PEGASUS GLOBAL HOLDINGS, INC.

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,

Patricia D. Galloway

Dr. Patricia D. Galloway, PE
Chair

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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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APPENDICES

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 AWV 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.

<u>City/State Relationship</u>

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/Elliot 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 AWV 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 AWV 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 AWV Project once the deep-bored tunnel component of the AWV 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 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 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 AWV 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 billon; 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 AWV 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 AWV. 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 requests[1]. 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	Kick-off meeting issues (introductions, organization, formalities, communication)
	Draft work plan
	Information walk-through
October 10, 2011	Program history
	Program organization
	Program delivery
	Change management and risk management
	STP change management and STP risk management
	Communication
	Tolling
October 11, 2011	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	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	Right of way presentation
	Noise and vibration
	Subsurface property rights
November 15, 2011	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 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 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 AWV 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 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 AWV 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 AWV 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 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 AWV 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 AWV 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 AWV 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, Port[2], 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 AWV 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 AWV 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 AWV 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 AWV 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 AWV 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 P.E, PMP, MRICS, CFCC

Chief Executive Officer

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:

- Galloway, Patricia D., *The 21st Century Engineer: A Proposal for Engineering Education Reform*, ASCE Press, Reston, VA American Society of Civil Engineers, 2007
- Foreward to Lunsden, Reese, *The View From Here, Optimize Your Engineering Career From the Start*, Illumina Publishing, 2011
- "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

- Foreward to Kusayanagi, S.; Niraula, R.; and Hirota, Y., *Principles and Practice of International Construction Project Management*, EIKO-SHA, Tokyo, Japan, 2009
- Foreward to Williams, F. Mary and Emerson Carolyn J. , *Becoming Leaders*, ASCE Press, Reston, VA, American Society of Civil Engineers, 2008
- Foreward to Hatch, Sybil E., *Changing our World: True Stories of Women Engineers*, ASCE Press, Reston, VA, American Society of Civil Engineers, 2006
- "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

She has also been featured in many international publications including:

- *PM Network Magazine*, Project Management Institute, March 2011 Vol. 25, No. 3 "Too Big to Handle? Megaprojects and meeting the triple constraints"
- ASCE Industry Leaders Council, Monthly "Insights – Perspectives from Civil Engineering Industry Leaders," podcast, January 31, 2011
- "2011 – Seven Who Blaze New Pathways," 21 Leaders for the 21st Century, Women's Enews.org, January 4, 2011
- "Top of Their Game," NYIT Magazine, Summer, 2010
- Curiosity Project, Discovery Channel, Screening in 2011
- Interview with Patricia D. Galloway, *ADR Perspectives*, February 2010
- *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

Awards and Honors (Partial)

- Women's Enews.org, 21 Leaders for 21st Century Honoree for, "Architect of Spaces for Women in Engineering and Science," May, 2011
- 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.

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.

Mr. Goodfellow's design experience includes analysis, design (including 2D and 3D numerical analysis) and technical oversight for all types of underground construction, including tunnel boring machine, new Austrian tunneling method (NATM), cut and cover tunnels, shafts and underground chambers. This broad range of construction techniques and ground conditions provides the basis for his expertise in management of risk and conceptual planning design review for major tunneling schemes.

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.

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)

Relevant Project Experience

RISK MANAGEMENT ASSIGNMENTS

Alaskan Way Viaduct Replacement Program, Seattle,WA
Independent Cost and Risk Evaluation Team – responsible for oversight of program team with special emphasis on review and comment on risk analysis and Management processes and the risk register for this $2.4Bn megaproject. Provide oversight as an independent subject matter expert in risk workshops and project meetings. Provide briefings to Washington State Transportation Committee Chairs (both houses of legislature)

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.

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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

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.

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 Geoeng 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.

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.