of Transportation
October 17, 2011	Kurt Beckett, Chief of Staff, Port of Seattle
October 17, 2011	Dan Thomas, Financial and Administration Officer, Port of Seattle
October 17, 2011	Mike Merritt, Government Relations Manager, Port of Seattle
October 17, 2011	Linda DeBolt, Deputy Director of Seattle Public Utilities, Chief Engineer of Utilities
November 15, 2011	Representative Judy Clibborn, Chair, House Transportation Committee

Interview Date	Individuals Interviewed
November 15, 2011	Representative Mike Armstrong, Ranking Minority Member, House Transportation Committee
November 16, 2011	Councilmember Richard Conlin, President, Seattle City Council
December 5, 2011	David Dye, Deputy Secretary, Washington State Department of Transportation
December 7, 2011	Councilmember Sally Clark, Seattle City Council
December 7, 2011	Commissioner Tom Albro, Port of Seattle
December 7, 2011	Tay Yoshitani, Chief Executive Officer, Port of Seattle
December 7, 2011	Representative Frank Chopp, Speaker of the House
December 8, 2011	Senator Mary Margaret Haugen, Chair, Senate Transportation Committee
December 8, 2011	Senator Curtis King, Ranking Minority Member, Senate Transportation Committee
December 8, 2011	Representative Judy Clibborn, Chair, House Transportation Committee
December 8, 2011	Paula Hammond, Secretary of Transportation, Washington State Department of Transportation
December 8, 2011	David Dye, Deputy Secretary, Washington State Department of Transportation
December 8, 2011	Jennifer Ziegler, Transportation Policy Advisor for Governor Gregoire
December 8, 2011	Reema Griffith, Executive Director, Washington State Transportation Commission
December 8, 2011	Jackson Maynard, Staff Counsel, Republican Caucus, Washington State Senate
December 8, 2011	Leslie Smith, Executive Director, Alliance for Pioneer Square
December 8, 2011	Bob C. Donegan, President, Ivar's
December 8, 2011	Phil Bussey, President and Chief Executive Officer, Seattle Metropolitan Chamber of Commerce
December 8, 2011	Jan Drago, Drago Associates Business Development
December 8, 2011	Kate Joncas, President, Downtown Seattle Association
December 8, 2011	Charles Knutsen, Senior Vice President Operations and Policy Development, Seattle Metropolitan Chamber of Commerce
December 9, 2011	Seattle Mayor Mike McGinn
December 22, 2011	Ellen Evans, Deputy Treasurer, Debt Management, Office of the State Treasurer
January 9, 2012	Ellen Evans, Deputy Treasurer, Debt Management, Office of the State Treasurer
January 9, 2012	Kate O'Looney, Debt Program Specialist, Office of the State Treasurer
January 9, 2012	Sung Yang, Chief of Staff, Office of King County Executive Dow Constantine
January 9, 2012	Harold S. Taniguchi, Director, Department of Transportation, King County

Interview Date	Individuals Interviewed
January 9, 2012	Dave Gering, Executive Director, Manufacturing Industrial Council
January 9, 2012	John Odland, Chairman, Manufacturing Industrial Council
January 9, 2012	Jerome Cohen, Chairman, West Seattle Chamber of Commerce
January 10, 2012	B. Gerald Johnson and John Nesholm, Seattle Waterfront Committee
January 10, 2012	Peter Hahn, Director, Seattle Department of Transportation

The ERP reviewed and analyzed a vast array of material including responses to questions the ERP submitted to the AWW Project team. Based on the information received and reviewed, the presentations made to the ERP, the interviews conducted, and the ERP’s experience and expertise, the ERP has prepared this independent report of its observations, findings, and recommendations. The report represents the ERP’s independent view of this very complex megaproject and those activities that have brought it to its current status of on schedule and budget.

2.6 ERP Recommendations

The ERP’s report is divided into three main sections corresponding to the ERP’s charge from the Governor and Legislature:

- Project Key Assumptions
- Project Finance Plan
- Project Risk Management Plan

Within each section are subsections that detail the topic areas reviewed in the AWW meetings described earlier, along with Project accomplishments, issue identification, potential challenges, and the ERP’s recommendations.

3 PROJECT KEY ASSUMPTIONS

3.1 Project Delivery

A functional and effective project management structure and efficient decision-making protocols are essential elements of successful public megaprojects. While the key component of the AWW Project is the deep-bored tunnel that is under a design-build contract with STP, the related issues associated with this Project, which involves multiple stakeholders, are complex at best. They require careful and deliberate coordination so that the diverse needs and objectives of all the associated stakeholders are met as appropriate.

The AWW Project is one of three major megaprojects being undertaken in Washington State concurrently, and many of the same stakeholders are invested in all three projects. The three megaprojects, while generating jobs in the State, will be competing for scarce resources, including qualified professional staff, the time and attention of elected officials, and necessary funding. The AWW Project team's key positions and capabilities, including those filled by WSDOT consultants, need to be protected from potential WSDOT and consultant cutbacks to assure no disruption to the unified team approach that has been established to date.

Managing Relations with Project Partners

The Project partner stakeholders in the AWW Project include the State Legislature, WSDOT, FHWA, the City of Seattle, King County, and the Port of Seattle. Each of these partners recognizes the need for extensive and effective partnering and coordination to deliver a successful project. In addition, the information "partnerships" for the AWW Project are much broader and involve local businesses, various working and interest groups, local communities, and the public at large.

Recognizing the importance of key stakeholder involvement and communication, the Governor, in accordance with industry best practices, appointed a Program Oversight Committee ("POC") consisting of the following stakeholder members:

- The Governor
- The Co-chairs of the Legislature's Joint Transportation Committee
- The Mayor, City of Seattle
- A City Council member
- The King County Executive
- A King County Council member
- The Port of Seattle Commissioner
- The Port of Seattle CEO

The POC is a key component of aiding the successful and timely completion of the required actions discussed in the Executive Summary. The ERP recommends that the POC should reconstitute its meetings as quickly as possible and meet regularly until the Project is successfully completed.

The ERP found that the AWW Project stakeholders and the public at large agree that the viaduct must be replaced. The process of how that takes place and how its replacement is managed involves challenges to delivery, as is true with any megaproject. These challenges include funding, governance, and legislative policy issues among the respective public agencies, as well as technical issues and stakeholder views and desires. As a federally identified and funded megaproject that requires multiple years to complete, the AWW Project is receiving attention at the highest levels of state and federal government. The management and decision-making activities for the Project reside at both state and project levels with a number of entities established for this express purpose.

Successful project management will include management of the multiple agreements entered into with various stakeholders. The programmatic agreements entered into with the City, Port, County, utilities,

and others address policies, procedures, funding commitments, and other topics for the AWV Project. The Project agreements entered into with the City, Port², County, utilities, and others, also address Project specific activities, schedules, and funding responsibilities. The AWV Project team has developed a commitment tracking system to manage the agreements which will 1) identify and monitor commitments, and 2) provide schedule and cost input for program reporting. The commitment tracking system serves as one tool for Project Managers during their monthly meetings for monitoring the commitments and their associated risks.

The Project tracking system incorporates tracking the status of commitments set forth in the FEIS, including its commitments to environmental mitigation and parking mitigation. For example, Milepost 31, located in Pioneer Square, has effectively fulfilled the Section 106 environmental commitment to the historical preservation for one of the City's historical neighborhood districts in a cost effective and economical manner; it has also provided an opportunity to collaborate with one of several key stakeholders of the Project while keeping business owners, visiting tourists, and residents informed of the Project's activities. The ERP finds that parking mitigation is still being resolved and continues to be an issue of concern for several stakeholders.

Construction Management

Day-to-day activities on the Project are managed at many levels as is appropriate for a megaproject such as the AWV Project. Project leadership is provided by the WSDOT Project Director, with Deputies in specific areas of the program. They are charged with oversight of the contractors, including the design-build tunnel contractor, and oversight of the Project staff, including consultants who bring specific expertise to the Project and the myriad day-to-day activities associated with the Project work. Decisions at a Project level are made under various departments divided by the construction contract and supported by several discipline leads.

The results demonstrated by the Project team to date confirm that the management team is experienced and highly competent. The senior personnel have sufficient relevant experience and, alongside consultant staff, have been organized to apply that experience adequately to supervise the contractors. Positive results to date include:

1. Obtaining competitive bid prices within allocated budgets for all contracts bid to date;
2. Completing ahead of schedule and under budget Holgate to King Stages 1 and 2 – unspent risk contingency funds from these contracts will soon be available for remaining projects in the program;
3. Selecting a design-build contracting mechanism for the tunnel contract that, in essence, allows completion in the specified time period;
4. Procuring a design-build megaproject within the allocated program dates, keeping to the required schedule and obtaining two competitive bids from shortlisted teams;
5. Achieving the FEIS and ROD approval milestones on schedule; and

² No binding agreement was signed at the time of this ERP report. A Memorandum of Agreement has been signed that outlines the Port's intent to financially contribute to the Project.

6. Maintaining good working relationships with key stakeholders. Stakeholders have told the ERP without exception that WSDOT has been a good partner in the planning and implementation of the Project.

4 FINANCE PLAN

The ERP took a comprehensive view of the AWW Project Finance Plan. The ERP's review of the August 2011 initial financial plan as approved by FHWA for the basis of federal funding provided a reasonable foundation for the panel's review but was not a sufficient base for evaluating the \$3.1 billion program's Finance Plan because:

- a. The 2011 initial financial plan submitted to FHWA was not intended to be a comprehensive plan covering all aspects of the Project. Rather, the 2011 financial plan was intended to meet the specific requirements of the FHWA;
- b. The FHWA specifically acknowledges that it has not independently verified the cost numbers provided to it by WSDOT. The FHWA instead relied on the WSDOT's cost estimates, citing FHWA's prior experience with the WSDOT CEVP process and confirmation of estimates versus actual costs on other federally funded WSDOT projects;
- c. The initial financial plan is already dated and is being updated by WSDOT based on new information;
- d. The initial financial plan addresses in detail only those projects included in the FEIS for the Replacement Project (with an estimated cost of \$2,160,000,000) and provides less detail on other important elements of the overall Project (with an estimated cost of \$990,700,000) including:
 - a. The replacement and realignment of the Alaskan Way surface street;
 - b. The Moving Forward projects; and
 - c. Transit enhancements as identified in the Letter of Agreement between the State, County, and the City dated January 13, 2009.

The ERP's review included current cost estimates, identified funding sources, and the State's relationship to projects where the City or County have responsibilities that may affect the State's Finance Plan.

4.1 Costs

Projected Project costs are described below in **Table 4.1-1**:

Table 4.1-1
Estimated Alaskan Way Viaduct Replacement Program Costs
 (Year of Expenditure, Millions of Dollars)

Project	Amount
Moving Forward	745.7
Central Waterfront	2,010.7
Bored Tunnel	1,656.3
North and South Access	121.7
ROW Acquisition	126.9
Preliminary Engineering	105.7
Other Components	320.0
Surface Street Restoration	290.0
Construction Mitigation	30.0
Program Management	75.0
Total	\$3,151.4

Source: Initial 2011 Financial Plan, Figure 4

The ERP concludes the overall cost estimate of \$3,151,400,000 is still a valid basis for planning. While it may prove necessary to move funds between Project components, the ERP’s confidence in the overall numbers is the result of four findings:

1. The Cost Estimate Validation Process (“CEVP”) is a valid basis for the cost estimates. Cost estimates are based on the WSDOT CEVP, except for cost estimates for the relocation of the Alaskan Way surface street, the demolition of the viaduct, and the decommissioning of the Battery Street Tunnel. The CEVP process involves multiple reviews of estimates, including reviews by outside experts in the field. The CEVP process provides a valid methodology for evaluating the variability of cost and schedule predictions due to risk and opportunities. The process recognizes that changes will occur, but appropriately selects estimates with a 60% probability of success. The ERP views this as a valid basis for estimating megaproject costs.

The CEVP process for the Project has identified key risks and allocated dollars to those risks. Those associated risk dollars are in addition to the contingency fund identified in the Project cost estimate. As risks are retired for the Project, any associated risk dollars not used are transferred into the contingency fund for the Project, which in turn can be used for “unknown unknowns” that may occur including any potential funding shortfalls.

The projects of the program to date, for which WSDOT has been responsible, have been well managed under a unified and competent Project team with components of the overall Project being completed within or under budget and earlier than planned. One key example is the demolition of the south end of the viaduct where stakeholders, different government agencies, and contractors worked collaboratively to complete that section of the overall WSDOT Project under budget and in significantly less time than anticipated.

2. Budget allowances for projects not subjected to the CEVP process are likely sufficient to meet the State’s goals. However, it is noted that key stakeholders may desire a design for the Alaskan Way surface street project that will cost more than the amount allowed by the WSDOT budget.
3. Results to date have been favorable. To date, the program has successfully retired some major risks (through construction of the Holgate to King Projects and after successful bidding of the deep-bored tunnel project) that have enabled funds to be re-allocated to the program-wide unallocated risk contingency fund.
4. No major new risks have been identified that would cause changes in the overall estimate; however, the ERP observes that delays in the schedule remain a significant potential risk to the Project’s overall costs.

4.2 Funding Sources for State Projects

Projected sources of funds for the AWV Project are summarized below in **Table 4.2-1**:

Table 4.2-1
Funding for the Alaskan Way Viaduct Replacement Program
 (Year of Expenditure, Millions of Dollars)

Source	Amount
Federal	483.0
State (non-toll)	1,911.2
Tolling	400.0
Port of Seattle	300.0
Other Local Funds	57.2
Total	\$3,151.4

Source: Initial 2011 Financial Plan, Figure 5

4.2.1 Federal Sources

Staff report that almost half of the anticipated Federal funds have been received and spent. While Congressional action is needed to reauthorize certain sources, the projections appear to be conservative and the ERP has no reason to doubt that the anticipated funds will be received.

4.2.2 State Sources

State non-toll funding is based primarily on MVFT and other transportation-related revenues including weight fees, car rental excise taxes, and sales taxes on motor vehicle sales. Most of the cash that will be used for the Project will come from the sale of bonds primarily secured by the MVFT, including the relatively new taxes authorized by the Legislature in 2003 and 2005.

Bonds backed first by MVFT and second by the State's General Obligation ("GO") pledge have become the customary method of generating State funds for WSDOT capital projects. The recent 520 bond sales added "Triple Pledge" bonds, with the additional security of toll revenues, as a tool for generating State funds.

The Project team sees its role as limited to telling the Treasurer when funds are needed, and in what amount, to meet the Project's cash flows. The Project team considers it to be the responsibility of others to determine how much of the State MVFT-related sources comes from bond sales and how much (if any) comes directly from taxes and other sources without borrowing. The Project team considers it to be the responsibility of the Treasurer to plan and implement bond sales that will provide cash as needed for the Project.

WSDOT staff expresses confidence that State sources will be available as needed. The viability of the AWW Project Finance Plan depends on the success of the State in issuing MVFT and/or Triple Pledge bonds to provide cash when needed for the Project.

For the most recent transportation budget (2012 Supplemental budget), the Governor provided six-year plans that incorporated the November 2011 revenue forecast and the cash flow and project expenditure adjustments that align with the Governor's budget, including the AWW Project. For the major transportation accounts that support highway construction, preservation, maintenance, and operations (Motor Vehicle Account, 2003 Nickel Account, 2005 Transportation Partnership Account, and the Multimodal Transportation Account), the combined ending balances at the end of the six-year period totals a deficit of \$211.4 million. This amount represents 9.2% of total state revenue sources in those accounts (\$211.4m /\$2,301.4m) in the final 2015-17 biennium.

Many sources have noted the need for the Governor and Legislature to address long-term transportation funding. It is assumed by State officials that any shortfalls will affect only the maintenance budget and not debt service on bonds. The new report from the Connecting Washington Task Force suggests several actions that might increase revenue.

The successful and timely receipt of the State funds will require action by several different branches of State government. Recent events have led to reduced expectations for MVFT revenue growth and changing projections for toll revenues (see below) and have therefore increased the need for Legislative attention to a potential funding gap.

Actions will be required by:

1. WSDOT to update capital plans;

2. The Governor and the Legislature to renew budget authority and to approve new bonding and tolling authority for the Project; and
3. The State Treasurer, the State Finance Committee, and the Transportation Commission to adopt debt and toll policies and carry out the successful sale of bonds.

The ERP is advised that much work is underway to support the necessary actions and decisions, including:

1. WSDOT capital plans that show all of the anticipated needs for funds from bond sales for transportation purposes;
2. Updated MVFT projections that reflect current trends related to travel patterns and fuel consumption;
3. Projections of WSDOT operating costs that will reduce the amount of MVFT that is available for debt service;
4. Updated toll revenue projections for the Tunnel:
 - a. The Finance Plan anticipates \$400,000,000 derived from toll revenues for the Project. WSDOT's January 2010 analysis ("Updated Cost and Tolling Summary Report to the Washington State Legislature") provided an affirmative response to the question "Can \$400 million be raised by tolls?" While that estimate may have been the best available, WSDOT and others believe it to be outdated and a new study is underway;
 - b. While sufficient information is not currently available to project toll revenues, the ERP believes there is a potential risk that the projected \$400 million in toll revenue as a funding source will not be realized and will have to be made up of other sources;
 - c. The ERP is advised that new projections are being prepared based upon new information. Some changes might increase toll revenue, but others would likely reduce it (for example, lowered "value of time" might increase diversion). Tolling studies are estimated to be complete by mid-2012 and will incorporate:
 - i. SR 520 tolling information (tolling on SR 520 began on December 29, 2011), which may provide some relevant data, and
 - ii. New assumptions about traffic diversions from the tolled roadway.
5. Policy decisions that will determine the cash for the AWV Project that can be generated from the sale of Triple Pledge (toll) bonds:
 - a. Key policy decisions to be made by the Transportation Commission, with assistance from the Treasurer and Finance Committee, will play an important role in determining how revised toll revenue projections can be used to generate funds for Project capital costs. These decisions will have to be made in light of information about what bond market participants (rating agencies, underwriters, and investors) will require in order to allow toll bonds to be sold at desirable rates. These decisions will include:
 - i. What bond legal covenants will be required for "coverage," that is, the amount of toll revenue expected in excess of debt service costs, with the surplus used to provide a cushion in the event of unanticipated operating costs or reduced traffic levels;

- ii. What additional coverage the State will view as necessary to provide additional assurance to the State and to investors that toll revenues will be sufficient to pay debt service;
 - iii. What additional reserves (for example, debt service reserves, reserves for replacement and major maintenance) will be required to be funded from tolls before toll revenue can be used for debt service; and
 - iv. Whether such reserves should be created and funded now, even if toll bonds are not sold, so the State can be ready to issue toll bonds if future conditions so allow, and to enforce a discipline that will mandate the availability of funding to perform maintenance and upgrade tasks that will allow for the long-term successful operation of the Tunnel.
6. Policy decisions that will determine the availability of cash from the sale of MVFT bonds:
- a. These decisions should include the amounts of “coverage” that the State should use to make sure that bonds that are primarily secured by MVFT bonds do not ever need to be paid from General Fund sources. A coverage policy might say that if \$1 were needed to pay actual debt service, the State would only sell bonds if (for example) projected revenues were at least \$1.25. The coverage policy can protect from the result of unanticipated operating costs that reduce the amount of MVFT revenue available for debt service or the result of an unanticipated failure of MVFT revenues to meet projections. The importance of coverage stems from the fact that, should MVFT revenues for any reason be insufficient to pay debt service, any shortfall must be made up from sources related to the State’s General Fund; and
 - b. Current policy seems to implicitly say that coverage is provided by the MVFT funds used for maintenance. This report is not the right place to consider this policy, but by way of comparison, the assumption that maintenance funding comes last poses major concerns for the long-term, particularly if that policy is applied to the Tunnel.

The ERP notes that work is currently underway by State agencies on many of these topics. The ERP concludes that the Legislature will need to consider all these items when determining how to generate the revenue needed for the successful completion of the AWV Project.

4.2.3 Port Funds

The Finance Plan and all public statements anticipate a contribution to the Project from the Port in the amount of \$300 million. The written basis for this anticipated source is the April 2010 Memorandum of Agreement (“MOA”) between the Port and the State.

There is strong evidence of the Port’s intentions to contribute the funds as described in the MOA, but the MOA is not a legally binding document; therefore, the ERP finds that this contribution is not yet secured.

The Port's intentions are documented in two ways. First, the ERP interviewed Port Staff (including the CEO) and a Port Commissioner (Mr. Tom Albro). These officials provided firm affirmations of the planned contribution. Second, the Port Commission adopted a 2011 budget that does not budget for this obligation but does acknowledge it, and the budget is accompanied by a Business Plan and a Draft Plan of Finance that anticipate a 2016 payment. It identifies a reasonable source of funding for the Port's payment.

There are good and objective reasons for the Port to contribute to the Project. For example, the MOA notes that *"a failure to maintain the Viaduct capacity would result in unacceptable congestion for freight and other traffic within the harbor and industrial areas."*

The ERP does not doubt the Port's intentions; however, the ERP finds that:

1. The 2011 financial plan assumes that the Port's contribution is all in the form of cash, whereas the Port's 2011 Budget Funding Plan says that the \$300 million will be reduced by a *"\$19 million credit for in-kind contributions towards freight mobility projects."* Also, the MOA says that an additional \$6 million may be allocated to non-State projects such as Mercer West. The ERP has been advised that WSDOT has identified additional federal funding to compensate for a \$19 million reduction in cash contribution from the Port;
2. The existing agreement includes contingent language that might provide a basis for the Port to contribute less than the \$300 million;
For example, the MOA says, *"Of critical importance is the ability of the 15th/Elliott and Mercer corridors to provide sufficient capacity for the purposes listed above."* It also says, *"The central waterfront segment from Pine Street to Colman Dock will have two lanes in each direction plus a turning lane; the segment south of Colman Dock will have three lanes in each direction plus a turning lane."*
3. The MOA says Port payments will be made *"to the extent feasible and authorized by the Port Commission"* and that *"the Port will take steps to obtain funding as described herein while retaining at all times the strategic financial capability to meet its overarching public obligations: maintaining current assets, responding to emerging customer or market demands; continuing significant environmental remediation and restoration projects; and maintaining sufficient transportation access in and around its facilities."* This language creates the possibility that the Port will find it has higher priorities in the future than the funding of its contribution to the AWV Project;
4. The plan to receive the Port's funds at the end of the Project creates an additional risk, if only because the Port's commitment as it currently stands can be changed by future Port Commissions; and
5. The MOA says that authorization will be requested *"from the Port Commission for a portion of the Port's contribution to AWV Project as early as possible in 2010,"* but the ERP is unaware that such a request was made.

The ERP recommends that WSDOT and the Port continue their negotiations and diligently work together to formalize a binding agreement no later than their mutually anticipated date of June 2012, which

demonstrates the Port's ability to make the planned contribution in the amounts and on the schedule required for the AWV Project.

4.3 King County Projects

King County's role in the Project is to implement transit improvements that will respond to the short-term impacts of the Project and to contribute to the long-term ability of the Project to meet its goals for moving people and freight. There are no financial contributions from King County to the AWV Project.

The State has successfully met its commitment to King County to provide funds for the short-term transit enhancements. The AWV Project budget includes approximately \$32 million for construction mitigation for the King County South Holgate Street to South King Street Project for increased transit service, transit travel time monitoring, and demand management systems. Approximately \$8.6 million of the construction mitigation fund has been paid to date, which, according to King County executives, has had a positive impact on transit mobility. However, this construction mitigation funding ends in 2014.

King County has not yet obtained a funding source for longer-term transit enhancements to enable the Project to meet all of its goals for moving people and freight. The January 13, 2009, LOA ties the County's long-term transit enhancements to a new countywide 1% Motor Vehicle Excise Tax to be imposed by the King County Council.

The Governor and Legislature have yet to adopt legislation needed to authorize such a tax.

4.4 City of Seattle Projects

Projects related to the replacement of the viaduct include certain projects that are the responsibility of the City of Seattle. Related City projects include:

- Elliott Bay Seawall Project
- Mercer East
- Mercer West and Parking Program
- South Spokane Street Viaduct Widening Project
- Waterfront Redevelopment Project
- Public Utility Relocation

The State has committed \$290 million of funding for projects not related to the deep-bored tunnel portion of the program, including the demolition of the viaduct, the decommissioning of the Battery Street tunnel, and the relocation of the Alaskan Way surface street. The City has taken the lead in the design of the Alaskan Way surface street relocation/replacement with the conceptual design being well underway. The City and the State are currently in discussions regarding how their respective future roles and responsibilities will be defined regarding the Alaskan Way surface street replacement. The ERP

recommends that the State continue these discussions about the Alaskan Way surface street, memorialize its understanding with the City in a written binding agreement, and monitor the City's progress in carrying out the Seawall Replacement and the Mercer West projects.

The City's progress on these projects is of interest to the State because:

- The public may not differentiate these roles in their ultimate evaluation of the State's completion of its Project; and
- The successful completion of the State's Project is in many ways dependent on the City's timely completion of related projects.

4.4.1 Mercer West

The successful completion of this City project will impact the achievement of the freight and traffic mobility goals expected by the Port, major stakeholders, and the public at large. City officials are confident that funds are available for the project, but stakeholders are concerned that important decisions still need to be made about project design and take special interest in the connection between West Mercer and Elliot Avenue West.

4.4.2 Seawall Replacement

The State's primary concern must be that the replacement of relevant portions of the seawall take place prior to the State's relocation of the Alaskan Way surface street and the demolition of the viaduct. While the ERP has heard conflicting opinions as to whether the surface street project can take place prior to seawall replacement, it seems only prudent that the seawall come first so as to assure the integrity of the surface street and the properties that it serves.

The City is working on a financing plan for the Seawall Replacement project. It is anticipated that project funding will come from a combination of assessments on benefitting property owners (the Local Improvement District, or "LID") and a citywide property tax authorization that must be approved by voters.

The State's plan for the Project anticipates that the surface street project will be constructed in 2016. Completion of the Seawall Project prior to that date is said to require voter approval at an election no later than the spring of 2013. The ERP notes that timely completion of the seawall will require City officials to make a variety of decisions in a timely manner, and the implementation of those decisions will require close coordination between several City agencies.

The City's plans for funding seawall improvements are not complete and face potential challenges in their implementation. Among these issues are the following:

- The City has yet to decide whether to combine the Waterfront Redevelopment Project and the Seawall Project in its planned ballot proposition authorizing new funds;

- It is expected that a LID will allow benefiting property owners to pay for a significant portion of the costs of the Seawall and/or Waterfront Redevelopment. Key stakeholders believe that the LID's contribution must be known before voters can approve new property taxes. However, state law and good process indicate that the implementation of the proposed LID will require substantial lead-time before funds are available. The City is early in its preparation for the LID, and it is not clear that the LID can be formed and the assessment roll certified in time to inform a potential spring 2013 election;
- While some property owners and their representatives have expressed their likely support for the LID, they also report that at this time they have received no communication about timing, amount, basis for assessment, appeal process, and related matters that will affect the eventual implementation of the LID and financing; and
- Voter approval of new property tax funds for the Seawall Project may not be obtained or may be delayed.

Property owners affected by the LID and/or the likely taxes resulting from a ballot measure may be asked to consider other cost measures in the same time frame, including a proposed Library tax, a County levy for the Youth Services Center, the extension of the County's levy for the Automated Finger Print system, and proposed extensions of Business Improvement Districts in Pioneer Square and Seattle's Downtown.

5 RISK MANAGEMENT PLAN

Risk is defined as the result of an uncertain event or condition that, if it occurs, has a consequence. (The consequence can be negative or positive. Positive outcomes are usually called "opportunities.") Risk is quantified as the combination of the probability of an event and the resulting consequence.

An appropriate risk evaluation process, such as that used by WSDOT, contains the following general steps:

- First, identify the risk elements – those risk events that could occur;
- Second, quantify (characterize) each of the risk elements identified in a matrix that establishes both probability of occurrence and the level of impact (that is, time and/or money or other attribute – for example, safety) should that risk element occur;
- Third, take those treatment actions necessary (avoid, mitigate, transfer, or accept) to manage the impact of the risk element on the project;
- Fourth, monitor the project to ascertain if and when a particular risk element has occurred and the planned control actions that have been taken; and
- Fifth, report how effectively the organization was at minimizing, mitigating, or controlling risks encountered over a defined period of time.

Management of risk – both the occurrence and the impact of risk – is a basic requirement for control of cost and schedule on a megaproject such as the AWV Project. The ERP concludes that risk management

is given a high priority by all parties involved in the AWV Project. The contractors have significant commercial and reputational risk associated with successful completion of their projects; stakeholders have commercial risks associated with minimizing impacts to surrounding businesses, transportation corridors, and residences in the project vicinity; funding agencies and legislators have commercial and political risks associated with successful completion of the program; and WSDOT has the overall responsibility for successful completion of the AWV Project and therefore carries not only commercial risk but also the most significant political and reputational risk tied to overall Project success.

A risk register is used to list and track the identified risks, their characteristics and quantification, risk mitigation actions, and status. WSDOT has specific risk management guidelines which identify the contents of risk registers for WSDOT projects.

The ERP finds that these guidelines appropriately identify the contents of a risk register and that the WSDOT Project team is successfully following these guidelines in its management of risks.

In reviewing the sufficiency of the risk management processes for the AWV Project, the tunnel contract was used as a primary example of how risk will be managed because the potential exposure to risk is highest within this project. Three aspects of management of risk were examined most closely:

1. The contractual tools that exist to facilitate management of risk;
2. The risk management plans and processes described and proposed by both WSDOT and STP; and
3. The execution of those plans to this point of the AWV Project.

These discussions will present observations and findings, followed by conclusions and, where appropriate, recommendations for consideration.

5.1 Review of Contractual Cost and Risk Management Tools

WSDOT has one of the best risk management programs of any state for major infrastructure projects. The planning, design, bidding, and risk allocation processes are proven and successful in delivering major projects within the planned budget and schedule. The ERP finds that the AWV Project risk management processes are adequate to manage this megaproject successfully.

The Contract Documents for the design-build contract of the deep-bored tunnel component of the AWV Project were provided to the ERP and have been reviewed.

The first measure of the quality and fairness of risk allocation in a contract is provided by the marketplace. Are the contractors willing to bid, and how do they perceive the risks they will take in bidding the work? The number and competitiveness of contractors' bids is a good test of contract fairness. The ERP finds that acceptable and competitive bid prices have been received for the following contracts indicating that WSDOT contracts are considered fair and reasonable:

1. Holgate to King – Stage 2

2. Holgate to King – Stage 3
3. South Access Contract
4. Tunnel Design-Build Contract

One major WSDOT procurement remains that is directly connected to the deep-bored tunnel infrastructure – the North Access Contract. Based on past experience of the AWV Project, it is reasonable to anticipate that this bid will be equally competitive and that the cost estimate is reliable and is a reasonable reflection of the actual costs. Other adjacent contracts remain to be let for bid by the City, notably the Seawall Replacement and West Mercer Street. Diligent review of these contracts must be carried out to make sure that reasonable cost estimates with fair contracts and consistent and clear contract documents are provided for bidding.

Focusing on the deep-bored design-build tunnel contract, there are several ways that costs have been tracked throughout the design/planning and construction phases. Tools that have been used include:

- Change/trend management process – This process provides an early warning and tracking tool for issues arising that could impact cost and schedule. The process is managed at the point of implementation by individual project and task managers. The process is reviewed by the line management within the Project team. Areas of continued attention for this process include:
 - The format and approach of this process should be standardized with the RMP – there are differences in risk identification format;
 - Provision should be made for regular third party review of the change management process – the current process relies on the task manager to identify potential issues arising; and
 - The format of the risk register should be less aspirational – the current format not only identifies an issue but also its solution (before it is implemented) when describing the resulting exposure. Additional emphasis on the current level of exposure and a detailed risk mitigation plan for each identified risk would help the user of the risk register to continue to manage risk effectively.
- Contractual Allocations, risk funds, and contingency amounts and timing of their activation – There are several allowances that are payable to the contractor in addition to the bid price. Also, there are available contingency funds that have been placed in the contract to account for and to share the commercial consequences of risk events that occur during construction. These funds are shown in **Table 5.1-1**.

**Table 5.1-1
Design-Build Tunnel Risk Allocation Summary**

Name of Allocation, Fund, or Amount	Amount	Comments
Insurance and Bonding Fund	\$100M	Contractual Allocation: Provided to Contractor to defer insurance payments. Whatever is not spent will be given to the Contractor upon project substantial completion.
Escalation Fund	\$110M	Contractual Allocation: Provided to the Contractor during the contract on the basis of percent complete.
South End Open Cut Section	\$50M	Contractual Allocation: Scope moved from South Access Contract into Tunnel Contract. Paid as work at South end is completed.
Schedule Incentive	\$25M	Paid if proposed schedule is met. Erodes as completion becomes progressively delayed.
Port of Seattle Lease for Pier/Terminal 46	\$20M	Contractual Allocation: Expenditure for the Contractor's staging area. To be paid directly from WSDOT to the Port during the project term.
Differing Site Condition and Unanticipated Intervention Risk Contingency (DSC Fund)	\$40M	Risk Fund: Paid if any intervention is required over the 1440 hours included in the bid. Also, provides the contingency fund to mitigate impact of any differing site condition during tunneling.
Deformation Mitigation and Repair Risk Contingency (DMR Fund)	\$20M	Risk Fund: Provides mitigation fund under certain circumstances for unanticipated deformation of structures or utilities due to tunneling.
Unallocated Risk Contingency for Tunnel Contract	\$100M	Contingency Amount: Unallocated reserve held by WSDOT to cover risk on the tunnel project. This does not appear in the contract.
Program-wide Unallocated Risk Contingency	\$4M	Contingency amount: Held by WSDOT as a program reserve but available to tunnel contract if required.

The total contingency allowance for risk items (including DSC Fund, DMR Fund, and both unallocated risk contingencies from the table above) is \$164 million, which is approximately 12% of the overall budget of \$1.35 billion. Withholding 12% in risk contingency is a reasonably prudent practice for this type of complex project and it is not unreasonable to assume that the program-wide risk contingency amount will increase as the Holgate to King Project proceeds successfully and as mitigated risks are retired.

- Geotechnical Baseline Report (“GBR”) – The baselines defined in this report provide the basis for differing site conditions (“DSC”), for example, that actual below-ground conditions differ from that what was expected at the time of bidding. The GBR will be scrutinized in great detail by both parties if there are unanticipated issues with tunnel construction. It is important to note that while a DSC is triggered by considerations in the GBR, a successful claim must also prove that there was an impact to construction, which the contractor had relied on information provided to bidders, and other factors.

- Miscellaneous other risk management tools – There are several clauses in the design-build contract where risks have been identified and either shared or allocated clearly. Such items in the contract include: insurance provisions, bonding requirements, utility relocation agreements, and liquidated damages on schedule. These measures are considered prudent and good contract practice for a megaproject.

5.2 Review of Deep-Bored Tunnel Project Risk Management Plan

The International Tunnel Insurance Group (“ITIG”) published a Code of Practice for Risk Management of Tunnel Projects (the “Code”) in 2006. The Code has become the industry standard for risk management and is referenced in the contract. Given the magnitude and urban location of the Project, the ERP finds that it was prudent for WSDOT to require adherence to this Code. In accordance with the Code, both WSDOT and STP have established an RMP that has been issued and revised periodically since the beginning of construction.

The responsibility for overall management of AWV Project risk lies with WSDOT. STP manages their risk as a subset of the overall program. Even where commercial risk has been allocated to STP, there is the potential for significant political, financial, and reputational risk for WSDOT in all areas of the design-build contract. For this reason, it is important that WSDOT continues to be proactive in leading the program-wide risk management process throughout design and construction. This leadership also has the associated advantage of providing consistency of approach to the management of risk.

1. For management and oversight to be effective, it is important for organization charts shown in the RMP to reflect the functional organization of risk management reporting on the project. The RMP organization charts should be modified to reflect the actual structure of risk management within the team:
 - a. The STP organization chart as it appears in the RMP is oversimplified. However, it is noted that the named personnel involved in managing risk clearly understand their role and responsibilities; and
 - b. After discussion with the WSDOT project team, it is clear that roles and responsibilities for risk management are understood by the leadership and the participants. However, the organization chart in the RMP does not reflect this clarity.
2. The STP risk identification format and rating quantification is not consistent with the program risk register and WSDOT format. The ERP recommended to both WSDOT and STP to change the STP format and rating quantification to match the WSDOT format.

Comparing the two plans, it is clear that there are some differences between their details. The ERP’s comments are intended to standardize the approach across the program in a constructive way.

The risk management plans of all parties should be standardized and not only aligned with industry standards but also aligned with each other. This will have several advantages, including:

1. The ability to easily cross-correlate the risk identifications and ratings;

2. The ability to rank the risks by magnitude across the project without any fear that a different rating system has been used that might bias this assessment;
3. Allowing for easier review and audit of the various project risk registers; and
4. Allowing for easier assessment and rating new risks with everybody using the same system for ratings.

Because the responsibility for overall management of AWV Project risk lies with WSDOT, it is recommended that the Project team consider eliminating the differences between the RMPs through adjustments to the STP RMP. It is noted that Revision 5 of STP's RMP considers the comments provided and has made changes to standardize the approach to rating and mapping risk in the risk registers.

5.3 Execution of the Risk Management Plan

The ITIG Code of Practice emphasizes that the presence of experienced practitioners on the team is an important factor in mitigation and management of project risk. After a review of resumes of the AWV Project risk management team, the ERP concludes that the Project team is experienced in major transportation projects and has been supplemented by technically experienced personnel in major urban tunnel projects.

While a tunnel of this diameter in an urban environment is not common and a TBM of this diameter is without precedent, there are team members representing both the contractor and owner who have significantly similar and relevant experience. In addition, prior to accepting the technical feasibility of the project, extensive interviews were carried out with TBM manufacturers to ascertain their capabilities and research their opinions on the project. Once it was established that this diameter was within their range of research for expansion of established technology, the Project team allowed the project to go forward. It is therefore not unreasonable to conclude that the deep-bored tunnel project can be completed successfully.

Communication of the risks between the various parties is of great importance if mitigation and Project progress is to proceed efficiently. Good communication protocols have been set up by the RMP and are being carried out between STP and WSDOT. Any issues with communication have, at least in part, been mitigated by assignment of people of equivalent stature from each team. These are the people that communicate directly on a daily basis, and any risk matters that arise can be addressed promptly through this familiarity to the benefit of the AWV Project as a whole.

Successful execution of the RMP depends on strict adherence to the RMP with constant attention to the progress of the Project in order to monitor and provide feedback on the Plan to ensure that it is still relevant. The essence of risk management is to use an established process to closely monitor each identified risk. The intent of this process is to minimize the likelihood of occurrence of each risk and to mitigate as much as possible the impact of those risks that do occur. Prudent management of risk requires the Project team to continue monitoring that:

- All Project team members know what the Project risks are;

- All Project team members be empowered to identify new risks and suggest mitigation actions;
- All front line supervision be aware of the required mitigations and implement them within their teams;
- The risk management team update risk registers at appropriate intervals and oversee implementation of mitigation plans; and
- All senior management is aware of the current status of major Project risks and mitigation measures.

The primary tool for risk identification, assessment, and management is the Project risk register. Risk registers for the tunnel portion of the AWW Project have been reviewed and the ERP has the following observations:

1. Basic major categories of construction risk, for example, TBM performance issues, have been appropriately identified for each project, exceeding settlement criteria;
2. Risk identification is conventionally more detailed for the construction phase; a typical risk register for a large project consists of over 200 risks compared to 113 for the AWW Project and only 73 for the tunnel project. A lack of definition in identification of risk can lead to a lack of clarity regarding the required mitigation actions and can negatively impact the ability to assess and audit the impact of these actions;
3. Overall dollar exposure as stated in the various project risk registers appears to be assessed somewhat optimistically. For example, the tunnel contractor's risk register shows \$44 million in current risk exposure with no additional mitigation, which appears to the ERP to be low for this early stage of the project (particularly considering the size of contingency funds available). Their assessment of \$13 million in risk exposure after mitigation also appears to be low;
4. The risk mitigation process appears to be aspirational in that risk exposures are defined and potential costs quantified as if mitigating actions have already been carried out. Emphasis on the current level of exposure would assist those using the risk registers to continue to manage risk effectively;
5. Single entries on a consolidated single Project risk register are strongly recommended. For example, the risk of exceeding the differing site condition fund amount appears separately on both WSDOT and STP risk registers but with different dollar and schedule impacts. A consolidated risk register can designate primary responsibility for risks (with a minor change in format) in order to clarify responsibility and the single entry promotes working together to mitigate project risks – to the ultimate benefit of the project; and
6. The connection of remaining exposure to the relevant contingency fund is not clear in project documentation or summaries reviewed. During construction, it would help the team to know the remaining dollars in each allocated fund alongside the remaining level of exposure for each fund.

Contingency planning actions are not clear for high consequence risks. It is common for each risk of very high consequence (and perhaps selected risks of high consequence) to have detailed written contingency plans of what should be done if these risks manifest. Details such as who to call and what

steps are required immediately to reduce and mitigate impacts would be contained in these plans. The risk of settlement damage due to tunneling is a good example of an instance in which a written contingency plan is important to mitigate potential impacts.

One significant risk that has been identified on the risk register concerns structural renovation and prevention of tunneling construction impact to the Western Building located in Pioneer Square. This is particularly significant because the status of the Western Building has evolved since the bid was awarded. The decision to repair the structure and maintain the Western Building in place while tunneling beneath it has created one of the most significant single risks on the Project for all parties. WSDOT has expended significant efforts in identifying the remediation actions to be undertaken and STP and WSDOT have worked cooperatively together to minimize the risks associated with the Western Building. The ERP has identified risks to both WSDOT and STP. The risk is primarily reputational for WSDOT as undercrossing this building is one of the earliest actions for tunneling through the heart of the City. For the same reason, this is a test for the tunneling systems of STP, as well as a significant financial risk for the design-build tunnel project.

The current understanding of the Western Building as it pertains to the design-build tunnel contract is as follows:

1. For bidding purposes, the design-build contractor assumed that the Western Building was removed and would not be present during tunneling;
2. Soon after bidding, WSDOT and other agencies completed negotiations that meant that the Western Building was to be maintained in place;
3. The Western Building thus falls into the Contractual category of a Group B structure (at risk of damage subject to the designation of the Contractor);
4. WSDOT has asserted that any money spent on the Western Building would be sourced from the Deformation Mitigation and Repair ("DMR") Fund; and
5. Clause 5.9.3.1 of the Contract states that the *"Design Builder will be entitled to reimbursement from the Deformation, Mitigation and Repair Fund for its direct costs of advance deformation mitigation measures for Group B structures that are not identified in the Contract Documents."* This clause applies to the Western Building.

The ERP finds it prudent to conclude that stabilization work carried out on the Western Building will be taken from the DMR fund. It should be noted, however, that verbal discussions with STP led the ERP to conclude that there may be some additional discussion necessary on this issue. In short, STP is of the opinion that a building not considered in the bid must be considered a changed condition and not resolved using the DMR fund.

The ERP recommends that the Project team clarify this issue with STP to resolve this apparent misunderstanding at the earliest opportunity and certainly ahead of the start of construction mitigation work on the structure.

6 CONCLUDING OBSERVATIONS

The Project is moving ahead as planned, on schedule and budget, and the ERP is confident that based on the course of action to date, the Project has the ability to be successfully completed. For reasons we explain in our report, key assumptions for the Project schedule, risk identification and management, and cost estimates are reasonable, but can be further strengthened with improvements to the risk management plans as noted herein. The ERP also finds the Finance Plan can be feasible and viable when the identified funding sources are secured.

The ERP's recommendations have been developed to enable the Governor and Legislature to take action as deemed necessary in order to allow the Project to continue to move forward efficiently, while at the same time increasing the opportunity for the Project to achieve its goals as envisioned by all who will benefit from the AWV Project at the local, regional, and state levels. Because of the number of significant action items and identified potential risks forecasted to be retired over the next six months, the ERP strongly recommends the Governor and Legislature consider a semi-annual ERP update on these action items and retired risks in addition to the more detailed annual reviews contemplated in the ERP's charge.

APPENDIX A

ERP Biographies



Dr. Patricia D. Galloway serves as an advisor to the energy and infrastructure industries regarding corporate governance, risk management, contracting/delivery, industry best practices, program/project management, standard of care, and project controls on complex megaprojects worldwide. She also serves as a member of the U.S. National Science Board, appointed by President Bush with Senate confirmation in 2006 for a six-year term, and served as its Vice Chair from 2008-2010. She is a mediator and an international arbitrator and is a member of the Board of Directors of the American Arbitration Association (AAA). She is also the Chair of the AAA National Construction Dispute Resolution Committee.

Pat received her Bachelor's degree in civil engineering from Purdue University in 1978 with majors in both structures and construction management, a Masters in Business Administration (MBA), Magna cum Laude from the New York Institute of Technology in 1984, a PhD in Infrastructure Systems (Civil) Engineering from the Kochi University of Technology in Japan in 2005, and an Honorary Doctorate of Science from the South Dakota School of Mines in 2011. With over 32 years of experience globally, she is a Registered Professional Engineer in 14 US States, Manitoba, Canada and Australia. Dr. Galloway is a Certified Project Management Professional (PMP) by the Project Management Institute (PMI), a Certified Forensic Claims Consultant by the Association for the Advancement of Cost Engineering International (AACEI), and holds a certificate of Director Education by the National Association of Corporate Directors and has served on a number of private and non-profit boards.

She has served as an advisor to multiple owner and contractor clients including board audit and compliance committees and has served as a member of various risk management assessment and independent review panels (IRP), including her current Chair appointment by the Legislature and Governor of the State of Washington for the Expert Review Panel on the Alaskan Way Viaduct Replacement Project and both the Governors of Washington and Oregon to the IRP for the Columbia River Crossing Project. She serves on the Eastern Washington Governor's Business Advisory Council and the Discovery Science Channel's Board of Advisors. She is a member of the NY Institute of Technology Engineering Dean's Advisory Council and has also served on the Purdue University Engineering Dean's Advisory Council. Dr. Galloway has been recognized by her peers and is an elected member to the National Academy of Construction, the Pan American Academy of Engineering, and the position of Fellow in several professional organizations.

In 2004, Pat served as the first woman President of the American Society of Civil Engineers (ASCE).

Books/Technical Papers and Presentations (Partial)

Dr. Galloway is a prolific writer and world renowned speaker having authored one book, written the foreword to several other books including:

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- "Engineering in Government and Public Policy," Section 4.5.3, UNESCO Report, Engineering: Issues, Challenges and Opportunities for Development, United Nations, UNESCO Publishing, 2010 Paris, France

DR. PATRICIA D. GALLOWAY

- Foreward to Kusayanagi, S.; Niraula, R.; and Hirota, Y., *Principles and Practice of International Construction Project Management*, EIKO-SHA, Tokyo, Japan, 2009
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- “Anticipating Problems: Project Risk Assessment and Project Risk Management,” co-authored with K. Nielsen, Chapter 6, *Collaboration Management, New Project and Partnering Techniques*, edited by H. Schaughnessy, John Wiley & Sons 1994

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- Curiosity Project, Discovery Channel, Screening in 2011
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- *Federal Technology Watch*, “Interview with National Science Board Vice Chair,” January 26, 2009
- “Building a Better Role Model,” Continental Airline's *In-Flight Magazine*, November 2005 Issue
- Bad Idea. You'll Flunk Out. *Time Magazine*, Science Section, First Person: Pat Galloway, Authored by Deirdre Van Dyk, March 7, 2005 Issue
- America's Infrastructure, Live Media Radio and Television appearances in over 25 cities across the United States, October 2004
- *Engineering Marvels-Seven Modern Engineering Wonders of the World*, Co-host to ABC / Discovery Channel Television Series, April, 2004

She has authored over 120 papers, 30 peer-reviewed journal articles and nearly 200 public speaking (including over 45 keynote addresses), engagements

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- Pan American Academy of Engineering, 2006
- Key Women in Energy-Global Awards, Energy Leaders Council, 2005
- National Academy of Construction, 2005
- Professional Leadership Award, National Professional Women in Construction, 1995
- Purdue University Distinguished Engineering Alumni Award, 1991
- Mercer County Engineer of the Year Award, 1990
- Somerset County's Outstanding Women in Business and Industry, October 1987
- Engineering News Record, “Top Women in Construction,” October 1986

ROBERT J. F. GOODFELLOW, CEng, P.E.

Education

Imperial College, London
University: B.S., ACGI Civil
Engineering, 1991
Imperial College, London
University: M.S., DIC
Engineering Rock Mechanics,
1993

Professional Registration

PE – Virginia, New York, Maryland,
Ohio, and Washington, DC
UK Chartered Engineer

Total Years Experience:

20

Professional Appointments and Associations

American Underground
Construction Association (UCA
of SME) – Executive Committee
Member
American Underground
Construction Association (UCA
of SME) – Chair of Task Force to
improve state of the practice
when using concrete in
underground application
Transportation Research Board
(TRB) - Tunnel and
Underground Construction
Committee Member
TRB - Past Chair of Sub-
Committee on Tunnel
Rehabilitation; Session Chair
(2005, 2008)
North American Tunneling
Conference (NAT) – Organizing
Committee (2004), Session
Chair (2006)
Rapid Excavation and Tunnel
Conference (RETC) – Session
Chair (2005 and 2009)

Mr. Robert Goodfellow has extensive management experience with regionally based tunneling and underground practice. Experience focused on risk management and technologies of tunneling and underground structures. Projects include design and construction of transportation and water systems in New York, Chicago, Washington, Boston, Seattle, Cincinnati, Cleveland, San Juan, Los Angeles, London, Copenhagen and Hong Kong.

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Mr. Goodfellow's Construction management experience includes authority on site safety issues, signatory authority for contractor's quality control and an advisory role on contractor's proposed means and methods.

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RISK MANAGEMENT ASSIGNMENTS

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Pipeline #6 South Reach Tunnel (Mount Olympus Tunnel), San Diego, CA

Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register for feasibility and alignment selection study. Tunnel is proposed and is 32,000 feet long and 12 feet in diameter with a construction value of over \$200M.

Niagara Falls Tunnel; Sir Adam Beck Hydro-Electric Station Tunnel #3, Niagara Falls, Canada

Project Risk Consultant – responsible for generation of project risk register for this 26,000 foot long and 42 foot diameter rock tunnel up to 260 feet deep. Organized and facilitated four workshops with Owner and project design staff. Produced detailed risk register and performed both qualitative analysis to facilitate future use as a project management tool and also performed quantitative probabilistic analysis to allow the Owner to view a distribution of possible contingencies for both cost and schedule for this \$550M project.

King County Regional Water and Sewer Program (RWSP) Program Management Contract, Seattle, WA

Risk Management Expert - Approved by client as a national expert in geotechnical risk management to review and comment upon the guidelines for Geotechnical Baseline Report writing for individual contract designers as part of the \$2.5Bn program.

ROBERT J. F. GOODFELLOW, CEng, P.E.

East Side Access Project, Long Island Railroad Extension, New York City

Design Review - Member of 5-person, international and independent project design review panel. Responsible for review and comment on contractual and risk aspects of Manhattan and Queens tunnels for this \$8.5bn transit project.

Olentangy Augmentation Relief Sewer (OARS), Columbus, OH

Risk Professional, responsible for workshops and creation/auditing of project risk register. Member of Value Engineering Panel to determine appropriate phasing and construction method for 24,000 feet of 18 foot diameter CSO tunnel valued at \$400M.

River Mountains Tunnel No. 3, SCOP, Las Vegas, NV

Project QA Review Panel for contractual and risk aspects of this \$750M Program, including: 38,000 foot long and 10 foot diameter rock tunnel, as well as adjoining 11,000 foot long soft ground tunnel and feasibility assessment of underground hydro-electric facility, including powerhouse cavern.

Catskill Aqueduct Pressurization Project, New York City, NY

Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register. Compliance with New York City DEP Project Delivery Manual requirements and quantitative assessment of impact of risk to project budget and schedule for three contracts totaling an estimated \$400M in construction cost.

Spring Fishburne Stormwater Drainage Tunnel, Charleston, SC

Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register for this 12-foot diameter, 2 1/2 miles long deep level storm water storage tunnel and shaft structure with a construction value of \$140M. Continued with audits and management of risk advice throughout design phase of project.

OTHER TUNNELS EXPERIENCE

McCook Haul Tunnels, Metropolitan Water and Reclamation District (MWRD), Chicago, IL

Task Manager - Responsible for the analysis and design coordination for two NATM rock tunnels in limestone and shale connecting an existing quarry with a new facility. Tunnels have a span of 31-feet and approximate length of 2700-feet each. Other aspects include an underground cavern for equipment, a raise-bore shaft and quarry highwall stabilization.

Jubilee Line Metro Extension – London Bridge Station, London

Lead Engineer - Managed and programmed design work. Production of design calculations using computer models. Responsible for design of all shotcrete and reinforced concrete tunnel and shaft linings, including connections to other contracts and junctions of three and four openings. Also produced a proposal, including design calculations, for permanent steel fiber reinforced shotcrete linings. Produced design calculations for the three-tunnel configuration of London Bridge Station using Finite Element analysis.

Lead Design Engineer, East London Metro Line – Brunel Tunnel Refurbishment, London.

Produced Finite element Analysis of twin tunnels under the River Thames, including transfer of information to design team. Also produced design

ROBERT J. F. GOODFELLOW, CEng, P.E.

calculations for the main tunnel shell and coordinated design calculation production for cross passages, and railway track slab.

Supervisor, East London Metro Line – Brunel Tunnel – Flood Mitigation Refurbishment, London.

Supervised construction including safety and stability of the tunnel structure during brickwork removal and concrete/shotcrete relining. Supervised all construction activity, including PVC waterproofing. Designed and interpreted tunnel instrumentation and real-time monitoring.

Senior Design Engineer, Boston Central Artery Highway Tunnel (Contract C19E1) Massachusetts.

Managed the analysis and design of three highway tunnel access ramps using two-dimensional and three-dimensional finite element analysis. Model includes complexities of excavation sequence, dewatering, spiling and jet grout column walls within tight settlement criteria, in difficult ground and under an active railway station.

Project Manager, Rio Piedras Station - San Juan Metro, Puerto Rico

Responsible for financial aspects and technical support to site personnel for geotechnical issues in this design build project, as well as Liaison with our client (KKZ/CMA) and the owner (Tren Urbano).

Kensico to City Water Tunnel, New York City, NY

Geotechnical and Tunnel Task Manager – Responsible for all underground and geotechnical aspects of the planning and alignment study for this 15 mile long, 24 foot diameter and up to 700 foot deep rock tunnel. Innovations include the use of field data loggers during the investigation and probabilistic cost and geotechnical modeling.

Studies undertaken and supervised include: Tunnel lining requirements, pressure tunnel depth requirements, rock mass characterization and temporary support, the use of risk registers in underground design and construction and geotechnical investigation and testing requirements for long and deep tunnels.

Bi-County Water Main Tunnel, Rockville, MD

Technical Principal – responsible for technical review and oversight of project team during design of this 29,000 foot long 7-foot diameter rock tunnel up to 250 deep with an internal pressure of 175 psi. Complexities include geotechnical conditions that include Piedmont residual profile and intrusions of quartzite and igneous rocks and the urban environment along the alignment. The project features a detailed study of preferred carrier pipe material and also production of a project risk register for design.

PUBLICATIONS

McKelvey, J.G., Goodfellow, R.J.F. and Hirner, C., 2008. *This is Where the Money is! The Impact of Contract Front End Documents on Tunneling Projects.* Proceedings North American Tunneling, 2008, San Francisco.

Oksuz, F., Goodfellow, R.J.F. and Mueller, C.G., 2008. *The Owner's Manual on How to Cut and Serve the Pie - Contracting and Contract Packaging Strategies for Large Engineering and Construction Projects.* Proceedings North American Tunneling, 2008, San Francisco.

ROBERT J. F. GOODFELLOW, CEng, P.E.

Goodfellow, R.J.F. and McKelvey, J.G., 2007. *Impact of the Risk Management Codes of Practice on Major Tunnel Programs in the US*. Proceedings WEFTEC, 2007, San Diego.

Goodfellow, R.J.F., 2007. *Risk Management for Underground Conveyance Design and Construction – State of the Practice Review*. Chesapeake WEF Conference, Ocean City, MD.

Goodfellow, R.J.F. and Mellors, T.W., 2007. *Cracking the Code – Assessing Implementation in the United States of the Codes of Practice for Risk Management of Tunnel Works*. Proceedings RETC 2007, Toronto.

Goodfellow, R.J.F. and Mellors, T.W., 2007. *Project Application of the Codes of Practice for Risk Management*. George Fox Conference, New York City (Invited Presentation).

Younis, M.A. and Goodfellow, R.J.F., 2006. *Soft ground tunnel displacement due to foundation excavation – a case history of the federal DOT building in Washington DC*. Proceedings NAT 2006, Chicago.

Goodfellow, R. J. F. and Sherman, S., 2006. *Risk Assessment and Analysis of Underground Work*. Proceedings NAT 2006, Chicago.

Clarke, K., Cole, E., Meakin, W. A. T. and Goodfellow, R. J. F., 2005. *The Kensico-City Tunnel for New York City Water Supply*. Proceedings RETC 2005, Seattle.

Younis, M.A. and Goodfellow, R.J.F., 2003. *The Design and Construction of Multiple Closely Spaced Tunnels in Soft Ground – A Case History of the MAC Storm Tunnel Project*. Proceedings RETC 2003, New Orleans.

Goodfellow, R. J. F. and Piepenburg, M., 2002. *Tunneling Beneath Railway Tracks – Performance Criteria for Design and Construction*. Proceedings NAT 2002, Seattle.

Goodfellow, R. J. F. and Claassen, M. D., 2000. *Design and Construction Components of Tunnel Rehabilitation*. Proceedings NAT 2000, Boston.

Goodfellow, R. J. F. and Groves, P. N., 2000. *Stiffness of Shotcrete Tunnel Linings - Considerations for Design and Construction*. Proceedings Geong 2000, Melbourne Australia, 2000.

Conway, J. J. and Goodfellow, R. J. F., 1996. *The Potential Application of Risk Analysis to UK Highway Tunnel Projects*. Unpublished Report, Transport Research Laboratory (TRL).

John M. Rose. Mr. Rose is currently associated with The Leora Consulting Group providing financial consulting services to local governments, non-profits, and private companies. He is also a founder and Director of Practical Steam, an early-stage firm developing a modern steam engine with many potential commercial applications. He is a member of the Board of Manzanita Capital, the parent firm of Seattle brokerage McAdams Wright Ragen.

Mr. Rose retired from Seattle-Northwest Securities Corporation in 2006 where he served as President, CEO, Manager of the Public Finance Department, and a member of the Board of Directors. Seattle-Northwest was the largest underwriter of municipal bonds in the Pacific Northwest. Mr. Rose's public finance practice included clients such as the cities of Seattle, Spokane, Tacoma and Yakima, and many Washington school districts.

Prior to his career at Seattle-Northwest Mr. Rose held several positions in King County government, including serving as Budget Director. He is active in community affairs, recently serving as Mayor of the Town of Beaux Arts Village and as chair of King County's Investment Pool Advisory Panel. He is a member of the Board of The Nature Conservancy of Washington and of the Board of the College Spark Foundation. Mr. Rose is a graduate of Princeton University and he pursued graduate study at the University of Chicago. He currently lives in Seattle.

APPENDIX B

ERP Work Scope

AWV Central Waterfront Bored Tunnel Expert Review Panel Advisory Services

Scope of Services

Under this Agreement, the CONSULTANT shall provide specialized services to the ERP in the areas of risk management, contract administration, and construction claims.

The CONSULTANT'S support is anticipated to include the following:

A. Review WSDOT-provided background materials regarding the Alaskan Way Viaduct and Seawall Replacement Project

- 2006 ERP Report
- Alaskan Way Viaduct Replacement Project History Report, September 2009
- Final Environmental Impact Statement (FEIS)
- STP Design-Build Contract
- AWVR Program Management Plan
- FHWA Finance Plan, approved August 23, 2011
- January 2010 Toll, Traffic, and Revenue Report
- Cost Estimate Validation Process (CEVP) Reports
- AWVR Program Risk Management Plan, with current risk registers
- Configuration Management and Trend Management Guidance
- Current LegFin TEIS Report

B. Attend Project Briefings, Orientation Sessions and Project Site Tours with Project Team Members

- Getting Organized – Meeting with Administrator & WSDOT Key Project Staff, Review and Update Work Plan, Logistics, Review Operating Guidelines, Etc,
- Regional Overview – Putting the Project in Context
- Attend Background Briefings
- Site Tour
- Technical Document Review Meetings

C. Meet With Key Project Stakeholders (as available)

The ERP may meet with a variety of stakeholders, such as members of the legislature (or their staff), City of Seattle officials (or their staff), FHWA, Port of Seattle, and King County staffs.

D. Conduct Independent Financial and Technical Review of the Project's Key Assumptions, Financial Plan, and Risk Management Plan.

- This review focuses on the Bored Tunnel Alternative, as selected in the FEIS
- The independent review includes the following:
 - Review the FHWA Finance Plan for the project to ensure that it clearly identifies secured and anticipated funding sources and is feasible and sufficient.
 - Review the key assumptions for the project schedules, risk identification and management, and cost estimates to assure they are reasonable.

AWV Central Waterfront Bored Tunnel Expert Review Panel Advisory Services

E. Prepare Draft Report

- Complete and submit a Final Work Plan and Schedule by November 15, 2011.
- Complete and circulate for comments a draft report that includes findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by December 22, 2011.
- Review draft report comments and update draft report as appropriate by January 16, 2012
- Present revised final draft report to selected WSDOT staff, Governor's Office Staff, OFM staff, and legislative staff for comment by January 17, 2012.
- Review final draft report comments and update draft report as appropriate by January 31, 2012.

F. Issue Final First Year Report

- Report First Year findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by February 1, 2012.
- Present First Year Report to Joint Transportation Committee, Governor, and Office of Financial Management, by February 15, 2012.
- Revise First Year Report to address comments from the Joint Transportation Committee, Governor, and Office of Financial Management by February 24, 2012.
- Submit Revised Final Report by February 27, 2012.

G. Develop Work Plan, Review, Update, and Provide On-Going Project Reporting

- On an annual basis, review the Financial Plan, and associated project plans (i.e. Risk Management Plan) until June 30, 2013
- Prepare and circulate for comments annual draft reports that include findings and recommendations
- Review draft report comments and update draft report as appropriate
- Present revised final draft report to selected WSDOT staff, Governor's Office Staff, OFM staff, and legislative staff.
- Review final draft report comments and update final draft report as appropriate
- Report annual findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by November 30, each year, until June 30, 2013.
- Present annual reports to Joint Transportation Committee, Governor, and Office of Financial Management.

APPENDIX B

ERP Biographies



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Imperial College, London
University: M.S., DIC
Engineering Rock Mechanics,
1993

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Ohio, and Washington, DC
UK Chartered Engineer

Total Years Experience:

20

Professional Appointments and Associations

American Underground
Construction Association (UCA
of SME) – Executive Committee
Member
American Underground
Construction Association (UCA
of SME) – Chair of Task Force to
improve state of the practice
when using concrete in
underground application
Transportation Research Board
(TRB) - Tunnel and
Underground Construction
Committee Member
TRB - Past Chair of Sub-
Committee on Tunnel
Rehabilitation; Session Chair
(2005, 2008)
North American Tunneling
Conference (NAT) – Organizing
Committee (2004), Session
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Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register for feasibility and alignment selection study. Tunnel is proposed and is 32,000 feet long and 12 feet in diameter with a construction value of over \$200M.

Niagara Falls Tunnel; Sir Adam Beck Hydro-Electric Station Tunnel #3, Niagara Falls, Canada

Project Risk Consultant – responsible for generation of project risk register for this 26,000 foot long and 42 foot diameter rock tunnel up to 260 feet deep. Organized and facilitated four workshops with Owner and project design staff. Produced detailed risk register and performed both qualitative analysis to facilitate future use as a project management tool and also performed quantitative probabilistic analysis to allow the Owner to view a distribution of possible contingencies for both cost and schedule for this \$550M project.

King County Regional Water and Sewer Program (RWSP) Program Management Contract, Seattle, WA

Risk Management Expert - Approved by client as a national expert in geotechnical risk management to review and comment upon the guidelines for Geotechnical Baseline Report writing for individual contract designers as part of the \$2.5Bn program.

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East Side Access Project, Long Island Railroad Extension, New York City

Design Review - Member of 5-person, international and independent project design review panel. Responsible for review and comment on contractual and risk aspects of Manhattan and Queens tunnels for this \$8.5bn transit project.

Olentangy Augmentation Relief Sewer (OARS), Columbus, OH

Risk Professional, responsible for workshops and creation/auditing of project risk register. Member of Value Engineering Panel to determine appropriate phasing and construction method for 24,000 feet of 18 foot diameter CSO tunnel valued at \$400M.

River Mountains Tunnel No. 3, SCOP, Las Vegas, NV

Project QA Review Panel for contractual and risk aspects of this \$750M Program, including: 38,000 foot long and 10 foot diameter rock tunnel, as well as adjoining 11,000 foot long soft ground tunnel and feasibility assessment of underground hydro-electric facility, including powerhouse cavern.

Catskill Aqueduct Pressurization Project, New York City, NY

Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register. Compliance with New York City DEP Project Delivery Manual requirements and quantitative assessment of impact of risk to project budget and schedule for three contracts totaling an estimated \$400M in construction cost.

Spring Fishburne Stormwater Drainage Tunnel, Charleston, SC

Risk Professional responsible for facilitation of workshops and creation/auditing of project risk register for this 12-foot diameter, 2 1/2 miles long deep level storm water storage tunnel and shaft structure with a construction value of \$140M. Continued with audits and management of risk advice throughout design phase of project.

OTHER TUNNELS EXPERIENCE

McCook Haul Tunnels, Metropolitan Water and Reclamation District (MWRD), Chicago, IL

Task Manager - Responsible for the analysis and design coordination for two NATM rock tunnels in limestone and shale connecting an existing quarry with a new facility. Tunnels have a span of 31-feet and approximate length of 2700-feet each. Other aspects include an underground cavern for equipment, a raise-bore shaft and quarry highwall stabilization.

Jubilee Line Metro Extension – London Bridge Station, London

Lead Engineer - Managed and programmed design work. Production of design calculations using computer models. Responsible for design of all shotcrete and reinforced concrete tunnel and shaft linings, including connections to other contracts and junctions of three and four openings. Also produced a proposal, including design calculations, for permanent steel fiber reinforced shotcrete linings. Produced design calculations for the three-tunnel configuration of London Bridge Station using Finite Element analysis.

Lead Design Engineer, East London Metro Line – Brunel Tunnel Refurbishment, London.

Produced Finite element Analysis of twin tunnels under the River Thames, including transfer of information to design team. Also produced design

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calculations for the main tunnel shell and coordinated design calculation production for cross passages, and railway track slab.

Supervisor, East London Metro Line – Brunel Tunnel – Flood Mitigation Refurbishment, London.

Supervised construction including safety and stability of the tunnel structure during brickwork removal and concrete/shotcrete relining. Supervised all construction activity, including PVC waterproofing. Designed and interpreted tunnel instrumentation and real-time monitoring.

Senior Design Engineer, Boston Central Artery Highway Tunnel (Contract C19E1) Massachusetts.

Managed the analysis and design of three highway tunnel access ramps using two-dimensional and three-dimensional finite element analysis. Model includes complexities of excavation sequence, dewatering, spiling and jet grout column walls within tight settlement criteria, in difficult ground and under an active railway station.

Project Manager, Rio Piedras Station - San Juan Metro, Puerto Rico

Responsible for financial aspects and technical support to site personnel for geotechnical issues in this design build project, as well as Liaison with our client (KKZ/CMA) and the owner (Tren Urbano).

Kensico to City Water Tunnel, New York City, NY

Geotechnical and Tunnel Task Manager – Responsible for all underground and geotechnical aspects of the planning and alignment study for this 15 mile long, 24 foot diameter and up to 700 foot deep rock tunnel. Innovations include the use of field data loggers during the investigation and probabilistic cost and geotechnical modeling.

Studies undertaken and supervised include: Tunnel lining requirements, pressure tunnel depth requirements, rock mass characterization and temporary support, the use of risk registers in underground design and construction and geotechnical investigation and testing requirements for long and deep tunnels.

Bi-County Water Main Tunnel, Rockville, MD

Technical Principal – responsible for technical review and oversight of project team during design of this 29,000 foot long 7-foot diameter rock tunnel up to 250 deep with an internal pressure of 175 psi. Complexities include geotechnical conditions that include Piedmont residual profile and intrusions of quartzite and igneous rocks and the urban environment along the alignment. The project features a detailed study of preferred carrier pipe material and also production of a project risk register for design.

PUBLICATIONS

McKelvey, J.G., Goodfellow, R.J.F. and Hirner, C., 2008. *This is Where the Money is! The Impact of Contract Front End Documents on Tunneling Projects.* Proceedings North American Tunneling, 2008, San Francisco.

Oksuz, F., Goodfellow, R.J.F. and Mueller, C.G., 2008. *The Owner's Manual on How to Cut and Serve the Pie - Contracting and Contract Packaging Strategies for Large Engineering and Construction Projects.* Proceedings North American Tunneling, 2008, San Francisco.

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Goodfellow, R.J.F. and McKelvey, J.G., 2007. *Impact of the Risk Management Codes of Practice on Major Tunnel Programs in the US*. Proceedings WEFTEC, 2007, San Diego.

Goodfellow, R.J.F., 2007. *Risk Management for Underground Conveyance Design and Construction – State of the Practice Review*. Chesapeake WEF Conference, Ocean City, MD.

Goodfellow, R.J.F. and Mellors, T.W., 2007. *Cracking the Code – Assessing Implementation in the United States of the Codes of Practice for Risk Management of Tunnel Works*. Proceedings RETC 2007, Toronto.

Goodfellow, R.J.F. and Mellors, T.W., 2007. *Project Application of the Codes of Practice for Risk Management*. George Fox Conference, New York City (Invited Presentation).

Younis, M.A. and Goodfellow, R.J.F., 2006. *Soft ground tunnel displacement due to foundation excavation – a case history of the federal DOT building in Washington DC*. Proceedings NAT 2006, Chicago.

Goodfellow, R. J. F. and Sherman, S., 2006. *Risk Assessment and Analysis of Underground Work*. Proceedings NAT 2006, Chicago.

Clarke, K., Cole, E., Meakin, W. A. T. and Goodfellow, R. J. F., 2005. *The Kensico-City Tunnel for New York City Water Supply*. Proceedings RETC 2005, Seattle.

Younis, M.A. and Goodfellow, R.J.F., 2003. *The Design and Construction of Multiple Closely Spaced Tunnels in Soft Ground – A Case History of the MAC Storm Tunnel Project*. Proceedings RETC 2003, New Orleans.

Goodfellow, R. J. F. and Piepenburg, M., 2002. *Tunneling Beneath Railway Tracks – Performance Criteria for Design and Construction*. Proceedings NAT 2002, Seattle.

Goodfellow, R. J. F. and Claassen, M. D., 2000. *Design and Construction Components of Tunnel Rehabilitation*. Proceedings NAT 2000, Boston.

Goodfellow, R. J. F. and Groves, P. N., 2000. *Stiffness of Shotcrete Tunnel Linings - Considerations for Design and Construction*. Proceedings Geoen 2000, Melbourne Australia, 2000.

Conway, J. J. and Goodfellow, R. J. F., 1996. *The Potential Application of Risk Analysis to UK Highway Tunnel Projects*. Unpublished Report, Transport Research Laboratory (TRL).

John M. Rose. Mr. Rose is currently associated with The Leora Consulting Group providing financial consulting services to local governments, non-profits, and private companies. He is also a founder and Director of Practical Steam, an early-stage firm developing a modern steam engine with many potential commercial applications. He is a member of the Board of Manzanita Capital, the parent firm of Seattle brokerage McAdams Wright Ragen.

Mr. Rose retired from Seattle-Northwest Securities Corporation in 2006 where he served as President, CEO, Manager of the Public Finance Department, and a member of the Board of Directors. Seattle-Northwest was the largest underwriter of municipal bonds in the Pacific Northwest. Mr. Rose's public finance practice included clients such as the cities of Seattle, Spokane, Tacoma and Yakima, and many Washington school districts.

Prior to his career at Seattle-Northwest Mr. Rose held several positions in King County government, including serving as Budget Director. He is active in community affairs, recently serving as Mayor of the Town of Beaux Arts Village and as chair of King County's Investment Pool Advisory Panel. He is a member of the Board of The Nature Conservancy of Washington and of the Board of the College Spark Foundation. Mr. Rose is a graduate of Princeton University and he pursued graduate study at the University of Chicago. He currently lives in Seattle.

APPENDIX C

ERP Work Scope

AWV Central Waterfront Bored Tunnel Expert Review Panel Advisory Services

Scope of Services

Under this Agreement, the CONSULTANT shall provide specialized services to the ERP in the areas of risk management, contract administration, and construction claims.

The CONSULTANT'S support is anticipated to include the following:

A. Review WSDOT-provided background materials regarding the Alaskan Way Viaduct and Seawall Replacement Project

- 2006 ERP Report
- Alaskan Way Viaduct Replacement Project History Report, September 2009
- Final Environmental Impact Statement (FEIS)
- STP Design-Build Contract
- AWVR Program Management Plan
- FHWA Finance Plan, approved August 23, 2011
- January 2010 Toll, Traffic, and Revenue Report
- Cost Estimate Validation Process (CEVP) Reports
- AWVR Program Risk Management Plan, with current risk registers
- Configuration Management and Trend Management Guidance
- Current LegFin TEIS Report

B. Attend Project Briefings, Orientation Sessions and Project Site Tours with Project Team Members

- Getting Organized – Meeting with Administrator & WSDOT Key Project Staff, Review and Update Work Plan, Logistics, Review Operating Guidelines, Etc,
- Regional Overview – Putting the Project in Context
- Attend Background Briefings
- Site Tour
- Technical Document Review Meetings

C. Meet With Key Project Stakeholders (as available)

The ERP may meet with a variety of stakeholders, such as members of the legislature (or their staff), City of Seattle officials (or their staff), FHWA, Port of Seattle, and King County staffs.

D. Conduct Independent Financial and Technical Review of the Project's Key Assumptions, Financial Plan, and Risk Management Plan.

- This review focuses on the Bored Tunnel Alternative, as selected in the FEIS
- The independent review includes the following:
 - Review the FHWA Finance Plan for the project to ensure that it clearly identifies secured and anticipated funding sources and is feasible and sufficient.
 - Review the key assumptions for the project schedules, risk identification and management, and cost estimates to assure they are reasonable.

AWV Central Waterfront Bored Tunnel Expert Review Panel Advisory Services

E. Prepare Draft Report

- Complete and submit a Final Work Plan and Schedule by November 15, 2011.
- Complete and circulate for comments a draft report that includes findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by December 22, 2011.
- Review draft report comments and update draft report as appropriate by January 16, 2012
- Present revised final draft report to selected WSDOT staff, Governor's Office Staff, OFM staff, and legislative staff for comment by January 17, 2012.
- Review final draft report comments and update draft report as appropriate by January 31, 2012.

F. Issue Final First Year Report

- Report First Year findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by February 1, 2012.
- Present First Year Report to Joint Transportation Committee, Governor, and Office of Financial Management, by February 15, 2012.
- Revise First Year Report to address comments from the Joint Transportation Committee, Governor, and Office of Financial Management by February 24, 2012.
- Submit Revised Final Report by February 27, 2012.

G. Develop Work Plan, Review, Update, and Provide On-Going Project Reporting

- On an annual basis, review the Financial Plan, and associated project plans (i.e. Risk Management Plan) until June 30, 2013
- Prepare and circulate for comments annual draft reports that include findings and recommendations
- Review draft report comments and update draft report as appropriate
- Present revised final draft report to selected WSDOT staff, Governor's Office Staff, OFM staff, and legislative staff.
- Review final draft report comments and update final draft report as appropriate
- Report annual findings and recommendations in accordance with this scope of services and ESHB 1175, Section 305, Proviso 30, by November 30, each year, until June 30, 2013.
- Present annual reports to Joint Transportation Committee, Governor, and Office of Financial Management.