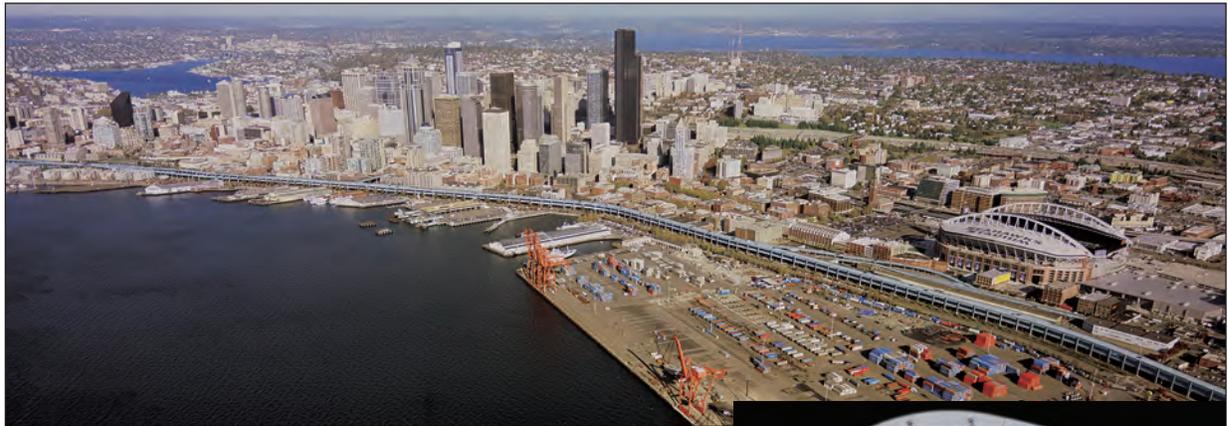
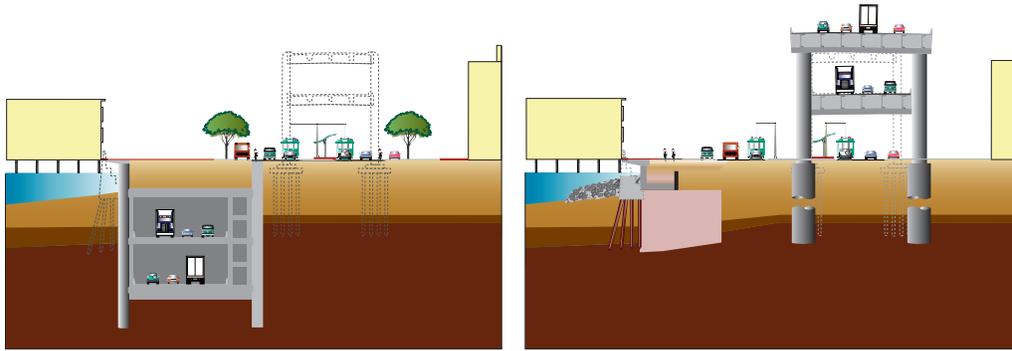


ALASKAN WAY VIADUCT REPLACEMENT PROJECT

Final Environmental Impact Statement

APPENDIX U Final EIS Correspondence



Submitted by:
PARSONS BRINCKERHOFF

Prepared by:
PARAMETRIX



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Appendix U

Correspondence

Consulting Parties
Correspondence

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King County



RON SIMS
KING COUNTY EXECUTIVE

CHRISTINE O. GREGOIRE
GOVERNOR

GREG NICKELS
MAYOR OF SEATTLE

March 14, 2007

To: Seattle Legislative Delegation, City Council, and County Council

Thanks for all your thoughts and concerns about the Alaskan Way Viaduct and its replacement. Major transportation projects in large cities are very challenging. And the path to success is not always smooth.

The past months have been particularly challenging for all of us as we have tried to forge a path forward on the viaduct replacement project. Clearly there are legitimate and heartfelt differences about the specific approach that path should take. Now that Seattle voters have expressed their opinions on two specific approaches to replacing the Alaskan Way Viaduct, we have the opportunity to renew our commitment to key principals and to find common ground.

In 2005, we secured the dollars necessary to replace the viaduct. In 2006, we started to develop options and estimate costs. Now in 2007, we have a much better understanding of the will of our citizens. We are making much needed progress and we appreciate all of your support in the effort.

We all agree that the viaduct is a significant safety risk and must come down within the project's existing timeframes. We all agree that delay is not an option. We further agree that any final selected alternative must adequately address the three fundamental criteria of safety, capacity, and financial responsibility. We all agree that the core elements of any solution must address issues such as vigorous public transit, freight mobility, business disruption, urban design, job creation, the preservation of our marine economy and the future of Seattle's central waterfront. With these principles and criteria in mind we are writing to invite you to join us in continuing our efforts to move forward.

Over the next several months we have a lot of work to do. We will begin by meeting to establish guidelines and a collaborative process that is timely and centers on determining a final alternative. The process needs to be inclusive and guided by the principles and criteria we hold in common. The process also needs to be open to creativity. We must rely on the best available engineering and design through the renewed efforts of the integrated project team from the State of Washington and the City of Seattle with representation from King County. Assuming you agree with this next step, we will be in touch with you in the near future as we get it started.

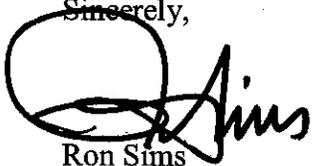
Seattle Legislative Delegation, City Council, and County Council
March 14, 2007
Page 2

Second, beginning this summer, we have agreed to initiate a series of projects that significantly advance the overall replacement project in time to avoid the \$10 million in project costs for every month of delay. These early safety and mobility projects are detailed in the enclosed graphic. None of these projects rely on the final design of the center one-mile portion of the overall project. However, by moving forward we will be on track to take down the existing viaduct in a timely manner.

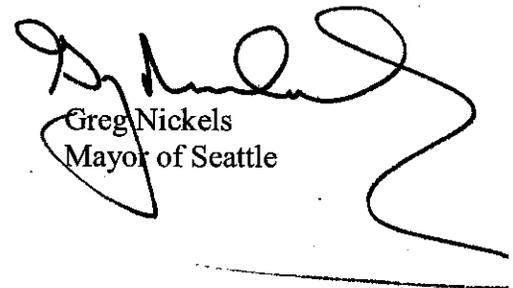
Lastly, we must remain vigilant about the safety of the existing structure for its continued use of approximately 110,000 vehicles per day. To this end, the Washington State Department of Transportation will increase the safety monitoring program and will undertake a series of temporary safety repairs on key portions of the structure described in the enclosure.

It has been six years since the Nisqually Earthquake. We must continue to move forward. We look forward to working with all of you on the next steps. We are confident that we are on the right track to break through the challenges of the past and develop a final design for replacing the Alaskan Way Viaduct in time for the next bi-annual budget.

Sincerely,


Ron Sims
King County Executive


Christine O. Gregoire
Governor


Greg Nickels
Mayor of Seattle

Enclosure

The Alaskan Way Viaduct & Seawall Replacement Project

03.07

Moving Forward: Proposed SR 99 Early Safety and Mobility Projects

1. Viaduct Safety Repair Project at Washington Street

Stabilize viaduct footings at columns 93 and 94. Increase frequency of viaduct inspections. Consider further load restrictions.

Design Complete: 2007
Construction Start: 2007
Construction End: 2008

2. Electrical Line Relocation Project

Relocate two transmission lines and five feeder lines from viaduct to Western and First Avenue.

Design Complete: 2007
Construction Start: 2008
Construction End: 2009

3. Battery Street Tunnel Fire and Life Safety Upgrade Project

Add lighting, fire suppression, seismic upgrades, and ventilation. Build detour routes and temporary connections.

Design Complete: 2008
Construction Start: 2008
Construction End: 2010

4. Earthquake Upgrade Project from Lenora to Battery Street Tunnel

Earthquake strengthening of steel structures in area of competent soil from Lenora to Battery Street Tunnel.

Design Complete: 2008
Construction Start: 2008
Construction End: 2010

5. Viaduct Removal from Holgate to King Street Project

Build new SR 99 from Holgate to Royal Brougham. Includes grade separation, detour routes, and temporary connections.

Design Complete: 2008
Construction Start: 2009
Construction End: 2012

6. Initial Transit Enhancements and Other Improvements

Improve arterials, bus lanes, signals, trip information, TDM programs, and transit to help manage traffic during early construction work.

Design: On-going
Construction: As Needed

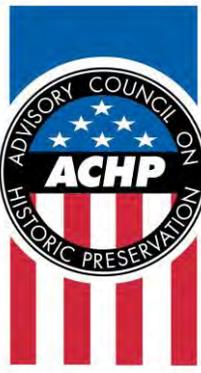


Early Project Costs

Costs for early projects are estimated to be \$915 million. These costs and the construction schedules are preliminary estimates and will need to be verified.

On-going Work by WSDOT

Develop and implement plans to minimize construction disruption to businesses, residents, and the traveling public.



Preserving America's Heritage

September 21, 2010

Mr. Daniel Mathis
Division Administrator
FHWA – Washington Division
711 S. Capitol Way – Suite 501 Evergreen Plaza
Olympia, WA 98501-1284

Ref: *Proposed Alaskan Way Viaduct & Seawall Replacement-North of the Holgate to King Project
King County, Washington*

Dear Mr. Mathis:

On September 8, 2010, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Washington State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Ms. Najah Duvall-Gabriel at 202-606-8585 or at ngabriel@achp.gov.

Sincerely,

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov



The Alaskan Way Viaduct & Seawall Replacement Program

U.S. Department of Transportation
Federal Highway Administration

Washington State
Department of Transportation

King County

City of Seattle

November 1, 2010

Ms. Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, WA 98104

RE: Invitation to Consult—Section 106 Review for the SR 99 Alaskan Way Viaduct Replacement Project

Dear Ms. Smith:

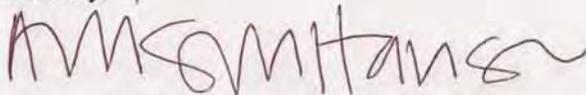
Per provisions of 36 CFR 800.3(a), the Washington State Department of Transportation (WSDOT), acting on behalf of the Federal Highway Administration (FHWA), would like to formally initiate consultation related to compliance with Section 106 of the National Historic Preservation Act. The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) is currently planning the SR 99 Alaskan Way Viaduct Replacement Project. The preferred alternative for the project is a single-bore double-deck tunnel that bypasses the central waterfront area of downtown Seattle. The project replaces the viaduct's central waterfront section with a bored tunnel beneath downtown, surface street connections in the north and south ends of the project, decommissions Battery Street Tunnel, and demolishes the viaduct.

WSDOT and FHWA have identified the cultural resources Area of Potential Effects (APE) for the project which encompasses the construction limits for the proposed project (see attached graphic). The Pioneer Square-Skid Road Historic District is within the APE. WSDOT has determined that the undertaking would have an adverse effect on the Western and Polson Buildings within this historic district. We are initiating consultation with you at this time as your organization represents community interests within this historic district. As a consulting party, WSDOT and FHWA would like to get your feedback on the approach and methods to resolving potential adverse effects to the properties within the district and involve you in the discussions related to mitigation alternatives. As part of this process, we will keep you informed about the project on a regular basis.

We look forward to your answer in regards to this invitation to become a consulting party for this undertaking. We would appreciate your response by December 1, 2010.

If you have any questions or concerns, please feel free to contact me at (206) 805-2880 or hanson@wsdot.wa.gov, or WSDOT Cultural Resources Specialist Kevin Bartoy at (206) 805-2887 or e-mail at bartoyk@wsdot.wa.gov.

Sincerely,



Allison Hanson
Environmental Services Director, WSDOT MegaProjects

cc. Randolph Everett, FHWA
Allyson Brooks, State Historic Preservation Officer



November 15, 2010

Mr. Stanley Piha
Stanley Real Estate
2101 4th Ave, #310
Seattle, WA 98121

RE: Invitation to Consult—Section 106 Review for the SR 99 Alaskan Way Viaduct Replacement Project

Dear Mr. Piha:

Per provisions of 36 CFR 800.3(a), the Washington State Department of Transportation (WSDOT), acting on behalf of the Federal Highway Administration (FHWA), would like to formally initiate consultation related to compliance with Section 106 of the National Historic Preservation Act. The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) is currently planning the SR 99 Alaskan Way Viaduct Replacement Project. The preferred alternative for the project is a single-bore double-deck tunnel that bypasses the central waterfront area of downtown Seattle. The project replaces the viaduct's central waterfront section with a bored tunnel beneath downtown, surface street connections in the north and south ends of the project, decommissions Battery Street Tunnel, and demolishes the viaduct.

WSDOT and FHWA have identified the cultural resources Area of Potential Effects (APE) for the project which encompasses the construction limits for the proposed project (see attached graphic). Two historic properties, the Western Building and the Polson Building, are within the APE. WSDOT has determined that the undertaking would have an adverse effect on these buildings. We are initiating consultation with you at this time as you are the designated representative for the owners of the Western and Polson buildings, Benjamin H. and Lois Mayers. We understand that the Mayers are the named owners on the title for the Polson Building and are the sole governing persons of L & B Property Investments LLC, which is the named owner on the title for the Western Building. As a consulting party, WSDOT and FHWA would like to get your feedback on the approach and methods to resolving potential adverse effects to these properties and involve you in the discussions related to mitigation alternatives. As part of this process, we will keep you informed about the project on a regular basis.

We look forward to your answer in regards to this invitation to become a consulting party for this undertaking. We would appreciate your response by December 15, 2010.

If you have any questions or concerns, please feel free to contact me at (206) 805-2880 or hanson@wsdot.wa.gov, or WSDOT Cultural Resources Specialist Kevin Bartoy at (206) 805-2887 or e-mail at bartoyk@wsdot.wa.gov.

Sincerely,

Allison Hanson
Environmental Services Director, WSDOT MegaProjects

cc. Benjamin and Lois Mayers, Owners of Western and Polson Buildings
Randolph Everett, FHWA
Allyson Brooks, State Historic Preservation Officer



STANLEY REAL ESTATE, INC.

Commercial Brokerage / Investment Property / Property Management

November 16, 2010

RECEIVED

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SA

WSDOT Doc. Control

Ms. Allison Hanson
Environmental Services Director
WSDOT MegaProjects
999 Third Avenue
Suite 2424, MS: NB82-230
Seattle, WA 98104

Re: Invitation to Consult

Dear Ms. Hanson,

In response to the Invitation to Consult – Section 106 Review for the SR 99 Alaskan Way Viaduct Replacement Project; on behalf of Benjamin H. and Lois E. Mayers and L & B Property Investments LLC, we are pleased to accept the invitation to become a consulting party.

You may use Stanley Real Estate, Inc., as the primary contact for communication purposes. We request the communications to be sent electronically when ever possible. When received, we will distribute your communications information to the appropriate parties working in conjunction with Mr. and Mrs. Mayers and L & B Property Investments LLC.

Should you have any questions, please do not hesitate to call.

Very Truly Yours,
Stanley Real Estate, Inc.


Stanley V. Piha
Authorized Agent
SVP:s

cc: Ron Mayers
Larry Smith, Esq.

mayers western dev acceptance of Section 106 invitation .ltr 11 16 10.doc



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
Seattle, WA 98104-4019
206-805-5400/ fax 206-805-2899
TTY: 1-800-833-6388
www.wsdot.wa.gov

December 1, 2010

Stanley Piha
Stanley Real Estate
2101 4th Ave, #310
Seattle, WA 98121

Dear Mr.Piha:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

As a consulting party, we are inviting you to a "kick-off" meeting to begin consultation on resolving the Project's adverse effects on historic properties. We would like to hold the meeting during the week of January 10, 2011, at WSDOT's Project offices in the Wells Fargo Building at 999 3rd Avenue, Seattle.

Please contact either Kevin Bartoy of WSDOT or David Cushman of the SRI Foundation at the addresses below, letting us know if you can attend a meeting during the week of January 10, 2011, and if so, what day of that week works best for you. Also, let us know if a meeting at the Wells Fargo Building at 999 3rd Avenue, in Seattle is acceptable; and if not, please suggest an alternative venue. Finally, please let us know who from your organization or agency would be attending the meeting.

Kevin Bartoy
Cultural Resources Specialist
Washington State Department
of Transportation
Alaskan Way Viaduct
999 Third Avenue
Suite 2424, MS NB82-230

David Cushman
Historic Preservation Specialist
SRI Foundation
333 Rio Rancho Drive, NE
Suite 103
Rio Rancho, NM 87124
505 897-5587

Seattle, WA 98104
206 805-2887
Bartoyk @wsdot.wa.gov

dcushman@srifoundation.org

We anticipate the meeting will last no more than three hours and will consist of two main agenda items: a summary of the adverse effects of the Project on historic properties and an initial discussion on potential measures to resolve these adverse effects.

We ask that you contact either Kevin or David within one week of receiving this letter. Also, if you have any questions about the "kick-off" meeting or any other Section 106 issues, please do not hesitate to contact either Kevin or David.

We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hanson". The signature is stylized and cursive.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Benjamin and Lois Mayers, Owners of Western and Polson Buildings
Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
Seattle, WA 98104-4019
206-805-5400/ fax 206-805-2899
TTY: 1-800-833-6388
www.wsdot.wa.gov

December 1, 2010

Eugenia Woo
Historic Seattle
The Dearborn House
1117 Minor Avenue
Seattle, WA 98101

Dear Ms. Woo:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

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333 Rio Rancho Drive, NE
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Seattle, WA 98104
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Bartoyk @wsdot.wa.gov

dcushman@srifoundation.org

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We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

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Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
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www.wsdot.wa.gov

December 1, 2010

Karen Gordon
City of Seattle Historic Preservation Officer
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, WA 98124-4649

Dear Ms. Gordon:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

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Sincerely,

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Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
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www.wsdot.wa.gov

December 1, 2010

Charlie Sundberg
King County Historic Preservation Program
701 Fifth Avenue, Suite 2000
Seattle, WA 98104

Dear Mr. Sundberg:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

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Sincerely,

A handwritten signature in black ink that reads "Allison Hanson". The signature is written in a cursive, slightly slanted style.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
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December 1, 2010

Stanley Piha
Stanley Real Estate
2101 4th Ave, #310
Seattle, WA 98121

Dear Mr.Piha:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

As a consulting party, we are inviting you to a "kick-off" meeting to begin consultation on resolving the Project's adverse effects on historic properties. We would like to hold the meeting during the week of January 10, 2011, at WSDOT's Project offices in the Wells Fargo Building at 999 3rd Avenue, Seattle.

Please contact either Kevin Bartoy of WSDOT or David Cushman of the SRI Foundation at the addresses below, letting us know if you can attend a meeting during the week of January 10, 2011, and if so, what day of that week works best for you. Also, let us know if a meeting at the Wells Fargo Building at 999 3rd Avenue, in Seattle is acceptable; and if not, please suggest an alternative venue. Finally, please let us know who from your organization or agency would be attending the meeting.

Kevin Bartoy
Cultural Resources Specialist
Washington State Department
of Transportation
Alaskan Way Viaduct
999 Third Avenue
Suite 2424, MS NB82-230

David Cushman
Historic Preservation Specialist
SRI Foundation
333 Rio Rancho Drive, NE
Suite 103
Rio Rancho, NM 87124
505 897-5587

Seattle, WA 98104
206 805-2887
Bartoyk @wsdot.wa.gov

dcushman@srifoundation.org

We anticipate the meeting will last no more than three hours and will consist of two main agenda items: a summary of the adverse effects of the Project on historic properties and an initial discussion on potential measures to resolve these adverse effects.

We ask that you contact either Kevin or David within one week of receiving this letter. Also, if you have any questions about the "kick-off" meeting or any other Section 106 issues, please do not hesitate to contact either Kevin or David.

We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hanson". The signature is stylized and cursive.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Benjamin and Lois Mayers, Owners of Western and Polson Buildings
Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
Seattle, WA 98104-4019
206-805-5400/ fax 206-805-2899
TTY: 1-800-833-6388
www.wsdot.wa.gov

December 1, 2010

Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, WA 98104

Dear Ms. Smith:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

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We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink that reads "Allison Hanson". The signature is written in a cursive, slightly slanted style.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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www.wsdot.wa.gov

December 1, 2010

Jennifer Meisner
Executive Director
Washington Trust for Historic Preservation
1204 Minor Avenue
Seattle, WA 98101

Dear Ms. Meisner:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

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We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hanson", with a stylized flourish at the end.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



STANLEY REAL ESTATE, INC.

Commercial Brokerage / Investment Property / Property Management

RECEIVED
J. V. Piha
DEC 03 2010
WSDOT Doc. Control

December 2, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT
999 Third Avenue
Suite 2424, MS: NB82-230
Seattle, WA 98104

Re: Invitation to Kick Off Meeting

Dear Mr. Bartoy,

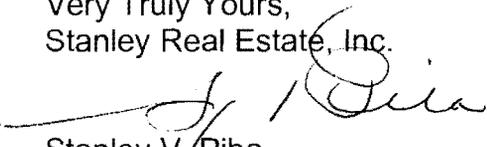
Thank you for the Invitation to attend a kick off meeting to discuss the Alaskan Way Viaduct Project's adverse effects on historic properties. Mr. Larry Smith, Attorney at Law with Graham and Dunn and I accept the invitation, and will be representing Mr. and Mrs. Benjamin Mayers.

The optimum time for this meeting to occur for Mr. Smith and myself is January 13, 2011 at 9:30 AM. We are agreeable to meet at the WSDOT offices.

You may confirm this meeting time and date by e-mail if that is convenient. My e-mail address is stanley@stanleyre.com. If this time and date do not work for WSDOT, please propose an alternate time and date that is within the latter part of the week of January 10, 2011.

Should you have any questions, please do not hesitate to call.

Very Truly Yours,
Stanley Real Estate, Inc.


Stanley V. Piha
Authorized Agent
SVP:s

cc: Ron Mayers
Larry Smith, Esq.

mayers western dev kick off meeting of Section 106 invitation .ltr 12 2 10.doc



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Larry Smith
Graham & Dunn, PC
2801 Alaskan Way, Suite 300
Seattle, Washington 98121-1128

Dear Larry:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the “consulting parties” in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Stanley Piha, Stanley Real Estate
Benjamin and Lois Mayers, Owners of Western and Polson Buildings
Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09
Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Eugenia Woo
Historic Seattle
The Dearborn House
1117 Minor Avenue
Seattle, Washington 98101

Dear Eugenia:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the “consulting parties” in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
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 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
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 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09

Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Karen Gordon
City of Seattle Historic Preservation Officer
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, Washington 98124-4649

Dear Karen:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the "consulting parties" in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

"Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process."

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: Joseph O. Mullen
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____

Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09
Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Charlie Sundberg
King County Historic Preservation Program
400 Yesler Way, Room 510
Seattle, Washington 98104

Dear Charlie:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the “consulting parties” in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Phil LeTourneau, King County
Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

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- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe
By: Joseph O. Mullen Date: 2-9-09
Honorable Joseph Mullen, Chair

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09
Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
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www.wsdot.wa.gov

January 3, 2011

Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, Washington 98104

Dear Leslie:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the "consulting parties" in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

"Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process."

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

- 1. Approved by FHWA;
- 2. Based on work need;
- 3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
- 4. Shared amongst requesting tribes.

E. Consultation

- 1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
- 2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
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SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: Joseph O. Mullen
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe
By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09
Karen Gordon, Historic Preservation Officer



**Washington State
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Paula Hammond
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January 3, 2011

Jennifer Meisner
Executive Director
Washington Trust for Historic Preservation
1204 Minor Avenue
Seattle, Washington 98101

Dear Ms. Meisner:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the “consulting parties” in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Chris Moore, Washington Trust for Historic Preservation
Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____

Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09

Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 6, 2011

Ms. Flo Lentz
4Culture
101 Prefontaine Place S.
Seattle, Washington 98104

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The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09

Karen Gordon, Historic Preservation Officer



January 6, 2011

Ms. Flo Lentz
4Culture
101 Prefontaine Place S.
Seattle, WA 98104

RE: Invitation to Consult—Section 106 Review for the SR 99 Alaskan Way Viaduct Replacement Project

Dear Ms. Lentz:

Per provisions of 36 CFR 800.3(a), the Washington State Department of Transportation (WSDOT), acting on behalf of the Federal Highway Administration (FHWA), would like to formally initiate consultation related to compliance with Section 106 of the National Historic Preservation Act. The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) is currently planning the SR 99 Alaskan Way Viaduct Replacement Project. The preferred alternative for the project is a single-bore double-deck tunnel that bypasses the central waterfront area of downtown Seattle. The project replaces the viaduct's central waterfront section with a bored tunnel beneath downtown, surface street connections in the north and south ends of the project, decommissions Battery Street Tunnel, and demolishes the viaduct.

In an email to Kevin Bartoy dated January 4, 2011, you requested that 4Culture would like to be included as a consulting party for Section 106 review, particularly with reference to effects within the Pioneer Square-Skid Road National Historic District. WSDOT is pleased to extend consulting party status to your organization. As a consulting party, WSDOT and FHWA would like to get your feedback on the approach and methods to resolving potential adverse effects to historic properties and involve you in the discussions related to mitigation alternatives. As part of this process, we will keep you informed about the project on a regular basis.

If you have any questions or concerns, please feel free to contact me at (206) 805-2887 or e-mail at bartoyk@wsdot.wa.gov or Environmental Services Director WSDOT MegaProjects at (206) 805-2880 or hansona@wsdot.wa.gov.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist, WSDOT MegaProjects

cc. Randolph Everett, FHWA
Allison Hanson, WSDOT



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 10, 2011

Ms. Flo Lentz
4Culture
101 Prefontaine Place S.
Seattle, Washington 98104

Dear Ms. Lentz:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National Register eligible; however, this will not diminish the property’s aspects of integrity, whatever those may be.

AWVRP Historic Properties List

You will note that the list of historic properties is presented by groups: Properties individually listed in or eligible for listing in the National Register, properties that are contributing elements to the National Register-listed Pioneer Square Historic District, archaeological sites, and archaeologically sensitive areas. Within these groups, information is provided on the identity of each property; its National Register eligibility status, determined by the agencies in consultation with the SHPO; the project action that may affect the property; an assessment of the kind of effect the undertaking may have on the property (direct/indirect) along with the damage potential assessment used in the Historic, Cultural and Archaeological Resources Discipline Report published with the 2010 Supplemental Draft Environmental Impact Statement; and lastly, an effect determination made by WSDOT/FHWA in consultation with the SHPO. This is the background information that will be used to focus the consultation on resolving adverse effects.

Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

The purpose of the follow-up meeting on the Western Building will be to provide information on the decision to demolish the Western Building and will address a variety of issues in addition to historic preservation. The consulting party meeting will be devoted to just resolving the adverse effect of the AWVRP undertaking pursuant to Section 106; the follow-up meeting will address broader issues specific to the Western Building beyond Section 106. A preliminary agenda for the Western Building Follow-up Meeting is presented below.

12:00 PM – Introductions (SRIF)

12:05 PM - Purpose of the meeting (SRIF)

12:10 PM - The Western Building Decision Process (WSDOT)

- a. Safety
- b. Comments on SDEIS
- c. Effect to PSHD
- d. Effect on the Western Building Owners
- e. Effect on the Western Building Tenants
- f. Environmental Process
- g. Cost

1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Heather Dwyer, 4Culture
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

Attachment 2. 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 10, 2011

Larry Smith
Graham & Dunn, PC
2801 Alaskan Way, Suite 300
Seattle, Washington 98121-1128

Dear Larry:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National Register eligible; however, this will not diminish the property’s aspects of integrity, whatever those may be.

AWVRP Historic Properties List

You will note that the list of historic properties is presented by groups: Properties individually listed in or eligible for listing in the National Register, properties that are contributing elements to the National Register-listed Pioneer Square Historic District, archaeological sites, and archaeologically sensitive areas. Within these groups, information is provided on the identity of each property; its National Register eligibility status, determined by the agencies in consultation with the SHPO; the project action that may affect the property; an assessment of the kind of effect the undertaking may have on the property (direct/indirect) along with the damage potential assessment used in the Historic, Cultural and Archaeological Resources Discipline Report published with the 2010 Supplemental Draft Environmental Impact Statement; and lastly, an effect determination made by WSDOT/FHWA in consultation with the SHPO. This is the background information that will be used to focus the consultation on resolving adverse effects.

Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

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If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Stanley Piha, Stanley Real Estate
 Benjamin and Lois Mayers, Owners of Western and Polson Buildings
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

List of ideas for discussion on how to resolve the adverse effects of the Alaskan Way Viaduct tunnel project by historic property

1. INDIVIDUALLY LISTED HISTORIC BUILDING

Resource Name (Address)	ID # (Bldg. Assessment ID #)	Historical Status	Project Action	Effect/ Damage	Effect Determination
Federal Office Building (901 1st Avenue)	H-124 (T243)	National Register (NR)	Tunnel Boring Machine (TBM)	Direct/ Slight	No Adverse Effect (NAE)
National Building (1000 Western Avenue)	H-126 (T234)	NR, Seattle Landmark (SL)	TBM	Direct/ Slight	NAE
Alexis Hotel (Globe Building) (1001 1st Avenue)	H-127 (T237)	NR, SL	TBM	Direct/ Slight	NAE
Arlington South (Beebe Building) 1013 1st Avenue)	H-129 (T236)	NR, SL	TBM	Direct/ Slight	NAE
Arlington North (Hotel Cecil) 1019 1st Avenue)	H-131 (T235)	NR, SL	TBM	Direct/ Slight	NAE
Watermark Tower (Colman Building) 1107 1st Avenue)	H-134 (T231)	SL, Not NR eligible	TBM	Direct/ Slight	NAE
Grand Pacific Hotel (1119 1st Avenue)	H-135 (T230)	NR, SL	TBM	Direct/ Slight	NAE
Grand Pacific/ Colonial (1123 1st Avenue)	H-136 (T230)	NR, SL	TBM	Direct/ Slight	NAE
Fire Station #2 (2334 4th Avenue)	H-264 (T086)	NR eligible, SL	TBM	Direct/ Slight	NAE
Archstone Belltown (Grosvenor House) (500 Wall Street)	H-056A (A110)	NR eligible	TBM	Direct/ Slight	NAE

Section 106 Objective: Avoid/minimize adverse effects to the individually listed historic buildings.

Ideas for discussion:

- *Develop deformation analysis plan to monitor structural integrity of each building before, during and after tunnel boring.*
- *Develop process for filing claims and making repairs, if needed. All repairs to follow Secretary of Interior Standards for Rehabilitation.*

2. PIONEER SQUARE HISTORIC DISTRICT AND CONTRIBUTING ELEMENTS

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
Pioneer Square Historic District (PSHD)		NR, City District	Temporary construction related traffic, traffic congestion, noise, limited access, etc.	Indirect	NAE
1 Yesler Building	H-87	PSHD - contributing property (CP)	TBM	Direct/ Very Slight	NAE
Western Building	H-108	PSHD – CP	TBM	Direct/ Very Severe	Adverse Effect (AE)
Polson Building	H-109	PSHD - CP	TBM	Direct/ Severe	AE

Section 106 Objective: Avoid/minimize potential effects of construction to Pioneer Square Historic District.

Ideas for discussion:

- *Develop best management practices (BMPs), traffic management plan, and public communication plan to be used for duration of project.*
- *Open (and staff) AWVRP public information center for the duration of the project. Include educational displays on history of Pioneer Square and the results of project related architectural and archaeological investigations.*
- *Develop mobile educational displays on history of Pioneer Square and results of project related architectural and archaeological investigations for use at other locations within Pioneer Square.*
- *Contribute funding to City of Seattle for ongoing monitoring and stabilization efforts for Areaways along 1st Avenue.*

- *Contribute funding to the Alliance for Pioneer Square’s Trails to Treasures program to enhance pedestrian use within and through Pioneer Square Historic District.*

Objective: Avoid/minimize adverse effects to the 1 Yesler Building

Ideas for discussion:

- *Install foundation micro piles along western wall between building and route of TBM.*

Objective: Avoid/minimize adverse effects to the Polson Building.

Ideas for discussion:

- *Develop deformation analysis plan to monitor structural integrity of the building before, during and after tunnel boring.*
- *Develop process for filing claims and making repairs, if needed. All repairs to follow Secretary of Interior Standards for Rehabilitation.*
- *Conduct compensation grouting.*

Objective: Mitigate adverse effects of demolition to the Western Building.

Ideas for discussion:

- *Conduct HABS Level II documentation of Western Building prior to demolition.*
- *Record façade of building using LIDAR prior to demolition.*
- *Conduct research study on historic warehouses of the Pioneer Square Historic District.*
- *Condition redevelopment of the property following demolition of Western Building to ensure that replacement building follows requirements of Seattle Municipal Code and receives approval from the Pioneer Square Historic District Preservation Board for new buildings.*

3. ARCHAEOLOGICAL SITES (HISTORIC)

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
SDOT Maintenance Yard Site	45KI958	To be determined (TBD)	North Portal Construction	Direct/ Severe	TBD
Dearborn South Tideland Site	45KI924	NR Eligible	South Portal Construction	Direct/ Moderate	AE
Historic manhole/sewer line site	TBD	NR Eligible	North Portal Construction	Direct/ Slight	NAE

Objective: Mitigate adverse effects of construction to National Register eligible archaeological sites

Ideas for discussion:

- *Develop historic properties treatment plan for sites 45KI958 and 45KI924 in consultation with DAHP, the tribes, and other consulting parties.*
- *Develop plan for unanticipated archaeological discoveries during construction.*

4. ARCHAEOLOGIALLY SENSITIVE AREAS (HISTORIC AND PREHISTORIC)

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
Potential buried peat Horizon	None	TBD, if present	North Portal Construction	Direct/ TBD	TBD via historic properties treatment plan (HPTP)
Potential buried tidal flat	None	TBD, if present	South Portal Construction	Direct/ TBD	TBD via HPTP
Potential buried tidal flat	None	TBD, if present	Grout shafts	Direct/ TBD	TBD via HPTP
Potential buried anthropogenic deposits	None	TBD, if present	Communication line relocation	Direct/ TBD	TBD via HPTP

Objective: Monitor construction to avoid/minimize/or mitigate adverse effects to NR eligible archaeological deposits, if present.

Ideas for discussion:

- *Develop archaeological monitoring plan to be include in the historic properties treatment plan.*

Attachment 2. 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document



TO: RON PAANANEN, AWV ADMINSTRATOR
LINEA LAIRD, DIRECTOR TUNNEL PROJECT

FROM: KIMBERLY FARLEY, DIRECTOR OF OPERATIONS, AWV PROGRAM
ALLISON HANSON, ENVIRONMENTAL DIRECTOR, MEGA PROJECTS

SUBJECT: 619 WESTERN AVE BUILDING – REHABILITATION VS DEMOLTION; DECISION DOCUMENT

DATE: JANUARY 10, 2011

CC: ALLYSON BROOKS, SHPO; KAREN GORDON, CITY OF SEATTLE HPO; DEBORAH CADE, AAG; DAVE DYE, WSDOT; RON JUDD, WSDOT; RANDY EVERETT, FHWA; DAVE SOWERS, WSDOT; SUSAN EVERETT, WSDOT; CHARLIE SUNDBERG, KING COUNTY; CHRIS MOORE, WASHINGTON TRUST FOR HISTORIC PRESERVATION; EUGENIA WOO, HISTORIC SEATTLE; LESLIE SMITH, THE ALLIANCE FOR PIONEER SQUARE; FLO LENTZ, 4CULTURE; LARRY SMITH, LEGAL REPRESENTATIVE FOR WESTERN BUILDING OWNERS

After careful consideration of several issues described below, it is the Alaskan Way Viaduct (AWV) team's recommendation that WSDOT pursue demolition of the building located at 619 Western Avenue (referred to as the Western Building). Below you will find a summary of information we gathered, a summary of the important factors that were considered, and the rational for our recommendation to pursue demolition of the building rather than to attempt to rehabilitate it.

WSDOT has reviewed several potential decision factors over the last ten months. The factors considered and our conclusions to reach a decision are as follows:

- Safety – In WSDOT's opinion, the Western Building is in such poor condition that even implementation of one of the retrofit options carries significant risk to both public and worker safety during retrofitting.
- Comments on the SDEIS – There were several comments suggesting that WSDOT should try to save the Western Building and through our analysis, we did investigate the possibility of rehabilitating the building. This option does not appear reasonable or prudent based on a consideration of public and worker safety as well as cost.
- Effect to the Pioneer Square-Skid Road National Historic District and local Pioneer Square Historic District (PSHD) – Demolition of the Western Building would deprive the historic district of an early twentieth-century warehouse building and would change the context of the western edge of the district. However, the change would not diminish the aspects of integrity of the PSHD in such a way as to alter the characteristics of the district that make it eligible for listing in the National Historic Register. Through consultation with the Section 106 consulting parties, WSDOT

believes that measures can be developed to mitigate for the loss of the Western Building that will be a more reasonable use of public funds to the benefit of the historic district.

- Effect on the Western Building owners – The building owners have expressed their willingness to cooperate and collaborate with WSDOT should we pursue demolition permits for the Western Building. In addition, they are ready to work with WSDOT, the City, the Pioneer Square Preservation Board, and through the Section 106 process to ensure that an appropriate building is put back in the Western Building location.
- Effect on Western Building tenants – Tenants of the Western Building would have to move regardless of whether the building is retrofitted or demolished. WSDOT will work with tenants to relocate. As part of this process, WSDOT is working with agencies and community groups to attempt to identify relocation space within Pioneer Square.
- Environmental Process – The complexity of the environmental process, even with the added process associated with obtaining a demolition permit, does not change significantly regardless of whether the building is retrofitted or demolished.
- Cost – Retrofitting would be an unwise and imprudent use of public funds given the substantial cost in light of the fact that it would result in a reduction of functionality.

Overview and Building Condition

The Western Building is a six-story concrete building which was constructed in 1910 as a warehouse. The Western Building is a contributing property to the Pioneer Square-Skid Road National Historic District and in the local Pioneer Square Historic District (PSHD). Currently, the building is occupied by retail uses on the ground floor and artists' studios on upper floors.

Earlier this year, AWW structural engineers analyzed the physical condition of the Western Building and determined that it will likely experience severe impacts during the tunnel boring process if significant structural work was not completed prior to the tunnel boring work. Because of the poor structural condition of the existing building, and the fact that the building sits on unconsolidated fill, which would settle as much as 2.4 inches during tunnel construction, it is likely without extensive retrofitting, there could be further extensive structural damage during construction, and even the possibility of collapse. For this reason, the concern for public safety has been a critical issue in the decision making process outlined below.

In summary, the Western Building has the following structural issues:

- There are large, full-height cracks in the north, interior, and south walls. Cracks are up to eight inches wide, have been patched, and have grown wider since the patching.

- The building has undergone severe differential settlement, causing the floors to slope up to five percent. The floors slope in both the east-west direction and the north-south direction.
- The central columns show significant diagonal cracking and spalling. At the roof level, the beam-column joint has large cracks extending through the parapet and the eastern wall is bulging out toward Western Avenue.
- Beams in the east and west façades are cracked near the supporting columns, and the concrete cover has spalled in several locations, exposing the reinforcing bars.
- The timber floors are separating from the concrete walls, leaving large gaps, up to three inches, at the perimeter.
- The concrete parapet is approximately four feet high and is unbraced.
- The slab-on-grade has large and extensive cracks.
- The pile foundation has deteriorated due to the fluctuating water table causing rotting of the timber piles. [In 1958, building records show that significant work was required on the foundation pilings due to rot and settlement. Similar work was done again in 1986. (Mahlum 2003)]

Attachment A describes in detail the structural issues associated with the Western Building.

Four options have been developed to address these issues, three structural rehabilitation options and a building demolition option, which are described in detail in Attachment A. During any of the structural rehabilitation options, there is a potential for localized failure during retrofit construction. The potential for localized failure during rehabilitation poses a significant risk to public and worker safety.

Rehabilitation Option A: Installation of an extensive latticework of steel bracing inside the building on the east, south and west walls.

Rehabilitation Option B: Installation of steel trusses inside the building cladding on the upper portion of the east, south and west elevations. The interior building framing would be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides.

Rehabilitation Option C: The exterior concrete walls would be stiffened by a full-height reinforced shotcrete wall inside the building cladding on each side of the building. The interior building framing would be stiffened by a latticework of steel bracing on the first interior column line of the building on all four sides.

All three rehabilitation options would also include:

- Strengthening the foundation by replacing the deteriorated piles and/or installing new piles at the interior and exterior columns and walls, and installing new and/or expanded concrete pile caps.
- Tying the floor structure together with steel elements connected to the timber floor and interior timber columns.
- Reinforcing the cracked columns.

- Stabilizing structural cracks in the walls by installing steel braces at each level across the cracks with through-bolts to sound concrete on either side.
- A program of compensation grouting before, during, and following tunneling to reduce building settlement.

Demolition Option: The building would be demolished prior to the start of tunneling. This process would include installation of bracing to safely control the demolition. Measures would also be taken to safely detach the structure from the wall of the Polson Building, which adjoins, and to make necessary repairs to the common wall following demolition. This controlled demolition would help to protect the Polson Building from damage that may be caused by collapse or localized failure of the Western Building.

Comments on the 2010 Supplemental Draft Environmental Impact Statement (SDEIS)

We have waited for the comment period to close for the SDEIS on December 13, 2010 to take into consideration the views and concerns that might have been shared by the public or agencies. In the SDEIS, we outlined the issues with the Western Building and described both rehabilitation and demolition as possible outcomes for the Western Building.

There were several comments regarding the Western Building submitted by organizations and individuals. These comments centered on the desire to save the building rather than demolish it. Several commenters sought information showing the condition of the building, and questioned the need for removing the building. A couple of comments centered around the question of whether we had considered the effect of removing a contributing building that is located within the Pioneer Square Historic District. Several commenters expressed concern for the Polson Building, which shares a wall with the Western Building, and questioned whether it would experience damage if the Western Building were removed (See Attachment B).

Historic Significance of the 619 Western Avenue Building and Potential Effect to the Pioneer Square Historic District

The information presented here is summarized or excerpted from a memo drafted by the Sheridan Consulting Group, which is provided in Attachment C.

The hundred year old Western Building was constructed as a warehouse. It is believed to be made of reinforced concrete, which represents an advance in construction knowledge and techniques over the brick and heavy timber construction used in earlier warehouses. The building is very simple in composition without the ornamentation seen in some nearby warehouses. Its primary defining feature is the rhythmic pattern of original wood-sash windows on the east and west facades. The loading docks on the west facade are another distinguishing characteristic.

The building's design has been attributed to Saunders and Lawton, who designed the adjoining Polson Building (1910). The firm designed numerous warehouse buildings in the early twentieth century. Many of them are in the Pioneer Square Historic District, including

the Norton Building (1904), the McKesson and Robbins Building (1906) and the Westland Building (1907). The Western Building shares a wall with the Polson Building, which is also a contributing property to the district.

If the Western Building were to be retrofitted, regardless of the option chosen, it is unlikely that its integrity would be affected enough that it would no longer be a contributing property to the historic district. This conclusion assumes that the building's primary characteristic, the multipaned wood-sash windows, are either retained or replaced in kind.

Demolition of the Western Building would deprive the historic district of an early twentieth-century warehouse building and would change the context of the western edge of the district. However, the change would not lessen the aspects of integrity or the characteristics of the district that make it eligible for listing in the National Register of Historic Places.

The AWV team has had several conversations with Allyson Brooks, the State Historic Preservation Officer, and Karen Gordon, the City of Seattle's Historic Preservation Officer, in order to describe the issues surrounding the Western Building. During these conversations, they requested that WSDOT investigate other retrofit options in addition to Rehabilitation Option A. In response, WSDOT investigated Options B and C. Dr. Brooks and Ms. Gordon also requested that cost estimates for all three options be prepared. A discussion of these cost estimates is provided below.

Consideration of the Owners and Tenants of the Building

WSDOT has discussed the options outlined above with the property owners, and recently had a meeting with the building tenants.

During the tenant meeting in mid-December of last year, many tenants expressed concern about moving out of the building. Rent in this building is very affordable, and they have concerns that another such situation will be difficult to find. WSDOT explained that the Western Building tenants would need to relocate regardless of whether the building was demolished or retrofitted. Because retrofitting the building would require substantial structural modifications and construction could take more than a year to complete, tenants would have to be relocated for the retrofitting work to take place.

WSDOT will offer tenants relocation assistance in accordance with both state and federal law. WSDOT is required to provide relocation assistance to tenants in the building following its purchase. Tenants must pay rent and certify they are lawfully present in the United States.

WSDOT's relocation team is working with agencies and community groups to attempt to identify relocation space within Pioneer Square. The team is contacting property owners with artist space available.

The building owners have expressed their willingness to cooperate and collaborate with WSDOT should we pursue demolition permits for the Western Building. In addition, they are ready to work with WSDOT, the City, the Pioneer Square Preservation Board, and through the Section 106 process to ensure that an appropriate building is put back in the Western Building location.

Environmental Process, Permitting, and Approvals

Regardless of whether WSDOT were to pursue retrofitting or demolishing the Western Building, environmental processes still apply. The following permits and regulatory requirements will be completed:

- National Environmental Policy Act/State Environmental Policy Act (NEPA/SEPA)
- National Historic Preservation Act (known as the Section 106 process)
- Section 4(f) – a “test” that transportation agencies using federal funds have to meet prior to “using” a historic property¹
- Pioneer Square Historic District Certificate of Approval for use, design, and demolition
- Master Use Permit [City of Seattle Department of Planning and Development (DPD) Demolition and Grading Permit, DPD Building and Grading Permit, DPD Shoreline Substantial Development Permit – exact suite of permits would depend on the option pursued]

WSDOT is nearing completion of its NEPA/SEPA process. WSDOT submitted its notice of intent to replace the Alaskan Way Viaduct and begin the environmental process in 2001. We have published a Draft EIS in 2004, a Supplemental Draft EIS in 2006, and a second Supplemental Draft EIS in October 2010. It was in this second SDEIS that we explored the impacts a bored tunnel would have overall, and specifically the impacts there would be to the Western Building. In the Final EIS, which we anticipate we will publish in summer 2011, the decision to pursue demolition will be disclosed, and mitigation for impacts will be committed to in the Record of Decision.

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions on historic properties that are listed in or eligible for listing in the National Register of Historic Places.

¹ Section 4(f) was created when the United States Department of Transportation (USDOT) was formed in 1966. It was initially codified at 49 U.S.C. 1653(f) (Section 4(f) of the USDOT Act of 1966) and only applies to the highway program. In 1983, Section 1653(f) was reworded without substantive change and recodified at 49 U.S.C. 303. The statute is still commonly referred to as Section 4(f).

Regardless of whether the Western Building is retrofitted or demolished, the Section 106 process would still be required as the understating (the proposed bored tunnel) would cause settlement which would be an adverse effect to the historic property. Although the mitigation that would be appropriate will differ depending on the option chosen, some form of mitigation would be undertaken to resolve the adverse effect. In consultation with the Section 106 consulting parties, FHWA and WSDOT will commit to measures to mitigate effects of the action on historic properties in a Memorandum of Agreement. This process was begun in December of last year, and will be completed by the time the Record of Decision is published.

In addition, Section 4(f) applies to this transportation project, and draft Section 4(f) evaluations have been prepared and have accompanied each of the EISs that have been published. A final Section 4(f) evaluation will be published with the Final EIS.

The Master Use Permit (MUP) is administered by DPD, and it provides an integrated and consolidated land use permit process, environmental review process with the procedures for review of land use decisions, and consolidation of appeals for all land use decisions. MUPs are required for all projects requiring multiple decisions (i.e. demolition, building, and shoreline permit decisions). In addition, the Pioneer Square Preservation Board will have to issue a Certificate of Approval prior to DPD's issuance of a MUP. Regardless of whether the Western Building is retrofitted or demolished, WSDOT will have to go through this City permit process and receive a MUP and a Certificate of Approval.

Costs

WSDOT investigated the costs associated with the three structural rehabilitation options and the one demolition option as described above (Prepared by Coughlin Porter Lundeen, Inc.). WSDOT estimates that:

- Rehabilitation Option A would cost approximately \$29 million;
- Rehabilitation Option B would cost approximately \$36 million;
- Rehabilitation Option C would cost approximately \$35 million; and
- Demolition Option would cost approximately \$2.5 million.

During the Section 106 process, under a demolition scenario, there would be costs associated with providing mitigation for the loss of the Western Building. This mitigation would take several forms such as ensuring that an appropriate replacement building is built in its place that fits the character of the District, and providing other improvements to the District as developed through consultation with the Section 106 consulting parties.

Attachments

A – Western Building Action Plan Alternatives Memorandum – Revision 1 (Terry Lundeen, Coughlin Porter Lundeen, Inc.)

B – SDEIS Comments on the Western Building

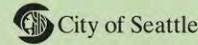
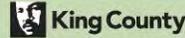
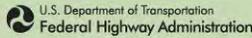
Ron Paananen
January 10, 2011
Page 8

C – Analysis of Western Building Alternatives (Mimi Sheridan, The Sheridan Consulting Group)

Ron Paananen
January 10, 2011

Attachment A – Western Building Action Plan Alternatives Memorandum – Revision 1
(Terry Lundeen, Coughlin Porter Lundeen, Inc.)

Alaskan Way Viaduct & Seawall Replacement Program



Memorandum

To: David Sowers, WSDOT

Through: Mike Rigsby, PB; Rick Conte, PB

From: Terry Lundeen, Coughlin Porter Lundeen, Inc.

Date: revised January 3, 2011

Subject: Western Building Action Plan Alternatives – Revision 1

Reference: Y-9715 Task No. DA.02/MDL No. PE.PD

cc: Allison Hanson, Kevin Bartoy, Kimberly Farley – WSDOT; Ann Costanza – Anchor QEA; Mimi Sheridan; Elizabeth Scheibe, Bill Hansmire – PB; Keith Moore – Coughlin Porter Lundeen

1. PURPOSE

This revision to the *Western Building Risk and Mitigation Technical Memorandum* (dated July 2, 2010), was prepared to present additional structural rehabilitation alternatives.

2. INTRODUCTION

This memorandum summarizes the condition of the existing Western Building in Pioneer Square, potential impacts to the building during tunneling operations, potential approaches to limit damage, and alternatives to rehabilitation. Presently, the building's major support elements are in very poor condition. Furthermore, based upon the documents available for review, the condition of the building has continued to deteriorate over the past decade. The existing damage is primarily due to past earthquakes and ongoing ground settlement and loss of foundation support. The route of the proposed bored tunnel that would replace the central waterfront portion of the Alaskan Way Viaduct travels directly underneath the Western Building. Accordingly, this memorandum presents the effects of bored tunnel construction on the Western Building and discusses the significant challenge and risk of the structural strengthening to the building and modifications to the subsurface soil condition to minimize additional damage or even partial collapse. Three structural rehabilitation approaches are presented and compared. This memo is based on previous reports and studies, a limited site visit by Coughlin Porter Lundeen, and conceptual level design.

3. SUMMARY OF EXISTING CONDITIONS

3.1. Seattle Public Records

The Western Building is located at 619 Western Avenue in Seattle, Washington (see Figure B-1 in Appendix B). It is bounded on the north by the Polson Building, on the east by Western Avenue, on the west by the Alaskan Way Viaduct, and on the south by a parking lot. The building is a six-story concrete framed structure reportedly constructed in 1910, with exterior dimensions of approximately 100 feet by 134 feet. The stories vary in height but on average are

approximately 12 feet. The exterior grade is relatively flat. Current occupancy consists of retail at the first floor and artist's studios at the upper floors.

A partial set of original structural drawings was available from the Seattle Department of Planning and Development (DPD) records; these drawings were not dated. In addition, DPD had drawings for repairing four timber piles in the east half of the building in 1958 (no confirmation as to whether this repair was completed) and for repairing a timber pile along the east façade in 1987 (DPD records indicate this permit was finalized).

The north wall of the building is a concrete common wall shared with the Polson Building. The east and west elevations consist of concrete beams and columns. The south elevation consists of a concrete wall perforated with window openings. In addition, there is an interior concrete wall spanning east-west the full length of the building. The roof and floor framing consist of laminated timber decking spanning to heavy timber girders, which are supported in turn by timber columns and the concrete walls and frames. Concrete pile caps on timber piles of unknown size and depth support the walls and columns. The ground floor is typically an 8-inch thick concrete slab-on-grade. There is a partial basement in the northwest corner of the building with concrete basement walls and a loading dock located along the west wall. See photographs in Appendix C.

Seattle DPD records accessed in April 2010 on the *Permit & Complaint Status* for the Western Building indicate the building has an active violation regarding earthquake damage and failure to remediate a yellow tag status, likely resulting from the 2001 Nisqually Earthquake.

3.2. Owner Supplied Information

The following additional information was provided by the building owner's representative, Stanley Piha:

- A memorandum to the Seattle Department of Construction and Land Use (DCLU - the precursor to DPD) Emergency Response Center regarding the earthquake damage assessment by Pacific Engineering Technologies, Inc., following the 2001 Nisqually earthquake. This assessment lists the damage observed and the likely code upgrades required. The cracked concrete corbel at the Sixth Floor on the east façade was listed as a hazardous condition, requiring shoring or repair. There was no indication repairs had been performed. [Piha 2001].
- A set of drawings to seismically strengthen the building [Pacific Engineering Technologies 2001]. The work shown by these drawings was not constructed.
- Two potential concept plans for foundation repairs, which had been developed but not constructed [Pacific Engineering Technologies 1999]. These drawings include a survey of the existing differential settlement of the Fifth Floor, circa 1999. Settlement along the east façade of the building ranges from 1-inch at the corners to 7-inches towards the middle of the concrete frame. The west façade has also settled and slopes towards the middle of the concrete frame (see Figure B-2 in Appendix B).

3.3. Shannon and Wilson Report

As part of the foundation strengthening implemented for Bents 93 and 94 of the Alaskan Way Viaduct in 2007, Shannon and Wilson performed a survey and documentation of the existing building condition for the Washington State Department of Transportation (WSDOT) [Shannon and Wilson 2007]. Significant structural damage was noted at the building's interior with 230 locations of visible structural distress (mostly cracks) documented. In addition, observation of the building's exterior identified numerous additional areas of distress. The following is a list of the main structural issues identified by Shannon & Wilson:

- There are large, full-height cracks in the north, interior, and south shear walls. Cracks in the interior wall are up to 8 inches wide. These cracks have been patched in the past and appear to have grown wider since the patching.
- The building has undergone severe, differential settlement, leading to floors sloping up to 5 percent in places (equivalent of 6 inches over 10 feet). The floors slope in both the east-west direction and the north-south direction, depending on location. The northern portion of the building appears to be tilting to the south and the southern portion of the building appears to be tilting north.
- Spalls and significant diagonal cracks were observed at the central columns on the east facade. At the roof level along the east facade, the beam-column joint has large shear cracks that extend up through the parapet and the wall is bulging out toward the street.
- Beams in the east and west façades are cracked near supporting columns. In addition, concrete spalls were observed at several locations, exposing the reinforcing bars.
- The timber floors are separating from the concrete walls, leading to large gaps, up to 3 inches, at the perimeter. The girders have slipped up to 2 inches on the concrete corbels.
- The concrete parapet is approximately 4 feet high and is not braced.
- The slab-on-grade has large and extensive cracks.
- The loading dock has experienced large differential settlements.

Shannon and Wilson attributed the settlement to decay of the existing timber piles, which are intended to support the entire building. They theorize the decay is within the upper few feet, where ground water levels fluctuate. As the timber piles have decayed, the pile caps have settled, leading to a significant portion of the damage present in the primary structural elements of the building as listed above.

3.4. Past Earthquakes or Other Damaging Events

The Western Building has experienced the Olympia Earthquake in 1949 (magnitude 7.1), the Seattle-Tacoma Earthquake in 1965 (magnitude 6.5), and the Nisqually Earthquake in 2001 (magnitude 6.8). These three earthquakes were deep events centered south of Seattle. Based on discussions with the tenants, the large vertical cracks in the concrete walls were present

prior to the Nisqually Earthquake, but widened significantly during the shaking [Shannon and Wilson 2007]. According to the tenants, the cracks in the east façade columns were believed to be attributed to the Seattle-Tacoma Earthquake. Damage attributed to earthquakes was validated by a WSDOT structural engineering consultant [Inverso 2008].

3.5. Coughlin Porter Lundeen Site Visit

A limited site visit was performed on April 2, 2010 as part of this assessment. Access was provided to the main east-west corridor at the Second through Sixth Floors, as well as to a few tenant spaces and the partial basement. Limited observations confirm the structure matches the original DPD records and confirms the state of the existing significant structural damage consistent with the Shannon and Wilson report. No new or expanded information beyond the reports cited may be added based on this limited review of the existing conditions.

Based on the existing conditions, it is suspected the existing timber piles have deteriorated in places, though no pits have been excavated to determine the true nature of the foundation deficiencies.

4. TUNNELING DESCRIPTION AND EXPECTED SETTLEMENTS

The proposed SR 99 Bored Tunnel would begin just south of S. King Street, passing under Alaskan Way and the existing viaduct, curving to pass diagonally under Seattle's central business district. The tunnel would curve again and extend diagonally under Seattle's Belltown neighborhood, surfacing north of Thomas Street. The proposed tunnel alignment passes directly beneath the northwest corner of the Western Building (reference Figure B-1 in Appendix B). The bored tunnel will be approximately 56 feet in diameter, and will be approximately 85 feet deep from the tunnel's crown to the surface when underneath the Western Building.

During tunneling, ground settlement may occur along the path of the tunnel, potentially leading to differential displacement, angular distortion, and horizontal strain of nearby buildings. Because the proposed tunnel passes under a corner of the Western Building, the structure will experience these effects (see Figure B-3 in Appendix B). The skewed alignment of the tunnel as it passes under the Western Building leads to both a rotation and twisting of the building as it settles. The north and west walls, and possibly the interior wall, should experience both sagging and hogging conditions due to the ground movement. The eastern portion of the building should experience minimal settlement, while the maximum building settlement should be approximately 2.4 inches towards the west end based upon a 0.5% ground loss. These additional settlement amounts, shown in Figure B-3, are additive to the existing settlement amounts, shown in Figure B-2. The combination of the existing settlement amounts and locations added to the possible bored tunnel settlements would induce considerable additional bending and torque in the already distressed and damaged structural elements of the building.

An initial assessment of tunnel impacts to the building was performed and presented in the report to WSDOT [Coughlin Porter Lundeen et al., 2010]. The existing condition of the Western Building was listed as "Very Severe", based on exterior observations and the Shannon and Wilson report. An analysis on the estimated tunneling settlement and the resulting effects on the Western Building indicate a potential for "Severe-to-Very-Severe" damage due to tunneling

effects. This classification indicates further structural damage could result from tunneling activities, including the possibility of collapse.

The damage assessment was based on a prediction that the Western Building would experience settlement of about 2.4 inches. WSDOT predictions of settlement range up to nearly 5 inches at the Western Building with a corresponding increase in damage expected.

5. BUILDING PROTECTION MEASURES

A number of extensive, and potentially risky, rehabilitation and protection measures would be required to minimize the risk of additional damage to the building during tunneling. Some of these measures would alter the architectural characteristics of the building, including impacts on appearance and usable space. The rehabilitation approach includes three essential elements: foundation strengthening and structural strengthening, followed by compensation or compaction grouting to reduce settlement. Three alternatives are presented for structural strengthening of the building. Grouting and foundation strengthening approaches are essentially the same for each alternative and would also need to be implemented to reduce damage. Both the foundation and structural strengthening would occur within the footprint of the existing building.

5.1. Foundation Strengthening

As explained above in Section 3.3, the existing foundation system has significantly deteriorated. Substantial foundation improvements to the Western Building would be required before grouting and tunneling could take place. These improvements would consist of replacing the deteriorated piles and/or installing new piles, both at interior and exterior columns and walls. New concrete pile caps would be epoxy grouted to the existing pile caps in either case.

This new foundation system would consist of new micro piles drilled down to the bearing soil layer (or as determined by a geotechnical engineer) and attached to new concrete pile caps with epoxy grouted dowels to the existing pile caps. These micro piles would support both the walls and the columns. In addition, new concrete grade beams would interconnect the pile caps in both the east/west and north/south directions, thus reducing the horizontal strains, which the structure above would experience during tunneling. A new structural slab would be installed at the ground level, spanning between the new pile caps and grade beams.

The construction sequence would require removal of the existing slab, excavation to a depth of several feet along the columns lines (at least to the depth of the existing pile caps), installation of the micro piles, and construction of the new pile caps. This work would have to be carefully coordinated with the structural retrofit and would likely require some concurrent bracing or structural rehabilitation to prevent collapse during construction.

This same approach would be used regardless of the selected structural protection approach. The actual location of the micro piles and pile cap configuration would vary based on retrofit plan implemented for the superstructure.

This work will need to be done within the existing footprint of the building. It is further complicated by the low overhead clearance when working inside the building.

5.2. Structural Strengthening

The building superstructure would need to be stiffened in order to behave as a rigid body. To accomplish this strengthening, individual elements of the building would be tied together to prevent differential movement, and certain damaged or weak existing elements repaired or strengthened.

Three structural rehabilitation alternatives have been considered. Structural Rehabilitation Options A through C are described in Appendix D. Concept level plans have been provided for each. All three options will have significant impact on building use during the construction period and for some period after tunneling is complete and settlement has abated. Each option has varying effects on the long term functionality and exterior appearance. Structural Rehabilitation Option A appears to have the least impact on long term building functionality and future use and would be the least costly of the three approaches. For these reasons it is considered the preferred approach for structural strengthening and is used as the basis for discussion herein.

Structural Rehabilitation Option A would use an extensive latticework of steel bracing located just inside of the building on the east, south, and west elevations. A deep concrete grade beam as described above would be constructed below this latticework. As noted above, a network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. This latticework would be permanent.

The roof and floor structures would be tied together with steel elements connected to the timber framing members and epoxy bolted to the concrete walls and frames. Steel plates would be utilized at the intersection of the timber girders to the interior timber columns to provide continuity across the roof and floor framing.

The cracks in the concrete columns at the east façade would require epoxy injection and the columns would be wrapped with a composite fiber or concrete jacket.

Horizontal channels would be added at each level across the large wall cracks, bolted to the sound concrete on either side of the crack with epoxy.

Installation of the structural frame may require temporary structural cribbing and/or additional framing to be installed outside the building to provide support to the existing structure to minimize the potential for additional damage and to prevent partial collapse during the retrofit construction.

5.3. Ground Improvement

At the Western Building, the soils consist of un-consolidated, human-placed fill material and tidal deposits over the much stiffer and more competent over-consolidated glacial soils. The preferred method for improving this soil in order to minimize and correct tunneling settlement would be “compensation grouting,” which will be used to protect a number of other buildings in the area of the Western Building. Compensation grouting would consist of sinking a work shaft near the site from which sleeve-port pipes (*tubes-a-manchette*) extend horizontally in drilled

holes, reaching below the existing building pile tips. Ports (openings) in the pipe then permit repetitive injection of grout at specific locations as indicated by settlement measurements. The technique is well established in its use for protection of structures from tunneling effects. Construction of the work shaft would require particular care to minimize settlement from shaft wall deflection or consolidation from dewatering.

Grout is injected before, during, and after tunneling. Drilling holes for installation of the grout pipes may involve minor settlement, in this case on the order of 1/4 to 1/2 inch. The ground is conditioned by injecting grout to fill the soil loosened by drilling. This process is considered complete when the building registers (that is, level measurements indicate) some minor heave. The purpose of this process is to tighten up the grouting system so it will be immediately effective when used during tunneling. During tunneling, grouting to limit and correct for settlement is tied to real-time, comprehensive instrumentation and monitoring of building settlement. The intent is to achieve practically no settlement once tunneling is completed, but in the process of mitigating settlement by grouting, some settlement and heave would take place. After tunneling, any remaining settlement can also be corrected by injecting grout.

Most importantly, in order to survive the cyclic up and down movement that occurs during grouting, the building must undergo sufficient structural strengthening to withstand the resulting stresses as discussed in the next sections.

5.4. Construction

Due to the existing condition of the building, rehabilitation would be very risky and presents a significant safety challenge. It is possible the structural retrofit work in itself would cause additional damage to the building, and steps would need to be taken during construction to sequence the retrofit to minimize damage and prevent partial collapse. Given the risk to the building during construction of protective measures and tunneling, evacuation of the building would be required during the construction of protective measures as well as for some period of time after the SR 99 Bored Tunnel has passed beneath the building.

Construction of the protective measures would be also highly intrusive. Noise, vibration, and construction traffic would significantly disrupt normal activity of adjacent businesses. It would be particularly disruptive for Polson Building occupants due to the shared wall between buildings. Construction is anticipated to last 12 to 13 months dependent on the structural protection approach selected. The level of activity, noise, and vibration would be similar throughout the period of construction. Hours of construction activity would be restricted under the City's Noise Ordinance.

Due to the shared wall, there remains a risk to the Polson Building under any of the structural rehabilitation alternatives. While this risk does not warrant building vacation, continuous monitoring and an evacuation plan would be prudent. Steps should be implemented during the construction of the structural protective measures to minimize the impacts to the tenants of the Polson Building.

6. ALTERNATIVES TO BUILDING RETROFIT

6.1. Vacate, Construct Tunnel, and Repair

Another approach to reduce upfront construction is to vacate the Western Building and construct the tunnel without constructing protective measures. Construction fences would need to be set back some distance from the building at the three accessible sides to protect passersby should damage occur. In addition, given the severe damage to the east wall of the building, structural bracing of the wall would need to be provided to minimize the impact of a potential collapse of this wall. After the tunnel construction, tunnel damaged areas would be repaired, which could require work as extensive as the structural strengthening option. This option carries significant risk given the existing condition of the building. Portions of the building could collapse and it is not entirely certain the building could be usefully occupied after stabilizing repairs are implemented. In addition, the adjacent Polson Building, with which the building shares a common wall and which would be occupied, could be damaged in an uncontrolled fashion.

6.2. Demolition

6.2.1. *Local Requirements*

There are specific regulations in the Seattle Municipal Code regarding building demolition in the Pioneer Square Historic District (PSHD). The Pioneer Square Preservation Board must recommend allowing demolition to the Department of Neighborhoods Director, whereupon the director may approve demolition based on one of two paths. Path A requires plans and a construction bond for a replacement structure, which must be completely constructed within two years of demolition; this path could only reasonably be pursued by the building owner. Path B states “When demolition or removal of a building or other structure in the District is essential to protect the public health, safety and welfare or when the purposes of this ordinance will be furthered by the demolition or removal, then the Director of Neighborhoods, following review and recommendation by the Board, may authorize such demolition or removal whether the prerequisites of this section are satisfied or not.”

6.2.2. *Impacts*

The Western Building would be demolished prior to start of tunneling and prior to constructing measures that would be necessary for protecting the Polson Building from damage due to tunnel induced settlement. Demolition would take 2 to 3 months with short term impacts to adjacent businesses, traffic, and parking. The level of activity, noise, and vibration would be similar throughout the duration and hours of construction activity would be restricted under the City’s Noise Ordinance. Bracing would be required to safely control demolition and avoid uncontrolled collapse. Care would also be required to safely detach the structure from the shared Polson Building wall. The shared wall would likely require some repair following the demolition.

7. SUMMARY OF FINDINGS

The existing building structure shows extensive and obvious damage, and is significantly structurally compromised. There are major safety risks, which may require special

consideration in sequencing the work to minimize additional damage to the structure and to prevent partial building collapse associated with implementation of the structural and foundation protective measures. Grouting approaches to minimize ground settlement due to tunneling will not be possible without the foundation and structural retrofits. Given there are no reliable design or construction records for the Western Building and given the extremely poor structural condition of the building, it is difficult to predict how the structure will behave when subjected to tunnel settlement and to protective efforts performed to minimize the impacts of tunnel settlement. Significant additional damage to the building, including a danger of instability with the very real scenario of partial collapse, is a possibility. Furthermore, even if a structural retrofit of the building was deemed feasible while protecting worker and public safety during the process, such structural retrofit would alter the architectural character of the building as well as reduce building functionality. Available lease space would be reduced by approximately 5% or 4,100 square feet.

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Appendix A

References

Coughlin Porter Lundeen, Inc.; Magnusson Klemencic Associates, Inc.; KPFF Consulting Engineers, Inc. "SR 99 Bored Tunnel Project –Assessment of Settlement Impacts to Buildings". Produced for WSDOT. March, 2010.

Inverso, George. Memorandum titled "Yesler Way Vicinity Foundation Stabilization Project: Summary 9 January 2007 Field Visit to Polson and Western Buildings". Produced for WSDOT. January 16, 2008.

Mahlum Architects. "The Western Building—An Historical Analysis". Produced for Piha/Rogel Commercial Real Estate. September 24, 2003.

Pacific Engineering Technologies, Inc. Drawings titled "Western Building Repair of Earthquake Damage, Phase I". August 22, 2001.

Pacific Engineering Technologies, Inc. Drawings for a foundation repair titled "Scheme 'A'—No Expanded Basement". December 22, 1999.

Pacific Engineering Technologies, Inc. Drawings for a foundation repair titled "Scheme 'B'—New Expanded Basement". December 22, 1999.

Ruffcorn Mott Hinthorne Stine Architects. "Zoning Analysis and Development Potential for 619 Western Avenue". Produced for Stanley Real Estate, Inc. No date.

Shannon and Wilson. "Condition Survey Report for Polson and Western Buildings". Produced for WSDOT and Parsons Brinkerhoff. December 2007.

Piha, Stanley. Memorandum regarding 619 Western Avenue/620 Alaskan Way; to the Emergency Response Center, DCLU. April 30, 2001. This memo includes the earthquake damage assessment by Pacific Engineering Technologies, Inc., dated April 27, 2001.

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Appendix B

List of Figures

B-1. Building Location

B-2. Existing Settlement Survey of the Fifth Floor

B-3. 3-D Settlement Curve

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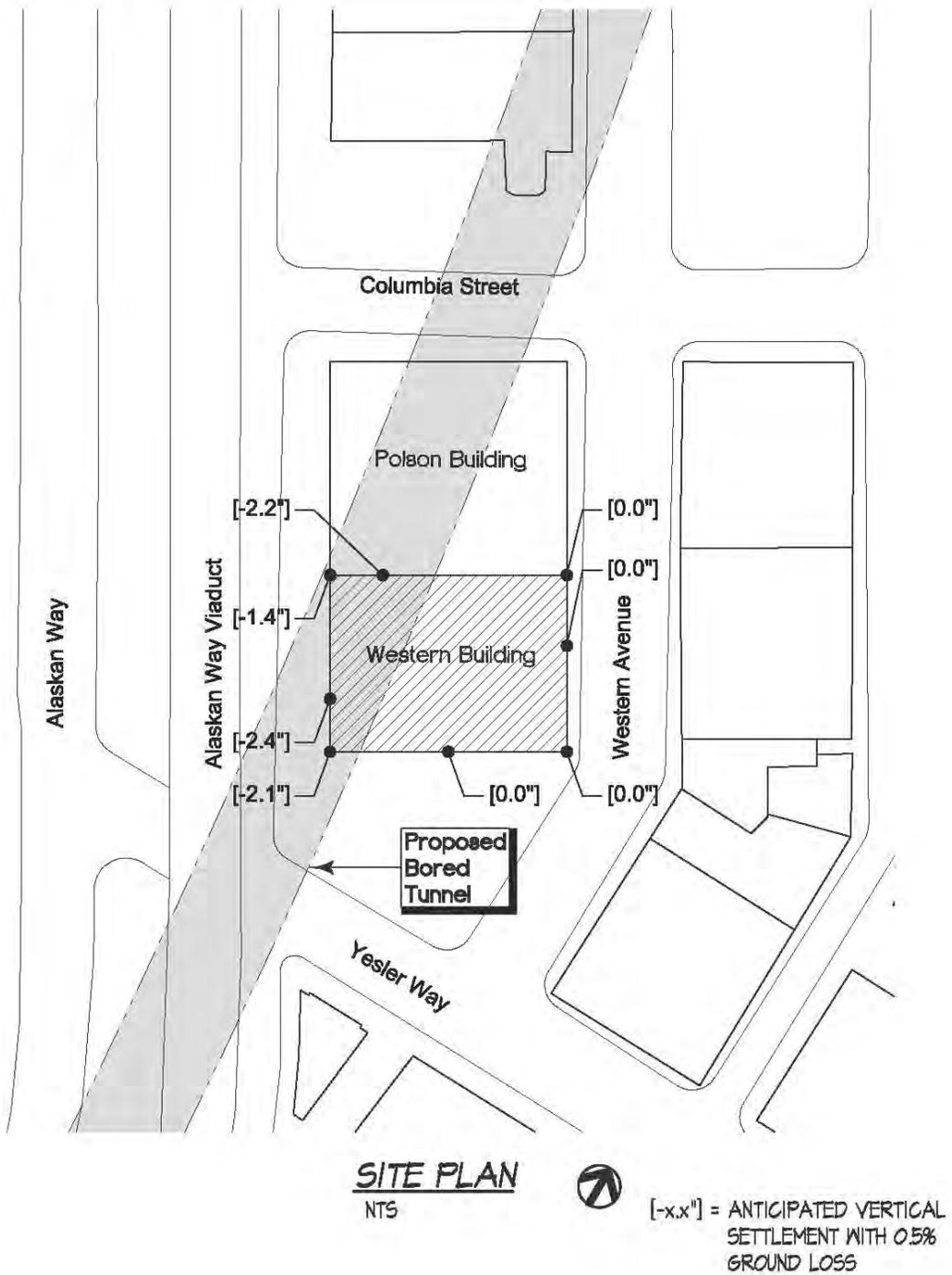


Figure B-1. Building Location

LEVEL SURVEY
 TO NEAREST 1", UNLABELED COLUMNS
 MINIMAL DISPLACEMENT



1300 Dander Ave. North - Suite 100 Seattle, Washington 98109
 Telephone: (206) 261-7300 Facsimile: (206) 261-4211
 Nationwide: (800) 621-7300

JOB NO. 99435.00 SHEET 1 OF 1
 JOB NAME WESTERN BUILDING
FOUNDATION REPAIRS
 COMP. BY DN/JA/JS DATE 12/22/99 CHK. BY _____

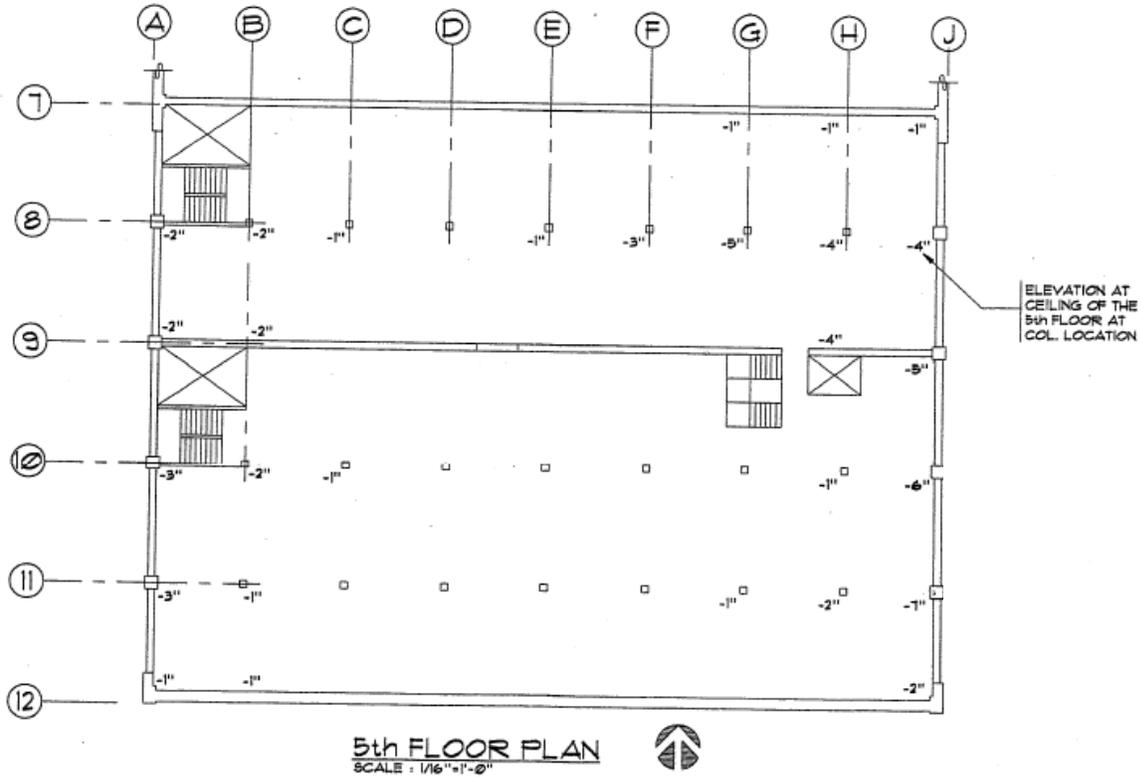


Figure B-2. Existing Settlement Survey of the Western Building - Fifth Floor [Pacific Engineering Technologies 1999]

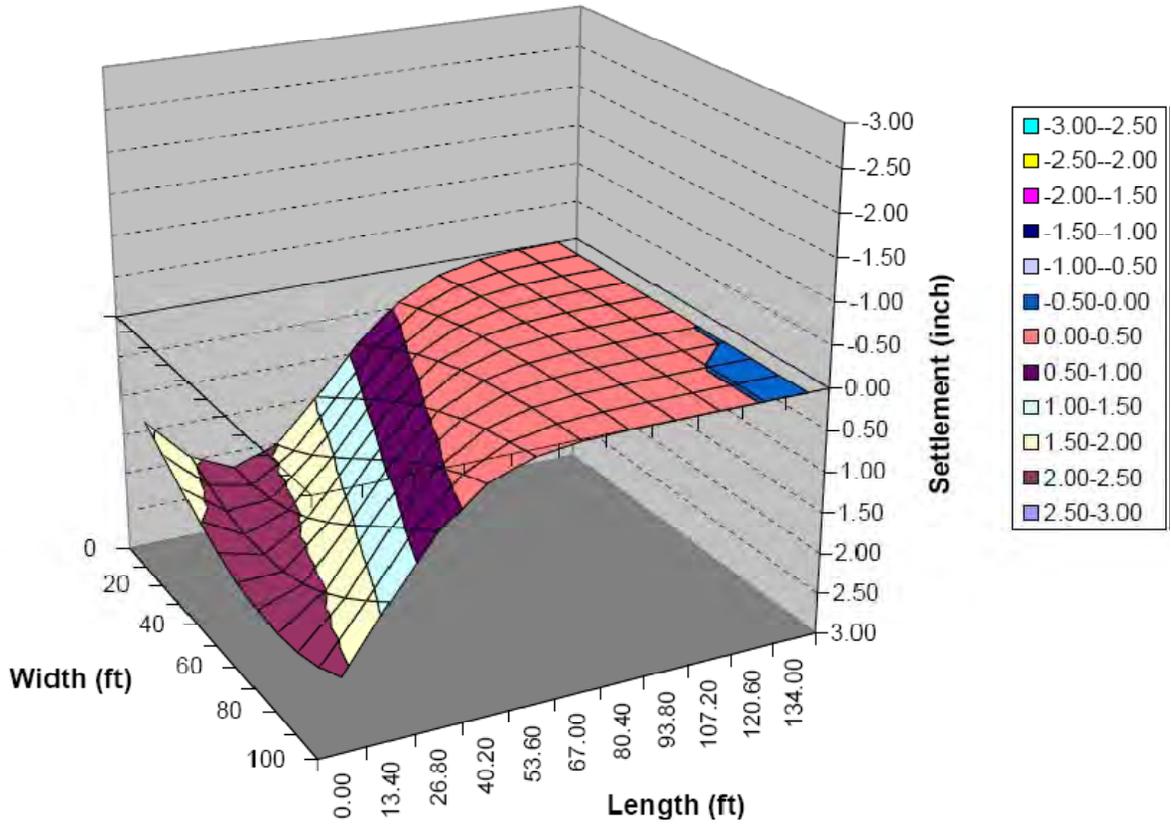


Figure B-3. Potential Additional Settlement of the Western Building due to Bored Tunnel Construction (3-D Curve)

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Appendix C

Photographs

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Photo 1: East Elevation



Photo 2: South Elevation



Photo 3: West Elevation



Photo 4: Cracking and Spalling in Concrete Column



Photo 5: Damaged Beam-Column Joint on East Elevation
[Shannon and Wilson 2007]



Photo 6: Crack in Spandrel Beam



Photo 7: Large Crack in Interior Concrete Wall
[Shannon and Wilson 2007]



Photo 8: Concrete Spalling at Interior Column
[Shannon and Wilson 2007]



Photo 9: Floor Separating from Wall
[Shannon and Wilson 2007]



Photo 10: Distorted Window (Sloping North 4%)
[Shannon and Wilson 2007]



Photo 11: Loading Dock (Sloping 10%)
[Shannon and Wilson 2007]



Photo 12: Typical Crack in Slab-on-Grade
[Shannon and Wilson 2007]

Appendix D

Structural Rehabilitation Options

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Western Building Structural Rehabilitation Options

1. Introduction

This document summarizes possible structural rehabilitation alternatives to mitigate the effects of tunnel induced deformation on the Western Building, located at 619 Western Avenue in Seattle, Washington. Three alternatives are presented with conceptual level design drawings to illustrate each approach (Figures D1 through D3).

The preferred ground improvement method regardless of the structural strengthening approach would be compensation grouting. Foundation strengthening schemes for both options would also be essentially the same, except that the new pile and pile cap layout would be revised as needed to support differing structural layouts. These ground improvement and foundation strengthening approaches are described in *Western Building Risk and Mitigation Technical Memorandum – Revision 1* dated October 12, 2010.

2. Structural Rehabilitation Option A

a. Description

The building would be stiffened in order to behave as a rigid body with full-height steel bracing at the exterior walls. Certain damaged or weak existing elements would be repaired or strengthened. Stiffening of the exterior walls would consist of an extensive latticework of steel bracing located just inside the building cladding on the east, south, and west elevations of the building. A deep concrete grade beam would be constructed below this latticework. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations thus minimizing differential movement. This latticework would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns.

The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Horizontal channels would be added at each level across the large wall cracks, epoxy bolted to the sound concrete on either side of the crack.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 12 months.

b. Concerns

- Reduces usable space by 5% (based on existing condition)
- Bracing visible through windows impacts aesthetics
- Construction time and impacts to adjacent tenants.
- Triggers substantial alteration code requirements
- High cost

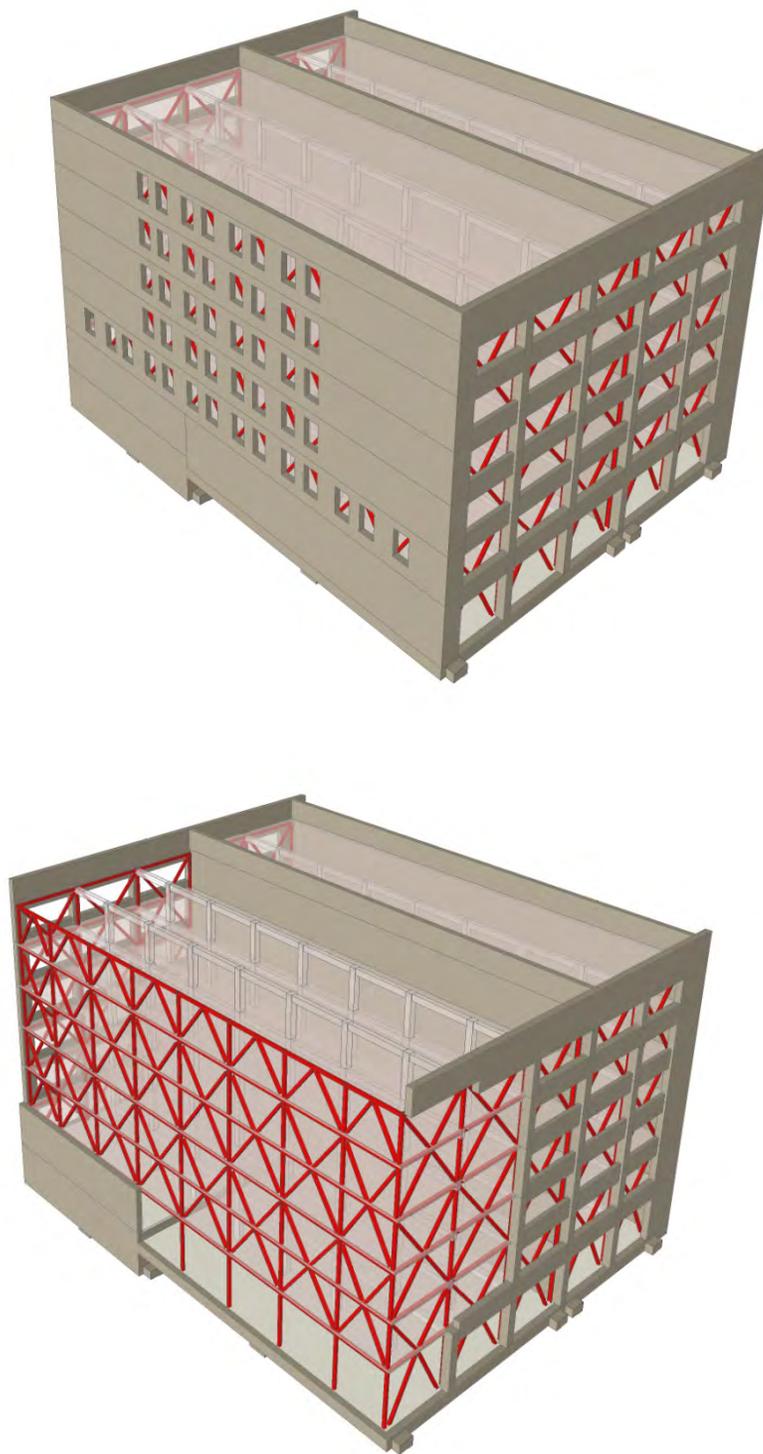


Figure D1 – Structural Rehabilitation Option A

3. Structural Rehabilitation Option B

a. Description

The building would be stiffened to behave as a rigid body at the interior of the building with steel bracing. The exterior walls would be stiffened by steel trusses at the upper two floors which would span to the interior steel bracing. Certain damaged or weak existing elements would also be strengthened or repaired.

The exterior walls would be reinforced by a steel truss just inside the building cladding on the east, south, and west elevations of the building. The truss would be two stories in depth, consisting of a bottom chord just below the fifth floor decking and a top chord just below the roof decking with diagonal web members. At each column line vertical web members of the truss would extend the full-height of the wall, continuously attached with expansion bolts, thus hanging the wall from the truss. Each truss would be supported by the steel bracing described below, as well as a two-story truss running north-to-south at the center column line of the building.

The interior building framing will be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides. The steel bracing will extend from the foundation to the underside of the roof framing, and will also support the steel trusses described above. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. The latticework and trusses would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns.

The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Horizontal channels would be added at each level across the large wall cracks, epoxy bolted to the sound concrete on either side of the crack.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 12 months.

b. Concerns

- Reduces usable space by 10% (based on existing condition)
- Reduces functionality due to extensive internal bracing
- Triggers substantial alteration code requirements
- Approximately 25% more costly than Option A

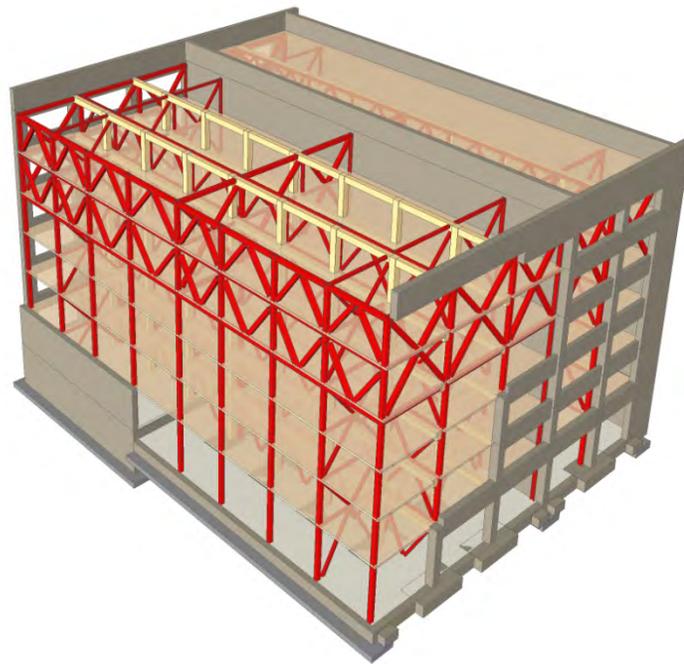
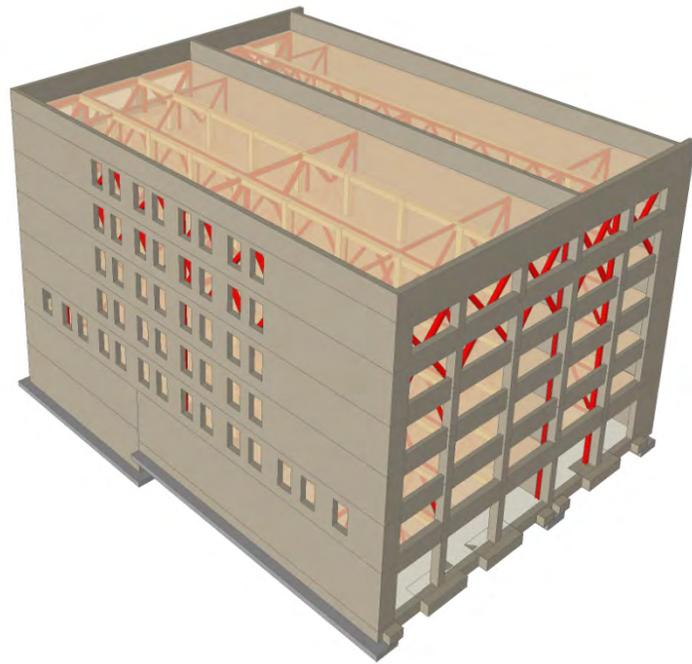


Figure D2: Structural Rehabilitation Option B

4. Structural Rehabilitation Option C

a. Description

The building would be stiffened to behave as a rigid body at the interior of the building with steel bracing. The exterior concrete walls, and two interior concrete walls, would be stiffened by a shotcrete wall epoxy doweled to the existing concrete just inside the building cladding on each side of the building. Certain damaged or weak existing elements would also be strengthened or repaired.

The north concrete wall shared with the Polson Building to the north and the interior concrete wall would also be reinforced by a shotcrete wall on one side. The shotcrete walls would be full-height, matching the current configuration of the existing wall openings and would be reinforced with continuous vertical and horizontal reinforcement. Continuous attachment to the existing concrete would be accomplished with epoxy dowels in a grid pattern.

The exterior walls with shotcrete would be supported by the interior braced frame columns where they intersect. To tie the exterior walls to the interior braced frames, the exterior shotcrete walls would also be supported by diagonal braces at each column line (where braced frames do not occur) between the 2nd and 3rd level and between the 4th and 5th level.

The interior building framing will be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides. The steel bracing will extend from the foundation to the underside of the roof framing, and will also support the exterior walls with shotcrete as described above. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. The latticework and shotcrete would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns. The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Wall cracks would be fully grouted prior to shotcrete wall installation.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 13 months.

b. Concerns

- Reduces usable space by 15% (based on existing condition)
- Reduces functionality because of more extensive internal bracing
- Triggers substantial alteration code requirements
- Approximately 20% more costly than Option A

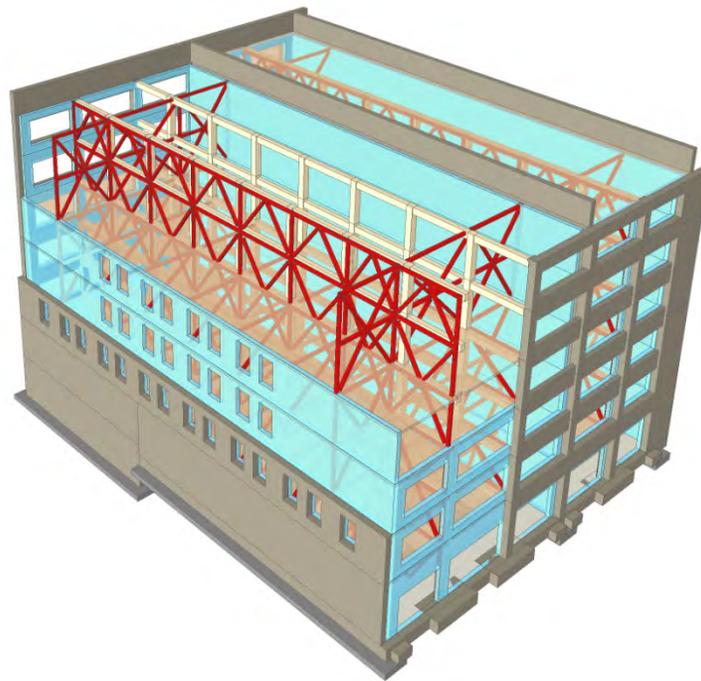
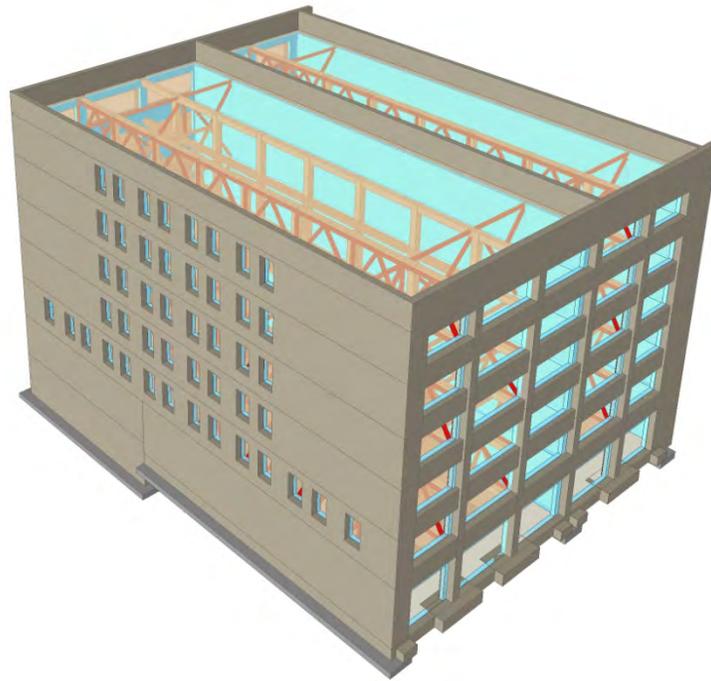


Figure D3: Structural Rehabilitation Option C

Ron Paananen
January 10, 2011

Attachment B – SDEIS Comments on the Western Building

Ron Paananen, AWW Project Manager
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Washington State Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104-4019

Peter Hahn, Director
Seattle Department of Transportation
PO Box 34996
Seattle, WA 98124-4996

December 13, 2010

Dear Ms. Freudenstein, Mr. Paananen, and Mr. Hahn,

This letter provides comments on the draft environmental impact statement (DEIS) for the Alaskan Way Viaduct Replacement Project. The Underground Tour, operated by Bill Speidel Enterprises Inc., has been a steward of and advocate for the Pioneer Square Historic District for nearly five decades. We care deeply about Seattle's first neighborhood, and the incredible historic resource value it represents. We are interested in ensuring, that whatever solution you decide on for viaduct replacement, the streets and character and vitality of our neighborhood are protected, not destroyed.

The following are our concerns with the DEIS.

Adequacy of Review, and Range of Alternatives

When the preferred alternative was announced in January 2009, the package included \$190 million worth of transit investments. Additional transit service was then, and is now, necessary to serve demand for access to and from downtown, since the bored tunnel itself does not. Moreover, the Letter of Agreement (LOA) between the City, County, and State promises funding for this transit service (see pg 258). **Additional transit service should be included** with the bored tunnel alternative, and analyzed for its utility.

Further, late in 2008, WSDOT, the City of Seattle, King County and various stakeholders completed an extensive review of multiple options for addressing the stated purpose of the project. That group concluded that there were two acceptable options. One of those options was a three-pronged plan to improve flow on Interstate 5, improve transit, and improve surface streets. That option—designated by your agency as one of the best and most viable options available—has never been analyzed in detail in an EIS. Why not? It is not too late to correct this error.

The **importance of the viaduct for local access has been understated** in assumptions, and data presentations, throughout the DEIS's analysis. A primary use of the current viaduct is to access downtown Seattle; 42% of current trips are coming and going to downtown neighborhoods (Ch 4, pg 73). The EIS should identify local mobility and access to downtown as a goal, and evaluate alternatives based on their ability to provide this.

The significant traffic impacts of tolling are not fully described in the analysis (Ch 9, pg 205). "As currently defined, the Bored Tunnel Alternative does not include tolls." The impact analyses in the entire document, including travel times, traffic volumes, greenhouse gas emissions, and stormwater runoff all assume that there will be no tolling on the project. However, tolling revenue is a necessary part of the basic funding plan, and use of tolling dramatically affects the impacts. Tolling should be included in the modeling throughout the EIS to clarify the impacts.

It is insufficient merely to reprise the State's January 2010 Tolling Study in Chapter 9 without incorporating tolling's impacts throughout the analysis. Without it, this EIS creates an inaccurate depiction of impacts—especially traffic effects on local streets.

Traffic Impacts to Pioneer Square Historic District Streets

Currently, the viaduct offers seven on- and off-ramps to provide access to downtown Seattle neighborhoods, spread from the stadium area to Belltown. The tunnel alternative reduces this number to four on- and off-ramps, and concentrates them all in one location: adjacent to the Pioneer Square Historic District (Ch 4 pg 74). This configuration concentrates in our neighborhood all the traffic going between SR-99 and downtown Seattle.

Without tolling, this DEIS says that 30,000 additional cars will shift to city streets from SR-99 (Ch 2, pg 19). More specific to our neighborhood, this DEIS states that 50,000 cars a day are expected to use the southern interchange ramps (Ch 5, pg 104). If tolling is implemented, as required by the funding plan for the project, an *additional* 40,000 to 45,000 cars are expected to divert to city streets. It is unclear how many of these cars are likely to use this interchange.

The Pioneer Square Historic District is already inundated with car traffic during events at Safeco Field, the WaMu Theater, and Qwest Field on 205 days a year, with 105 of these happening during rush hour. How will this additional traffic generated by the southern interchange, at least 50,000 trips a day and perhaps much more, be accommodated on event days?

After analyzing the traffic impacts on surface streets that would result from tolling, the conclusion is, "These effects would not be acceptable as part of a long term tolling solution" (Ch 9, pg 214). No alternative is suggested other than to say another alternative is needed.

After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion again is, "These effects would not be acceptable as part of a long term tolling solution."

The existing street grid in this area is not well connected, and there are not many viable routes. Some of the streets are narrow, historic, physically fragile, and pedestrian oriented, and not suitable for use as access roads to a highway interchange.

This EIS must describe in more detail the traffic volumes that are expected on specific streets around the southern interchange, both without tolling and with it. How many cars will use Alaskan Way, First Ave, Second Ave, and Fourth Ave? What revisions will WSDOT make to these streets to make room for all these cars, and for pedestrian traffic crossing First Ave? What are the impacts, in detail, of these solutions? How will this affect the pedestrian character of the streets? How will it affect on-street parking and the viability of retail? Are these historic streets, built on fill and supported by 100-year-old areaways and retaining walls, physically capable of carrying this much traffic? How will the proposed changes to these streets affect the viability of travel by bicycle? If the impacts to transit are unacceptable, what alternative solution or mitigation is being offered?

In general, what alternatives or mitigation are being considered—such as additional transit, or routing away from the Historic District and improvements to pedestrian rights of way—to minimize the untenable impact of adding at least 50,000 vehicles, and perhaps more (if the project is tolled), to our local streets? And what impacts do these possible solutions bring?

Concerns about the significant impacts of heavy concentrations of traffic on Pioneer Square streets caused by the preferred alternative were raised by neighborhood stewards over a year ago. It is misleading for this draft EIS to not provide decision makers more detail on these problems, and possible solutions, within this draft EIS.

Physical Risks to Historic Resources

Boring a tunnel next to our historic district, with its historic buildings, fragile and brittle infrastructure, high water table, and unstable soils, is a steep engineering challenge. This EIS describes the risks of digging and boring in this location (Ch 5, pg 126), possible damage to 12 historic structures (Ch 2, pg 31), and possible collapse or dramatic damage to two buildings during construction (Ch 6, pg 142), and mentions measures to protect structures. But many important issues remain unaddressed.

What damage could soil settlement from tunnel boring cause, specifically? Will residents and users of those buildings be at risk of harm? Will Pioneer Square's unique but delicate areaways—its historic Underground—be at risk?

What buildings specifically will be required to have their supporting soil improved with jet grout? What impacts will that have on the use of their Underground portions? What sidewalks will be closed, what streets will be closed, what basements will be altered, what areaways will be temporarily or permanently affected?

Some of the “solutions” proposed actually exacerbate other problems, but these impacts are not disclosed or assessed.

Because the water table is quite close to the surface in this neighborhood, there is risk that the solidification of soils—due to tunnel walls, retained cuts at the portals, and the injection of jet grout under buildings—might alter natural water flows, create a water barrier, and cause water to back up (Ch 5, pg 127). What exactly is the risk of potentially submerging subsurface structures? Which structures? Will decayed and fragile underground water and sewage infrastructure be at risk of failing? What is the risk of basements flooding? Many of these basements are occupied, either by functioning retail or other business uses. Some are part of the historic Underground, which is a popular visitor attraction, occupied at times by hundreds of visitors. What will WSDOT do to protect against flooding events?

Duty to Obtain Important Information

SEPA and NEPA require your agencies to identify information gaps and fill them, especially when that information is important to making a reasoned decision. Some of the issues identified in this letter will not be easy to address. But considering the magnitude of the possible impacts, your duty to acquire important information compels you to do the studies necessary to answer these critical questions. State and Federal agencies involved in this project must not make such irrevocable decisions without benefit of the required critical information identified above.

Process Issues

This letter has identified many issues that have not been addressed adequately or at all in your draft document, and notes the absence of reasonable alternatives. Including this missing analysis for the first time in the FEIS deprives the community and public agencies of the opportunity to comment on a draft version of this important information. Another draft containing the missing alternative and missing impact analysis should be prepared.

We are deeply troubled by the focus on your preferred alternative before the environmental review process is complete.

When the EIS is complete, decision makers should have a *real* opportunity to choose between alternatives. If one alternative has been developed to a far greater extent than the others, you leave decision makers with little genuine choice—or, at minimum, you skew the choice severely in favor of the more fully developed alternative.

That seems to be precisely the process you are using here. You have spent tens of millions of dollars engineering the tunnel option to the 30% level. You have solicited, received and now awarded a bid for construction of the tunnel. You have taken a host of other actions making it all but impossible for a decision maker to choose any alternative other than the tunnel.

You must move the other alternatives far enough along so that when the FEIS is released decision makers have real options, not simply the option of approving a *fait accompli*.

Summary

I've been advocating for Pioneer Square for the last 24 years or so. I have participated in legions of projects related to my favorite neighborhood. Today, I'm concerned for Pioneer

Square's survival. I am asking you, please, to take special care of our beloved historic district, its buildings, streets, areaways and sidewalks, as you make decisions on this project.

Pioneer Square is a beautiful and cherished neighborhood, and has irreplaceable historic value to the city of Seattle. Preserving our lovely thoroughfares has not been easy. Every generation of stewards has devoted significant attention to protecting our streets, whether by saving the majestic plane trees on First Ave or carefully guiding façade renovations or doing the hard work to ensure ferry traffic is routed away from our neighborhood streets.

The risks and harms to Pioneer Square mentioned in this DEIS might truly be overwhelming. The traffic generated—certainly 50,000 cars a day, and likely more with tolling—by placing a massive highway interchange in our neighborhood could ruin our fragile neighborhood and our connection to the new waterfront.

The DEIS acknowledges the traffic impacts are “unacceptable.” It acknowledges that the absence of tunnel entrances and exits in the downtown core, combined with the effects of tolling required by the State's statutory funding plan, will divert to surface roadways over half the trips which currently use the viaduct. Yet the EIS refuses to disclose the full scope of these impacts and minimizes their adverse effects, treating the increased congestion more like an accounting problem than an assault on the integrity of Pioneer Square. Compounding the problem, the DEIS discusses mitigation measures as if funding were available for them, totally misleading most readers who are not aware that there is no funding available for these measures. The EIS should candidly disclose the likelihood (or not) of funds being available for critical mitigation measures. City and State decision makers deserve immediate clarity on exactly how WSDOT intends to “improve” our local street grid. These “solutions” should be included for analysis in this EIS.

Two historic buildings might need to be torn down, and twelve others could suffer damage. The flooding risks caused by the project's inability to prevent changes to ground water flows could put some of the over 100,000 annual visitors to the Underground Tour, and the neighborhood, in danger.

It is our collective responsibility to protect the pedestrian environment, streets, and physical fabric of the historic district, including our Underground areaways. Our neighborhood is counting on City and State decision makers to ensure highway-bound traffic is not routed through our streets, to negotiate excellent design for local streets that must be altered, and to secure adequate funding for successful completion. We are counting on the City and State decision makers to ensure the historic buildings and Underground are safe from damage, and Pioneer Square residents and visitors are safe from risks. Pioneer Square must not only survive WSDOT's tunnel project, but emerge on the other side stronger.

Thank you,

Sunny Speidel
President, CEO
Bill Speidel Enterprises Inc.

Ron Paananen, AWW Project Manager
Angela Freudenstein
Washington State Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104

Peter Hahn, Director
Seattle Department of Transportation
PO Box 34996
Seattle, WA 98124-4996

November 22, 2010

Dear Ms. Freudenstein, Mr. Paananen and Mr. Hahn,

This letter is to provide comments on draft environmental impact statement for the Alaskan Way Viaduct Replacement Project. The People's Waterfront Coalition is very interested in a sustainable, forward-looking transportation solution that protects the opportunity for Seattle's new waterfront. We have been active participants in this discussion for 6 years, including serving on the 2008 Viaduct Replacement Stakeholder Advisory Committee.

Concerns have been grouped into eleven categories. There are specific requests for action in each category, and a summary of more comprehensive requests for action at the end.

1. Access into downtown is a vital function of the Alaskan Way Viaduct. Solutions must provide good access. The preferred alternative does not.

A primary use of the current viaduct is to access downtown; 42% of trips are coming and going to downtown neighborhoods. Downtown Seattle is a center for jobs and commerce, perhaps the core economic engine for Washington State. Analysis in the 2008 stakeholder process showed that 80% of trips on the viaduct are short trips that start and end within Seattle city limits. This EIS should identify local mobility and access to downtown as a goal, and evaluate alternatives based on their ability to provide this.

The usage of the viaduct has not been described accurately in this DEIS. The importance of the viaduct for local access for people and freight has been understated in the assumptions and criteria, and usage of the viaduct as a through-route has been exaggerated. Consequently the analysis doesn't give decision-makers an accurate portrayal of the challenge.

The DEIS says in Ch 1pg 4 that the viaduct carries 20-25% of traffic traveling through downtown. What is the source for this claim? 90,000 - 110,000 trips a day travel on the viaduct currently, depending on exact location. When compared to a total of 1,670,000 trips to and through Seattle, the viaduct carries less than 7% of traffic. The exaggeration of importance for bypass trips in this DEIS, and the disregard for local access and mobility, misrepresents the basic challenge and creates an inaccurate analysis.

Action: Mobility and access into downtown Seattle should be included as an integral goal and evaluation measure. **Additional transit service at significantly higher levels should be included** as part of the bored tunnel alternative in this DEIS.

2. Traffic impacts to local streets caused by the preferred alternative are unacceptable. Especially for the Pioneer Square Historic District.

Currently, the viaduct offers seven on and off ramps to provide access to downtown Seattle neighborhoods, spread from the stadium area to Belltown. (Ch 4 pg 74) The tunnel alternative reduces this to one highway interchange, located adjacent to the Pioneer Square Historic District. This configuration concentrates all the traffic going between SR-99 and downtown Seattle on only a few streets.

Without tolling, this DEIS states that 50,000 cars a day are expected to use the southern interchange ramps (Ch 5 pg 104). It says that 29,000 of current SR-99 users will shift to City streets (Ch 2 pg 19).

If tolling is implemented (Ch 9), as required by the funding plan for the tunnel alternative, **an *additional 40,000 to 45,000 cars are expected to divert to city streets.***

The Pioneer Square Historic District is already inundated with car traffic during events at Safeco Field, the Stadium Exhibition Center, and Qwest Field for over one hundred days a year, with a significant number of these happening during the week at rush hour. How will this additional traffic, somewhere between 50,000 and 80,000 trips a day (with tolling), generated by the southern interchange be accommodated on event days?

After analyzing the traffic impacts on surface streets that would result from tolling, the conclusion is that “These effects would not be acceptable as part of a long term tolling solution.” (Ch 9, pg 214) No alternative is suggested other than to say another alternative is needed.

After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion again is that “These effects would not be acceptable as part of a long term tolling solution.”

The existing street grid in this area is not well connected, and there are not many viable routes for drivers. Some of the streets are narrow, historic, physically fragile, and pedestrian oriented, and not suitable for use as access roads to highway interchange.

Predictions for the waterfront Alaskan Way are also alarming. The SDEIS traffic projections reveal that 35,000 cars a day will use the new Alaskan Way in this area. While it is possible to design a quality street that carries this volume, attracting this volume of new traffic to the new waterfront runs counter to Seattle’s vision for this site.

Action: This DEIS must describe in more detail the traffic volumes that are expected on specific streets around the southern interchange for the preferred alternative. How many cars and trucks will use Alaskan Way, First Ave, Second Ave, Fourth Ave? How many more cars would be added to each of the streets if tolling is implemented and 40,000 to 45,000 vehicles from SR-99 choose to avoid the toll?

The DEIS must describe what street revisions WSDOT will implement to make room for all these vehicles, and what are the impacts of these so-called street improvements.

Does WSDOT plan to remove on-street parking, or any of the mature and cherished London Plane trees in the Historic District? Will these changes affect the access to and viability of retail? How will the planned revisions affect the pedestrian character of the streets, and their viability for biking and walking? Are these historic streets, built on fill and supported by 100 year old areaways and retaining walls, physically capable of carrying these increased traffic volumes? Pioneer Square is hoping to reconnect to the new waterfront park, and re-establish its presence as a waterfront neighborhood; how will the proposed widening and increased traffic volumes on the new Alaskan Way affect these hopes?

What solutions are being considered to avoid burdening Historic District streets and the waterfront with an influx of traffic generated by the interchange? What solutions are offered to reduce congestion for local delivery trucks? For instance, additional transit service to and from downtown, or routing SR-99 bound traffic away from the Historic District, investing in improvements to I-5 to shift through-trips there, relocating the interchange further away from Pioneer Square, and demand management should be analyzed for their usefulness in protecting Pioneer Square from this influx of car traffic.

Note: Concerns about the heavy concentration of traffic on Pioneer Square streets caused by the tunnel's interchange have been raised repeatedly by neighborhood stewards for over a year. Is a viable solution even possible? Either there is a plan for reengineering streets to accommodate these much higher volumes, which should be described in this DEIS, or it is impossible to solve this problem without ruining Pioneer Square streets. Withholding this information from decision-makers obscures what might be the most egregious impacts of the tunnel alternative.

3. The significant traffic impacts of tolling are ignored. When tolling is included in the traffic modeling, the preferred alternative loses so many users that it effectively doesn't meet the statement of purpose and need.

The DEIS states (Ch 9 Pg 205) "As currently defined, the Bored Tunnel Alternative does not include tolls." The analysis in the entire document (except for Ch 9), including travel times, traffic volumes, greenhouse gas emissions, and stormwater runoff all assume that there will be no tolling on the project. However, tolling revenue is a necessary part of the basic funding plan, and use of tolling will dramatically affect tunnel usage and impacts.

The non-tolled tunnel sends 29,000 of the viaducts cars and trucks to city streets. The tolled tunnel sends an additional 40,000 to 45,000 vehicles to city streets. **This causes 74,000 new trips outside the tunnel, and 41,000 inside the tunnel. The preferred alternative, at \$3.1 billion cost, only serves about 1/3 of the transportation challenge, and offers no solutions for 2/3 of travelers.**

As this preferred alternative is described, the negative impacts to local mobility for people and freight are egregious. When the diversion effects of tolling are included, these negative impacts are intolerable.

Action: Tolling must be included in the modeling and analysis throughout this DEIS to clarify the impacts. Without it, this DEIS creates an inaccurate depiction of the very utility of the tunnel, as well as traffic and environmental impacts of toll diversion. A mitigation plan must be developed to show how WSDOT will prevent, resolve, or mitigate the unacceptable detriments to the functioning of Seattle's local transportation system.

4. The preferred alternative causes alarming physical risks to Historic Resources – Pioneer Square Historic District and buildings. The viaduct replacement project must guarantee protection from harm.

Boring a tunnel next to Seattle's historic neighborhood, with its historic buildings, fragile and brittle infrastructure, high water table, and unstable soils, is a steep engineering challenge. This DEIS describes the risks of digging and boring in this location (Ch 5 pg 126), possible damage to 12 historic structures (Ch 2 pg 31), and possible collapse or dramatic damage to two buildings (Ch 6 pg 142) because of difficulty controlling soil loss or preventing over-excavations or sinkholes.

The DEIS says this of the Western and Polson buildings, both 'contributing' buildings in the Pioneer Square Historic District: "Mitigation measures to protect the buildings may not prevent the need for demolition to avoid the possibility of collapse."

It says twelve buildings within the Pioneer Square Historic District or listed on the National Register of Historic Places – including the Historic Federal Building -- may be affected by settlement, structures could crack, and utilities may be disrupted or damaged. While the DEIS states measures will be implemented to avoid or minimize damage, it mentions that unavoidable damage might still occur with the preferred alternative.

Action: WSDOT must provide more information on how and when damage is likely to occur, and fully describe what they will do to prevent, repair, or mitigate damage. What damage could soil settlement from tunnel boring cause, specifically? Is WSDOT planning to purchase and demolish any of these buildings? What is the likelihood of unavoidable damage to the fourteen buildings at risk? Will residents and users of those buildings be at risk of harm?

WSDOT will not know if there is an adverse effect to an at-risk building due to their boring activities until they start tunneling under it.

Action: To ensure protection of the at-risk buildings cited in the DEIS, WSDOT should do 3-D laser scans before, during and after construction. This technology represents current best practice in historic preservation, and is being used widely. The before scan will show existing cracks and the tilt of the walls, etc. During-construction scans will monitor the cracks and tilts, and if any significant movement is detected, the project should halt and do something to stop the problem. A post-construction scan would show if any damage occurred so that WSDOT knows to repair. And exterior laser scan should also be done for all buildings along the proposed route.

Will Pioneer Square's unique but delicate areaways and historic underground be put at risk?

Action: WSDOT must provide more information on how and when damage is likely to occur, and fully describe what they will do to prevent, repair, or mitigate damage. What buildings specifically need to have their supporting soil improved with jet grout? What impacts will that have on the use of underground floors? What sidewalks will be closed, what streets will be closed, what basements will be altered, what areaways will be temporarily or permanently affected by implementation of this preventative measure?

Some of the 'solutions' proposed to prevent structural damage actually exacerbate other problems.

Given that water table is quite close to the surface, there is risk that the solidification of soils -- due to tunnel walls, retained cuts at the portals, and the injection of jet grout under buildings -- might alter natural water flows, create a water barrier, and cause water to back up in the Pioneer Square Historic District. (Ch 5 pg 127.)

Action: WSDOT must provide more information on how and when damage is likely to occur with the preferred alternative, and fully describe what they will do to prevent damage or safety risk to building users. What exactly is the risk of potentially submerging subsurface structures? What structures are vulnerable? Will decayed and fragile underground water and sewage infrastructure be at risk of failing if the ground becomes over-saturated due to altered water flows? What is the risk of basements flooding? Many of these basements are occupied, either by active retail or other business uses. Many are part of the historic underground, which is a popular visitor attraction, and occupied at times by hundreds of people. **What will WSDOT do to protect against flooding events and guarantee safety?**

Pioneer Square Historic District is listed in the National Register of Historic Places. Why is it not being protected via Section 4(f)?

Action: This DEIS should provide Pioneer Square Historic District full protection under section 4(f). It should identify and evaluate alternatives that avoid the possible harms to the streetscape, the buildings, and the underground that together comprise the unique quality of this district.

5. The Statement of Purpose and Need was recently rewritten with narrower language to exclude viable and cost effective alternatives, and favor the preferred alternative.

The range of alternatives to be considered flows from the statement of purpose and need. However, in this current draft, the statement of purpose and need was rewritten into a much narrower definition. The **statement of purpose and need** (Ch 1 pg 4) should continue to use the long- established definition for this project, 'mobility for people and freight', not redefine the target as vehicle 'capacity.' The statement of purpose and need from the 2006 SDEIS should be kept: "The project will maintain or improve mobility, accessibility, and traffic safety for people and goods along the existing Alaskan Way Viaduct Corridor."

By using the term capacity instead of mobility, solutions that include **transit, demand management, or available capacity on other facilities are disqualified**. It is not legal under SEPA – or prudent -- to frame the statement so narrowly as to exclude reasonable alternatives.

When the bored tunnel was announced as the preferred alternative in January 2009, the package included \$190 million worth of transit investments. Additional transit service was then, and is now, deemed necessary to provide access to and from downtown Seattle, since the bored tunnel alone does not provide any downtown ramps.

The benefits of transit are many. A robust transit system offers an affordable alternative to the high cost of car ownership for many citizens. For some families, this is a big deal: saving roughly \$8000 annually by getting by without a second car can mean more education or better housing. Transit is a key part of a larger strategy to reduce green house gas emissions. It reduces congestion for other roadway users, especially freight trips, car-pools, and other travelers who need to drive. A recent survey by T4America shows that 59% of Americans believe we need to increase public transportation to reduce traffic congestion, and make it easier to walk and bike.

Action: WSDOT should change the operative phrase in the statement of purposed and need back to "mobility and access for people and freight. "

6. All reasonable alternatives have not been included.

The alternatives analysis is the heart of the Environmental Impact Statement, and state law says all reasonable alternatives must be evaluated. A viable alternative that serves mobility, serves access to Seattle, AND also preserves the opportunity for Seattle's waterfront should be included in this DEIS.

Deep bore tunnels are marvels of engineering but also among the most difficult projects to plan and control financially. This proposed tunnel would be the largest diameter bore ever attempted in the world, in tricky soil and water conditions, under our state's most valuable real estate. Abrasive soils, clay, boulders, uncontrollable water flows, or unexpected utilities could stop the boring machine in its tracks. The delay and cost consequences of the machine getting stuck are very high. Removing a 56' x 400' machine from underneath downtown Seattle streets or buildings would be a nightmare, and huge financial risk.

According to a thorough analysis of 258 massive transportation projects by one of the world's foremost authorities on the subject, Bent Flyvbjerg, a professor at the University of Oxford, 9 out of 10 transportation megaprojects run over their cost estimates. For tunnel and bridge projects, Flyvbjerg found, "actual costs are on average 34 percent higher than estimated costs."

Both tunnel experts hired by the City of Seattle affirmed that costly problems are likely to emerge, despite WSDOT's best intentions. Using WSDOT's own data, these professionals predicted this project is 40% likely to exceed its establish cost cap. Further, David Dye, WSDOT leading project official at that time, said on record at

the conclusion of the 2008 stakeholder process, about why they did not select the bored tunnel: "And so it's a cold dose of fiscal reality that I guess I'm the one who has to bring the bucket and pour on this.... But it is out of reach in the current state of affairs to make it happen."

There is a significant uncertainty around the state's ability to fully fund the bored tunnel alternative. It is essential for this DEIS to consider a viable back up plan that meets goals for mobility and access into downtown neighborhoods -- *and* protects the full opportunity of the future waterfront. Neither of the two other alternatives in this DEIS offers this. Further, both these alternatives were soundly rejected by Seattle voters in the 2007 advisory ballot.

At the conclusion of the 2008 stakeholder process, the leaders of the City, County and State Departments of Transportation recommended two alternatives for viaduct replacement: the I-5/ Surface / Transit hybrid, and the Elevated / Transit hybrid. After a year-long evaluation, these two approaches proved best for meeting the agencies six goals for viaduct replacement at an affordable cost. **Each of these two solutions was determined by the City, County and State DOTs as feasible, lower cost, and effective in providing mobility after exhaustive analysis. The I-5/ Surface/ Transit hybrid alternative should be evaluated in this EIS.**

The I-5/ Surface / Transit proposals A and B provide mobility for through-travel and for local access, offer a four lane urban street on the waterfront, and can be achieved at a cost savings of \$700 million to \$1 billion compared to the tunnel. Like the tunnel, these options offer a calm, four-lane waterfront street, which is central to the City's plans for the new waterfront. To exclude these from the DEIS analysis creates a false choice for waterfront proponents.

Further, the City of Seattle Ordinance 12246 states the City's preference for an alternative to the tunnel: "In the event a tunnel proves to be infeasible, the City recommends the development of a transit and surface street alternative that meets the intent of Resolutions 30664 and 30724." This alternative would offer the City one of the key advantages it seeks – reclaiming the downtown waterfront – at a significant cost savings.

Action: A version of I-5/ Surface / Transit alternative that includes an urban, four-lane waterfront street should be included in this EIS so that decision makers who care about mobility for people and freight AND Seattle's new waterfront have a lower cost, lower risk alternative to consider.

7. This project should plan for reducing vehicle usage and greenhouse gas emissions, according to by City, County, State and Federal policies and statutory benchmarks.

The City has policies urging transportation agencies to pursue decreased Vehicle Miles Traveled over time, and increase the viability of other modes, as part of a larger effort to reduce green house gas emissions from vehicles.

- The City recently established a goal for Carbon Neutrality as one of its 16 priorities for 2010, knowing that this will demand dramatic efforts to reduce fossil fuel consumption and driving. A citizens' commission is at work defining specific implementation steps.
- The City's transportation policy as defined by the Comprehensive Plan states: Ensure that transportation decisions, strategies and investments are coordinated with land use goals and support the urban village strategy.
- The City's Climate Action Plan, launched in 2006, says: "The goal of the Seattle Climate Protection Initiative is to reduce greenhouse gases in Seattle by 7% below 1990 levels by 2012, 30% below 1990 levels by 2024, and 80% below 1990 levels by 2050." Reducing VMT is a key strategy to reduce emissions, as 60% of Seattle's emissions come from vehicles.

The County has put addressing climate change at the center of its comprehensive plan, as one of three

framework policies guiding the entire plan. FW-102 states that "King County will be a leader in prevention and mitigation of, and adaptation to, climate change effects." This overarching policy is carried through the rest of the comprehensive plan, including the following policies on Reducing Climate Pollution:

- Recommends that the County collaborate with other local governments to reduce greenhouse gas emissions in the region to 80% below 2007 levels by 2050 (Policy E-216)
- Establishes a goal of reducing County government GHG emissions by 6% below 2000 levels by 2010 (Policy E-204).

The State has established statutory benchmarks and policy urging transportation agencies to pursue decreased Vehicle Miles Traveled over time, and increase the viability of other modes, as part of a larger effort to reduce green house gas emissions from vehicles.

- State law says we shall "By 2035, reduce overall emissions of greenhouse gases in the state to twenty-five percent below 1990 levels, and by fifty percent by 2050."
(<http://apps.leg.wa.gov/rcw/default.aspx?cite=70.235.020>)

State law requires agencies distributing capital funds for infrastructure projects to consider whether the entity (WSDOT) has adopted policies to reduce greenhouse gas emissions. The agencies must consider whether the project is consistent with the state's limits on the emissions of green house gases and statewide goals to reduce annual per capita miles traveled.

The federal government – the DOT, the EPA and House of Representatives -- have shifted policies away from vehicular capacity and congestion relief and toward mobility by other modes in order to reduce greenhouse gas emissions and reduce oil dependence.

At the end of 2009, the U.S. Environmental Protection Agency (EPA) announced that greenhouse gases (GHGs) threaten the public health and welfare of the American people. EPA also announced their finding that GHG emissions from on-road vehicles contribute to that threat.

Ray La Hood, Secretary of the US Department of Transportation, announced in March 2010 a dramatic change from existing policy regarding transportation funding. This "major policy revision" aims to give bicycling and walking the same policy and economic consideration as driving. "Today I want to announce a sea change.... This is the end of favoring motorized transportation at the expense of non-motorized." A major thrust of the DOT's current priorities are to foster livability, sustainable communities, and reduced car dependence. One of their six principles is: "**Provide more transportation choices** to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health."

The American Clean Energy and Security Act passed last summer set the goal of reducing greenhouse gas emissions by 17% from 2005 levels by 2020, and 83% by 2050.

To summarize, climate change is the most significant and daunting environmental issue facing this generation. Many agencies at all levels are working to shift how mobility is understood and delivered to achieve reduced pollution, increased choice, and reduced economic dependence on fossil fuels. Countless scientific and policy analyses of how to meet these goals arrives at the same fundamental conclusions: decision makers and agencies must commit to more alternative transportation, and pro-actively plan for reduced Vehicle Miles Traveled, in order to achieve reductions in GHG emissions. The preferred alternative directly violates statutory benchmarks, goals and policies at all levels of government by aiming for and facilitating increased car usage.

Action: In light of City, County, State, and Federal policies aimed to reduce greenhouse gas emissions from vehicles, the EIS should aim for reductions in emissions and VMT. Greenhouse gas emissions should be compared for all the alternatives. The analysis should examine the cumulative use impacts created by the decision in this corridor – not just the trips on the facility, but the area wide effects generated by the decision in this corridor.

Beyond policies, there is practical evidence that calls into question the narrow focus on vehicle capacity in this corridor.

This project uses PSRC forecasts for future travel, which extrapolates past growth rates for driving. However, the empirical data for the Seattle area and this facility make those assumptions dubious. According to the City's annual counts, usage of the Alaskan Way Viaduct has been flat over the past twelve years. Research from Sightline Institute (<http://www.sightline.org/publications/reports/braking-news-gas-consumption-goes-into-reverse/>) reveals car travel has been declining the past 13 years in our region. A new study by Advertising Age reveals that young people (16-20 years old) are driving 20 to 25% less than their parents' generation. (http://adage.com/digital/article?article_id=144155).

Forty percent of regional trips are less than 2 miles in length, which means it would be viable to serve a significant portion of SOV trips by biking, walking, or transit.

Demographics are changing, societal values are changing, the energy economy is changing, and land use and transportation patterns in Seattle are changing. Actual rates of driving have been flat or declining. This project should plan for serving Seattle's future travel patterns and policies, not the past.

Furthermore, this inaccurate portrayal of "need" for car capacity is worsened in this DEIS by ignoring the fact that travel on the viaduct is expected to decrease by about 1/3 during the 4.5 years of construction. After 4.5 years, travel patterns will have already adjusted to the lower capacity. (Ch 6, pg 139) People and freight will have found other routes, modes and solutions, and our local travel patterns will have shifted. At that point, the 'need' will be different. It is fallacious for this EIS to predict a spontaneous surge in demand in car travel from perhaps 70,000 trips a day before the new tunnel opens to 117,000 trips a day after it opens. It is misleading for this analysis to justify such an expensive facility on predictions of 'need' that are contradicted by empirical evidence.

Action: It would be **more accurate -- and compliant with City and State policy - for this project to plan for a reduced number of car trips**, and increased use of transit, biking, and ride-sharing. Evaluation measure should compare access and mobility for people and freight, and favor solutions that provide viable alternatives to travel by car.

8. This EIS should carefully consider the public safety risk of delaying viaduct closure from the promised date of 2012 to 2015, 2016, or beyond.

By default or by design, the Viaduct is severely damaged and will come down. The city and region desperately need interim traffic solutions to be in place before it does. Plans for dealing with the loss of the viaduct have been developed. Many of the elements in these plans are necessary for local access, whatever the final decision for viaduct replacement. These alternative traffic solutions should be implemented now, so the viaduct may be closed earlier if necessary, and public safety is not eroded any further by delaying the promised closure date of 2012.

Linking Viaduct removal to the opening of the deep-bored tunnel idea only delays the inevitable closure and increases the danger. According to many experts in transportation planning and earthquake preparedness policy, it is better to bring the structure down in controlled fashion than to let it pancake during a seismic event. http://seattletimes.nwsourc.com/html/opinion/2002837776_viaduct02.html Furthermore, analysis in the DEIS states that the viaduct is particularly vulnerable to damage from soil settlement during construction, if the bored tunnel is pursued, and may fail before 2016.

Action: Seattle DOT should work with WSDOT to update plans for local access and mobility without the viaduct, based on the Center City Access Strategy and Urban Mobility Plan, and prioritize these investments NOW. A seismic event or further settlement may damage the viaduct at any time, and the

systems needed to provide mobility must be ready to go. . **The project should prepare to provide mobility and access in case the viaduct must be closed sooner than 2016.**

9. The high cost of tolls, in combination with the significant degradation of transit travel times, is particularly onerous for low-income citizens. This must be evaluated as a social justice impact for the preferred alternative. This DEIS reveals WSDOT intends to charge tolls of up to \$4 each way for a trip through the tunnel. This could add up to hundreds of dollars in additional costs each week for taxi drivers, local freight movers, and any small businesses that provide delivery or site visits as part of their service. Further, the DEIS states that tolling significantly impairs transit service due to increased congestion. After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion is that “These effects would not be acceptable as part of a long term tolling solution.”

Action: This DEIS must analyze how the combination of high tolls, the default on the January 2009 promise of additional transit, and impairments to existing transit from congestion affects lower income people. How affordable is this toll for low and average income earners? Does the plan for high tolls and impaired transit support the State’s intention of improving mobility for everyone, or just wealthy car owners who can afford the toll?

10. The public and decision makers have been misled about the finality of a decision for the bored tunnel alternative in advance of comprehensive environmental review of impacts.

WSDOT has advanced design, development, and contracts for the deep bore tunnel far beyond the other alternatives. SEPA law requires that a final Environmental Impact Statement be completed *before* decisions are made that commit the government to a particular course of action. Until the FEIS is completed, agencies are precluded from making decisions that pre-judge the choice among alternatives.

There are many indications, especially in the State’s advocacy efforts and public communications, that the playing field has been tilted and the tunnel is in a substantially favored position already:

- Preparation of, and pressure to sign, MOAs for the tunnel with the City,
- Significant development of the bored tunnel design,
- Preparation of contracts with tunnel construction bidders, with the intention to sign them before the FEIS is issued, and
- Numerous statements by state officials that a “Decision has already been made and would not be revisited,” which have deceived and confused the public about the status of environmental review and record of decision.

WSDOT’s actions effectively preempt any opportunity for a deliberate and balanced decision-making process after environmental analysis is complete. Giving the tunnel alternative a two-year head start, and investing substantive resources into creating the illusion that it is the only possible solution at this point – before harms and risks and negative impacts are made known to the public – directly violates SEPA. As the public is just now learning, the tunnel alternative comes with a high price tag, many unresolved challenges, and significant impact to the City of Seattle.

To summarize the shortcomings that are finally revealed in this DEIS: The preferred alternative only solves a portion of the transportation challenge. Unless significant investments to local mobility are added to the preferred alternative, it would create havoc on city streets for people and freight. It has a very high price but only benefits a few of the region’s travelers. High toll rates render the capacity useless for 2/3 of potential SR-99 users. Construction might do irreparable damage to historic buildings and the Pioneer Square Historic District, and WSDOT may not have sufficient budget to offer protection or mitigation. Funding plans reveal a high risk of cost escalation, meager contingency reserves, and no funding plan for potential cost overruns.

Action: This DEIS should compare current and reasonable alternatives to the tunnel, alternatives that improve access and mobility in Seattle while protecting the opportunity for a new waterfront -- in case its merits do not outweigh the costs and risks.

11. Decision makers and the public deserve complete clarity on the promised project scope, budget, and security of funding.

With the data that exists now, it is practically impossible for decision makers to get a firm fix on full cost of the preferred alternative. It is not clear what elements of the project scope are funded and what might be cut, the full cost of protecting against or mitigating for expected harm is not known, and contingency reserves necessary for potential future problems seem to have been mostly drained.

The funding side is as unclear. There is a firm budget cap of \$2.4 billion on the state's resources. That leaves \$700 million in unsecured commitments. The Port of Seattle's promised \$300 million has not materialized, and may not. This \$400 million from future toll revenues may not be realistic. There is significant doubt as to whether the state will be able to float bonds on future tolling revenue because the state is at the limit currently for debt capacity, and both SR-520 and SR-99 projects are dependent on raising \$2.4 billion in new bonds. Initiative 1053 also casts doubt on whether WSDOT can impose tolls without action by the legislature, which may not happen. Finally, there is firm resistance from all parties – City, County, and State -- to accept liability for the cost overruns, overruns that are likely to occur with 40% probability.

Action: WSDOT must prepare a table comparing full project costs (including reasonable contingency reserves), and a full funding plan, (including back up plans if the unsecured funds fall through, and willing sources for potential overruns) and present it to the public and decision makers.

Summary

1. The tunnel alternative only answers part of the viaduct replacement challenge. Trips that bypass downtown Seattle neighborhoods are well-served; access into Seattle neighborhoods for vehicles, freight and transit users is not. As the preferred alternative is described, the negative impacts to local streets are egregious. When the diversion effects of tolling are included, these negative impacts are unacceptable – and cast doubt on whether the alternative as it will be used meets the statement of purpose and need.

WSDOT must develop a plan to show how WSDOT will provide good access to downtown Seattle for people and freight, and prevent, resolve, or mitigate the intolerable impacts to the streets of Pioneer Square Historic that are caused by the preferred alternative. Solutions such as additional transit, routing traffic away from Historic District streets, transportation demand management, improvements to I-5, and relocating the interchange elsewhere should be analyzed for their ability to enhance local mobility and access while protecting Historic District streets.

2. WSDOT must develop a mitigation plan to show how WSDOT will prevent, resolve, or mitigate potential damage to all historic buildings along the tunnel route, and in the Pioneer Square historic district and underground. This plan should include 3-D laser scans of each building before, during, and after construction. Damage must be arrested as it is occurring, if significant. Laser scans are necessary to identify which buildings must be repaired afterward.

3. A full budget for all alternatives should be developed that identifies the appropriate responsibility and source for each line item. **This is a state project, and the state must show it can cover costs for the preferred alternative, including:**

- The bored tunnel itself,
- Other project components promised as part of the program (lids over the cut and cover sections, improvements to the street grid around the interchanges, reconnecting three streets across SR-99 in

- South Lake Union, access to downtown Seattle, urban design and landscaping around the portals, viaduct removal and replacement of Alaskan Way surface street, etc),
- Solutions for local access and improvements to local streets,
- Protection of historic buildings and the Pioneer Square Historic District,
- How WSDOT will cover costs if they escalate from the 60% confidence interval (\$1.96 billion) to the 95% confidence interval (\$2.37 billion), and
- Any further cost escalations that may occur later due to the risk of boring in such complex soil and water conditions, under valuable real estate and intense commercial activity.

4. There is still significant uncertainty around whether the preferred alternative can be fully funded. Decision makers deserve a clear picture of the alternative's basic financial viability. **WSDOT should prepare a comprehensive funding plan** for the preferred alternative that addresses:

- Clear description of what project elements promised as part of the tunnel program are covered by the minimal state allocation of \$2.4 billion, the project budget of \$3.1 billion, and what are not,
- What the project will do if the \$700 million of project funding is not secured,
- What contingency funds remain unallocated, and how much this is expressed as a percentage of full \$3.1 billion project budget,
- How WSDOT plans to exceed the constitutional debt limit to borrow \$2.4 billion necessary for both 520 and SR-99 projects concurrently, and
- Exactly how potential cost overruns will be covered, given the unresolved contention between governments.

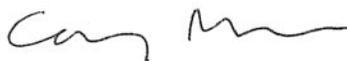
The public and elected decision makers at the City and State deserve a clear picture of total project costs (item 3 above) compared to the full funding plan (item 4.) WSDOT should explain how they will address any shortfalls, and what elements or the overall program scope are vulnerable to being cut. The City of Seattle, local neighborhoods, the federal GSA, or private property owners cannot be held liable for costs of the State's project.

"Measure twice, cut once" for funding would prevent a worst case situation: if the tunnel project is started but runs into trouble, and additional funding is not unavailable. Existing funds could be consumed, the project left incomplete, leaving a further degraded Viaduct intact and no money for transportation and waterfront improvements. That situation would represent a miserable failure of leadership in pursuing a project with full knowledge of risk, but without sufficient funding or a back-up plan.

It is unfortunate that decisions made by WSDOT in the early stages of drafting this DEIS document led to such a flawed evaluation. Many of the concerns described here were raised in early 2009 with WSDOT and SDOT, again in late 2009 in multiple EIS scoping letters from Seattle organizations, and once again by City officials in July 2010 when an early draft was released. The sooner WSDOT rectifies these errors and omissions, the sooner the viaduct replacement project can get back on track. Decision-makers in Seattle and the State are counting on accurate and robust information so they can assure a final decision provides public safety, mobility, and access for the future – while fully protecting Seattle's assets -- at a cost effective price.

Thanks for your consideration of these comments.

Sincerely,



Cary Moon
Director, People's Waterfront Coalition



Preservation Development
Authority Council

Rick Sever
Chair
Karen Breckenridge
Sharon Coleman
Andrea Divoky
Fauna Doyle
James Fearn
Michael Herschensohn
Mary McCumber
Pete Mills
Rico Quirindongo
Marcia Wagoner

Kathleen Brooker
Executive Director

Foundation
Board of Directors

Michael Herschensohn
President
James Fearn
Gary Gaffner
Rick Sever

13 December 2010
Via Email

Angela Freudenstein
Alaskan Way Viaduct Replacement Project
Washington State Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104

Re: Comments on the Supplemental DEIS and Section 4(f)
Evaluation for the Alaskan Way Viaduct Replacement Project

Dear Ms. Freudenstein:

This letter provides comments on the 2010 Supplemental Draft Environmental Impact Statement (SDEIS) for the Alaskan Way Viaduct Replacement Project. I am writing on behalf of Historic Seattle, which is Seattle and King County's only nonprofit membership organization dedicated to preserving our architectural legacy. Our mission is to educate, advocate and preserve. Historic Seattle is also a Section 106 Consulting Party in this process.

From our review of the SDEIS and Section 4(f) Evaluation, the most adverse impacts appear to be in the Pioneer Square Historic District, listed on the National Register of Historic Places and designated as a City of Seattle historic district. **Following are our concerns regarding impacts to historic and cultural resources.**

-The Pioneer Square Historic District as a whole will be adversely affected, directly and indirectly.

In the Section 4(f) Evaluation, the historic district is not included as a "resource subject to use under 4(f)," but some individual resources within the district are subject to use. How does 4(f) apply in a National Register-listed district such as the Pioneer Square Historic District? Why are the effects on the district as a whole not considered an impairment on the district?

Pioneer Square is the city's original business district defined by the interplay of buildings and structures, system of alleys, sidewalks, areaways, and streets. The pedestrian-friendly character of the district will be greatly impacted by the tens of thousands of vehicles expected to go through city streets (specifically Pioneer Square streets) as a result of the proposed south portal for SR 99. Can this old and historic infrastructure, built on fill, carry the heavy loads and volumes of traffic that are projected? Since there is no central downtown access proposed, Pioneer Square will be taking the "hit" as a thoroughfare for city traffic. Is there a plan to deal with these traffic impacts to the streets of the historic district to protect its pedestrian character?

The Section 106 Cultural Discipline Report (Appendix I) does not adequately recognize indirect effects to the historic district. It focuses on direct effects to specific buildings during construction. How will the considerable traffic impacts to the historic district be dealt with after construction of the preferred alternative (Bored Tunnel) is completed?

-Building Damage Assessment

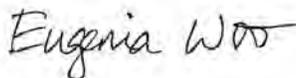
Exhibit 6-2 (Potential Effects on Historic Properties) in Appendix I (pp. 97-98) focuses on potential damage to 15 buildings within the Pioneer Square Historic District and outside the district. How accurate are the effects determination? What happens if the effects are greater than anticipated? The majority of the effects are classified as “slight” at this point. What if, in reality, they become “moderate” or worse? What are the proposed actions to deal with this potential?

The building damage assessment (pp. 95-96) focuses on the Western Building and Polson Building, both contributing resources to the historic district, because they will be adversely affected by construction. Section 6.2.1 (Built Environment Resources, p. 103) states that (in reference to the Western Building) “Given the current condition of the building, demolition may be the only safe option.” It goes on to say, “Further analysis of the building options is being performed.” What are these options? Where are the structural engineer’s report and cost estimates for stabilizing the structure? Are there different ways to structurally stabilize the building? A temporary, exterior, steel frame is mentioned as needed to stiffen and strengthen the building. A temporary exterior, steel frame was used to shore up the Cadillac Hotel Building in Pioneer Square after the 2001 Nisqually earthquake so there is precedent in the district for similar treatment. Many also thought the Cadillac Hotel could not be saved after the earthquake, yet it was successfully rehabilitated and since 2005, has stood as a model for restoration in Pioneer Square. Granted, the foundation conditions are probably different and there are other issues at play here.

WSDOT should consider carefully the ramifications of demolishing a contributing resource in the Pioneer Square Historic District. The district has not lost a building in a long time (if you don’t count the King Dome). The point is made clearly in the SDEIS that the existing condition is poor but this takes nothing away from its value to the district. Neither Section 106 nor Section 4(f) take cost into consideration. It appears the proposed mitigation measures for the Polson Building would stabilize the structure during construction and not jeopardize it.

Thank you for the opportunity to comment.

Sincerely,



Eugenia Woo
Director of Preservation Services



December 13, 2010

Angela Freudenstein
Washington State Department of Transportation
Alaskan Way Viaduct Replacement Project SDEIS
999 Third Ave., Suite 2424
Seattle, WA 98104

RE: Alaskan Way Viaduct (SR99) Replacement Project – SDEIS

Dear Ms. Freudenstein,

The Washington Trust for Historic Preservation received information on CD related to the Supplemental Draft Environmental Impact Statement (SDEIS) for the Alaskan Way Viaduct Replacement Project. Thank you for sending this information. As a consulting party through the Section 106 process for this project, the Washington Trust appreciates the opportunity to provide comment.

After reviewing material included in the SDEIS, the Washington Trust agrees that a number of cultural resources will be adversely affected. In addition, while proposed best practices utilized before, during and after construction are anticipated to prevent adverse effects, the potential for other cultural resources to experience unanticipated adverse effects remains.

Both the Viaduct, slated to be removed, and the Battery Street Tunnel, slated to be decommissioned, have been identified as eligible for inclusion in the National Register of Historic Places (NRHP). As noted in the SDEIS, HAER documentation has been completed for these resources, while other interpretive programs are under development. The Washington Trust looks forward to learning more about the scope and breadth of these interpretive elements and engaging in discussions related to additional mitigation measures for the loss of the resources.

Numerous historic resources have been identified within the Area of Potential Effect (APE). The SDEIS anticipates that the majority of these resources will not be adversely affected by the tunnel and may experience damage classified as 'very slight to slight' given the proposed monitoring and grouting measures. While these monitoring and grouting measures seem appropriate, given the intensely complicated nature of the project, comprehensive contingency measures should be in place in the event adverse effects become evident and damage increases as a result of construction. The timeframe for monitoring settlement is described in the SDEIS as being 6 months prior to construction through 1 year after the project is completed. Consideration should be given

Ms. Angela Freudenstein
December 13, 2010
Page Two

to extending this window on either end given the fact that settlement from construction activity and subsequent vibration effects due to vehicular traffic can take a long time to manifest.

Of paramount concern are the Western and Polson Buildings, located near the proposed south portal tunnel entrance. Each building serves as a contributing element to the Pioneer Square Historic District. Due to the deteriorated existing condition of the Western Building, the SDEIS notes that demolition may be the only safe option. Demolition of the Western Building should be considered only as a last resort and after the discovery of clear evidence suggesting the building would not withstand construction activity related to the tunnel boring machine. To this end, the Washington Trust respectfully requests a copy of the structural engineering report for the Western Building. While structural reinforcement measures have been implemented to the Polson Building, the SDEIS notes the potential for 'severe to very severe damage' to occur. Because of this, and due to the fact that the Polson Building shares a common wall with the Western Building, considering should be given to adding the Polson Building as subject to use under Section 4(f) review.

The Pioneer Square Historic District constitutes an irreplaceable historic resource for the city, state and region. While much consideration has been given to the buildings, it seems that other elements related to the district have not received the same attention. For example, the areaways below grade are associated as character-defining features of historic buildings. The SDEIS notes that no adverse effect is anticipated to those areaways that retain historic integrity. Areaways, even if minor settlement occurred, may be more vulnerable to damage than their above ground counterparts. It may be prudent to pay closer attention to these elements even though the above ground resources with which they are associated are not anticipated to be adversely affected.

Finally, traffic in and around the Pioneer Square Historic District is a concern. While removal of the Viaduct may enhance the historical context of the district (a somewhat problematic claim made in the SDEIS), it will certainly increase traffic. Yet the SDEIS does not highlight any adverse effects for the historic district related to traffic either during or after completion of the project.

The Washington Trust for Historic Preservation looks forward to addressing these issues and others with all stakeholders involved. Thank you for the opportunity to comment on this important and monumental project.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Moore". The signature is fluid and cursive, written in a professional style.

Chris Moore
Field Director



United States Department of the Interior

NATIONAL PARK SERVICE

Klondike Gold Rush National Historical Park - Seattle Unit
319 Second Avenue South
Seattle, Washington 98104

IN REPLY REFER TO:

L7619 (KLSE)

December 13, 2010

Angela Freudenstein
Alaskan Way Viaduct Replacement Project
999 3rd Ave, Suite 2424
Seattle, WA 98104-4019

Dear Ms. Freudenstein:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Alaskan Way Viaduct Replacement Project. The National Park Service supports any alternatives which will improve the safety of motor vehicle travel through downtown Seattle. However, I would like to share concerns regarding potential adverse effects outlined in the DEIS. This letter's purpose is to encourage solutions and mitigation strategies that would result in continued preservation of historic character for the Pioneer Square National Historic Landmark, the Pioneer Square National Historic District, and the operations of Klondike Gold Rush National Historical Park.

The current DEIS notes that the Polson Building and the Western Building, both contributing buildings to the Pioneer Square National Historic District, may experience settling during the proposed project which could result in severe damage to the structures. The document mentions that even with mitigation, the Western Building may require demolition. As both these buildings contribute to the historic character of the District, I would highly encourage the planning team to continue to develop solutions that would prevent adverse effects resulting from a loss of these particular historic resources; as well as minimize damage to the additional 12 historic structures listed in the DEIS.

The DEIS also includes information regarding a significant increase in traffic through the Pioneer Square National Historic District. The District is currently a pedestrian friendly neighborhood, conducive to the provision of walking tours by National Park Rangers for visitors to Seattle. The National Park Service is working with the Alliance for Pioneer Square and more than 40 public stakeholders to develop the *Trail to Treasure* self guided walking tour through the District. I am concerned that increased traffic volume, as proposed in the DEIS, would significantly inhibit the safe and pleasant provision of visitor services that Klondike Gold Rush NHP provides along the streets and sidewalks of Pioneer Square and impact the *Trail to Treasure*. These types of visitor services draw tourists to Pioneer Square, significantly contributing to the economy of the area. I would encourage you to seek traffic solutions and mitigations that do not increase through traffic in Pioneer Square, but rather improve local traffic conditions, provide adequate parking for visitors, and markedly contribute to a safe, pleasant pedestrian atmosphere.

Once again, thank you for the opportunity to provide comments on the DEIS for the Alaskan Way Viaduct Replacement Project.

Sincerely,


Karen Beppler-Dorn
Superintendent

From: allisonpaints@gmail.com [mailto:allisonpaints@gmail.com]
Sent: Sunday, November 07, 2010 8:14 PM
To: Alaskan Way Viaduct
Subject: AWW Feedback

Sent from: Allison Agostinelli

Address:

City:

State: WA

County:

Zip:

Email: allisonpaints@gmail.com

Phone:

Comments:

After reading the following report my understanding is that the building that I have a lease for 4000 sq feet and have about 14 artists on my floor that I rent to at 619 Western will likely not survive the impact of the viaduct removal. We were well aware that the building would eventually come down but the timeline is confusing. Basically I am trying to ask how long we have. I am sorry to see that we do not have a cultural impact on the environment according to the report. Perhaps someday someone will drill a hole and find evidence of us. ALASKAN WAY VIADUCT REPLACEMENT PROJECT 2010 Supplemental Draft Environmental Impact Statement

From: Erik Macki [macki@seanet.com]
Sent: Tuesday, November 16, 2010 3:23 PM
To: AWV SDEIS Comments; peter.hahn@seattle.gov;
mike.mcgin@seattle.gov; richard.conlin@seattle.gov;
sally.bagshaw@seattle.gov; tim.burgess@seattle.gov;
sally.clark@seattle.gov; jean.godden@seattle.gov;
nick.licata@seattle.gov; bruce.harrell@seattle.gov;
mike.obrien@seattle.gov; tom.rasmussen@seattle.gov
Subject: Public Feedback on the Deep-Bore Tunnel Project
Importance: High

Dear Mr. Hahn and WSDOT team,
Dear Mayor McGinn, dear Council Members Conlin, Bagshaw, Burgess, Clark,
Godden, Licata, Harrell, O'Brien, and Rasmussen,

I am writing to provide feedback on the Deep-Bore Tunnel Project and the SDEIS as a part of the public comment period through December 13.

First as a general comment, I personally remain confused about the rationale of a project whose purpose is to ferry drivers from north of Seattle underneath Seattle to south of Seattle, considering that the current Alaskan Way Viaduct has no fewer than seven exits into downtown Seattle itself. It seems odd for Seattle to paying for a road whose purpose is to get drivers through, and not into, Seattle. The Mayor has communicated fairly cogent arguments to the public against the tunnel project, but the members of the City Council and certainly the state and WSDOT have not done so other than speak in platitudes and generalizations (not borne out by the new SDEIS, in fact, I might add). As a result, I would like to remind the City Council that their support of the project will haunt them at election time if Seattleites end up paying for its very likely cost overruns, if Pioneer Square is damaged, and particularly if downtown becomes swamped with 40,000 or more extra cars per day, as the SDEIS says it will.

My first comment on the SDEIS specifically is that the tunnel CANNOT destroy any structure in Pioneer Square. The value to future generations of an intact Pioneer Square far outweighs any transportation benefit from the tunnel project, and the SDEIS indicates that at least TWO important buildings (and others) are at risk of COLLAPSE from the Deep-Bore Tunnel Project, to say nothing of subgrade flooding and other issues throughout downtown caused by the new tunnel structure. No responsible representative of the people of the City of Seattle who is at all mindful of our history and heritage can rightfully condone a project that so directly endangers a cornerstone of our history. Once news of these impacts to Pioneer Square become more widely known, the furor will be deafening. Why not avoid the furor in advance by sufficiently addressing this issue in advance?

My second comment on the SDEIS is that the project must provide ACTUAL ACCESS TO THE CITY OF SEATTLE and not merely bypass Seattle. As currently planned, the Deep-Bore Tunnel Project does not even remotely do this, either by means of actual downtown exits or by means of improved public transit into and out of downtown. In fact, the existing plan merely shifts 40,000 cars onto downtown streets, which--if you really think about it--obviates any need for the tunnel in the first place. The current plan is shockingly myopic and not tenable as a transportation improvement project.

My last comment on the SDEIS is that no one has yet shown how to pay for the VERY LIKELY cost overruns. For instance, if damage is incurred to Pioneer Square, how will the repair of Pioneer Square be paid for? If the seawall caves in, how will the damage to downtown Seattle be paid for? If 40,000 extra cars are driving on Seattle's streets downtown, how will the added costs for maintenance and upkeep and traffic mitigation be paid for?

The SDEIS underscores how poorly thought-through the Deep-Bore Tunnel Project is, how poorly funded it is, and how damaging to Pioneer Square it will be. It's hard for me grasp why anyone, after reading the SDEIS, can think the tunnel project in its current form remains a good idea. The project needs serious and fundamental rethinking to address these three issues.

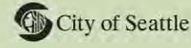
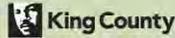
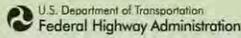
Sincerely,

-Erik Macki
1516 NE 98th St., Seattle, WA 98115

Ron Paananen
January 10, 2011

Attachment C – Analysis of Western Building Alternatives (Mimi Sheridan, The Sheridan Consulting Group)

Alaskan Way Viaduct & Seawall Replacement Program



MEMORANDUM

To: Kimberly Farley, WSDOT
From: Mimi Sheridan, AICP
Date: December 18, 2010
Subject: Analysis of Western Building Alternatives

1. PURPOSE

This memorandum discusses the proposed action alternatives for the Western Building and potential impacts of each one on the Pioneer Square Historic District. The purposes and significance of both the NRHP and local historic districts are provided as a basis for determining the impacts.

2. OVERVIEW

Engineering analysis indicates that the Western Building, a contributing property in both the NRHP and the local Pioneer Square historic districts, may experience severe impacts during the tunnel boring process. Because of the existing poor structural condition of the building, the estimated settlement of 2.4 inches may cause further extensive structural damage and the possibility of collapse. Four alternative action approaches have been developed: three structural rehabilitation options and building demolition.

The rehabilitation approaches would affect the building's exterior appearance to varying degrees, but not enough to make it a non-contributing building in the historic district. They would also reduce the rentable area of the building, making it more difficult for the owner to rent the building profitably. Conversely, the improved condition of the rehabilitated building may allow the owner to charge increased rents and may support increased property values in the historic district.

Demolition of the Western Building would deprive the historic district of an early warehouse building and would change the context of the western edge of the district. However, the change would not be significant enough to threaten its significance as a district.

3. WESTERN BUILDING

The six-story building was constructed in 1910 as a warehouse and is currently occupied by retail uses on the ground floor and artists' studios on upper floors. It is built of reinforced concrete, which represents an advance in construction knowledge and techniques over the brick and heavy timber construction used in earlier warehouses. The building is very simple in composition without the ornamentation seen in some warehouses of the era. Its primary defining feature is the fenestration, with a rhythmic pattern of original wood-sash windows on the east and west facades. The loading docks on the west facade are another distinguishing characteristic.

The building's design has been attributed to the prominent local architectural firm of Saunders and Lawton, who designed the adjoining Polson Building (1910). The firm designed numerous warehouse buildings in the early twentieth century. Several of them are in the Pioneer Square Historic District, including the Norton Building (1904), the McKesson and Robbins Building (1906) and the Westland Building (1907).

The Western Building is typical of warehouses of this period, with a facade of multi-paned windows in recessed bays set between multi-story piers. It measures approximately 100 feet by 134 feet. The north wall is a concrete common wall shared with the Polson Building. An interior concrete wall spans east-west the full height of the building. The roof and floor framing consist of laminated timber decking spanning to heavy timber girders, which are supported in turn by timber columns and the concrete walls. Concrete pile caps on timber piles of unknown size and depth support the walls and columns. At the top is a flat concrete cornice topped by a concrete parapet wall.

The Western Avenue (east) facade is divided into five bays separated by concrete piers. The ground level has five storefronts with wood-framed display windows; three of the storefronts retain their original six-light transoms. The three central bays of levels two to five have a row of four pivoting windows (three-over-three) topped by pivoting three-light transom windows. The single bays to each side of the central bays each have a row of three similar windows. The top level has the same standard window but without transoms.

The west facade, facing the railroad tracks and the waterfront, is characterized by a loading dock and two rolling doors. The windows on the upper stories are similar to those on the east facade.

On the south facade, facing a parking lot on Yesler Way, the only features are the windows, which are concentrated in the center of the building, with wide blank walls on each side. The second level has 14 six-light windows without transoms; the lower portions of these windows have been filled in with bricks. The upper floors have eight standard windows; those on the top floor have no transoms.

4. HISTORIC DISTRICTS

An historic district is a grouping of historic structures unified by history or by spatial and architectural characteristics. The group as a whole has greater importance and significance than the individual building; most of the buildings in a district would not be considered significant on their own. A district typically has one or more unifying themes, such as an architectural period or style or an important era in local history. A district reflects one or more specific historical periods, called the period(s) of significance. Buildings or other elements that were built during a district's period of significance, contribute to its theme(s) and are substantially unaltered are contributing properties; those that were built afterwards or that have been significantly altered are non-contributing properties.

4.1 Pioneer Square-Skid Road Historic District

The Western Building is a contributing property in the Pioneer Square-Skid Road Historic District, which was listed in the National Register of Historic Places (NRHP) in 1970. The boundaries were expanded in 1978 and 1988, toward the south and the east. The district nomination was updated in 2007, with considerable additional information on the history and significance of the district and the individual buildings.

The district is significant under two NRHP criteria.

- Criterion A: A property is associated with events that have made a significant contribution to the broad patterns of history.
- Criterion C: A property embodies the distinctive characteristics of a type, period or method of construction or represents the work of a master, or possesses high artistic values or represents a significant and distinguishable entity whose components lack individual distinction.

The areas of significance for the district, based on NRHP categories, are: architecture, commerce, community planning and development, engineering, industry, landscape architecture, politics/government, social history and transportation.

Contributing properties in the district date from one of four periods of significance:

- 1889-1899 The period of rebuilding the commercial district following the Great Fire of June 6, 1889
- 1900-1910 A period of explosive growth following the filling of the tidelands, including expansion of the rail yards and manufacturing/warehousing activities
- 1911-1927 Buildings associated with the World War I effort and other buildings of this period

- 1928-1931 Buildings and other elements associated with construction of the Second Avenue Extension

The Western Building dates from the second period of significance, when warehouses were a primary building type constructed in this area. The filling of the tidelands south of Pioneer Square allowed expansion of the rail yards and construction of King Street Station (1906) and Union Station (1911). At the same time, manufacturing and shipping from the nearby port increased. All of these activities encouraged warehouse construction. The Western Building is one of approximately 20 extant warehouses built in Pioneer Square in this period.

4.2 Pioneer Square Preservation District

The local special review district, known as the Pioneer Square Preservation District, was designated by the Seattle City Council in 1970, shortly before the district was listed in the NRHP. The purposes for creating the district are identified in SMC 23.66.100 as:

- To preserve, protect and enhance the historic character of the Pioneer Square area and the buildings therein
- To return unproductive structures to useful purposes
- To attract visitors to the city
- To avoid a proliferation of vehicular parking and vehicular-oriented uses
- To provide regulations for existing on-street and off-street parking
- To stabilize existing, and encourage a variety of new and rehabilitated, housing types for all income groups
- To encourage the use of transportation modes other than the private automobile
- To protect existing commercial vehicle access
- To improve visual and urban relationships between existing and future buildings and structures, parking spaces and public improvements within the area
- To encourage pedestrian uses.

The specific reasons for creating the district are listed in the same section of the code and are summarized briefly as follows:

- Historic significance, as the site of the beginning of the City of Seattle
- Architectural significance, as a unique collection of late nineteenth- and early twentieth-century buildings of similar materials, construction techniques and architectural style
- Social diversity, representing an area where people of many income levels and social strata live, shop and work
- Business environment, as a place with a diverse group of businesses ranging from specialty shops, restaurants, taverns and professional offices to light manufacturing and warehousing

- Educational value, because the restoration and preservation of the district will yield information regarding the way of life and the architecture of the late nineteenth century
- Geographic location, being sited adjacent to the waterfront, the central business district and the stadium.

5. PLAN ALTERNATIVES

Four alternative approaches to treating the Western Building have been proposed: three structural rehabilitation options and demolition.

- Option A Installation of an extensive latticework of steel bracing just inside the building walls on the east, south and west elevations.
- Option B Installation of steel trusses just inside the building walls, on the upper portion of the east, south and west elevations (from just below the fifth floor decking to just below the roof decking). Each truss would be supported by steel bracing. There would also be a two-story truss running north-south at the center column line of the building. The interior building framing would be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides.
- Option C The exterior concrete walls would be stiffened by a full-height reinforced shotcrete wall just inside the building cladding on each side of the building. The north concrete wall shared with the Polson Building and the interior concrete wall would be also be reinforced by a reinforced shotcrete wall on one side. The exterior walls would be supported by a braced frame. The interior building framing would be stiffened by a latticework of steel bracing on the first interior column line of the building on all four sides, extending from the foundation to the underside of the roof framing.

All three options would also include:

- Strengthening the foundation by replacing the deteriorated piles and/or installing new piles at the interior and exterior columns and walls, and attaching new concrete pile caps to the existing pile caps.
- Tying the floor structure together with steel elements connected to the timber floor structure. Timber girders would be tied to the interior timber columns. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations.
- Reinforcing the cracked column caps on the east facade with epoxy injection and a composite fiber wrap or concrete jacket.
- Adding horizontal channels at each level across the large wall cracks, bolted with epoxy to the sound concrete on either side of the crack.

- Undertaking compensation grouting following completion of the project to reduce building settlement.

Demolition: The building would be demolished prior to the start of tunneling. This process would include installation of bracing to safely control the demolition and avoid uncontrolled collapse. Measures would also be taken to safely detach the structure from the wall of the Polson Building and to make necessary repairs to the common wall following demolition, following the Secretary of the Interior's Standards.

6. IMPACTS OF THE PROPOSED OPTIONS

6.1 Reinforcement Options

- Option A would noticeably affect the exterior appearance of the building because the extensive steel latticework on the interior would be located next to the windows. The X-shaped bracing would be visible through most windows on all three sides of the building. This option would also reduce the rentable area of the building.
- Option B would affect the appearance of the building to a lesser degree than would Option A. The steel lattice would be visible only through the fifth and sixth floor windows. The rentable square footage would be reduced more than it would be under Option A.
- Option C would have a minimal effect on the exterior appearance of the building, as the bracing would be on the interior, but it would reduce the rentable area more than the other two options.

All three structural reinforcement options would be disruptive to the Polson Building and nearby residents for approximately a year during the construction process. The adjacent parking lot would be used as a staging area, reducing available parking in the district.

In summary, Options A and B would somewhat diminish the exterior appearance of the Western Building. However, it is unlikely that its integrity would be affected enough that it would no longer be a contributing property to the historic district. This is assuming that the building's primary characteristic, the multipaned wood-sash windows, are either retained or replaced in kind.

The reduction in rentable area could make it more difficult for the property owner to make a profit from the building. However, the building's improved condition may make it possible to get increased rents, which may contribute to increasing property values in the historic district.

6.2 Demolition

Demolition of the Western Building would diminish the integrity of the historic district in two ways:

- It would reduce the number of warehouse buildings and the number of examples of the work of Saunders and Lawton in the district. The information about early twentieth-century architecture and commerce that is provided by the building's presence would be reduced to some extent.
- Because of the building's location at the western edge of the district, demolition would alter the context and setting at Yesler Way, a major gateway into the district from the waterfront. The building's location near a corner and adjacent to a parking lot means that there would be a significant open space and a noticeable hole in the urban fabric of the district until the demolished building is replaced appropriately.

Although loss of the building would be a permanent change in the district, it would not affect the significance of the district to such an extent that it would no longer be considered a district (either NRHP or local). The district would still be eligible under NRHP Criterion A and Criterion C. The preservation district would also continue to meet the purposes for which the local district was established.

While the setting and context of the western edge of the district would be altered, the district boundary would not have to be changed if a replacement building is constructed that is compatible in size, massing, materials and use.

References

- Rick Conte to David Sowers. Western Building Action Plan Cost Estimates, October 29, 2010.
- Link, Karin. National Register Nomination Form, Pioneer-Square Skid Road Historic District, 2007.
- Terry Lundeen to David Sowers. Western Building Action Plan Alternatives-Revision 1, October 27, 2010.
- National Park Service. How to Apply the National Register Criteria for Evaluation, 1995.
- City of Seattle Historic Properties Database, 611 Western Avenue.
- Seattle Municipal Code 9SMC) 23.66.100,



**Washington State
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January 10, 2011

Eugenia Woo
Historic Seattle
The Dearborn House
1117 Minor Avenue
Seattle, Washington 98101

Dear Eugenia:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National

Register eligible; however, this will not diminish the property's aspects of integrity, whatever those may be.

AWVRP Historic Properties List

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Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

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12:05 PM - Purpose of the meeting (SRIF)

12:10 PM - The Western Building Decision Process (WSDOT)

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- b. Comments on SDEIS
- c. Effect to PSHD
- d. Effect on the Western Building Owners
- e. Effect on the Western Building Tenants
- f. Environmental Process
- g. Cost

1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List



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January 10, 2011

Karen Gordon
City of Seattle Historic Preservation Officer
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, Washington 98124-4649

Dear Karen:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

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If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVPR Historic Properties List
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Cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

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January 10, 2011

Charlie Sundberg
King County Historic Preservation Program
400 Yesler Way, Room 510
Seattle, Washington 98104

Dear Charlie:

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Sincerely,

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Cultural Resources Specialist
WSDOT ESO Mega Projects

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Cc: Phil LeTourneau, King County
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January 10, 2011

Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, Washington 98104

Dear Leslie:

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1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 10, 2011

Jennifer Meisner
Executive Director
Washington Trust for Historic Preservation
1204 Minor Avenue
Seattle, Washington 98101

Dear Ms. Meisner:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National

Register eligible; however, this will not diminish the property's aspects of integrity, whatever those may be.

AWVRP Historic Properties List

You will note that the list of historic properties is presented by groups: Properties individually listed in or eligible for listing in the National Register, properties that are contributing elements to the National Register-listed Pioneer Square Historic District, archaeological sites, and archaeologically sensitive areas. Within these groups, information is provided on the identity of each property; its National Register eligibility status, determined by the agencies in consultation with the SHPO; the project action that may affect the property; an assessment of the kind of effect the undertaking may have on the property (direct/indirect) along with the damage potential assessment used in the Historic, Cultural and Archaeological Resources Discipline Report published with the 2010 Supplemental Draft Environmental Impact Statement; and lastly, an effect determination made by WSDOT/FHWA in consultation with the SHPO. This is the background information that will be used to focus the consultation on resolving adverse effects.

Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

The purpose of the follow-up meeting on the Western Building will be to provide information on the decision to demolish the Western Building and will address a variety of issues in addition to historic preservation. The consulting party meeting will be devoted to just resolving the adverse effect of the AWVRP undertaking pursuant to Section 106; the follow-up meeting will address broader issues specific to the Western Building beyond Section 106. A preliminary agenda for the Western Building Follow-up Meeting is presented below.

12:00 PM – Introductions (SRIF)

12:05 PM - Purpose of the meeting (SRIF)

12:10 PM - The Western Building Decision Process (WSDOT)

- a. Safety
- b. Comments on SDEIS
- c. Effect to PSHD
- d. Effect on the Western Building Owners
- e. Effect on the Western Building Tenants
- f. Environmental Process
- g. Cost

1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Chris Moore, Washington Trust for Historic Preservation
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

January 25, 2011

Kevin M. Bartoy, RPA
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104
bartoyk@wsdot.wa.gov

**NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®**

**Western
OFFICE**

VIA EMAIL

**Re: Alaska Way Viaduct Replacement Project - Request from for
Consulting Party Status Under Section 106 of the National Historic
Preservation Act**

Dear Mr. Bartoy,

The National Trust for Historic Preservation is concerned about proposed impacts to historic properties caused by the Alaska Way Viaduct Replacement Project in Seattle, Washington, and, in particular, its potential effects on the Pioneer Square-Skid Road National Historic District. Of paramount concern are the proposed impacts of the Bored Tunnel, the currently preferred alternative, on both the District as a whole as well as upon individual contributing properties. The Washington State Department of Transportation (WSDOT) has concluded that this alternative has the potential to cause high levels of settlement that could severely damage at least two contributing structures within the District.

We are particularly apprehensive about WSDOT's proposed plan to demolish the Western Building, a 1910 warehouse and contributing structure within the District, located at 619 Western. The Western Building is characterized by a rhythmic pattern of original wood sash windows on its east and west facades and is also currently home to over 100 artists and their studios. We are additionally concerned that, contrary to the views of consulting parties, WSDOT has refused to acknowledge that the loss of this building and other Project impacts would cause an adverse effect upon or a Section 4(f) "use" of the District as a whole. In light of the potential impacts of the Project and the controversy surrounding the review process, the National Trust for Historic Preservation formally requests to participate both as a "consulting party" under Section 106 of the NHPA, pursuant to 36 C.F.R. § 800.2(c)(5), and by receiving and commenting on any documents prepared pursuant to Section 4(f).

Interests of the National Trust for Historic Preservation

The National Trust for Historic Preservation was chartered by Congress in 1949 as a private nonprofit organization for the purpose of furthering the historic preservation

Western Office

5 Third Street, Suite 707
San Francisco, CA 94103
P 415.947.0692
F 415.947.0699
E wro@nthp.org
Serving: AK, AZ, CA, HI, ID, NV, OR, WA &
Pacific Island territories

National Office

1785 Massachusetts Avenue, NW
Washington, DC 20036
P 202.588.6000
F 202.588.6038
E info@nthp.org
www.PreservationNation.org

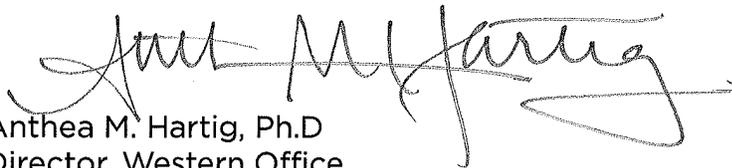
policies of the United States and facilitating public participation in the preservation of our nation's heritage. 16 U.S.C. § 468. With the support of our members nationwide, the National Trust works to protect significant historic sites and to advocate historic preservation as a fundamental value in programs and policies at all levels of government. The Trust has nine regional offices around the country, including a Western Office in San Francisco which is specifically responsive to preservation issues in Washington State.

Because of the National Trust for Historic Preservation's knowledge and concern about historic properties potentially affected by the project, we believe we can provide important information and a valuable perspective as a consulting party under Section 106 and in the review process under Section 4(f). Please include use the following contact in your distribution list for public notices of any meetings, and for the circulation of documents for comment.

Brian Turner, Esq.
Regional Attorney, Western Office
5 Third St., Suite 707
San Francisco, CA 94118
Brian_Turner@nthp.org

We look forward to participating as the review and consultation process moves forward for the Alaska Way Viaduct Replacement Project. Please feel free to contact me or Mr. Turner at 415-947-0692 if you have any questions or concerns.

Sincerely,



Anthea M. Hartig, Ph.D
Director, Western Office

cc:

Reid Nelson, Advisory Council on Historic Preservation
Charlene Dwin Vaughn, Advisory Council on Historic Preservation
Najah Duvall-Gabriel, Advisory Council on Historic Preservation
Allyson Brooks, Ph.D. Washington State Historic Preservation Officer
Karen Gordon, City of Seattle Historic Preservation Officer
Chris Moore, Washington Trust for Historic Preservation
Eugenia Woo, Historic Seattle



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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January 31, 2011

Flo Lentz
4Culture
101 Prefontaine Place S.
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Flo:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. It is anticipated that a maximum of two barges will be transported per day. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

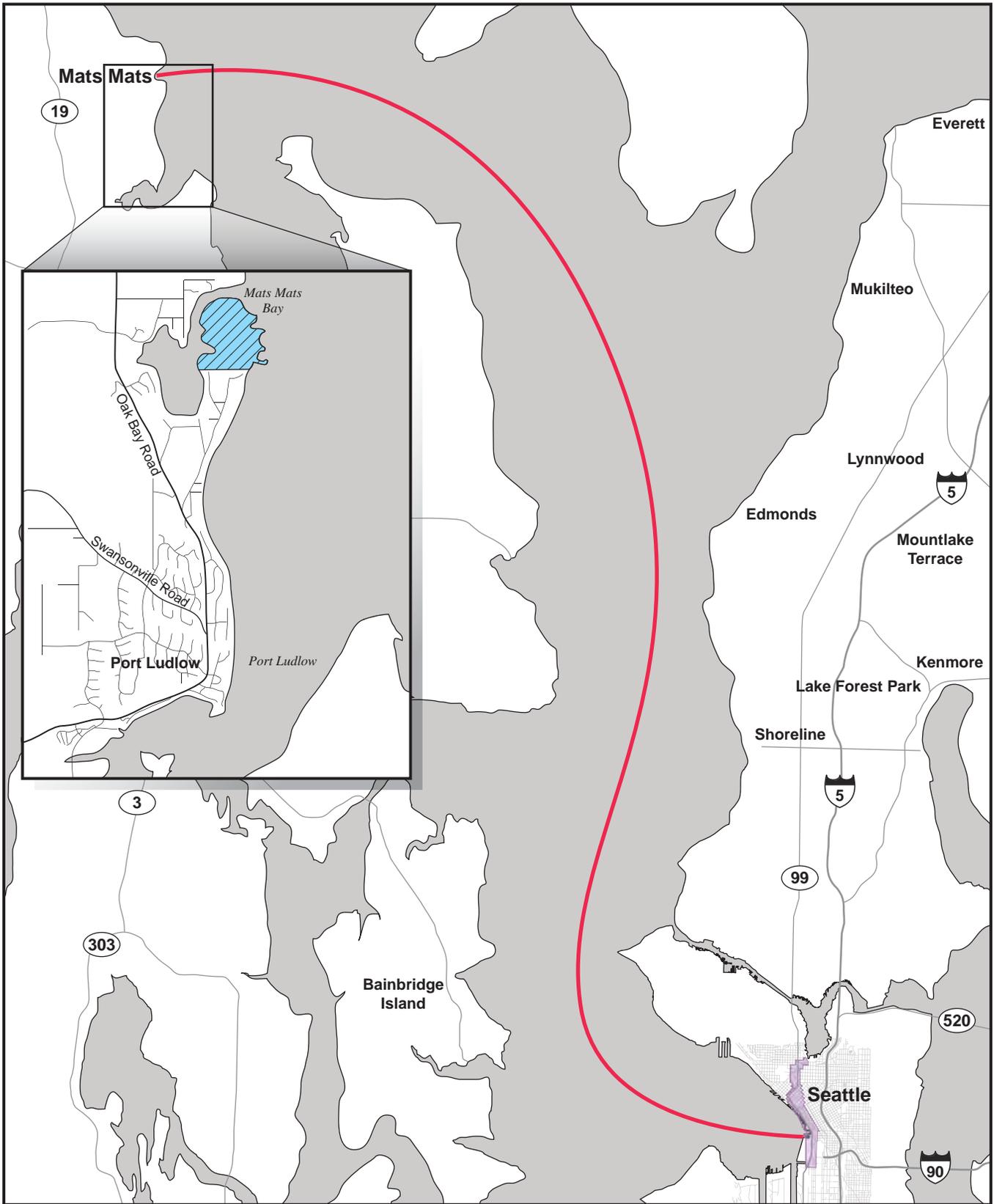
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

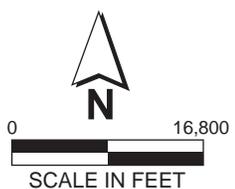
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: Matthew Sterner, DAHP
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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January 31, 2011

Eugenia Woo
Historic Seattle
The Dearborn House
1117 Minor Avenue
Seattle, Washington 98101

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Eugenia:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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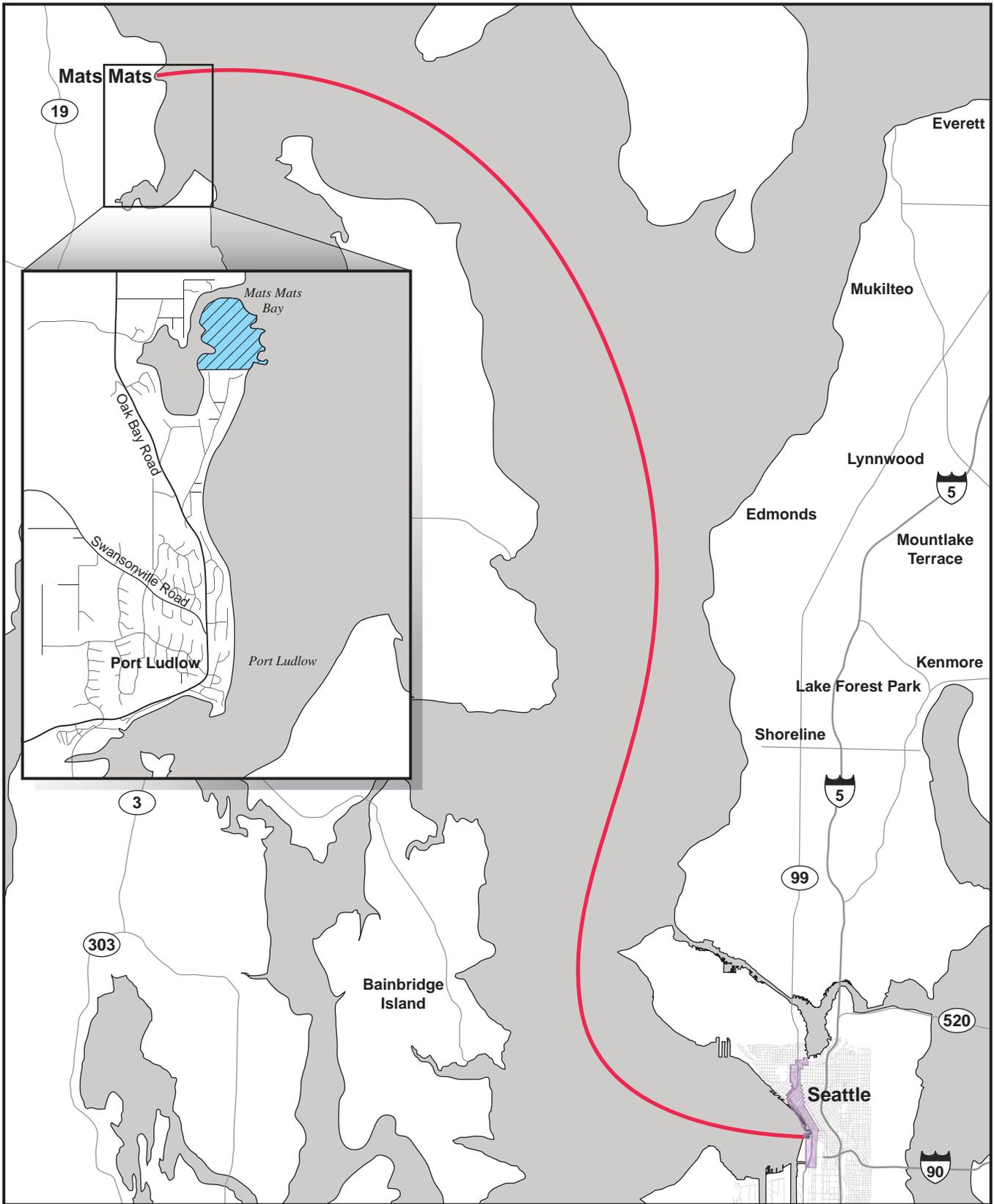
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

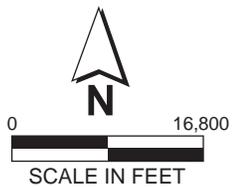
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Existing Mats Mats Quarry Facility with Work Locations Noted



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January 31, 2011

Karen Gordon
Historic Preservation Officer
City of Seattle
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, Washington 98124-4649

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Karen:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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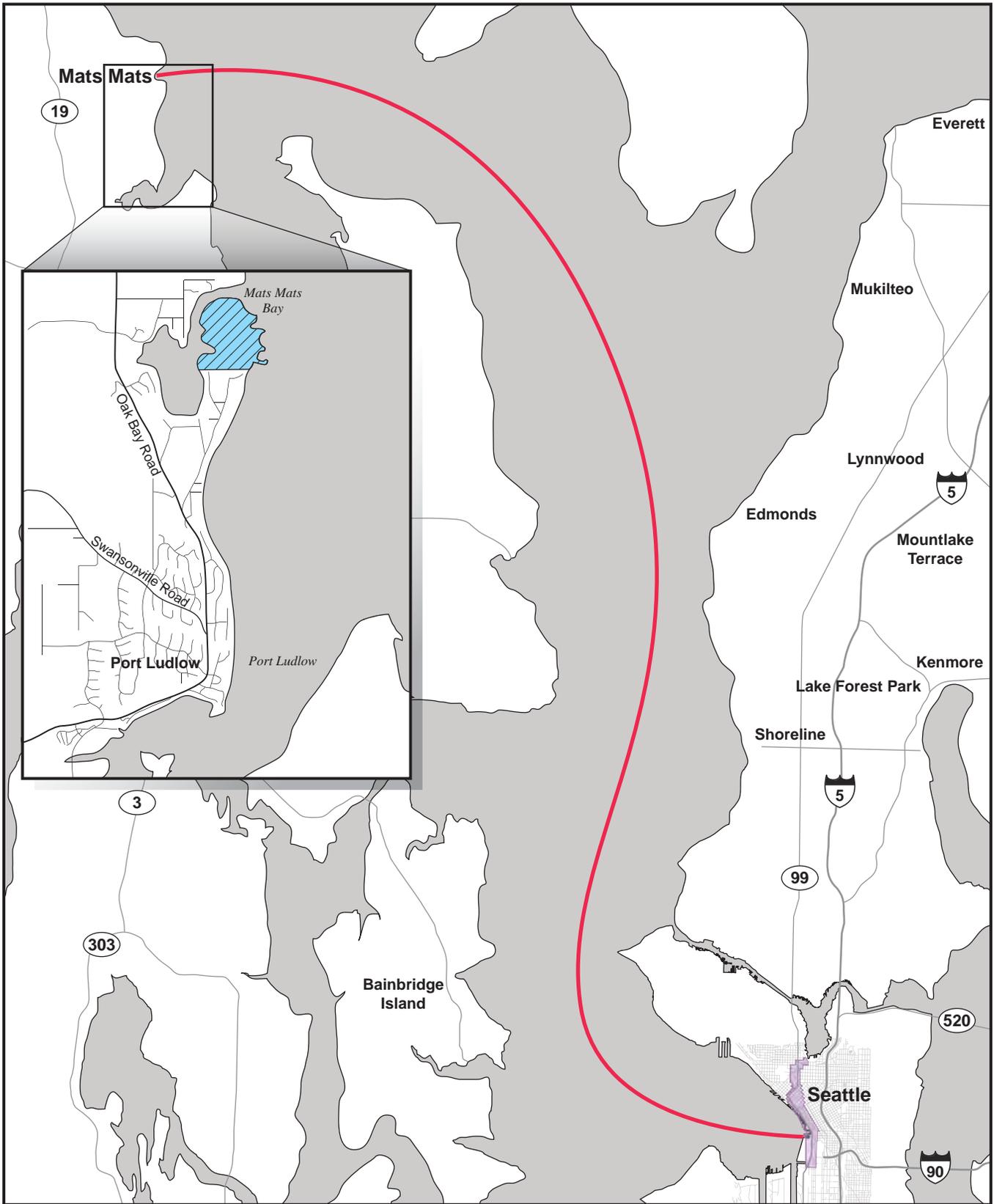
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Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

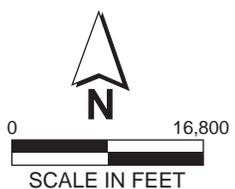
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January 31, 2011

Charlie Sundberg
King County Historic Preservation Program
Yesler Building
400 Yesler Way Room 510
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Charlie:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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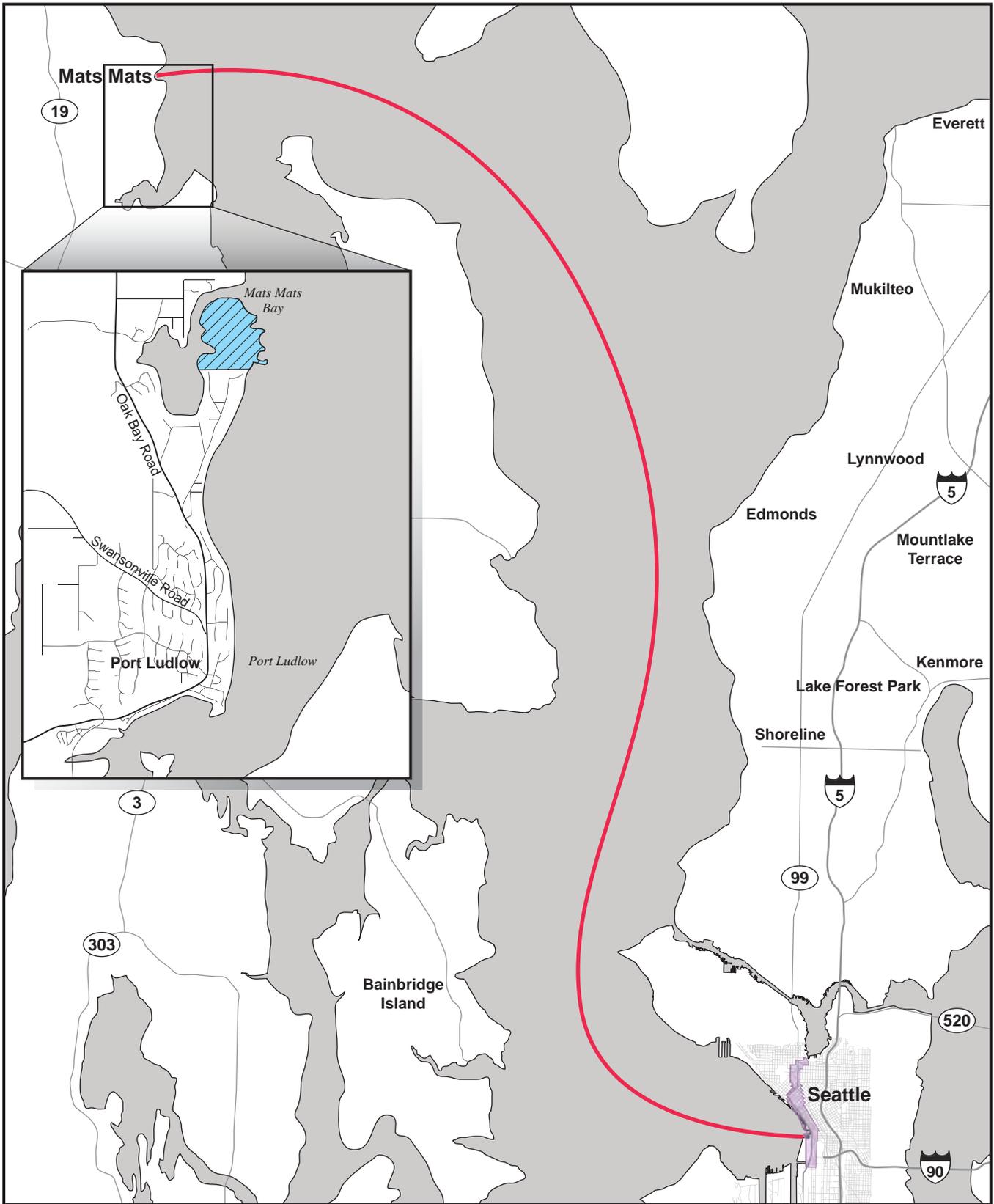
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

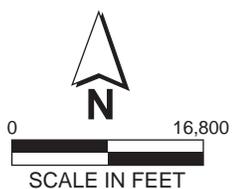
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Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



January 31, 2011

Dr. Anthea M. Hartig
Director, Western Office
National Trust for Historic Preservation
5 Third Street, Suite 707
San Francisco, California 94118

RE: Invitation to Consult—Section 106 Review for the SR 99 Alaskan Way Viaduct Replacement Project

Dear Dr. Hartig:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), acting on behalf of the Federal Highway Administration (FHWA), would like to formally initiate consultation related to compliance with Section 106 of the National Historic Preservation Act. The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) is currently planning the SR 99 Alaskan Way Viaduct Replacement Project. The preferred alternative for the project is a single-bore double-deck tunnel that bypasses the central waterfront area of downtown Seattle. The project replaces the viaduct's central waterfront section with a bored tunnel beneath downtown, surface street connections in the north and south ends of the project, decommissions Battery Street Tunnel, and demolishes the viaduct.

In a letter to Kevin Bartoy dated January 25, 2011, you requested that the National Trust for Historic Preservation would like to be included as a consulting party for Section 106 review. WSDOT is pleased to extend consulting party status to your organization. As a consulting party, WSDOT and FHWA would like to get your feedback on the approach and methods to resolving potential adverse effects to historic properties and involve you in the discussions related to mitigation alternatives. As part of this process, we will keep you informed about the project on a regular basis. I will be in touch with you shortly to provide existing project information.

If you have any questions or concerns, please feel free to contact me at (206) 805-2887 or e-mail at bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Services Director WSDOT MegaProjects) at (206) 805-2880 or hanson@wsdot.wa.gov.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist, WSDOT MegaProjects

cc. Brian Turner, NTHP
Randolph Everett, FHWA
Allison Hanson, WSDOT
Allyson Brooks, SHPO
Matthew Sterner, DAHP



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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January 31, 2011

Stanley Piha
Stanley Real Estate
2101 4th Avenue, #310
Seattle, Washington 98121

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Stanley:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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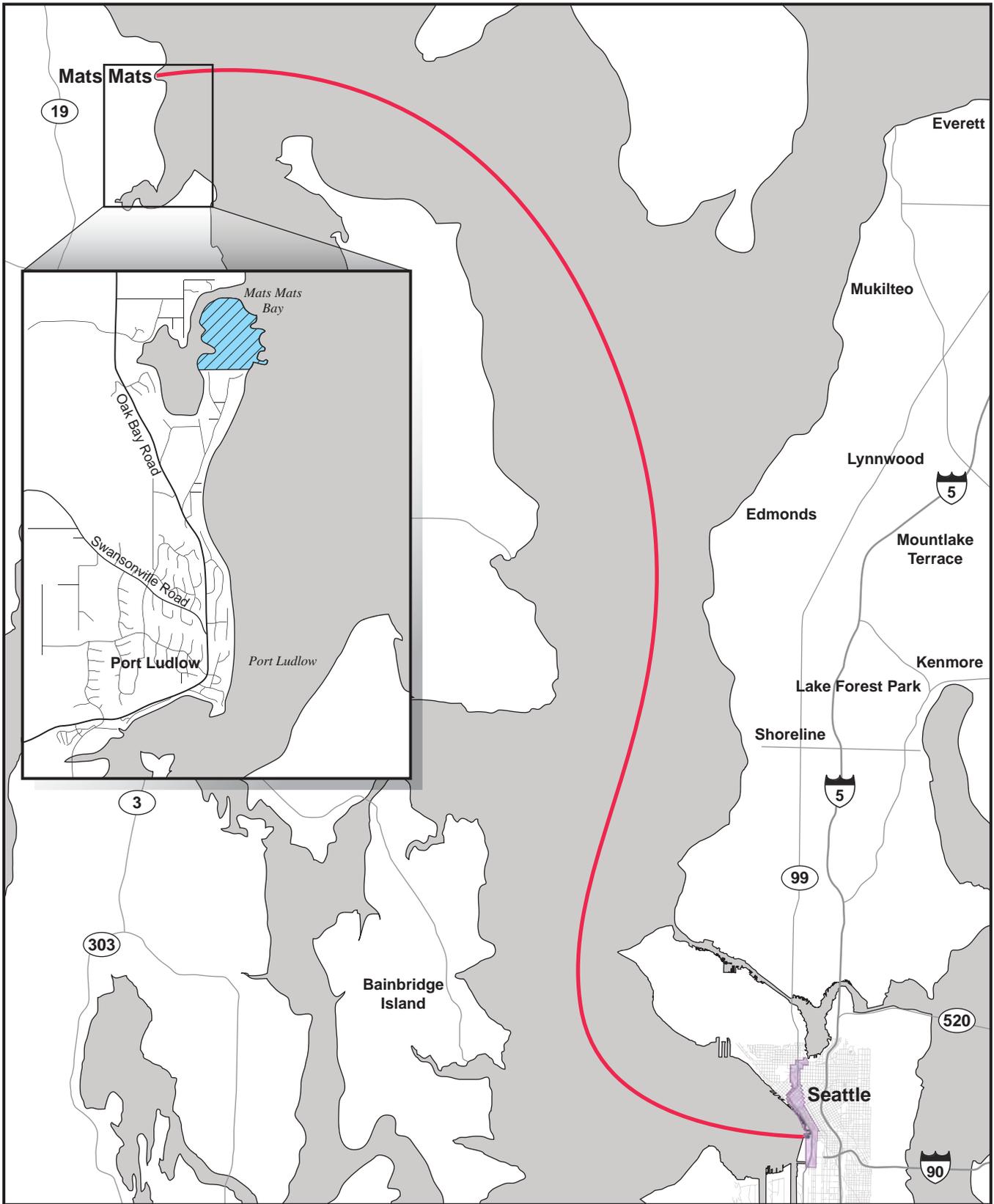
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Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

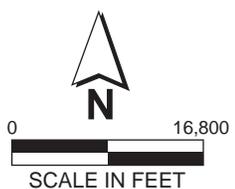
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Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
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Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
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Paula Hammond
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January 31, 2011

Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Leslie:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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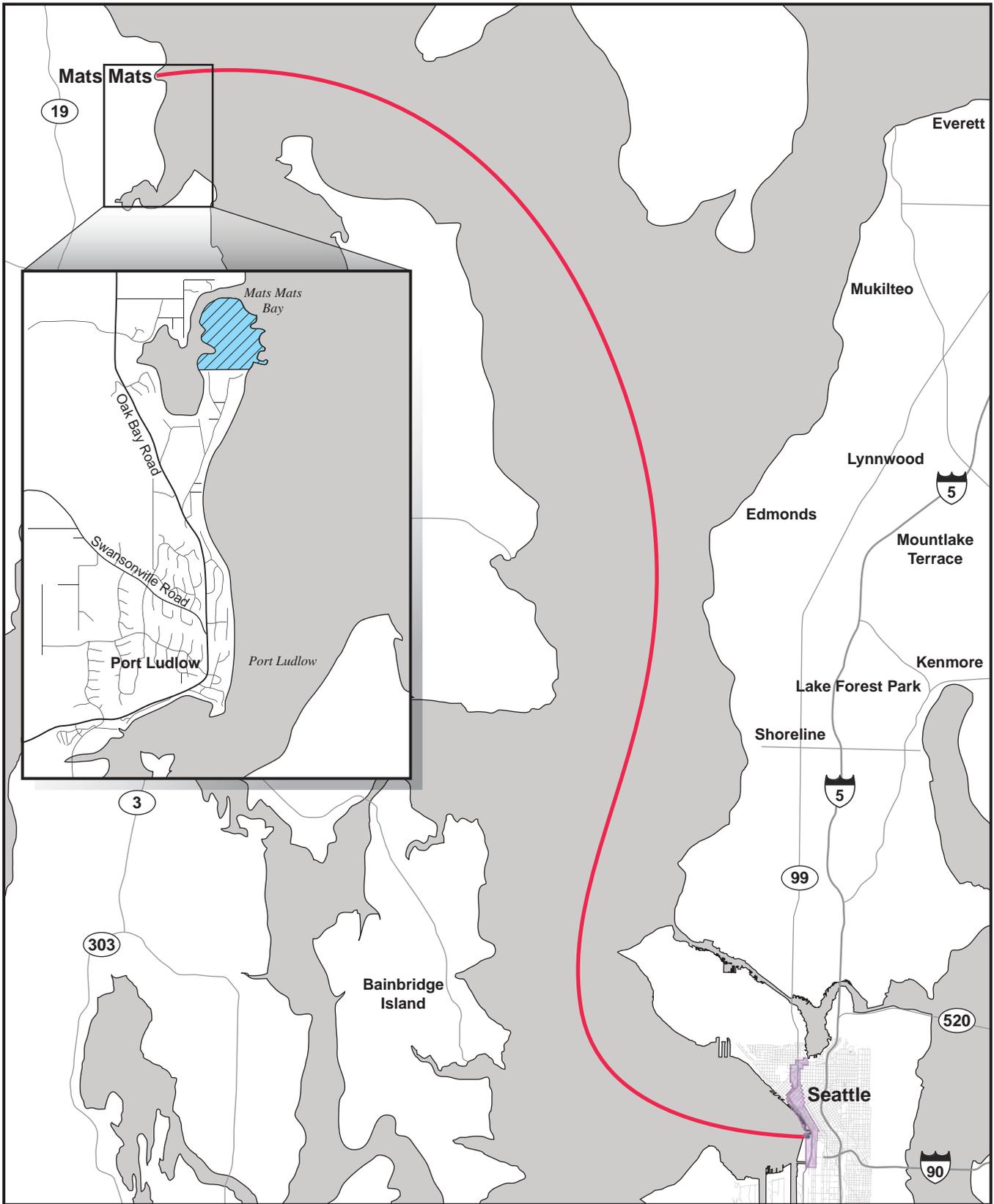
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

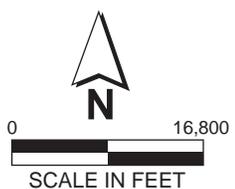
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: Matthew Sterner, DAHP
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 31, 2011

Chris Moore
Washington Trust for Historic Preservation
1204 Minor Avenue
Seattle, Washington 98101

Re: Alaskan Way Viaduct Replacement Project, APE Revision to Include Existing Disposal Facility

Dear Chris:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. It is anticipated that a maximum of two barges will be transported per day. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

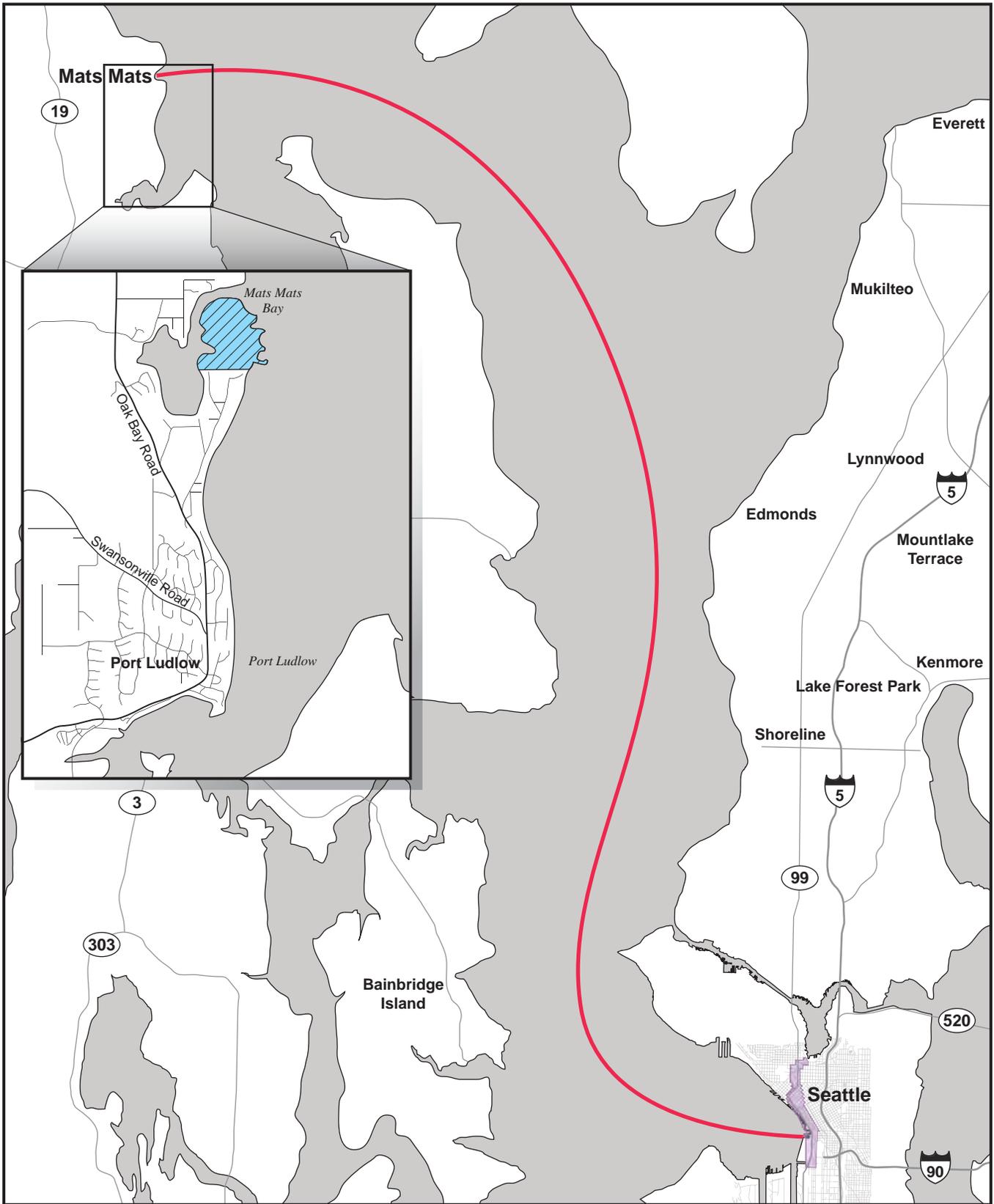
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

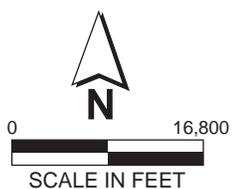
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Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



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February 2, 2011

Karen Gordon
Historic Preservation Officer
City of Seattle
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, Washington 98124-4649

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Karen:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

The DVD includes the following:

- 1) Proposed SR 99 Bored Tunnel – Assessment of Settlement Impacts to Buildings;
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- 4) Cost Estimate Narrative;
- 5) Seattle Tunnel Partner's (STP) Technical Proposal; and,
- 6) STP's Deformation Mitigation Submittal.

As previously discussed at our meeting on January 13, 2011, this information is of a highly technical nature. For that reason, WSDOT has arranged for individuals who were involved in the production of these documents to provide a presentation for you at our upcoming meeting on February 15, 2011. These individuals will also be able to answer questions that you may have following your review of the enclosed documents. In the coming week, I will be sending out an agenda and more information concerning this meeting.

After you review the enclosed documents, please do contact me if you have any questions, concerns, or need for additional information. You can contact me at any time at 206.805.2887, email bartoyk@wsdot.wa.gov. You may also contact Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

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Suggested reading in the STP Proposal:

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February 2, 2011

Eugenia Woo
Historic Seattle
The Dearborn House
1117 Minor Avenue
Seattle, Washington 98101

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Eugenia:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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After you review the enclosed documents, please do contact me if you have any questions, concerns, or need for additional information. You can contact me at any time at 206.805.2887, email bartoyk@wsdot.wa.gov. You may also contact Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Thank you for your continued participation in consultation on this project. I look forward to seeing you at our meeting on February 15, 2011.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) Table of Contents for Section 106 Consulting Parties Technical
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 2) DVD of Section 106 Consulting Parties Technical Background
 Information

cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

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**Washington State
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February 2, 2011

Chris Moore
Washington Trust for Historic Preservation
1204 Minor Avenue
Seattle, Washington 98101

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Chris:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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February 2, 2011

Charlie Sundberg
King County Historic Preservation Program
King Street Center
201 S. Jackson Street Room 700
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Charlie:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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February 2, 2011

Leslie Smith
Executive Director
The Alliance for Pioneer Square
201 Yesler Way, Suite B
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Leslie:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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16. **Appendix B** – Resumes of key personnel on the STP team



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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February 2, 2011

Stanley Piha
Stanley Real Estate
2101 4th Avenue, #310
Seattle, Washington 98121

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Stanley:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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- 6) STP's Deformation Mitigation Submittal.

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After you review the enclosed documents, please do contact me if you have any questions, concerns, or need for additional information. You can contact me at any time at 206.805.2887, email bartoyk@wsdot.wa.gov. You may also contact Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

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Suggested reading in the STP Proposal:

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February 2, 2011

Flo Lentz
4Culture
101 Prefontaine Place S.
Seattle, Washington 98104

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Flo:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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- 6) STP's Deformation Mitigation Submittal.

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Suggested reading in the STP Proposal:

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February 2, 2011

Brian Turner
Regional Attorney, Western Office
The National Trust for Historic Preservation
5 Third Street, Suite 707
San Francisco, California 94118

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Mr. Turner:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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Thank you for your continued participation in consultation on this project. I look forward to seeing you at our meeting on February 15, 2011.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) Table of Contents for Section 106 Consulting Parties Technical
 Background Information DVD
 2) DVD of Section 106 Consulting Parties Technical Background
 Information

cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

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February 2, 2011

Karen Gordon
Historic Preservation Officer
City of Seattle
Department of Neighborhoods, Historic Preservation
PO Box 64649
Seattle, Washington 98124-4649

Re: Alaskan Way Viaduct Replacement Project, Section 106 Consulting Parties Technical Background Information

Dear Karen:

Pursuant to 36 CFR 800.2(c)(3), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

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February 3, 2011

Brian Turner
Regional Attorney, Western Office
The National Trust for Historic Preservation
5 Third Street, Suite 707
San Francisco, California 94118

Re: Alaskan Way Viaduct Replacement Project, SDEIS Transmittal

Dear Mr. Turner:

Pursuant to 36 CFR 800.2(c)(5), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. As discussed in an email from Kevin Bartoy to Brian Turner and Anthea Hartig dated February 3, 2011, WSDOT is providing you with a copy of the second Supplemental Draft Environmental Impact Statement that was published in October 2010. Please find that document included with this transmittal letter.

The document includes a printed version of the Executive Summary of the 2010 SDEIS as well as CDs in the rear of the document that include electronic copies of the previous DEIS from March 2004 with all of its technical appendices, the first SDEIS from July 2006 with all of its technical appendices, and the full version of the second SDEIS from October 2010 with all of its technical appendices. Within the 2010 SDEIS, you will most likely be interested in Appendix I and Appendix J, which are the discipline reports for Historic, Cultural, and Archaeological Resources, and Section 4(f). Appendix I is the Section 106 document for the project.

After you review the enclosed documents, please do contact me if you have any questions, concerns, or need for additional information. You can contact me at any time at 206.805.2887, email bartoyk@wsdot.wa.gov. You may also contact Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

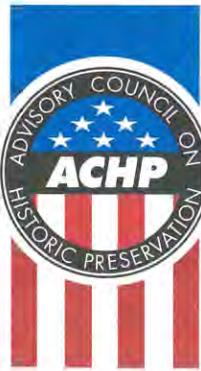
Thank you for your participation in consultation on this project.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (1): 1) 2010 Supplemental Draft Environmental Impact Statement for the Alaskan Way Viaduct Replacement Project

cc: Randy Everett, FHWA
Allison Hanson, WSDOT



Preserving America's Heritage

February 7, 2011

Randolph Everett
Seattle Major Projects Oversight Manager
Washington Division
Federal Highway Administration
Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, WA 98501-1284

RE: *Section 106 Consultation for the Alaskan Way Viaduct Project.*

Dear Mr. Everett:

Thank you for contacting the Advisory Council on Historic Preservation (ACHP) about recent developments during the Section 106 consultation regarding the Alaskan Way Viaduct Project. As you know, the ACHP declined to participate in consultation for this undertaking on September 21, 2010 after the Federal Highway Administration (FHWA) notified us of its finding of adverse effects. Recently, FHWA contacted Carol Legard, the ACHP's FHWA Liaison, regarding the possibility of the ACHP entering consultation to help resolve a disagreement among consulting parties about the treatment of the project's effects on the Western Building, a contributing property in the Pioneer Square Historic District. Regrettably, Ms. Legard will not be available to participate in the Section 106 consultation meeting to be held in Seattle on February 15, 2011.

We appreciate your invitation to the meeting and hope that it will be helpful in resolving the disagreement. Since the ACHP will not be attending, we request that you provide us a summary of the outcome and clarify whether our participation will, in fact, be needed to conclude the Section 106 review for this undertaking. If FHWA believes that our involvement is warranted, we will be happy to enter consultation and review the relevant background documentation.

Thank you for seeking our views on this undertaking. Please feel free to contact Carol Legard, our FHWA Liaison, at 202-606-8522 or via email at clegard@achp.gov.

Sincerely,

Charlene Dwin Vaughn, AICP
Assistant Director, FPLAS
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov



U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

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711 South Capitol Way
Olympia, Washington 98501-1284
(360) 753-9480
(360) 753-9889 (FAX)
<http://www.fhwa.dot.gov/wadiv>

March 4, 2011

HMP-WA/WA 646

Mr. William W. Stelle, Jr.
National Marine Fisheries Service
7600 Sand Point Way NE, Bldg 1
Seattle, WA 98115

**Essential Fish Habitat Recommendations
for the SR 99 Alaskan Way Viaduct
Replacement Project**

Dear Mr. Stelle:

This letter is in response to the January 27th, 2011 Biological Opinion (BO) for the SR 99 Alaskan Way Viaduct Replacement Project (NMFS Tracking No.: 2010/04009). The BO includes Essential Fish Habitat (EFH) conservation recommendations proposed by the National Marine Fisheries Service (NMFS) for inclusion in the project to avoid, mitigate, or offset the impact the proposed action has on EFH. The Magnuson-Stevens Act and 50 CFR 600.929(j) require that the Federal Highway Administration (FHWA) prepare this written response to the recommendations.

NMFS proposes two conservation recommendations, both of which will be accepted by FHWA. The EFH conservation recommendations and the measures to be taken by the Washington State Department of Transportation (WSDOT) and the project contractors are as follows:

- 1. If the final stormwater design differs from the design evaluated in this Opinion, then the WSDOT will evaluate stormwater pollutant loadings and concentrations to determine if they differ significantly from those considered in this consultation. If predicted pollutant loadings or concentrations exceed those addressed in the Opinion, then the WSDOT will provide NMFS a description of the design change(s) and a revised stormwater analyses (Term and Condition 1.b).*



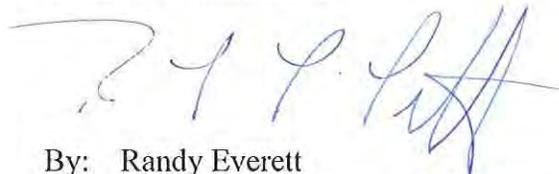
FHWA accepts this conservation recommendation.

2. *The WSDOT and FHWA shall implement the programmatic approach to stormwater monitoring (titled: Programmatic Monitoring Approach for Highway Stormwater Runoff in Support of Endangered Species Act (ESA) Section 7 Consultation, dated June 2009). This programmatic effort will include the following elements (Term and Condition 2.a):*
 - a. *Accurate characterization of stormwater BMP effectiveness and "end-of-pipe" effluent/discharge concentrations for treated and untreated stormwater runoff (total and dissolved Cu; total and dissolved Zn; total suspended solids).*
 - b. *Sampling, data collection, analysis, and reporting (including quality control/quality assurance procedures) consistent with the requirements of the WSDOT's Municipal Stormwater NPDES (National Pollutant Discharge Elimination System) and State Waste Discharge General Permit.*
 - c. *An experimental design that is representative of conditions within the action area, including annual average daily traffic (AADT) and seasonal/temporal variations in stormwater runoff quantity and quality.*
 - d. *Annual reporting of monitoring activities and findings to NMFS.*

FHWA accepts this conservation recommendation, with the following clarification regarding Element c: FHWA and WSDOT will follow the June 30, 2009 Programmatic Monitoring Approach signed by FHWA, NMFS, USFWS, and WSDOT. As described in that approach, sampling will be performed at a total of four sites in Western Washington. Sampling locations will be chosen to characterize sites with varying levels of AADT, including two highly urbanized sites with AADT \geq 100,000, which is representative of conditions within the action area. Samples will also be collected throughout the year to reflect the distribution of rainfall between the wet and dry seasons.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator



By: Randy Everett
Major Projects Oversight Manager

cc: Allison Hanson, WSDOT ESO Megaprojects Environmental Director
Angela Freudenstein, WSDOT AWW Replacement Project Environmental Manager
Jim Muck, NMFS/USFWS Liaison
Cindy Callahan, FHWA Biologist
Mystery Bridgers, FHWA Legal



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

9043.1
PEP/NRM



ER 10/0936

Ms. Angela Freudenstein
Environmental Manager
Washington State Department of Transportation
Alaskan Way Viaduct Replacement Project SDEIS
999 Third Avenue, Suite 2424
Seattle, WA 98104-4109

APR 26 2011

RECEIVED

MAY 02 2011 *SA*

WSDOT Doc. Control

Dear Ms. Freudenstein:

The U.S. Department of the Interior (Department) has reviewed the Federal Highway Administration's (FHWA) State Route 99 Alaskan Way Viaduct Replacement Project, Second Supplemental Draft Environmental Impact Statement (SDEIS) and Section 4(f) Evaluation, and offers the following comments.

The Department agrees that the existing Alaskan Way Viaduct State Route 99 was damaged in the 2001 Nisqually earthquake and needs to be replaced. The SDEIS analyzes the bored tunnel replacement alternative and compares its effects to the cut-and-cover tunnel and elevated structure alternatives evaluated in a 2006 SDEIS. According to the SDEIS, each of the proposed alternatives would require the use of Section 4(f) resources. The bored tunnel alternative has been identified as the preferred alternative.

Section 4(f) of the Department of Transportation Act

Section 4(f) of the U.S. Department of Transportation Act of 1966 prohibits the use of land from publicly owned parks, recreation areas, wildlife or waterfowl refuges, or historic sites for any federally funded transportation program, unless it is determined that there is no feasible and prudent alternative to using such land and the project includes all possible planning to minimize harm to the land resulting from its use. In this instance, no wildlife or waterfowl refuges will be impacted. However, a number of publically owned parks, recreation areas, and historic sites will be impacted by the project. The Department agrees there is no prudent and feasible way to avoid the "use" of Section 4(f) resources with any of the proposed alternatives. Because of this, the Department offers several comments and suggestions for consideration.

- Public Parks and Recreation Lands

The Department agrees that the bored tunnel alternative will benefit parks and recreational resources by removing the existing viaduct, improving connections between elements of the Seattle's park and recreation system, and creating a new trail for pedestrians and bicyclists to enjoy. However, the Department realizes that the construction and demolition activities outlined in the SDEIS will likely result in increased

noise and vibration, reductions in visual quality, and access restrictions to public parks and recreation lands at various times during the project. Therefore, we request plans and measures be developed to minimize these impacts before the project begins.

- Historic Sites

In addition to the protections for historic properties found in Section 4(f), Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties in this instance include both standing structures and archaeological resources. The Department defers to the Washington State Department of Transportation (WSDOT), FHWA, Department of Archeology and Historic Preservation, Advisory Council on Historic Preservation, affected tribes, the city of Seattle, and other interested parties (such as the Pioneer Square Preservation Board and the Seattle Landmarks Preservation Board), to develop the Memorandum of Agreement (MOA) and any requirements contained therein related to the Viaduct.

The Department recommends the MOA be completed and attached to the Final Environmental Impact Statement when it is released for comment. We ask that special consideration be given to the National Historic Landmarks (NHL) within the project area. Section 110(f) of the NHPA requires Federal agencies, “to the maximum extent possible,” develop plans and actions to minimize harm to NHL’s prior to any undertaking. The Pioneer Building, the Iron Pergola, and the Totem pole located on 1st Avenue and Yesler Way, are considered NHL’s, and the Department requests every effort be made to preserve the historic character of these landmarks.

Additionally, the SDEIS states that construction of the bored tunnel is anticipated to cause a severe adverse effect to the Western Building to the extent the building may need to be demolished. The Polson Building may also experience extensive structural damage during construction. Both buildings are contributing buildings to the Pioneer Square National Historic District, and thus every effort should be made prior to and during construction to avoid structural damage to these, and the other twelve buildings within the Pioneer Square Historic District listed in the SDEIS.

Section 6(f) of the Land and Water Conservation Fund Act

The Department has identified two parks in the project area that are protected by Section 6(f) of the Land and Water Conservation Fund Act – Blake Island State Park and Elliot Bay Park. It appears as if there will not be impacts on the Blake Island State Park sufficient to result in a 6(f) conversion. However, it does appear that there may be temporary and/or access impacts to the Elliot Bay Park that could result in a 6(f) conversion. Because impacts do not have to be direct or permanent to result in a conversion of an outdoor recreation resource, we would like the potential impacts to Elliot Bay Park to be assessed. We encourage WSDOT to work closely with

the Washington State Recreation and Conservation Office and the Department as the project develops. (Note: The 6(f) protected section of Elliot Bay Park is owned by the Washington Department of Natural Resources, and not the Port of Seattle, as indicated on WSDOT's chart.)

Thank you for the opportunity to provide comments. For questions concerning Section 4(f), please contact Sharon Powell, NPS, at 206-220-4090, sharon_powell@partner.nps.gov. For questions concerning Section 6(f), please contact Heather Ramsay, Project Manager, at 206-220-4123, heather_ramsay@nps.gov.

Sincerely,



Willie R. Taylor, Director
Office of Environmental Policy
and Compliance

May 10, 2011

Mr. Steve Landino
Washington State Habitat Director
National Marine Fisheries Service
510 Desmond Drive SE, Suite 103
Lacey, Washington 98503

Subject: Evaluation of effects to ESA-listed species relating to tolling for the SR99 Alaskan Way Viaduct Replacement Project

Dear Mr. Landino:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) initiated early coordination on the *SR-99 Alaskan Way Viaduct Replacement Project* (project) in August 2009 and submitted the Biological Assessment (BA) in August 2010. WSDOT received a Biological Opinion (BO) from the National Marine Fisheries Service (NMFS) on January 27th, 2011 (NMFS Tracking No. 2010/04009). The BO states that the FHWA and WSDOT shall analyze project effects if tolling is authorized on SR99, and that reinitiation is required if project impacts related to stormwater discharge to Elliott Bay changes due to vehicles traveling on surface streets through the City of Seattle rather than in the tunnel.

When consultation was first initiated on the project, tolling was not included as a component of the proposed preferred alternative (the Bored Tunnel Alternative), and was therefore not addressed in the BA. Based on recent conversations between FHWA and WSDOT, FHWA anticipates that a Tolloed Bored Tunnel Alternative will be the preferred alternative in the FEIS to be published in July of this year. However, WSDOT still needs authorization from the Washington State Legislature to impose tolls on the bored tunnel. If the legislature grants this authority, WSDOT, SDOT and other agencies will work to optimize the bored tunnel's toll configuration in order to minimize diversion to city streets while maintaining efficient traffic flow on SR 99 and generating revenue.

This letter provides an analysis of project effects due to changes in vehicle traffic in the event that tolling becomes implemented on SR99, and concludes that tolling will have no effect on listed species. Therefore, this letter serves as an information update and not a reinitiation request.

Changes in Daily Vehicle Volumes Due to Tolling

The project analyzed vehicle volumes on SR99, I-5, and City streets under the non-tolled and tolled bored tunnel alternatives. The analysis determined that under the tolled alternative, 4 percent to 32 percent of traffic volumes will be diverted from SR99 onto surface streets in the study area (Exhibit 1). The volume of traffic diverted depends on the location in the study area. A much smaller volume (0.6-4.4 percent) of traffic will also be diverted onto I-5 (Exhibit 2).

Although the facilities on which vehicles travel will differ under the tolled and non-tolled bored tunnel alternatives, the number of vehicles traveling through the study area will remain virtually the same. With or without tolling on SR99, the highway and street network in the study area would support the same vehicle demand (Exhibit 3).

Stormwater Analysis Methodology for WSDOT Biological Assessments

On February 16, 2009, the FHWA, NMFS, United States Fish & Wildlife Service (USFWS) and the WSDOT signed a Memorandum of Agreement committing these four agencies to use a common methodology for analyzing the effects of stormwater on fish species listed under the Endangered Species Act (http://www.wsdot.wa.gov/NR/rdonlyres/F39C7232-6A97-43C2-AC47-185167D7E8D0/0/BA_AssessingStormwaterEffects.pdf). The methodology includes the new Western Washington Highway Runoff Dilution and Loading Stormwater Model (HI-RUN Model), its user guide, and accompanying stormwater assessment guidance.

As noted in the HI-RUN model user's guide, the model has limitations that make it impossible to predict how certain factors, such as average annual daily traffic (AADT), interact to affect highway runoff at a given site, and have not been directly incorporated into the HI-RUN model. Therefore, model outputs are independent of changes in AADT. Pollutant loads and concentrations are determined instead by the amount of pollutant-generating impervious surface (PGIS) within the project area and levels of stormwater treatment provided by the project, the only editable fields on the HI-RUN model data entry page (Exhibit 4). To compensate for the limitations of the model a conservative default risk threshold of 5 percent is applied when interpreting whether fish may be exposed to pollutant concentrations exceeding the established effects thresholds.

On April 14, 2011, the FHWA, NMFS, USFWS, and WSDOT also agreed on a methodology for analyzing the indirect effects of stormwater based on land use changes that might reasonably occur as a result of the project (<http://www.wsdot.wa.gov/Environment/Biology/BA/BAGuidance.htm>). The method calculates pollutant loading from acres of different land use types such as forestry, agriculture, low-medium development, and high development, and compares loading from pre- and post-project land use types.

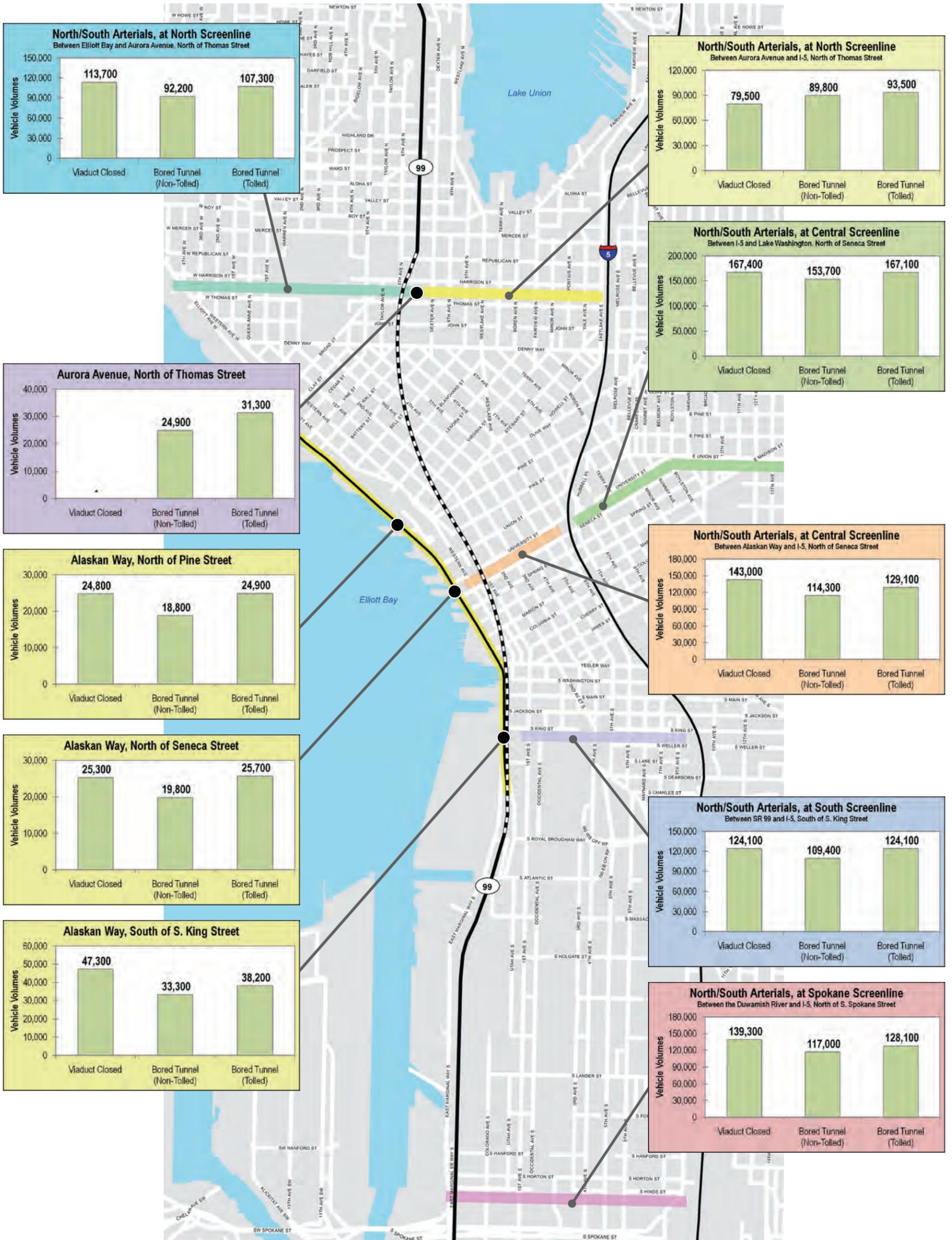


Exhibit 1
Daily Vehicle Volumes on Arterials —
Tolled Bored Tunnel Alternative

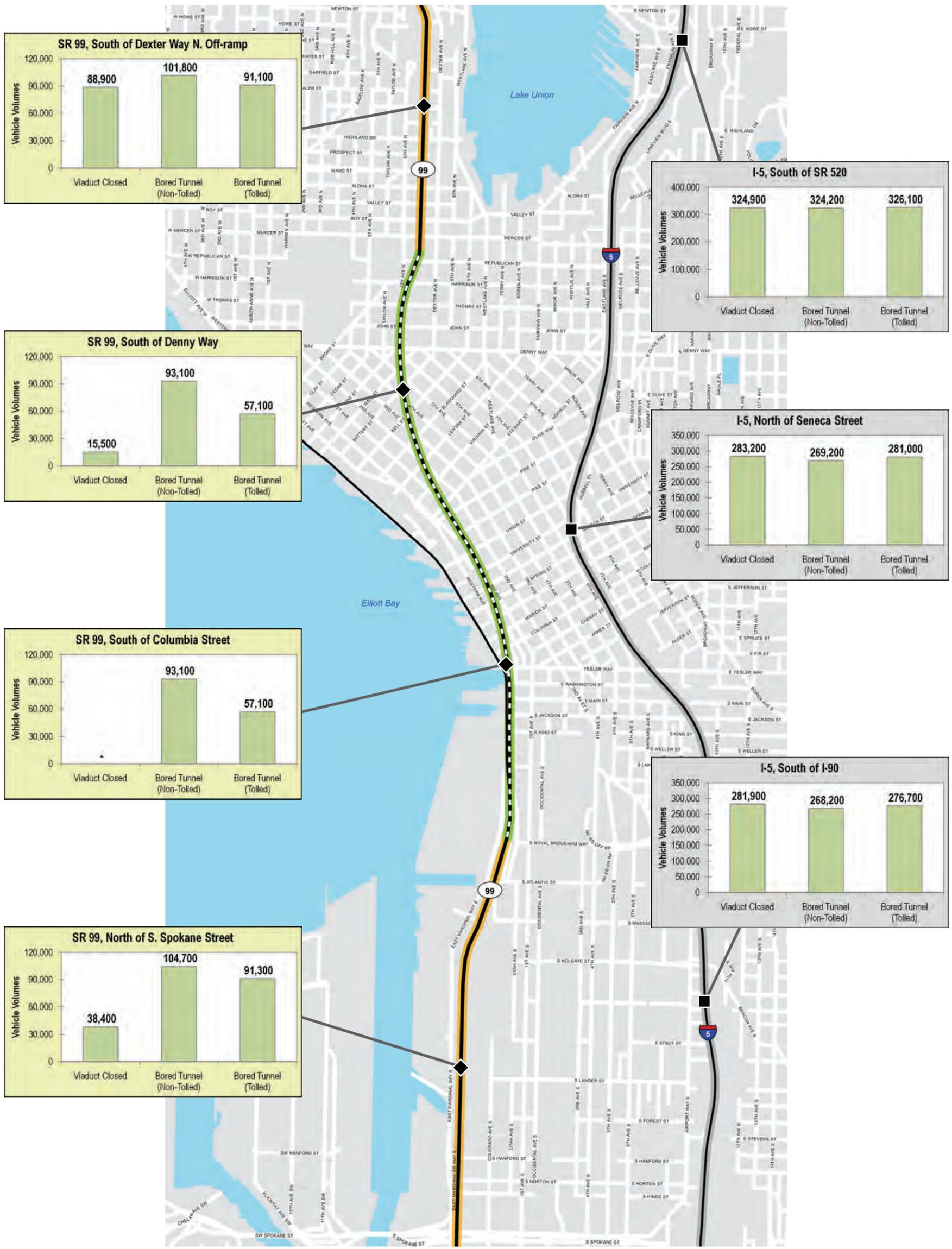


Exhibit 2
Daily Vehicle Volumes on SR 99 and I-5 —
Tolled Bored Tunnel Alternative

Exhibit 3. Estimated Vehicle Volumes under the Non-Tolled and Tolled Bored Tunnel Alternatives

	Bored Tunnel (Non-Tolled)	Bored Tunnel (Tolled)
Spokane Screenline (North of S. Spokane Street)		
AM peak hour	34,590	34,850
PM peak hour	38,400	38,550
Daily	495,900	500,000
South Screenline (South of S. King Street)		
AM peak hour	37,360	37,630
PM peak hour	43,430	43,220
Daily	559,000	561,500
Central Screenline (North of Seneca Street)		
AM peak hour	33,580	33,300
PM peak hour	37,410	37,100
Daily	491,100	490,800
North Screenline (North of Thomas Street)		
AM peak hour	40,370	40,600
PM peak hour	45,880	45,970
Daily	578,000	572,200
Total	2124000	2124500

Highway Runoff Dilution and Loading model (HI-RUN) Version 2.0 For Excel 2007

This model is for stormwater analysis associated with biological assessments, and is not a design tool.

Run Loading Model	Load Inputs	Save Inputs	Clear TDA Inputs
-----------------------------------	-----------------------------	-----------------------------	----------------------------------

Data Inputs - End-of-Pipe Loading Subroutine

Description: This model provides risk-based predictions of stormwater quality at the outfall and Threshold Discharge Area (TDA) scale. The Highway Runoff Manual provides a thorough discussion of TDA delineation specific to transportation drainage systems. The analysis of water quality concentrations is conducted at a subbasin scale, with subbasins being divisions of TDAs that have discrete discharge points in the receiving water. If a TDA has only one discharge point, data need only be entered under Subbasin 1. The analysis of pollutant loadings is done at the TDA scale only. Water quality parameters analyzed by this tool are Total Suspended Solids (TSS), Total Copper (TCu), Dissolved Copper (DCu), Total Zinc (TZn), and Dissolved Zinc (DZn).

Project/TDA ID:

Precipitation Timeseries:

Water Quality Parameters All TSS Copper - Total Copper -Dissolved Zinc - Total Zinc - Dissolved	Month January February March April May June July August September October November December
--	--

TDA Information - Baseline Conditions							
Treatment Type	Level of Incidental Infiltration (%)	Subbasin Area (acres)					TDA Impervious Area (acres)
		1	2	3	4	5	
Basic	0						0
	20						0
	40						0
	60						0
	80						0
Enhanced	0						0
	20						0
	40						0
	60						0
80						0	
Infiltration BMP	100						0
None	0						0
Total		0	0	0	0	0	0

TDA Information - Proposed Conditions							
Treatment Type	Level of Incidental Infiltration (%)	Subbasin Area (acres)					TDA Impervious Area (acres)
		1	2	3	4	5	
Basic	0						0
	20						0
	40						0
	60						0
	80						0
Enhanced	0						0
	20						0
	40						0
	60						0
80						0	
Infiltration BMP	100						0
None	0						0
Total		0	0	0	0	0	0

Last Revision Date: December 1, 2010

Exhibit 4
Data entry page for the BA HI-RUN model.

Stormwater Analysis for the SR99 Alaskan Way Viaduct Replacement Project BA

The HI-RUN model was used in the project's BA to estimate pollutant loading and concentrations at stormwater outfalls in the project area. A separate model, Cormix Version 6.0GT, was used as the dilution modeling program for estimating the distance from project discharge points at which pollutants of concern dilute to a given threshold. Because stormwater runoff from the project co-mingles with stormwater from City streets and other parcels of land in the project area, greatly complicating the analysis, WSDOT and NMFS agreed to use a "pipe within a pipe" approach to analyzing stormwater impacts. This approach assumes that stormwater from WSDOT property does not combine with water from other sources prior to the discharge point.

The models predict that pollutant loads will be reduced by approximately 34 percent post-project and that dilution zones for outfalls to Elliott Bay will also decrease, resulting in a slight overall improvement in water quality in the project area. The reduction is largely due to a 10-acre decrease in PGIS post-project, and to a lesser extent to stormwater quality treatment provided by the project. Due to conservative assumptions factored into both the HI-RUN model and "pipe within a pipe" approach, the analysis presented in the BA likely overestimates both pollutant loading and dilution zones.

The BA did not analyze potential indirect effects from stormwater because there will be no land use changes as a result of the project. The project area is already 100 percent developed. Per discussions with City of Seattle planners and a review of the City of Seattle's Comprehensive Plan, Transportation Strategic Plan, the Seattle Center Century 21 Master Plan, and relevant local neighborhood plans, there are no proposed changes in zoning or amendments to existing land use plans that would result from the proposed bored tunnel project. A standard indirect effects analysis carried out for the BA determined that the project will not result in any induced growth or land use changes; the BO was consistent with this conclusion.

Potential Impacts to Listed Species from Tolling SR99

Implementation of tolling on SR99 would result in changes in traffic patterns as described above. However, tolling would not result in changes to pollutant loads or concentrations in Elliott Bay for the following reasons:

- Tolling would not change in PGIS in the project area;
- Tolling would not change the amount or level of stormwater treatment provided by the project;
- Levels of vehicle traffic within the project area would also remain virtually unchanged under the tolled and non-tolled scenarios; and,
- There are no land use changes that would occur as a result of tolling.

Implementation of tolling will not result in any direct or indirect effects to listed species. The effects to listed species are therefore the same as described in the project BA, and reinitiation is not required at this time.

In accordance with a programmatic stormwater monitoring agreement between FHWA, NMFS, USFWS, and WSDOT (http://www.wsdot.wa.gov/NR/rdonlyres/0B027B4A-F9FF-4C88-8DE0-39B165E4CD94/64282/BA_ProgMonitoringApproach.pdf), WSDOT will monitor various stormwater discharge points throughout the year to obtain additional data for improving the HI-RUN model's predictions.

Please contact George Ritchotte at (206) 805-2891 or ritchog@wsdot.wa.gov if you require additional information or have any questions about this project.

Sincerely,

Randy Everett
Major Projects Oversight Manager



U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284
(360) 753-9480
(360) 753-9889 (FAX)
<http://www.fhwa.dot.gov/wadiv>

June 2, 2011

HMP-WA/WA 525

Mr. Willie R. Taylor, Director
United States Department of the Interior
Office of Environmental Policy and Compliance
1849 C Street, NW MS 2462
Washington, DC 20240

**Response to U.S. Department of the
Interior Comments on SR 99 AWW
Replacement SDEIS**

Dear Mr. Taylor:

We have received your April 26, 2011 letter from the U.S. Department of the Interior (DOI), commenting on the State Route 99 Alaskan Way Viaduct (AWV) Replacement Project, Second Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation (2010 SDEIS). I am writing to confirm that although the comment period has closed, your letter will be considered by the Federal Highway Administration (FHWA) in preparing the Final Environmental Impact Statement ("Final EIS") for this project.

The notice of availability for the 2010 SDEIS was published in the Federal Register on October 29, 2010; it announced that comments would be accepted through December 13, 2010. The DOI submitted its comments on the 2010 SDEIS in a letter dated April 26, 2011, more than four months after the end of the comment period. The letter provided the Department's comments on FHWA's Section 4(f) Evaluation, which was included as part of the 2010 SDEIS. The letter concurred with FHWA's determination that "there is no prudent and feasible way to avoid the 'use' of Section 4(1) resources with any of the proposed alternatives." The comment letter also provided several recommendations regarding ways to minimize and mitigate for impacts to Section 4(f) resources.

Under FHWA's Section 4(f) regulations, the FHWA "may assume a lack of objection and proceed with the action" if the DOI's comments on a Section 4(f) evaluation are not received within 15 days after the comment deadline. 23 C.F.R. § 774.5(a). Notwithstanding that regulation, FHWA also has discretion to consider late-filed comments. In this instance, FHWA will deem the DOI's comment letter timely and address it with other agency comments in the Final EIS.



We also would like to take this opportunity to inform you of several updates to our Section 4(f) evaluation, which will be documented in the Section 4(f) chapter of the Final EIS.

- The project now incorporates additional avoidance and minimization measures to reduce harm to Section 4(f) resources previously identified in the 2010 SDEIS. The Section 4(f) properties that were affected by the Bored Tunnel Alternative (now the project's Preferred Alternative) are also subject to Section 106. Through the Section 106 consultation process, a Memorandum of Agreement has been developed defining the measures to be taken to avoid, minimize and mitigate effects.
- Most notably, the Section 106 MOA addresses settlement impacts to a number of historic buildings, including the Western Building in the Pioneer Square Historic District, which had settlement impacts that were severe enough to potentially require demolition. The MOA commits the project to a program of protection and restoration measures that would avoid the loss of the Western Building. Although a Section 4(f) use would still result because construction period protections for the building are extensive, this now avoids any permanent loss of any contributing buildings to the Pioneer Square Historic District.
- Additional engineering investigations and a program of preventative measures will avoid potential settlement effects on 10 other historic buildings
- Measures have also been defined for the treatment of an archaeological site that is identified as having an unavoidable use by all alternatives.
- The Section 4(f) analysis has provided additional information and comparisons of alternatives to support a proposed finding by FHWA that the Bored Tunnel Alternative is the least harm alternative, since no prudent or feasible avoidance alternative exists.

We will provide a complete response to all of your comments on the 2010 SDEIS in the Final EIS, along with our responses to all other agency comment letters.

We appreciate your continued involvement in this project, and look forward to continuing to work with you as we complete the environmental review process. If you have any questions, please contact Mr. Randy Everett at 206-220-7538 or randolph.everett@dot.gov.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator



By: Randy Everett
Major Projects Oversight Manager

cc: Angela Angove, AWV Project Team

Appendix U

Correspondence

Department of Archaeology
and Historic Preservation
and State Historic
Preservation Officer
Correspondence

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**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Urban Corridors Office
401 Second Avenue South, Suite 300
Seattle, WA 98104
206-716-1121/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

April 21, 2009

Dr. Allyson Brooks
State Historic Preservation Officer
Department of Archaeological and Historic Preservation
PO Box 48343
Olympia, WA 98504-8343

Dear Dr. Brooks:

Per provisions of 36 CFR 800.3(a), the Washington State Department of Transportation (WSDOT), acting on behalf of the Federal Highway Administration (FHWA), is initiating consultation related to compliance with Section 106 of the National Historic Preservation Act. The Alaskan Way Viaduct and Seawall Replacement Program (AWVSRP) currently is planning the SR 99 Deep Bored Tunnel Project, a single-bore double-deck tunnel that bypasses the Central Waterfront area of downtown Seattle (see attached project map). Governor Gregoire, King County Executive Sims and Mayor Nickels have recommended replacing the viaduct's central waterfront section with a bored tunnel beneath downtown, a new waterfront surface street, transit investments, and downtown waterfront and city street improvements. The state, county and city departments of transportation are working together to implement the bored tunnel and related projects. Pending final decisions about the full suite of elements to be included in the project, we will be able to define the cultural resources Area of Potential Effects (APE). We then will seek your input and concurrence on the APE definition.

We are initiating consultation with you at this time because we have a geotechnical coring program to establish existing subsurface conditions along the proposed tunnel alignment (see attached Proposed Exploration Plan, 6 plates). Both mud rotary and rotosonic borings are being completed, which produce a split-spoon sedimentary sample or a solid, continuous core, respectively. Several cores will be acquired within the boundaries of the Pioneer Square National Historic District. WSDOT has retained the services of a cultural resources consultant to monitor extraction of the rotosonic cores, examine and log the cores on-site, and segregate core sections they believe may contain information about the archaeological record of historic and perhaps pre-contact Seattle. Core sections of interest are moved to a laboratory where sediments are described and screened to recover any cultural materials. The data collected will be used to supplement previous coring efforts and help plan future coring locations, specifically for archaeology, and to plan for future archaeological investigations within the project's APE.

On behalf of FHWA, WSDOT is pleased to initiate consultation with you and your staff. We will keep you informed about the project on a regular basis, and will provide you with all correspondences between us and the identified concerned Native American tribes and other identified interested parties. We would very much appreciate hearing your comments, and will

answer any questions or concerns you may have related to cultural resources in the project area and vicinity. Please feel free to contact the UCO Environmental Services Director, Allison Hanson, at (206) 716-1136 or HansonA@wsdot.wa.gov, or me at (206) 464-1236 or e-mail at JuellK@wsdot.wa.gov.

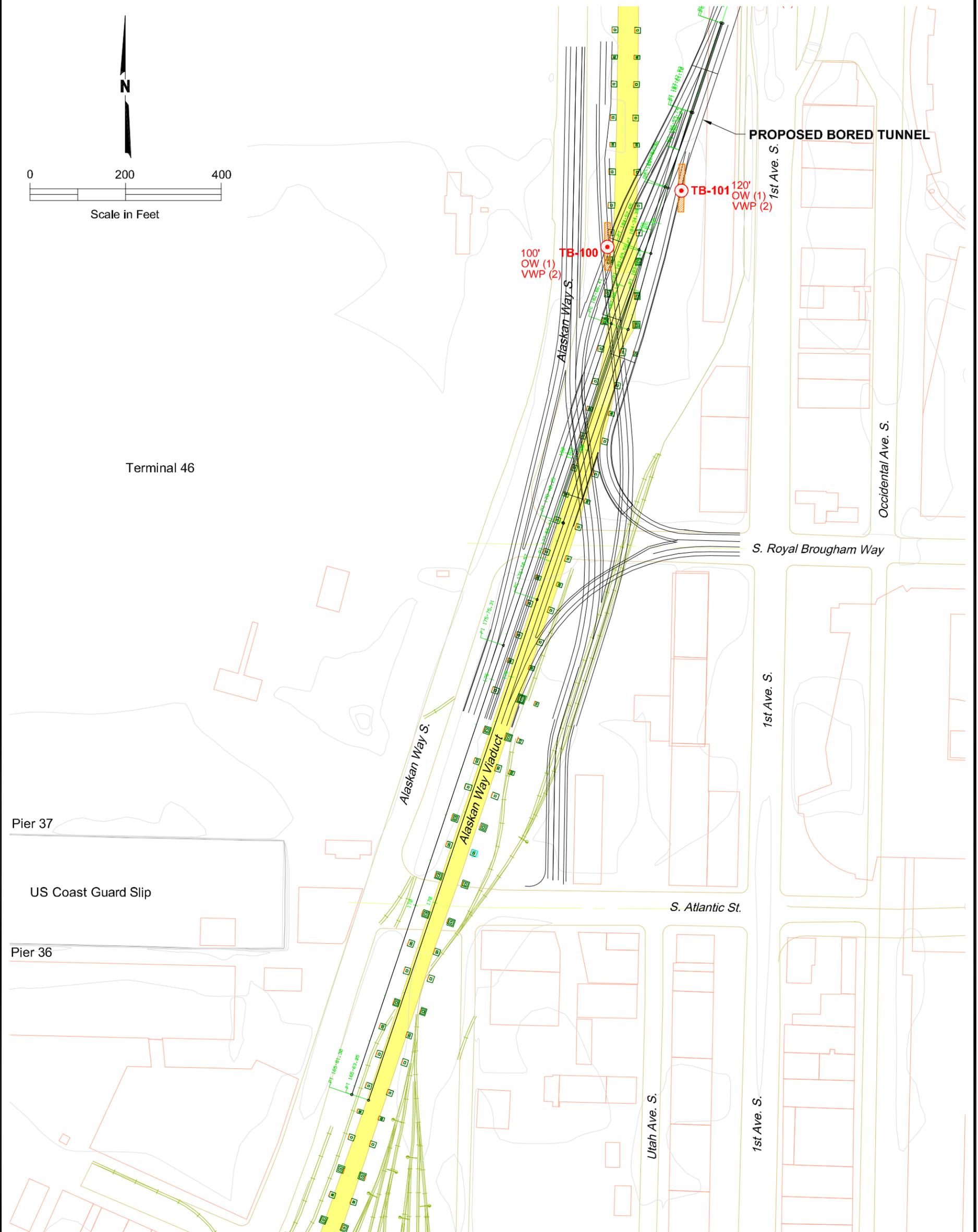
Sincerely,

A handwritten signature in black ink that reads "Kenneth E. Juell". The signature is written in a cursive, slightly slanted style.

Kenneth E. Juell

Cultural Resources Specialist

- cc. Randolph Everett, FHWA w/ attachments
- John White, WSDOT UCO w/ attachments
- Allison Hanson, WSDOT UCO w/ attachments
- Ann Costanza, WSDOT UCO w/o attachments
- Angela Freudenstein, WSDOT UCO w/o attachments
- Scott Williams, WSDOT HQ w/ attachments
- David Mattern, WSDOT UCO w/o attachments



PROPOSED EXPLORATIONS AND LEGEND

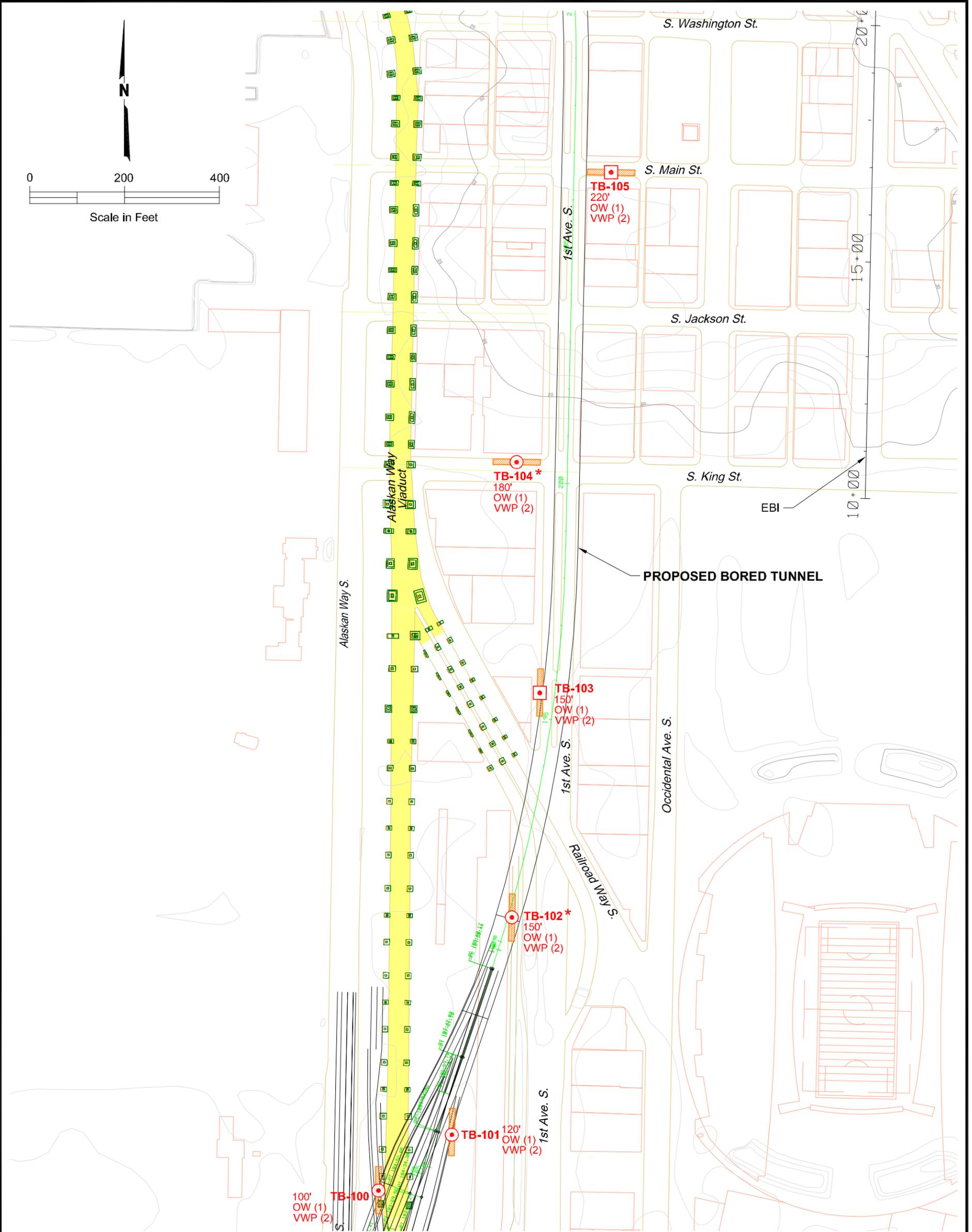
- TB-100** Proposed Soil Boring and Designation
- TB-103** Proposed Sonic Core Boring and Designation
- Proposed Boring Work Zone
- ALT.** Alternative Proposed Boring
- Proposed Shear Wave Velocity Testing
- Proposed Depth of Boring
- Proposed Observation Well and Quantity
- Proposed Vibrating Wire Piezometer and Quantity

DRAFT

NOTES

1. Base map is adapted from City of Seattle GIS data files *topo_all.dwg*, *st_names.dwg*, and *paveedge.dwg*, received 3-11-02; City of Seattle GIS data file *buildings.dwg*, received 3-6-02; and Parsons Brinckerhoff AutoCAD files *BSMP_SO.dwg*, received 11-30-01, and *rail.dwg*, received 5-15-03.
2. Bored tunnel, bus tunnel, and BNSF tunnel are based on file *SINGLE BORE W SOIL 121608 - PLN.dgn*, received 1-15-09 from Parsons Brinckerhoff.
3. Existing footings are based on Parsons Brinckerhoff files *160073U00ALLUEF000.dwg*, received 6-11-07; *GIS_EX_VIADUCT.dgn*, received 4-9-08; and *160073CSBS00SD200.MST*, received 5-27-08.

Alaskan Way Viaduct and Seawall Program Bored Tunnel Project Seattle, Washington	
PROPOSED EXPLORATION PLAN	
February 2009	21-1-20840-010
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	FIG. 1 Sheet 1 of 6



PROJECT EXPLORATIONS AND LEGEND

- TB-100** Proposed Soil Boring and Designation
- TB-103** Proposed Sonic Core Boring and Designation
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DRAFT

Alaskan Way Viaduct and Seawall Program
Bored Tunnel Project
Seattle, Washington

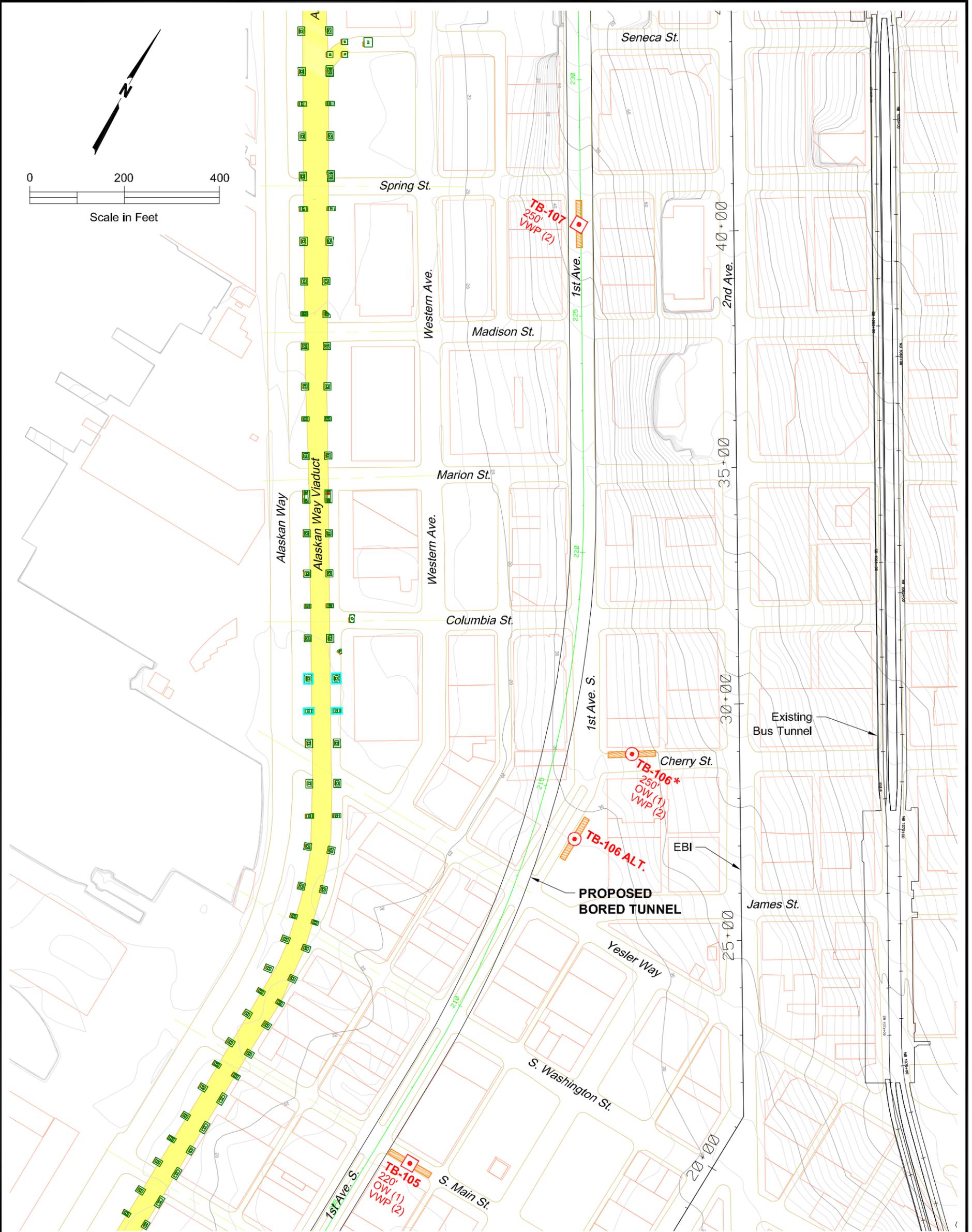
PROPOSED EXPLORATION PLAN

February 2009

21-1-20840-010

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1
Sheet 2 of 6



PROJECT EXPLORATIONS AND LEGEND

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DRAFT

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3. Existing footings are based on Parsons Brinckerhoff files *160073U00ALLUEF000.dwg*, received 6-11-07; *GIS_EX_VIADUCT.dgn*, received 4-9-08; and *160073CSBS00SD200.MST*, received 5-27-08.

Alaskan Way Viaduct and Seawall Program
Bored Tunnel Project
Seattle, Washington

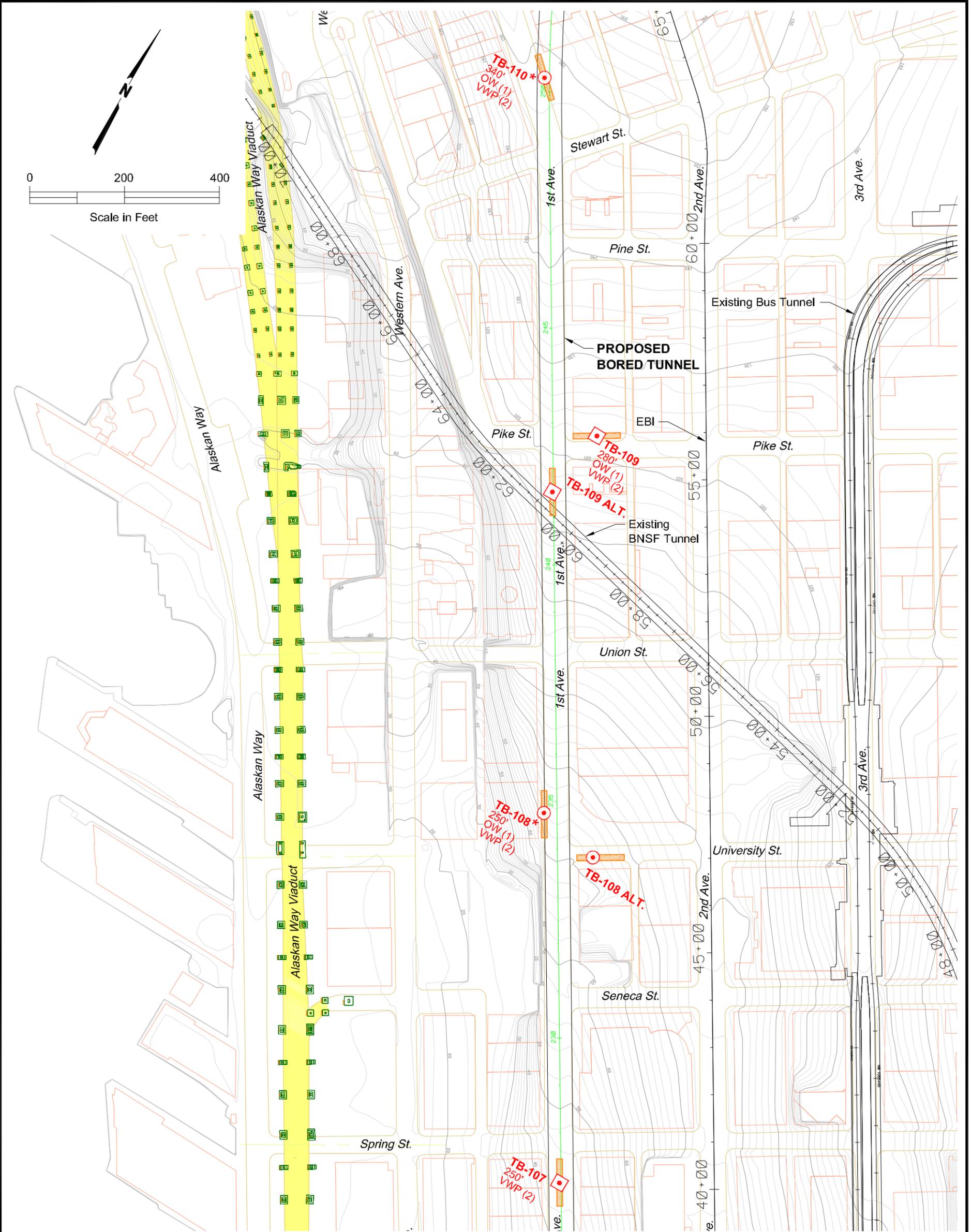
PROPOSED EXPLORATION PLAN

February 2009

21-1-20840-010

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1
Sheet 3 of 6



PROJECT EXPLORATIONS AND LEGEND

- TB-100** Proposed Soil Boring and Designation
- TB-103** Proposed Sonic Core Boring and Designation
- Proposed Boring Work Zone
- ALT.** Alternative Proposed Boring
- *** Proposed Shear Wave Velocity Testing
- Proposed Depth of Boring
- Proposed Observation Well and Quantity
- Proposed Vibrating Wire Piezometer and Quantity

DRAFT

NOTES

1. Base map is adapted from City of Seattle GIS data files *topo_all.dwg*, *st_names.dwg*, and *paveedge.dwg*, received 3-11-02; City of Seattle GIS data file *buildings.dwg*, received 3-6-02; and Parsons Brinckerhoff AutoCAD files *BSMP_SO.dwg*, received 11-30-01, and *rail.dwg*, received 5-15-03.
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Alaskan Way Viaduct and Seawall Program
Bored Tunnel Project
Seattle, Washington

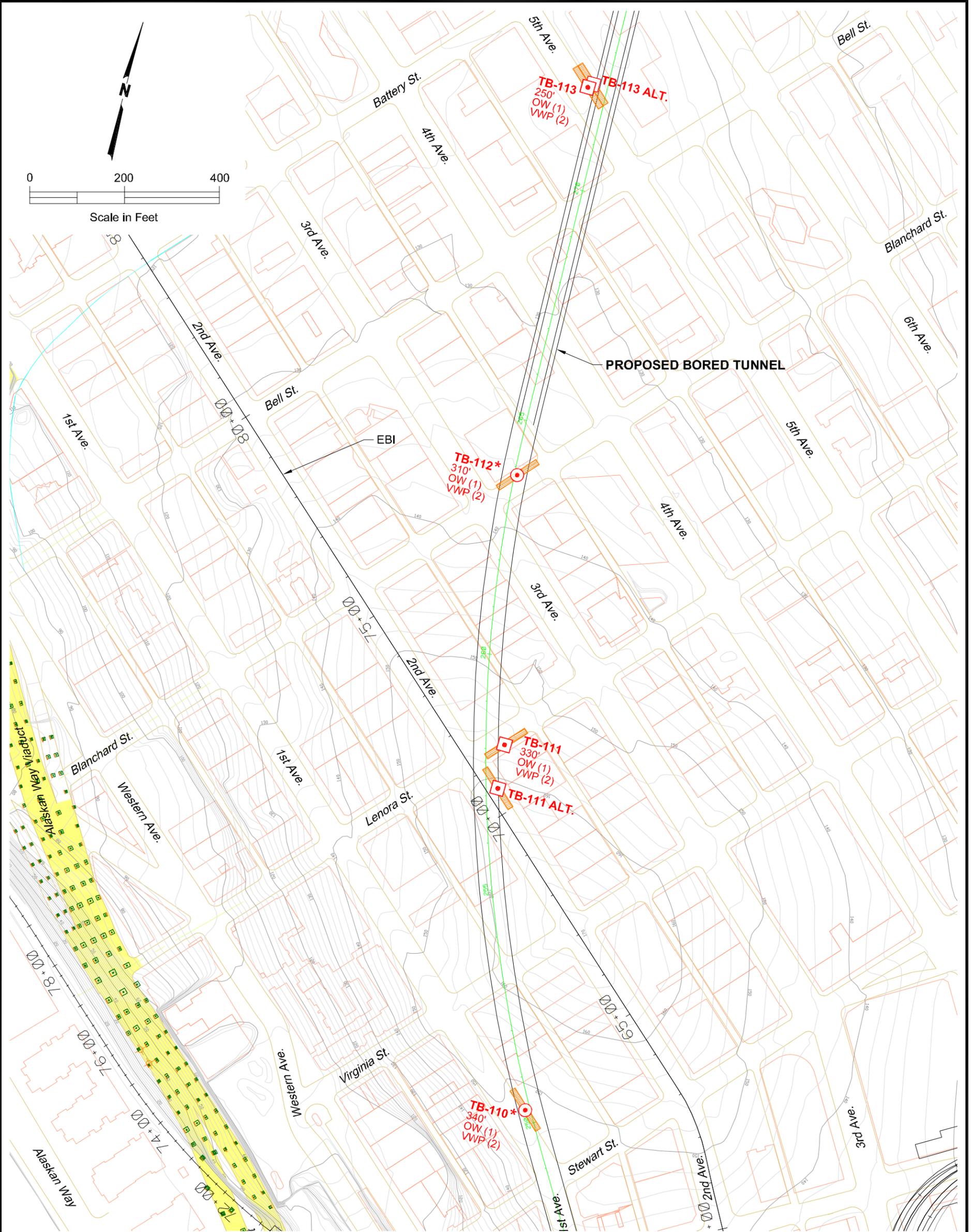
PROPOSED EXPLORATION PLAN

February 2009

21-1-20840-010

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1
Sheet 4 of 6



PROJECT EXPLORATIONS AND LEGEND

- | | | | |
|---------------|--|--|---|
| TB-100 | Proposed Soil Boring and Designation | | Proposed Depth of Boring |
| TB-103 | Proposed Sonic Core Boring and Designation | | Proposed Observation Well and Quantity |
| | Proposed Boring Work Zone | | Proposed Vibrating Wire Piezometer and Quantity |
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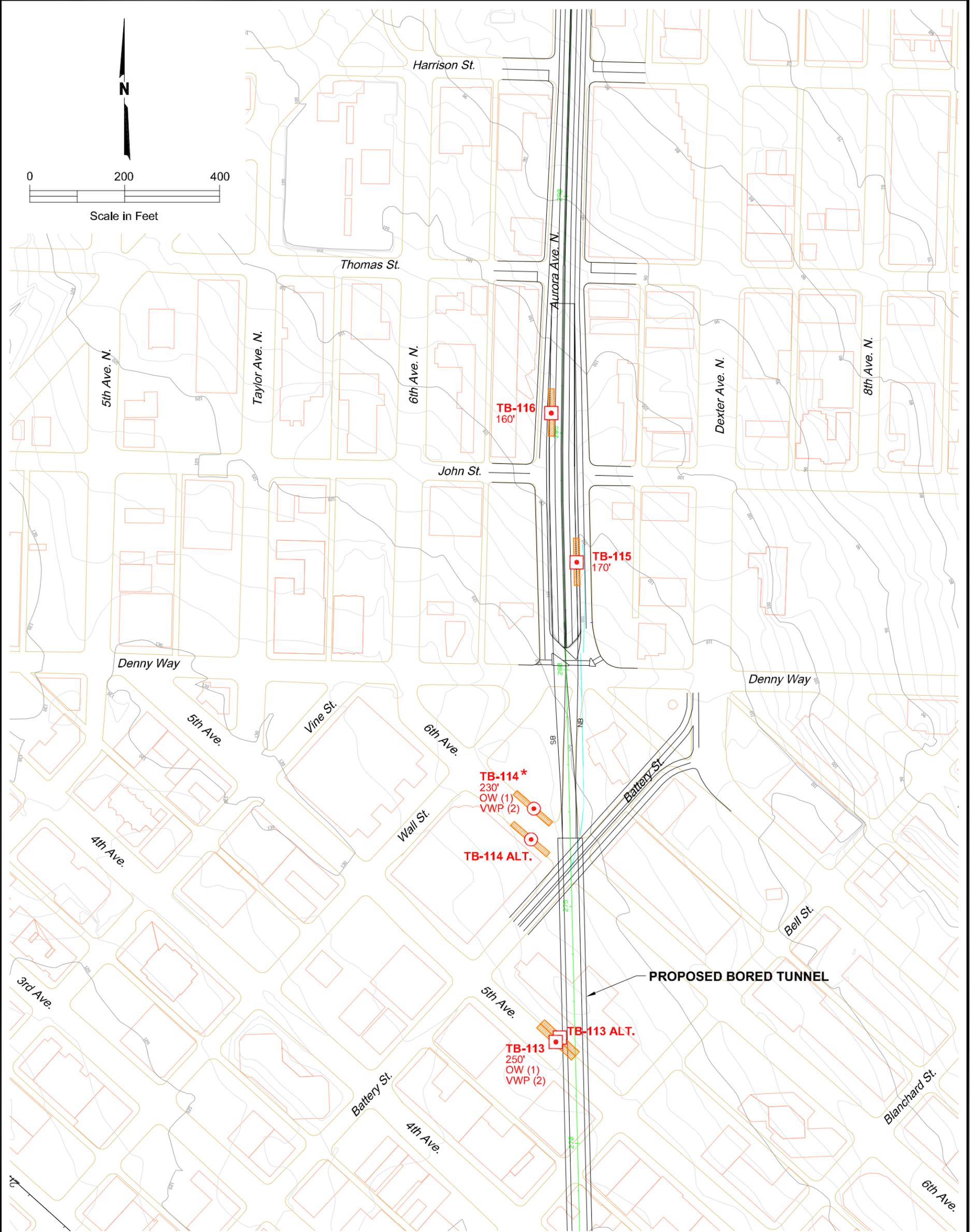
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NOTES

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FIG 1
Sheet 5 of 6

Alaskan Way Viaduct and Seawall Program Bored Tunnel Project Seattle, Washington	
PROPOSED EXPLORATION PLAN	
February 2009	21-1-20840-010
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	FIG. 1 Sheet 5 of 6



PROJECT EXPLORATIONS AND LEGEND

- | | | | |
|---------------|--|--|---|
| TB-100 | Proposed Soil Boring and Designation | | Proposed Depth of Boring |
| TB-103 | Proposed Sonic Core Boring and Designation | | Proposed Observation Well and Quantity |
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| ALT. | Alternative Proposed Boring | | |
| * | Proposed Shear Wave Velocity Testing | | |

DRAFT

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Alaskan Way Viaduct and Seawall Program
Bored Tunnel Project
Seattle, Washington

PROPOSED EXPLORATION PLAN

February 2009

21-1-20840-010

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1
Sheet 6 of 6



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501

Mailing address: PO Box 48343 • Olympia, Washington 98504-8343

(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

May 12, 2009

Mr. Ken Juell
Cultural Resource Specialist
Washington State Department of Transportation
Northwest Washington Division
Urban Corridors Office
401 Second Avenue South, Suite 560
Seattle, Washington 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: More Information Needed

Dear Mr. Juell:

Thank you for contacting our office. I have reviewed the materials you provided for this project. Thank you for initiating consultation on this important project. Please provide any additional information you have regarding the archaeological review, analysis, interpretation, and curation of any cultural materials associated with the coring project.

I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Please contact me should you have any specific questions about our request and we look forward to receiving this material.

Sincerely,

Matthew Sterner, M.A., RPA
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Northwest Washington Division
401 Second Avenue South, Suite 300
Seattle, WA 98104
206-716-1121/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

August 5, 2009

Dr. Allyson Brooks
State Historic Preservation Officer
Washington Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504

Re: Review of Area of Potential Effects (APE) on Alaskan Way Viaduct Replacement (SR 99) Project
DAHP Log # 051209-10-FHWA

Dear Dr. Brooks:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to Section 106 of the National Historic Preservation Act 36 CFR 800.2(c)(3). As you recall, the undertaking would involve replacing the central section of the Alaskan Way Viaduct (SR 99) with a two mile-long deep bored tunnel, extending from South Royal Brougham Way and continuing north under First Avenue to Harrison Street, where it would reconnect to the existing SR 99. The project would also include removal of the Alaskan Way Viaduct in downtown and the decommissioning of Battery Street Tunnel.

WSDOT recently finalized the early engineering 'snapshot' for the Alaskan Way Viaduct Replacement Project, and has defined an Area of Potential Effects (APE) per compliance with Section 106. We are requesting your input on the APE definition, which is shown on the enclosed figure.

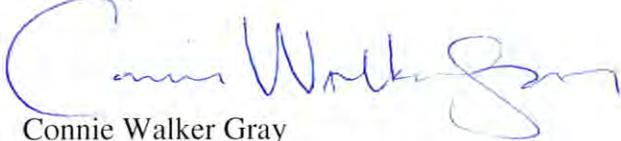
The APE was determined based on the geographical extent of the project and the activities that may affect the resources. Preliminary plans show the new bored tunnel extending from the vicinity of S. Royal Brougham Way beneath First Avenue, turning easterly at Stewart Street, and reaching the surface near Thomas Street. Modifications to SR 99 continue to Aloha Street.

Based on current project information, the APE extends horizontally one block on each side of the bored tunnel route, as described above, as well as around demolition and staging areas and other affected sites. To account for the planned removal of the existing viaduct structure, the APE also extends one block east of Alaskan Way and west to the waterfront piers, between S. Royal Brougham Way and Battery Street. Vertically, the APE includes the entirety of the tunnel right-of-way vertically from the ground surface to its maximum depth of excavation at the north and south ends of the tunnel where cut-and-cover trenches will be excavated for the tunnel boring machine (TBM). Above the tunnel, the APE extends only down to the upper five (5) feet of Pleistocene deposits. The vertical APE also includes the area beneath the existing viaduct structure and those areas subject to ground improvements, such as jet grouting.

Thank you for participating in this undertaking as a consulting party, and your assistance in identifying the project APE and any cultural resources known to your organization. We appreciate your response to the proposed APE by September 8; we look forward to meeting with you and discussing this project in more detail.

If you have questions, comments or concerns please contact me at 206-716-1138 or grayc@wsdot.wa.gov. You may also contact Ken Juell, WSDOT Archaeologist at 206-464-1236 or juellk@wsdot.wa.gov or Allison Hanson, Director of Environmental Services at 206-464-1136 or hansona@wsdot.wa.gov.

Sincerely,



Connie Walker Gray
WSDOT Architectural Historian
401 Second Avenue South, Suite 300
Seattle, WA 98104

cc: Randy Everett, FHWA, w/ enclosure
Scott Williams, WSDOT HQ w/enclosure
Ken Juell, WSDOT w/ enclosure



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

August 17, 2009

Ms. Connie Walker Gray
WSDOT Architectural Historian
401 2nd Ave. South, Suite 300
Seattle, Washington 98104

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: Archaeology - APE Concur

Dear Ms. Walker Gray:

We have reviewed the materials forwarded to our office for the Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel project. Thank you for your description of the area of potential effect (APE) for the project. We concur with the definition of the APE. We look forward to the results of your cultural resources investigations, your consultation with the concerned tribes, and further consultation with our agency on this complex undertaking. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the discipline report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Matthew Sterner".

Matthew Sterner, M.A., RPA
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
401 Second Avenue South, Suite 300
Seattle, WA 98104
206-716-1121/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

October 20, 2009

Dr. Allyson Brooks
State Historic Preservation Officer
Department of Archaeology and Historic Preservation
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: Review of Discipline Report (DR) for Second Supplemental Draft Environmental Impact Statement (SDEIS)

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the Alaskan Way Viaduct Replacement (SR 99) Project.

WSDOT is continuing preparation of a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative and compares the Bored Tunnel Alternative to the two alternatives analyzed in the 2006 SDEIS.

Pursuant to 36 CFR 800.8(a) and 40 CFR 1502.25(a), you will find attached a copy of the draft historic, cultural, and archaeological resources discipline report (Attachment 1) prepared for inclusion in the second SDEIS, which is currently scheduled to be published in March 2010. We seek your review and comment on this document.

The Alaskan Way Viaduct Replacement (SR 99) Project presents unique challenges in regards to historic properties given that access to these resources is restricted by depth below surface, ground water, existing infrastructure, requirements of existing transportation, the need to maintain existing utility service, and the proposed methods of construction. In addition to these challenges, a portion of the project is design-build, which integrates the final design and the construction phases. For these reasons, we are conducting a phased process for the identification and evaluation of historic properties as specified 36 CFR 800.4(b)(2).

Pursuant to 36 CFR 800.4(b)(2), the attached historic, cultural, and archaeological resources discipline report establishes "the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation." In continued consultation with you, Indian tribes, identified consulting parties, and other interested parties, we intend to develop a memorandum of agreement (MOA) pursuant to 36 CFR 800.6. We believe that this process and this document will be similar to the MOA developed for the Alaskan Way Viaduct, S. Holgate to S. King Replacement (DAHP Log # 012908-06-FHWA) and the project-specific programmatic agreement (PA) developed for the I-405 Corridor. The eventual MOA will resolve all identified adverse effects as well as potential adverse effects identified if this project alternative moves forward.

Within the area of potential effects (APE), we identified 320 historic built environment resources 40 years old and older. Of these, 172 have been previously recorded, and include the NRHP-listed Pioneer Square and Pike Place Market Historic Districts, and the NRHP-eligible Central Waterfront Pier District (Piers 54 through 59). There is one National Historic Landmark within the APE: the Pioneer Building/Pioneer Place/Pergola on 1st Avenue and Yesler Way.

As part of the cultural resources investigation, we surveyed and inventoried 148 built environment resources that had not been previously recorded. Of these, 43 are eligible for listing in the NRHP and 105 are not eligible for listing in the NRHP. At this time, pursuant to 36 CFR 800.4(c)(2), we seek your concurrence with our determinations of eligibility for the NRHP. These buildings, as well as previously recorded resources that are not listed in the NRHP, are listed in the table attached to this letter (Attachment 2) and are detailed in the cultural resources discipline report (Attachment 1), which includes Historic Property Inventory (HPI) forms for the properties not previously recorded. We will hand-deliver a CD, which includes the HPI database files, on Thursday, October 22.

As detailed in Attachment 1, we have identified adverse effects to three historic properties listed on or eligible for listing on the NRHP. In terms of the built environment, this project alternative will have an adverse effect on the NRHP-eligible Alaskan Way Viaduct and Battery Street Tunnel, and the NRHP-listed Triangle (Flatiron) Building in Pioneer Square. In terms of archaeology, this project alternative will have an adverse effect on the Dearborn South Tideland Site (45KI924). Measures to mitigate these adverse effects are outlined in the attached document. These measures would be part of any MOA developed to mitigate the effects of this project alternative.

Given the challenges posed by this project and its current alternatives under consideration, the attached documents are the first steps in our phased process for the identification and evaluation of historic properties. We look forward to continued consultation with you and your office as we move through this process.

Should you have questions or concerns please contact me at 206.716.1121, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.382.5279, email hanson@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS
Attachment 2. SR 99 Eligibility Recommendations: Buildings and Structures 40 or More Years Old within the Area of Potential Effects

cc: Matthew Sterner, DAHP w/ enclosure
Randy Everett, FHWA w/o enclosure
Ron Paananen, WSDOT AWW w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Megan White, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure

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3

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Appendix I

5

Section 106: Historic, Cultural, and Archaeological
Resources Discipline Report

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Alaskan Way Viaduct Replacement Project

8

Supplemental Draft EIS

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Lead and Cooperating Agency Review Draft

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For Review Only

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We respectfully request that the public not be given access to this document because

18

FHWA has determined that this preliminary document is an intergovernmental

19

exchange that may be withheld under the Freedom of Information Act. Premature

20

release of this material to any segment of the public could give some sectors an unfair

21

advantage and would have a chilling effect on intergovernmental coordination and the

22

success of the cooperating agency concept.

23

SR 99: ALASKAN WAY VIADUCT BORED TUNNEL PROJECT

10/19/2009

ELIGIBILITY RECOMMENDATIONS: Buildings and Structures 40 or More Years Old within the Area of Potential Effects

Properties already listed in the NRHP or in national historic districts are omitted from this list. Information on properties that have been recorded previously is available at www.dahp.wa.gov/pages/wisaardintro.htm. Copies will be provided on request.

#	Address	Current Name (Historic Name)	NRHP Determination	HPI Form
H-1	Alaskan Way	Alaskan Way Seawall	Eligible	Enclosed
H-2	Alaskan Way /Battery Street	Alaskan Way Viaduct & Battery Street Tunnel	Eligible	HAER 2009
H-3	S. Main St. to Bell St.	Burlington Northern Railway Tunnel (Great Northern Railway Tunnel)	Eligible	Enclosed
H-4	1526 1 st Ave. S.	Emerald Market Supply (David Dow and Sons)	Not eligible*	Recorded 2008
H-5	1518 1 st Ave. S.	McKinnon Furniture (Frederick & Nelson Warehouse)	Eligible	Recorded 2008
H-6	1251 1 st Ave. S.	Great Floors (International Harvester)	Not eligible	Recorded 2007
H-7	1201 1 st Ave. S.	Pyramid Alehouse	Not eligible	Recorded 2008
H-8	1041 1 st Ave. S.	Gerry Sportswear	Not eligible	Recorded 2007
H-10	1028 1 st Ave. S.	Hawk's Nest (Maginnis Bottling Works)	Not eligible	Recorded 2008
H-11	1014 1 st Ave. S.	Olympic Reprographics (M. F. Backus Warehouse)	Eligible	Recorded 2008
H-12	1000 1 st Ave. S.	Palmer Court (A. L. Palmer Building)	Eligible	Recorded 2007
H-13	902 1 st Ave. S.	Artists' Gallery of Seattle/ Worldwide Marble & Granite	Not eligible	Recorded 2008
H-14	900 1 st Ave. S.	Roebing Building	Eligible	Recorded 2008
H-15	820 1 st Ave. S.	Coastal Environmental Systems	Not eligible	Recorded 2008

* Note: NRHP determinations have already been made for previously-recorded properties.

#	Address	Current Name (Historic Name)	NRHP Determination	HPI Form
H-16	1020-22 1 st Ave. S.	E. O. Graves Building	Eligible	Recorded 2008
H-52	201 Alaskan Way South	Pier 48	Not eligible*	Recorded 2004
H-115	801 Alaskan Way	Piers 52/53 (Colman Dock)	Not eligible	Recorded 2004
H-116	809 Western Ave.	Commuter Building Garage (Mutual Creamery)	Not eligible	Enclosed
H-117	815 Western Ave.	Commuter Building (Carstens Building)	Not eligible	Enclosed
H-119	801 2 nd Ave.	Norton Building	Eligible	Enclosed
H-120	815 2 nd Ave.	Key Bank (Bank of California)	Eligible	Enclosed
H-121	821 2 nd Ave.	Exchange Building	Eligible	Enclosed
H-122	925 Alaskan Way	Fire Station #5	Eligible	Enclosed
H-123	911 Western Ave.	Maritime Building	Eligible	Enclosed
H-125	1001 Alaskan Way	Pier 54 (NPRR 3/Galbraith Dock)	Eligible	Enclosed
H-128	1012 1 st Ave.	Schoenfeld Furniture Store Building	Eligible	Enclosed
H-132	1015 2 nd Ave.	Federal Reserve Bank	Eligible	Recorded 2008
H-133	1101 Alaskan Way	Pier 55 (NPRR 4/Arlington Dock)	Eligible	Enclosed
H-137	1100 2 nd Ave.	Security Pacific Building (J. A. Baillargeon Building)	Eligible	Enclosed
H-138	1201 Alaskan Way	Pier 56 (Frank Waterhouse Dock)	Eligible	Enclosed
H-140	51 University St.	51 University) (Pacific Net & Twine Building)	Eligible	Enclosed
H-141	1206-12 1 st Avenue	Freedman's Loans/Money Mart	Not eligible	Enclosed
H-142	1216-1222 1 st Avenue	Diller Hotel	Eligible	Enclosed
H-143	1201-1211 2 nd Ave.	Seneca Building (Brown Building)	Not eligible	Enclosed
H-144	1215 2 nd Ave.	Galland Building (Stone, Fisher & Lane Department Store)	Not eligible	Enclosed

* Note: NRHP determinations have already been made for previously-recorded properties.

#	Address	Current Name (Historic Name)	NRHP Determination	HPI Form
H-145	1301 Alaskan Way	Pier 57 (John P. Ager's Dock/Milwaukee Dock)	Eligible	Enclosed
H-146	1319 Western Ave.	Seattle Steam (Mutual Light & Heating Company)	Not eligible	Enclosed
H-147	55 Union St.	Shurgard Storage (Diamond Ice & Storage Company)	Not eligible	Enclosed
H-149	1315 1 st Ave.	The Lusty Lady (Hotel Vendome/Post Edwards Building)	Not eligible	Enclosed
H-150	1414 Alaskan Way	Market Square (Schwabacher Warehouse #2)	Not eligible	Enclosed
H-151	1426 Alaskan Way	Bakun Building (A.C. Frye Company)	Not eligible	Enclosed
H-152	1483 Alaskan Way	Pier 59/Aquarium (Pier 8/Ainsworth & Dunn Pike Street Wharf)	Not eligible	Enclosed
H-153	1401 Western Ave.	Antique Warehouse (G.J. Callahan Warehouse)	Not eligible	Enclosed
H-158	1426 1 st Ave.	Showbox (Frye Market)	Not eligible	Enclosed
H-159	1501 Western Ave.	Madore Building (Frank L. Green Company)	Not eligible	Enclosed
H-160	1507 Western Ave.	Fix Building	Eligible	Enclosed
H-162	1500 1 st Ave.	Broderick Building	Not eligible	Enclosed
H-164	1510 1 st Ave.	Déjà Vu Showgirls (S.J. Holmes Building)	Not eligible	Enclosed
H-169	110 Union St.	Harold Poll Building (Hancock Building)	Not eligible	Enclosed
H-171	1501 2 nd Ave.	Eitel Building	Eligible	Enclosed
H-172	103 Pike St.	Hahn Building (Elliott Hotel)	Not eligible	Enclosed
H-173	114 Pike St.	Hard Rock Café (Liberty Building)	Not eligible	Enclosed
H-174	107 Pine St.	Gatewood Apartments (Colonnade Hotel)	Eligible	Enclosed
H-177	1601 2 nd Ave.	Broadacres Building	Not eligible	Enclosed
H-178	1613 2 nd Ave.	MJA Building (Ames Building)	Not eligible	Enclosed
H-180	1601 3 rd Ave.	Bon Marche Garage (Circular Ramp Garage)	Not eligible	Enclosed
H-181	300 Pine St.	Macy's (Bon Marché)	Eligible	Enclosed

#	Address	Current Name (Historic Name)	NRHP Determination	HPI Form
H-183	414 Stewart St.	Centennial Building (Tyee Building)	Eligible	Enclosed
H-190	1920 1 st Ave.	Oxford Apartments	Eligible	Enclosed
H-193	1924 1 st Ave.	Cipra Building (Rector Hotel/Madrona Hotel)	Not eligible	Enclosed
H-198	1915 2 nd Ave	Second Avenue Parking Garage (Northwest Building Co. Garage)	Not eligible	Enclosed
H-199	116 Stewart St.	St. Regis (Hotel Archibald)	Not eligible	Enclosed
H-200	1919 2 nd Ave.	(Hansen Brothers Building)	Not eligible	Enclosed
H-201	1921 2 nd Ave.	Great Jones Home (Barnett's Auction House)	Not eligible	Enclosed
H-203	1931 2 nd Ave.	Terminal Sales Annex (Puget Sound News)	Eligible	Enclosed
H-204	2016 1 st Ave.	Vogue Hotel	Not eligible	Enclosed
H-205	104 Pine St.	Atwood Apartments (Afton Hotel)	Not eligible	Enclosed
H-206	2000 2 nd Ave.	Palladian Apartments (Calhoun Hotel)	Eligible	Enclosed
H-207	1907 3 rd Ave.	Bergman's (Donohoe Garage)	Not eligible	Enclosed
H-208	1915 3 rd Avenue	Downtown Mini-Storage (White Garage)	Not eligible	Enclosed
H-209	1921 3 rd Ave.	Haddon Hall Apartments (Kelley-Gorham Building)	Eligible	Enclosed
H-210	1925 3 rd Ave.	Trust Building (Heiden Building)	Not eligible	Enclosed
H-211	2006 2 nd Ave.	Bushell's Auction House	Not eligible	Enclosed
H-212	2014 2 nd Ave.	Trust Parking (President Garage)	Not eligible	Enclosed
H-213	2001 3 rd Ave.	Swiftly Printing (Bailey Garage)	Not eligible	Enclosed
H-214	2013-15 3rd Ave.	First Avenue Service Center Shelter (Apex Printing)	Not eligible	Enclosed
H-215	2019 3 rd Ave.	Denny Hill Building	Not eligible	Enclosed
H-216	2025 3 rd Ave.	Pathé Building	Eligible	Enclosed
H-217	2031 3 rd Ave.	Jewish Federation	Not eligible	Enclosed

#	Address	Current Name (Historic Name)	NRHP Determination	HPI Form
H-218	2035 4 th Ave.	Ralph's Grocery	Not eligible	Enclosed
H-219	2021 4 th Ave.	Stratford Apartments (Nesika Apartments)	Not eligible	Enclosed
H-220	2033 4 th Ave.	Jiffy Lube	Not eligible	Enclosed
H-221	2106 2 nd Ave.	Belltown Center	Not eligible	Enclosed
H-222	2122 2 nd Ave.	Velocity/Saito's (Henry's Garage)	Not eligible	Enclosed
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H-224	2101 3 rd Ave.	Sig's Barber Shop	Not eligible	Enclosed
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H-308	601-15 Dexter Ave N.	Copiers Northwest	Not eligible	Recorded 2007
H-309	700 Dexter Ave N./770 Roy St.	Huletz Auto Electric/Auto Hound	Not eligible	Recorded 2007
H-310	717 Dexter Ave N.	European Auto Service	Not eligible	Enclosed
H-311	708 6 th Ave. N.	Midori Inc	Not eligible	Enclosed
H-312	800 Aloha St.	Seattle Parks Maintenance Facility (Puget Sound Power & Light)	Eligible	Enclosed
H-313	701-11 9 th Ave. N.	Bucca di Beppo/Ducati	Not eligible	Recorded 2007
H-314	739-45 9 th Ave. N.	Maaco	Not eligible	Enclosed
H-315	753 9 th Ave. N.	KPG Architects	Not eligible	Enclosed
H-316	731 Westlake Ave. N.	Jillian's Billiard Club (Art Marble Company)	Not eligible	Enclosed

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**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
401 Second Avenue South, Suite 300
Seattle, WA 98104
206-716-1121/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

October 22, 2009

Dr. Allyson Brooks
State Historic Preservation Officer
Department of Archaeology and Historic Preservation
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Transmittal of Historic Property Inventory Forms and Database Files

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the Alaskan Way Viaduct Replacement (SR 99) Project.

As noted in Kevin Bartoy's October 20, 2009 letter to your office, we are submitting the hard copies of the Historic Property Inventory (HPI) forms, as well as a CD containing the files on the DAHP HPI database. The enclosed table of properties summarizes the resources that were surveyed as part of the cultural resources investigation.

As Mr. Bartoy noted in his October 20 letter, we surveyed and inventoried 148 built environment resources that had not been previously recorded. Of these, 43 are eligible for listing in the NRHP and 105 are not eligible for listing in the NRHP. At this time, pursuant to 36 CFR 800.4(c)(2), we seek your concurrence on our determinations of eligibility and non-eligibility for the NRHP for these recorded historic properties within the APE for the project.

If you have questions or concerns please contact me at 206.716.1138, email grayc@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.382.5279, email hansona@wsdot.wa.gov.

Sincerely,

Connie Walker Gray
Cultural Resources Specialist
WSDOT ESO Mega Projects

cc: Matthew Sterner, DAHP
Randy Everett, FHWA
Ron Paananen, WSDOT
Allison Hanson, WSDOT
Megan White, WSDOT
Scott Williams, WSDOT

SR 99: ALASKAN WAY VIADUCT BORED TUNNEL PROJECT
10/19/2009
ELIGIBILITY RECOMMENDATIONS: Buildings and Structures 40 or More Years Old within the Area of Potential Effects

Properties already listed in the NRHP or in national historic districts are omitted from this list. Information on properties that have been recorded previously is available at www.dahp.wa.gov/pages/wisaardintro.htm. Copies will be provided on request.

#	Address	Current Name (Historic Name)	NRHP Recommendation	HPI Form
H-1	Alaskan Way	Alaskan Way Seawall	Eligible	Enclosed
H-2	Alaskan Way /Battery Street	Alaskan Way Viaduct & Battery Street Tunnel	Eligible	HAER 2009
H-3	S. Main St. to Bell St.	Burlington Northern Railway Tunnel (Great Northern Railway Tunnel)	Eligible	Enclosed
H-4	1526 1 st Ave. S.	Emerald Market Supply (David Dow and Sons)	Not eligible*	Recorded 2008
H-5	1518 1 st Ave. S.	McKinnon Furniture (Frederick & Nelson Warehouse)	Eligible	Recorded 2008
H-6	1251 1 st Ave. S.	Great Floors (International Harvester)	Not eligible	Recorded 2007
H-7	1201 1 st Ave. S.	Pyramid Alehouse	Not eligible	Recorded 2008
H-8	1041 1 st Ave. S.	Gerry Sportswear	Not eligible	Recorded 2007
H-10	1028 1 st Ave. S.	Hawk's Nest (Maginnis Bottling Works)	Not eligible	Recorded 2008
H-11	1014 1 st Ave. S.	Olympic Reprographics (M. F. Backus Warehouse)	Eligible	Recorded 2008
H-12	1000 1 st Ave. S.	Palmer Court (A. L. Palmer Building)	Eligible	Recorded 2007
H-13	902 1 st Ave. S.	Artists' Gallery of Seattle/ Worldwide Marble & Granite	Not eligible	Recorded 2008
H-14	900 1 st Ave. S.	Roebbling Building	Eligible	Recorded 2008
H-15	820 1 st Ave. S.	Coastal Environmental Systems	Not eligible	Recorded 2008

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H-16	1020-22 1 st Ave. S.	E. O. Graves Building	Eligible	Recorded 2008
H-52	201 Alaskan Way South	Pier 48	Not eligible*	Recorded 2004
H-115	801 Alaskan Way	Piers 52/53 (Colman Dock)	Not eligible	Recorded 2004
H-116	809 Western Ave.	Commuter Building Garage (Mutual Creamery)	Not eligible	Enclosed
H-117	815 Western Ave.	Commuter Building (Carstens Building)	Not eligible	Enclosed
H-119	801 2 nd Ave.	Norton Building	Eligible	Enclosed
H-120	815 2 nd Ave.	Key Bank (Bank of California)	Eligible	Enclosed
H-121	821 2 nd Ave.	Exchange Building	Eligible	Enclosed
H-122	925 Alaskan Way	Fire Station #5	Eligible	Enclosed
H-123	911 Western Ave.	Maritime Building	Eligible	Enclosed
H-125	1001 Alaskan Way	Pier 54 (NPRR 3/Galbraith Dock)	Eligible	Enclosed
H-128	1012 1 st Ave.	Schoenfeld Furniture Store Building	Eligible	Enclosed
H-132	1015 2 nd Ave.	Federal Reserve Bank	Eligible	Recorded 2008
H-133	1101 Alaskan Way	Pier 55 (NPRR 4/Arlington Dock)	Eligible	Enclosed
H-137	1100 2 nd Ave.	Security Pacific Building (J. A. Baillargeon Building)	Eligible	Enclosed
H-138	1201 Alaskan Way	Pier 56 (Frank Waterhouse Dock)	Eligible	Enclosed
H-140	51 University St.	51 University (Pacific Net & Twine Building)	Eligible	Enclosed
H-141	1206-12 1 st Avenue	Freedman's Loans/Money Mart	Not eligible	Enclosed
H-142	1216-1222 1 st Avenue	Diller Hotel	Eligible	Enclosed
H-143	1201-1211 2 nd Ave.	Seneca Building (Brown Building)	Not eligible	Enclosed
H-144	1215 2 nd Ave.	Galland Building (Stone, Fisher & Lane Department Store)	Not eligible	Enclosed

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H-145	1301 Alaskan Way	Pier 57	Eligible	Enclosed
H-146	1319 Western Ave.	(John P. Agen's Dock/Milwaukee Dock) Seattle Steam (Mutual Light & Heating Company)	Not eligible	Enclosed
H-147	55 Union St.	Shurgard Storage (Diamond Ice & Storage Company)	Not eligible	Enclosed
H-149	1315 1 st Ave.	The Lusty Lady (Hotel Vendome/Post Edwards Building)	Not eligible	Enclosed
H-150	1414 Alaskan Way	Market Square (Schwabacher Warehouse #2)	Not eligible	Enclosed
H-151	1426 Alaskan Way	Bakun Building (A.C. Frye Company)	Not eligible	Enclosed
H-152	1483 Alaskan Way	Pier 59/Aquarium (Pier 8/Ainsworth & Dunn Pike Street Wharf)	Not eligible	Enclosed
H-153	1401 Western Ave.	Antique Warehouse (G.J. Callahan Warehouse)	Not eligible	Enclosed
H-158	1426 1 st Ave.	Showbox (Frye Market)	Not eligible	Enclosed
H-159	1501 Western Ave.	Madore Building (Frank L. Green Company)	Not eligible	Enclosed
H-160	1507 Western Ave.	Fix Building	Eligible	Enclosed
H-162	1500 1 st Ave.	Broderick Building	Not eligible	Enclosed
H-164	1510 1 st Ave.	Déjà Vu Showgirls (S.J. Holmes Building)	Not eligible	Enclosed
H-169	110 Union St.	Harold Poll Building (Hancock Building)	Not eligible	Enclosed
H-171	1501 2 nd Ave.	Eitel Building	Eligible	Enclosed
H-172	103 Pike St.	Hahn Building (Elliott Hotel)	Not eligible	Enclosed
H-173	114 Pike St.	Hard Rock Café (Liberty Building)	Not eligible	Enclosed
H-174	107 Pine St.	Gateway Apartments (Colonnade Hotel)	Eligible	Enclosed
H-177	1601 2 nd Ave.	Broadacres Building	Not eligible	Enclosed
H-178	1613 2 nd Ave.	MJA Building (Ames Building)	Not eligible	Enclosed
H-180	1601 3 rd Ave.	Bon Marche Garage (Circular Ramp Garage)	Not eligible	Enclosed
H-181	300 Pine St.	Macy's (Bon Marché)	Eligible	Enclosed

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H-183	414 Stewart St.	Centennial Building (Tye Building)	Eligible	Enclosed
H-190	1920 1 st Ave.	Oxford Apartments	Eligible	Enclosed
H-193	1924 1 st Ave.	Cipra Building (Rector Hotel/Madrona Hotel)	Not eligible	Enclosed
H-198	1915 2 nd Ave	Second Avenue Parking Garage (Northwest Building Co. Garage)	Not eligible	Enclosed
H-199	116 Stewart St.	St. Regis (Hotel Archibald)	Not eligible	Enclosed
H-200	1919 2 nd Ave.	(Hansen Brothers Building)	Not eligible	Enclosed
H-201	1921 2 nd Ave.	Great Jones Home (Barnett's Auction House)	Not eligible	Enclosed
H-203	1931 2 nd Ave.	Terminal Sales Annex (Puget Sound News)	Eligible	Enclosed
H-204	2016 1 st Ave.	Vogue Hotel	Not eligible	Enclosed
H-205	104 Pine St.	Atwood Apartments (Afton Hotel)	Not eligible	Enclosed
H-206	2000 2 nd Ave.	Palladian Apartments (Calhoun Hotel)	Eligible	Enclosed
H-207	1907 3 rd Ave.	Bergman's (Donohoe Garage)	Not eligible	Enclosed
H-208	1915 3 rd Avenue	Downtown Mini-Storage (White Garage)	Not eligible	Enclosed
H-209	1921 3 rd Ave.	Haddon Hall Apartments (Kelley-Gorham Building)	Eligible	Enclosed
H-210	1925 3 rd Ave.	Trust Building (Heiden Building)	Not eligible	Enclosed
H-211	2006 2 nd Ave.	Bushell's Auction House	Not eligible	Enclosed
H-212	2014 2 nd Ave.	Trust Parking (President Garage)	Not eligible	Enclosed
H-213	2001 3 rd Ave.	Swiftly Printing (Bailey Garage)	Not eligible	Enclosed
H-214	2013-15 3rd Ave.	First Avenue Service Center Shelter (Apex Printing)	Not eligible	Enclosed
H-215	2019 3 rd Ave.	Denny Hill Building	Not eligible	Enclosed
H-216	2025 3 rd Ave.	Pathé Building	Eligible	Enclosed
H-217	2031 3 rd Ave.	Jewish Federation	Not eligible	Enclosed

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H-219	2021 4 th Ave.	Stratford Apartments (Nesika Apartments)	Not eligible	Enclosed
H-220	2033 4 th Ave.	Jiffy Lube	Not eligible	Enclosed
H-221	2106 2 nd Ave.	Belltown Center	Not eligible	Enclosed
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H-309	700 Dexter Ave N./770 Roy St.	Huletz Auto Electric/Auto Hound	Not eligible	Recorded 2007
H-310	717 Dexter Ave N.	European Auto Service	Not eligible	Enclosed
H-311	708 6 th Ave. N.	Midori Inc	Not eligible	Enclosed
H-312	800 Aloha St.	Seattle Parks Maintenance Facility (Puget Sound Power & Light)	Eligible	Enclosed
H-313	701-11 9 th Ave. N.	Buocca di Beppo/Ducati	Not eligible	Recorded 2007
H-314	739-45 9 th Ave. N.	Macco	Not eligible	Enclosed
H-315	753 9 th Ave. N.	KPG Architects	Not eligible	Enclosed
H-316	731 Westlake Ave. N.	Jillian's Billiard Club (Art Marble Company)	Not eligible	Enclosed

* NRHP determinations have already been made on previously-recorded properties.



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

November 18, 2009

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
401 Second Ave. South, Suite 300
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Review Comments on Draft Discipline Report

Dear Mr. Bartoy:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP) and providing a copy of the Draft Cultural Resources Discipline Report for the Central Waterfront, Deep-Bore Tunnel portion of the Alaskan Way Viaduct project. The discipline report has been reviewed on behalf of the State Historic Preservation Officer under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. My review is based upon documentation contained in your communication.

I will restrict my comments to those portions of the discipline report that pertain to the archaeological component of the project. Discussions regarding the built environment resources associated with the project will most likely be directed to you from Mr. Russell Holter, built-environment compliance reviewer here at DAHP.

Regarding the archaeological component of the report, I have the following comments at present:

- The report discusses the “potential” for both prehistoric and historical-period materials in pages 63–69. Additional discussions that justify these assertions, elaborate on what types of resources or other features might be encountered, and generally discusses the ‘adequacy’ of the archaeological investigations to date do not appear in the discussion. It is difficult to assess the adequacy of the work that has been completed to date when that data does not effectively appear in the document. Normally, the submittal of a discipline report is preceded by a cultural resources survey report or similar document that contains the technical data by which reviewers can adequately assess and evaluate the adequacy of the investigation. Since no such document was produced for this project, I would have to say that the report does not allow us the opportunity to effectively determine if the archaeological survey/investigation is adequate.



- There is insufficient discussion of the extent and damage that will be caused by 'soil improvements' that are slated for the project.
- The accompanying cover letter implies that the only archaeological resource that may be affected by the project is the Dearborn South Tidelands Site (45KI924). What about those resources presented on page 69 that are not associated with 45KI924? Is the report contending that WSDOT has gathered sufficient information on these properties to identify them as discreet archaeological properties and is ready to propose specific mitigation for direct or indirect project impacts?

My overall feeling is that the report devotes considerable time and effort is discussing mitigation measures for a cultural resources universe that has not yet been defined. Until the adequacy of the survey level investigation for the project has been concurred upon by DAHP, any discussion of mitigation or next steps is premature.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. If you have not registered for a copy of the database, please log onto our website at www.dahp.wa.gov and go to the Survey/Inventory page for more information and a registration form. To assist you in conducting a survey, DAHP has developed a set of cultural resource reporting guidelines. You can obtain a copy of these guidelines from our website. Finally, please note that effective Nov. 2, 2009, DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD along with an unbound paper copy. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment.

Sincerely,



Matthew Sterner, M.A., RPA
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

November 24, 2009

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
401 Second Ave. South, Suite 300
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: More Information Needed

Dear Mr. Bartoy:

Thank you for contacting our office. I have reviewed the materials you provided for this project. We have reviewed the 176 inventory forms associated with properties within the Area of Potential Effect for this undertaking. Of those 176 forms we concur with your consultant's professional opinion that 43 properties are eligible for listing to the National Register of Historic Places. We also concur that 118 properties are not eligible for listing to the National Register of Historic Places. This leaves 15 properties where consultation under Section 106 should continue before a determination is made as to the undertakings affects. These 15 properties are as follows:

H-3	Great Northern RR Tunnel*	S Main to Bell St.
H-137	The JA Baillargeon Building*	1100 2 nd Ave
H-160	The Fix Building	1507 Western
H-207	The Donohoe Garage	1907 3 rd Ave
H-210	The Heiden Building	1925 3 rd Ave
H-219	The Nesika Apartments*	2021 4 th Ave
H-227	The Rex Land Company	2124 3 rd Ave
H-231	The Cinerama	2100 4 th Ave
H-243	The Cornelius Apartments	306 Blanchard
H-249	The Charlesgate Apartments	2230 4 th Ave
H-254	The Royal Typewriter Building	2221 5 th Ave
H-258	The Compton Building*	2315 Western
H-276	The Bianchi Law Offices	605 Thomas
H-284	The Seattle City Light Building*	319 6 th Ave
H-291	The Continental Baking Company	434 Aurora

* The form was missing or incomplete



In order to complete our review we request additional information be provided as to how your consultant arrived at their conclusions. For the Nesika Apartments, the photo links to the Historic Property Inventory Database was either broken or the photos were left off the database.

I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available. These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Please contact me should you have any specific questions about our request and we look forward to receiving this material.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically in PDF format on a CD along with an unbound copy of your report. Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,



Russell Holter
Project Compliance Reviewer
(360) 586-3533
russell.holter@dahp.wa.gov

Cc: Matthew Sterner (DAHP)
Karen Gordon (Seattle)



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
401 Second Avenue South, Suite 300
Seattle, WA 98104
206-716-1121/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

December 8, 2009

Dr. Allyson Brooks
State Historic Preservation Officer
Washington Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504

**Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project
DAHP Log # 051209-10-FHWA**

Dear Dr. Brooks:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(1).

WSDOT is preparing to undertake another phase of geotechnical coring to establish existing subsurface conditions along the proposed tunnel alignment. We previously sent you the geotechnical exploration plan for Phase 1 of this effort and notified you of the implementation of Phase 2 earlier this fall. The current coring represents Phase 3 of this effort. Attached to this letter, you will find location information for this Phase 3 coring effort.

WSDOT has retained the services of a cultural resources consultant to monitor extraction of the sonic core borings, which produce a continuous sample in contrast to the mud rotary borings which produce a split-spoon sedimentary sample. In addition to monitoring the consultant will examine and log the cores on-site, and segregate core sections they believe may contain information about the archaeological record for later analysis. Core sections of interest will be moved to a laboratory where sediments will be described and screened to recover any cultural materials. The data collected will be used to supplement previous coring efforts and help plan future coring locations, specifically for archaeology, and to plan for future archaeological investigations within the project's Area of Potential Effects.

If you would be interested in observing this process, please do not hesitate to contact me so that we can arrange a time when the field operations are underway. We would appreciate hearing your comments, and will answer any questions or concerns you may have related to the coring program.

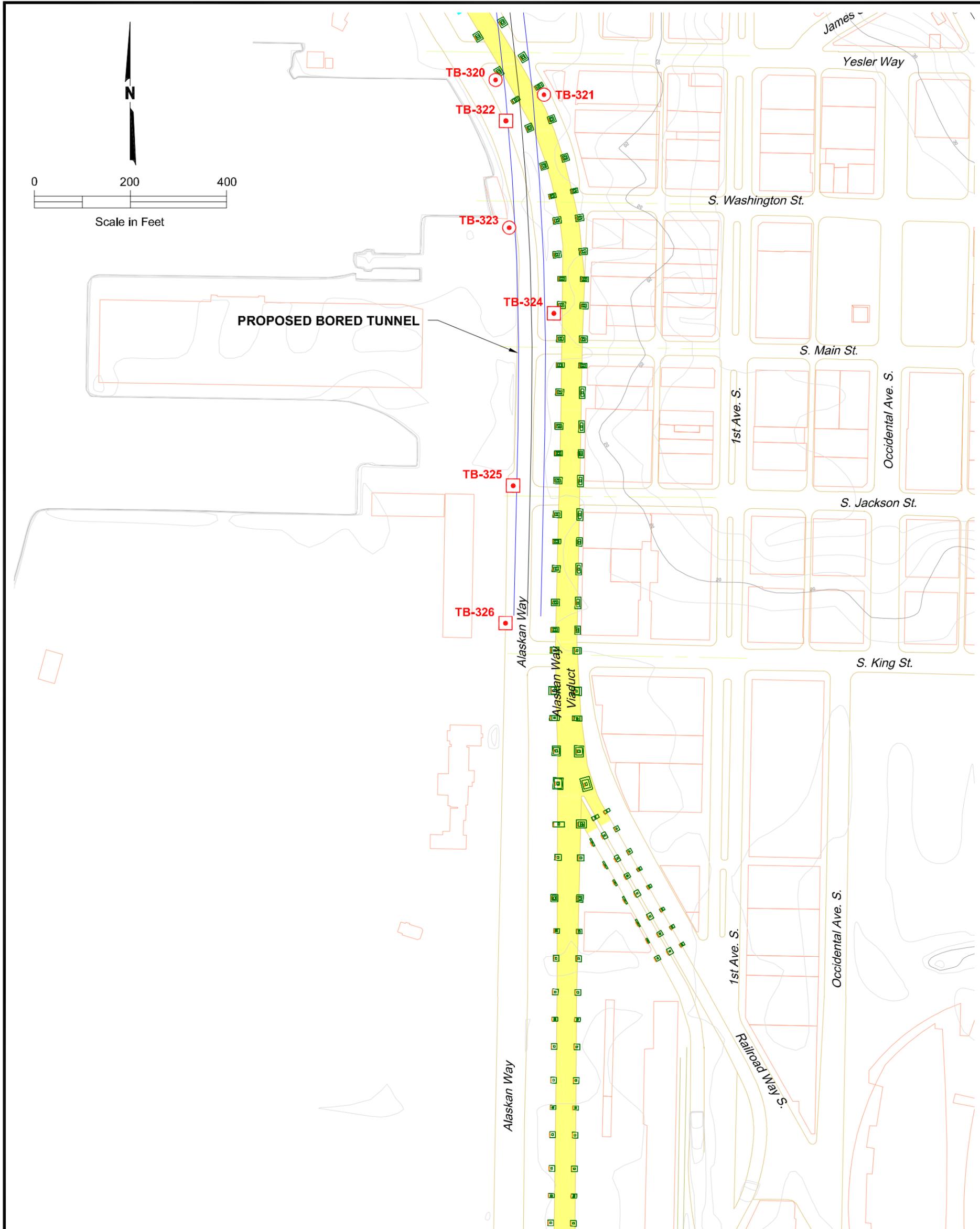
Should you have questions or concerns please contact me at 206.716.1121, email bartoyk@wsdot.wa.gov, or Allison Hanson (Environmental Services Director for Mega-Projects) at 206.382.5279, email hansona@wsdot.wa.gov.

Sincerely,

Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

Enclosure: Proposed Phase 3 Boring Plan Maps (5 pages)

cc: Matt Sterner, DAHP, w/ enclosure
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT



PROJECT EXPLORATIONS AND LEGEND

- Proposed Soil Borings
- ◻ Proposed Sonic Core Borings
- ◐ Proposed Air Rotary Borings
- * Proposed Shear Wave Velocity Testing
- Geoprobes Performed (2001 - 2009)
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- △ Cone Penetration Test Probes (2001 - 2008)
- Explorations Shown in Blue Have Groundwater Monitoring Devices (Wells Or Vibrating Wire Piezometers)

- Superscripts
- W Well Installed
 - * Shear Wave Velocity Measurements Obtained
 - P Pressuremeter Tests Performed
 - V Vane Shear Tests Performed

PREVIOUS BORINGS BY OTHERS

- ✕ Boring Less than 50' Deep
- ✕ Boring Between 50'-100' Deep
- ✕ Boring More than 100' Deep

NOTES

1. Base map is adapted from City of Seattle GIS data files *topo_all.dwg*, *st_names.dwg*, and *paveedge.dwg*, received 3-11-02; City of Seattle GIS data file *buildings.dwg*, received 3-6-02; and Parsons Brinckerhoff AutoCAD files *BSMP_SO.dwg*, received 11-30-01, and *rail.dwg*, received 5-15-03.
2. Bus tunnel, BNSF tunnel, and EBI are based on file *BT Feb09 Mezher.dgn*, received 2-27-09 from Parsons Brinckerhoff.
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4. Existing footings are based on Parsons Brinckerhoff files *160073U00ALLUEF000.dwg*, received 6-11-07; *GIS_EX_VIADUCT.dgn*, received 4-9-08; and *160073CSBS00SD200.MST*, received 5-27-08.

DRAFT

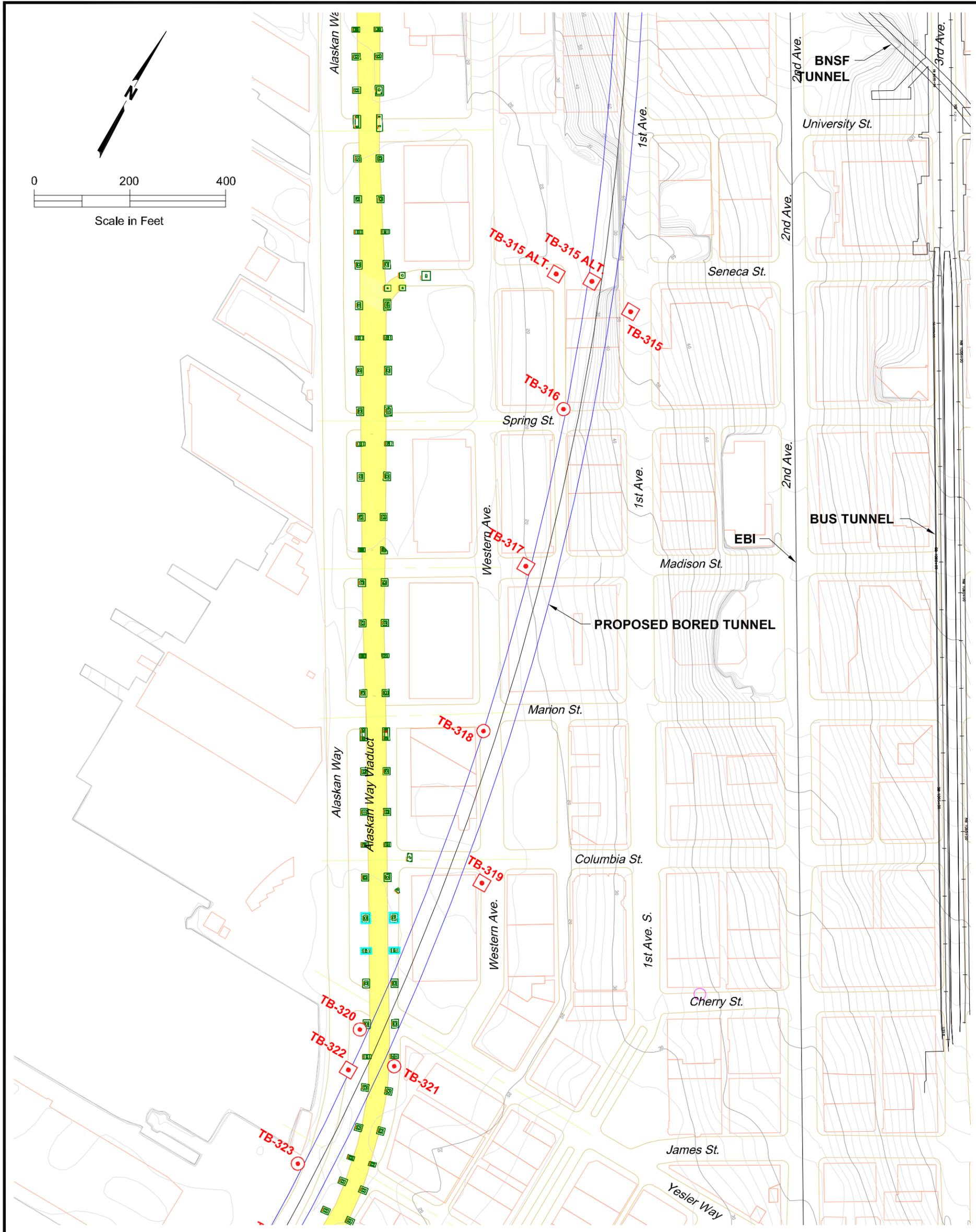
Alaskan Way Viaduct and Seawall Program
Central Waterfront Tunnel
Seattle, Washington

SITE AND EXPLORATION PLAN

November 2009 21-1-20840-073

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 1 of 5



PROJECT EXPLORATIONS AND LEGEND

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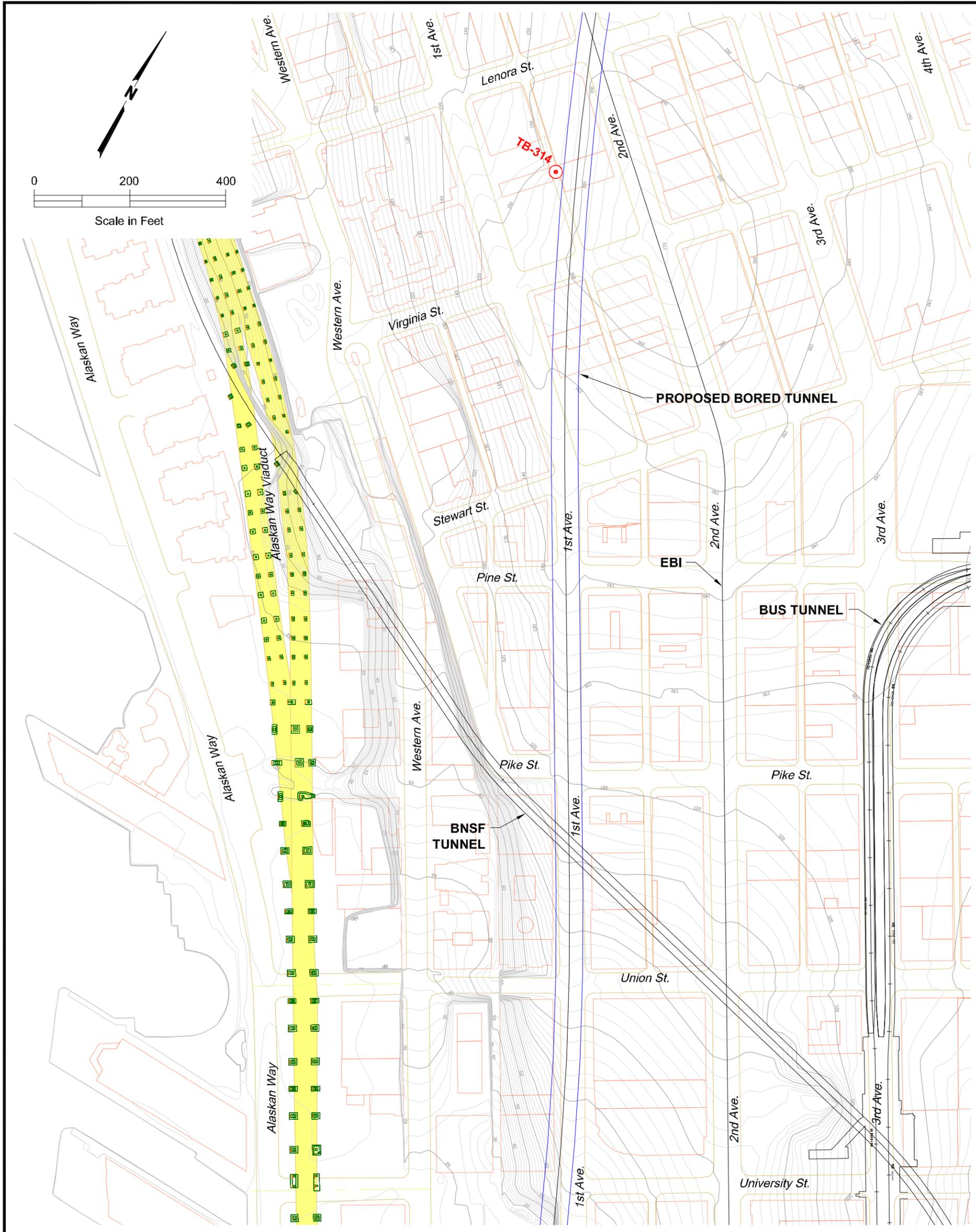
Alaskan Way Viaduct and Seawall Program
Central Waterfront Tunnel
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SITE AND EXPLORATION PLAN

November 2009 21-1-20840-073

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 2 of 5



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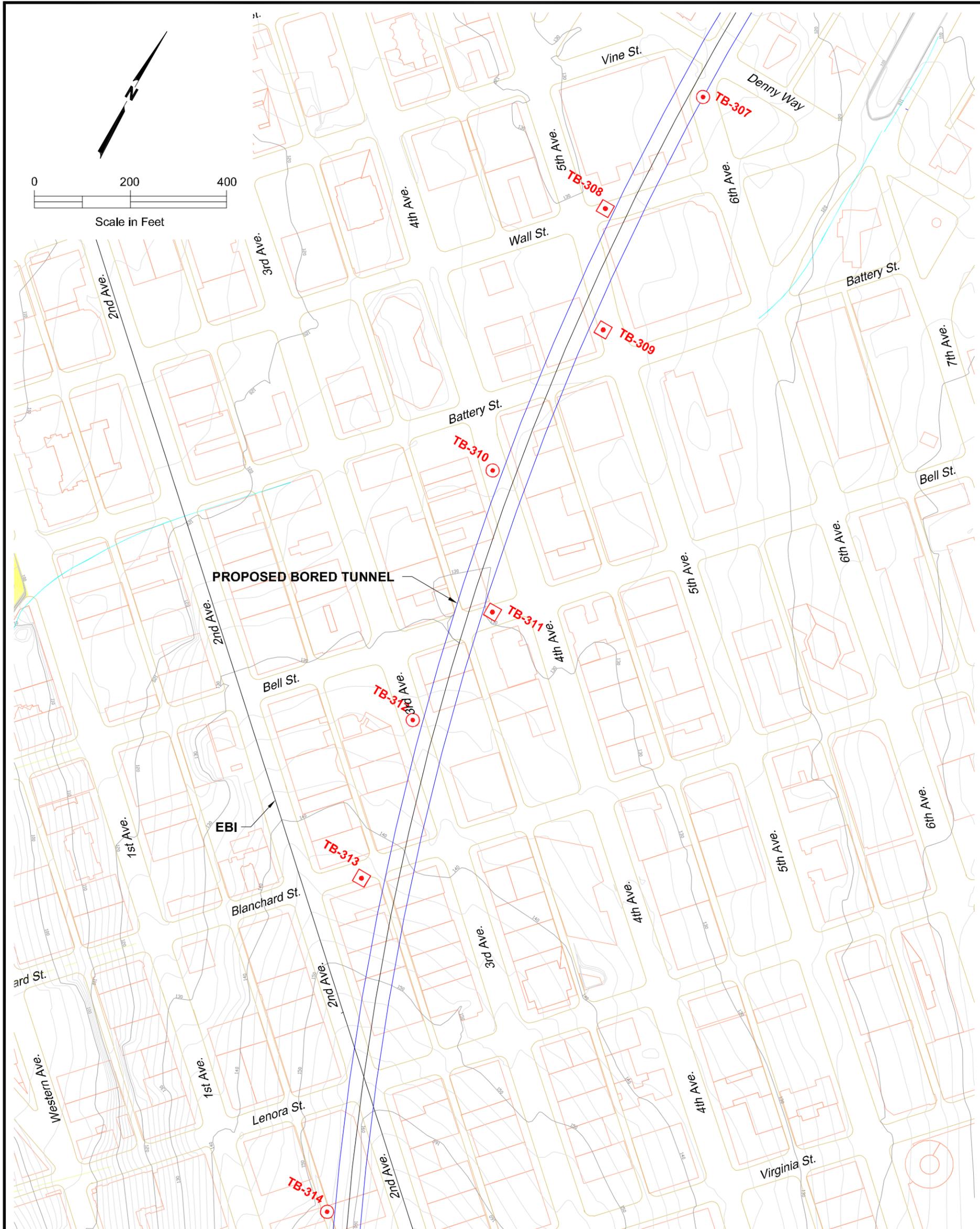
Alaskan Way Viaduct and Seawall Program
Central Waterfront Tunnel
Seattle, Washington

SITE AND EXPLORATION PLAN

November 2009 21-1-20840-073

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Geotechnical and Environmental Consultants

FIG. 2
Sheet 3 of 5



PROPOSED BORED TUNNEL

EBI

PROJECT EXPLORATIONS AND LEGEND

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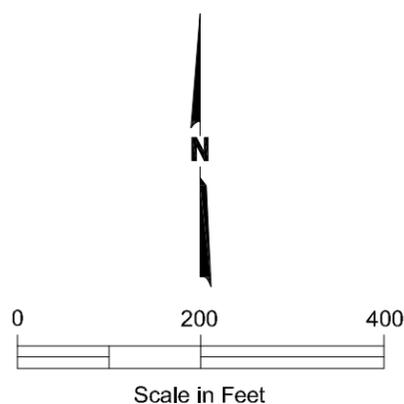
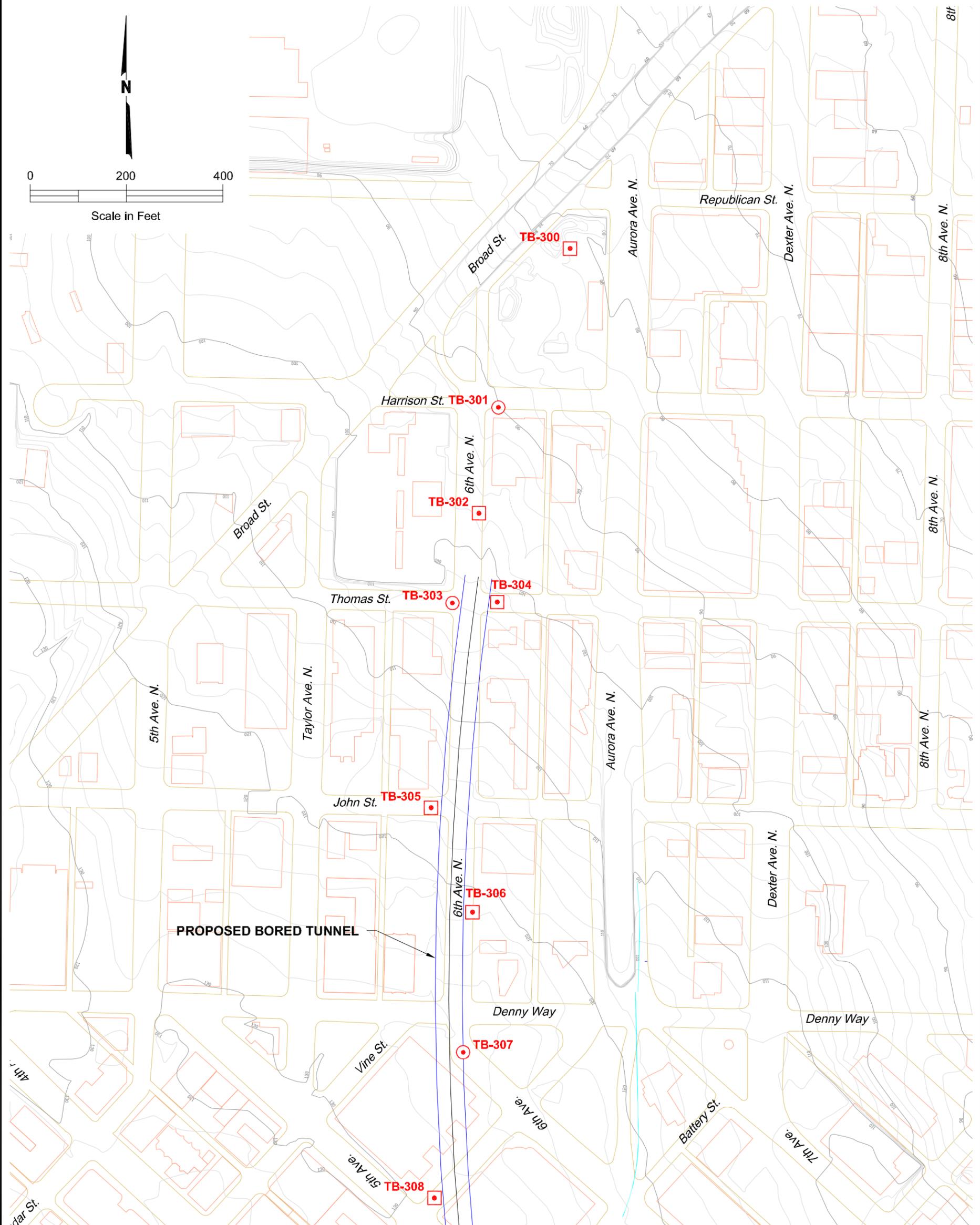
Alaskan Way Viaduct and Seawall Program
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Seattle, Washington

SITE AND EXPLORATION PLAN

November 2009 21-1-20840-073

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 4 of 5



PROJECT EXPLORATIONS AND LEGEND

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DRAFT

Alaskan Way Viaduct and Seawall Program
Central Waterfront Tunnel
Seattle, Washington

SITE AND EXPLORATION PLAN

November 2009 21-1-20840-073

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2
Sheet 5 of 5

FIG. 2
Sheet 5 of 5



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104
206-716-1220/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

February 4, 2010

Dr. Allyson Brooks
State Historic Preservation Officer
Washington Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504

Log: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Comment Request for Revised Area of Potential Effects (APE)

Dear Dr. Brooks:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(1). As you are aware, recent value engineering efforts have led us to a redesign of the north and south portal locations as well as the alignment for the proposed bored tunnel. WSDOT, on behalf of FHWA, seeks your comment on the revised Area of Potential Effects (APE), which reflects the adjusted tunnel alignment.

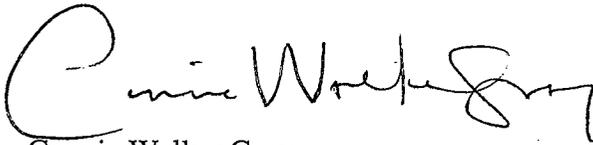
The enclosed graphic, titled "Area of Potential Effects," illustrates the revised APE, including potential staging areas. The horizontal APE, which extends one block on each side of the bored tunnel route, has not changed substantially; the primary adjustment is on the north end of the APE, which now incorporates more of the Belltown neighborhood. The vertical APE at the north and south ends of the tunnel where cut-and-cover trenches will be excavated for the tunnel boring machine (TBM) includes the entirety of the tunnel right-of-way from the ground surface to its maximum depth of excavation. Above the bored tunnel, the vertical APE extends from the ground surface to the upper five feet of Pleistocene deposits.

The other enclosed graphic, titled "SR 99 DEIS-2 Configuration," illustrates the new portal locations and tunnel alignment as well as a profile of the proposed bored tunnel. Potential construction staging areas indicated on the enclosed APE map include:

- Terminal 106
- Terminal 25
- I-90 HOV Ramp Site (S. Royal Brougham Way and 6th Avenue South)
- Fischer Site (S. Atlantic and 4th Avenue South)
- I-90 Ramp Site (S. Royal Brougham Way and 4th Avenue South)
- 1st Avenue South Bridge site

Thank you for your ongoing interest and participation in this undertaking, We look forward to your comment on the revised APE for this project by March 10, 2010. If you have questions, comments or concerns please contact me at 206-521-5631, email grayc@wsdot.wa.gov or you may also contact Kevin Bartoy, WSDOT Archaeologist at 206-521-5628 or bartoyk@wsdot.wa.gov.

Sincerely,



Connie Walker Gray
WSDOT Cultural Resources Specialist

New Address

999 3rd Avenue, Suite 2424
Seattle, WA 98104

cc: Randy Everett, FHWA, w/ enclosure
Allyson Brooks, SHPO w/enclosure
Scott Williams, WSDOT HQ w/enclosure
Allison Hanson, WSDOT, w/ enclosure
Kevin Bartoy, WSDOT, w/ enclosure



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 23, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: Archaeology – More Information Needed

Dear Mr. Bartoy:

We have reviewed the materials forwarded to our office for the Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel project. Thank you for your description of the revised area of potential effect (APE) for the project. I would like to request clarification regarding the extent of the APE in the area of the Battery St. Tunnel. Since the ultimate disposition of the Battery St. Tunnel has not yet been determined following the completion of the deep-bore tunnel, I would request justification for the northern boundary of the APE remaining along Battery St. Dismantling or destruction of the Battery St Tunnel could result in vibration or other damage to adjacent National Register of Historic Property (NRHP)-listed or eligible structures. Please revisit the APE boundary in this portion of the project area and resubmit with justifications to our office for review and comment.

We look forward to the results of your cultural resources survey efforts, your consultation with the concerned tribes, and receiving the survey report. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. If you have not registered for a copy of the database, please log onto our website at www.dahp.wa.gov and go to the Survey/Inventory page for more information and a registration form. To assist you in conducting a survey, DAHP has developed a set of cultural resource reporting guidelines. You can obtain a copy of these guidelines from our website. Finally, please note that



DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

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effective Nov. 2, 2009, DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD along with an unbound paper copy. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,



Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

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March 29, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 012908-06-FHWA

Property: Alaskan Way Viaduct, S Holgate to S King Viaduct Replacement (as 'Program')

Re: Section 4(f) Status for Archaeological Site 45KI924

Dear Mr. Bartoy:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHHP). Your correspondence of February 24th, 2010, has been reviewed on behalf of the State Historic Preservation Officer under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. My review is based upon documentation contained in your communication.

Regarding your determination of exempt Section 4(f) status for archaeological site 45KI924, we concur with your determination that the site is eligible and important for its research potential and that it has no inherent value for preservation in place.

Thank you for the opportunity to review and comment.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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April 1, 2010

Dr. Allyson Brooks
State Historic Preservation Officer
Washington Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504

Log: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Comment Request for Revised Area of Potential Effects (APE)

Dear Dr. Brooks:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(1). Thank you for the letter from Matthew Sterner dated February 23, 2010, regarding the Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel APE. Mr. Sterner requested additional information about the decommissioning of the Battery Street Tunnel (BST) and recommended including properties above and immediately north of the BST within the APE. We appreciate the comment, and have expanded the APE per Mr. Sterner's suggestion, as you will note in the attached map.

Furthermore, a current description of the BST decommissioning is provided here. The decommissioning will use crushed rubble recycled from the existing Viaduct to fill the tunnel approximately two-thirds full. Then, low-strength concrete slurry will be pumped in from above to solidify the tunnel. Businesses and residents may experience short-term effects from truck traffic due to this activity, but no long-term effects are expected. Additional analysis of this activity, as well as other effects from this project, will be included in the forthcoming Cultural Resources Discipline Report.

Thank you for your ongoing interest and participation in this undertaking. We look forward to your comment on the revised APE for this project by May 3, 2010. If you

have questions, comments or concerns please contact me at 206-521-5631, email grayc@wsdot.wa.gov or you may also contact Kevin Bartoy, WSDOT Archaeologist at 206-521-5628 or bartoyk@wsdot.wa.gov.

Sincerely,

A handwritten signature in black ink that reads "Connie Walker Gray". The signature is written in a cursive style with a large initial "C" and a stylized "E" at the end.

Connie Walker Gray
WSDOT Cultural Resources Specialist

cc: Randy Everett, FHWA, w/ enclosure
Scott Williams, WSDOT HQ w/enclosure
Allison Hanson, WSDOT, w/ enclosure
Kevin Bartoy, WSDOT, w/ enclosure



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April 28, 2010

Ms. Connie Walker-Gray
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: Archaeology - APE Concur

Dear Ms. Walker-Gray:

We have reviewed the materials forwarded to our office for the Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel project. Thank you for your description of the revised area of potential effect (APE) for the project. We concur with the definition of the revised APE. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. Please also note that effective Nov. 2, 2009, DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD along with an unbound paper copy. For more, please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
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May 24, 2010

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Review of Discipline Report (DR) for Second Supplemental Draft Environmental Impact Statement (SDEIS), Determination of NRHP Eligibility for the Built Environment, and Determination of Adverse Effect

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. WSDOT is preparing a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative.

Pursuant to 36 CFR 800.8(c) and 40 CFR 1502.25(a), you will find attached a copy of the draft historic, cultural, and archaeological resources discipline report (Attachment 1) prepared for inclusion in the second SDEIS, which is currently scheduled to be published in October 2010. We seek your review and comment on this document.

The Alaskan Way Viaduct Replacement Project presents unique challenges in regards to historic properties given that access to archaeological resources is restricted by depth below surface, ground water, existing infrastructure, requirements of existing transportation, the need to maintain existing utility service, and the proposed methods of construction. In addition to these challenges, a portion of the project is design-build, which integrates the final design and the construction phases. For these reasons, we are conducting a phased process for the identification and evaluation of historic properties as specified 36 CFR 800.4(b)(2).

Pursuant to 36 CFR 800.4(b)(2), the attached historic, cultural, and archaeological resources discipline report establishes "the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation." In continued consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties, we intend to develop a memorandum of agreement

(MOA) pursuant to 36 CFR 800.6. The eventual MOA will resolve identified adverse effects as well as potential adverse effects identified if the Bored Tunnel Alternative is the selected alternative in the Record of Decision.

As part of the cultural resources investigation, all historic built environment resources within the Area of Potential Effects (APE) were evaluated and recorded. Within the APE there known previously recorded resources, including the NRHP-listed Pioneer Square and Pike Place Market Historic Districts, and the NRHP-eligible Central Waterfront Pier District (Piers 54 through 59). There is one National Historic Landmark within the APE: the Pioneer Building/Pioneer Place/Pergola on 1st Avenue and Yesler Way.

In a letter dated October 20, 2009, WSDOT, on behalf of FHWA, made determinations of eligibility to the National Register of Historic Places (NRHP) for all historic built environment resources within the APE. In a November 24, 2009 letter from Mr. Russell Holter, DAHP concurred with the NRHP determinations for 161 properties within the APE. Mr. Holter requested additional information and/or justification of NRHP eligibility for 15 resources. With this submittal, we are continuing consultation on those 15 properties, and we are resubmitting those forms with the following NRHP eligibility determinations:

Great Northern Railroad Tunnel, S. Main to Bell Streets – NRHP eligible
The J.A. Baillargeon Building, 1100 2nd Avenue – NRHP eligible (two buildings)
The Fix Building, 1507 Western – not NRHP eligible
The Donohoe Garage, 1907 3rd Avenue – NRHP eligible
The Heiden Building, 1925 3rd Avenue – NRHP eligible
The Nesika Apartments, 2021 4th Avenue – not NRHP eligible
The Rex Land Company, 2124 3rd Avenue – not NRHP eligible
The Cinerama, 2100 4th Avenue – not NRHP eligible
The Cornelius Apartments, 306 Blanchard – not NRHP eligible
The Charlesgate Apartments, 2230 4th Avenue – not NRHP eligible
The Royal Typewriter Building, 2221 5th Avenue – not NRHP eligible
The Compton Building, 2315 Western - NRHP eligible
The Bianchi Law Offices, 605 Thomas Street – not NRHP eligible
The Seattle City Light Building, 319 6th Avenue - NRHP eligible
The Continental Baking Company, 434 Aurora Avenue – not NRHP eligible

Furthermore, as you are aware, we have revised the APE to accommodate new areas that might be affected by the realigned bored tunnel, as well as identified construction staging areas. There are 64 additional buildings within the new APE. WSDOT, on behalf of FHWA, has determined that 15 of these newly identified buildings are NRHP-eligible.

All buildings, structures, and objects have been recorded on Washington State Historic Property Inventory (HPI) forms, which are included in this submittal in printed form (Attachment 2), with database files on the accompanying CD. At this time, pursuant to 36 CFR 800.4(c)(2), we seek your concurrence with our determinations of eligibility for the NRHP.

This undertaking will adversely affect historic properties. As detailed in Attachment 1, we have identified adverse effects to four historic properties listed on or eligible for listing on the NRHP. In terms of the built environment, this project alternative will have an adverse effect on the NRHP-eligible Alaskan Way Viaduct and Battery Street Tunnel, as well as the Western Building and Polson Building, which are contributing elements to the Pioneer Square National Historic District.

In terms of archaeology, this project alternative will have an adverse effect on the Dearborn South Tideland Site (45KI924). Pursuant to 36 CFR 800.8(c)(v), measures to mitigate these adverse effects are outlined in the attached document. These measures would be part of any MOA developed in consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties to mitigate the effects of this project alternative.

Given the challenges posed by this project and its current alternatives under consideration, the attached documents begin our phased process for the identification and evaluation of historic properties. We look forward to continued consultation with you and your office as we move through this process.

Should you have questions or concerns please contact me at 206.521.5628, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.382.5279, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): Attachment 1. Section 106: Historic, Cultural, and Archaeological
Resources Discipline Report, Alaskan Way Viaduct Replacement Project,
Supplemental Draft EIS
Attachment 2. SR 99 Eligibility Determinations: Buildings and Structures
40 or More Years Old within the Area of Potential Effects

cc: Matthew Sterner, DAHP w/ enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure



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DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

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June 17, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: More Information Needed

Dear Mr. Bartoy:

Thank you for contacting our office and providing a copy of the discipline report for the second supplemental draft environmental impact statement for the Alaskan Way Viaduct Replacement project. I have completed my review of the report. I have a number of comments on the document and will discuss below some additional materials and/or steps that are required in order to complete our review.

I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

- I understand from Mr. Russell Holter, that disagreements remain surrounding eligibility of a number of buildings within the area of potential effect (APE) for the project. My understanding is that Mr. Holter's letter of June 14th indicated DAHP's lack of eligibility concurrence at this time on two of the properties within the APE (the Royal Typewriter and Rex Land Company Buildings) and the need for continued discussions regarding the Bianchi Law Firm Building.
- I also understand from Mr. Holter that issues involving misassigned and duplicated field identification numbers for some of the newly identified properties have not yet been resolved.
- Formal concurrence on the eligibility of the 64 additional buildings within the expanded APE will occur when resolution to the outstanding disagreements is completed.
- Regarding impacts from the project on archaeological resources that either exist or may exist in the APE, we feel the list provided on page 5 of the report is incomplete. From an archaeological perspective, the list indicates only a single archaeological resource (45KI924) and fails to mention or account for the numerous other known or presumed archaeological resources that exist or may exist within the APE. The report does not address the eligibility of or effects to 45KI958 (the SDOT Maintenance Yard site) and does not discuss eligibility or effect determinations for numerous other potential archaeological resources that may exist throughout the APE. Most notable among these resources are Ballast and Denny Islands, remnants of which



were apparently identified during recent coring in the southern portion of the APE. Also, there is a good discussion of the ethnographic resources that are known within the APE, yet there is no substantive discussion of how these resources will be dealt with either before or during construction.

- Page 10 of the document indicates that additional subsurface archaeological exploration will be conducted prior to construction in “areas identified as highly sensitive.” I failed to identify further discussion of these “highly sensitive areas.” Sections 6.1.3 and 6.2.3 do not adequately address this issue.
- No justification is provided for the statements made on page 10, lines 1–4.
- No justification is provided for the statements made on page 10, lines 30–33.
- DAHP has significant concerns and questions surrounding the concept and implementation of ‘compensation grouting.’ While the subject is discussed in the discipline report, the detail of the discussion is not sufficient to adequately explain all of the possible effects that this procedure could have on historical and archaeological resources. Until this topic can be presented to the SHPO and DAHP staff in greater detail, we are not in a position to properly evaluate any or all possible effects that this engineering procedure might have on built-environment properties.
- We also have serious concerns regarding settling and vibration issues as they will affect historic structures during construction. Discussion of these specific issues and methods for monitoring their impacts to historic buildings should be addressed in the document.

We look forward to continuing our discussions regarding the content of the discipline report. Overall, the report is well-written and generally descriptive.

These comments are based on the information available at the time of this review in consultation with and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Please contact me should you have any specific questions about our request and we look forward to receiving this material.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,



Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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June 24, 2010

Mr. Matthew Sterner
Transportation Archaeologist
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Response to Comments in Letter Dated June 17, 2010

Dear Mr. Sterner:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. This letter is intended to respond to comments outlined in your letter dated June 17, 2010 and to provide clarification as to the path forward discussed in a telephone conversation between us and Connie Walker Gray on June 22, 2010. We thank you for taking the time to review our draft historic, cultural, and archaeological resources discipline report submitted to you on May 24, 2010. We greatly appreciate the comments that you provided in writing and also through telephone conversation. We hope that this letter provides clarification to our initial submittal letter to you dated May 24, 2010.

As mentioned in our original submittal letter, the Alaskan Way Viaduct Replacement Project presents unique challenges in regards to historic properties given that access to archaeological resources is restricted by depth below surface, ground water, existing infrastructure, requirements of existing transportation, the need to maintain existing utility service, and the proposed methods of construction. In addition to these challenges, a portion of the project is design-build, which integrates the final design and the construction phases. For these reasons, we are conducting a phased process for the identification and evaluation of historic properties as specified 36 CFR 800.4(b)(2).

We have identified adverse effects to four historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP). In terms of the built environment, this project alternative would have an adverse effect on the NRHP-eligible Alaskan Way Viaduct and Battery Street Tunnel, as well as the Western Building and Polson Building, which are contributing elements to the Pioneer Square National Historic District. In terms of archaeology, this project alternative would have an adverse effect on the Dearborn South Tideland Site (45KI924).

Additionally, we have identified another archaeological site (45KI958), which we intend to treat as eligible for listing in the NRHP for planning purposes, but have decided not to formally determine

eligible until further testing can be undertaken in concert with construction. We have also identified areas sensitive for potential archaeological resources, including the former landforms of Ballast Island and Denny Island. It should be noted that the project will avoid both of these landforms during construction. Information about the additional site and sensitive areas are detailed in Chapters 4.3.2 and 4.3.3 of our draft historic, cultural, and archaeological resources discipline report, and their treatment is addressed in Chapters 6.1.2 and 6.2.2.

Pursuant to 36 CFR 800.4(b)(2), we believe our historic, cultural, and archaeological resources discipline report establishes “the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation.” In continued consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties, we intend to develop a memorandum of agreement (MOA) pursuant to 36 CFR 800.6. The eventual MOA will resolve identified adverse effects as well as potential adverse effects identified if the Bored Tunnel Alternative is the selected alternative in the Record of Decision.

From our telephone conversation, we understand that you have outstanding concerns in regards to ethnographic and built environment resources. In terms of the ethnographic resources identified in our report, we intend to revise the text to indicate that our identification efforts failed to locate physical remains of these resources and that we are continuing consultation with the tribes in regards to any concerns that they might have in regards to these identified ethnographic locations. We understand that this would satisfy the concern expressed in your letter in regards to these resources.

In terms of built environment resources, we acknowledge that the Rex Land Company (2124 3rd Avenue) and the Royal Typewriter (2221 5th Avenue) buildings are eligible for listing in the NRHP. Connie Walker Gray has provided additional information on the Bianchi Law Firm building (605 Thomas) to Russell Holter, and anticipate his response this week.

Ms. Gray continues to work with Mr. Holter on the remaining Historic Property Inventory (HPI) forms for the 64 newly identified resources within the expanded Area of Potential Effects (APE). Our consultant is revising the field identification number on the forms to avoid duplication. Once we have renumbered all of the forms, location maps, and tables, we will resubmit these materials to your office. At that point, we would appreciate formal concurrence on eligibility from your office as soon as possible.

As you are aware, WSDOT staff, including project structural engineers, will be meeting with you on July 1, 2010 to present information on the program’s building settlement survey and the proposed measures—including compensation grouting—for avoiding effects on historic properties as a result of vibration and settlement before, during, and after construction. We will also discuss the steps that will be taken to address unanticipated damage to historic properties.

As we move forward in consultation with DAHP on this project, we are requesting the following actions from you:

- Concurrence on the determinations of NRHP eligibility for all properties within the APE; and,
- Concurrence on the determinations of adverse effect on four historic properties within the APE.

Given the challenges posed by this project and its current alternatives under consideration, our historic, cultural, and archaeological resources discipline report begins our phased process for the identification and evaluation of historic properties. We look forward to continued consultation with you and your office as we start to negotiate an MOA with SHPO, DAHP, tribes, consulting parties, and other interested parties that resolves our adverse effects to the Alaskan Way Viaduct and Battery Street Tunnel, the Western Building, Polson Building, and the Dearborn South Tideland Site (45KI924). We intend for the MOA to also outline the further treatment of archaeological site 45KI958 and the areas identified within the APE as sensitive for potential archaeological resources.

Should you have questions or concerns please contact me at 206.521.5628, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.267.6532, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

cc: Allyson Brooks, SHPO
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Connie Walker Gray, WSDOT



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June 28, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel (Bianchi Law Firm)

Re: Attachment EZ-2

Dear Mr. Bartoy:

Thank you for contacting our department. We have reviewed the materials you provided. We concur with the findings of your consultant that the Bianchi Law Firm is NOT ELIGIBLE for the National Register of Historic Places under criterion C. As a result of this finding, further contact with us is not necessary. If additional information on the project becomes available, or if any archaeological resources are uncovered during construction, work must stop in the area of discovery and contact the appropriate Native American Tribes and our Department for further consultation.

The project has been reviewed on behalf of the State Historic Preservation Officer under provisions of Section 106 of the National Historic Preservation Act.

Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,

Russell Holter
Project Compliance Reviewer
(360) 586-3533
russell.holter@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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July 1, 2010

Dr. Allyson Brooks, Director
Washington Department of Archaeology & Historic Preservation
PO Box 48343
Olympia, WA 98504

Log: 051209-10-FHWA
Property: Alaskan Way Viaduct and Seawall Replacement Program
Re: Resubmittal of Historic Property Inventory Forms

Dear Dr. Brooks:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(1). The purpose of this letter and the attachments therein is to provide your office with updated Historic Property Inventory (HPI) forms that corrects the duplicative Field Site numbers on the form. As indicated in Kevin Bartoy's June 24 letter to your office, we have updated the forms in response to the June 17 letter from Matthew Sterner, as well as in response to a phone conversation with Russell Holter, Michael Houser, and Mimi Sheridan, and me on June 8, 2010. Enclosed please find the updated CD with the database files as well as a revised property summary table. A revised map, for reference, will be emailed to you later today.

I trust that this will satisfy your request for the corrected forms. We now request your prompt concurrence on the remaining Determinations of NRHP Eligibility for the remaining 64 historic resources within the expanded APE.

Thank you for your ongoing interest and participation in this project. If you have additional questions or concerns, please contact me at 206-521-5631, email grayc@wsdot.wa.gov.

Sincerely,

A handwritten signature in cursive script that reads "Connie Walker Gray". The signature is written in a light gray or blue ink.

Connie Walker Gray
WSDOT Cultural Resources Specialist

CC: Allison Hanson, WSDOT
Scott Williams, WSDOT
Randy Everett, FHWA



STATE OF WASHINGTON

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July 1, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel Expanded APE

Re: Determined Eligible

Dear Mr. Bartoy:

Thank you for contacting our office. I have reviewed the materials you provided to our office and we concur with your consultant's professional opinion that the following historic properties are eligible to the National Register of Historic Places:

- National Bank of Commerce (1100 2nd Ave)
- Colski Building
- Rivoli Apartments
- Donald/Alexandria Hotel
- Bell Street Studios
- Douglas Hotel
- RKO Studios
- Lorraine Hotel
- MGM-Loews
- Adams Apartments
- The Two Bells
- Ace Hotel
- Lexington Concord Apartments
- National Bank of Commerce (2401 3rd Ave)
- Devonshire Apartments
- Grosvenor House

I look forward to further consultation regarding your determination of effect.

We also concur with the consultant's determination that the other 50 properties surveyed in the expanded APE are not eligible for listing to the National Register of Historic Places.



I would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4). These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office in PDF format on a labeled CD along with an unbound paper copy. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf. Thank you for the opportunity to review and comment. Should you have any questions, please feel free to contact me.

Sincerely,



Russell Holter
Project Compliance Reviewer
(360) 586-3533
russell.holter@dahp.wa.gov

Cc: Karen Gordon (Seattle)



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501

Mailing address: PO Box 48343 • Olympia, Washington 98504-8343

(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

July 8, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

Re: ADVERSE Effect

Dear Mr. Bartoy:

Thank you for contacting the Department of Archaeology and Historic Preservation (DAHP). Thank you for your June 24, 2010 letter and the responses to our concerns stemming from our letter of June 17, 2010. Based on your response, we can now concur with your determination that the project, as proposed, will have an Adverse Effect on one or more National Register of Historic Places (NRHP) properties.

We understand that data presented at this time indicates that four NRHP-eligible properties will be impacted as a result of the proposed tunnel alternative. Those properties are: the Alaskan Way Viaduct and Battery Street Tunnel, the Western Building (within the Pioneer Square Historic District), the Polson Building (within the Pioneer Square Historic District), and archaeological site 45KI924 (the Dearborn South Tideland site). We also understand that you plan to treat archaeological site 45KI958 as eligible at this time, although you are choosing to withhold that determination formally pending the outcome of additional archaeological investigation. We also understand that as engineering and design continues on this alternative, our evaluation of impacts to NRHP-eligible properties will continue.

We look forward to further consultation and the development of a Memorandum of Agreement (MOA) to address this Adverse Effect.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available. These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically. If you have not registered for a copy of the database, please log onto



our website at www.dahp.wa.gov and go to the Survey/Inventory page for more information and a registration form. To assist you in conducting a survey, DAHP has developed a set of cultural resource reporting guidelines. You can obtain a copy of these guidelines from our website. Finally, please note that effective Nov. 2, 2009, DAHP requires that all cultural resource reports be submitted in PDF format on a labeled CD along with an unbound paper copy. For further information please go to http://www.dahp.wa.gov/documents/CR_ReportPDF_Requirement.pdf.

Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,



Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501

Mailing address: PO Box 48343 • Olympia, Washington 98504-8343

(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

July 8, 2010

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA

Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel

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Thank you for the opportunity to review and comment. If you have any questions, please contact me.

Sincerely,



Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
Seattle, WA 98104-4019
206-805-5400/ fax 206-805-2899
TTY: 1-800-833-6388
www.wsdot.wa.gov

December 1, 2010

Dr. Allyson Brooks
State Historic Preservation Officer
Department of Archaeology and Historic Preservation
PO Box 48343
Olympia, WA 98504-8343

Dear Dr. Brooks:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

As a consulting party, we are inviting you to a "kick-off" meeting to begin consultation on resolving the Project's adverse effects on historic properties. We would like to hold the meeting during the week of January 10, 2011, at WSDOT's Project offices in the Wells Fargo Building at 999 3rd Avenue, Seattle.

Please contact either Kevin Bartoy of WSDOT or David Cushman of the SRI Foundation at the addresses below, letting us know if you can attend a meeting during the week of January 10, 2011, and if so, what day of that week works best for you. Also, let us know if a meeting at the Wells Fargo Building at 999 3rd Avenue, in Seattle is acceptable; and if not, please suggest an alternative venue. Finally, please let us know who from your organization or agency would be attending the meeting.

Kevin Bartoy
Cultural Resources Specialist
Washington State Department
of Transportation
Alaskan Way Viaduct
999 Third Avenue
Suite 2424, MS NB82-230

David Cushman
Historic Preservation Specialist
SRI Foundation
333 Rio Rancho Drive, NE
Suite 103
Rio Rancho, NM 87124
505 897-5587

Seattle, WA 98104
206 805-2887
Bartoyk @wsdot.wa.gov

dcushman@srifoundation.org

We anticipate the meeting will last no more than three hours and will consist of two main agenda items: a summary of the adverse effects of the Project on historic properties and an initial discussion on potential measures to resolve these adverse effects.

We ask that you contact either Kevin or David within one week of receiving this letter. Also, if you have any questions about the "kick-off" meeting or any other Section 106 issues, please do not hesitate to contact either Kevin or David.

We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hanson". The signature is written in a cursive, somewhat stylized font.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
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December 16, 2010

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: APE Revision to Include Existing Disposal Facility

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by January 17, 2011. Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hanson@wsdot.wa.gov.

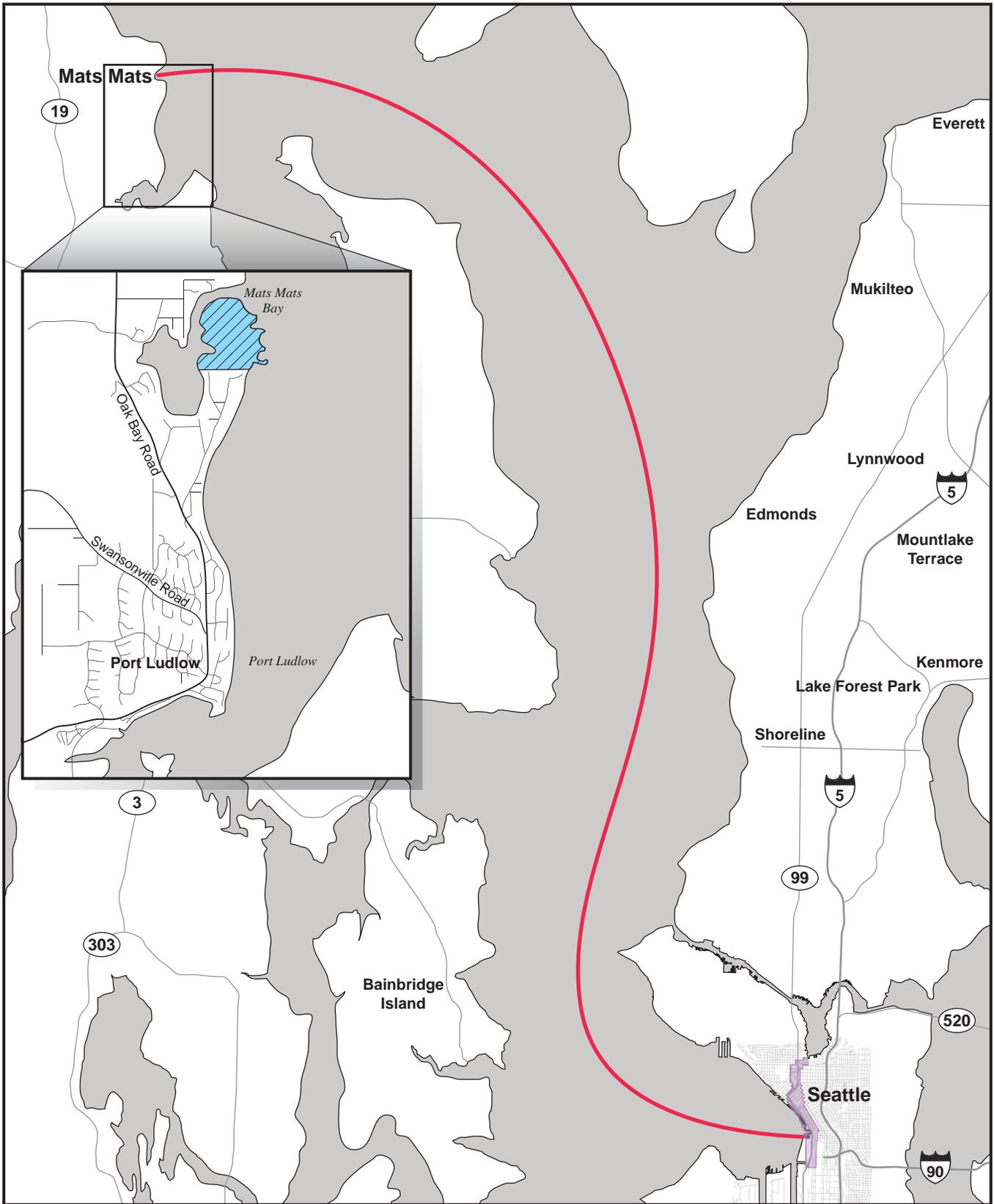
Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

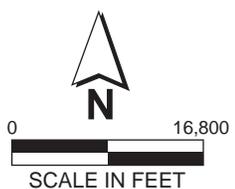
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: Matthew Sterner, DAHP
 Randy Everett, FHWA
 Allison Hanson, WSDOT
 Scott Williams, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
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(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

December 23, 2010

RECEIVED

DEC 29 2010 *DA*

WSDOT Doc. Control

Mr. Kevin Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:

Log: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Archaeology - APE Concur

Dear Mr. Bartoy:

We have reviewed the materials forwarded to our office for the Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel project. Thank you for your description of the revised area of potential effect (APE) for the project that now includes the Mats Mats Quarry site. We concur with the definition of the revised APE. We look forward to the results of your cultural resources survey efforts, your consultation with the concerned tribes, and receiving the survey report. We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4) and the survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov





**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Consulting Party Meeting to Resolve Adverse Effect

Dear Dr. Brooks:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the "consulting parties" in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency’s decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community’s historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking’s adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this

document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09
Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 3, 2011

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Consulting Party Meeting to Resolve Adverse Effect

Dear Dr. Brooks:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the "consulting parties" in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency’s decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community’s historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking’s adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this

document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

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noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

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A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____

Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09

Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 10, 2011

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Consulting Party Meeting to Resolve Adverse Effect

Dear Dr. Brooks:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National Register eligible; however, this will not diminish the property's aspects of integrity, whatever those may be.

AWVRP Historic Properties List

You will note that the list of historic properties is presented by groups: Properties individually listed in or eligible for listing in the National Register, properties that are contributing elements to the National Register-listed Pioneer Square Historic District, archaeological sites, and archaeologically sensitive areas. Within these groups, information is provided on the identity of each property; its National Register eligibility status, determined by the agencies in consultation with the SHPO; the project action that may affect the property; an assessment of the kind of effect the undertaking may have on the property (direct/indirect) along with the damage potential assessment used in the Historic, Cultural and Archaeological Resources Discipline Report published with the 2010 Supplemental Draft Environmental Impact Statement; and lastly, an effect determination made by WSDOT/FHWA in consultation with the SHPO. This is the background information that will be used to focus the consultation on resolving adverse effects.

Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

The purpose of the follow-up meeting on the Western Building will be to provide information on the decision to demolish the Western Building and will address a variety of issues in addition to historic preservation. The consulting party meeting will be devoted to just resolving the adverse effect of the AWVRP undertaking pursuant to Section 106; the follow-up meeting will address broader issues specific to the Western Building beyond Section 106. A preliminary agenda for the Western Building Follow-up Meeting is presented below.

12:00 PM – Introductions (SRIF)

12:05 PM - Purpose of the meeting (SRIF)

12:10 PM - The Western Building Decision Process (WSDOT)

- a. Safety
- b. Comments on SDEIS
- c. Effect to PSHD
- d. Effect on the Western Building Owners
- e. Effect on the Western Building Tenants
- f. Environmental Process
- g. Cost

1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Matthew Sterner, DAHP
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

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January 10, 2011

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Sincerely,



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Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Matthew Sterner, DAHP
 Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

List of ideas for discussion on how to resolve the adverse effects of the Alaskan Way Viaduct tunnel project by historic property

1. INDIVIDUALLY LISTED HISTORIC BUILDING

Resource Name (Address)	ID # (Bldg. Assessment ID #)	Historical Status	Project Action	Effect/ Damage	Effect Determination
Federal Office Building (901 1st Avenue)	H-124 (T243)	National Register (NR)	Tunnel Boring Machine (TBM)	Direct/ Slight	No Adverse Effect (NAE)
National Building (1000 Western Avenue)	H-126 (T234)	NR, Seattle Landmark (SL)	TBM	Direct/ Slight	NAE
Alexis Hotel (Globe Building) (1001 1st Avenue)	H-127 (T237)	NR, SL	TBM	Direct/ Slight	NAE
Arlington South (Beebe Building) 1013 1st Avenue)	H-129 (T236)	NR, SL	TBM	Direct/ Slight	NAE
Arlington North (Hotel Cecil) 1019 1st Avenue)	H-131 (T235)	NR, SL	TBM	Direct/ Slight	NAE
Watermark Tower (Colman Building) 1107 1st Avenue)	H-134 (T231)	SL, Not NR eligible	TBM	Direct/ Slight	NAE
Grand Pacific Hotel (1119 1st Avenue)	H-135 (T230)	NR, SL	TBM	Direct/ Slight	NAE
Grand Pacific/ Colonial (1123 1st Avenue)	H-136 (T230)	NR, SL	TBM	Direct/ Slight	NAE
Fire Station #2 (2334 4th Avenue)	H-264 (T086)	NR eligible, SL	TBM	Direct/ Slight	NAE
Archstone Belltown (Grosvenor House) (500 Wall Street)	H-056A (A110)	NR eligible	TBM	Direct/ Slight	NAE

Section 106 Objective: Avoid/minimize adverse effects to the individually listed historic buildings.

Ideas for discussion:

- *Develop deformation analysis plan to monitor structural integrity of each building before, during and after tunnel boring.*
- *Develop process for filing claims and making repairs, if needed. All repairs to follow Secretary of Interior Standards for Rehabilitation.*

2. PIONEER SQUARE HISTORIC DISTRICT AND CONTRIBUTING ELEMENTS

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
Pioneer Square Historic District (PSHD)		NR, City District	Temporary construction related traffic, traffic congestion, noise, limited access, etc.	Indirect	NAE
1 Yesler Building	H-87	PSHD - contributing property (CP)	TBM	Direct/ Very Slight	NAE
Western Building	H-108	PSHD – CP	TBM	Direct/ Very Severe	Adverse Effect (AE)
Polson Building	H-109	PSHD - CP	TBM	Direct/ Severe	AE

Section 106 Objective: Avoid/minimize potential effects of construction to Pioneer Square Historic District.

Ideas for discussion:

- *Develop best management practices (BMPs), traffic management plan, and public communication plan to be used for duration of project.*
- *Open (and staff) AWVRP public information center for the duration of the project. Include educational displays on history of Pioneer Square and the results of project related architectural and archaeological investigations.*
- *Develop mobile educational displays on history of Pioneer Square and results of project related architectural and archaeological investigations for use at other locations within Pioneer Square.*
- *Contribute funding to City of Seattle for ongoing monitoring and stabilization efforts for Areaways along 1st Avenue.*

- *Contribute funding to the Alliance for Pioneer Square’s Trails to Treasures program to enhance pedestrian use within and through Pioneer Square Historic District.*

Objective: Avoid/minimize adverse effects to the 1 Yesler Building

Ideas for discussion:

- *Install foundation micro piles along western wall between building and route of TBM.*

Objective: Avoid/minimize adverse effects to the Polson Building.

Ideas for discussion:

- *Develop deformation analysis plan to monitor structural integrity of the building before, during and after tunnel boring.*
- *Develop process for filing claims and making repairs, if needed. All repairs to follow Secretary of Interior Standards for Rehabilitation.*
- *Conduct compensation grouting.*

Objective: Mitigate adverse effects of demolition to the Western Building.

Ideas for discussion:

- *Conduct HABS Level II documentation of Western Building prior to demolition.*
- *Record façade of building using LIDAR prior to demolition.*
- *Conduct research study on historic warehouses of the Pioneer Square Historic District.*
- *Condition redevelopment of the property following demolition of Western Building to ensure that replacement building follows requirements of Seattle Municipal Code and receives approval from the Pioneer Square Historic District Preservation Board for new buildings.*

3. ARCHAEOLOGICAL SITES (HISTORIC)

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
SDOT Maintenance Yard Site	45KI958	To be determined (TBD)	North Portal Construction	Direct/ Severe	TBD
Dearborn South Tideland Site	45KI924	NR Eligible	South Portal Construction	Direct/ Moderate	AE
Historic manhole/sewer line site	TBD	NR Eligible	North Portal Construction	Direct/ Slight	NAE

Objective: Mitigate adverse effects of construction to National Register eligible archaeological sites

Ideas for discussion:

- *Develop historic properties treatment plan for sites 45KI958 and 45KI924 in consultation with DAHP, the tribes, and other consulting parties.*
- *Develop plan for unanticipated archaeological discoveries during construction.*

4. ARCHAEOGALLY SENSITIVE AREAS (HISTORIC AND PREHISTORIC)

Resource Name	ID #	Eligibility Status	Project Action	Effect/ Damage	Effect Determination
Potential buried peat Horizon	None	TBD, if present	North Portal Construction	Direct/ TBD	TBD via historic properties treatment plan (HPTP)
Potential buried tidal flat	None	TBD, if present	South Portal Construction	Direct/ TBD	TBD via HPTP
Potential buried tidal flat	None	TBD, if present	Grout shafts	Direct/ TBD	TBD via HPTP
Potential buried anthropogenic deposits	None	TBD, if present	Communication line relocation	Direct/ TBD	TBD via HPTP

Objective: Monitor construction to avoid/minimize/or mitigate adverse effects to NR eligible archaeological deposits, if present.

Ideas for discussion:

- *Develop archaeological monitoring plan to be include in the historic properties treatment plan.*

Attachment 2. 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document



TO: RON PAANANEN, AWV ADMINSTRATOR
LINEA LAIRD, DIRECTOR TUNNEL PROJECT

FROM: KIMBERLY FARLEY, DIRECTOR OF OPERATIONS, AWV PROGRAM
ALLISON HANSON, ENVIRONMENTAL DIRECTOR, MEGA PROJECTS

SUBJECT: 619 WESTERN AVE BUILDING – REHABILITATION VS DEMOLTION; DECISION DOCUMENT

DATE: JANUARY 10, 2011

CC: ALLYSON BROOKS, SHPO; KAREN GORDON, CITY OF SEATTLE HPO; DEBORAH CADE, AAG; DAVE DYE, WSDOT; RON JUDD, WSDOT; RANDY EVERETT, FHWA; DAVE SOWERS, WSDOT; SUSAN EVERETT, WSDOT; CHARLIE SUNDBERG, KING COUNTY; CHRIS MOORE, WASHINGTON TRUST FOR HISTORIC PRESERVATION; EUGENIA WOO, HISTORIC SEATTLE; LESLIE SMITH, THE ALLIANCE FOR PIONEER SQUARE; FLO LENTZ, 4CULTURE; LARRY SMITH, LEGAL REPRESENTATIVE FOR WESTERN BUILDING OWNERS

After careful consideration of several issues described below, it is the Alaskan Way Viaduct (AWV) team's recommendation that WSDOT pursue demolition of the building located at 619 Western Avenue (referred to as the Western Building). Below you will find a summary of information we gathered, a summary of the important factors that were considered, and the rational for our recommendation to pursue demolition of the building rather than to attempt to rehabilitate it.

WSDOT has reviewed several potential decision factors over the last ten months. The factors considered and our conclusions to reach a decision are as follows:

- Safety – In WSDOT's opinion, the Western Building is in such poor condition that even implementation of one of the retrofit options carries significant risk to both public and worker safety during retrofitting.
- Comments on the SDEIS – There were several comments suggesting that WSDOT should try to save the Western Building and through our analysis, we did investigate the possibility of rehabilitating the building. This option does not appear reasonable or prudent based on a consideration of public and worker safety as well as cost.
- Effect to the Pioneer Square-Skid Road National Historic District and local Pioneer Square Historic District (PSHD) – Demolition of the Western Building would deprive the historic district of an early twentieth-century warehouse building and would change the context of the western edge of the district. However, the change would not diminish the aspects of integrity of the PSHD in such a way as to alter the characteristics of the district that make it eligible for listing in the National Historic Register. Through consultation with the Section 106 consulting parties, WSDOT

believes that measures can be developed to mitigate for the loss of the Western Building that will be a more reasonable use of public funds to the benefit of the historic district.

- Effect on the Western Building owners – The building owners have expressed their willingness to cooperate and collaborate with WSDOT should we pursue demolition permits for the Western Building. In addition, they are ready to work with WSDOT, the City, the Pioneer Square Preservation Board, and through the Section 106 process to ensure that an appropriate building is put back in the Western Building location.
- Effect on Western Building tenants – Tenants of the Western Building would have to move regardless of whether the building is retrofitted or demolished. WSDOT will work with tenants to relocate. As part of this process, WSDOT is working with agencies and community groups to attempt to identify relocation space within Pioneer Square.
- Environmental Process – The complexity of the environmental process, even with the added process associated with obtaining a demolition permit, does not change significantly regardless of whether the building is retrofitted or demolished.
- Cost – Retrofitting would be an unwise and imprudent use of public funds given the substantial cost in light of the fact that it would result in a reduction of functionality.

Overview and Building Condition

The Western Building is a six-story concrete building which was constructed in 1910 as a warehouse. The Western Building is a contributing property to the Pioneer Square-Skid Road National Historic District and in the local Pioneer Square Historic District (PSHD). Currently, the building is occupied by retail uses on the ground floor and artists' studios on upper floors.

Earlier this year, AWW structural engineers analyzed the physical condition of the Western Building and determined that it will likely experience severe impacts during the tunnel boring process if significant structural work was not completed prior to the tunnel boring work. Because of the poor structural condition of the existing building, and the fact that the building sits on unconsolidated fill, which would settle as much as 2.4 inches during tunnel construction, it is likely without extensive retrofitting, there could be further extensive structural damage during construction, and even the possibility of collapse. For this reason, the concern for public safety has been a critical issue in the decision making process outlined below.

In summary, the Western Building has the following structural issues:

- There are large, full-height cracks in the north, interior, and south walls. Cracks are up to eight inches wide, have been patched, and have grown wider since the patching.

- The building has undergone severe differential settlement, causing the floors to slope up to five percent. The floors slope in both the east-west direction and the north-south direction.
- The central columns show significant diagonal cracking and spalling. At the roof level, the beam-column joint has large cracks extending through the parapet and the eastern wall is bulging out toward Western Avenue.
- Beams in the east and west façades are cracked near the supporting columns, and the concrete cover has spalled in several locations, exposing the reinforcing bars.
- The timber floors are separating from the concrete walls, leaving large gaps, up to three inches, at the perimeter.
- The concrete parapet is approximately four feet high and is unbraced.
- The slab-on-grade has large and extensive cracks.
- The pile foundation has deteriorated due to the fluctuating water table causing rotting of the timber piles. [In 1958, building records show that significant work was required on the foundation pilings due to rot and settlement. Similar work was done again in 1986. (Mahlum 2003)]

Attachment A describes in detail the structural issues associated with the Western Building.

Four options have been developed to address these issues, three structural rehabilitation options and a building demolition option, which are described in detail in Attachment A. During any of the structural rehabilitation options, there is a potential for localized failure during retrofit construction. The potential for localized failure during rehabilitation poses a significant risk to public and worker safety.

Rehabilitation Option A: Installation of an extensive latticework of steel bracing inside the building on the east, south and west walls.

Rehabilitation Option B: Installation of steel trusses inside the building cladding on the upper portion of the east, south and west elevations. The interior building framing would be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides.

Rehabilitation Option C: The exterior concrete walls would be stiffened by a full-height reinforced shotcrete wall inside the building cladding on each side of the building. The interior building framing would be stiffened by a latticework of steel bracing on the first interior column line of the building on all four sides.

All three rehabilitation options would also include:

- Strengthening the foundation by replacing the deteriorated piles and/or installing new piles at the interior and exterior columns and walls, and installing new and/or expanded concrete pile caps.
- Tying the floor structure together with steel elements connected to the timber floor and interior timber columns.
- Reinforcing the cracked columns.

- Stabilizing structural cracks in the walls by installing steel braces at each level across the cracks with through-bolts to sound concrete on either side.
- A program of compensation grouting before, during, and following tunneling to reduce building settlement.

Demolition Option: The building would be demolished prior to the start of tunneling. This process would include installation of bracing to safely control the demolition. Measures would also be taken to safely detach the structure from the wall of the Polson Building, which adjoins, and to make necessary repairs to the common wall following demolition. This controlled demolition would help to protect the Polson Building from damage that may be caused by collapse or localized failure of the Western Building.

Comments on the 2010 Supplemental Draft Environmental Impact Statement (SDEIS)

We have waited for the comment period to close for the SDEIS on December 13, 2010 to take into consideration the views and concerns that might have been shared by the public or agencies. In the SDEIS, we outlined the issues with the Western Building and described both rehabilitation and demolition as possible outcomes for the Western Building.

There were several comments regarding the Western Building submitted by organizations and individuals. These comments centered on the desire to save the building rather than demolish it. Several commenters sought information showing the condition of the building, and questioned the need for removing the building. A couple of comments centered around the question of whether we had considered the effect of removing a contributing building that is located within the Pioneer Square Historic District. Several commenters expressed concern for the Polson Building, which shares a wall with the Western Building, and questioned whether it would experience damage if the Western Building were removed (See Attachment B).

Historic Significance of the 619 Western Avenue Building and Potential Effect to the Pioneer Square Historic District

The information presented here is summarized or excerpted from a memo drafted by the Sheridan Consulting Group, which is provided in Attachment C.

The hundred year old Western Building was constructed as a warehouse. It is believed to be made of reinforced concrete, which represents an advance in construction knowledge and techniques over the brick and heavy timber construction used in earlier warehouses. The building is very simple in composition without the ornamentation seen in some nearby warehouses. Its primary defining feature is the rhythmic pattern of original wood-sash windows on the east and west facades. The loading docks on the west facade are another distinguishing characteristic.

The building's design has been attributed to Saunders and Lawton, who designed the adjoining Polson Building (1910). The firm designed numerous warehouse buildings in the early twentieth century. Many of them are in the Pioneer Square Historic District, including

the Norton Building (1904), the McKesson and Robbins Building (1906) and the Westland Building (1907). The Western Building shares a wall with the Polson Building, which is also a contributing property to the district.

If the Western Building were to be retrofitted, regardless of the option chosen, it is unlikely that its integrity would be affected enough that it would no longer be a contributing property to the historic district. This conclusion assumes that the building's primary characteristic, the multipaned wood-sash windows, are either retained or replaced in kind.

Demolition of the Western Building would deprive the historic district of an early twentieth-century warehouse building and would change the context of the western edge of the district. However, the change would not lessen the aspects of integrity or the characteristics of the district that make it eligible for listing in the National Register of Historic Places.

The AWV team has had several conversations with Allyson Brooks, the State Historic Preservation Officer, and Karen Gordon, the City of Seattle's Historic Preservation Officer, in order to describe the issues surrounding the Western Building. During these conversations, they requested that WSDOT investigate other retrofit options in addition to Rehabilitation Option A. In response, WSDOT investigated Options B and C. Dr. Brooks and Ms. Gordon also requested that cost estimates for all three options be prepared. A discussion of these cost estimates is provided below.

Consideration of the Owners and Tenants of the Building

WSDOT has discussed the options outlined above with the property owners, and recently had a meeting with the building tenants.

During the tenant meeting in mid-December of last year, many tenants expressed concern about moving out of the building. Rent in this building is very affordable, and they have concerns that another such situation will be difficult to find. WSDOT explained that the Western Building tenants would need to relocate regardless of whether the building was demolished or retrofitted. Because retrofitting the building would require substantial structural modifications and construction could take more than a year to complete, tenants would have to be relocated for the retrofitting work to take place.

WSDOT will offer tenants relocation assistance in accordance with both state and federal law. WSDOT is required to provide relocation assistance to tenants in the building following its purchase. Tenants must pay rent and certify they are lawfully present in the United States.

WSDOT's relocation team is working with agencies and community groups to attempt to identify relocation space within Pioneer Square. The team is contacting property owners with artist space available.

The building owners have expressed their willingness to cooperate and collaborate with WSDOT should we pursue demolition permits for the Western Building. In addition, they are ready to work with WSDOT, the City, the Pioneer Square Preservation Board, and through the Section 106 process to ensure that an appropriate building is put back in the Western Building location.

Environmental Process, Permitting, and Approvals

Regardless of whether WSDOT were to pursue retrofitting or demolishing the Western Building, environmental processes still apply. The following permits and regulatory requirements will be completed:

- National Environmental Policy Act/State Environmental Policy Act (NEPA/SEPA)
- National Historic Preservation Act (known as the Section 106 process)
- Section 4(f) – a “test” that transportation agencies using federal funds have to meet prior to “using” a historic property¹
- Pioneer Square Historic District Certificate of Approval for use, design, and demolition
- Master Use Permit [City of Seattle Department of Planning and Development (DPD) Demolition and Grading Permit, DPD Building and Grading Permit, DPD Shoreline Substantial Development Permit – exact suite of permits would depend on the option pursued]

WSDOT is nearing completion of its NEPA/SEPA process. WSDOT submitted its notice of intent to replace the Alaskan Way Viaduct and begin the environmental process in 2001. We have published a Draft EIS in 2004, a Supplemental Draft EIS in 2006, and a second Supplemental Draft EIS in October 2010. It was in this second SDEIS that we explored the impacts a bored tunnel would have overall, and specifically the impacts there would be to the Western Building. In the Final EIS, which we anticipate we will publish in summer 2011, the decision to pursue demolition will be disclosed, and mitigation for impacts will be committed to in the Record of Decision.

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions on historic properties that are listed in or eligible for listing in the National Register of Historic Places.

¹ Section 4(f) was created when the United States Department of Transportation (USDOT) was formed in 1966. It was initially codified at 49 U.S.C. 1653(f) (Section 4(f) of the USDOT Act of 1966) and only applies to the highway program. In 1983, Section 1653(f) was reworded without substantive change and recodified at 49 U.S.C. 303. The statute is still commonly referred to as Section 4(f).

Regardless of whether the Western Building is retrofitted or demolished, the Section 106 process would still be required as the understating (the proposed bored tunnel) would cause settlement which would be an adverse effect to the historic property. Although the mitigation that would be appropriate will differ depending on the option chosen, some form of mitigation would be undertaken to resolve the adverse effect. In consultation with the Section 106 consulting parties, FHWA and WSDOT will commit to measures to mitigate effects of the action on historic properties in a Memorandum of Agreement. This process was begun in December of last year, and will be completed by the time the Record of Decision is published.

In addition, Section 4(f) applies to this transportation project, and draft Section 4(f) evaluations have been prepared and have accompanied each of the EISs that have been published. A final Section 4(f) evaluation will be published with the Final EIS.

The Master Use Permit (MUP) is administered by DPD, and it provides an integrated and consolidated land use permit process, environmental review process with the procedures for review of land use decisions, and consolidation of appeals for all land use decisions. MUPs are required for all projects requiring multiple decisions (i.e. demolition, building, and shoreline permit decisions). In addition, the Pioneer Square Preservation Board will have to issue a Certificate of Approval prior to DPD's issuance of a MUP. Regardless of whether the Western Building is retrofitted or demolished, WSDOT will have to go through this City permit process and receive a MUP and a Certificate of Approval.

Costs

WSDOT investigated the costs associated with the three structural rehabilitation options and the one demolition option as described above (Prepared by Coughlin Porter Lundeen, Inc.). WSDOT estimates that:

- Rehabilitation Option A would cost approximately \$29 million;
- Rehabilitation Option B would cost approximately \$36 million;
- Rehabilitation Option C would cost approximately \$35 million; and
- Demolition Option would cost approximately \$2.5 million.

During the Section 106 process, under a demolition scenario, there would be costs associated with providing mitigation for the loss of the Western Building. This mitigation would take several forms such as ensuring that an appropriate replacement building is built in its place that fits the character of the District, and providing other improvements to the District as developed through consultation with the Section 106 consulting parties.

Attachments

A – Western Building Action Plan Alternatives Memorandum – Revision 1 (Terry Lundeen, Coughlin Porter Lundeen, Inc.)

B – SDEIS Comments on the Western Building

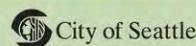
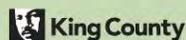
Ron Paananen
January 10, 2011
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C – Analysis of Western Building Alternatives (Mimi Sheridan, The Sheridan Consulting Group)

Ron Paananen
January 10, 2011

Attachment A – Western Building Action Plan Alternatives Memorandum – Revision 1
(Terry Lundeen, Coughlin Porter Lundeen, Inc.)

Alaskan Way Viaduct & Seawall Replacement Program



Memorandum

To: David Sowers, WSDOT

Through: Mike Rigsby, PB; Rick Conte, PB

From: Terry Lundeen, Coughlin Porter Lundeen, Inc.

Date: revised January 3, 2011

Subject: Western Building Action Plan Alternatives – Revision 1

Reference: Y-9715 Task No. DA.02/MDL No. PE.PD

cc: Allison Hanson, Kevin Bartoy, Kimberly Farley – WSDOT; Ann Costanza – Anchor QEA; Mimi Sheridan; Elizabeth Scheibe, Bill Hansmire – PB; Keith Moore – Coughlin Porter Lundeen

1. PURPOSE

This revision to the *Western Building Risk and Mitigation Technical Memorandum* (dated July 2, 2010), was prepared to present additional structural rehabilitation alternatives.

2. INTRODUCTION

This memorandum summarizes the condition of the existing Western Building in Pioneer Square, potential impacts to the building during tunneling operations, potential approaches to limit damage, and alternatives to rehabilitation. Presently, the building's major support elements are in very poor condition. Furthermore, based upon the documents available for review, the condition of the building has continued to deteriorate over the past decade. The existing damage is primarily due to past earthquakes and ongoing ground settlement and loss of foundation support. The route of the proposed bored tunnel that would replace the central waterfront portion of the Alaskan Way Viaduct travels directly underneath the Western Building. Accordingly, this memorandum presents the effects of bored tunnel construction on the Western Building and discusses the significant challenge and risk of the structural strengthening to the building and modifications to the subsurface soil condition to minimize additional damage or even partial collapse. Three structural rehabilitation approaches are presented and compared. This memo is based on previous reports and studies, a limited site visit by Coughlin Porter Lundeen, and conceptual level design.

3. SUMMARY OF EXISTING CONDITIONS

3.1. Seattle Public Records

The Western Building is located at 619 Western Avenue in Seattle, Washington (see Figure B-1 in Appendix B). It is bounded on the north by the Polson Building, on the east by Western Avenue, on the west by the Alaskan Way Viaduct, and on the south by a parking lot. The building is a six-story concrete framed structure reportedly constructed in 1910, with exterior dimensions of approximately 100 feet by 134 feet. The stories vary in height but on average are

approximately 12 feet. The exterior grade is relatively flat. Current occupancy consists of retail at the first floor and artist's studios at the upper floors.

A partial set of original structural drawings was available from the Seattle Department of Planning and Development (DPD) records; these drawings were not dated. In addition, DPD had drawings for repairing four timber piles in the east half of the building in 1958 (no confirmation as to whether this repair was completed) and for repairing a timber pile along the east façade in 1987 (DPD records indicate this permit was finalized).

The north wall of the building is a concrete common wall shared with the Polson Building. The east and west elevations consist of concrete beams and columns. The south elevation consists of a concrete wall perforated with window openings. In addition, there is an interior concrete wall spanning east-west the full length of the building. The roof and floor framing consist of laminated timber decking spanning to heavy timber girders, which are supported in turn by timber columns and the concrete walls and frames. Concrete pile caps on timber piles of unknown size and depth support the walls and columns. The ground floor is typically an 8-inch thick concrete slab-on-grade. There is a partial basement in the northwest corner of the building with concrete basement walls and a loading dock located along the west wall. See photographs in Appendix C.

Seattle DPD records accessed in April 2010 on the *Permit & Complaint Status* for the Western Building indicate the building has an active violation regarding earthquake damage and failure to remediate a yellow tag status, likely resulting from the 2001 Nisqually Earthquake.

3.2. Owner Supplied Information

The following additional information was provided by the building owner's representative, Stanley Piha:

- A memorandum to the Seattle Department of Construction and Land Use (DCLU - the precursor to DPD) Emergency Response Center regarding the earthquake damage assessment by Pacific Engineering Technologies, Inc., following the 2001 Nisqually earthquake. This assessment lists the damage observed and the likely code upgrades required. The cracked concrete corbel at the Sixth Floor on the east façade was listed as a hazardous condition, requiring shoring or repair. There was no indication repairs had been performed. [Piha 2001].
- A set of drawings to seismically strengthen the building [Pacific Engineering Technologies 2001]. The work shown by these drawings was not constructed.
- Two potential concept plans for foundation repairs, which had been developed but not constructed [Pacific Engineering Technologies 1999]. These drawings include a survey of the existing differential settlement of the Fifth Floor, circa 1999. Settlement along the east façade of the building ranges from 1-inch at the corners to 7-inches towards the middle of the concrete frame. The west façade has also settled and slopes towards the middle of the concrete frame (see Figure B-2 in Appendix B).

3.3. Shannon and Wilson Report

As part of the foundation strengthening implemented for Bents 93 and 94 of the Alaskan Way Viaduct in 2007, Shannon and Wilson performed a survey and documentation of the existing building condition for the Washington State Department of Transportation (WSDOT) [Shannon and Wilson 2007]. Significant structural damage was noted at the building's interior with 230 locations of visible structural distress (mostly cracks) documented. In addition, observation of the building's exterior identified numerous additional areas of distress. The following is a list of the main structural issues identified by Shannon & Wilson:

- There are large, full-height cracks in the north, interior, and south shear walls. Cracks in the interior wall are up to 8 inches wide. These cracks have been patched in the past and appear to have grown wider since the patching.
- The building has undergone severe, differential settlement, leading to floors sloping up to 5 percent in places (equivalent of 6 inches over 10 feet). The floors slope in both the east-west direction and the north-south direction, depending on location. The northern portion of the building appears to be tilting to the south and the southern portion of the building appears to be tilting north.
- Spalls and significant diagonal cracks were observed at the central columns on the east facade. At the roof level along the east facade, the beam-column joint has large shear cracks that extend up through the parapet and the wall is bulging out toward the street.
- Beams in the east and west façades are cracked near supporting columns. In addition, concrete spalls were observed at several locations, exposing the reinforcing bars.
- The timber floors are separating from the concrete walls, leading to large gaps, up to 3 inches, at the perimeter. The girders have slipped up to 2 inches on the concrete corbels.
- The concrete parapet is approximately 4 feet high and is not braced.
- The slab-on-grade has large and extensive cracks.
- The loading dock has experienced large differential settlements.

Shannon and Wilson attributed the settlement to decay of the existing timber piles, which are intended to support the entire building. They theorize the decay is within the upper few feet, where ground water levels fluctuate. As the timber piles have decayed, the pile caps have settled, leading to a significant portion of the damage present in the primary structural elements of the building as listed above.

3.4. Past Earthquakes or Other Damaging Events

The Western Building has experienced the Olympia Earthquake in 1949 (magnitude 7.1), the Seattle-Tacoma Earthquake in 1965 (magnitude 6.5), and the Nisqually Earthquake in 2001 (magnitude 6.8). These three earthquakes were deep events centered south of Seattle. Based on discussions with the tenants, the large vertical cracks in the concrete walls were present

prior to the Nisqually Earthquake, but widened significantly during the shaking [Shannon and Wilson 2007]. According to the tenants, the cracks in the east façade columns were believed to be attributed to the Seattle-Tacoma Earthquake. Damage attributed to earthquakes was validated by a WSDOT structural engineering consultant [Inverso 2008].

3.5. Coughlin Porter Lundeen Site Visit

A limited site visit was performed on April 2, 2010 as part of this assessment. Access was provided to the main east-west corridor at the Second through Sixth Floors, as well as to a few tenant spaces and the partial basement. Limited observations confirm the structure matches the original DPD records and confirms the state of the existing significant structural damage consistent with the Shannon and Wilson report. No new or expanded information beyond the reports cited may be added based on this limited review of the existing conditions.

Based on the existing conditions, it is suspected the existing timber piles have deteriorated in places, though no pits have been excavated to determine the true nature of the foundation deficiencies.

4. TUNNELING DESCRIPTION AND EXPECTED SETTLEMENTS

The proposed SR 99 Bored Tunnel would begin just south of S. King Street, passing under Alaskan Way and the existing viaduct, curving to pass diagonally under Seattle's central business district. The tunnel would curve again and extend diagonally under Seattle's Belltown neighborhood, surfacing north of Thomas Street. The proposed tunnel alignment passes directly beneath the northwest corner of the Western Building (reference Figure B-1 in Appendix B). The bored tunnel will be approximately 56 feet in diameter, and will be approximately 85 feet deep from the tunnel's crown to the surface when underneath the Western Building.

During tunneling, ground settlement may occur along the path of the tunnel, potentially leading to differential displacement, angular distortion, and horizontal strain of nearby buildings. Because the proposed tunnel passes under a corner of the Western Building, the structure will experience these effects (see Figure B-3 in Appendix B). The skewed alignment of the tunnel as it passes under the Western Building leads to both a rotation and twisting of the building as it settles. The north and west walls, and possibly the interior wall, should experience both sagging and hogging conditions due to the ground movement. The eastern portion of the building should experience minimal settlement, while the maximum building settlement should be approximately 2.4 inches towards the west end based upon a 0.5% ground loss. These additional settlement amounts, shown in Figure B-3, are additive to the existing settlement amounts, shown in Figure B-2. The combination of the existing settlement amounts and locations added to the possible bored tunnel settlements would induce considerable additional bending and torque in the already distressed and damaged structural elements of the building.

An initial assessment of tunnel impacts to the building was performed and presented in the report to WSDOT [Coughlin Porter Lundeen et al., 2010]. The existing condition of the Western Building was listed as "Very Severe", based on exterior observations and the Shannon and Wilson report. An analysis on the estimated tunneling settlement and the resulting effects on the Western Building indicate a potential for "Severe-to-Very-Severe" damage due to tunneling

effects. This classification indicates further structural damage could result from tunneling activities, including the possibility of collapse.

The damage assessment was based on a prediction that the Western Building would experience settlement of about 2.4 inches. WSDOT predictions of settlement range up to nearly 5 inches at the Western Building with a corresponding increase in damage expected.

5. BUILDING PROTECTION MEASURES

A number of extensive, and potentially risky, rehabilitation and protection measures would be required to minimize the risk of additional damage to the building during tunneling. Some of these measures would alter the architectural characteristics of the building, including impacts on appearance and usable space. The rehabilitation approach includes three essential elements: foundation strengthening and structural strengthening, followed by compensation or compaction grouting to reduce settlement. Three alternatives are presented for structural strengthening of the building. Grouting and foundation strengthening approaches are essentially the same for each alternative and would also need to be implemented to reduce damage. Both the foundation and structural strengthening would occur within the footprint of the existing building.

5.1. Foundation Strengthening

As explained above in Section 3.3, the existing foundation system has significantly deteriorated. Substantial foundation improvements to the Western Building would be required before grouting and tunneling could take place. These improvements would consist of replacing the deteriorated piles and/or installing new piles, both at interior and exterior columns and walls. New concrete pile caps would be epoxy grouted to the existing pile caps in either case.

This new foundation system would consist of new micro piles drilled down to the bearing soil layer (or as determined by a geotechnical engineer) and attached to new concrete pile caps with epoxy grouted dowels to the existing pile caps. These micro piles would support both the walls and the columns. In addition, new concrete grade beams would interconnect the pile caps in both the east/west and north/south directions, thus reducing the horizontal strains, which the structure above would experience during tunneling. A new structural slab would be installed at the ground level, spanning between the new pile caps and grade beams.

The construction sequence would require removal of the existing slab, excavation to a depth of several feet along the columns lines (at least to the depth of the existing pile caps), installation of the micro piles, and construction of the new pile caps. This work would have to be carefully coordinated with the structural retrofit and would likely require some concurrent bracing or structural rehabilitation to prevent collapse during construction.

This same approach would be used regardless of the selected structural protection approach. The actual location of the micro piles and pile cap configuration would vary based on retrofit plan implemented for the superstructure.

This work will need to be done within the existing footprint of the building. It is further complicated by the low overhead clearance when working inside the building.

5.2. Structural Strengthening

The building superstructure would need to be stiffened in order to behave as a rigid body. To accomplish this strengthening, individual elements of the building would be tied together to prevent differential movement, and certain damaged or weak existing elements repaired or strengthened.

Three structural rehabilitation alternatives have been considered. Structural Rehabilitation Options A through C are described in Appendix D. Concept level plans have been provided for each. All three options will have significant impact on building use during the construction period and for some period after tunneling is complete and settlement has abated. Each option has varying effects on the long term functionality and exterior appearance. Structural Rehabilitation Option A appears to have the least impact on long term building functionality and future use and would be the least costly of the three approaches. For these reasons it is considered the preferred approach for structural strengthening and is used as the basis for discussion herein.

Structural Rehabilitation Option A would use an extensive latticework of steel bracing located just inside of the building on the east, south, and west elevations. A deep concrete grade beam as described above would be constructed below this latticework. As noted above, a network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. This latticework would be permanent.

The roof and floor structures would be tied together with steel elements connected to the timber framing members and epoxy bolted to the concrete walls and frames. Steel plates would be utilized at the intersection of the timber girders to the interior timber columns to provide continuity across the roof and floor framing.

The cracks in the concrete columns at the east façade would require epoxy injection and the columns would be wrapped with a composite fiber or concrete jacket.

Horizontal channels would be added at each level across the large wall cracks, bolted to the sound concrete on either side of the crack with epoxy.

Installation of the structural frame may require temporary structural cribbing and/or additional framing to be installed outside the building to provide support to the existing structure to minimize the potential for additional damage and to prevent partial collapse during the retrofit construction.

5.3. Ground Improvement

At the Western Building, the soils consist of un-consolidated, human-placed fill material and tidal deposits over the much stiffer and more competent over-consolidated glacial soils. The preferred method for improving this soil in order to minimize and correct tunneling settlement would be “compensation grouting,” which will be used to protect a number of other buildings in the area of the Western Building. Compensation grouting would consist of sinking a work shaft near the site from which sleeve-port pipes (*tubes-a-manchette*) extend horizontally in drilled

holes, reaching below the existing building pile tips. Ports (openings) in the pipe then permit repetitive injection of grout at specific locations as indicated by settlement measurements. The technique is well established in its use for protection of structures from tunneling effects. Construction of the work shaft would require particular care to minimize settlement from shaft wall deflection or consolidation from dewatering.

Grout is injected before, during, and after tunneling. Drilling holes for installation of the grout pipes may involve minor settlement, in this case on the order of 1/4 to 1/2 inch. The ground is conditioned by injecting grout to fill the soil loosened by drilling. This process is considered complete when the building registers (that is, level measurements indicate) some minor heave. The purpose of this process is to tighten up the grouting system so it will be immediately effective when used during tunneling. During tunneling, grouting to limit and correct for settlement is tied to real-time, comprehensive instrumentation and monitoring of building settlement. The intent is to achieve practically no settlement once tunneling is completed, but in the process of mitigating settlement by grouting, some settlement and heave would take place. After tunneling, any remaining settlement can also be corrected by injecting grout.

Most importantly, in order to survive the cyclic up and down movement that occurs during grouting, the building must undergo sufficient structural strengthening to withstand the resulting stresses as discussed in the next sections.

5.4. Construction

Due to the existing condition of the building, rehabilitation would be very risky and presents a significant safety challenge. It is possible the structural retrofit work in itself would cause additional damage to the building, and steps would need to be taken during construction to sequence the retrofit to minimize damage and prevent partial collapse. Given the risk to the building during construction of protective measures and tunneling, evacuation of the building would be required during the construction of protective measures as well as for some period of time after the SR 99 Bored Tunnel has passed beneath the building.

Construction of the protective measures would be also highly intrusive. Noise, vibration, and construction traffic would significantly disrupt normal activity of adjacent businesses. It would be particularly disruptive for Polson Building occupants due to the shared wall between buildings. Construction is anticipated to last 12 to 13 months dependent on the structural protection approach selected. The level of activity, noise, and vibration would be similar throughout the period of construction. Hours of construction activity would be restricted under the City's Noise Ordinance.

Due to the shared wall, there remains a risk to the Polson Building under any of the structural rehabilitation alternatives. While this risk does not warrant building vacation, continuous monitoring and an evacuation plan would be prudent. Steps should be implemented during the construction of the structural protective measures to minimize the impacts to the tenants of the Polson Building.

6. ALTERNATIVES TO BUILDING RETROFIT

6.1. Vacate, Construct Tunnel, and Repair

Another approach to reduce upfront construction is to vacate the Western Building and construct the tunnel without constructing protective measures. Construction fences would need to be set back some distance from the building at the three accessible sides to protect passersby should damage occur. In addition, given the severe damage to the east wall of the building, structural bracing of the wall would need to be provided to minimize the impact of a potential collapse of this wall. After the tunnel construction, tunnel damaged areas would be repaired, which could require work as extensive as the structural strengthening option. This option carries significant risk given the existing condition of the building. Portions of the building could collapse and it is not entirely certain the building could be usefully occupied after stabilizing repairs are implemented. In addition, the adjacent Polson Building, with which the building shares a common wall and which would be occupied, could be damaged in an uncontrolled fashion.

6.2. Demolition

6.2.1. *Local Requirements*

There are specific regulations in the Seattle Municipal Code regarding building demolition in the Pioneer Square Historic District (PSHD). The Pioneer Square Preservation Board must recommend allowing demolition to the Department of Neighborhoods Director, whereupon the director may approve demolition based on one of two paths. Path A requires plans and a construction bond for a replacement structure, which must be completely constructed within two years of demolition; this path could only reasonably be pursued by the building owner. Path B states “When demolition or removal of a building or other structure in the District is essential to protect the public health, safety and welfare or when the purposes of this ordinance will be furthered by the demolition or removal, then the Director of Neighborhoods, following review and recommendation by the Board, may authorize such demolition or removal whether the prerequisites of this section are satisfied or not.”

6.2.2. *Impacts*

The Western Building would be demolished prior to start of tunneling and prior to constructing measures that would be necessary for protecting the Polson Building from damage due to tunnel induced settlement. Demolition would take 2 to 3 months with short term impacts to adjacent businesses, traffic, and parking. The level of activity, noise, and vibration would be similar throughout the duration and hours of construction activity would be restricted under the City’s Noise Ordinance. Bracing would be required to safely control demolition and avoid uncontrolled collapse. Care would also be required to safely detach the structure from the shared Polson Building wall. The shared wall would likely require some repair following the demolition.

7. SUMMARY OF FINDINGS

The existing building structure shows extensive and obvious damage, and is significantly structurally compromised. There are major safety risks, which may require special

consideration in sequencing the work to minimize additional damage to the structure and to prevent partial building collapse associated with implementation of the structural and foundation protective measures. Grouting approaches to minimize ground settlement due to tunneling will not be possible without the foundation and structural retrofits. Given there are no reliable design or construction records for the Western Building and given the extremely poor structural condition of the building, it is difficult to predict how the structure will behave when subjected to tunnel settlement and to protective efforts performed to minimize the impacts of tunnel settlement. Significant additional damage to the building, including a danger of instability with the very real scenario of partial collapse, is a possibility. Furthermore, even if a structural retrofit of the building was deemed feasible while protecting worker and public safety during the process, such structural retrofit would alter the architectural character of the building as well as reduce building functionality. Available lease space would be reduced by approximately 5% or 4,100 square feet.

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Appendix A

References

Coughlin Porter Lundeen, Inc.; Magnusson Klemencic Associates, Inc.; KPFF Consulting Engineers, Inc. "SR 99 Bored Tunnel Project –Assessment of Settlement Impacts to Buildings". Produced for WSDOT. March, 2010.

Inverso, George. Memorandum titled "Yesler Way Vicinity Foundation Stabilization Project: Summary 9 January 2007 Field Visit to Polson and Western Buildings". Produced for WSDOT. January 16, 2008.

Mahlum Architects. "The Western Building—An Historical Analysis". Produced for Piha/Rogel Commercial Real Estate. September 24, 2003.

Pacific Engineering Technologies, Inc. Drawings titled "Western Building Repair of Earthquake Damage, Phase I". August 22, 2001.

Pacific Engineering Technologies, Inc. Drawings for a foundation repair titled "Scheme 'A'—No Expanded Basement". December 22, 1999.

Pacific Engineering Technologies, Inc. Drawings for a foundation repair titled "Scheme 'B'—New Expanded Basement". December 22, 1999.

Ruffcorn Mott Hinthorne Stine Architects. "Zoning Analysis and Development Potential for 619 Western Avenue". Produced for Stanley Real Estate, Inc. No date.

Shannon and Wilson. "Condition Survey Report for Polson and Western Buildings". Produced for WSDOT and Parsons Brinkerhoff. December 2007.

Piha, Stanley. Memorandum regarding 619 Western Avenue/620 Alaskan Way; to the Emergency Response Center, DCLU. April 30, 2001. This memo includes the earthquake damage assessment by Pacific Engineering Technologies, Inc., dated April 27, 2001.

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Appendix B

List of Figures

B-1. Building Location

B-2. Existing Settlement Survey of the Fifth Floor

B-3. 3-D Settlement Curve

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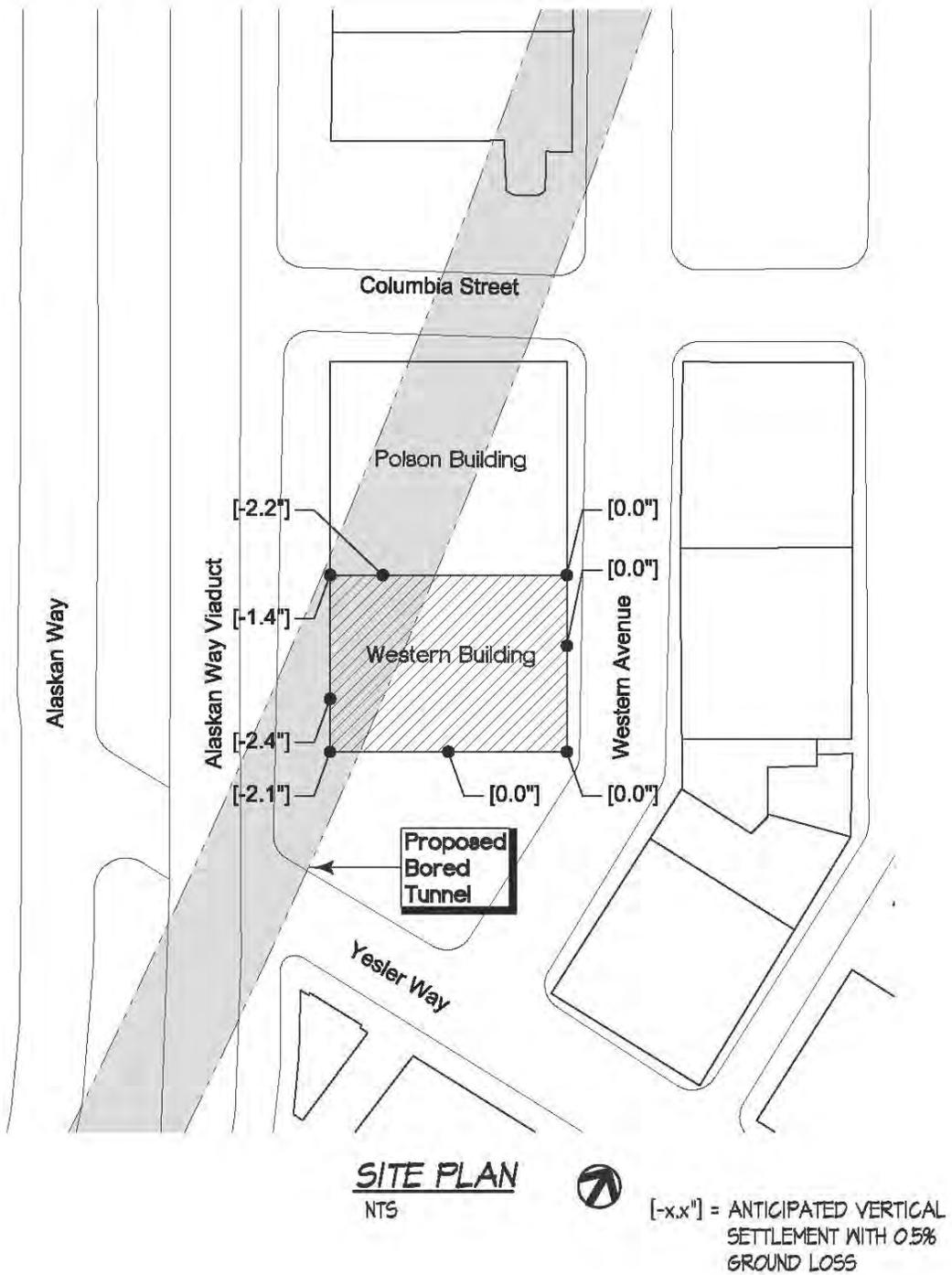


Figure B-1. Building Location

LEVEL SURVEY
TO NEAREST 1", UNLABELED COLUMNS
MINIMAL DISPLACEMENT



1300 Dander Ave. North - Suite 100 Seattle, Washington 98109
Telephone: (206) 261-7300 Facsimile: (206) 261-4211
Nationally: (800) 621-7300

JOB NO. 99435.00 SHEET 1 OF 1
JOB NAME WESTERN BUILDING
FOUNDATION REPAIRS
COMP. BY DN/JA/JS DATE 12/22/99 CHK. BY _____

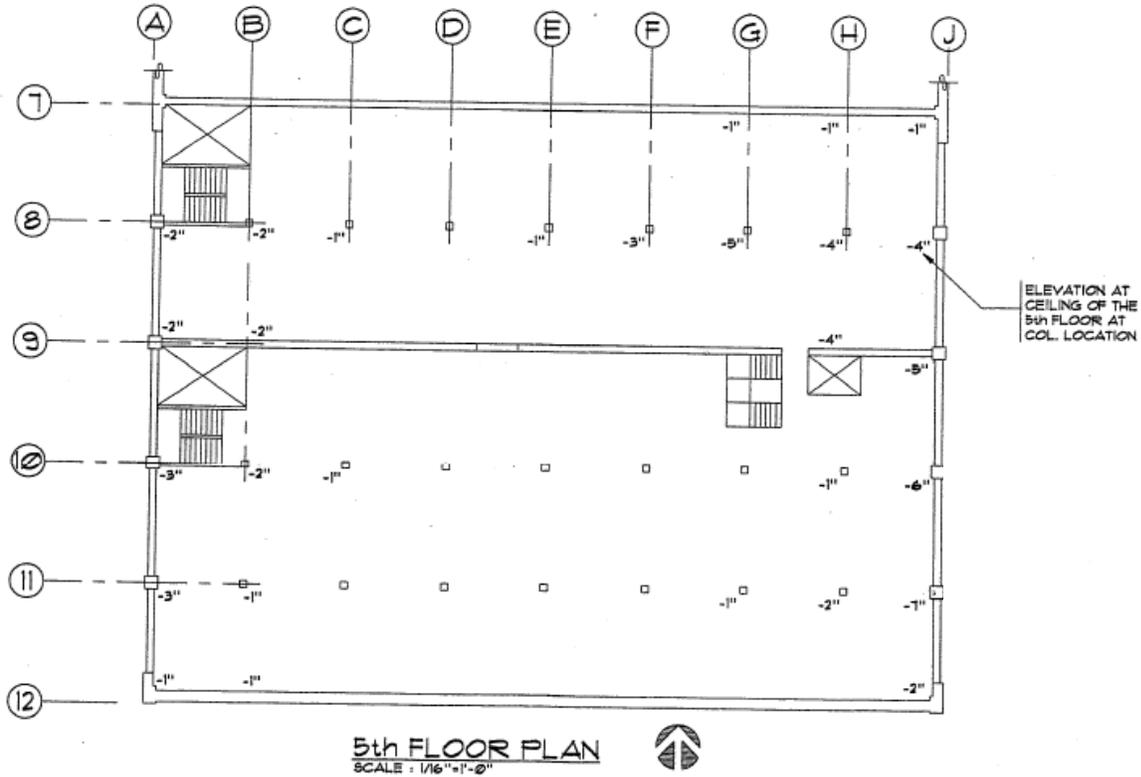


Figure B-2. Existing Settlement Survey of the Western Building - Fifth Floor [Pacific Engineering Technologies 1999]

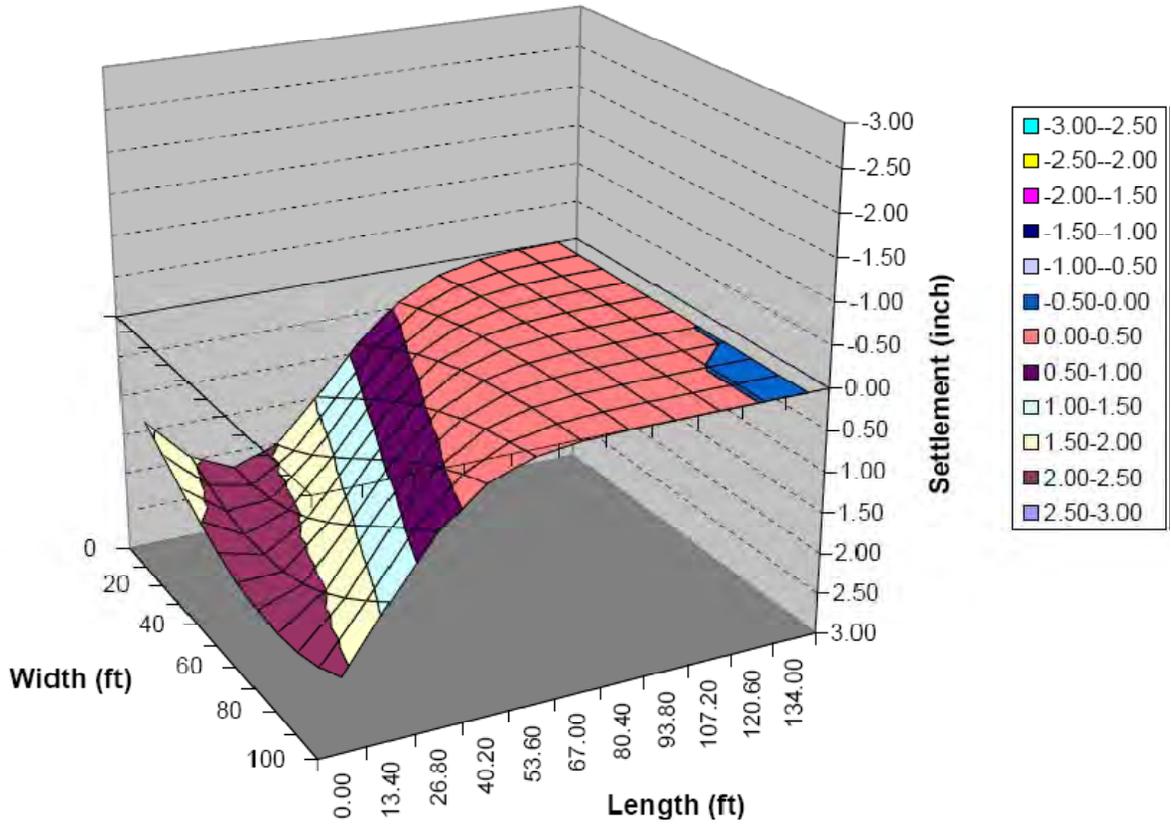


Figure B-3. Potential Additional Settlement of the Western Building due to Bored Tunnel Construction (3-D Curve)

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Appendix C

Photographs

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Photo 1: East Elevation



Photo 2: South Elevation



Photo 3: West Elevation



Photo 4: Cracking and Spalling in Concrete Column



Photo 5: Damaged Beam-Column Joint on East Elevation
[Shannon and Wilson 2007]



Photo 6: Crack in Spandrel Beam



Photo 7: Large Crack in Interior Concrete Wall
[Shannon and Wilson 2007]



Photo 8: Concrete Spalling at Interior Column
[Shannon and Wilson 2007]



Photo 9: Floor Separating from Wall
[Shannon and Wilson 2007]



Photo 10: Distorted Window (Sloping North 4%)
[Shannon and Wilson 2007]



Photo 11: Loading Dock (Sloping 10%)
[Shannon and Wilson 2007]



Photo 12: Typical Crack in Slab-on-Grade
[Shannon and Wilson 2007]

Appendix D

Structural Rehabilitation Options

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Western Building Structural Rehabilitation Options

1. Introduction

This document summarizes possible structural rehabilitation alternatives to mitigate the effects of tunnel induced deformation on the Western Building, located at 619 Western Avenue in Seattle, Washington. Three alternatives are presented with conceptual level design drawings to illustrate each approach (Figures D1 through D3).

The preferred ground improvement method regardless of the structural strengthening approach would be compensation grouting. Foundation strengthening schemes for both options would also be essentially the same, except that the new pile and pile cap layout would be revised as needed to support differing structural layouts. These ground improvement and foundation strengthening approaches are described in *Western Building Risk and Mitigation Technical Memorandum – Revision 1* dated October 12, 2010.

2. Structural Rehabilitation Option A

a. Description

The building would be stiffened in order to behave as a rigid body with full-height steel bracing at the exterior walls. Certain damaged or weak existing elements would be repaired or strengthened. Stiffening of the exterior walls would consist of an extensive latticework of steel bracing located just inside the building cladding on the east, south, and west elevations of the building. A deep concrete grade beam would be constructed below this latticework. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations thus minimizing differential movement. This latticework would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns.

The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Horizontal channels would be added at each level across the large wall cracks, epoxy bolted to the sound concrete on either side of the crack.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 12 months.

b. Concerns

- Reduces usable space by 5% (based on existing condition)
- Bracing visible through windows impacts aesthetics
- Construction time and impacts to adjacent tenants.
- Triggers substantial alteration code requirements
- High cost

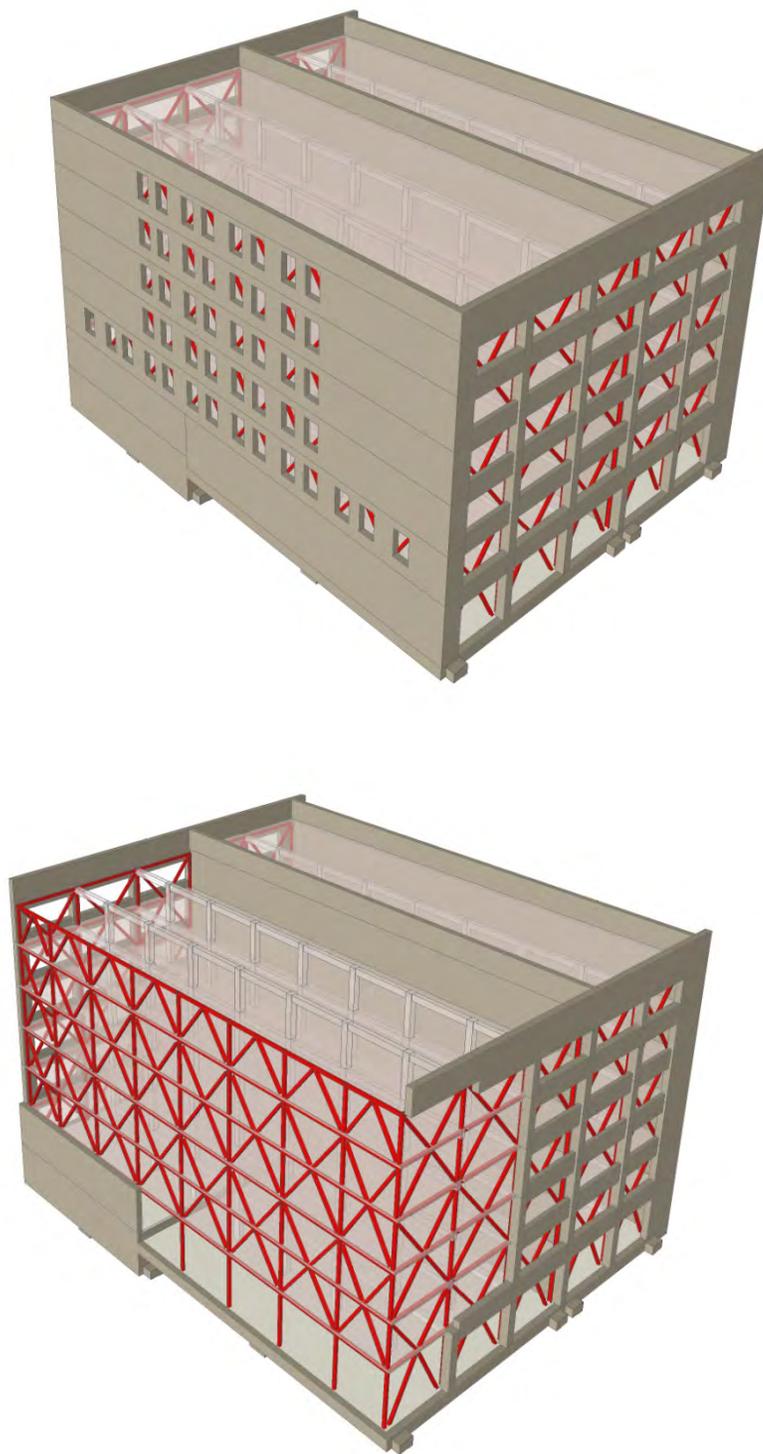


Figure D1 – Structural Rehabilitation Option A

3. Structural Rehabilitation Option B

a. Description

The building would be stiffened to behave as a rigid body at the interior of the building with steel bracing. The exterior walls would be stiffened by steel trusses at the upper two floors which would span to the interior steel bracing. Certain damaged or weak existing elements would also be strengthened or repaired.

The exterior walls would be reinforced by a steel truss just inside the building cladding on the east, south, and west elevations of the building. The truss would be two stories in depth, consisting of a bottom chord just below the fifth floor decking and a top chord just below the roof decking with diagonal web members. At each column line vertical web members of the truss would extend the full-height of the wall, continuously attached with expansion bolts, thus hanging the wall from the truss. Each truss would be supported by the steel bracing described below, as well as a two-story truss running north-to-south at the center column line of the building.

The interior building framing will be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides. The steel bracing will extend from the foundation to the underside of the roof framing, and will also support the steel trusses described above. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. The latticework and trusses would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns.

The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Horizontal channels would be added at each level across the large wall cracks, epoxy bolted to the sound concrete on either side of the crack.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 12 months.

b. Concerns

- Reduces usable space by 10% (based on existing condition)
- Reduces functionality due to extensive internal bracing
- Triggers substantial alteration code requirements
- Approximately 25% more costly than Option A

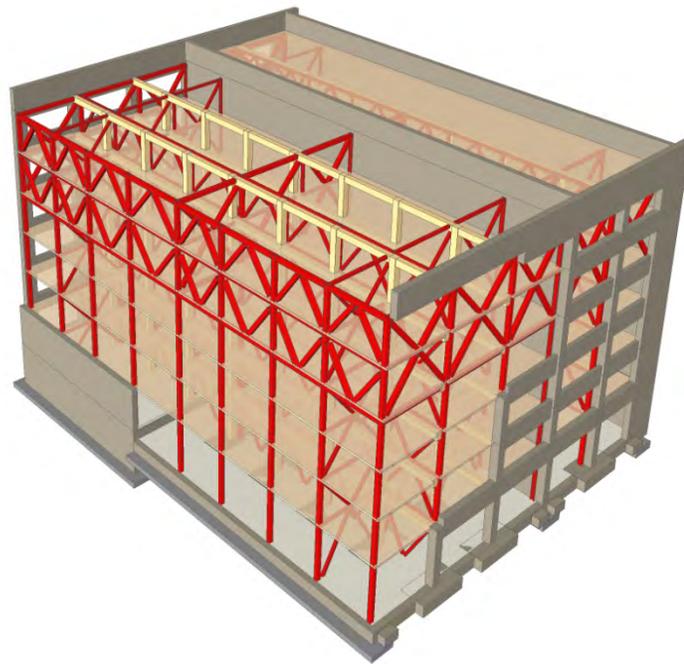
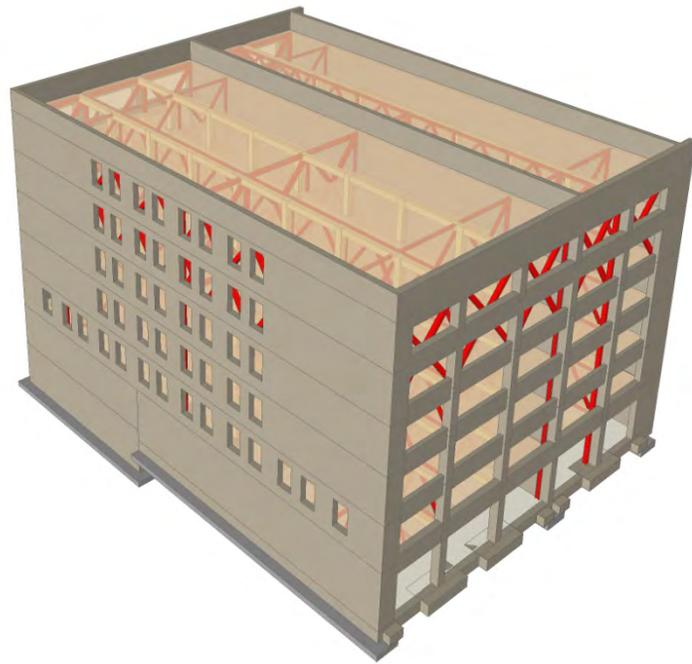


Figure D2: Structural Rehabilitation Option B

4. Structural Rehabilitation Option C

a. Description

The building would be stiffened to behave as a rigid body at the interior of the building with steel bracing. The exterior concrete walls, and two interior concrete walls, would be stiffened by a shotcrete wall epoxy doveled to the existing concrete just inside the building cladding on each side of the building. Certain damaged or weak existing elements would also be strengthened or repaired.

The north concrete wall shared with the Polson Building to the north and the interior concrete wall would also be reinforced by a shotcrete wall on one side. The shotcrete walls would be full-height, matching the current configuration of the existing wall openings and would be reinforced with continuous vertical and horizontal reinforcement. Continuous attachment to the existing concrete would be accomplished with epoxy dowels in a grid pattern.

The exterior walls with shotcrete would be supported by the interior braced frame columns where they intersect. To tie the exterior walls to the interior braced frames, the exterior shotcrete walls would also be supported by diagonal braces at each column line (where braced frames do not occur) between the 2nd and 3rd level and between the 4th and 5th level.

The interior building framing will be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides. The steel bracing will extend from the foundation to the underside of the roof framing, and will also support the exterior walls with shotcrete as described above. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations, thus minimizing the differential movement. The latticework and shotcrete would be permanent.

The floor structure would be tied together with steel elements connected to the timber floor structure and epoxy bolted to the concrete structure. The timber girders would be tied to the interior timber columns. The cracked concrete columns at the east façade would require epoxy injection and a composite fiber wrap or concrete jacket. Wall cracks would be fully grouted prior to shotcrete wall installation.

Installation of the structural frame would likely require structural cribbing and/or additional framing to be installed inside the building to provide support to the existing structure during construction. Construction time is approximately 13 months.

b. Concerns

- Reduces usable space by 15% (based on existing condition)
- Reduces functionality because of more extensive internal bracing
- Triggers substantial alteration code requirements
- Approximately 20% more costly than Option A

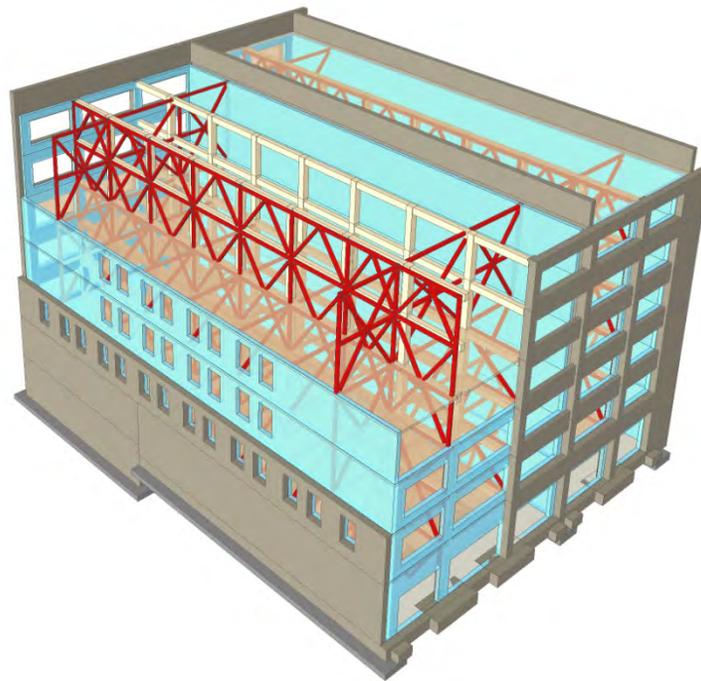
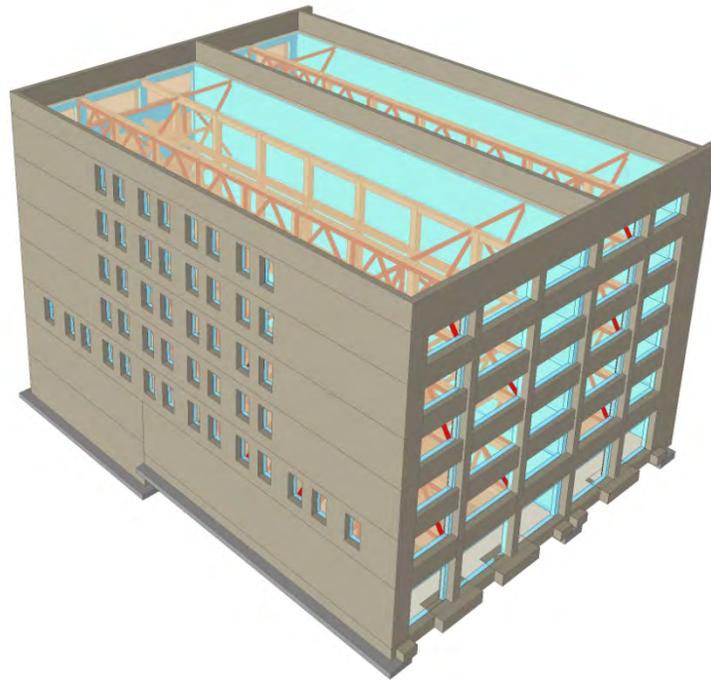


Figure D3: Structural Rehabilitation Option C

Ron Paananen
January 10, 2011

Attachment B – SDEIS Comments on the Western Building

Ron Paananen, AWW Project Manager
Angela Freudenstein
Washington State Department of Transportation
999 Third Avenue, Suite 2424
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Peter Hahn, Director
Seattle Department of Transportation
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December 13, 2010

Dear Ms. Freudenstein, Mr. Paananen, and Mr. Hahn,

This letter provides comments on the draft environmental impact statement (DEIS) for the Alaskan Way Viaduct Replacement Project. The Underground Tour, operated by Bill Speidel Enterprises Inc., has been a steward of and advocate for the Pioneer Square Historic District for nearly five decades. We care deeply about Seattle's first neighborhood, and the incredible historic resource value it represents. We are interested in ensuring, that whatever solution you decide on for viaduct replacement, the streets and character and vitality of our neighborhood are protected, not destroyed.

The following are our concerns with the DEIS.

Adequacy of Review, and Range of Alternatives

When the preferred alternative was announced in January 2009, the package included \$190 million worth of transit investments. Additional transit service was then, and is now, necessary to serve demand for access to and from downtown, since the bored tunnel itself does not. Moreover, the Letter of Agreement (LOA) between the City, County, and State promises funding for this transit service (see pg 258). **Additional transit service should be included** with the bored tunnel alternative, and analyzed for its utility.

Further, late in 2008, WSDOT, the City of Seattle, King County and various stakeholders completed an extensive review of multiple options for addressing the stated purpose of the project. That group concluded that there were two acceptable options. One of those options was a three-pronged plan to improve flow on Interstate 5, improve transit, and improve surface streets. That option—designated by your agency as one of the best and most viable options available—has never been analyzed in detail in an EIS. Why not? It is not too late to correct this error.

The **importance of the viaduct for local access has been understated** in assumptions, and data presentations, throughout the DEIS's analysis. A primary use of the current viaduct is to access downtown Seattle; 42% of current trips are coming and going to downtown neighborhoods (Ch 4, pg 73). The EIS should identify local mobility and access to downtown as a goal, and evaluate alternatives based on their ability to provide this.

The significant traffic impacts of tolling are not fully described in the analysis (Ch 9, pg 205). "As currently defined, the Bored Tunnel Alternative does not include tolls." The impact analyses in the entire document, including travel times, traffic volumes, greenhouse gas emissions, and stormwater runoff all assume that there will be no tolling on the project. However, tolling revenue is a necessary part of the basic funding plan, and use of tolling dramatically affects the impacts. Tolling should be included in the modeling throughout the EIS to clarify the impacts.

It is insufficient merely to reprise the State's January 2010 Tolling Study in Chapter 9 without incorporating tolling's impacts throughout the analysis. Without it, this EIS creates an inaccurate depiction of impacts—especially traffic effects on local streets.

Traffic Impacts to Pioneer Square Historic District Streets

Currently, the viaduct offers seven on- and off-ramps to provide access to downtown Seattle neighborhoods, spread from the stadium area to Belltown. The tunnel alternative reduces this number to four on- and off-ramps, and concentrates them all in one location: adjacent to the Pioneer Square Historic District (Ch 4 pg 74). This configuration concentrates in our neighborhood all the traffic going between SR-99 and downtown Seattle.

Without tolling, this DEIS says that 30,000 additional cars will shift to city streets from SR-99 (Ch 2, pg 19). More specific to our neighborhood, this DEIS states that 50,000 cars a day are expected to use the southern interchange ramps (Ch 5, pg 104). If tolling is implemented, as required by the funding plan for the project, an *additional* 40,000 to 45,000 cars are expected to divert to city streets. It is unclear how many of these cars are likely to use this interchange.

The Pioneer Square Historic District is already inundated with car traffic during events at Safeco Field, the WaMu Theater, and Qwest Field on 205 days a year, with 105 of these happening during rush hour. How will this additional traffic generated by the southern interchange, at least 50,000 trips a day and perhaps much more, be accommodated on event days?

After analyzing the traffic impacts on surface streets that would result from tolling, the conclusion is, "These effects would not be acceptable as part of a long term tolling solution" (Ch 9, pg 214). No alternative is suggested other than to say another alternative is needed.

After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion again is, "These effects would not be acceptable as part of a long term tolling solution."

The existing street grid in this area is not well connected, and there are not many viable routes. Some of the streets are narrow, historic, physically fragile, and pedestrian oriented, and not suitable for use as access roads to a highway interchange.

This EIS must describe in more detail the traffic volumes that are expected on specific streets around the southern interchange, both without tolling and with it. How many cars will use Alaskan Way, First Ave, Second Ave, and Fourth Ave? What revisions will WSDOT make to these streets to make room for all these cars, and for pedestrian traffic crossing First Ave? What are the impacts, in detail, of these solutions? How will this affect the pedestrian character of the streets? How will it affect on-street parking and the viability of retail? Are these historic streets, built on fill and supported by 100-year-old areaways and retaining walls, physically capable of carrying this much traffic? How will the proposed changes to these streets affect the viability of travel by bicycle? If the impacts to transit are unacceptable, what alternative solution or mitigation is being offered?

In general, what alternatives or mitigation are being considered—such as additional transit, or routing away from the Historic District and improvements to pedestrian rights of way—to minimize the untenable impact of adding at least 50,000 vehicles, and perhaps more (if the project is tolled), to our local streets? And what impacts do these possible solutions bring?

Concerns about the significant impacts of heavy concentrations of traffic on Pioneer Square streets caused by the preferred alternative were raised by neighborhood stewards over a year ago. It is misleading for this draft EIS to not provide decision makers more detail on these problems, and possible solutions, within this draft EIS.

Physical Risks to Historic Resources

Boring a tunnel next to our historic district, with its historic buildings, fragile and brittle infrastructure, high water table, and unstable soils, is a steep engineering challenge. This EIS describes the risks of digging and boring in this location (Ch 5, pg 126), possible damage to 12 historic structures (Ch 2, pg 31), and possible collapse or dramatic damage to two buildings during construction (Ch 6, pg 142), and mentions measures to protect structures. But many important issues remain unaddressed.

What damage could soil settlement from tunnel boring cause, specifically? Will residents and users of those buildings be at risk of harm? Will Pioneer Square's unique but delicate areaways—its historic Underground—be at risk?

What buildings specifically will be required to have their supporting soil improved with jet grout? What impacts will that have on the use of their Underground portions? What sidewalks will be closed, what streets will be closed, what basements will be altered, what areaways will be temporarily or permanently affected?

Some of the “solutions” proposed actually exacerbate other problems, but these impacts are not disclosed or assessed.

Because the water table is quite close to the surface in this neighborhood, there is risk that the solidification of soils—due to tunnel walls, retained cuts at the portals, and the injection of jet grout under buildings—might alter natural water flows, create a water barrier, and cause water to back up (Ch 5, pg 127). What exactly is the risk of potentially submerging subsurface structures? Which structures? Will decayed and fragile underground water and sewage infrastructure be at risk of failing? What is the risk of basements flooding? Many of these basements are occupied, either by functioning retail or other business uses. Some are part of the historic Underground, which is a popular visitor attraction, occupied at times by hundreds of visitors. What will WSDOT do to protect against flooding events?

Duty to Obtain Important Information

SEPA and NEPA require your agencies to identify information gaps and fill them, especially when that information is important to making a reasoned decision. Some of the issues identified in this letter will not be easy to address. But considering the magnitude of the possible impacts, your duty to acquire important information compels you to do the studies necessary to answer these critical questions. State and Federal agencies involved in this project must not make such irrevocable decisions without benefit of the required critical information identified above.

Process Issues

This letter has identified many issues that have not been addressed adequately or at all in your draft document, and notes the absence of reasonable alternatives. Including this missing analysis for the first time in the FEIS deprives the community and public agencies of the opportunity to comment on a draft version of this important information. Another draft containing the missing alternative and missing impact analysis should be prepared.

We are deeply troubled by the focus on your preferred alternative before the environmental review process is complete.

When the EIS is complete, decision makers should have a *real* opportunity to choose between alternatives. If one alternative has been developed to a far greater extent than the others, you leave decision makers with little genuine choice—or, at minimum, you skew the choice severely in favor of the more fully developed alternative.

That seems to be precisely the process you are using here. You have spent tens of millions of dollars engineering the tunnel option to the 30% level. You have solicited, received and now awarded a bid for construction of the tunnel. You have taken a host of other actions making it all but impossible for a decision maker to choose any alternative other than the tunnel.

You must move the other alternatives far enough along so that when the FEIS is released decision makers have real options, not simply the option of approving a *fait accompli*.

Summary

I've been advocating for Pioneer Square for the last 24 years or so. I have participated in legions of projects related to my favorite neighborhood. Today, I'm concerned for Pioneer

Square's survival. I am asking you, please, to take special care of our beloved historic district, its buildings, streets, areaways and sidewalks, as you make decisions on this project.

Pioneer Square is a beautiful and cherished neighborhood, and has irreplaceable historic value to the city of Seattle. Preserving our lovely thoroughfares has not been easy. Every generation of stewards has devoted significant attention to protecting our streets, whether by saving the majestic plane trees on First Ave or carefully guiding façade renovations or doing the hard work to ensure ferry traffic is routed away from our neighborhood streets.

The risks and harms to Pioneer Square mentioned in this DEIS might truly be overwhelming. The traffic generated—certainly 50,000 cars a day, and likely more with tolling—by placing a massive highway interchange in our neighborhood could ruin our fragile neighborhood and our connection to the new waterfront.

The DEIS acknowledges the traffic impacts are “unacceptable.” It acknowledges that the absence of tunnel entrances and exits in the downtown core, combined with the effects of tolling required by the State's statutory funding plan, will divert to surface roadways over half the trips which currently use the viaduct. Yet the EIS refuses to disclose the full scope of these impacts and minimizes their adverse effects, treating the increased congestion more like an accounting problem than an assault on the integrity of Pioneer Square. Compounding the problem, the DEIS discusses mitigation measures as if funding were available for them, totally misleading most readers who are not aware that there is no funding available for these measures. The EIS should candidly disclose the likelihood (or not) of funds being available for critical mitigation measures. City and State decision makers deserve immediate clarity on exactly how WSDOT intends to “improve” our local street grid. These “solutions” should be included for analysis in this EIS.

Two historic buildings might need to be torn down, and twelve others could suffer damage. The flooding risks caused by the project's inability to prevent changes to ground water flows could put some of the over 100,000 annual visitors to the Underground Tour, and the neighborhood, in danger.

It is our collective responsibility to protect the pedestrian environment, streets, and physical fabric of the historic district, including our Underground areaways. Our neighborhood is counting on City and State decision makers to ensure highway-bound traffic is not routed through our streets, to negotiate excellent design for local streets that must be altered, and to secure adequate funding for successful completion. We are counting on the City and State decision makers to ensure the historic buildings and Underground are safe from damage, and Pioneer Square residents and visitors are safe from risks. Pioneer Square must not only survive WSDOT's tunnel project, but emerge on the other side stronger.

Thank you,

Sunny Speidel
President, CEO
Bill Speidel Enterprises Inc.

Ron Paananen, AWW Project Manager
Angela Freudenstein
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999 Third Avenue, Suite 2424
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Peter Hahn, Director
Seattle Department of Transportation
PO Box 34996
Seattle, WA 98124-4996

November 22, 2010

Dear Ms. Freudenstein, Mr. Paananen and Mr. Hahn,

This letter is to provide comments on draft environmental impact statement for the Alaskan Way Viaduct Replacement Project. The People's Waterfront Coalition is very interested in a sustainable, forward-looking transportation solution that protects the opportunity for Seattle's new waterfront. We have been active participants in this discussion for 6 years, including serving on the 2008 Viaduct Replacement Stakeholder Advisory Committee.

Concerns have been grouped into eleven categories. There are specific requests for action in each category, and a summary of more comprehensive requests for action at the end.

1. Access into downtown is a vital function of the Alaskan Way Viaduct. Solutions must provide good access. The preferred alternative does not.

A primary use of the current viaduct is to access downtown; 42% of trips are coming and going to downtown neighborhoods. Downtown Seattle is a center for jobs and commerce, perhaps the core economic engine for Washington State. Analysis in the 2008 stakeholder process showed that 80% of trips on the viaduct are short trips that start and end within Seattle city limits. This EIS should identify local mobility and access to downtown as a goal, and evaluate alternatives based on their ability to provide this.

The usage of the viaduct has not been described accurately in this DEIS. The importance of the viaduct for local access for people and freight has been understated in the assumptions and criteria, and usage of the viaduct as a through-route has been exaggerated. Consequently the analysis doesn't give decision-makers an accurate portrayal of the challenge.

The DEIS says in Ch 1pg 4 that the viaduct carries 20-25% of traffic traveling through downtown. What is the source for this claim? 90,000 - 110,000 trips a day travel on the viaduct currently, depending on exact location. When compared to a total of 1,670,000 trips to and through Seattle, the viaduct carries less than 7% of traffic. The exaggeration of importance for bypass trips in this DEIS, and the disregard for local access and mobility, misrepresents the basic challenge and creates an inaccurate analysis.

Action: Mobility and access into downtown Seattle should be included as an integral goal and evaluation measure. **Additional transit service at significantly higher levels should be included** as part of the bored tunnel alternative in this DEIS.

2. Traffic impacts to local streets caused by the preferred alternative are unacceptable. Especially for the Pioneer Square Historic District.

Currently, the viaduct offers seven on and off ramps to provide access to downtown Seattle neighborhoods, spread from the stadium area to Belltown. (Ch 4 pg 74) The tunnel alternative reduces this to one highway interchange, located adjacent to the Pioneer Square Historic District. This configuration concentrates all the traffic going between SR-99 and downtown Seattle on only a few streets.

Without tolling, this DEIS states that 50,000 cars a day are expected to use the southern interchange ramps (Ch 5 pg 104). It says that 29,000 of current SR-99 users will shift to City streets (Ch 2 pg 19).

If tolling is implemented (Ch 9), as required by the funding plan for the tunnel alternative, **an *additional 40,000 to 45,000 cars are expected to divert to city streets.***

The Pioneer Square Historic District is already inundated with car traffic during events at Safeco Field, the Stadium Exhibition Center, and Qwest Field for over one hundred days a year, with a significant number of these happening during the week at rush hour. How will this additional traffic, somewhere between 50,000 and 80,000 trips a day (with tolling), generated by the southern interchange be accommodated on event days?

After analyzing the traffic impacts on surface streets that would result from tolling, the conclusion is that “These effects would not be acceptable as part of a long term tolling solution.” (Ch 9, pg 214) No alternative is suggested other than to say another alternative is needed.

After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion again is that “These effects would not be acceptable as part of a long term tolling solution.”

The existing street grid in this area is not well connected, and there are not many viable routes for drivers. Some of the streets are narrow, historic, physically fragile, and pedestrian oriented, and not suitable for use as access roads to highway interchange.

Predictions for the waterfront Alaskan Way are also alarming. The SDEIS traffic projections reveal that 35,000 cars a day will use the new Alaskan Way in this area. While it is possible to design a quality street that carries this volume, attracting this volume of new traffic to the new waterfront runs counter to Seattle’s vision for this site.

Action: This DEIS must describe in more detail the traffic volumes that are expected on specific streets around the southern interchange for the preferred alternative. How many cars and trucks will use Alaskan Way, First Ave, Second Ave, Fourth Ave? How many more cars would be added to each of the streets if tolling is implemented and 40,000 to 45,000 vehicles from SR-99 choose to avoid the toll?

The DEIS must describe what street revisions WSDOT will implement to make room for all these vehicles, and what are the impacts of these so-called street improvements.

Does WSDOT plan to remove on-street parking, or any of the mature and cherished London Plane trees in the Historic District? Will these changes affect the access to and viability of retail? How will the planned revisions affect the pedestrian character of the streets, and their viability for biking and walking? Are these historic streets, built on fill and supported by 100 year old areaways and retaining walls, physically capable of carrying these increased traffic volumes? Pioneer Square is hoping to reconnect to the new waterfront park, and re-establish its presence as a waterfront neighborhood; how will the proposed widening and increased traffic volumes on the new Alaskan Way affect these hopes?

What solutions are being considered to avoid burdening Historic District streets and the waterfront with an influx of traffic generated by the interchange? What solutions are offered to reduce congestion for local delivery trucks? For instance, additional transit service to and from downtown, or routing SR-99 bound traffic away from the Historic District, investing in improvements to I-5 to shift through-trips there, relocating the interchange further away from Pioneer Square, and demand management should be analyzed for their usefulness in protecting Pioneer Square from this influx of car traffic.

Note: Concerns about the heavy concentration of traffic on Pioneer Square streets caused by the tunnel's interchange have been raised repeatedly by neighborhood stewards for over a year. Is a viable solution even possible? Either there is a plan for reengineering streets to accommodate these much higher volumes, which should be described in this DEIS, or it is impossible to solve this problem without ruining Pioneer Square streets. Withholding this information from decision-makers obscures what might be the most egregious impacts of the tunnel alternative.

3. The significant traffic impacts of tolling are ignored. When tolling is included in the traffic modeling, the preferred alternative loses so many users that it effectively doesn't meet the statement of purpose and need.

The DEIS states (Ch 9 Pg 205) "As currently defined, the Bored Tunnel Alternative does not include tolls." The analysis in the entire document (except for Ch 9), including travel times, traffic volumes, greenhouse gas emissions, and stormwater runoff all assume that there will be no tolling on the project. However, tolling revenue is a necessary part of the basic funding plan, and use of tolling will dramatically affect tunnel usage and impacts.

The non-tolled tunnel sends 29,000 of the viaducts cars and trucks to city streets. The tolled tunnel sends an additional 40,000 to 45,000 vehicles to city streets. **This causes 74,000 new trips outside the tunnel, and 41,000 inside the tunnel. The preferred alternative, at \$3.1 billion cost, only serves about 1/3 of the transportation challenge, and offers no solutions for 2/3 of travelers.**

As this preferred alternative is described, the negative impacts to local mobility for people and freight are egregious. When the diversion effects of tolling are included, these negative impacts are intolerable.

Action: Tolling must be included in the modeling and analysis throughout this DEIS to clarify the impacts. Without it, this DEIS creates an inaccurate depiction of the very utility of the tunnel, as well as traffic and environmental impacts of toll diversion. A mitigation plan must be developed to show how WSDOT will prevent, resolve, or mitigate the unacceptable detriments to the functioning of Seattle's local transportation system.

4. The preferred alternative causes alarming physical risks to Historic Resources – Pioneer Square Historic District and buildings. The viaduct replacement project must guarantee protection from harm.

Boring a tunnel next to Seattle's historic neighborhood, with its historic buildings, fragile and brittle infrastructure, high water table, and unstable soils, is a steep engineering challenge. This DEIS describes the risks of digging and boring in this location (Ch 5 pg 126), possible damage to 12 historic structures (Ch 2 pg 31), and possible collapse or dramatic damage to two buildings (Ch 6 pg 142) because of difficulty controlling soil loss or preventing over-excavations or sinkholes.

The DEIS says this of the Western and Polson buildings, both 'contributing' buildings in the Pioneer Square Historic District: "Mitigation measures to protect the buildings may not prevent the need for demolition to avoid the possibility of collapse."

It says twelve buildings within the Pioneer Square Historic District or listed on the National Register of Historic Places – including the Historic Federal Building -- may be affected by settlement, structures could crack, and utilities may be disrupted or damaged. While the DEIS states measures will be implemented to avoid or minimize damage, it mentions that unavoidable damage might still occur with the preferred alternative.

Action: WSDOT must provide more information on how and when damage is likely to occur, and fully describe what they will do to prevent, repair, or mitigate damage. What damage could soil settlement from tunnel boring cause, specifically? Is WSDOT planning to purchase and demolish any of these buildings? What is the likelihood of unavoidable damage to the fourteen buildings at risk? Will residents and users of those buildings be at risk of harm?

WSDOT will not know if there is an adverse effect to an at-risk building due to their boring activities until they start tunneling under it.

Action: To ensure protection of the at-risk buildings cited in the DEIS, WSDOT should do 3-D laser scans before, during and after construction. This technology represents current best practice in historic preservation, and is being used widely. The before scan will show existing cracks and the tilt of the walls, etc. During-construction scans will monitor the cracks and tilts, and if any significant movement is detected, the project should halt and do something to stop the problem. A post-construction scan would show if any damage occurred so that WSDOT knows to repair. And exterior laser scan should also be done for all buildings along the proposed route.

Will Pioneer Square's unique but delicate areaways and historic underground be put at risk?

Action: WSDOT must provide more information on how and when damage is likely to occur, and fully describe what they will do to prevent, repair, or mitigate damage. What buildings specifically need to have their supporting soil improved with jet grout? What impacts will that have on the use of underground floors? What sidewalks will be closed, what streets will be closed, what basements will be altered, what areaways will be temporarily or permanently affected by implementation of this preventative measure?

Some of the 'solutions' proposed to prevent structural damage actually exacerbate other problems.

Given that water table is quite close to the surface, there is risk that the solidification of soils -- due to tunnel walls, retained cuts at the portals, and the injection of jet grout under buildings -- might alter natural water flows, create a water barrier, and cause water to back up in the Pioneer Square Historic District. (Ch 5 pg 127.)

Action: WSDOT must provide more information on how and when damage is likely to occur with the preferred alternative, and fully describe what they will do to prevent damage or safety risk to building users. What exactly is the risk of potentially submerging subsurface structures? What structures are vulnerable? Will decayed and fragile underground water and sewage infrastructure be at risk of failing if the ground becomes over-saturated due to altered water flows? What is the risk of basements flooding? Many of these basements are occupied, either by active retail or other business uses. Many are part of the historic underground, which is a popular visitor attraction, and occupied at times by hundreds of people. **What will WSDOT do to protect against flooding events and guarantee safety?**

Pioneer Square Historic District is listed in the National Register of Historic Places. Why is it not being protected via Section 4(f)?

Action: This DEIS should provide Pioneer Square Historic District full protection under section 4(f). It should identify and evaluate alternatives that avoid the possible harms to the streetscape, the buildings, and the underground that together comprise the unique quality of this district.

5. The Statement of Purpose and Need was recently rewritten with narrower language to exclude viable and cost effective alternatives, and favor the preferred alternative.

The range of alternatives to be considered flows from the statement of purpose and need. However, in this current draft, the statement of purpose and need was rewritten into a much narrower definition. The **statement of purpose and need** (Ch 1 pg 4) should continue to use the long- established definition for this project, 'mobility for people and freight', not redefine the target as vehicle 'capacity.' The statement of purpose and need from the 2006 SDEIS should be kept: "The project will maintain or improve mobility, accessibility, and traffic safety for people and goods along the existing Alaskan Way Viaduct Corridor."

By using the term capacity instead of mobility, solutions that include **transit, demand management, or available capacity on other facilities are disqualified**. It is not legal under SEPA – or prudent -- to frame the statement so narrowly as to exclude reasonable alternatives.

When the bored tunnel was announced as the preferred alternative in January 2009, the package included \$190 million worth of transit investments. Additional transit service was then, and is now, deemed necessary to provide access to and from downtown Seattle, since the bored tunnel alone does not provide any downtown ramps.

The benefits of transit are many. A robust transit system offers an affordable alternative to the high cost of car ownership for many citizens. For some families, this is a big deal: saving roughly \$8000 annually by getting by without a second car can mean more education or better housing. Transit is a key part of a larger strategy to reduce green house gas emissions. It reduces congestion for other roadway users, especially freight trips, car-pools, and other travelers who need to drive. A recent survey by T4America shows that 59% of Americans believe we need to increase public transportation to reduce traffic congestion, and make it easier to walk and bike.

Action: WSDOT should change the operative phrase in the statement of purposed and need back to "mobility and access for people and freight. "

6. All reasonable alternatives have not been included.

The alternatives analysis is the heart of the Environmental Impact Statement, and state law says all reasonable alternatives must be evaluated. A viable alternative that serves mobility, serves access to Seattle, AND also preserves the opportunity for Seattle's waterfront should be included in this DEIS.

Deep bore tunnels are marvels of engineering but also among the most difficult projects to plan and control financially. This proposed tunnel would be the largest diameter bore ever attempted in the world, in tricky soil and water conditions, under our state's most valuable real estate. Abrasive soils, clay, boulders, uncontrollable water flows, or unexpected utilities could stop the boring machine in its tracks. The delay and cost consequences of the machine getting stuck are very high. Removing a 56' x 400' machine from underneath downtown Seattle streets or buildings would be a nightmare, and huge financial risk.

According to a thorough analysis of 258 massive transportation projects by one of the world's foremost authorities on the subject, Bent Flyvbjerg, a professor at the University of Oxford, 9 out of 10 transportation megaprojects run over their cost estimates. For tunnel and bridge projects, Flyvbjerg found, "actual costs are on average 34 percent higher than estimated costs."

Both tunnel experts hired by the City of Seattle affirmed that costly problems are likely to emerge, despite WSDOT's best intentions. Using WSDOT's own data, these professionals predicted this project is 40% likely to exceed its establish cost cap. Further, David Dye, WSDOT leading project official at that time, said on record at

the conclusion of the 2008 stakeholder process, about why they did not select the bored tunnel: "And so it's a cold dose of fiscal reality that I guess I'm the one who has to bring the bucket and pour on this.... But it is out of reach in the current state of affairs to make it happen."

There is a significant uncertainty around the state's ability to fully fund the bored tunnel alternative. It is essential for this DEIS to consider a viable back up plan that meets goals for mobility and access into downtown neighborhoods -- *and* protects the full opportunity of the future waterfront. Neither of the two other alternatives in this DEIS offers this. Further, both these alternatives were soundly rejected by Seattle voters in the 2007 advisory ballot.

At the conclusion of the 2008 stakeholder process, the leaders of the City, County and State Departments of Transportation recommended two alternatives for viaduct replacement: the I-5/ Surface / Transit hybrid, and the Elevated / Transit hybrid. After a year-long evaluation, these two approaches proved best for meeting the agencies six goals for viaduct replacement at an affordable cost. **Each of these two solutions was determined by the City, County and State DOTs as feasible, lower cost, and effective in providing mobility after exhaustive analysis. The I-5/ Surface/ Transit hybrid alternative should be evaluated in this EIS.**

The I-5/ Surface / Transit proposals A and B provide mobility for through-travel and for local access, offer a four lane urban street on the waterfront, and can be achieved at a cost savings of \$700 million to \$1 billion compared to the tunnel. Like the tunnel, these options offer a calm, four-lane waterfront street, which is central to the City's plans for the new waterfront. To exclude these from the DEIS analysis creates a false choice for waterfront proponents.

Further, the City of Seattle Ordinance 12246 states the City's preference for an alternative to the tunnel: "In the event a tunnel proves to be infeasible, the City recommends the development of a transit and surface street alternative that meets the intent of Resolutions 30664 and 30724." This alternative would offer the City one of the key advantages it seeks – reclaiming the downtown waterfront – at a significant cost savings.

Action: A version of I-5/ Surface / Transit alternative that includes an urban, four-lane waterfront street should be included in this EIS so that decision makers who care about mobility for people and freight AND Seattle's new waterfront have a lower cost, lower risk alternative to consider.

7. This project should plan for reducing vehicle usage and greenhouse gas emissions, according to by City, County, State and Federal policies and statutory benchmarks.

The City has policies urging transportation agencies to pursue decreased Vehicle Miles Traveled over time, and increase the viability of other modes, as part of a larger effort to reduce green house gas emissions from vehicles.

- The City recently established a goal for Carbon Neutrality as one of its 16 priorities for 2010, knowing that this will demand dramatic efforts to reduce fossil fuel consumption and driving. A citizens' commission is at work defining specific implementation steps.
- The City's transportation policy as defined by the Comprehensive Plan states: Ensure that transportation decisions, strategies and investments are coordinated with land use goals and support the urban village strategy.
- The City's Climate Action Plan, launched in 2006, says: "The goal of the Seattle Climate Protection Initiative is to reduce greenhouse gases in Seattle by 7% below 1990 levels by 2012, 30% below 1990 levels by 2024, and 80% below 1990 levels by 2050." Reducing VMT is a key strategy to reduce emissions, as 60% of Seattle's emissions come from vehicles.

The County has put addressing climate change at the center of its comprehensive plan, as one of three

framework policies guiding the entire plan. FW-102 states that "King County will be a leader in prevention and mitigation of, and adaptation to, climate change effects." This overarching policy is carried through the rest of the comprehensive plan, including the following policies on Reducing Climate Pollution:

- Recommends that the County collaborate with other local governments to reduce greenhouse gas emissions in the region to 80% below 2007 levels by 2050 (Policy E-216)
- Establishes a goal of reducing County government GHG emissions by 6% below 2000 levels by 2010 (Policy E-204).

The State has established statutory benchmarks and policy urging transportation agencies to pursue decreased Vehicle Miles Traveled over time, and increase the viability of other modes, as part of a larger effort to reduce green house gas emissions from vehicles.

- State law says we shall "By 2035, reduce overall emissions of greenhouse gases in the state to twenty-five percent below 1990 levels, and by fifty percent by 2050."
(<http://apps.leg.wa.gov/rcw/default.aspx?cite=70.235.020>)

State law requires agencies distributing capital funds for infrastructure projects to consider whether the entity (WSDOT) has adopted policies to reduce greenhouse gas emissions. The agencies must consider whether the project is consistent with the state's limits on the emissions of green house gases and statewide goals to reduce annual per capita miles traveled.

The federal government – the DOT, the EPA and House of Representatives -- have shifted policies away from vehicular capacity and congestion relief and toward mobility by other modes in order to reduce greenhouse gas emissions and reduce oil dependence.

At the end of 2009, the U.S. Environmental Protection Agency (EPA) announced that greenhouse gases (GHGs) threaten the public health and welfare of the American people. EPA also announced their finding that GHG emissions from on-road vehicles contribute to that threat.

Ray La Hood, Secretary of the US Department of Transportation, announced in March 2010 a dramatic change from existing policy regarding transportation funding. This "major policy revision" aims to give bicycling and walking the same policy and economic consideration as driving. "Today I want to announce a sea change.... This is the end of favoring motorized transportation at the expense of non-motorized." A major thrust of the DOT's current priorities are to foster livability, sustainable communities, and reduced car dependence. One of their six principles is: "**Provide more transportation choices** to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health."

The American Clean Energy and Security Act passed last summer set the goal of reducing greenhouse gas emissions by 17% from 2005 levels by 2020, and 83% by 2050.

To summarize, climate change is the most significant and daunting environmental issue facing this generation. Many agencies at all levels are working to shift how mobility is understood and delivered to achieve reduced pollution, increased choice, and reduced economic dependence on fossil fuels. Countless scientific and policy analyses of how to meet these goals arrives at the same fundamental conclusions: decision makers and agencies must commit to more alternative transportation, and pro-actively plan for reduced Vehicle Miles Traveled, in order to achieve reductions in GHG emissions. The preferred alternative directly violates statutory benchmarks, goals and policies at all levels of government by aiming for and facilitating increased car usage.

Action: In light of City, County, State, and Federal policies aimed to reduce greenhouse gas emissions from vehicles, the EIS should aim for reductions in emissions and VMT. Greenhouse gas emissions should be compared for all the alternatives. The analysis should examine the cumulative use impacts created by the decision in this corridor – not just the trips on the facility, but the area wide effects generated by the decision in this corridor.

Beyond policies, there is practical evidence that calls into question the narrow focus on vehicle capacity in this corridor.

This project uses PSRC forecasts for future travel, which extrapolates past growth rates for driving. However, the empirical data for the Seattle area and this facility make those assumptions dubious. According to the City's annual counts, usage of the Alaskan Way Viaduct has been flat over the past twelve years. Research from Sightline Institute (<http://www.sightline.org/publications/reports/braking-news-gas-consumption-goes-into-reverse/>) reveals car travel has been declining the past 13 years in our region. A new study by Advertising Age reveals that young people (16-20 years old) are driving 20 to 25% less than their parents' generation. (http://adage.com/digital/article?article_id=144155).

Forty percent of regional trips are less than 2 miles in length, which means it would be viable to serve a significant portion of SOV trips by biking, walking, or transit.

Demographics are changing, societal values are changing, the energy economy is changing, and land use and transportation patterns in Seattle are changing. Actual rates of driving have been flat or declining. This project should plan for serving Seattle's future travel patterns and policies, not the past.

Furthermore, this inaccurate portrayal of "need" for car capacity is worsened in this DEIS by ignoring the fact that travel on the viaduct is expected to decrease by about 1/3 during the 4.5 years of construction. After 4.5 years, travel patterns will have already adjusted to the lower capacity. (Ch 6, pg 139) People and freight will have found other routes, modes and solutions, and our local travel patterns will have shifted. At that point, the 'need' will be different. It is fallacious for this EIS to predict a spontaneous surge in demand in car travel from perhaps 70,000 trips a day before the new tunnel opens to 117,000 trips a day after it opens. It is misleading for this analysis to justify such an expensive facility on predictions of 'need' that are contradicted by empirical evidence.

Action: It would be **more accurate -- and compliant with City and State policy - for this project to plan for a reduced number of car trips**, and increased use of transit, biking, and ride-sharing. Evaluation measure should compare access and mobility for people and freight, and favor solutions that provide viable alternatives to travel by car.

8. This EIS should carefully consider the public safety risk of delaying viaduct closure from the promised date of 2012 to 2015, 2016, or beyond.

By default or by design, the Viaduct is severely damaged and will come down. The city and region desperately need interim traffic solutions to be in place before it does. Plans for dealing with the loss of the viaduct have been developed. Many of the elements in these plans are necessary for local access, whatever the final decision for viaduct replacement. These alternative traffic solutions should be implemented now, so the viaduct may be closed earlier if necessary, and public safety is not eroded any further by delaying the promised closure date of 2012.

Linking Viaduct removal to the opening of the deep-bored tunnel idea only delays the inevitable closure and increases the danger. According to many experts in transportation planning and earthquake preparedness policy, it is better to bring the structure down in controlled fashion than to let it pancake during a seismic event. http://seattletimes.nwsourc.com/html/opinion/2002837776_viaduct02.html Furthermore, analysis in the DEIS states that the viaduct is particularly vulnerable to damage from soil settlement during construction, if the bored tunnel is pursued, and may fail before 2016.

Action: Seattle DOT should work with WSDOT to update plans for local access and mobility without the viaduct, based on the Center City Access Strategy and Urban Mobility Plan, and prioritize these investments NOW. A seismic event or further settlement may damage the viaduct at any time, and the

systems needed to provide mobility must be ready to go. . **The project should prepare to provide mobility and access in case the viaduct must be closed sooner than 2016.**

9. The high cost of tolls, in combination with the significant degradation of transit travel times, is particularly onerous for low-income citizens. This must be evaluated as a social justice impact for the preferred alternative. This DEIS reveals WSDOT intends to charge tolls of up to \$4 each way for a trip through the tunnel. This could add up to hundreds of dollars in additional costs each week for taxi drivers, local freight movers, and any small businesses that provide delivery or site visits as part of their service. Further, the DEIS states that tolling significantly impairs transit service due to increased congestion. After analyzing tolling impacts on transit riders (Ch 9, pg 215) the conclusion is that “These effects would not be acceptable as part of a long term tolling solution.”

Action: This DEIS must analyze how the combination of high tolls, the default on the January 2009 promise of additional transit, and impairments to existing transit from congestion affects lower income people. How affordable is this toll for low and average income earners? Does the plan for high tolls and impaired transit support the State’s intention of improving mobility for everyone, or just wealthy car owners who can afford the toll?

10. The public and decision makers have been misled about the finality of a decision for the bored tunnel alternative in advance of comprehensive environmental review of impacts.

WSDOT has advanced design, development, and contracts for the deep bore tunnel far beyond the other alternatives. SEPA law requires that a final Environmental Impact Statement be completed *before* decisions are made that commit the government to a particular course of action. Until the FEIS is completed, agencies are precluded from making decisions that pre-judge the choice among alternatives.

There are many indications, especially in the State’s advocacy efforts and public communications, that the playing field has been tilted and the tunnel is in a substantially favored position already:

- Preparation of, and pressure to sign, MOAs for the tunnel with the City,
- Significant development of the bored tunnel design,
- Preparation of contracts with tunnel construction bidders, with the intention to sign them before the FEIS is issued, and
- Numerous statements by state officials that a “Decision has already been made and would not be revisited,” which have deceived and confused the public about the status of environmental review and record of decision.

WSDOT’s actions effectively preempt any opportunity for a deliberate and balanced decision-making process after environmental analysis is complete. Giving the tunnel alternative a two-year head start, and investing substantive resources into creating the illusion that it is the only possible solution at this point – before harms and risks and negative impacts are made known to the public – directly violates SEPA. As the public is just now learning, the tunnel alternative comes with a high price tag, many unresolved challenges, and significant impact to the City of Seattle.

To summarize the shortcomings that are finally revealed in this DEIS: The preferred alternative only solves a portion of the transportation challenge. Unless significant investments to local mobility are added to the preferred alternative, it would create havoc on city streets for people and freight. It has a very high price but only benefits a few of the region’s travelers. High toll rates render the capacity useless for 2/3 of potential SR-99 users. Construction might do irreparable damage to historic buildings and the Pioneer Square Historic District, and WSDOT may not have sufficient budget to offer protection or mitigation. Funding plans reveal a high risk of cost escalation, meager contingency reserves, and no funding plan for potential cost overruns.

Action: This DEIS should compare current and reasonable alternatives to the tunnel, alternatives that improve access and mobility in Seattle while protecting the opportunity for a new waterfront -- in case its merits do not outweigh the costs and risks.

11. Decision makers and the public deserve complete clarity on the promised project scope, budget, and security of funding.

With the data that exists now, it is practically impossible for decision makers to get a firm fix on full cost of the preferred alternative. It is not clear what elements of the project scope are funded and what might be cut, the full cost of protecting against or mitigating for expected harm is not known, and contingency reserves necessary for potential future problems seem to have been mostly drained.

The funding side is as unclear. There is a firm budget cap of \$2.4 billion on the state's resources. That leaves \$700 million in unsecured commitments. The Port of Seattle's promised \$300 million has not materialized, and may not. This \$400 million from future toll revenues may not be realistic. There is significant doubt as to whether the state will be able to float bonds on future tolling revenue because the state is at the limit currently for debt capacity, and both SR-520 and SR-99 projects are dependent on raising \$2.4 billion in new bonds. Initiative 1053 also casts doubt on whether WSDOT can impose tolls without action by the legislature, which may not happen. Finally, there is firm resistance from all parties – City, County, and State -- to accept liability for the cost overruns, overruns that are likely to occur with 40% probability.

Action: WSDOT must prepare a table comparing full project costs (including reasonable contingency reserves), and a full funding plan, (including back up plans if the unsecured funds fall through, and willing sources for potential overruns) and present it to the public and decision makers.

Summary

1. The tunnel alternative only answers part of the viaduct replacement challenge. Trips that bypass downtown Seattle neighborhoods are well-served; access into Seattle neighborhoods for vehicles, freight and transit users is not. As the preferred alternative is described, the negative impacts to local streets are egregious. When the diversion effects of tolling are included, these negative impacts are unacceptable – and cast doubt on whether the alternative as it will be used meets the statement of purpose and need.

WSDOT must develop a plan to show how WSDOT will provide good access to downtown Seattle for people and freight, and prevent, resolve, or mitigate the intolerable impacts to the streets of Pioneer Square Historic that are caused by the preferred alternative. Solutions such as additional transit, routing traffic away from Historic District streets, transportation demand management, improvements to I-5, and relocating the interchange elsewhere should be analyzed for their ability to enhance local mobility and access while protecting Historic District streets.

2. WSDOT must develop a mitigation plan to show how WSDOT will prevent, resolve, or mitigate potential damage to all historic buildings along the tunnel route, and in the Pioneer Square historic district and underground. This plan should include 3-D laser scans of each building before, during, and after construction. Damage must be arrested as it is occurring, if significant. Laser scans are necessary to identify which buildings must be repaired afterward.

3. A full budget for all alternatives should be developed that identifies the appropriate responsibility and source for each line item. **This is a state project, and the state must show it can cover costs for the preferred alternative, including:**

- The bored tunnel itself,
- Other project components promised as part of the program (lids over the cut and cover sections, improvements to the street grid around the interchanges, reconnecting three streets across SR-99 in

- South Lake Union, access to downtown Seattle, urban design and landscaping around the portals, viaduct removal and replacement of Alaskan Way surface street, etc),
- Solutions for local access and improvements to local streets,
- Protection of historic buildings and the Pioneer Square Historic District,
- How WSDOT will cover costs if they escalate from the 60% confidence interval (\$1.96 billion) to the 95% confidence interval (\$2.37 billion), and
- Any further cost escalations that may occur later due to the risk of boring in such complex soil and water conditions, under valuable real estate and intense commercial activity.

4. There is still significant uncertainty around whether the preferred alternative can be fully funded. Decision makers deserve a clear picture of the alternative's basic financial viability. **WSDOT should prepare a comprehensive funding plan** for the preferred alternative that addresses:

- Clear description of what project elements promised as part of the tunnel program are covered by the minimal state allocation of \$2.4 billion, the project budget of \$3.1 billion, and what are not,
- What the project will do if the \$700 million of project funding is not secured,
- What contingency funds remain unallocated, and how much this is expressed as a percentage of full \$3.1 billion project budget,
- How WSDOT plans to exceed the constitutional debt limit to borrow \$2.4 billion necessary for both 520 and SR-99 projects concurrently, and
- Exactly how potential cost overruns will be covered, given the unresolved contention between governments.

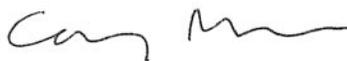
The public and elected decision makers at the City and State deserve a clear picture of total project costs (item 3 above) compared to the full funding plan (item 4.) WSDOT should explain how they will address any shortfalls, and what elements or the overall program scope are vulnerable to being cut. The City of Seattle, local neighborhoods, the federal GSA, or private property owners cannot be held liable for costs of the State's project.

"Measure twice, cut once" for funding would prevent a worst case situation: if the tunnel project is started but runs into trouble, and additional funding is not unavailable. Existing funds could be consumed, the project left incomplete, leaving a further degraded Viaduct intact and no money for transportation and waterfront improvements. That situation would represent a miserable failure of leadership in pursuing a project with full knowledge of risk, but without sufficient funding or a back-up plan.

It is unfortunate that decisions made by WSDOT in the early stages of drafting this DEIS document led to such a flawed evaluation. Many of the concerns described here were raised in early 2009 with WSDOT and SDOT, again in late 2009 in multiple EIS scoping letters from Seattle organizations, and once again by City officials in July 2010 when an early draft was released. The sooner WSDOT rectifies these errors and omissions, the sooner the viaduct replacement project can get back on track. Decision-makers in Seattle and the State are counting on accurate and robust information so they can assure a final decision provides public safety, mobility, and access for the future – while fully protecting Seattle's assets -- at a cost effective price.

Thanks for your consideration of these comments.

Sincerely,



Cary Moon
Director, People's Waterfront Coalition



Preservation Development
Authority Council

Rick Sever
Chair
Karen Breckenridge
Sharon Coleman
Andrea Divoky
Fauna Doyle
James Fearn
Michael Herschensohn
Mary McCumber
Pete Mills
Rico Quirindongo
Marcia Wagoner

Kathleen Brooker
Executive Director

Foundation
Board of Directors

Michael Herschensohn
President
James Fearn
Gary Gaffner
Rick Sever

13 December 2010
Via Email

Angela Freudenstein
Alaskan Way Viaduct Replacement Project
Washington State Department of Transportation
999 Third Avenue, Suite 2424
Seattle, WA 98104

Re: Comments on the Supplemental DEIS and Section 4(f)
Evaluation for the Alaskan Way Viaduct Replacement Project

Dear Ms. Freudenstein:

This letter provides comments on the 2010 Supplemental Draft Environmental Impact Statement (SDEIS) for the Alaskan Way Viaduct Replacement Project. I am writing on behalf of Historic Seattle, which is Seattle and King County's only nonprofit membership organization dedicated to preserving our architectural legacy. Our mission is to educate, advocate and preserve. Historic Seattle is also a Section 106 Consulting Party in this process.

From our review of the SDEIS and Section 4(f) Evaluation, the most adverse impacts appear to be in the Pioneer Square Historic District, listed on the National Register of Historic Places and designated as a City of Seattle historic district. **Following are our concerns regarding impacts to historic and cultural resources.**

-The Pioneer Square Historic District as a whole will be adversely affected, directly and indirectly.

In the Section 4(f) Evaluation, the historic district is not included as a "resource subject to use under 4(f)," but some individual resources within the district are subject to use. How does 4(f) apply in a National Register-listed district such as the Pioneer Square Historic District? Why are the effects on the district as a whole not considered an impairment on the district?

Pioneer Square is the city's original business district defined by the interplay of buildings and structures, system of alleys, sidewalks, areaways, and streets. The pedestrian-friendly character of the district will be greatly impacted by the tens of thousands of vehicles expected to go through city streets (specifically Pioneer Square streets) as a result of the proposed south portal for SR 99. Can this old and historic infrastructure, built on fill, carry the heavy loads and volumes of traffic that are projected? Since there is no central downtown access proposed, Pioneer Square will be taking the "hit" as a thoroughfare for city traffic. Is there a plan to deal with these traffic impacts to the streets of the historic district to protect its pedestrian character?

The Section 106 Cultural Discipline Report (Appendix I) does not adequately recognize indirect effects to the historic district. It focuses on direct effects to specific buildings during construction. How will the considerable traffic impacts to the historic district be dealt with after construction of the preferred alternative (Bored Tunnel) is completed?

-Building Damage Assessment

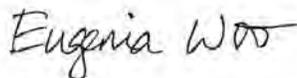
Exhibit 6-2 (Potential Effects on Historic Properties) in Appendix I (pp. 97-98) focuses on potential damage to 15 buildings within the Pioneer Square Historic District and outside the district. How accurate are the effects determination? What happens if the effects are greater than anticipated? The majority of the effects are classified as “slight” at this point. What if, in reality, they become “moderate” or worse? What are the proposed actions to deal with this potential?

The building damage assessment (pp. 95-96) focuses on the Western Building and Polson Building, both contributing resources to the historic district, because they will be adversely affected by construction. Section 6.2.1 (Built Environment Resources, p. 103) states that (in reference to the Western Building) “Given the current condition of the building, demolition may be the only safe option.” It goes on to say, “Further analysis of the building options is being performed.” What are these options? Where are the structural engineer’s report and cost estimates for stabilizing the structure? Are there different ways to structurally stabilize the building? A temporary, exterior, steel frame is mentioned as needed to stiffen and strengthen the building. A temporary exterior, steel frame was used to shore up the Cadillac Hotel Building in Pioneer Square after the 2001 Nisqually earthquake so there is precedent in the district for similar treatment. Many also thought the Cadillac Hotel could not be saved after the earthquake, yet it was successfully rehabilitated and since 2005, has stood as a model for restoration in Pioneer Square. Granted, the foundation conditions are probably different and there are other issues at play here.

WSDOT should consider carefully the ramifications of demolishing a contributing resource in the Pioneer Square Historic District. The district has not lost a building in a long time (if you don’t count the King Dome). The point is made clearly in the SDEIS that the existing condition is poor but this takes nothing away from its value to the district. Neither Section 106 nor Section 4(f) take cost into consideration. It appears the proposed mitigation measures for the Polson Building would stabilize the structure during construction and not jeopardize it.

Thank you for the opportunity to comment.

Sincerely,



Eugenia Woo
Director of Preservation Services



December 13, 2010

Angela Freudenstein
Washington State Department of Transportation
Alaskan Way Viaduct Replacement Project SDEIS
999 Third Ave., Suite 2424
Seattle, WA 98104

RE: Alaskan Way Viaduct (SR99) Replacement Project – SDEIS

Dear Ms. Freudenstein,

The Washington Trust for Historic Preservation received information on CD related to the Supplemental Draft Environmental Impact Statement (SDEIS) for the Alaskan Way Viaduct Replacement Project. Thank you for sending this information. As a consulting party through the Section 106 process for this project, the Washington Trust appreciates the opportunity to provide comment.

After reviewing material included in the SDEIS, the Washington Trust agrees that a number of cultural resources will be adversely affected. In addition, while proposed best practices utilized before, during and after construction are anticipated to prevent adverse effects, the potential for other cultural resources to experience unanticipated adverse effects remains.

Both the Viaduct, slated to be removed, and the Battery Street Tunnel, slated to be decommissioned, have been identified as eligible for inclusion in the National Register of Historic Places (NRHP). As noted in the SDEIS, HAER documentation has been completed for these resources, while other interpretive programs are under development. The Washington Trust looks forward to learning more about the scope and breadth of these interpretive elements and engaging in discussions related to additional mitigation measures for the loss of the resources.

Numerous historic resources have been identified within the Area of Potential Effect (APE). The SDEIS anticipates that the majority of these resources will not be adversely affected by the tunnel and may experience damage classified as 'very slight to slight' given the proposed monitoring and grouting measures. While these monitoring and grouting measures seem appropriate, given the intensely complicated nature of the project, comprehensive contingency measures should be in place in the event adverse effects become evident and damage increases as a result of construction. The timeframe for monitoring settlement is described in the SDEIS as being 6 months prior to construction through 1 year after the project is completed. Consideration should be given

Ms. Angela Freudenstein
December 13, 2010
Page Two

to extending this window on either end given the fact that settlement from construction activity and subsequent vibration effects due to vehicular traffic can take a long time to manifest.

Of paramount concern are the Western and Polson Buildings, located near the proposed south portal tunnel entrance. Each building serves as a contributing element to the Pioneer Square Historic District. Due to the deteriorated existing condition of the Western Building, the SDEIS notes that demolition may be the only safe option. Demolition of the Western Building should be considered only as a last resort and after the discovery of clear evidence suggesting the building would not withstand construction activity related to the tunnel boring machine. To this end, the Washington Trust respectfully requests a copy of the structural engineering report for the Western Building. While structural reinforcement measures have been implemented to the Polson Building, the SDEIS notes the potential for 'severe to very severe damage' to occur. Because of this, and due to the fact that the Polson Building shares a common wall with the Western Building, considering should be given to adding the Polson Building as subject to use under Section 4(f) review.

The Pioneer Square Historic District constitutes an irreplaceable historic resource for the city, state and region. While much consideration has been given to the buildings, it seems that other elements related to the district have not received the same attention. For example, the areaways below grade are associated as character-defining features of historic buildings. The SDEIS notes that no adverse effect is anticipated to those areaways that retain historic integrity. Areaways, even if minor settlement occurred, may be more vulnerable to damage than their above ground counterparts. It may be prudent to pay closer attention to these elements even though the above ground resources with which they are associated are not anticipated to be adversely affected.

Finally, traffic in and around the Pioneer Square Historic District is a concern. While removal of the Viaduct may enhance the historical context of the district (a somewhat problematic claim made in the SDEIS), it will certainly increase traffic. Yet the SDEIS does not highlight any adverse effects for the historic district related to traffic either during or after completion of the project.

The Washington Trust for Historic Preservation looks forward to addressing these issues and others with all stakeholders involved. Thank you for the opportunity to comment on this important and monumental project.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Moore". The signature is fluid and cursive, written in a professional style.

Chris Moore
Field Director



United States Department of the Interior

NATIONAL PARK SERVICE

Klondike Gold Rush National Historical Park - Seattle Unit
319 Second Avenue South
Seattle, Washington 98104

IN REPLY REFER TO:

L7619 (KLSE)

December 13, 2010

Angela Freudenstein
Alaskan Way Viaduct Replacement Project
999 3rd Ave, Suite 2424
Seattle, WA 98104-4019

Dear Ms. Freudenstein:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Alaskan Way Viaduct Replacement Project. The National Park Service supports any alternatives which will improve the safety of motor vehicle travel through downtown Seattle. However, I would like to share concerns regarding potential adverse effects outlined in the DEIS. This letter's purpose is to encourage solutions and mitigation strategies that would result in continued preservation of historic character for the Pioneer Square National Historic Landmark, the Pioneer Square National Historic District, and the operations of Klondike Gold Rush National Historical Park.

The current DEIS notes that the Polson Building and the Western Building, both contributing buildings to the Pioneer Square National Historic District, may experience settling during the proposed project which could result in severe damage to the structures. The document mentions that even with mitigation, the Western Building may require demolition. As both these buildings contribute to the historic character of the District, I would highly encourage the planning team to continue to develop solutions that would prevent adverse effects resulting from a loss of these particular historic resources; as well as minimize damage to the additional 12 historic structures listed in the DEIS.

The DEIS also includes information regarding a significant increase in traffic through the Pioneer Square National Historic District. The District is currently a pedestrian friendly neighborhood, conducive to the provision of walking tours by National Park Rangers for visitors to Seattle. The National Park Service is working with the Alliance for Pioneer Square and more than 40 public stakeholders to develop the *Trail to Treasure* self guided walking tour through the District. I am concerned that increased traffic volume, as proposed in the DEIS, would significantly inhibit the safe and pleasant provision of visitor services that Klondike Gold Rush NHP provides along the streets and sidewalks of Pioneer Square and impact the *Trail to Treasure*. These types of visitor services draw tourists to Pioneer Square, significantly contributing to the economy of the area. I would encourage you to seek traffic solutions and mitigations that do not increase through traffic in Pioneer Square, but rather improve local traffic conditions, provide adequate parking for visitors, and markedly contribute to a safe, pleasant pedestrian atmosphere.

Once again, thank you for the opportunity to provide comments on the DEIS for the Alaskan Way Viaduct Replacement Project.

Sincerely,


Karen Beppler-Dorn
Superintendent

From: allisonpaints@gmail.com [mailto:allisonpaints@gmail.com]
Sent: Sunday, November 07, 2010 8:14 PM
To: Alaskan Way Viaduct
Subject: AWW Feedback

Sent from: Allison Agostinelli

Address:

City:

State: WA

County:

Zip:

Email: allisonpaints@gmail.com

Phone:

Comments:

After reading the following report my understanding is that the building that I have a lease for 4000 sq feet and have about 14 artists on my floor that I rent to at 619 Western will likely not survive the impact of the viaduct removal. We were well aware that the building would eventually come down but the timeline is confusing. Basically I am trying to ask how long we have. I am sorry to see that we do not have a cultural impact on the environment according to the report. Perhaps someday someone will drill a hole and find evidence of us. ALASKAN WAY VIADUCT REPLACEMENT PROJECT 2010 Supplemental Draft Environmental Impact Statement

From: Erik Macki [macki@seanet.com]
Sent: Tuesday, November 16, 2010 3:23 PM
To: AWV SDEIS Comments; peter.hahn@seattle.gov;
mike.mcgin@seattle.gov; richard.conlin@seattle.gov;
sally.bagshaw@seattle.gov; tim.burgess@seattle.gov;
sally.clark@seattle.gov; jean.godden@seattle.gov;
nick.licata@seattle.gov; bruce.harrell@seattle.gov;
mike.obrien@seattle.gov; tom.rasmussen@seattle.gov
Subject: Public Feedback on the Deep-Bore Tunnel Project
Importance: High

Dear Mr. Hahn and WSDOT team,
Dear Mayor McGinn, dear Council Members Conlin, Bagshaw, Burgess, Clark,
Godden, Licata, Harrell, O'Brien, and Rasmussen,

I am writing to provide feedback on the Deep-Bore Tunnel Project and the SDEIS as a part of the public comment period through December 13.

First as a general comment, I personally remain confused about the rationale of a project whose purpose is to ferry drivers from north of Seattle underneath Seattle to south of Seattle, considering that the current Alaskan Way Viaduct has no fewer than seven exits into downtown Seattle itself. It seems odd for Seattle to paying for a road whose purpose is to get drivers through, and not into, Seattle. The Mayor has communicated fairly cogent arguments to the public against the tunnel project, but the members of the City Council and certainly the state and WSDOT have not done so other than speak in platitudes and generalizations (not borne out by the new SDEIS, in fact, I might add). As a result, I would like to remind the City Council that their support of the project will haunt them at election time if Seattleites end up paying for its very likely cost overruns, if Pioneer Square is damaged, and particularly if downtown becomes swamped with 40,000 or more extra cars per day, as the SDEIS says it will.

My first comment on the SDEIS specifically is that the tunnel CANNOT destroy any structure in Pioneer Square. The value to future generations of an intact Pioneer Square far outweighs any transportation benefit from the tunnel project, and the SDEIS indicates that at least TWO important buildings (and others) are at risk of COLLAPSE from the Deep-Bore Tunnel Project, to say nothing of subgrade flooding and other issues throughout downtown caused by the new tunnel structure. No responsible representative of the people of the City of Seattle who is at all mindful of our history and heritage can rightfully condone a project that so directly endangers a cornerstone of our history. Once news of these impacts to Pioneer Square become more widely known, the furor will be deafening. Why not avoid the furor in advance by sufficiently addressing this issue in advance?

My second comment on the SDEIS is that the project must provide ACTUAL ACCESS TO THE CITY OF SEATTLE and not merely bypass Seattle. As currently planned, the Deep-Bore Tunnel Project does not even remotely do this, either by means of actual downtown exits or by means of improved public transit into and out of downtown. In fact, the existing plan merely shifts 40,000 cars onto downtown streets, which--if you really think about it--obviates any need for the tunnel in the first place. The current plan is shockingly myopic and not tenable as a transportation improvement project.

My last comment on the SDEIS is that no one has yet shown how to pay for the VERY LIKELY cost overruns. For instance, if damage is incurred to Pioneer Square, how will the repair of Pioneer Square be paid for? If the seawall caves in, how will the damage to downtown Seattle be paid for? If 40,000 extra cars are driving on Seattle's streets downtown, how will the added costs for maintenance and upkeep and traffic mitigation be paid for?

The SDEIS underscores how poorly thought-through the Deep-Bore Tunnel Project is, how poorly funded it is, and how damaging to Pioneer Square it will be. It's hard for me grasp why anyone, after reading the SDEIS, can think the tunnel project in its current form remains a good idea. The project needs serious and fundamental rethinking to address these three issues.

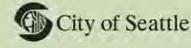
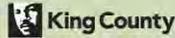
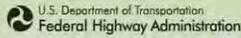
Sincerely,

-Erik Macki
1516 NE 98th St., Seattle, WA 98115

Ron Paananen
January 10, 2011

Attachment C – Analysis of Western Building Alternatives (Mimi Sheridan, The Sheridan Consulting Group)

Alaskan Way Viaduct & Seawall Replacement Program



MEMORANDUM

To: Kimberly Farley, WSDOT
From: Mimi Sheridan, AICP
Date: December 18, 2010
Subject: Analysis of Western Building Alternatives

1. PURPOSE

This memorandum discusses the proposed action alternatives for the Western Building and potential impacts of each one on the Pioneer Square Historic District. The purposes and significance of both the NRHP and local historic districts are provided as a basis for determining the impacts.

2. OVERVIEW

Engineering analysis indicates that the Western Building, a contributing property in both the NRHP and the local Pioneer Square historic districts, may experience severe impacts during the tunnel boring process. Because of the existing poor structural condition of the building, the estimated settlement of 2.4 inches may cause further extensive structural damage and the possibility of collapse. Four alternative action approaches have been developed: three structural rehabilitation options and building demolition.

The rehabilitation approaches would affect the building's exterior appearance to varying degrees, but not enough to make it a non-contributing building in the historic district. They would also reduce the rentable area of the building, making it more difficult for the owner to rent the building profitably. Conversely, the improved condition of the rehabilitated building may allow the owner to charge increased rents and may support increased property values in the historic district.

Demolition of the Western Building would deprive the historic district of an early warehouse building and would change the context of the western edge of the district. However, the change would not be significant enough to threaten its significance as a district.

3. WESTERN BUILDING

The six-story building was constructed in 1910 as a warehouse and is currently occupied by retail uses on the ground floor and artists' studios on upper floors. It is built of reinforced concrete, which represents an advance in construction knowledge and techniques over the brick and heavy timber construction used in earlier warehouses. The building is very simple in composition without the ornamentation seen in some warehouses of the era. Its primary defining feature is the fenestration, with a rhythmic pattern of original wood-sash windows on the east and west facades. The loading docks on the west facade are another distinguishing characteristic.

The building's design has been attributed to the prominent local architectural firm of Saunders and Lawton, who designed the adjoining Polson Building (1910). The firm designed numerous warehouse buildings in the early twentieth century. Several of them are in the Pioneer Square Historic District, including the Norton Building (1904), the McKesson and Robbins Building (1906) and the Westland Building (1907).

The Western Building is typical of warehouses of this period, with a facade of multi-paned windows in recessed bays set between multi-story piers. It measures approximately 100 feet by 134 feet. The north wall is a concrete common wall shared with the Polson Building. An interior concrete wall spans east-west the full height of the building. The roof and floor framing consist of laminated timber decking spanning to heavy timber girders, which are supported in turn by timber columns and the concrete walls. Concrete pile caps on timber piles of unknown size and depth support the walls and columns. At the top is a flat concrete cornice topped by a concrete parapet wall.

The Western Avenue (east) facade is divided into five bays separated by concrete piers. The ground level has five storefronts with wood-framed display windows; three of the storefronts retain their original six-light transoms. The three central bays of levels two to five have a row of four pivoting windows (three-over-three) topped by pivoting three-light transom windows. The single bays to each side of the central bays each have a row of three similar windows. The top level has the same standard window but without transoms.

The west facade, facing the railroad tracks and the waterfront, is characterized by a loading dock and two rolling doors. The windows on the upper stories are similar to those on the east facade.

On the south facade, facing a parking lot on Yesler Way, the only features are the windows, which are concentrated in the center of the building, with wide blank walls on each side. The second level has 14 six-light windows without transoms; the lower portions of these windows have been filled in with bricks. The upper floors have eight standard windows; those on the top floor have no transoms.

4. HISTORIC DISTRICTS

An historic district is a grouping of historic structures unified by history or by spatial and architectural characteristics. The group as a whole has greater importance and significance than the individual building; most of the buildings in a district would not be considered significant on their own. A district typically has one or more unifying themes, such as an architectural period or style or an important era in local history. A district reflects one or more specific historical periods, called the period(s) of significance. Buildings or other elements that were built during a district's period of significance, contribute to its theme(s) and are substantially unaltered are contributing properties; those that were built afterwards or that have been significantly altered are non-contributing properties.

4.1 Pioneer Square-Skid Road Historic District

The Western Building is a contributing property in the Pioneer Square-Skid Road Historic District, which was listed in the National Register of Historic Places (NRHP) in 1970. The boundaries were expanded in 1978 and 1988, toward the south and the east. The district nomination was updated in 2007, with considerable additional information on the history and significance of the district and the individual buildings.

The district is significant under two NRHP criteria.

- Criterion A: A property is associated with events that have made a significant contribution to the broad patterns of history.
- Criterion C: A property embodies the distinctive characteristics of a type, period or method of construction or represents the work of a master, or possesses high artistic values or represents a significant and distinguishable entity whose components lack individual distinction.

The areas of significance for the district, based on NRHP categories, are: architecture, commerce, community planning and development, engineering, industry, landscape architecture, politics/government, social history and transportation.

Contributing properties in the district date from one of four periods of significance:

- 1889-1899 The period of rebuilding the commercial district following the Great Fire of June 6, 1889
- 1900-1910 A period of explosive growth following the filling of the tidelands, including expansion of the rail yards and manufacturing/warehousing activities
- 1911-1927 Buildings associated with the World War I effort and other buildings of this period

- 1928-1931 Buildings and other elements associated with construction of the Second Avenue Extension

The Western Building dates from the second period of significance, when warehouses were a primary building type constructed in this area. The filling of the tidelands south of Pioneer Square allowed expansion of the rail yards and construction of King Street Station (1906) and Union Station (1911). At the same time, manufacturing and shipping from the nearby port increased. All of these activities encouraged warehouse construction. The Western Building is one of approximately 20 extant warehouses built in Pioneer Square in this period.

4.2 Pioneer Square Preservation District

The local special review district, known as the Pioneer Square Preservation District, was designated by the Seattle City Council in 1970, shortly before the district was listed in the NRHP. The purposes for creating the district are identified in SMC 23.66.100 as:

- To preserve, protect and enhance the historic character of the Pioneer Square area and the buildings therein
- To return unproductive structures to useful purposes
- To attract visitors to the city
- To avoid a proliferation of vehicular parking and vehicular-oriented uses
- To provide regulations for existing on-street and off-street parking
- To stabilize existing, and encourage a variety of new and rehabilitated, housing types for all income groups
- To encourage the use of transportation modes other than the private automobile
- To protect existing commercial vehicle access
- To improve visual and urban relationships between existing and future buildings and structures, parking spaces and public improvements within the area
- To encourage pedestrian uses.

The specific reasons for creating the district are listed in the same section of the code and are summarized briefly as follows:

- Historic significance, as the site of the beginning of the City of Seattle
- Architectural significance, as a unique collection of late nineteenth- and early twentieth-century buildings of similar materials, construction techniques and architectural style
- Social diversity, representing an area where people of many income levels and social strata live, shop and work
- Business environment, as a place with a diverse group of businesses ranging from specialty shops, restaurants, taverns and professional offices to light manufacturing and warehousing

- Educational value, because the restoration and preservation of the district will yield information regarding the way of life and the architecture of the late nineteenth century
- Geographic location, being sited adjacent to the waterfront, the central business district and the stadium.

5. PLAN ALTERNATIVES

Four alternative approaches to treating the Western Building have been proposed: three structural rehabilitation options and demolition.

- Option A Installation of an extensive latticework of steel bracing just inside the building walls on the east, south and west elevations.
- Option B Installation of steel trusses just inside the building walls, on the upper portion of the east, south and west elevations (from just below the fifth floor decking to just below the roof decking). Each truss would be supported by steel bracing. There would also be a two-story truss running north-south at the center column line of the building. The interior building framing would be stiffened by a latticework of steel bracing located on the first interior column line of the building on all four sides.
- Option C The exterior concrete walls would be stiffened by a full-height reinforced shotcrete wall just inside the building cladding on each side of the building. The north concrete wall shared with the Polson Building and the interior concrete wall would be also be reinforced by a reinforced shotcrete wall on one side. The exterior walls would be supported by a braced frame. The interior building framing would be stiffened by a latticework of steel bracing on the first interior column line of the building on all four sides, extending from the foundation to the underside of the roof framing.

All three options would also include:

- Strengthening the foundation by replacing the deteriorated piles and/or installing new piles at the interior and exterior columns and walls, and attaching new concrete pile caps to the existing pile caps.
- Tying the floor structure together with steel elements connected to the timber floor structure. Timber girders would be tied to the interior timber columns. A network of concrete grade beams would interconnect the individual column pile caps and the remaining wall foundations.
- Reinforcing the cracked column caps on the east facade with epoxy injection and a composite fiber wrap or concrete jacket.
- Adding horizontal channels at each level across the large wall cracks, bolted with epoxy to the sound concrete on either side of the crack.

- Undertaking compensation grouting following completion of the project to reduce building settlement.

Demolition: The building would be demolished prior to the start of tunneling. This process would include installation of bracing to safely control the demolition and avoid uncontrolled collapse. Measures would also be taken to safely detach the structure from the wall of the Polson Building and to make necessary repairs to the common wall following demolition, following the Secretary of the Interior's Standards.

6. IMPACTS OF THE PROPOSED OPTIONS

6.1 Reinforcement Options

- Option A would noticeably affect the exterior appearance of the building because the extensive steel latticework on the interior would be located next to the windows. The X-shaped bracing would be visible through most windows on all three sides of the building. This option would also reduce the rentable area of the building.
- Option B would affect the appearance of the building to a lesser degree than would Option A. The steel lattice would be visible only through the fifth and sixth floor windows. The rentable square footage would be reduced more than it would be under Option A.
- Option C would have a minimal effect on the exterior appearance of the building, as the bracing would be on the interior, but it would reduce the rentable area more than the other two options.

All three structural reinforcement options would be disruptive to the Polson Building and nearby residents for approximately a year during the construction process. The adjacent parking lot would be used as a staging area, reducing available parking in the district.

In summary, Options A and B would somewhat diminish the exterior appearance of the Western Building. However, it is unlikely that its integrity would be affected enough that it would no longer be a contributing property to the historic district. This is assuming that the building's primary characteristic, the multipaned wood-sash windows, are either retained or replaced in kind.

The reduction in rentable area could make it more difficult for the property owner to make a profit from the building. However, the building's improved condition may make it possible to get increased rents, which may contribute to increasing property values in the historic district.

6.2 Demolition

Demolition of the Western Building would diminish the integrity of the historic district in two ways:

- It would reduce the number of warehouse buildings and the number of examples of the work of Saunders and Lawton in the district. The information about early twentieth-century architecture and commerce that is provided by the building's presence would be reduced to some extent.
- Because of the building's location at the western edge of the district, demolition would alter the context and setting at Yesler Way, a major gateway into the district from the waterfront. The building's location near a corner and adjacent to a parking lot means that there would be a significant open space and a noticeable hole in the urban fabric of the district until the demolished building is replaced appropriately.

Although loss of the building would be a permanent change in the district, it would not affect the significance of the district to such an extent that it would no longer be considered a district (either NRHP or local). The district would still be eligible under NRHP Criterion A and Criterion C. The preservation district would also continue to meet the purposes for which the local district was established.

While the setting and context of the western edge of the district would be altered, the district boundary would not have to be changed if a replacement building is constructed that is compatible in size, massing, materials and use.

References

- Rick Conte to David Sowers. Western Building Action Plan Cost Estimates, October 29, 2010.
- Link, Karin. National Register Nomination Form, Pioneer-Square Skid Road Historic District, 2007.
- Terry Lundeen to David Sowers. Western Building Action Plan Alternatives-Revision 1, October 27, 2010.
- National Park Service. How to Apply the National Register Criteria for Evaluation, 1995.
- City of Seattle Historic Properties Database, 611 Western Avenue.
- Seattle Municipal Code 9SMC) 23.66.100,



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 24, 2011

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Clarification on APE Revision and Concurrence

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project (AWVRP). In a letter dated December 23, 2010, Matthew Sterner concurred with our revision of the AWVRP Area of Potential Effects (APE). This revision was made to include Cal-Portland's Mats Mats Quarry, an existing and permitted facility located in Jefferson County, Washington. The facility is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWV Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process.

In his concurrence letter, Matthew Sterner stated: "We look forward to the results of your cultural resources survey efforts, your consultation with concerned tribes, and receiving the survey report." WSDOT will not be conducting a survey of the quarry as it is an existing and permitted facility. WSDOT has visited the existing facility and has determined that the planned activities have no potential to affect historic or archaeological resources. WSDOT will consult with concerned tribes to ensure that there are no tribal concerns associated with this location. This approach was outlined and deemed acceptable by Matthew Sterner during a conference call on January 12, 2011.

Thank you for your continued participation in consultation on this project. Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

cc:

Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT



STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 1, 2011

RECEIVED

FEB 03 2011

WSDOT Doc. Control

Mr. Kevin Bartoy
WSDOT ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104-3850

In future correspondence please refer to:
Log: 051209-10-FHWA
Property: Alaskan Way Viaduct, Central Waterfront, Deep-Bore Tunnel
Re: Receipt of Correction Letter

Dear Mr. Bartoy:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHHP). Thank you for your letter of January 24, 2011, clarifying WSDOT's position on the use of the Mats Mats Quarry for waste disposal resulting from the construction of the Alaskan Way Viaduct Replacement Program deep-bore tunnel. Following our telephone conversation of January 12, 2011, I now realize that no cultural resources survey (or report) will result from the use of this permitted facility. When my original response (December 23, 2010) to your request for an APE revision was written, I had no understanding that you did not plan to conduct a cultural resources survey. It was for this reason that the language regarding a cultural resources survey and report expectation remained in my letter.

If I understand your most recent correspondence correctly, WSDOT has no intention of conducting a cultural resources investigation because:

- 1) the Mats Mats facility is an existing and permitted facility, and
- 2) the planned activities have no potential to affect historic or archaeological resources.

I agree with your expectation and will not expect further documentation or investigation of cultural resources issues surrounding the use of the Mats Mats facility unless concerns are raised by concerned tribes or other consulting parties.

Thank you for your clarification and the opportunity to review and comment.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov



DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

Protect the Past, Shape the Future



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

February 2, 2011

Dr. Allyson Brooks
State Historic Preservation Officer (SHPO)
Department of Archaeology and Historic Preservation (DAHP)
PO Box 48343
Olympia, Washington 98504-8343

DAHP Log #: 051209-10-FHWA
Property: Alaskan Way Viaduct Replacement Project
Re: Section 106 Consulting Parties Technical Background Information

Dear Dr. Brooks:

Pursuant to 36 CFR 800.2(c)(1), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project. During our recent consulting party meeting on January 13, 2011, several consulting parties requested additional technical information be provided to them. Included with this letter you will find a DVD that includes this technical information in electronic format. You will also find a table of contents that provides you with the contents of the DVD as well as some additional information related to the technical information.

The DVD includes the following:

- 1) Proposed SR 99 Bored Tunnel – Assessment of Settlement Impacts to Buildings;
- 2) Individual Building Assessments of Historic Buildings;
- 3) Settlement Mitigation Report;
- 4) Cost Estimate Narrative;
- 5) Seattle Tunnel Partner's (STP) Technical Proposal; and,
- 6) STP's Deformation Mitigation Submittal.

As previously discussed at our meeting on January 13, 2011, this information is of a highly technical nature. For that reason, WSDOT has arranged for individuals who were involved in the production of these documents to provide a presentation for you at our upcoming meeting on February 15, 2011. These individuals will also be able to answer questions that you may have following your review of the enclosed documents. In the coming week, I will be sending out an agenda and more information concerning this meeting.

After you review the enclosed documents, please do contact me if you have any questions, concerns, or need for additional information. You can contact me at any time at 206.805.2887, email bartoyk@wsdot.wa.gov. You may also contact Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Table of Contents

Section 106 Consulting Parties Technical Background Info

- I. **Section 1: Pre-proposal Building Deformation Analyses** – assessments conducted by WSDOT and provided to the proposers during the bid period. Included in this section are:
 - a. Proposed SR 99 Bored Tunnel - Assessment of Settlement Impacts to Buildings
 - b. Individual Building Assessments of historic buildings - each folder contains the narrative assessment, the calculation sheet of estimated deformation, photographs, and where conducted additional analysis (Phase 3)
 - i. A110 - Archstone Belltown (includes Phase 3)
 - ii. A160 - 1 Yesler Bldg
 - iii. T086 - Fire Station No 2
 - iv. T230 - Grand Pacific-Colonial (includes Phase 3)
 - v. T231 - Watermark Tower - Colman Bldg (includes Phase 3)
 - vi. T234 - National Bldg (includes Phase 3)
 - vii. T235 - Arlington North (includes Phase 3 for T235, T236, and T237)
 - viii. T236 - Arlington South
 - ix. T237 - Alexis Hotel
 - x. T243 - Federal Office Bldg
 - xi. T251 - Polson Bldg
 - xii. T252 - Western Bldg (includes Planning Memorandum)
 - c. Settlement Mitigation Report – outlines pre-proposal plan for mitigating the potential effects of settlement
 - d. Cost estimate narrative describing the basis of the cost estimates
- II. **Section 2: Seattle Tunnel Partners (STP) Proposal** – STP’s winning proposal that is now part of the contract with WSDOT
 - a. STP Proposal (see next page for suggested reading)
 - b. STP Deformation Mitigation Submittal – this pre-proposal submittal includes STP’s estimate of deformation and assessment of impacts to Buildings, Other Structures (such as the Viaduct, Seattle Monorail, etc. and Utilities and provides their mitigation plan. It is considered part of the proposal.

Suggested reading in the STP Proposal:

1. **Section 2.1.3** - Approach to Addressing Constructability, Durability, Maintainability, and Environmental Protection
2. **Section 2.2** - Organization Structure and Key Personnel (particularly Table 2.2-1 STP Key Personnel)
3. **Section 2.4** - Expert Review Board (pp.8,11)
4. **Section 2.5** - Proactive Risk Planning (pp.10-13)
5. **Section 2.5** - Ground Vibration Risk Assessment (pp.24-26)
6. **Section 2.5.4** - Third Party Risks (pp.29-42)
7. **Section 5** - Excavation and Support of Bored Tunnel and Management of Ground Deformation Impacts
8. **Section 5.2.4** - Expected Tunnel Ground Loss
9. **Section 5.2.5** - TBM Monitoring System
10. **Section 5.2.6** - TBM Tail Void Grouting System
11. **Section 5.2.8** - TBM Break-in and Break-out (p.120-123 includes discussion of work in Barcelona at La Sagrada Familia)
12. **Section 5.2.9** - Other Innovation
13. **Section 5.4** - Structures and Utility Deformation Assumptions and Design Parameters
14. **Section 5.5** - Measures to Manage Deformation
15. **Section 6.4.3** - Managing Archaeological Investigations

16. **Appendix B** – Resumes of key personnel on the STP team

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Appendix U

Correspondence

Tribal Correspondence

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**Washington State
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December 8, 2009

Johnson Meninick
Confederated Tribes and Bands of the Yakama Nation
PO Box 151
Toppenish, WA 98948

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Johnson Meninick:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

WSDOT is preparing to undertake another phase of geotechnical coring to establish existing subsurface conditions along the proposed tunnel alignment. We previously sent you the geotechnical exploration plan for Phase 1 of this effort and notified you of the implementation of Phase 2 earlier this fall. The current coring represents Phase 3 of this effort. Attached to this letter, you will find location information for this Phase 3 coring effort.

WSDOT has retained the services of a cultural resources consultant to monitor extraction of the sonic core borings, which produce a continuous sample in contrast to the mud rotary borings which produce a split-spoon sedimentary sample. In addition to monitoring the consultant will examine and log the cores on-site, and segregate core sections they believe may contain information about the archaeological record for later analysis. Core sections of interest will be moved to a laboratory where sediments will be described and screened to recover any cultural materials. The data collected will be used to supplement previous coring efforts and help plan future coring locations, specifically for archaeology, and to plan for future archaeological investigations within the project's Area of Potential Effects.

If you would be interested in observing this process, please do not hesitate to contact me so that we can arrange a time when the field operations are underway. We would appreciate hearing your comments, and will answer any questions or concerns you may have related to the coring program.

Should you have questions or concerns please contact me at 206.716.1121, email bartoyk@wsdot.wa.gov, or Allison Hanson (Environmental Services Director for Mega-Projects) at 206.382.5279, email hansona@wsdot.wa.gov.

Sincerely,

Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

Enclosure: Proposed Phase 3 Boring Plan Maps (5 pages)

cc: Matt Sterner, DAHP, w/ enclosure
Randy Everett, FHWA w/ enclosure
Allison Hanson, WSDOT w/ enclosure
Scott Williams, WSDOT w/ enclosure
Megan Beeby, WSDOT w/ enclosure



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December 8, 2009

Cecile Hansen
Duwamish Tribe
4717 W. Marginal Way
Seattle, WA 98106-1514

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Chairwoman Hansen:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

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December 8, 2009

Laura Murphy
Muckleshoot Indian Tribe
39015 172nd Avenue SE
Auburn, WA 98092

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Laura Murphy:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

WSDOT is preparing to undertake another phase of geotechnical coring to establish existing subsurface conditions along the proposed tunnel alignment. We previously sent you the geotechnical exploration plan for Phase 1 of this effort and notified you of the implementation of Phase 2 earlier this fall. The current coring represents Phase 3 of this effort. Attached to this letter, you will find location information for this Phase 3 coring effort.

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Sincerely,

Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

Enclosure: Proposed Phase 3 Boring Plan Maps (5 pages)

cc: Matt Sterner, DAHP, w/ enclosure
Randy Everett, FHWA w/ enclosure
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Megan Beeby, WSDOT w/ enclosure



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December 8, 2009

Ray Mullen
Snoqualmie Nation
PO Box 969
8130 Railroad Avenue, Suite 103
Snoqualmie, WA 98065

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Ray Mullen:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

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December 8, 2009

Cindy Spiry
Snoqualmie Nation
PO Box 969
8130 Railroad Avenue, Suite 103
Snoqualmie, WA 98065

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Cindy Spiry:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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WSDOT Cultural Resources Specialist
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December 8, 2009

Dennis Lewarch
The Suquamish Tribe
PO Box 498
Suquamish , WA 98392

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Dennis Lewarch:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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Kevin M. Bartoy
WSDOT Cultural Resources Specialist
ESO Mega Projects

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December 8, 2009

Tim Brewer
Tulalip Tribes
7515 Totem Beach Road
Tulalip, WA 98271-9694

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Tim Brewer:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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WSDOT Cultural Resources Specialist
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December 8, 2009

Hank Gobin
Tulalip Tribes
7515 Totem Beach Road
Tulalip, WA 98271-9694

Re: Update on Geotechnical Coring Work for Alaskan Way Viaduct Replacement Project

Dear Hank Gobin:

The Washington State Department of Transportation (WSDOT), in cooperation with the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2).

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Kevin M. Bartoy
WSDOT Cultural Resources Specialist
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February 5, 2010

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, Washington 98106

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairwoman Hansen:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2). Recent value engineering efforts have led to a redesign of the north and south portal locations as well as the alignment for the proposed bored tunnel. WSDOT, on behalf of FHWA, seeks your comment on the revised Area of Potential Effects (APE), which reflects the adjusted tunnel alignment.

Attachment 1, titled "Area of Potential Effects," illustrates the revised APE, including potential staging areas. The horizontal APE, which extends one block on each side of the bored tunnel route, has not changed substantially; the primary adjustment is on the north end of the APE, which now incorporates more of the Belltown neighborhood. The vertical APE at the north and south ends of the tunnel where cut-and-cover trenches will be excavated for the tunnel boring machine (TBM) includes the entirety of the tunnel right-of-way from the ground surface to its maximum depth of excavation. Above the bored tunnel, the vertical APE extends from the ground surface to the upper five feet of Pleistocene deposits.

Attachment 2, titled "SR 99 DEIS-2 Configuration," illustrates the new portal locations and tunnel alignment as well as a profile of the proposed bored tunnel.

WSDOT respectfully requests your review and comment by March 10, 2010. Comments can be sent to Kevin Bartoy and his contact information is below.

Should you have questions or concerns please contact Kevin Bartoy (WSDOT Cultural Resources Specialist) at 206.491.9242, email bartoyk@wsdot.wa.gov, or Allison Hanson (Environmental Services Director for Mega Projects) at 206.382.5279, email hansonall@wsdot.wa.gov.

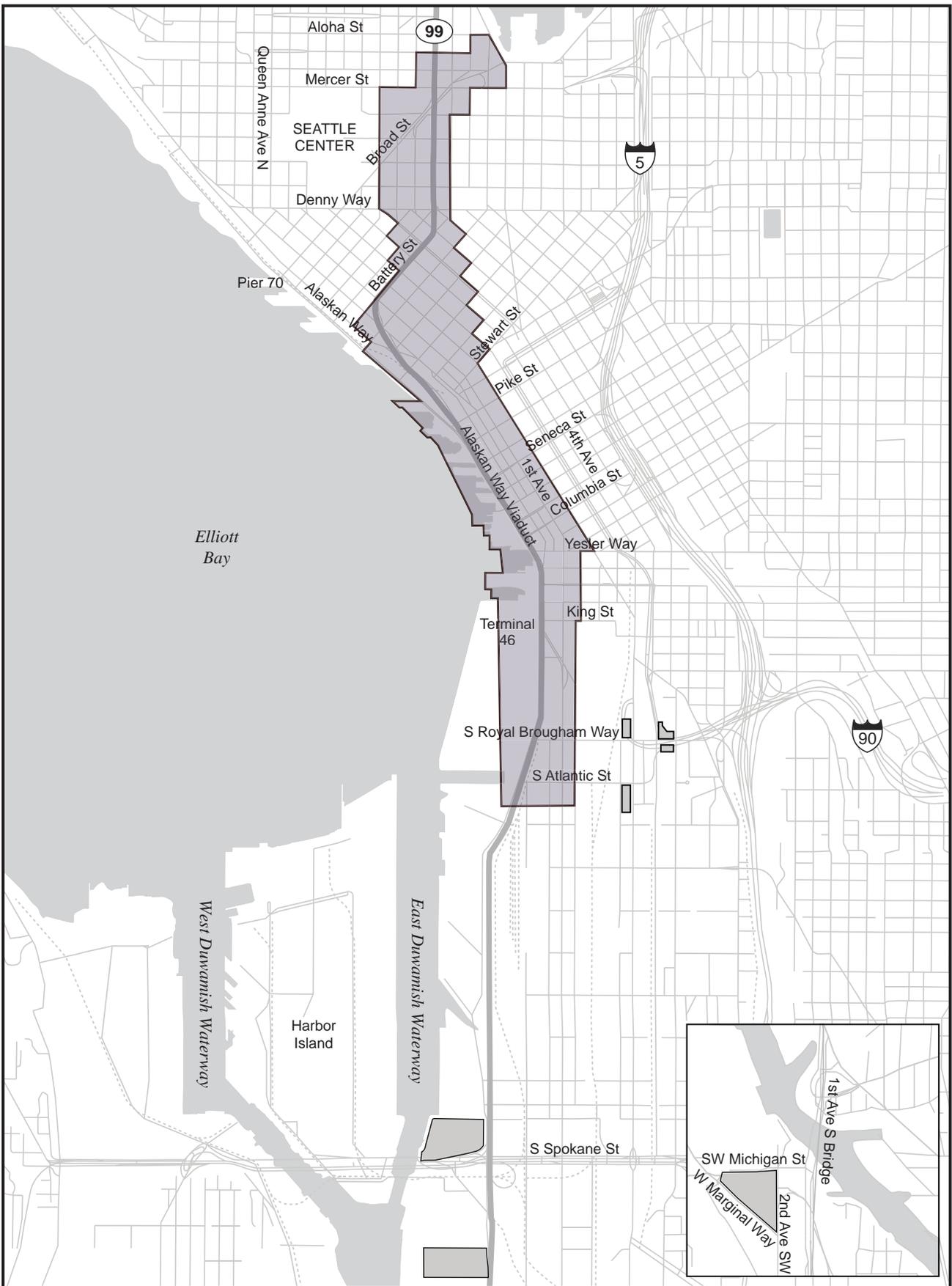
Sincerely,

Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Attachment 1. Map of Area of Potential Effects

Attachment 2. SR 99 DEIS-2 Configuration

cc. Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure



554-1585-030/CC(07) 1/28/10

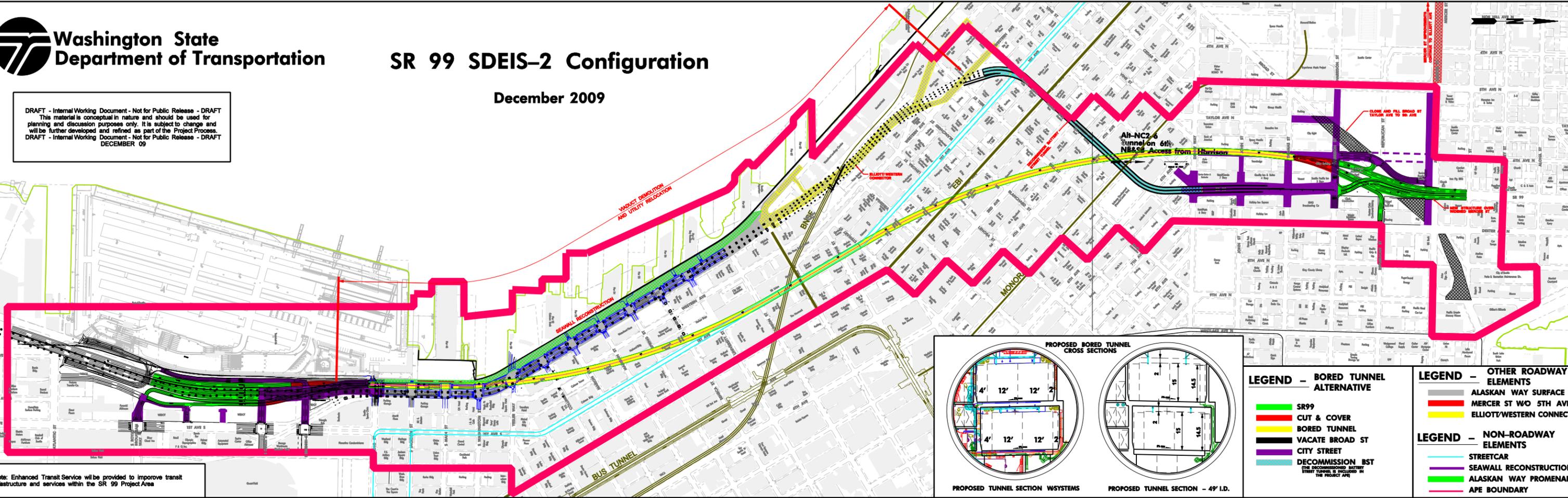


Area of Potential Effect

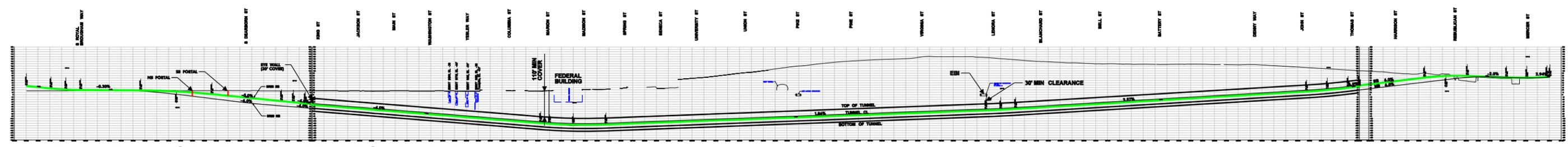
SR 99 SDEIS-2 Configuration

December 2009

DRAFT - Internal Working Document - Not for Public Release - DRAFT
 This material is conceptual in nature and should be used for planning and discussion purposes only. It is subject to change and will be further developed and refined as part of the Project Process.
 DRAFT - Internal Working Document - Not for Public Release - DRAFT
 DECEMBER 09



Note: Enhanced Transit Service will be provided to improve transit infrastructure and services within the SR 99 Project Area



TUNNEL PROFILE - DRAFT DEC 21 2009

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 DECEMBER 09



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-521-5628/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

February 5, 2010

Honorable Charlotte Williams
Muckleshoot Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairwoman Williams:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2). Recent value engineering efforts have led to a redesign of the north and south portal locations as well as the alignment for the proposed bored tunnel. WSDOT, on behalf of FHWA, seeks your comment on the revised Area of Potential Effects (APE), which reflects the adjusted tunnel alignment.

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WSDOT respectfully requests your review and comment by March 10, 2010. Comments can be sent to Kevin Bartoy and his contact information is below.

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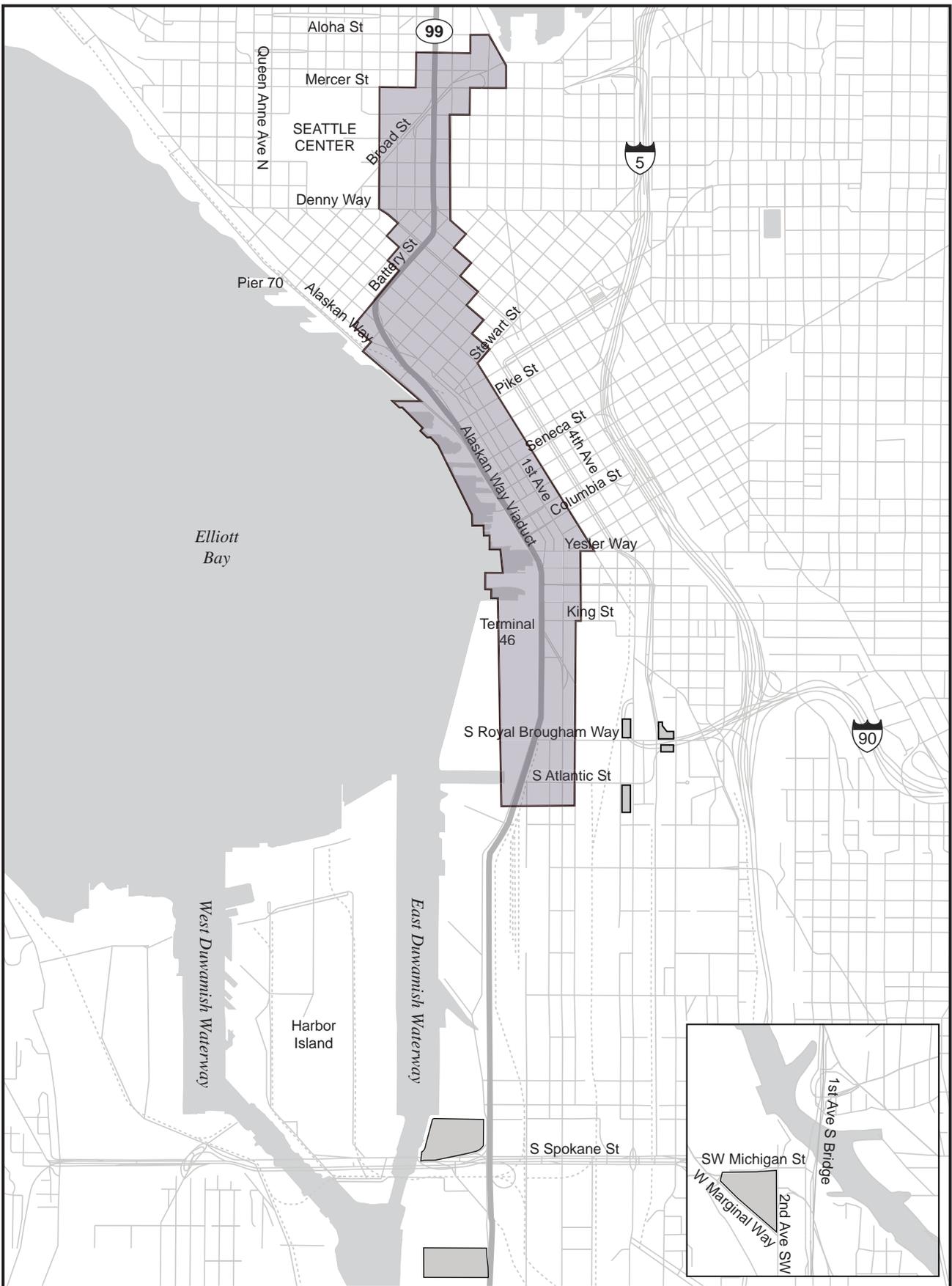
Sincerely,

Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

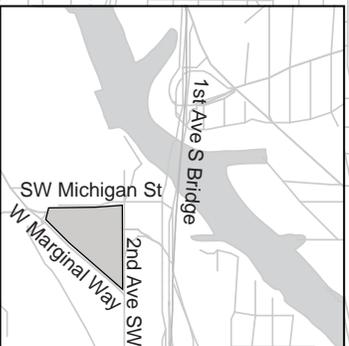
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cc. Laura Murphy, Muckleshoot Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure



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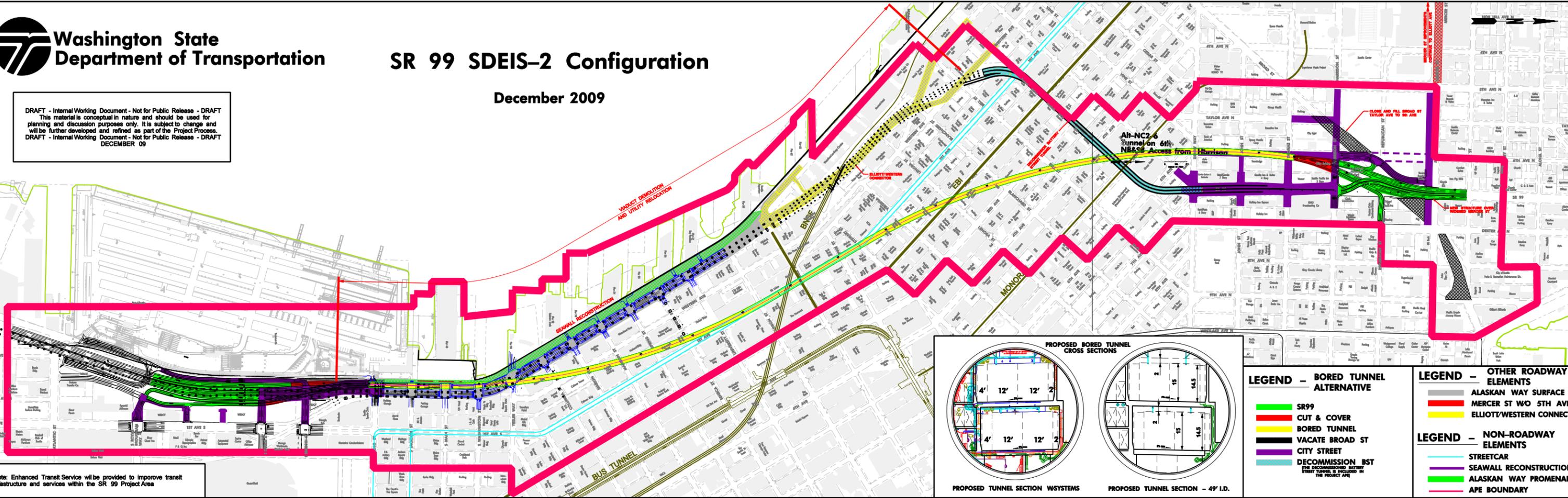


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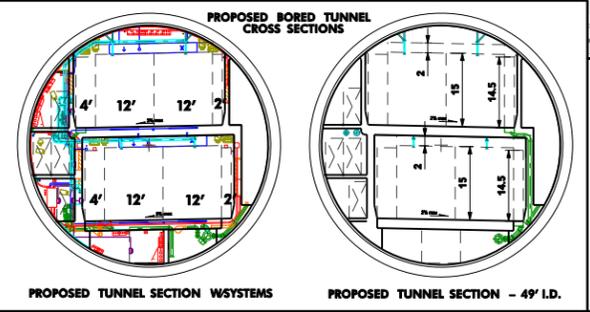
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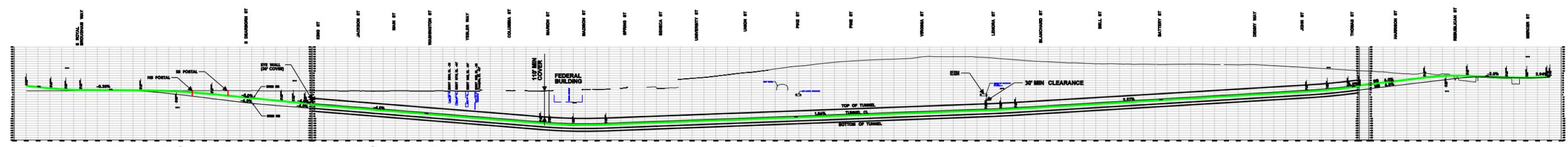
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February 5, 2010

Honorable Joseph Mullen
Snoqualmie Tribe
PO Box 969
Snoqualmie, Washington 98065

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairman Mullen:

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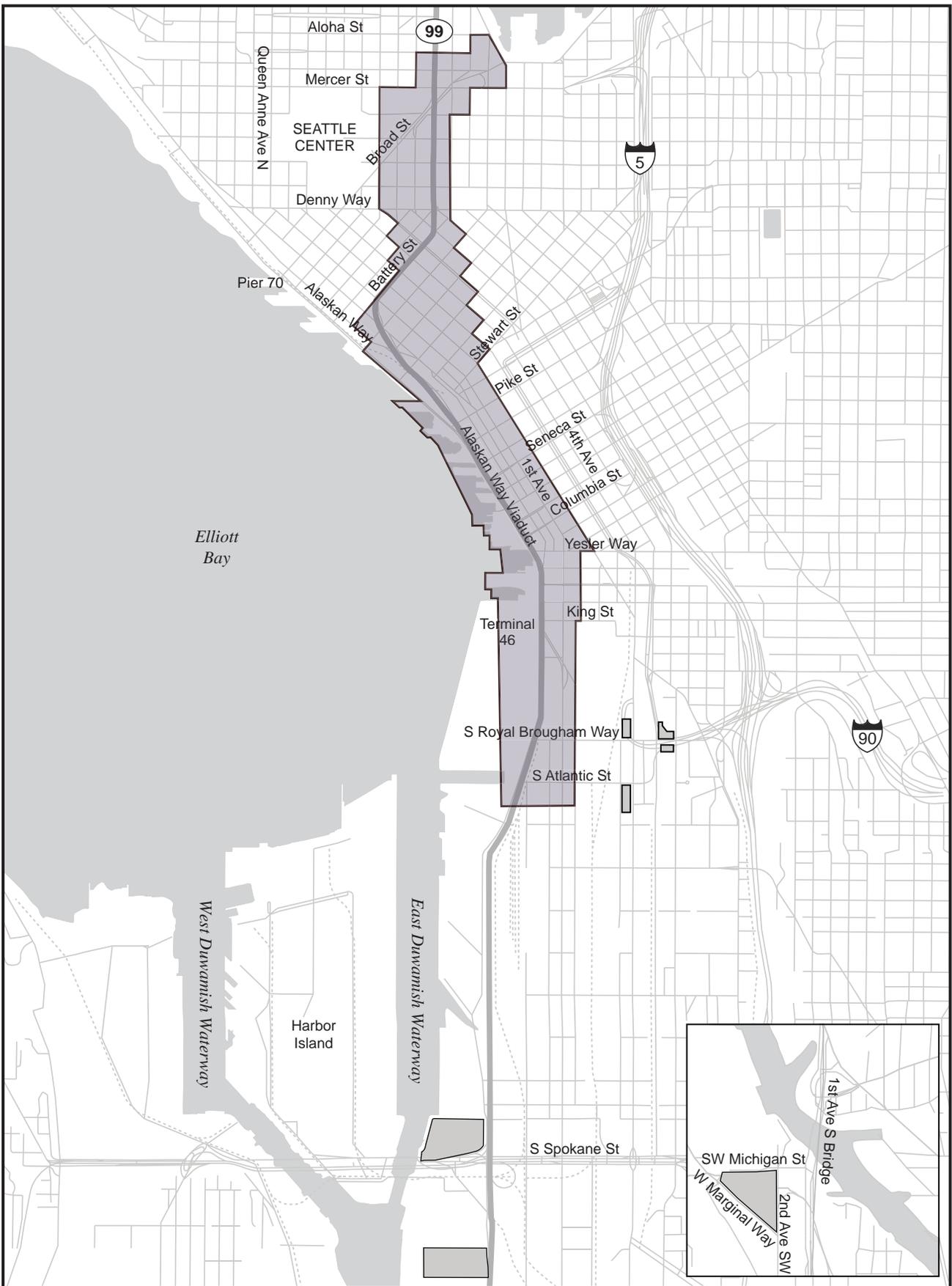
Sincerely,

Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

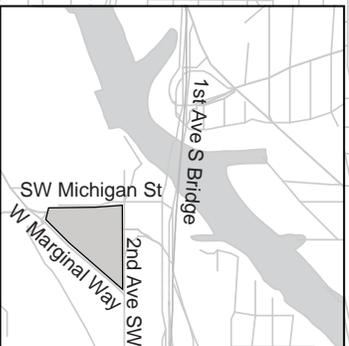
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cc. Ray Mullen, Snoqualmie Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
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Scott Williams, WSDOT w/o enclosure
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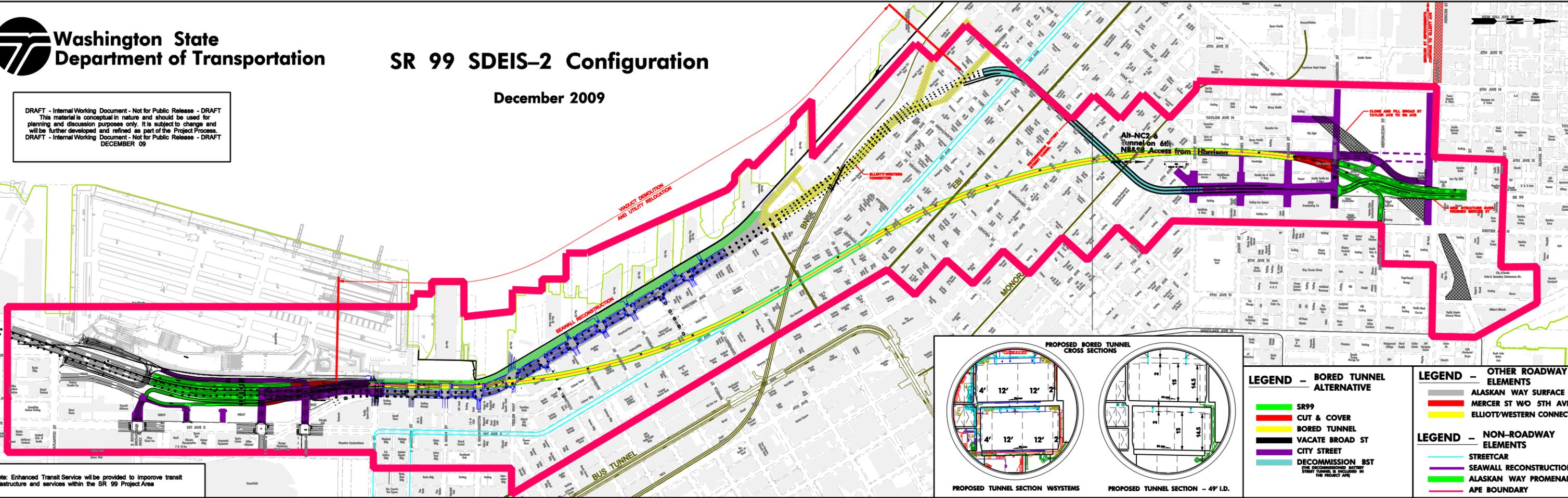


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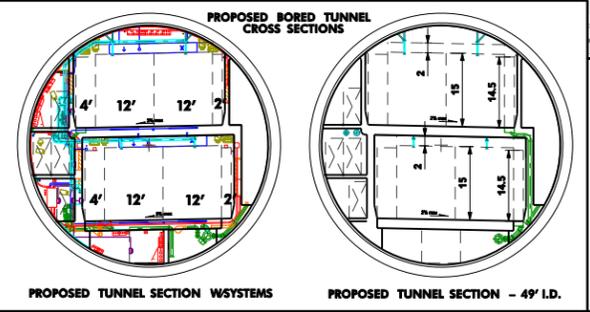
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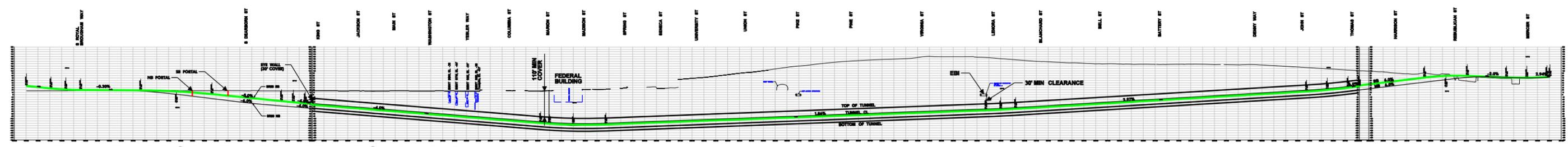
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February 5, 2010

Honorable Leonard Forsman
Suquamish Tribe
PO Box 498
Suquamish, Washington 98292

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairman Forsman:

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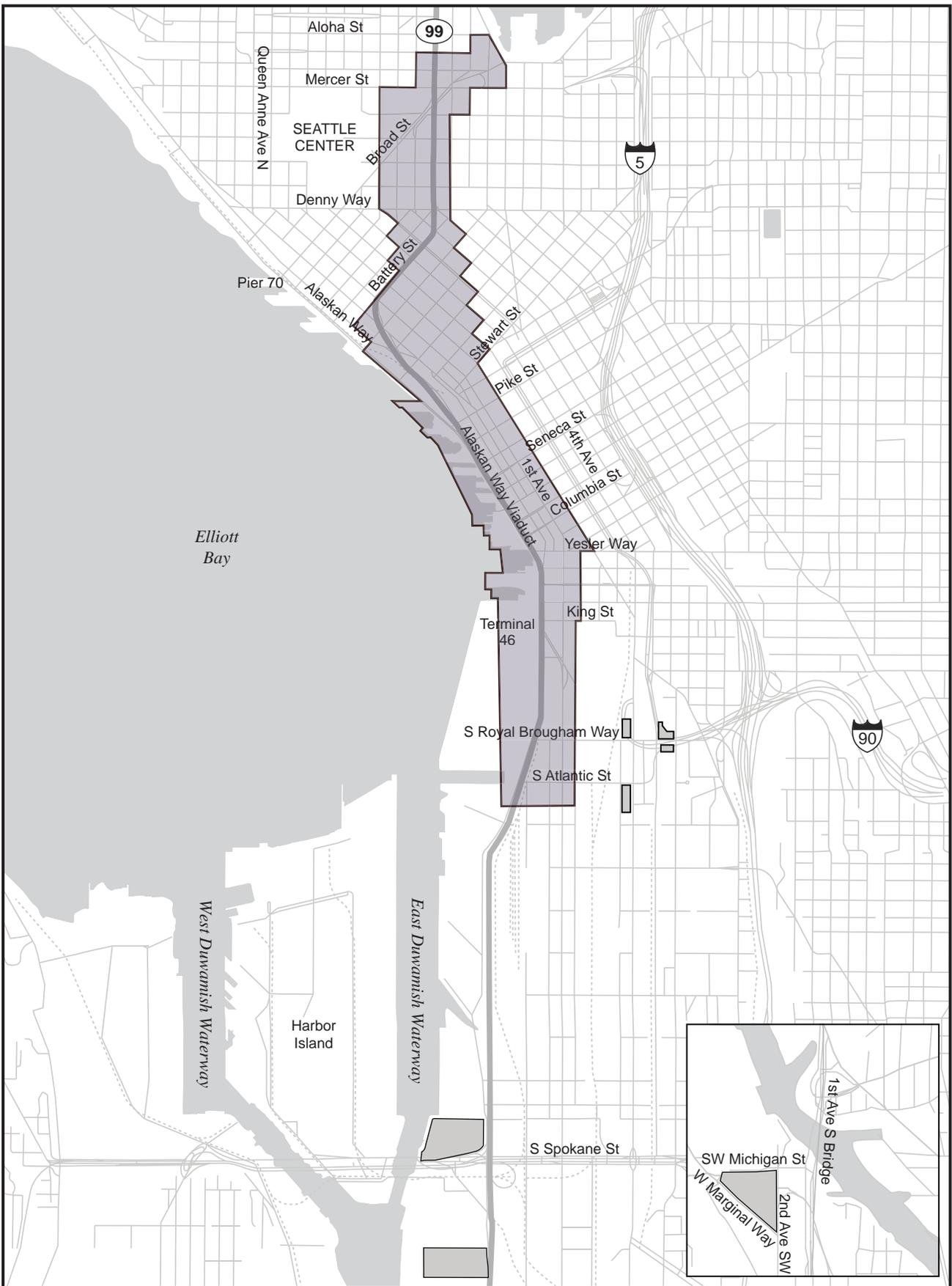
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Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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cc. Dennis Lewarch, Suquamish Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
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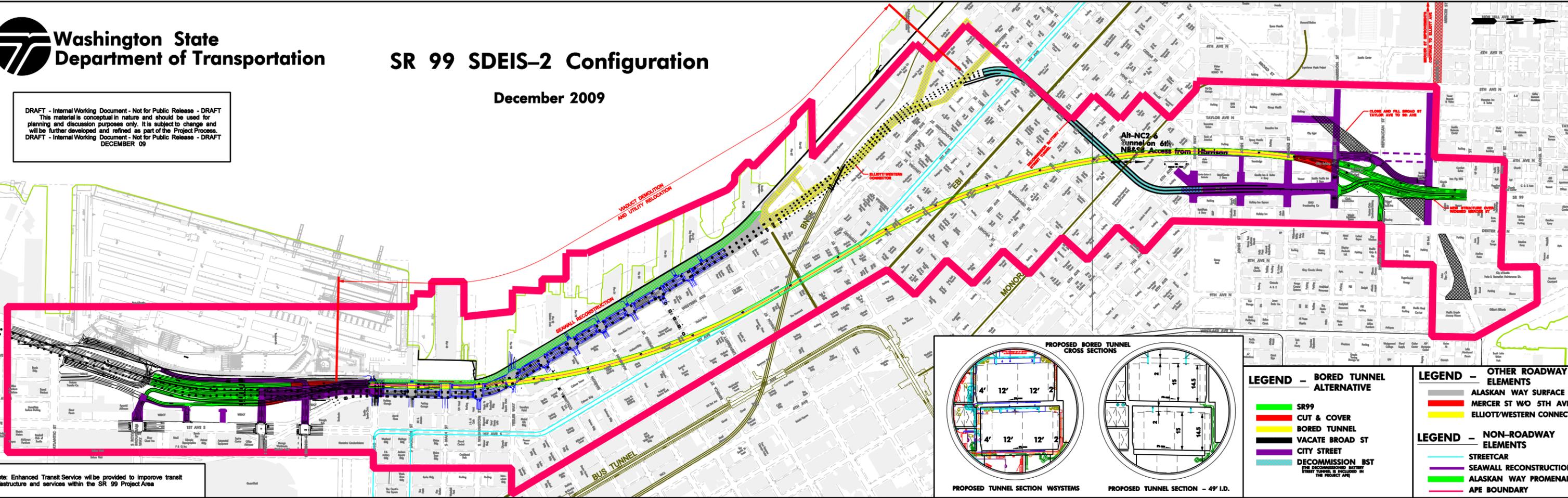


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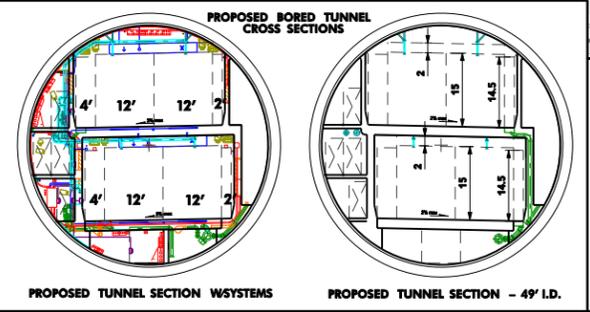
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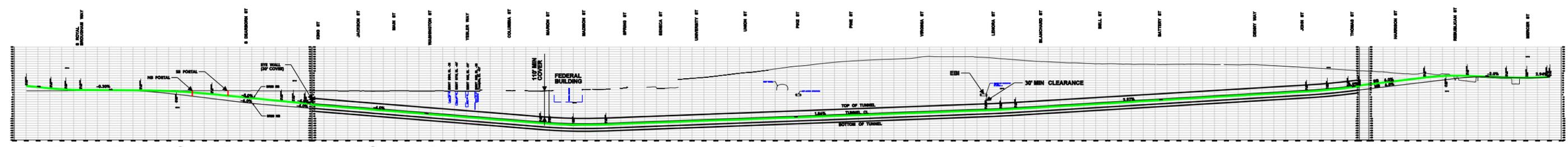
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February 5, 2010

Honorable Melvin R. Sheldon
Tulalip Tribes
6406 Marine Drive
Tulalip, Washington 98271

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairman Sheldon:

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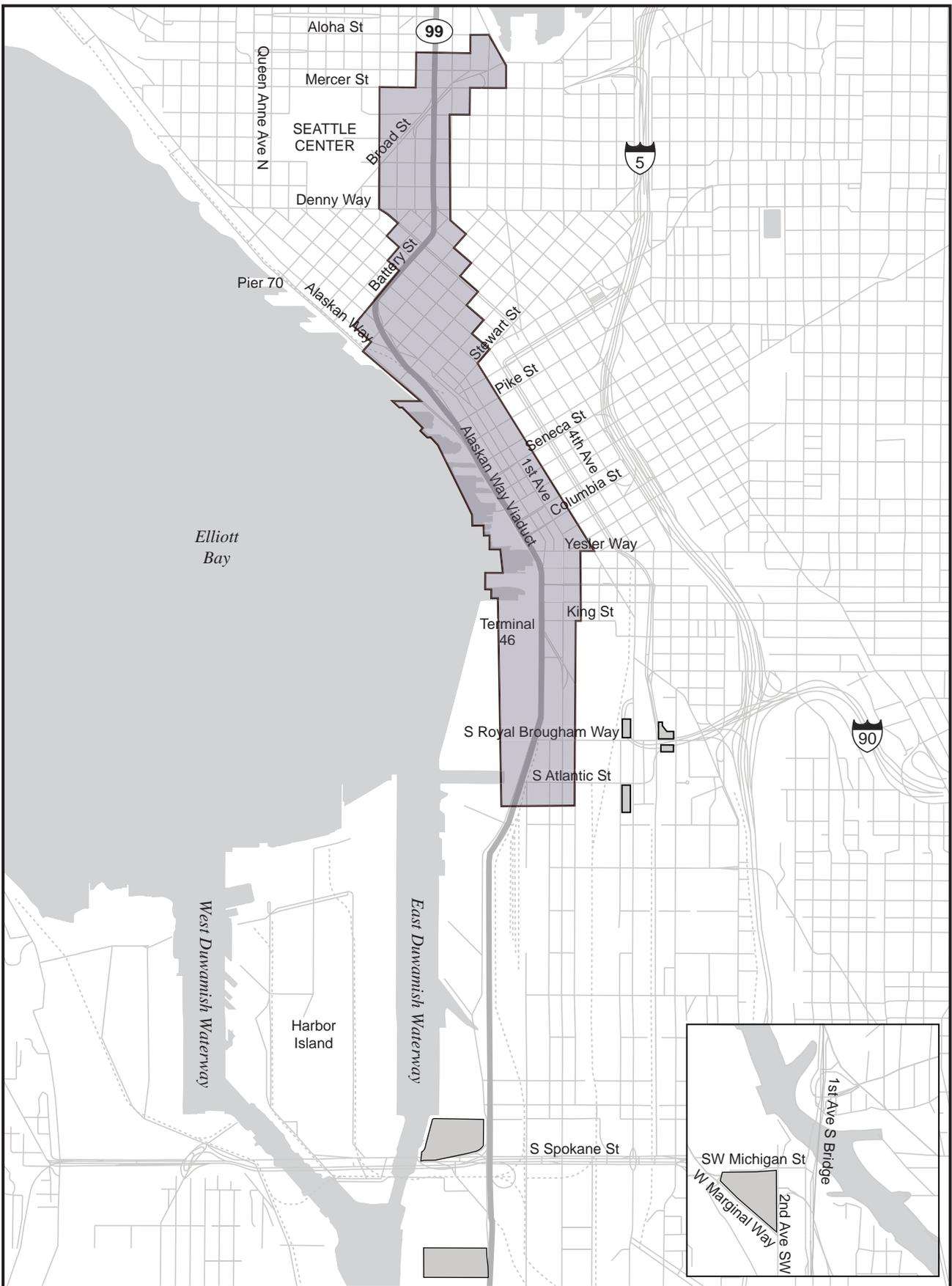
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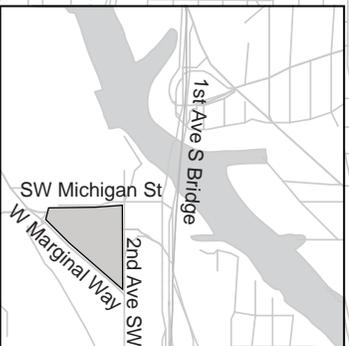
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Timothy Brewer, Tulalip Tribes w/ enclosure
Richard Young, Tulalip Tribes w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
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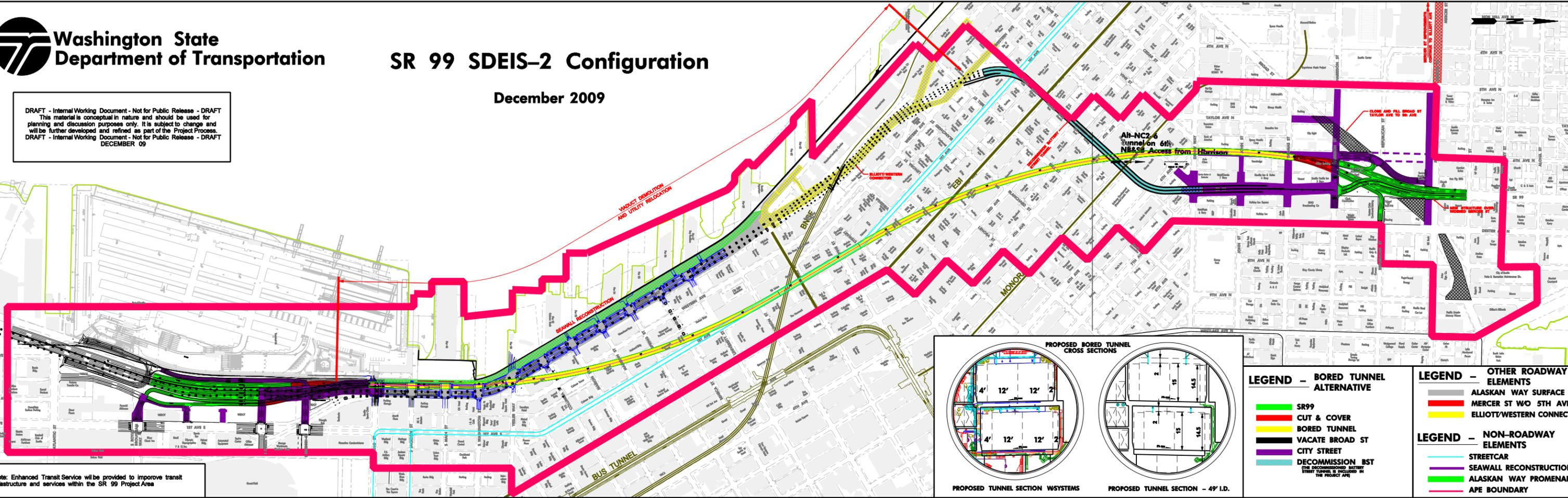


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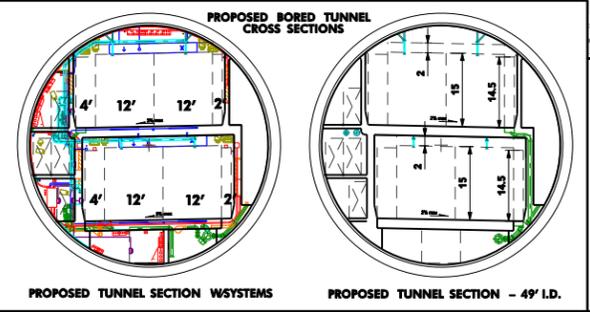
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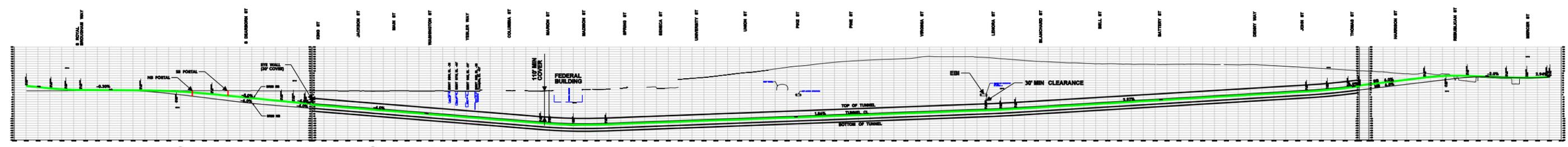
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February 5, 2010

Honorable Ralph Sampson, Jr.
Yakama Nation
PO Box 151
Toppenish, Washington 98948

Re: Comment Request for Revised Area of Potential Effects (APE) for Alaskan Way Viaduct Bored Tunnel Alternative

Dear Chairman Sampson:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2(c)(2). Recent value engineering efforts have led to a redesign of the north and south portal locations as well as the alignment for the proposed bored tunnel. WSDOT, on behalf of FHWA, seeks your comment on the revised Area of Potential Effects (APE), which reflects the adjusted tunnel alignment.

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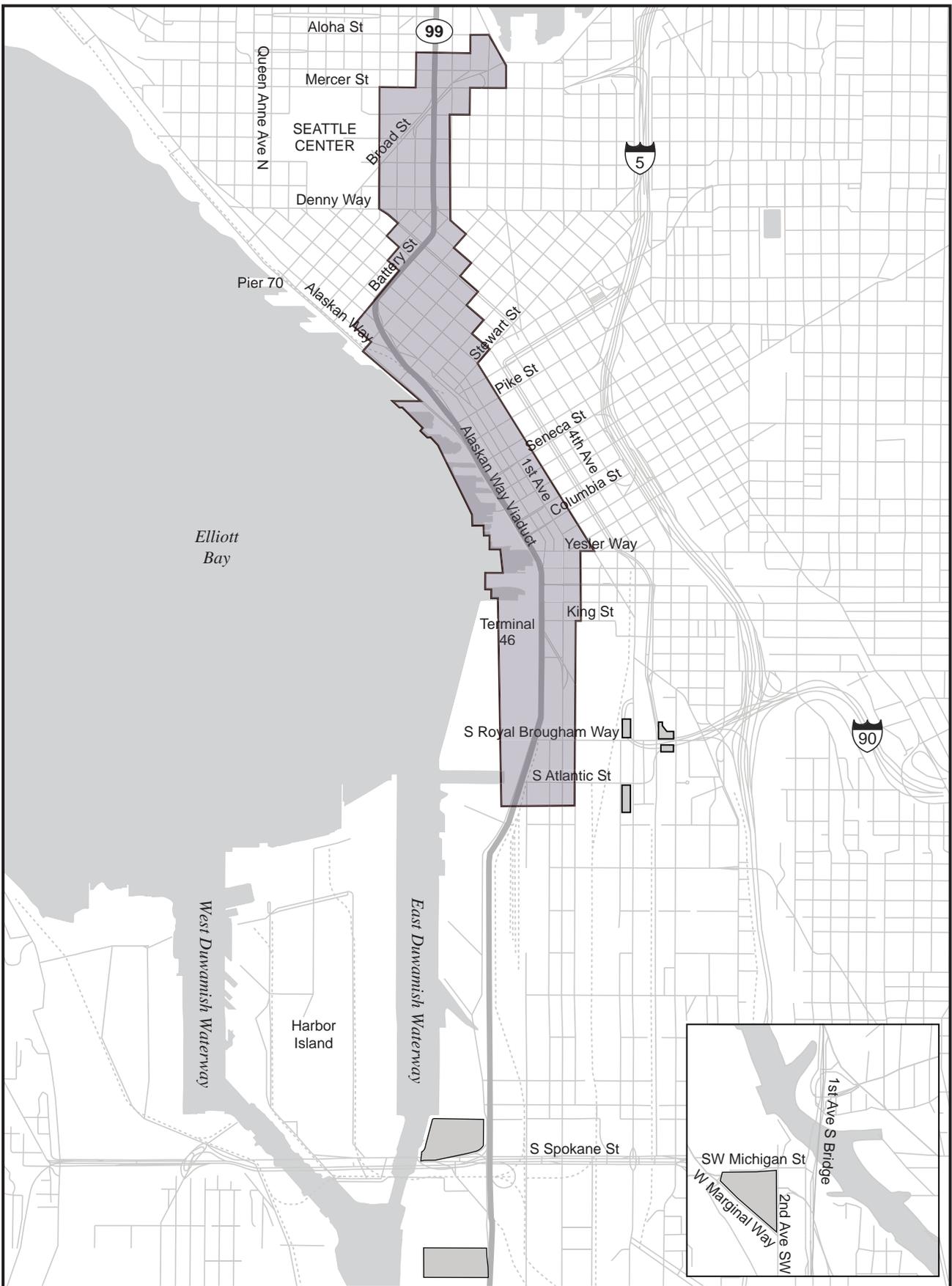
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Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
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Area of Potential Effect



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May 5, 2010

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, WA 98106

**Re: Comment Request for Revised Area of Potential Effect (APE) for Alaskan
Way Viaduct Replacement Project Bored Tunnel Alternative**

Dear Chairwoman Hansen:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2 (c)(2) of the National Historic Preservation Act.

We are writing to inform you that we have revised the Area of Potential Effects (APE) for this project in order to consider potential above-ground effects associated with the decommissioning of the Battery Street Tunnel (BST). The decommissioning will use crushed rubble recycled from the existing Viaduct to fill the tunnel approximately two-thirds full. Then, low-strength concrete slurry will be pumped in from above to solidify the tunnel. Businesses and residents may experience short-term effects from truck traffic due to this activity, but no long-term effects are expected.

The enclosed graphic illustrates the revised APE, including potential staging areas. We are currently working on identifying historic properties within the revised APE, and will then consider the undertaking's effects on historic properties. This analysis will be presented in the Cultural Resources Discipline Report, which will be available for review and comment later this spring. Upon submittal of the report, we will be coordinating with the Section 106 consulting parties and scheduling a meeting to provide an overview of the project and a venue for questions and comments.

Thank you for your ongoing interest and participation in this undertaking. We look forward to continuing consultation with you, and will provide you with a copy of the Cultural Resources Discipline Report when it becomes available. In the meantime, if you

have questions, comments or concerns please contact Kevin Bartoy, WSDOT Cultural Resources Specialist, at 206-521-5628, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Services Director for Mega Projects) at 206-282-5279, email hansona@wsdot.wa.gov.

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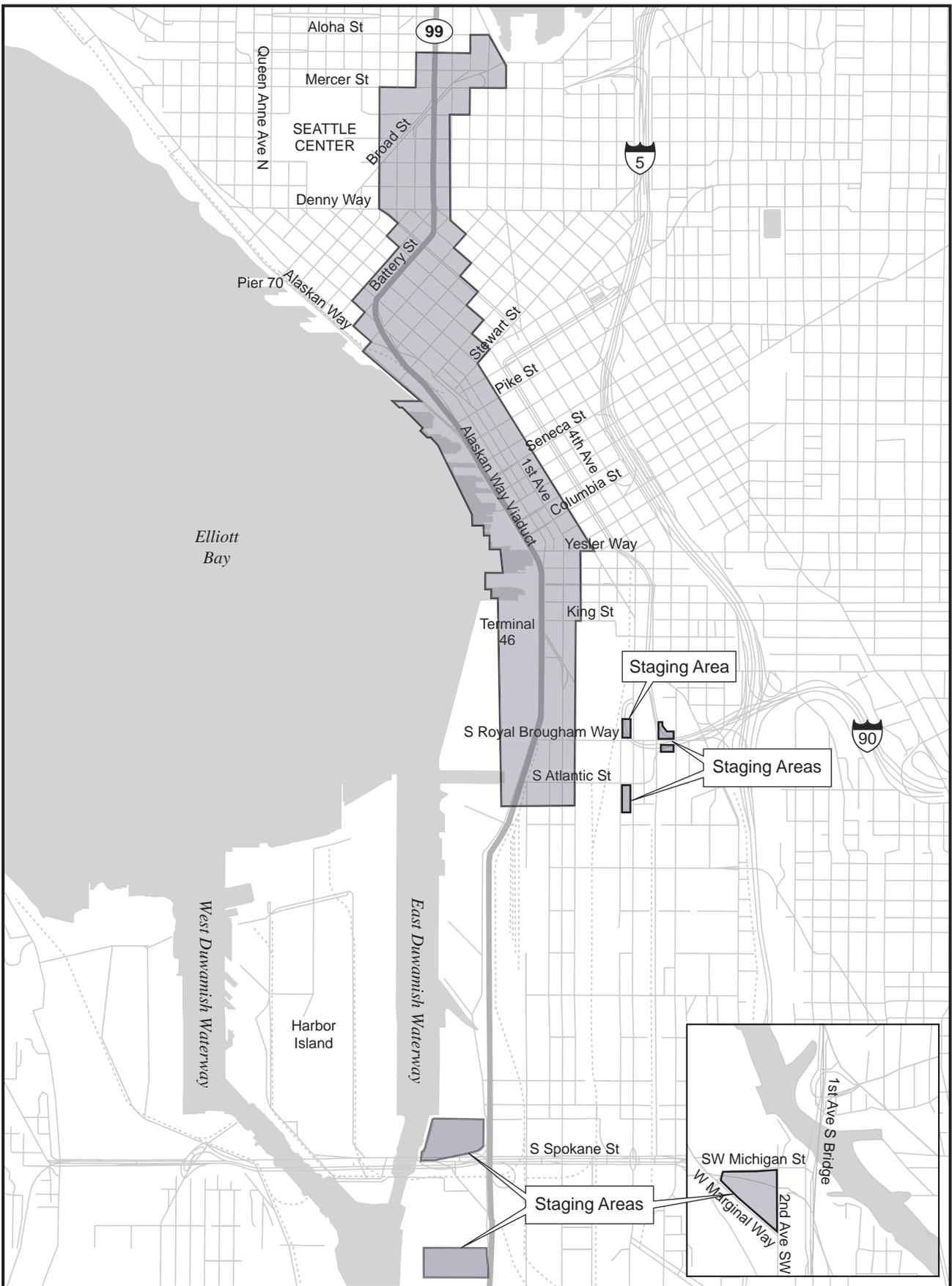


Ron Paananen

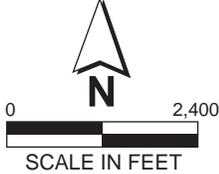
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Alaskan Way Viaduct and Seawall Replacement Program

cc: Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
Allison Hanson, WSDOT



554-1585-030/CC(07) 3/31/10



**Alaskan Way Viaduct
Replacement Project
Area of Potential Effect**



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May 5, 2010

Honorable Charlotte Williams
Muckleshoot Tribe
39015 172nd Avenue SE
Auburn, WA 98092

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Thank you for your ongoing interest and participation in this undertaking. We look forward to continuing consultation with you, and will provide you with a copy of the Cultural Resources Discipline Report when it becomes available. In the meantime, if you

have questions, comments or concerns please contact Kevin Bartoy, WSDOT Cultural Resources Specialist, at 206-521-5628, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Services Director for Mega Projects) at 206-282-5279, email hansona@wsdot.wa.gov.

Sincerely,

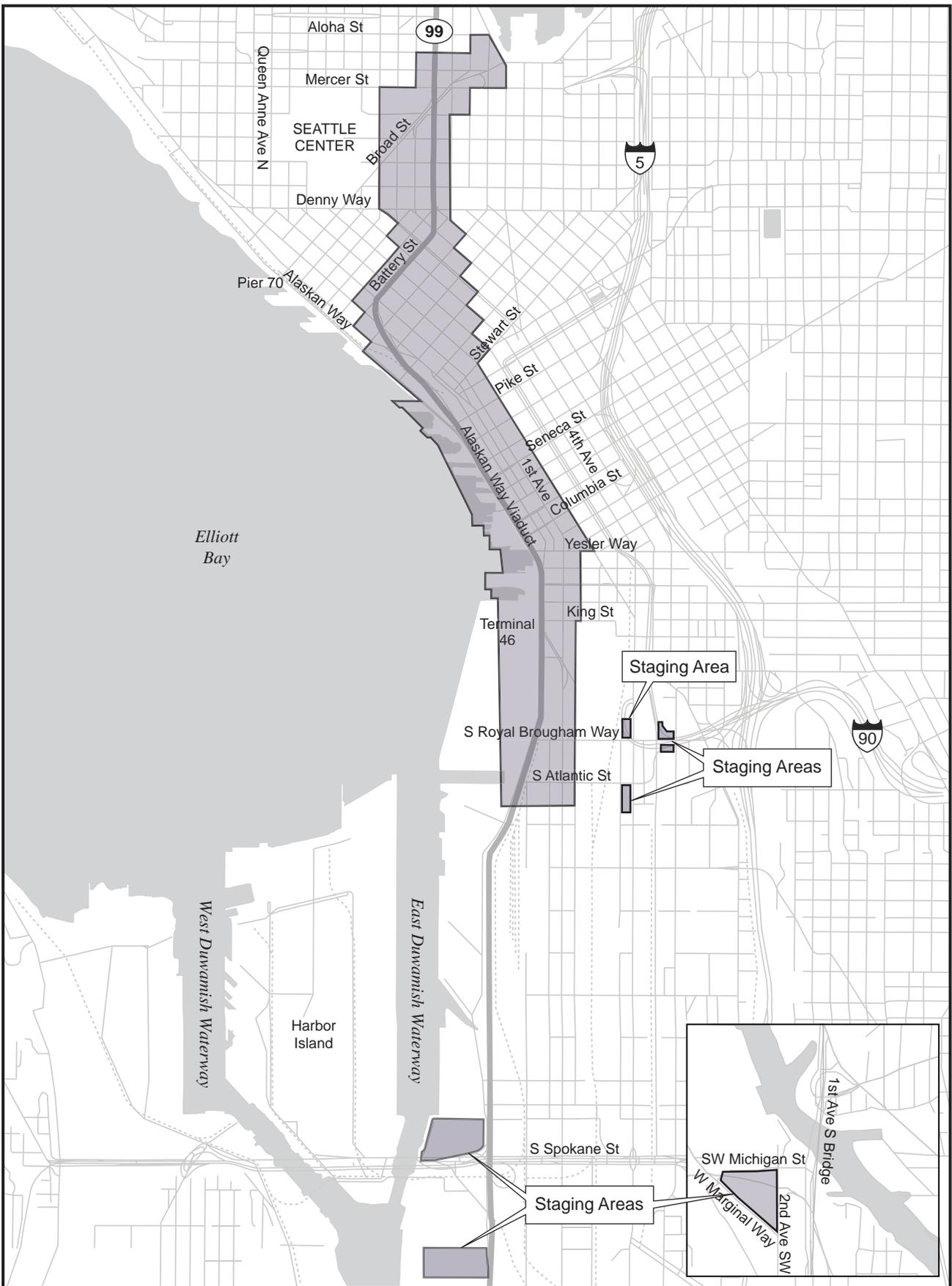


Ron Paanahen

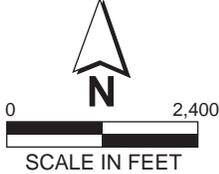
Administrator

Alaskan Way Viaduct and Seawall Replacement Program

cc: Laura Murphy, Muckleshoot Tribe
Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
Allison Hanson, WSDOT



554-1585-030/CC(07) 3/31/10



**Alaskan Way Viaduct
Replacement Project
Area of Potential Effect**



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
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Seattle, WA 98104
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www.wsdot.wa.gov

May 5, 2010

Honorable Joseph Mullen
Snoqualmie Tribe
PO Box 969
Snoqualmie, WA 98065

**Re: Comment Request for Revised Area of Potential Effect (APE) for Alaskan
Way Viaduct Replacement Project Bored Tunnel Alternative**

Dear Chairman Mullen:

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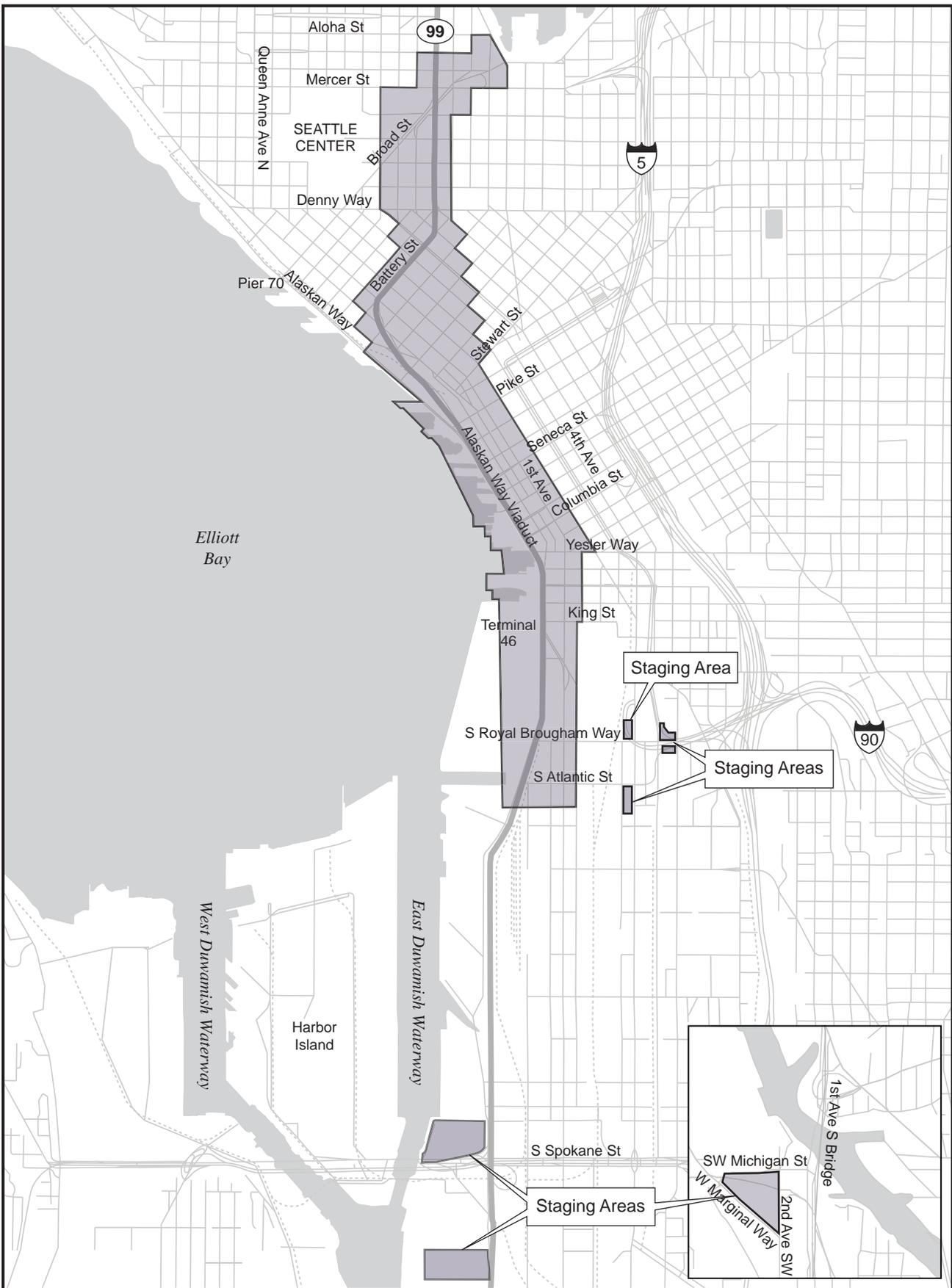


Ron Paananen

Administrator

Alaskan Way Viaduct and Seawall Replacement Program

cc: Ray Mullen, Snoqualmie Tribe
Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
Allison Hanson, WSDOT



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May 5, 2010

Honorable Leonard Forsman
Suquamish Tribe
PO Box 498
Suquamish, WA 98292

**Re: Comment Request for Revised Area of Potential Effect (APE) for Alaskan
Way Viaduct Replacement Project Bored Tunnel Alternative**

Dear Chairman Forsman:

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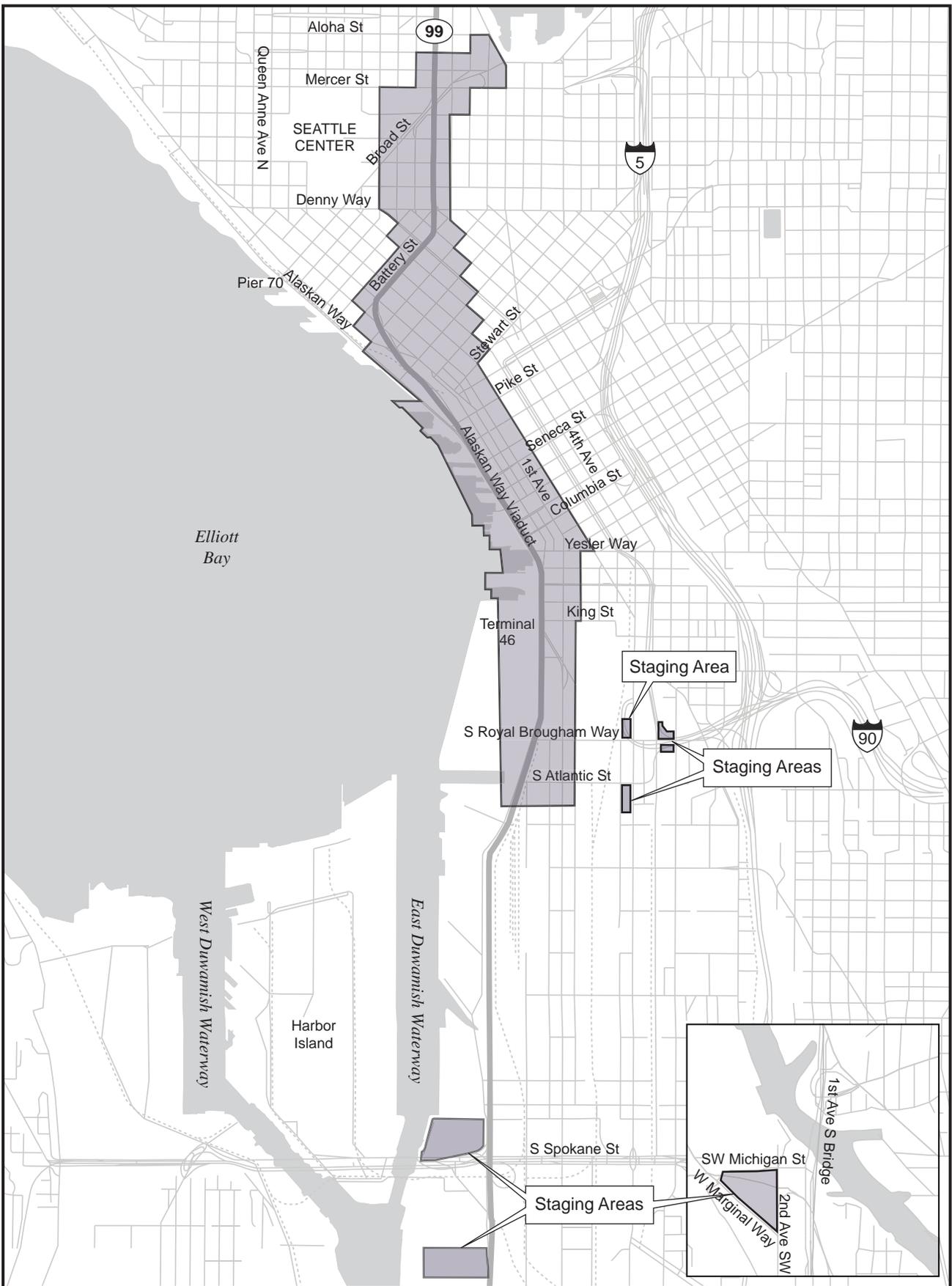


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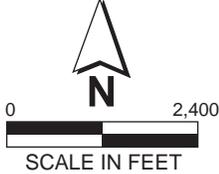
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Alaskan Way Viaduct and Seawall Replacement Program

cc: Dennis Lewarch, Suquamish Tribe
Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
Allison Hanson, WSDOT



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May 5, 2010

Honorable Melvin R. Sheldon
Tulalip Tribe
6406 Marine Drive
Tulalip, WA 98271

**Re: Comment Request for Revised Area of Potential Effect (APE) for Alaskan
Way Viaduct Replacement Project Bored Tunnel Alternative**

Dear Chairman Sheldon:

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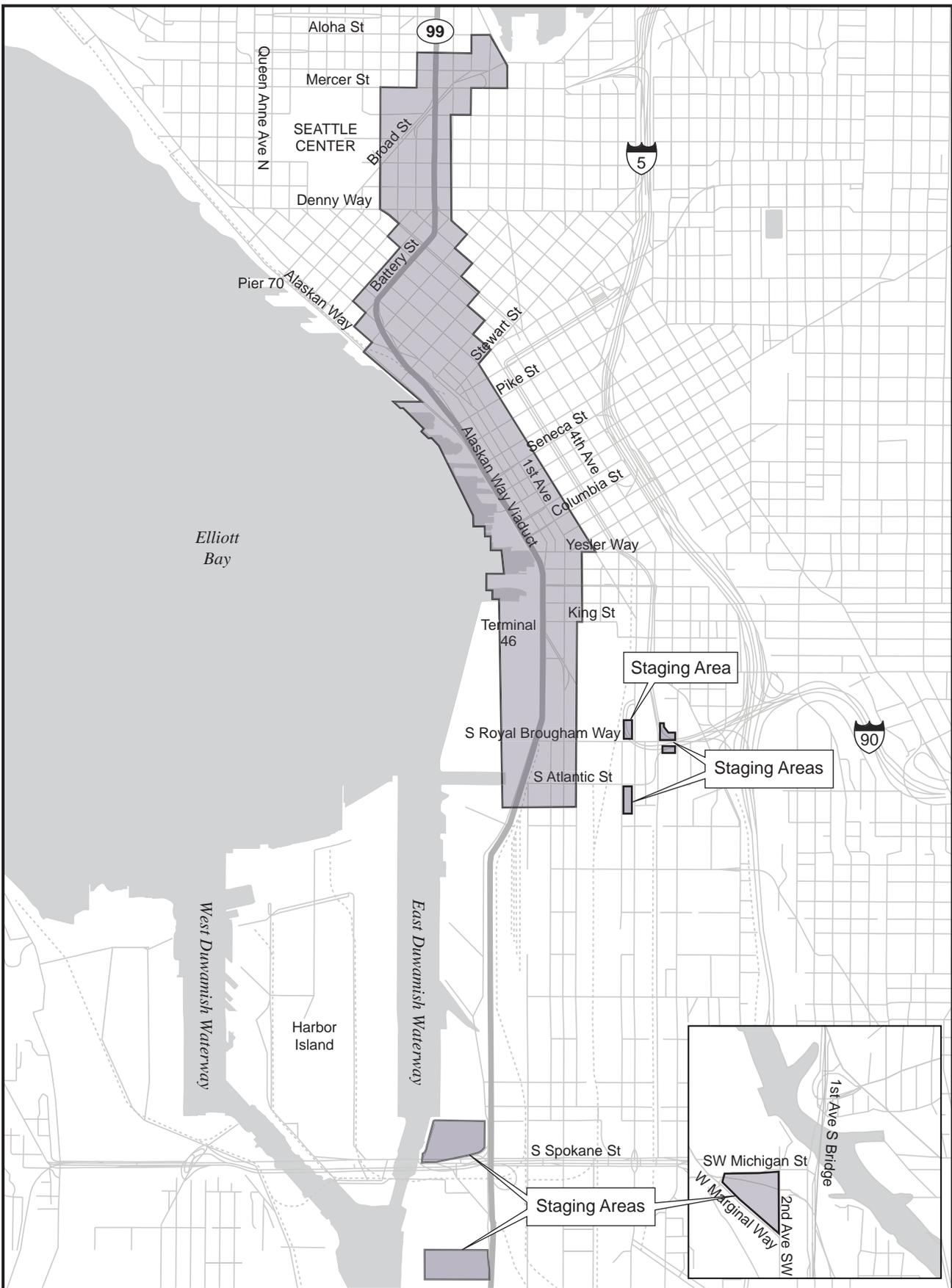


Ron Paananen

Administrator

Alaskan Way Viaduct and Seawall Replacement Program

cc: Hank Gobin, Tulalip Tribes
Timothy Brewer, Tulalip Tribes
Richard Young, Tulalip Tribes
Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
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May 5, 2010

Honorable Ralph Sampson, Jr.
Yakama Nation
PO Box 151
Toppenish, WA 98948

**Re: Comment Request for Revised Area of Potential Effect (APE) for Alaskan
Way Viaduct Replacement Project Bored Tunnel Alternative**

Dear Chairman Sampson:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation on the Alaskan Way Viaduct Replacement Project in downtown Seattle, pursuant to 36 CFR 800.2 (c)(2) of the National Historic Preservation Act.

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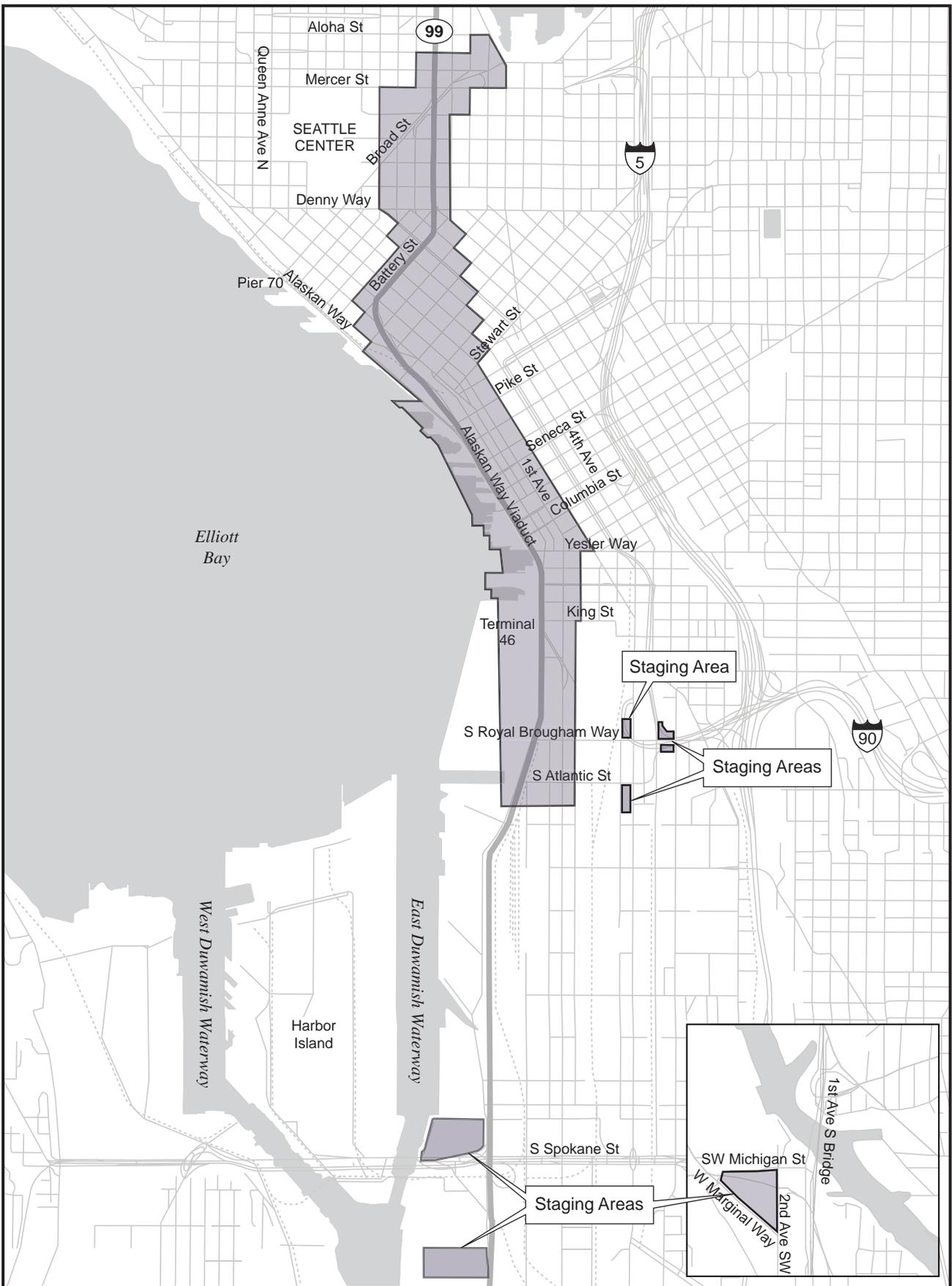


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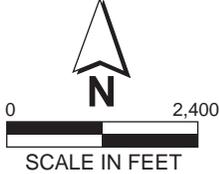
Administrator

Alaskan Way Viaduct and Seawall Replacement Program

cc: Johnson Meninick, Yakama Nation
Randy Everett, FHWA
Matthew Sterner, DAHP
Scott Williams, WSDOT
Kevin Bartoy, WSDOT
Allison Hanson, WSDOT



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**Washington State
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May 24, 2010

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, Washington 98106

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
for Second Supplemental Draft Environmental Impact Statement (SDEIS)**

Dear Chairwoman Hansen:

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. WSDOT is preparing a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative.

Pursuant to 36 CFR 800.8(c) and 40 CFR 1502.25(a), you will find attached a copy of the draft historic, cultural, and archaeological resources discipline report (Attachment 1) prepared for inclusion in the second SDEIS, which is currently scheduled to be published in October 2010. We seek your review and comment on this document.

The Alaskan Way Viaduct Replacement Project presents unique challenges in regards to historic properties given that access to archaeological resources is restricted by depth below surface, ground water, existing infrastructure, requirements of existing transportation, the need to maintain existing utility service, and the proposed methods of construction. In addition to these challenges, a portion of the project is design-build, which integrates the final design and the construction phases. For these reasons, we are conducting a phased process for the identification and evaluation of historic properties as specified 36 CFR 800.4(b)(2).

Pursuant to 36 CFR 800.4(b)(2), the attached historic, cultural, and archaeological resources discipline report establishes "the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation." In continued consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties, we intend to develop a memorandum of agreement (MOA) pursuant to 36 CFR 800.6. The eventual MOA will resolve identified adverse effects as well as potential adverse effects identified if the Bored Tunnel Alternative is the selected alternative in the Record of Decision.

As part of the cultural resources investigation, all historic built environment resources within the Area of Potential Effects (APE) were evaluated and recorded. Within the APE there known

previously recorded resources, including the NRHP-listed Pioneer Square and Pike Place Market Historic Districts, and the NRHP-eligible Central Waterfront Pier District (Piers 54 through 59). There is one National Historic Landmark within the APE: the Pioneer Building/Pioneer Place/Pergola on 1st Avenue and Yesler Way.

In a letter dated October 20, 2009, WSDOT, on behalf of FHWA, made determinations of eligibility to the National Register of Historic Places (NRHP) for all historic built environment resources within the APE. In a November 24, 2009 letter from Mr. Russell Holter, DAHP concurred with the NRHP determinations for 161 properties within the APE. Mr. Holter requested additional information and/or justification of NRHP eligibility for 15 resources. WSDOT is continuing consultation on those 15 properties, and has submitted NRHP eligibility determinations to DAHP with six of the 15 properties having been determined NRHP-eligible.

Furthermore, as you are aware, we have revised the APE to accommodate new areas that might be affected by the realigned bored tunnel, as well as identified construction staging areas. There are 64 additional buildings within the new APE. WSDOT, on behalf of FHWA, has determined that 15 of these newly identified buildings are NRHP-eligible.

As detailed in Attachment 1, we have identified adverse effects to four historic properties listed on or eligible for listing on the NRHP. In terms of the built environment, this project alternative will have an adverse effect on the NRHP-eligible Alaskan Way Viaduct and Battery Street Tunnel, as well as the Western Building and Polson Building, which are contributing elements to the Pioneer Square National Historic District. In terms of archaeology, this project alternative will have an adverse effect on the Dearborn South Tideland Site (45KI924), a historic-period archaeological site associated with the commercial development of the area of former tide flats south of S. King Street. Pursuant to 36 CFR 800.8(c)(v), measures to mitigate these adverse effects are outlined in the attached document. These measures would be part of any MOA developed in consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties to mitigate the effects of this project alternative.

Given the challenges posed by this project and its current alternatives under consideration, the attached documents are the first steps in our phased process for the identification and evaluation of historic properties. We look forward to continued consultation with you as we move through this process.

Should you have questions or concerns please contact WSDOT ESO Mega Projects Archaeologist Kevin Bartoy at 206.521.5628, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.382.5279, email hanson@wsdot.wa.gov.

Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure

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Appendix I

**Section 106: Historic, Cultural, and Archaeological
Resources Discipline Report
Alaskan Way Viaduct Replacement Project
Supplemental Draft EIS**

**Lead and Cooperating Agency Review Draft
For Review Only**

We respectfully request that the public not be given access to this document because FHWA has determined that this preliminary document is an intergovernmental exchange that may be withheld under the Freedom of Information Act. Premature release of this material to any segment of the public could give some sectors an unfair advantage and would have a chilling effect on intergovernmental coordination and the success of the cooperating agency concept.



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Secretary of Transportation

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May 24, 2010

Honorable Virginia Cross
Muckleshoot Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
for Second Supplemental Draft Environmental Impact Statement (SDEIS)**

Dear Chairwoman Cross:

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. WSDOT is preparing a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative.

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Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Laura Murphy, Muckleshoot Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure

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Appendix I

**Section 106: Historic, Cultural, and Archaeological
Resources Discipline Report
Alaskan Way Viaduct Replacement Project
Supplemental Draft EIS**

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May 24, 2010

Honorable Joseph Mullen
Snoqualmie Tribe
PO Box 969
Snoqualmie, Washington 98065

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
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Given the challenges posed by this project and its current alternatives under consideration, the attached documents are the first steps in our phased process for the identification and evaluation of historic properties. We look forward to continued consultation with you as we move through this process.

Should you have questions or concerns please contact WSDOT ESO Mega Projects Archaeologist Kevin Bartoy at 206.521.5628, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.382.5279, email hansona@wsdot.wa.gov.

Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Ray Mullen, Snoqualmie Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure

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Appendix I

**Section 106: Historic, Cultural, and Archaeological
Resources Discipline Report
Alaskan Way Viaduct Replacement Project
Supplemental Draft EIS**

**Lead and Cooperating Agency Review Draft
For Review Only**

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**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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May 24, 2010

Honorable Leonard Forsman
Suquamish Tribe
PO Box 498
Suquamish, Washington 98292

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
for Second Supplemental Draft Environmental Impact Statement (SDEIS)**

Dear Chairman Forsman:

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. WSDOT is preparing a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative.

Pursuant to 36 CFR 800.8(c) and 40 CFR 1502.25(a), you will find attached a copy of the draft historic, cultural, and archaeological resources discipline report (Attachment 1) prepared for inclusion in the second SDEIS, which is currently scheduled to be published in October 2010. We seek your review and comment on this document.

The Alaskan Way Viaduct Replacement Project presents unique challenges in regards to historic properties given that access to archaeological resources is restricted by depth below surface, ground water, existing infrastructure, requirements of existing transportation, the need to maintain existing utility service, and the proposed methods of construction. In addition to these challenges, a portion of the project is design-build, which integrates the final design and the construction phases. For these reasons, we are conducting a phased process for the identification and evaluation of historic properties as specified 36 CFR 800.4(b)(2).

Pursuant to 36 CFR 800.4(b)(2), the attached historic, cultural, and archaeological resources discipline report establishes "the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation." In continued consultation with SHPO, DAHP, tribes, consulting parties, and other interested parties, we intend to develop a memorandum of agreement (MOA) pursuant to 36 CFR 800.6. The eventual MOA will resolve identified adverse effects as well as potential adverse effects identified if the Bored Tunnel Alternative is the selected alternative in the Record of Decision.

As part of the cultural resources investigation, all historic built environment resources within the Area of Potential Effects (APE) were evaluated and recorded. Within the APE there known

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Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Dennis Lewarch, Suquamish Tribe w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure

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Appendix I

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Alaskan Way Viaduct Replacement Project
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May 24, 2010

Honorable Melvin R. Sheldon
Tulalip Tribes
6406 Marine Drive
Tulalip, Washington 98271

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
for Second Supplemental Draft Environmental Impact Statement (SDEIS)**

Dear Chairman Sheldon:

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with you in regards to the SR 99 Alaskan Way Viaduct Replacement Project. WSDOT is preparing a second Supplemental Draft Environmental Impact Statement (SDEIS) to meet the requirements of the National Environmental Policy Act (NEPA). This second SDEIS focuses on the potential effects of the Bored Tunnel Alternative.

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Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Hank Gobin, Tulalip Tribes w/ enclosure
Timothy Brewer, Tulalip Tribes w/ enclosure
Richard Young, Tulalip Tribes w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
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Scott Williams, WSDOT w/o enclosure
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Paula Hammond
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May 24, 2010

Honorable Ralph Sampson, Jr.
Yakama Nation
PO Box 151
Toppenish, Washington 98948

**Re: SR 99 Alaskan Way Viaduct Replacement Project, Review of Discipline Report (DR)
for Second Supplemental Draft Environmental Impact Statement (SDEIS)**

Dear Chairman Sampson:

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Sincerely,



Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures: Attachment 1. Section 106: Historic, Cultural, and Archaeological Resources Discipline Report, Alaskan Way Viaduct Replacement Project, Supplemental Draft EIS

cc.

Johnson Meninick, Yakama Nation w/ enclosure
Matthew Sterner, DAHP w/o enclosure
Randy Everett, FHWA w/o enclosure
Allison Hanson, WSDOT w/o enclosure
Scott Williams, WSDOT w/o enclosure
Megan Cotton, WSDOT w/o enclosure

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**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

Alaskan Way Viaduct Replacement Program
999 Third Avenue, Suite 2424, MS NB82-230
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December 1, 2010

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, WA 98106

Dear Chairwoman Hansen:

The Federal Highway Administration (FHWA) and the Washington State Department of Transportation (WSDOT) have determined that the Alaskan Way Viaduct Replacement Project will have an adverse effect on historic properties. As required by the regulations implementing Section 106 of the National Historic Preservation Act, FHWA has notified the Advisory Council on Historic Preservation (ACHP) on this finding of adverse effect. The next step in the Section 106 process is for FHWA and WSDOT to work with the Project's consulting parties to identify measures to avoid, minimize, or mitigate this adverse effect on historic properties. The selected measures to resolve the Project's adverse effects on historic properties will be included within a Memorandum of Agreement (MOA) to be signed by FHWA, WSDOT, and the Washington State Historic Preservation Officer (SHPO) and other Section 106 consulting parties. The ACHP has notified FHWA that they will not participate in the preparation of the MOA, though the MOA will be filed with the ACHP once the agreement is completed. The consulting parties identified to date are: the Washington Department of Archaeology and Historic Preservation (DAHP); the City of Seattle; King County, Washington; Historic Seattle; the Washington Trust for Historic Preservation; the Alliance for Pioneer Square; Benjamin and Lois Mayers; and the Duwamish Tribe.

As a consulting party, we are inviting you to a "kick-off" meeting to begin consultation on resolving the Project's adverse effects on historic properties. We would like to hold the meeting during the week of January 10, 2011, at WSDOT's Project offices in the Wells Fargo Building at 999 3rd Avenue, Seattle.

Please contact either Kevin Bartoy of WSDOT or David Cushman of the SRI Foundation at the addresses below, letting us know if you can attend a meeting during the week of January 10, 2011, and if so, what day of that week works best for you. Also, let us know if a meeting at the Wells Fargo Building at 999 3rd Avenue, in Seattle is acceptable; and if not, please suggest an alternative venue. Finally, please let us know who from your organization or agency would be attending the meeting.

Kevin Bartoy
Cultural Resources Specialist
Washington State Department
of Transportation
Alaskan Way Viaduct
999 Third Avenue
Suite 2424, MS NB82-230

David Cushman
Historic Preservation Specialist
SRI Foundation
333 Rio Rancho Drive, NE
Suite 103
Rio Rancho, NM 87124
505 897-5587

Seattle, WA 98104
206 805-2887
Bartoyk @wsdot.wa.gov

dcushman@srifoundation.org

We anticipate the meeting will last no more than three hours and will consist of two main agenda items: a summary of the adverse effects of the Project on historic properties and an initial discussion on potential measures to resolve these adverse effects.

We ask that you contact either Kevin or David within one week of receiving this letter. Also, if you have any questions about the "kick-off" meeting or any other Section 106 issues, please do not hesitate to contact either Kevin or David.

We look forward to working with you to identify measures to avoid, minimize, or mitigate the Project's adverse effect on historic properties.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Hanson". The signature is written in a cursive, somewhat stylized font.

Allison Hanson
Director of Environmental Services
ESO Mega Projects

cc: Randy Everett, FHWA



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
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January 3, 2011

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, Washington 98106

Dear Chairwoman Hansen:

Thank you for agreeing to participate in Section 106 consultations for the Alaskan Way Viaduct Replacement Project (AWVRP). The following is being sent to you in preparation for the January 13, 2011 consulting party meeting among the Washington Department of Transportation (WSDOT), the Federal Highway Administration (FHWA), and the consulting parties. Presented below is information about Section 106 consultation, the role of the consulting parties, the affected historic properties, an example of a Memorandum of Agreement (MOA), and a preliminary agenda for the kick off meeting. Please note that more detailed information on the historic properties identified in the project Area of Potential Effect (APE) and how each property may be affected will be sent to you before the meeting on the 13th.

Section 106 Consultation

The regulations that implement Section 106 of the National Historic Preservation Act are found at 36 CFR Part 800. Under these regulations, the responsible federal agency, in this case the FHWA, is required to follow procedures for meeting its statutory obligation to take into account the effects of its actions, called undertakings, on historic properties that are listed in or eligible for listing in the National Register of Historic Places. The agency is not required to preserve these properties. What the agency must do is consider the effects of the undertaking during project planning in consultation with parties that have a demonstrated legal or economic interest in the undertaking or a concern about the effects of the undertaking on historic properties. These parties are called the “consulting parties” in the Section 106 regulations. You will be participating in the consulting party meeting for the AWVRP undertaking as a consulting party.

Role of the Consulting Parties

Consulting parties play an important role in the Section 106 process. The federal agency is required to identify the consulting parties, to invite them into the consultation process, and to listen to their concerns about, and ideas for, resolving adverse effects. The agency, however, is not required to do what the consulting parties want, only to consider their views through the consultation process. Consultation is defined under 36 CFR Part 800.16 (f) as follows.

“Consultation means the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.”

As a consulting party to the AWVRP undertaking you will have the opportunity to assist FHWA and WSDOT in resolving the adverse effects of the undertaking on historic properties by suggesting ideas that you think the agency should consider. Even though the federal agency is not required to adopt these ideas, the process allows the consulting parties to influence the agency's decisions about what it will do to meet the legal requirements and to achieve the best possible preservation outcome. In this manner, the agency can balance the needs of the undertaking with its responsibility to also be a good steward of the community's historic properties.

Adverse Effects for AWVRP

The AWVRP undertaking may adversely affect multiple historic properties within the project APE. These historic properties can be organized into four groups based on their nature as cultural resources (architectural or archaeological), their National Register status (individually listed or contribute to a historic district) and how they may be affected (directly or indirectly).

1. There are 13 historic buildings that are individually listed to the National Register that may be directly affected by vibrations from the tunnel boring machine passing underneath the buildings.
2. The Pioneer Square Historic District is listed on the National Register of Historic Places and is a Preservation District designated by the City of Seattle. The Western Building and the Polson Building are contributing elements to the District and will be directly affected by vibrations from the tunnel boring machine. The District itself may be indirectly affected by construction related effects that will be on-going over the duration of the project.
3. There are three historic era archaeological sites, one of which is National Register eligible and two which are potentially eligible, that will be directly affected by construction related excavations at the proposed locations of the north and south tunnel portals.
4. There are four archaeologically sensitive areas that may, or may not, contain deeply buried prehistoric deposits or historic era deposits that if present may be potentially National Register eligible. These areas will be directly affected by utility line excavations and other project related earth moving activities.

The MOA developed for the AWVRP undertaking will resolve the adverse effects of the undertaking on all the historic properties within each of these four groups. As such, the consulting party kick-off meeting on January 13th will be organized to address the undertaking's adverse effects by these groupings of historic properties.

Memorandum of Agreement

Many of the consulting parties are very knowledgeable about the Section 106 consultation process. Some are not as familiar and may not have ever seen a Section 106 Memorandum of Agreement. Attached is an example of a MOA for a project that is related to, but separate from, the AWVRP undertaking: the South Holgate to South King Street Viaduct Replacement Project. The MOA is provided to help you visualize what the AWVRP MOA may look like, how it could be structured and the kinds of stipulations it might contain. You will note, for example, that a treatment plan for archaeological excavation is not included in the MOA; however, a process for developing this document is included. Something similar will be needed for the AWVRP project because the historic properties treatment plan will be completed after the AWVRP MOA is signed. Other plans, such as a plan for unanticipated archaeological discoveries during construction, will need to be attached to the MOA or developed under a separate process included in the MOA.

Agenda and Expectations

Under the Section 106 regulations, at the conclusion of the Section 106 consultation process, the federal agency and the consulting parties agree, where possible, on a list of measures for how the agency will resolve the adverse effects of the undertaking to National Register listed and eligible historic properties within the APE. These measures are then codified as stipulations in a MOA committing the agency to resolve the adverse effects of the undertaking in the agreed upon manner.

On January 13, 2011, WSDOT and FHWA will initiate consultation with the consulting parties to resolve the adverse effects of the AWVRP undertaking. The purpose of the meeting will be to develop ideas for how the agencies can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will then be used to draft a preliminary MOA, which will be circulated to all parties for review and comment. To that end, the following is a preliminary agenda for the meeting.

9:30 AM - Introductions

9:40 AM - Purpose of the meeting

9:45 AM – Review of the effects findings

10:15 AM - Ideas for resolving adverse effects by property group

11:20 AM - Meeting summary and next step

11:30 AM - Meeting adjourns

Should you have questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
ESO Mega Projects

Att (1):South Holgate to South King Street Viaduct Replacement Project MOA

Cc: Randy Everett, FHWA
Allison Hanson, WSDOT

Attachment 1. South Holgate to South King Street Viaduct Replacement Project MOA

MEMORANDUM OF AGREEMENT
Between
The Federal Highway Administration, and
The Washington State Historic Preservation Officer

Implementing Section 106 of the National Historic Preservation Act for
the S. Holgate Street to S. King Street Viaduct Replacement Project,
City of Seattle, King County, Washington

WHEREAS, The Washington State Department of Transportation (WSDOT) plans to construct the South Holgate Street to South King Street Viaduct Replacement Project (hereinafter "the Project"), which is one a component of the SR 99 Alaskan Way Viaduct and Seawall Replacement Program (hereinafter, "the Program"); and

WHEREAS, U.S. Department of Transportation, Federal Highway Administration (FHWA) plans to provide assistance to the Project pursuant to the Federal-Aid Highway Program as described in Title 23 USC § 101 et seq.; and

WHEREAS, FHWA has determined that the Project is an undertaking, as defined in 36 CFR § 800.16(y), subject to review under Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470f and its implementing regulations, 36 CFR § 800; and

WHEREAS, FHWA will be lead federal agency for this undertaking; and

WHEREAS, FHWA has requested that WSDOT initiate consultation with the Washington State Historic Preservation Officer (SHPO) and interested and affected Indian tribes pursuant to 36 CFR § 800.14, on the behalf of FHWA; and,

WHEREAS, FHWA and WSDOT, in consultation with the SHPO, interested and affected Indian tribes, and other interested parties, have conducted preliminary cultural resource studies to identify and evaluate the effects upon historic properties located within the Area of Potential Effects (APE) to the extent possible; and

WHEREAS, FHWA has determined that the Project will have an adverse effect on Alaskan Way Viaduct and Battery Street Tunnel (hereinafter, "AWV") and the Bemis Building built-environment historic properties, which are eligible for listing in the National Register of Historic Places; and

WHEREAS, FHWA has determined that the Project has the potential to adversely affect previously unidentified or potentially identified archaeological sites; but due to conditions including extensive deep fill, engineering constraints, and safety concerns within an urban context, further investigation and mitigation actions, if needed, shall be integrated into the construction program; and

WHEREAS, the Advisory Council on Historic Preservation has been invited to participate in the development of this Agreement, and has declined to participate; and

WHEREAS, pursuant to 36 CFR § 800.14(b)(3) the Muckleshoot Indian Tribe, the Snoqualmie Indian Tribe, the Suquamish Tribe, the Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation (federally recognized Indian tribes that may attach religious and cultural significance to historic properties potentially affected by the project) have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Duwamish Tribe (a non-federally recognized tribe), the City of Seattle Historic Preservation Officer (HPO) and the Historic Bridge Foundation have been consulted regarding this Agreement and invited to concur in the Agreement; and

WHEREAS, the Confederated Bands and Tribes of the Yakama Nation, the Duwamish Tribe, and the Historic Bridge Foundation declined to concur in this Agreement, or did not respond to the invitation to concur in this Agreement; and

WHEREAS, “signatories” means the required and invited signatories (FHWA, SHPO, and WSDOT) “concurring parties” means consulting parties that have signed the Agreement, and “consulting parties” means signatories, concurring parties, all interested and affected tribes, and other interested parties consulted on the Project, regardless of whether they agreed to sign the Agreement; and

WHEREAS, additional federal undertakings related to the Alaskan Way Viaduct and Seawall Replacement Program shall go through the Section 106 process independently and, other than measures to address the AWV historic property over its entire length, will be mitigated separately from this agreement.

NOW, THEREFORE, FHWA, WSDOT, and the SHPO agree that the project shall be implemented with the following stipulations in order to take into account and mitigate the effects of the undertaking on historic properties:

STIPULATIONS

The FHWA will ensure that the following measures are carried out:

I. GENERAL REQUIREMENTS AND STANDARDS

- A. As a condition of its award of any assistance under the Federal-Aid Highway Program to WSDOT, FHWA shall require that WSDOT carry out the requirements of this Agreement, and all applicable laws.
- B. Signatories shall keep sensitive cultural resources information confidential to the extent allowed by state and federal law.

- C. Activities carried out pursuant to this Agreement shall meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716 as revised) as well as existing standards and guidelines for historic preservation activities established by SHPO.
- D. FHWA and WSDOT will ensure that all work carried out under this Agreement is conducted by or under the direct supervision of a person or persons meeting the *Secretary of the Interior's Professional Qualification Standards* (36 CFR 61).
- E. All resource management documents as specified under this Agreement (the Archaeological Treatment Plan and elements of the Unanticipated Discovery Plan) will be completed prior to any construction and within two months of the release of the 90% design documents for the Project. Nothing in this MOA shall be construed as indicating acceptance by the consulting parties of the resource management documents, which have yet to be developed. WSDOT shall in good faith attempt to reach a consensus on the contents of the resource management documents with the consulting parties.

II. MITIGATION OF ADVERSE EFFECTS TO HISTORIC BUILDINGS AND STRUCTURES

A. Alaskan Way Viaduct and Battery Street Tunnel Historic Property Mitigation

Mitigation for the AWW as described in this section shall constitute complete mitigation of adverse effects to the AWW historic property, namely the loss of the entire structure. The measures will address requirements specific to the AWW property for all future undertakings associated with the Program. This does not apply to any other historic properties that may be affected by future activity associated with the Program.

1. WSDOT shall complete and make available for public use a Level II HAER documentation for the entire length of the AWW to include the following.
 - (i) HAER documentation consisting of a context statement; a minimum of 50 large format photographs that address both the nature of the overall structure and unique or representative details; aerial perspective photographs; and narrative documentation of distinctive attributes. The HAER package will also include digital copies of all available historic photographs, construction design plans, and as-built construction plan sheets held by WSDOT and the Seattle Municipal Archives.
 - (ii) HAER documentation, including photographs and narrative, shall be filed at the following institutions:
 - Library of Congress
 - Department of Archaeology and Historic Preservation,
 - Museum of History and Industry,

- Seattle Public Library,
- University of Washington Libraries, and
- Seattle Municipal Archives

(iii) WSDOT, in consultation with SHPO, shall offer the large-format HAER photographs and narrative essays for display and interpretation at one or more of the following local museums, repositories, and public venues:

- Seattle Public Library
- Museum of History and Industry
- University of Washington
- Seattle City Hall
- Seattle-Tacoma Airport
- The Washington State Library in Olympia
- The Washington State Archives in Olympia

2. WSDOT shall develop a Public Education and Outreach program specifically for the AWV to include the following:

(i) A Public Website

(a) WSDOT in conjunction with HistoryLink.org, and in consultation with SHPO and the City of Seattle HPO, shall create and maintain a website that will provide an historical interpretation of the role played by the AWV in Seattle including display photographs, essays, interviews, maps, and background materials highlighting the significance of the AWV. The website will include a selection of the following:

- Explanatory materials about the Alaskan Way Viaduct and its context within Seattle waterfront history that will be compatible with the HistoryLink.org website;
- Selected HAER photographs, essays derived from the HAER narrative report;
- Videotaped interviews of people involved in construction or early use of the Viaduct;
- Visual simulation or animation videos using existing LiDAR and other electronic media; and
- A webpage dedicated to educational materials and activities for children.

The website will be designed to accommodate new information that may be prepared as mitigation for future adverse effects to historic properties other than the AWV that may result from other projects in the SR 99 Alaskan Way Viaduct and Seawall Replacement Program. WSDOT shall maintain the website for the duration of the Program,

and will offer it to the Washington State Archives' digital library and/or HistoryLink.org for subsequent continued display.

- (b) WSDOT shall contact educational, public and non-profit organizations interested in Seattle history and historic preservation, including, but not limited to, the City of Seattle, King County, the Washington Trust of Historic Preservation, and Historic Seattle, and shall inform them of the ability to link to this website.

(ii) Educational Materials

WSDOT, in consultation with SHPO, shall develop professionally printed materials to be distributed at local museums and heritage organizations for the duration of the Project. This information will highlight local engineering and architecture, including the AWW, as well as the social, economic, and cultural trends of mid-20th century Seattle. The types of materials that will be prepared include:

- Contemporary photographs from the HAER documentation and historic photographs;
- Quotations derived from the HAER research and oral history interviews; and
- A map of mid-20th century attractions, including historic structures and important places.

B. Bemis Building

Mitigation for the Bemis Building shall address potential economic effects tenants and specify actions to avoid possible structural damage through the following measures. WSDOT shall:

1. Document the building meeting the intent of standards for architectural documentation using a Light Detection and Radar (LiDAR) recordation process;
2. Develop a vibration and settlement management and monitoring plan to determine if the historic building is at risk, and protect from damage due to vibration or subsidence;
3. Develop a Communications Plan that identifies a process to maintain regular communication with affected residents and businesses in the Bemis Building (through building management) about construction issues and maintain adequate access to the property, including loading dock access, so that businesses can continue to operate;
4. Develop an air pollution and noise management plan that establishes maximum noise limits and air quality parameters; specifies certain hours for

noisier construction activities; recommends use of quieter equipment, and uses Best Management Practices (BMPs) for both issues;

5. Encourage construction management scheduling to minimize impacts from increased traffic; and
6. Ensure continued utility service throughout construction; or if there are possible brief intervals of utility service disruption, WSDOT shall provide advance notice of a minimum of two business days to building management.

III. ARCHAEOLOGICAL RESOURCES

The project lies within the historical Seattle Tidelands, which were part of the Duwamish River delta until filled during the late-19th and early-20th centuries. Fill materials range from depths of 20 to more than 42 feet within the project area. Studies conducted for the Project and the Program have developed an overall Research Design for the Seattle waterfront as well as site-specific testing programs for the Project. The studies have identified nexus or target areas relating to the historical development of the City that may represent archaeological assemblages that meet NRHP criteria. The study programs, however, have not identified archaeological resources representing Native American use of the tidelands area. It is possible that significant historical archaeological resources may be encountered within identified target areas; it is also possible that unanticipated archaeological resources including Native American sites (based on ethnographic and other studies) and unanticipated historic resources could occur beneath the Project corridor. Based on the design parameters, buried conditions, and construction methods, it is possible that some resources may not be accessible for data recovery mitigation measures. All plans as specified below will be reviewed by consulting parties prior to any construction activity. Consideration of significant resources shall be addressed by the following actions.

A. WSDOT shall prepare an Archaeological Resources Treatment Plan (hereinafter, "Treatment Plan").

The Treatment Plan will guide the actions of cultural resources professionals during its implementation. WSDOT shall develop the plan in consultation with SHPO, interested and affected tribes, and other consulting parties. The plan shall:

1. Describe Project actions based on review of the 90% design plans and discussions with Project engineers (to clarify the extent of ground-disturbing actions and design parameters that would affect archaeological resources);
2. Summarize the environmental setting with an emphasis on the historic intertidal zone and based on and with reference to the prior Program Research Design and area-specific subsurface testing reports to include:

- (i) Discussion of the natural setting including geomorphology, paying attention to the location and extent of Pleistocene and Holocene deposits, and historical filling sequences within the APE;
 - (ii) An overview of the cultural setting as directly related to the use and development of the intertidal and subtidal areas of the project area;
 - (iii) Discussion of previous pre-contact and historical archaeological investigations within the Puget Sound area that relate directly to anticipated conditions within the APE; and
 - (iv) An analysis of potential site types that may be encountered within fill, at the stabilized surfaces of fill events, and at the Holocene contact, including consideration and the potential for encountering human remains within fill deposits;
3. Identify relevant research domains that pertain directly to the history and prehistory of the Project area based on those already developed under the Program Research Design;
 4. Discuss the nature and extent of “known” archaeological resources and conditions that have been identified through the subsurface testing program including:
 - (i) Identification of probability zones:
 - (a) High-potential areas where presumed-eligible resources are located;
 - (b) Moderate-potential areas where data show the presence of cultural materials; and
 - (c) Low-potential areas where data do not show the presence of cultural materials;
 - (ii) An analysis of anticipated historical archaeological resources based on correlation with the Sanborn Fire Insurance maps and the relationship between the types of expected artifact assemblages and the historical activity that will contribute to an enhanced understanding of history through research domains; and
 - (iii) An analysis of anticipated pre-contact or Native American archaeological resources that may occur within the Project APE and their relationship to research domains.
 5. Evaluate and describe the location-specific Project actions that have a potential to affect significant archaeological resources including:
 - (i) The nature of the actions (excavation, cast piles, etc.); and

- (ii) Probable effects relative to resource potentials;
6. Discuss in detail appropriate treatments (possibly including integrated rapid data recovery, monitoring, alternative mitigation measures, or other measures) and how they will be applied to the identified Project actions. This discussion will include specific proposals and methods for an integrated rapid data recovery for areas where construction activity will encounter previously identified cultural deposits;
 7. Establish criteria that trigger further consultation by WSDOT with SHPO, interested and affected tribes, and other consulting parties, and evaluation of archaeological resources identified during construction (including, for example, intact features and artifacts related to Native American use; high density historical artifact assemblages or features that relate directly to a known activity area or relevant discrete historical activities);
 8. Describe methods that will be used to recover and process archaeological materials and information that are deemed NRHP-eligible including:
 - (i) The different methods proposed to recover different types of site assemblages (for example, appropriate methods for Native American sites vs. historic sites)
 - (ii) Potential specialty or analytical methods that may be applied to recovered resources (e.g., C-14 dating, faunal analysis, flotation, trademark identification and dating, etc.);
 - (iii) Artifact processing parameters and laboratory procedures that will permit relevant study and reporting;
 9. Outline anticipated reporting requirements, while fully realizing that reporting specifics are dependent on the nature of the resources that are recovered by Project actions. An appropriate timeframe for analysis and reporting will be negotiated with consulting parties after completion of fieldwork activities and will be dependent on the nature and extent of recovered archaeological information;
 10. Identify requirements and process approaches for final curation of artifacts and information associated with any data recovery actions; and
 11. Discuss measures that will be taken to disseminate findings to the general public.
- B. WSDOT, in consultation with SHPO, interested and affected tribes, and other consulting parties, shall prepare an Unanticipated Discovery Plan (UDP) that addresses resources other than those identified by previous studies that are found during construction activities.

The UDP will consist of two stand-alone parts that are attached to the Treatment Plan. These plans will address: 1) archaeological resources not previously identified in the Treatment Plan; and 2) treatment of human remains, if discovered. Their primary purpose is to provide procedural guidance to Project supervisors and contractors regarding actions associated with construction, and to establish the formal process and notification responsibilities of relevant parties.

1. Archaeological Resources Not Previously Identified in the Treatment Plan.

This part will describe procedures to be followed by the construction contractors and Project engineers, which ensure appropriate consideration of archaeological resources if encountered during construction. The part shall:

- (i) Discuss pre-construction requirements, including:
 - (a) Educational briefings by professional archaeologists;
 - (b) Briefing materials for construction contractor personnel and WSDOT engineers and inspectors; and
- (ii) Provide background information on the context of anticipated resources within the Project to the construction contractor;
- (iii) Identify in lay terms the nature of primary archaeological resources indicators (for example, high densities of fire modified rock; shell middens; high density historical municipal or industrial middens, etc.) that may represent a significant resource and which require consideration by professional archaeologist and consideration by consulting parties;
- (iv) Identify relevant procedures and contractor responsibilities for initial site protection and evaluation.

2. Treatment of Human Remains.

This part will describe actions that shall be taken in the event that human skeletal remains are discovered during construction. The plan will inform Project Personnel about the requirements implementing the State law relating to the inadvertent discovery of Human Skeletal Remains under RCW 27.44.055 and RCW 68.60.55 and will provide Project personnel with a clear understanding of the subsequent process. The plan shall:

- (i) Discuss the potentials for encountering human remains including the possibility of location within imported fill materials;
- (ii) Discuss the immediate area work-site actions that will be taken to secure and protect the area of discovery including immediate notification of the local coroner and law enforcement agency; and

- (iii) Provide information on the steps that will be taken by either the coroner or DAHP subsequent to the discovery as specified under the Laws.

C. Additional Mitigation Measures and Public Education

Some of the engineering requirements for the Project are likely to exclude the potential for data recovery of previously-identified archaeological resources. In addition, the Secretary of the Interior's Standards for Archaeological Documentation mandates that "the results of archaeological documentation are reported and made available to the public" (48 CFR 44734).

1. WSDOT shall disseminate the findings of the archaeological investigations as developed under the Treatment Plan and in consultation with SHPO, interested and affected tribes, and other consulting parties. Methods shall include one or more of the following:
 - (i) A reader-friendly summary of information gleaned on history and/or prehistory through the data recovery process;
 - (ii) A museum-quality display or displays that could be showcased at one of the WSDOT facilities (for example, the Colman Dock terminal) or offered to local museums on a rotating basis;
 - (iii) Use of historical non-Native American artifacts to develop a traveling informational toolkit for use in public and private schools.
2. WSDOT shall develop an audio walking tour for locations of historical significance along the Program corridor to be offered as a podcast on the Program website (described in Stipulation II.A.2.i) and the iTunes podcast store. The product will be available for the duration of the Program and will be offered to other local history organizations for continued use subsequent to the Program;
3. WSDOT shall develop a guidance document for future development by others in the vicinity of the Project based on the insights gleaned from the identification and mitigation process used by the Project.

Because of its size, the Project has resulted in an increased awareness of applicable research methods, resource potentials, primary precontact and historic resource locations, and potential treatment methods within a complex urban environment. The document, which will be prepared during the analysis and reporting phase of the archaeological mitigation program, shall:

- (i) Discuss appropriate background research and analysis methods that can be applied to fulfill state and federal environmental requirements for future public or private development within the tideflats area;

- (ii) Identify appropriate target locations (for example, original intertidal surfaces and features, stabilized surfaces within monolithic fills, etc.) that have higher probabilities to contain significant resources and the types of expected resources;
- (iii) Identify specific subsurface testing methods that can provide preliminary indications of significant resources including a discussion of criteria for identification of probable intact resources warranting further consideration;
- (iv) Describe mitigation data recovery methods appropriate to treatment of properties within deep fill including approaches and procedures for mitigation during construction.

D. Tribal Monitoring

The interested and affected tribes shall be afforded opportunity to participate directly in project archaeological monitoring activities as specified in the Treatment Plan with staff paid for by WSDOT provided this is:

1. Approved by FHWA;
2. Based on work need;
3. Located in areas as described in the Archaeological Treatment Plan that have probable or potential association with Native American site resources; and
4. Shared amongst requesting tribes.

E. Consultation

1. WSDOT shall communicate with consulting parties at the following times:
 - (i) After draft completion of the Treatment Plan and UDP for review and comment;
 - (ii) Monthly after the date of signing of this Agreement, providing an update on archaeological work;
 - (iii) When design is finalized, if any changes to the impacts described in the Treatment Plan have been identified; and
 - (iv) At the request of a consulting party.
2. WSDOT shall facilitate field visits for consulting parties upon request.

3. Each communication with interested and affected tribes shall include an offer to meet individually, or to facilitate a meeting with multiple tribes. SHPO and FHWA shall be invited to all meetings between WSDOT and tribes.
4. WSDOT shall consult with interested and affected tribes prior to public outreach on the topic of tribal history or other tribal issues.

IV. DISPUTE RESOLUTION

- A. All signatories shall strive to address and resolve disagreements informally. In the event that resolution cannot be achieved within 30 days, the applicable sections of 36 CFR 800 will determine steps for notice and resolution between FHWA and the ACHP.
- B. Should a member of the public raise an objection, FHWA shall take the objection into account and consult as needed with the objecting party to resolve the objection.
- C. Each party reserves any and all rights it may otherwise have to enforce its rights or seek resolution of the dispute under applicable law.

V. AMENDMENT AND TERMINATION

- A. Any signatory to this agreement may terminate it by providing 30 calendar days written notice to the other parties, provided that the signatories will meet during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Consulting parties will be invited to any such meetings. This agreement cannot be terminated without such a meeting.
- B. In the event of termination, FHWA shall comply with 36 CFR § 800 with regard to all remaining actions under this Agreement.
- C. If FHWA or WSDOT proposes to modify this Agreement or the attachments in a manner that alters the resolution of adverse effects of historic properties, the modification will be made in consultation with consulting parties. The modified Agreement must be signed by all signatories.

SIGNATORIES

Federal Highway Administration

By: *Daniel M. Mathis* Date: 02/11/09
Daniel M. Mathis, Division Administrator

Washington State Historic Preservation Officer

By: *Allyson Brooks* Date: 2/11/09
Allyson Brooks, Ph.D.

INVITED SIGNATORIES

Washington State Department of Transportation

By: *Craig J. Stone* Date: 2/2/2009
Craig J. Stone, P.E., Urban Corridors Administrator

CONCURRING PARTIES

Muckleshoot Indian Tribe

By: Charlotte Williams Date: 04-02-09
Honorable Charlotte Williams, Chair

Snoqualmie Indian Tribe

By: 
Honorable Joseph Mullen, Chair

Date: 2-9-09

Suquamish Tribe

By: _____ Date: _____
Honorable Leonard Forsman, Chair

Tulalip Tribes

By: _____ Date: _____

Honorable Melvin Sheldon, Chair

City of Seattle

By:  Date: 2/10/09

Karen Gordon, Historic Preservation Officer



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 10, 2011

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, Washington 98106

Dear Chairwoman Hansen:

Please find attached a list of the historic properties identified in the Area of Potential Effect (APE) for the Alaskan Way Viaduct Replacement Project (AWVRP) and how each property may be affected by the undertaking. This list is being provided to you in preparation for the AWVRP consulting party meeting to be held on January 13, 2011. Also attached for your information is a memorandum from the Washington State Department of Transportation (WSDOT) regarding our decision to demolish the Western Building as part of the AWVRP undertaking. A separate meeting on the Western Building will be held following the consulting party kick off meeting and a preliminary agenda for that meeting is presented below.

Adverse Effects

As stated previously, the purpose of the consulting party kick off meeting is to develop ideas for how the agencies (WSDOT and FHWA) can avoid, minimize, or mitigate the adverse effects of the undertaking on historic properties. These ideas will be used to draft a preliminary Memorandum of Agreement (MOA) that will be circulated for review. To guide the discussion on resolving adverse effects, the regulatory language on adverse effect and no adverse effect is presented below along with the specific citations.

“An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR Part 800.5.(a) (1).

The aspects of integrity vary from property to property depending on what makes the property historically significant.

“The agency official, in consultation with the SHPO/THPO [tribal official consulted when on tribal lands], may propose a finding of no adverse effect when the undertaking’s effects do not meet the criteria of paragraph (a) (1) of this section or the undertaking is modified or conditions are imposed ... to avoid adverse effects” (36 CFR Part 800.5 (b).

A no adverse effect finding means that the agency, in consultation with the SHPO, has determined that the undertaking may alter, in some way, the qualities that make a historic property National Register eligible; however, this will not diminish the property’s aspects of integrity, whatever those may be.

AWVRP Historic Properties List

You will note that the list of historic properties is presented by groups: Properties individually listed in or eligible for listing in the National Register, properties that are contributing elements to the National Register-listed Pioneer Square Historic District, archaeological sites, and archaeologically sensitive areas. Within these groups, information is provided on the identity of each property; its National Register eligibility status, determined by the agencies in consultation with the SHPO; the project action that may affect the property; an assessment of the kind of effect the undertaking may have on the property (direct/indirect) along with the damage potential assessment used in the Historic, Cultural and Archaeological Resources Discipline Report published with the 2010 Supplemental Draft Environmental Impact Statement; and lastly, an effect determination made by WSDOT/FHWA in consultation with the SHPO. This is the background information that will be used to focus the consultation on resolving adverse effects.

Under each group of historic properties is a statement of the Section 106 objective for avoiding, minimizing or mitigating adverse effects by property group or in some cases by individual properties. Below this are ideas for discussion that will achieve the objective. These ideas are presented to begin discussions and may be added to, modified, or discarded in the course of consultation. Please review this information in advance of the consulting party meeting on January 13, 2011 and be prepared to discuss.

Western Building Follow-up Meeting

The purpose of the follow-up meeting on the Western Building will be to provide information on the decision to demolish the Western Building and will address a variety of issues in addition to historic preservation. The consulting party meeting will be devoted to just resolving the adverse effect of the AWVRP undertaking pursuant to Section 106; the follow-up meeting will address broader issues specific to the Western Building beyond Section 106. A preliminary agenda for the Western Building Follow-up Meeting is presented below.

12:00 PM – Introductions (SRIF)

12:05 PM - Purpose of the meeting (SRIF)

12:10 PM - The Western Building Decision Process (WSDOT)

- a. Safety
- b. Comments on SDEIS
- c. Effect to PSHD
- d. Effect on the Western Building Owners
- e. Effect on the Western Building Tenants
- f. Environmental Process
- g. Cost

1:00 PM - Western Building next steps (WSDOT)

1:10 PM - Questions

1:30 PM - Meeting adjourns

WSDOT and FHWA look forward to working with you to resolve the adverse effect of the AWVRP undertaking.

If you have any questions or concerns please contact me, via phone: 206-805-2887 or email: BartoyK@wsdot.wa.gov; or David Cushman, SRI Foundation, via phone: 505-892-5587 or email: dcushman @srifoundation.org.

Sincerely,

Kevin M. Bartoy
Cultural Resources Specialist
WSDOT ESO Mega Projects

Enclosures (2): 1) AWVRP Historic Properties List
 2) 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document

Cc: Randy Everett, FHWA
 Allison Hanson, WSDOT

Attachment 1. AWVRP Historic Properties List

Attachment 2. 619 Western Ave Building – Rehabilitation vs Demolition; Decision Document



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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January 31, 2011

Honorable Cecile Hansen
Duwamish Tribe
4705 West Marginal Way
Seattle, Washington 98106

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairwoman Hansen:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact Cultural Resources Specialist WSDOT ESO Mega Projects Kevin Bartoy at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

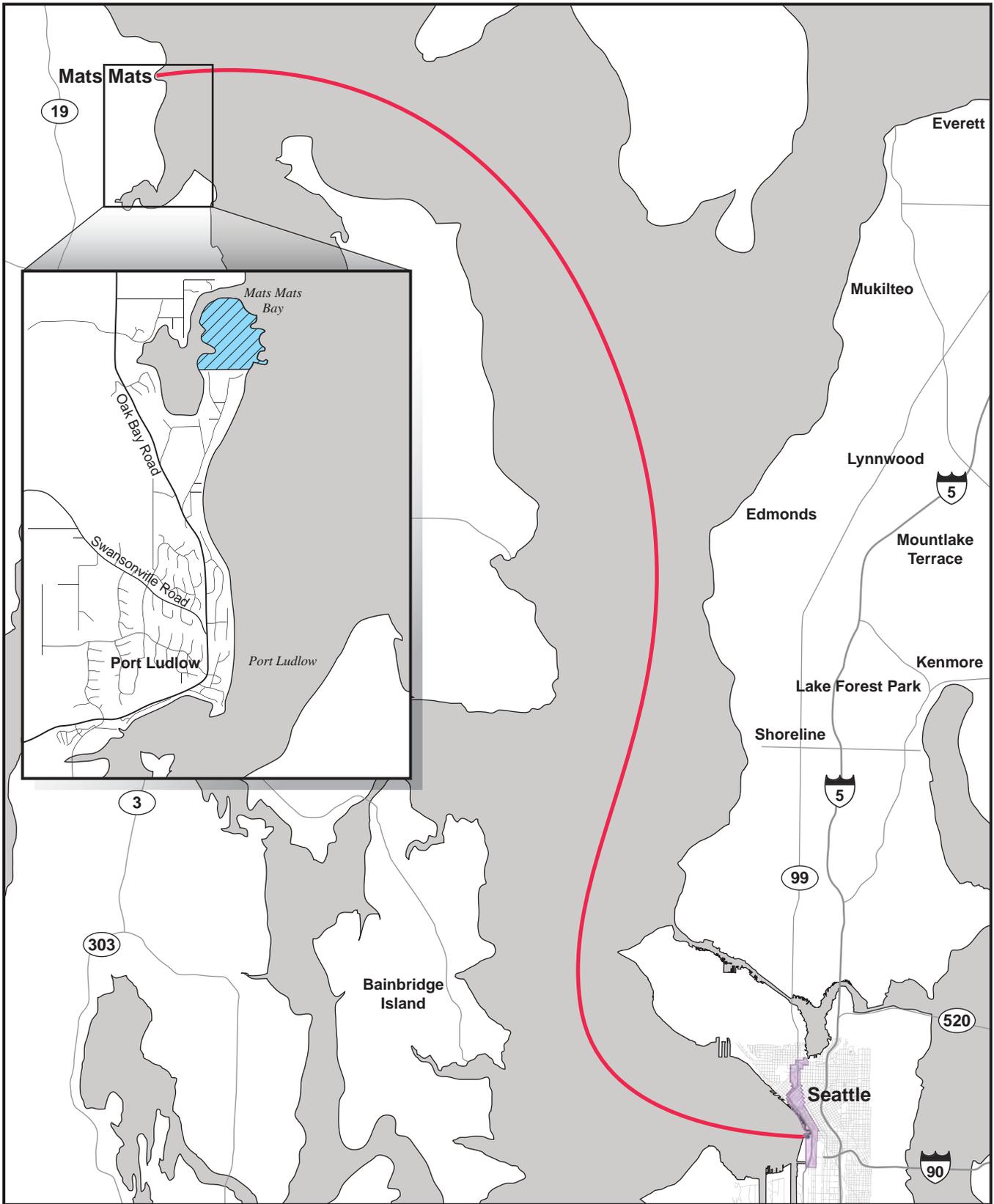
Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington

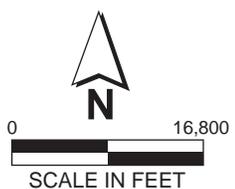
cc.

Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



Alaskan Way Viaduct Replacement Project

U.S. Department of Transportation
Federal Highway Administration

WSDOT

City of Seattle

January 31, 2011

Chairman W. Ron Allen
Jamestown S'Klallam Tribe
1033 Old Blyn Highway
Sequim, Washington 98382

Dear Chairman Allen,

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), would like to initiate government-to-government consultation with the Jamestown S'Klallam Tribe for the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified that is located within the tribe's area of consultation. As depicted on the attached map, the Area of Potential Effects (APE) has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The attached aerial photograph further illustrates the features of the existing facility.

WSDOT is currently preparing a Final Environmental Impact Statement under the National Environmental Policy Act (NEPA). WSDOT is working with other tribes as well as consulting parties to resolve adverse effects to historic resources that were identified during the environmental review process. We would like to consult with you in regards to the revision of the project APE to include the Mats Mats Quarry in Jefferson County. Recognizing the government-to-government relationship which the FHWA has with the Tribe, they will continue to play a key role in this undertaking as the responsible Federal agency. However, WSDOT has been delegated the authority from FHWA to initiate consultation. Although we will be directly managing the cultural resources compliance and carrying out this undertaking, you may contact FHWA at anytime for assistance with the process and/or the undertaking.

We are seeking your comments on a revised Area of Potential Effects (APE), which was revised to include the Mats Mats Quarry facility. Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. Existing shipping lanes between this facility and Seattle will be used to barge the material. It is anticipated that a maximum of two barges will be transported per day.

We would very much appreciate the opportunity to meet with you and other appropriate representatives of the Tribe in order to commence government-to-government consultation on the Alaskan Way Viaduct Replacement Project. The goal of the consultation is to identify any concerns that you may have in regards to the undertaking and reach mutually agreeable decisions while taking into account the interests of both the Tribal, State and Federal governments.

Thank you for taking the time to consider our invitation. We look forward to your response by March 2, 2011. Should you have questions or concerns please contact Kevin Bartoy (WSDOT Cultural Resources Specialist) at 206.805.2887, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Director WSDOT ESO Mega Projects) at 206.805.2880, email hanson@wsdot.wa.gov.

Sincerely,

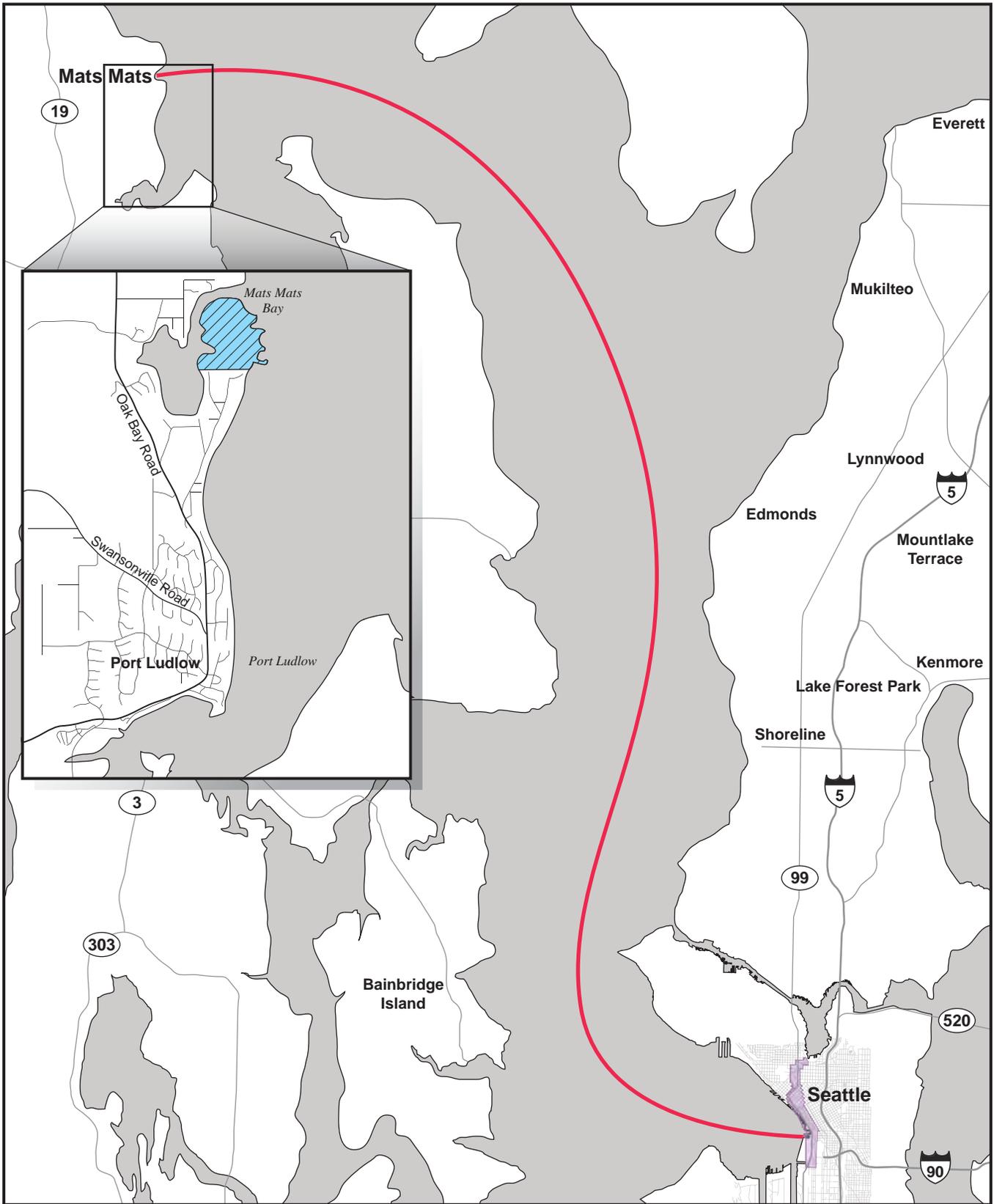


Ronald J. Paananen, P.E.
Administrator
Alaskan Way Viaduct and Seawall Replacement Project
Washington State Department of Transportation
999 Third Ave., Suite 2424
Seattle, WA 98104
206-267-6886
paananr@wsdot.wa.gov

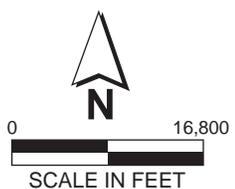
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: Kathleen Duncan, Jamestown S'Klallam Tribe
 Randy Everett, FHWA
 Matthew Sterner, DAHP
 Megan Cotton, WSDOT
 Allison Hanson, WSDOT
 Scott Williams, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



Alaskan Way Viaduct Replacement Project

U.S. Department of Transportation
Federal Highway Administration

WSDOT

City of Seattle

January 31, 2011

Chairwoman Frances Charles
Lower Elwha Klallam Tribe
2851 Lower Elwha Road
Port Angeles, Washington 98363

Dear Chairwoman Charles,

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), would like to initiate government-to-government consultation with the Lower Elwha Klallam Tribe Tribe for the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified that is located within the tribe's area of consultation. As depicted on the attached map, the Area of Potential Effects (APE) has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The attached aerial photograph further illustrates the features of the existing facility.

WSDOT is currently preparing a Final Environmental Impact Statement under the National Environmental Policy Act (NEPA). WSDOT is working with other tribes as well as consulting parties to resolve adverse effects to historic resources that were identified during the environmental review process. We would like to consult with you in regards to the revision of the project APE to include the Mats Mats Quarry in Jefferson County. Recognizing the government-to-government relationship which the FHWA has with the Tribe, they will continue to play a key role in this undertaking as the responsible Federal agency. However, WSDOT has been delegated the authority from FHWA to initiate consultation. Although we will be directly managing the cultural resources compliance and carrying out this undertaking, you may contact FHWA at anytime for assistance with the process and/or the undertaking.

We are seeking your comments on a revised Area of Potential Effects (APE), which was revised to include the Mats Mats Quarry facility. Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. Existing shipping lanes between this facility and Seattle will be used to barge the material. It is anticipated that a maximum of two barges will be transported per day.

We would very much appreciate the opportunity to meet with you and other appropriate representatives of the Tribe in order to commence government-to-government consultation on the Alaskan Way Viaduct Replacement Project. The goal of the consultation is to identify any concerns that you may have in regards to the undertaking and reach mutually agreeable decisions while taking into account the interests of both the Tribal, State and Federal governments.

Thank you for taking the time to consider our invitation. We look forward to your response by March 2, 2011. Should you have questions or concerns please contact Kevin Bartoy (WSDOT Cultural Resources Specialist) at 206.805.2887, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Director WSDOT ESO Mega Projects) at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

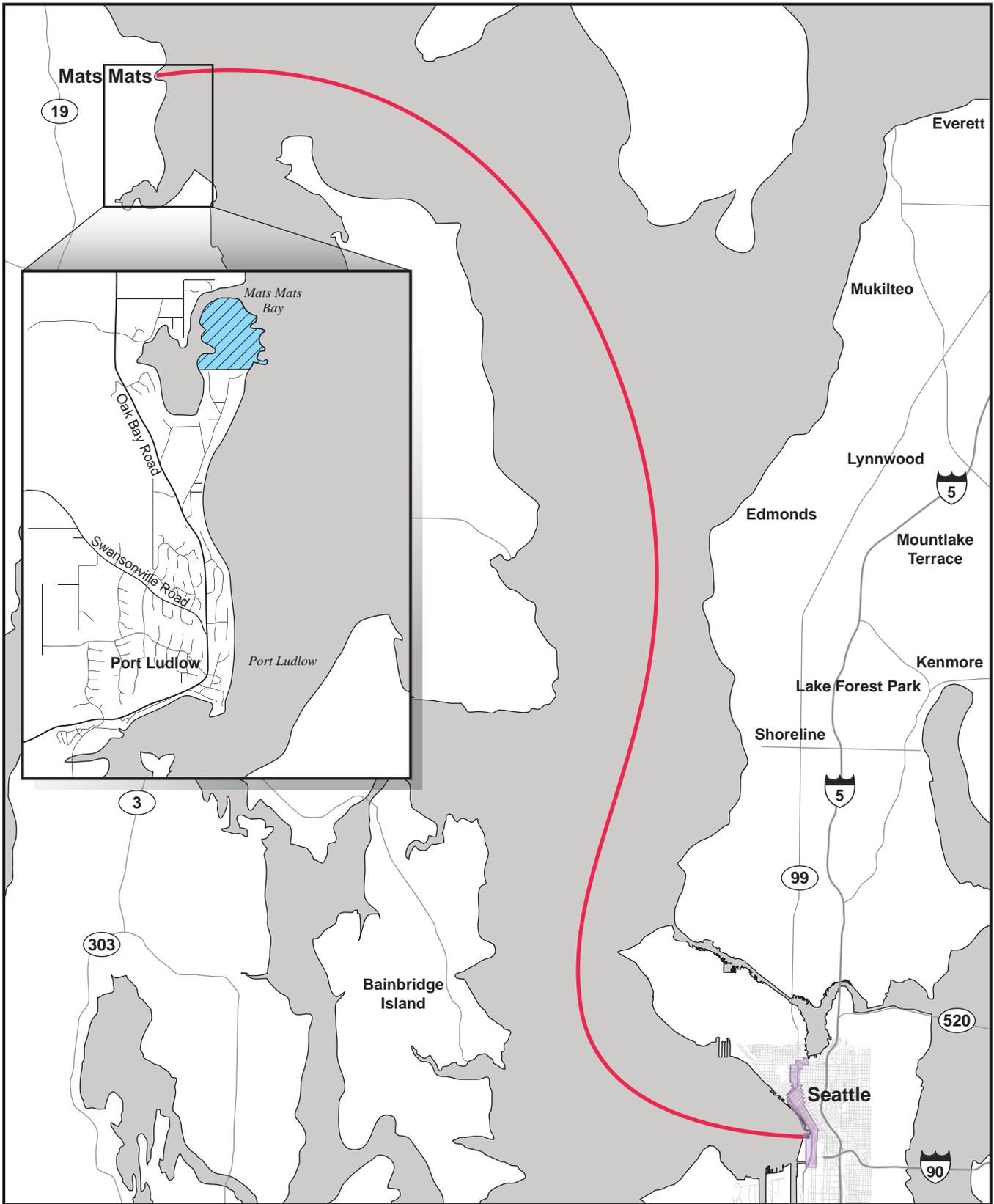


Ronald J. Paananen, P.E.
Administrator
Alaskan Way Viaduct and Seawall Replacement Project
Washington State Department of Transportation
999 Third Ave., Suite 2424
Seattle, WA 98104
206-267-6886
paananr@wsdot.wa.gov

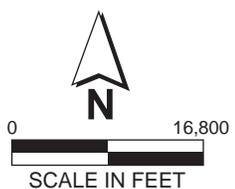
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: William S. White, Lower Elwha Klallam
 Carmen Watson-Charles, Lower Elwha Klallam
 Randy Everett, FHWA
 Matthew Sterner, DAHP
 Megan Cotton, WSDOT
 Allison Hanson, WSDOT
 Scott Williams, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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Seattle, WA 98104
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TTY: 1-800-833-6388
www.wsdot.wa.gov

January 31, 2011

Honorable Virginia Cross
Muckleshoot Tribe
39015 172nd Avenue SE
Auburn, Washington 98092

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairwoman Cross:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact Cultural Resources Specialist WSDOT ESO Mega Projects Kevin Bartoy at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

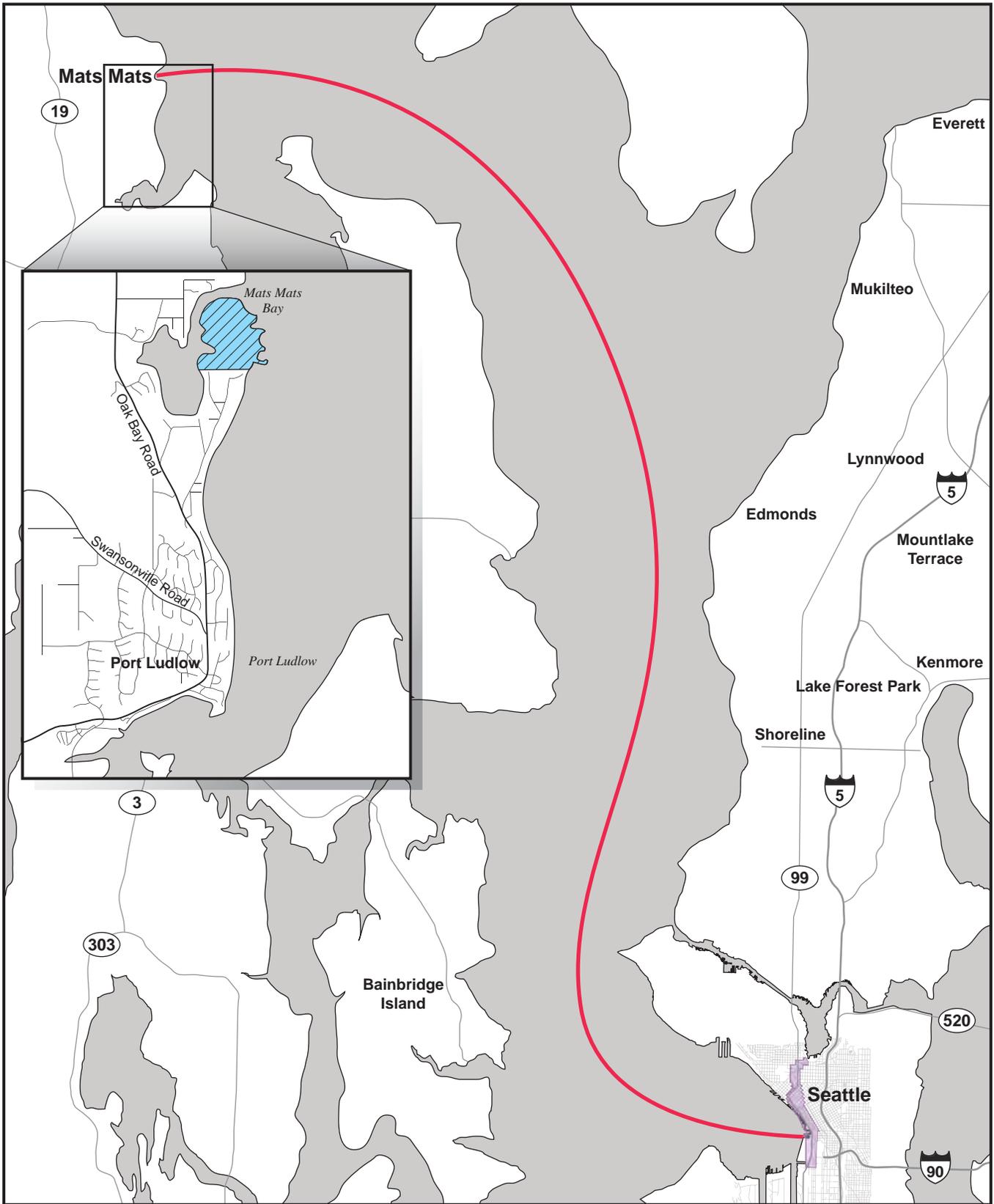
Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington

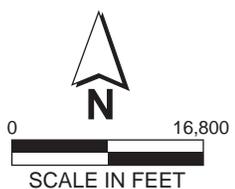
cc.

Laura Murphy, Muckleshoot Tribe
Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



Alaskan Way Viaduct Replacement Project

U.S. Department of Transportation
Federal Highway Administration

WSDOT

City of Seattle

January 31, 2011

Chairman Jeromy Sullivan
Port Gamble S'Klallam Tribe
31912 Little Boston Road NE
Kingston, Washington 98346

Dear Chairman Sullivan,

Pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), would like to initiate government-to-government consultation with the Port Gamble S'Klallam Tribe for the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified that is located within the tribe's area of consultation. As depicted on the attached map, the Area of Potential Effects (APE) has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The attached aerial photograph further illustrates the features of the existing facility.

WSDOT is currently preparing a Final Environmental Impact Statement under the National Environmental Policy Act (NEPA). WSDOT is working with other tribes as well as consulting parties to resolve adverse effects to historic resources that were identified during the environmental review process. We would like to consult with you in regards to the revision of the project APE to include the Mats Mats Quarry in Jefferson County. Recognizing the government-to-government relationship which the FHWA has with the Tribe, they will continue to play a key role in this undertaking as the responsible Federal agency. However, WSDOT has been delegated the authority from FHWA to initiate consultation. Although we will be directly managing the cultural resources compliance and carrying out this undertaking, you may contact FHWA at anytime for assistance with the process and/or the undertaking.

We are seeking your comments on a revised Area of Potential Effects (APE), which was revised to include the Mats Mats Quarry facility. Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. Existing shipping lanes between this facility and Seattle will be used to barge the material. It is anticipated that a maximum of two barges will be transported per day.

We would very much appreciate the opportunity to meet with you and other appropriate representatives of the Tribe in order to commence government-to-government consultation on the Alaskan Way Viaduct Replacement Project. The goal of the consultation is to identify any concerns that you may have in regards to the undertaking and reach mutually agreeable decisions while taking into account the interests of both the Tribal, State and Federal governments.

Thank you for taking the time to consider our invitation. We look forward to your response by March 2, 2011. Should you have questions or concerns please contact Kevin Bartoy (WSDOT Cultural Resources Specialist) at 206.805.2887, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Director WSDOT ESO Mega Projects) at 206.805.2880, email hanson@wsdot.wa.gov.

Sincerely,

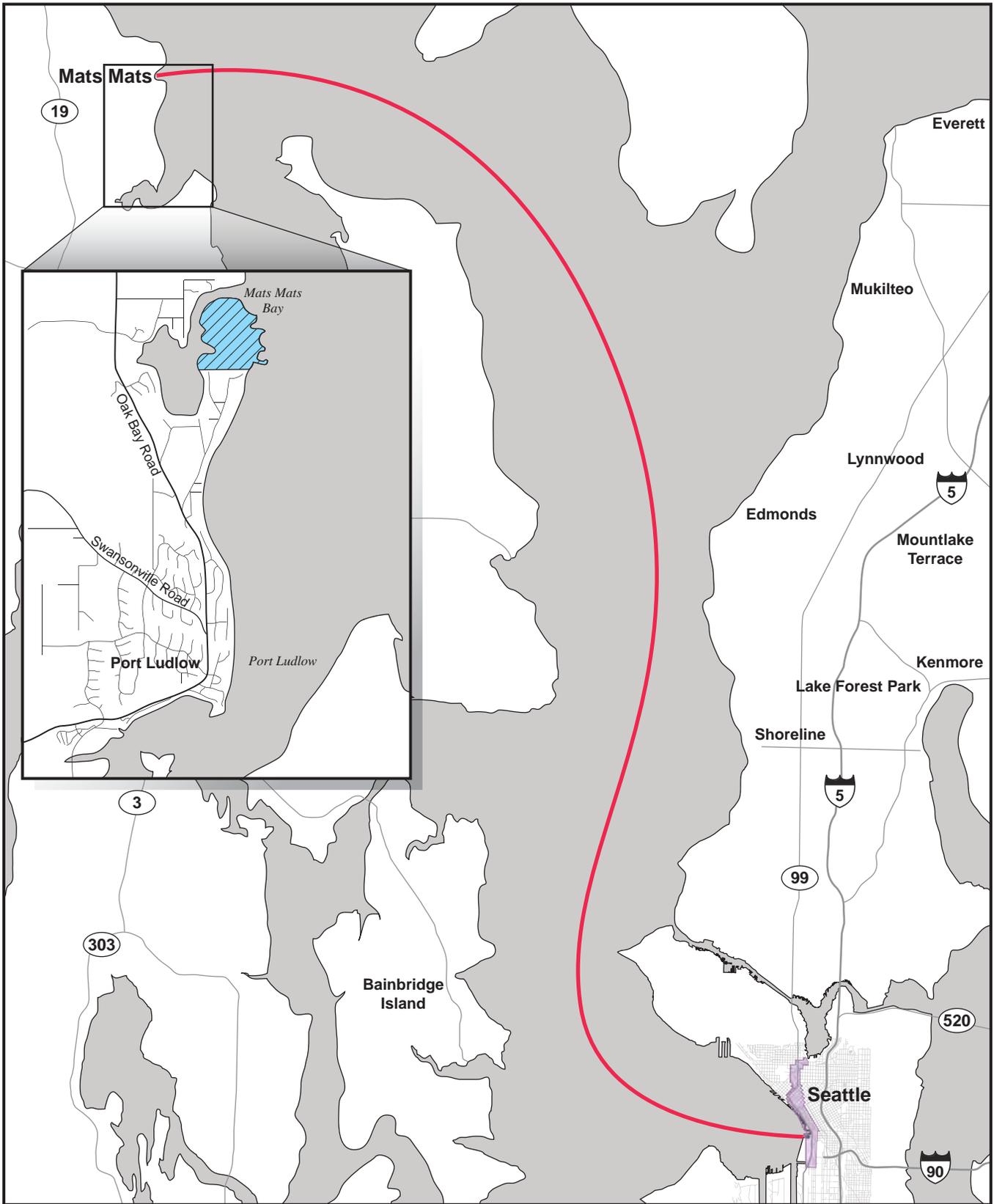


Ronald J. Paananen, P.E.
Administrator
Alaskan Way Viaduct and Seawall Replacement Project
Washington State Department of Transportation
999 Third Ave., Suite 2424
Seattle, WA 98104
206-267-6886
paananr@wsdot.wa.gov

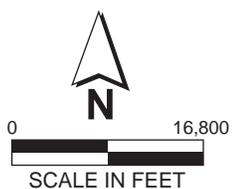
Enclosures (2): 1) Location Map of Mats Mats Quarry, Jefferson County, Washington
 2) Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson
 County, Washington

cc: Josh Wisniewski, Port Gamble S'Klallam Tribe
 Marie Hebert, Port Gamble S'Klallam Tribe
 Randy Everett, FHWA
 Matthew Sterner, DAHP
 Megan Cotton, WSDOT
 Allison Hanson, WSDOT
 Scott Williams, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

ESO Mega Projects
999 Third Avenue, Suite 2424
Seattle, WA 98104
206-805-2887/ fax 206-716-1101
TTY: 1-800-833-6388
www.wsdot.wa.gov

January 31, 2011

Chairwoman Shelley Burch
Snoqualmie Tribe
PO Box 969
Snoqualmie, Washington 98065

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairman Burch:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact Cultural Resources Specialist WSDOT ESO Mega Projects Kevin Bartoy at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

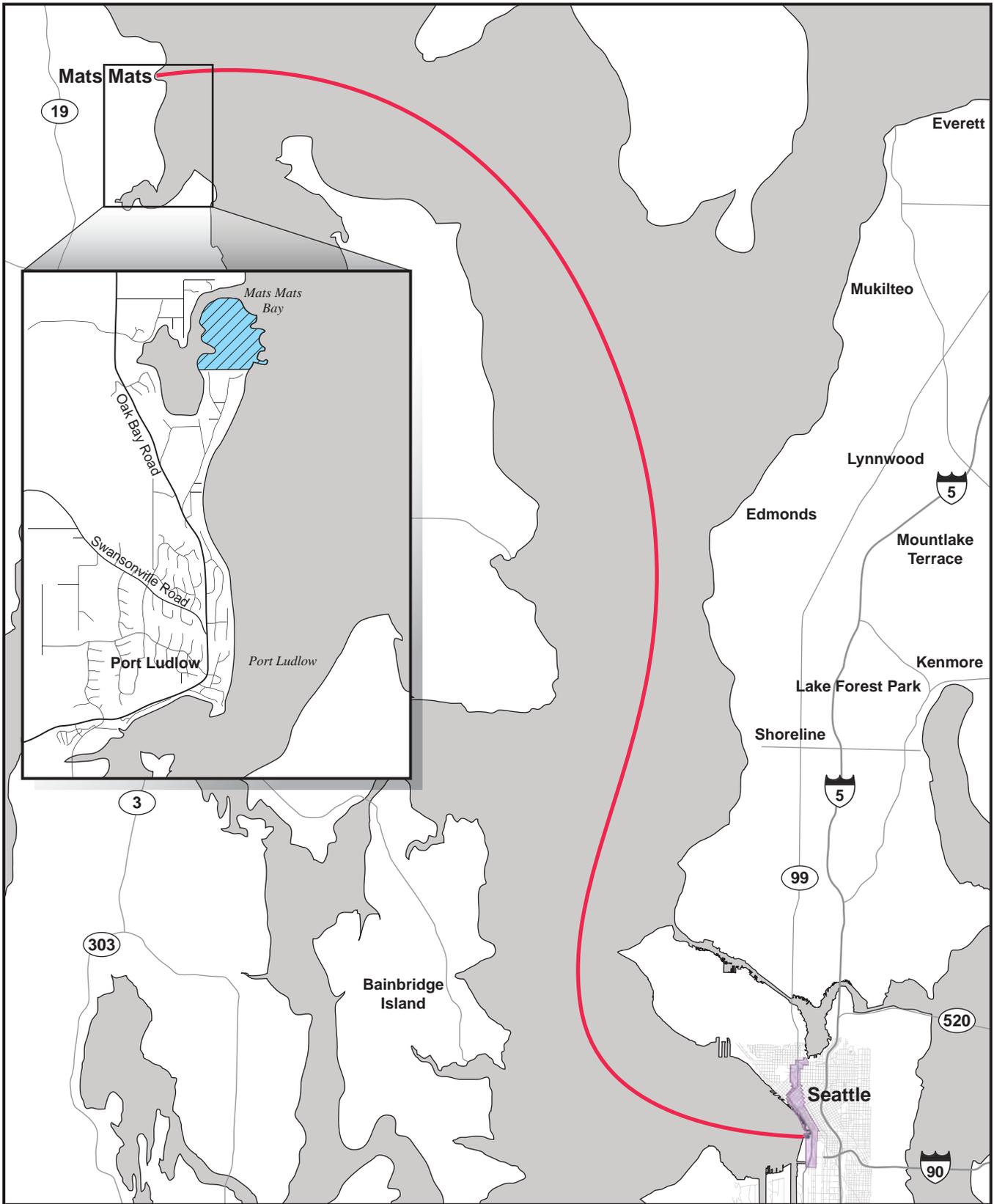
Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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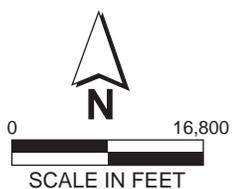
cc.

Ray Mullen, Snoqualmie Tribe
Adam Osbekoff, Snoqualmie Tribe
Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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Seattle, WA 98104
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TTY: 1-800-833-6388
www.wsdot.wa.gov

January 31, 2011

Honorable Leonard Forsman
Suquamish Tribe
PO Box 498
Suquamish, Washington 98292

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairman Forsman:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

As depicted on the attached map, the APE has expanded to include Cal-Portland's Mats Mats Quarry located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. The Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWW Replacement Project will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. The attached aerial photograph further illustrates the features of the existing facility.

Thank you for your continued participation in consultation on this project. We look forward to your comment on this revision to the APE by March 2, 2011. Should you have questions or concerns please contact Cultural Resources Specialist WSDOT ESO Mega Projects Kevin Bartoy at 206.805.2887, email bartoyk@wsdot.wa.gov or Environmental Director WSDOT ESO Mega Projects Allison Hanson at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,

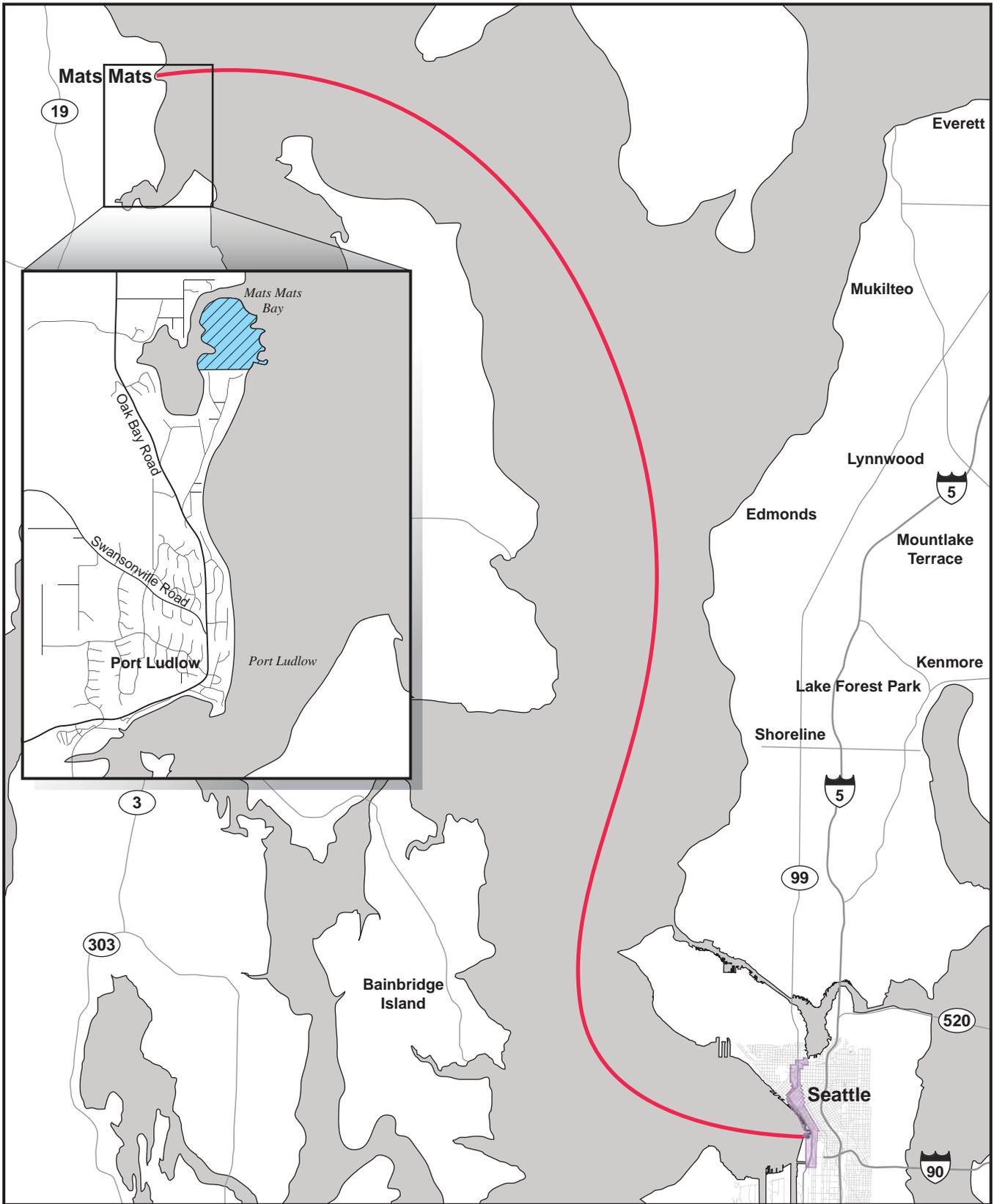
Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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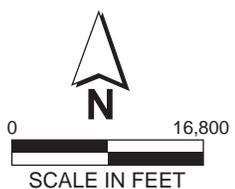
cc.

Dennis Lewarch, Suquamish Tribe
Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
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Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
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TTY: 1-800-833-6388
www.wsdot.wa.gov

January 31, 2011

Honorable Melvin R. Sheldon
Tulalip Tribes
6406 Marine Drive
Tulalip, Washington 98271

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairman Sheldon:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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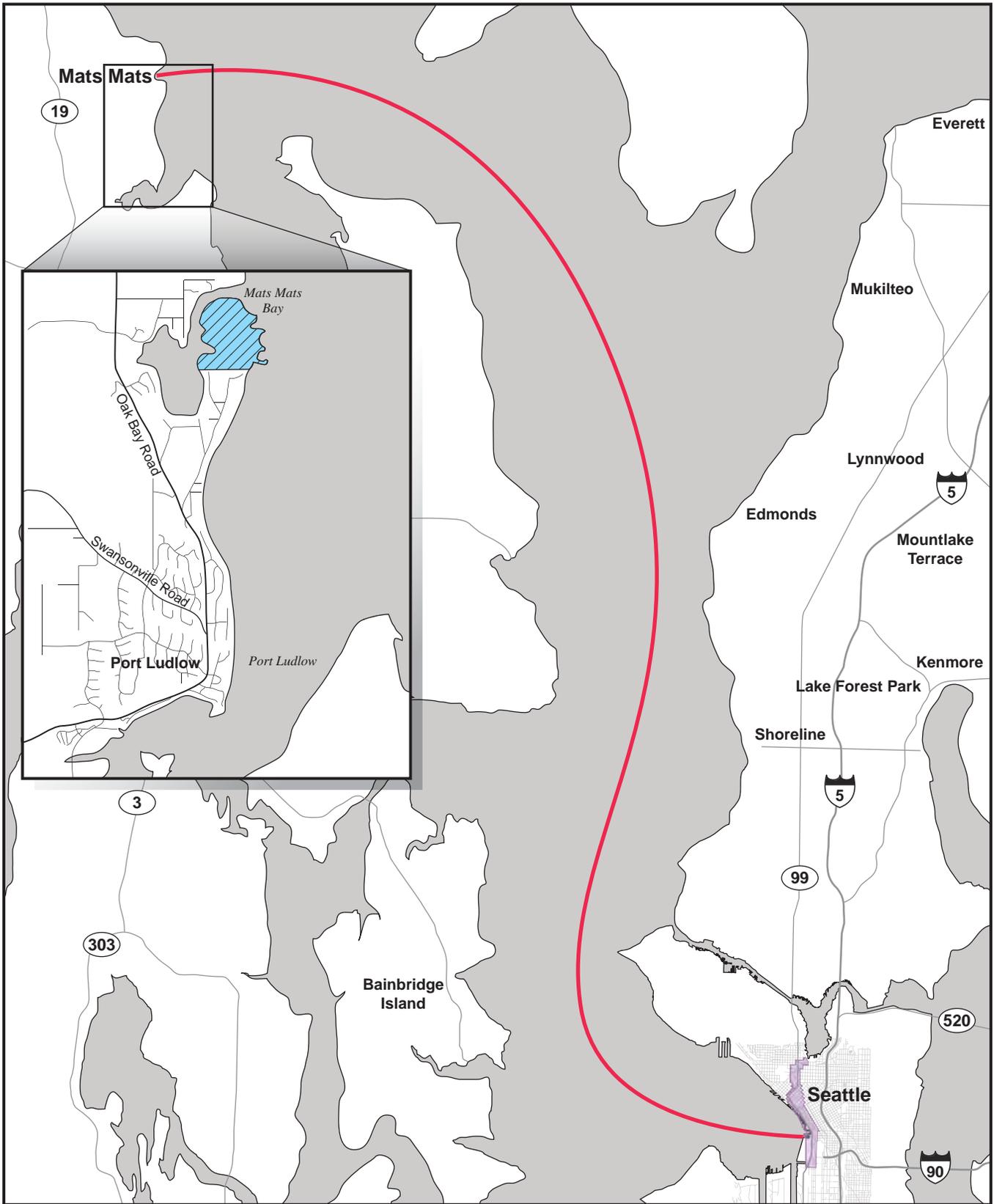
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Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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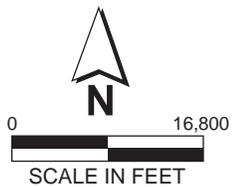
cc.

Hank Gobin, Tulalip Tribes
Richard Young, Tulalip Tribes
Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
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-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted



**Washington State
Department of Transportation**

Paula Hammond
Secretary of Transportation

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www.wsdot.wa.gov

January 31, 2011

Honorable Harry Smiskin
Yakama Nation
PO Box 151
Toppenish, Washington 98948

Re: Alaskan Way Viaduct Replacement Project, Comment Request for Revised Area of Potential Effects (APE)

Dear Chairman Smiskin:

On behalf of the Federal Highway Administration (FHWA), pursuant to 36 CFR 800.2(c)(2), the Washington State Department of Transportation (WSDOT) is continuing consultation in regards to the Alaskan Way Viaduct Replacement Project. With continued planning for this project, a reasonably foreseeable disposal location for uncontaminated tunnel excavation spoils has been identified. We are seeking your comments on a revised Area of Potential Effects (APE), which includes this existing facility.

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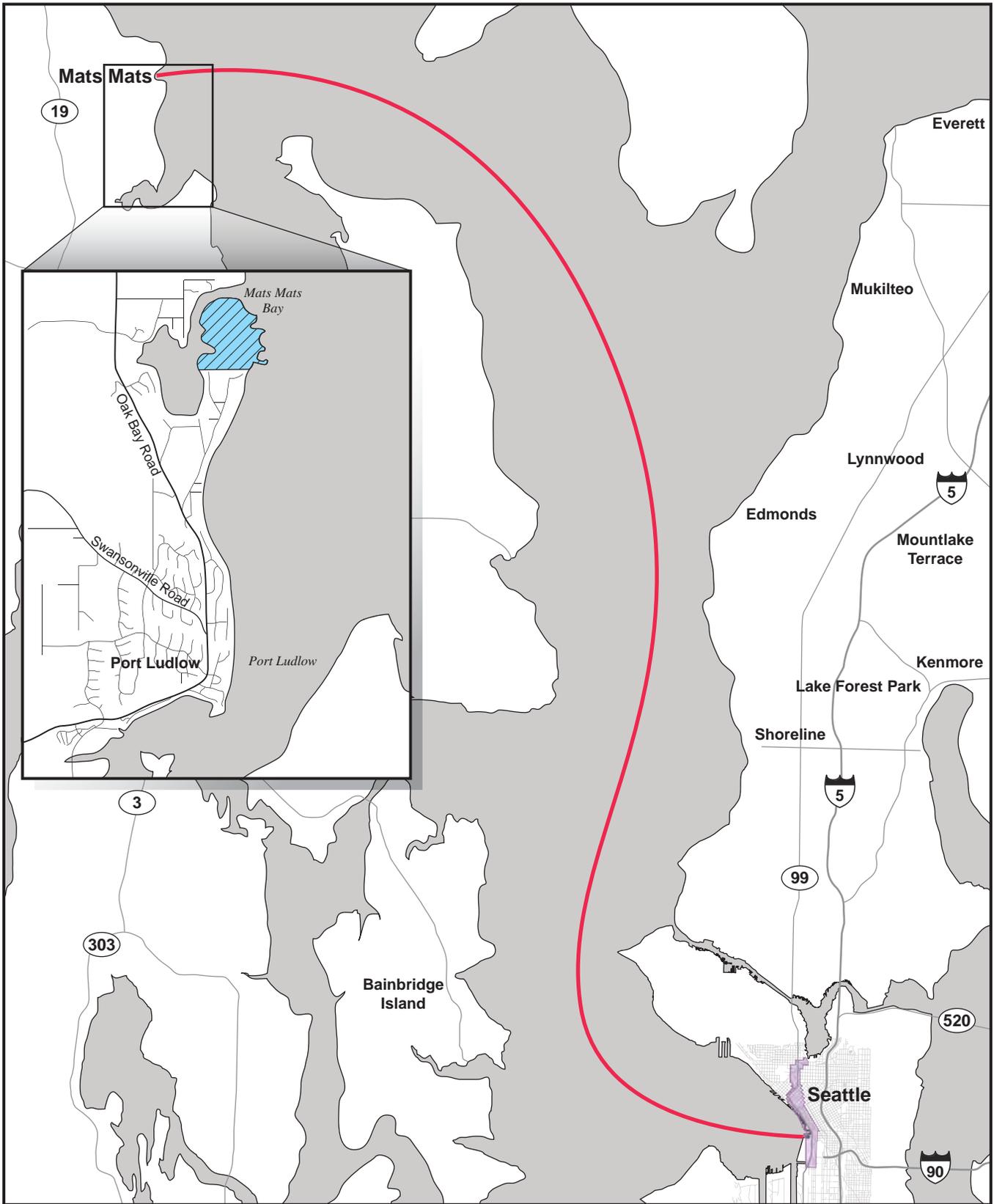
Ronald Paananen
Administrator
Alaskan Way Viaduct and Seawall Replacement Program

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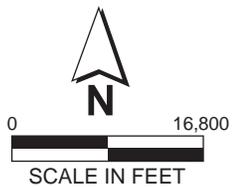
cc.

Johnson Meninick, Yakama Nation
Matthew Sterner, DAHP
Randy Everett, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT
Megan Cotton, WSDOT

Location Map of Mats Mats Quarry, Jefferson County, Washington



12/14/10



-  Existing Mats Mats Quarry
-  Barge Route
-  Existing Bored Tunnel APE

Revised Area of Potential Effects Spoils Disposal Facility

Aerial Photograph with Annotations of the Mats Mats Quarry, Jefferson County, Washington



Existing Mats Mats Quarry Facility with Work Locations Noted

Washington. This village has been documented as a historic ethnographic village that was used for the purpose of potlatching by Native American tribes. The Traditional Cultural Property of "Tamanous Rock" offers a panoramic view of Hood Canal where Klallam ancestors sought spiritual guidance through vision quest. The Lower Elwha Klallam Tribe recommends that your department review its cultural resource monitoring and discovery plan with the Lower Elwha Klallam and Port Gamble S'Klallam Tribes prior to any ground disturbing activities. Should archaeological or cultural resources be inadvertently discovered during this project the Lower Elwha Klallam Tribe will exercise its subsequent legal rights under the National Historic Preservation Act's Section 106 process to participate as a consulting party and provide direction and comment on this undertaking. Thank you again for the opportunity to provide comment on the proposed project.

Sincerely,



William S. White
Tribal Archaeologist, MA
Cultural Resources Department
Lower Elwha Klallam Tribe
2851 Lower Elwha Road
Port Angeles, WA 98363

cc: Frances Charles, Tribal Chairwoman, Lower Elwha Klallam Tribe
LEKT Business Committee
Sonya Tetnowski, Chief Executive Officer
File



Alaskan Way Viaduct Replacement Project

U.S. Department of Transportation
Federal Highway Administration

WSDOT

City of Seattle

March 9, 2011

William S. White
Tribal Archaeologist
Cultural Resources Department
Lower Elwha Klallam Tribe
2851 Lower Elwha Road
Port Angeles, Washington 98363

Re: Alaskan Way Viaduct Replacement Project Use of Mats Mats Quarry

Dear Mr. White,

On behalf of the Federal Highway Administration (FHWA), the Washington State Department of Transportation (WSDOT) would like to thank you for your letter response dated February 15, 2011. We understand that there are several recorded shell middens along the shoreline north of Port Ludlow, Washington in addition to the village site of "Tsets-I-Bus" that lies underneath the modern town of Port Ludlow. We also understand that the Lower Elwha Klallam Tribe considers "Tamanous Rock" to be a Traditional Cultural Property important to the Klallam ancestors and members of the the Lower Elwha Klallam Tribe.

As currently planned, the Alaskan Way Viaduct Replacement Project (AWVRP) will be using Cal-Portland's Mats Mats Quarry facility located on Basalt Point approximately three miles north of Port Ludlow in Jefferson County, Washington. Mats Mats Quarry is an existing facility that is currently backfilling previously mined sections of the quarry with suitable fill material. Spoils from the AWVRP will be barged to the quarry location using existing facilities; no new construction will be necessary for the transport and disposal process. No ground disturbance will occur as a result of these activities. Existing shipping lanes between this facility and Seattle will be used to barge the material. It is anticipated that a maximum of two barges will be transported per day.

Given that there is no ground disturbance planned for the activities at Mats Mats Quarry, a monitoring plan specific to this facility will not be developed. However, WSDOT is currently developing an Archaeological Treatment Plan for the portions of the AWVRP located in Seattle, Washington that include ground disturbance. This treatment plan will include provisions for monitoring in areas of planned ground disturbance as well as an unanticipated discovery plan for the entire AWVRP. Although activities at Mats Mats Quarry will not include ground disturbance, the unanticipated discovery plan will be in effect for all project activities.

WSDOT would be pleased to provide this unanticipated discovery plan to the Lower Elwha Klallam and Port Gamble S'Klallam for review.

Your letter indicates that the tribe would only participate as a consulting party in the event that archaeological or cultural resources are inadvertently discovered during project activities at Mats Mats Quarry. In order to clarify the participation of the Lower Elwha Klallam Tribe in this project, please let me know if my understanding is correct in this regard.

Once again, thank you for your letter and the information provided in regards to cultural resources of significance to the Lower Elwha Klallam Tribe in the vicinity of the Mats Mats Quarry. Should you have additional questions or concerns please contact me at 206.805.2887, email bartoyk@wsdot.wa.gov or Allison Hanson (Environmental Director WSDOT ESO Mega Projects) at 206.805.2880, email hansona@wsdot.wa.gov.

Sincerely,



Kevin M. Bartoy
Cultural Resources Specialist
Alaskan Way Viaduct and Seawall Replacement Program
WSDOT ESO Mega Projects

cc: Carmen Watson-Charles, Lower Elwha Klallam
Randy Everett, FHWA
Matthew Sterner, DAHP
Megan Cotton, WSDOT
Allison Hanson, WSDOT
Scott Williams, WSDOT

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Appendix U
Correspondence

Endangered Species Act
Correspondence

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**Washington State
Department of Transportation**
Paula J. Hammond, P.E.
Secretary of Transportation

**Alaskan Way Viaduct & Seawall
Replacement Program**
999 Third Avenue, #2424, MS NB82-230
Seattle, WA 98104-4019

206-267-6840 / Fax 206-382-5291
TTY: 1-800-833-6388
www.wsdot.wa.gov

August 12, 2010

Mr. Ken Berg
U.S. Fish and Wildlife Service
510 Desmond Drive SE, Suite 102
Lacey, Washington 98503-1273

Re: SR99: Alaskan Way Viaduct Replacement Project Biological Assessment

Dear Mr. Berg:

The Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is proposing to replace the Alaskan Way Viaduct in Seattle, King County, Washington. The project is necessary provide a facility that meets current seismic safety standards and maintain State Route (SR) 99 as a critical regional transportation corridor.

The SR 99: Alaskan Way Viaduct Replacement Project (the project) proposes to replace SR 99 with a bored tunnel, construct north and south portals and associated tunnel operations buildings, relocate utilities currently on or under the viaduct, remove the existing viaduct, decommission the Battery Street Tunnel, improve surface streets in the tunnel's south and north portal areas, and provide stormwater treatment and detention. Project construction will begin in 2011 and take approximately 66 months to complete.

The project includes funding from the FHWA and is therefore it is subject to requirements under Section 7(c) of the Endangered Species Act. WSDOT conducted a Biological Assessment (BA) on behalf of FHWA to comply with Section 7(c) consultation requirements. The BA concludes the following effect determinations for the project:

May affect, not likely to adversely affect bull trout;

May affect, not likely to adversely affect designated bull trout critical habitat;

Will not destroy or adversely modify proposed bull trout critical habitat; and

No effect on marbled murrelet.

It is our understanding that this satisfies our responsibilities under Section 7(c) of the ESA at this time. We will continue to remain aware of any change in status of these species and will be prepared to re-evaluate potential project impacts if necessary.

Please contact George Ritchotte at (206) 521-5633 or ritchog@wsdot.wa.gov if you require additional information or have any questions about this project.

Sincerely,



Michelle Meade
Biology Program Manager
WSDOT ESO Megaprojects

Attachment: Biological Assessment for SR99: Alaskan Way Viaduct Replacement Project

cc: Allison Hanson, WSDOT ESO Megaprojects Environmental Director
Angela Freudenstein, WSDOT AWW Replacement Project Environmental Manager



U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284
(360) 753-9480
(360) 753-9889 (FAX)
<http://www.fhwa.dot.gov/wadiv>

August 16, 2010

HADA-WA.1/WA 525

Mr. Steve Landino
Washington State Habitat Director
National Marine Fisheries Service
510 Desmond Drive SE, Suite 103
Lacey, WA 98503

**Biological Assessment for the SR99
Alaskan way Viaduct Replacement
Project**

Dear Mr. Landino:

The Federal Highway Administration (FHWA) is providing funds to the Washington State Department of Transportation (WSDOT) to replace the Alaskan Way Viaduct in Seattle, King County, Washington. The project is necessary provide a facility that meets current seismic safety standards and maintain State Route (SR) 99 as a critical regional transportation corridor. The SR 99: Alaskan Way Viaduct Replacement Project proposes to replace SR99 with a bored tunnel, construct north and south portals and associated tunnel operations buildings, relocate utilities currently on or under the viaduct, remove the existing viaduct, decommission the Battery Street Tunnel, improve surface streets in the tunnel's south and north portal areas, and provide stormwater treatment and detention. Project construction is scheduled to begin in July 2011 and take approximately 66 months to complete.

The enclosed biological assessment (BA) was prepared on our behalf by WSDOT for listed species as required under Section 7(c) of the Endangered Species Act. The BA concludes the following effect determinations for the project:

May affect, likely to adversely affect Puget Sound Chinook salmon evolutionarily significant unit (ESU);

May affect, not likely to adversely affect Puget Sound Chinook salmon ESU critical habitat;

May affect, not likely to adversely affect southern resident killer whale (SRKW) distinct population segment (DPS); and



May affect, not likely to adversely affect Puget Sound steelhead DPS.

Additionally, the BA concludes that the proposed project will have **no effect** on humpback whale, SRKW DPS critical habitat, Steller sea lion, Hood Canal summer chum ESU, Hood canal summer chum ESU critical habitat, green sturgeon, Pacific eulachon, canary rockfish, bocaccio, or yelloweye rockfish.

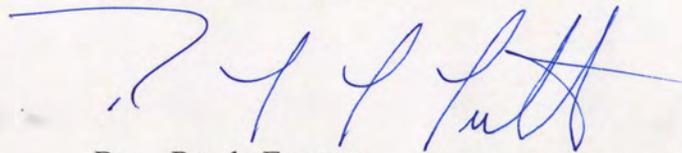
Therefore, we are requesting formal consultation on Puget Sound Chinook salmon ESU, and informal consultation on Puget Sound Chinook salmon ESU critical habitat, SRKW, and Puget Sound steelhead DPS. FHWA understands that, as stipulated in ESA Section 7(b)(1)(A) and 50 CFR §402.14(e), formal consultation will be initiated by your receipt of this request, and will conclude within 90 days from that date. We look forward to receiving a letter from you concurring with our determination within 30 days. If no letter is received within this timeframe, we will assume that you are in concurrence with our determination. NMFS will develop a Biological Opinion (BO) within 45 days of completing the formal consultation period. FHWA requests advance copies of the draft BO, incidental take statement, terms and conditions, and reasonable and prudent measure for review prior to finalizing the BO.

It is our understanding that following completion of formal consultation on Puget Sound Chinook salmon ESU and receiving concurrence on Chinook critical habitat, SRKW, and Puget Sound steelhead DPS our responsibilities under Section 7(c) of the Endangered Species Act will be satisfied. We will continue to remain aware of any change in status of these species and will be prepared to re-evaluate potential project impacts if necessary.

Please contact George Ritchotte at (206) 521-5633 or ritchog@wsdot.wa.gov if you require additional information or have any questions about this project.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator

A handwritten signature in blue ink, appearing to read 'Randy Everett', is written over a horizontal line.

By: Randy Everett
Major Projects Oversight Manager

Enclosure

cc: Allison Hanson, WSDOT ESO Megaprojects Environmental Director
Michelle Meade, WSDOT ESO Megaprojects Biology Program Manager
Angela Freudenstein, WSDOT AWW Replacement Project Environmental Manager

SR 99: ALASKAN WAY VIADUCT REPLACEMENT PROJECT

Biological Assessment

Prepared by:
Washington State Department of Transportation
ESO Mega Projects
999 3rd Avenue, Suite 2424
Seattle, WA 98104

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ACRONYMS AND ABBREVIATIONS

AWV	Alaskan Way Viaduct
BA	biological assessment
BMP	best management practices
BST	Battery Street tunnel
C	centigrade
CDF	controlled density fill
cm	centimeter
cfs	cubic feet per second
City	City of Seattle
cm	centimeter
Corps	U.S. Army Corps of Engineers
CSO	combined sewer overflow
DCu	dissolved copper
dB	decibel
DO	dissolved oxygen
DPS	distinct population segment
DZn	dissolved zinc
EBI	Elliott Bay Interceptor
ECM	Environmental Compliance Manager
Ecology	Washington State Department of Ecology
EFH	essential fish habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESC	erosion and sediment control
ESU	evolutionarily significant unit
F	Fahrenheit
FHWA	Federal Highway Administration
gpm	gallons per minute

HUC	Hydrologic Unit Code
IS	impervious surface
m	meter
µg/L	micrograms per liter
mm	millimeter
NMFS	National Marine Fisheries Service
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
PCE	primary constituent elements
PGIS	pollutant-generating impervious surface
PHS	priority habitat and species
RM	river mile
Services	National Marine Fisheries Service and U.S. Fish and Wildlife Service
SGMP	soil and groundwater management plan
SPCC	spill prevention, control, and countermeasures
SR	state route
SRKW	southern resident killer whale
SWPPP	stormwater pollution prevention plan
TBM	tunnel boring machine
TCu	total copper
TDA	threshold discharge area
TESC	temporary erosion and sediment control
TSS	total suspended solids
TZn	total zinc
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WOSCA	Washington-Oregon Shippers Cooperative Association
WPTP	West Point Treatment Plant
WRIA	watershed resource inventory area
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

The Federal Highway Administration (FHWA), the Washington State Department of Transportation (WSDOT) and the City of Seattle (City) are proposing to replace the Alaskan Way Viaduct because it is likely to fail in an earthquake. This Biological Assessment (BA) addresses the Bored Tunnel Alternative for the project. The Bored Tunnel Alternative would replace State Route (SR) 99 with a bored tunnel, construct south and north portals and associated tunnel operations buildings, relocate utilities currently on or under the viaduct, remove the existing viaduct, decommission the Battery Street tunnel (BST), improve surface streets in the tunnel's south and north portal areas, manage groundwater during construction, and provide stormwater treatment and detention. Project construction will begin in 2011 and take approximately 66 months to complete. The Bored Tunnel alternative is one of the alternatives being considered for the project.

Project Location

The proposed bored tunnel will extend approximately 1.7 miles underneath the City of Seattle from S. Royal Brougham Way in the south to Roy Street in the north.

Project Description

The proposed project will replace the viaduct with a bored tunnel. The tunnel will be a stacked structure approximately 49 feet in internal diameter with southbound lanes on the upper level and northbound lanes on the lower level. Associated improvements will include relocating utilities currently on or under the viaduct, removing the existing viaduct, decommissioning the BST, and making improvements to the surface streets in the tunnel's south and north portal areas. Tunnel spoils will be transported via barge to Mats Mats quarry in Port Ludlow, Washington, for disposal.

Construction will take approximately 66 months. Numerous measures will be used to minimize or avoid potential effects on species and habitats in the action area. These include the following:

- Best management practices and monitoring measures will be specified to ensure that construction stormwater and dewatering water will minimize impacts to water quality.
- No in-water work will be associated with the project.
- The project will reduce pollutant-generating impervious surface (PGIS) in the action area and provide treatment for stormwater runoff, reducing pollutant loading and concentrations in Lake Union and Elliott Bay.
- The project will provide detention for stormwater discharged to the City's combined sewer system at the north end of the project to prevent any increase in the frequency and volume of untreated wastewater discharge to Elliott Bay.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The project component with the greatest extent of impact is noise generated by construction equipment. Aerial transmission of sound could affect terrestrial habitats within approximately 650 feet of the construction footprint (which includes the north and south portals, viaduct, and staging areas). The project will discharge stormwater to three existing outfalls in Elliott Bay and to one to Lake Union. Tunnel spoils will be barged to Mats Mats quarry for disposal. Several staging areas have been identified in downtown Seattle.

The action area therefore encompasses a 650-foot radius from the construction footprint, the mixing zone around each of the stormwater outfalls, and the barge route from the Seattle waterfront to Mats Mats quarry.

Species and Critical Habitat Information

This biological assessment (BA) was prepared to determine the potential effects of the project on listed and proposed threatened and endangered species and their critical habitat. Species addressed in this BA are listed in Exhibit ES-1. Designated critical habitat for southern resident killer whale, Chinook salmon, bull trout, and Hood Canal summer-run chum also occurs within the action area. Revisions to bull trout critical habitat have also been proposed. Designated critical habitat for Steller sea lions, green sturgeon, and marbled murrelets does not occur in the action area. Critical habitat has not been designated for the other species addressed in this BA.

Effects Analysis and Determinations

Exhibit ES-1 summarizes effect determinations for each species. The primary potential effect on listed species is due to the discharge of project stormwater from existing outfalls. Reduction of PGIS and implementation of stormwater treatment and detention, as well as BMPs incorporated into the project description, will minimize and avoid adverse effects to listed species.

Exhibit ES-1. Summary of Effects Determinations for Listed Species and Critical Habitat

Common Name (Scientific Name)	ESA Status	Effects Determination
Southern resident killer whale DPS (<i>Orcinus orca</i>)	E	May affect, not likely to adversely affect
Southern resident killer whale DPS critical habitat	D	No effect
Humpback whale (<i>Megaptera novaeangliae</i>)	E	No effect
Steller sea lion (<i>Eumetopias jubatus</i>)	T	No effect
Puget Sound Chinook salmon ESU (<i>Oncorhynchus tshawytscha</i>)	T	May affect, likely to adversely affect
Chinook salmon critical habitat	D	May affect, not likely to adversely affect
Hood Canal summer chum ESU (<i>Oncorhynchus keta</i>)	T	No effect

Exhibit ES-1. Summary of Effects Determinations for Listed Species and Critical Habitat (continued)

Common Name (Scientific Name)	ESA Status	Effects Determination
Hood Canal summer chum ESU critical habitat	D	No effect
Puget Sound steelhead DPS (<i>Oncorhynchus mykiss</i>)	T	May affect, not likely to adversely affect
Green sturgeon (<i>Acipenser medirostris</i>)	T	No effect
Pacific eulachon (<i>Thaleichthys pacificus</i>)	T	No effect
Coastal-Puget Sound bull trout DPS (<i>Salvelinus confluentus</i>)	T	May affect, not likely to adversely affect
Bull trout critical habitat	D	May affect, not likely to adversely affect
Bull trout critical habitat	P	Will not destroy or adversely modify
Marbled murrelet (<i>Brachyramphus marmoratus</i>)	T	No effect
Canary rockfish (<i>Sebastes pinniger</i>)	T	No effect
Bocaccio (<i>S. paucispinus</i>)	E	No effect
Yelloweye rockfish (<i>S. ruberrimus</i>)	T	No effect

Notes: E-Endangered; T-Threatened; D-Designated; P-Proposed
DPS=distinct population segment
ESU-evolutionarily significant unit

Essential fish habitat (EFH) for Pacific salmon, groundfish, and coastal pelagic species occurs in the action area. Effects to EFH are addressed in this BA (Appendix A). Implementation of appropriate BMPs, stormwater treatment, and reduction of PGIS will minimize impacts to nearshore habitat and water quality during project construction and operation. No structures will be installed that could obstruct passage or impact habitat for EFH species. Any effects on EFH species prey will be temporary, insignificant, and discountable. Therefore, the project will have no adverse effect on EFH.

Chapter 1 INTRODUCTION

1.1 Project

The Federal Highway Administration (FHWA), the Washington State Department of Transportation (WSDOT) and the City of Seattle (City) are proposing to replace the Alaskan Way Viaduct because it is likely to fail in an earthquake. The SR 99: Alaskan Way Viaduct Replacement Project (the project) proposes to replace State Route (SR) 99 with a bored tunnel, construct north and south portals and associated tunnel operations buildings, relocate utilities currently on or under the viaduct, remove the existing viaduct, decommission the Battery Street tunnel (BST), improve surface streets in the tunnel's south and north portal areas, and provide stormwater treatment and detention (Exhibit 1-1). Project construction will begin in 2011 and take approximately 66 months to complete. The bored tunnel alternative is one of the alternatives being considered for the project.

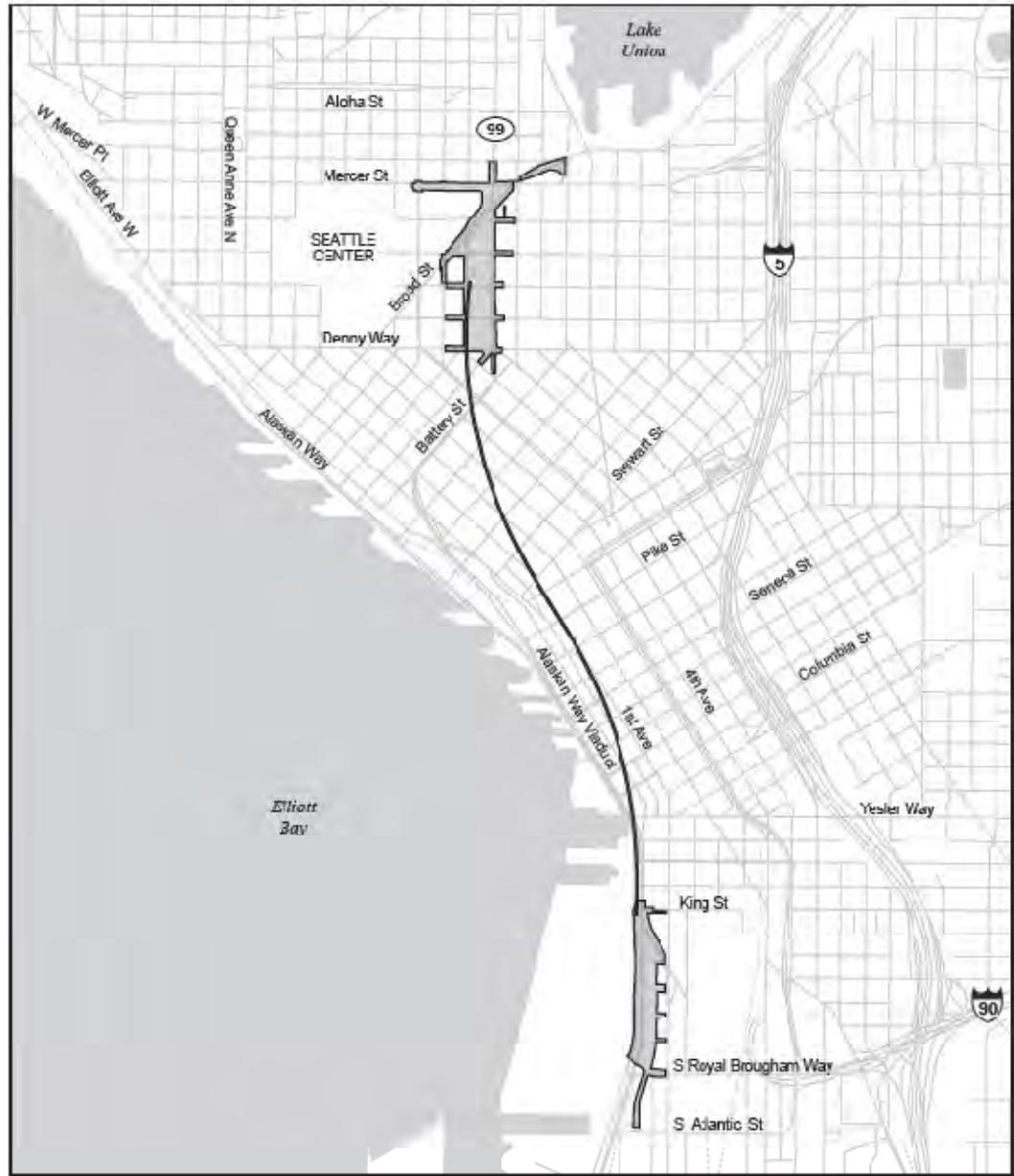
The project is located within the range of species protected under the federal Endangered Species Act (ESA) of 1973, as amended. Because the project will receive funding from FHWA, interagency consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) (Services) is required pursuant to Section 7(a)(2) of the ESA. WSDOT has prepared this biological assessment (BA) on behalf of FHWA, as required under Section 7(c) of the ESA, to facilitate interagency consultation and address potential project impacts on species listed or proposed for listing under the ESA.

WSDOT identified listed species and their designated critical habitats within the action area through the NMFS website (NMFS 2010) and USFWS website (USFWS 2010). To determine the potential occurrence of these species within the action area, project biologists reviewed priority habitat and species (PHS) data obtained from the Washington Department of Fish and Wildlife (WDFW) (WDFW 2009). WSDOT also consulted local experts and existing literature as cited in the text. WSDOT biologists visited the action area on several occasions in 2009 and 2010 to determine the presence and suitability of habitat for listed species.

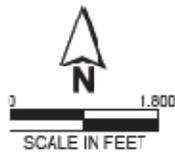
Based on the presence of potentially suitable habitat and/or documented species occurrences within the action area, this BA addresses impacts on the following:

- Southern resident killer whale (*Orcinus orca*) distinct population segment (DPS) (endangered) and designated critical habitat
- Humpback whale (*Megaptera novaeangliae*) (endangered)
- Steller sea lion (*Eumetopias jubatus*) (threatened)
- Puget Sound evolutionarily significant unit (ESU) Chinook salmon (*Oncorhynchus tshawytscha*) (threatened) and designated critical habitat

Exhibit 1-1. Alaskan Way Viaduct Replacement Project



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**Exhibit 1-1
Alaskan Way Viaduct
Replacement Project**

- Hood Canal summer run chum ESU (*Oncorhynchus keta*) and designated critical habitat
- Puget Sound steelhead ESU (*Oncorhynchus mykiss*) (threatened)
- Southern DPS green sturgeon (*Acipenser medirostris*) (threatened)
- Pacific eulachon (*Thaleichthys pacificus*) (threatened)
- Coastal/Puget Sound DPS bull trout (*Salvelinus confluentus*) (threatened) and designated and proposed critical habitat;
- Marbled murrelet (*Brachyramphus marmoratus*) (threatened);
- Yelloweye rockfish (*Sebastes ruberrimus*) (threatened)
- Bocaccio (*S. paucispinus*) (endangered)
- Canary rockfish (*S. pinniger*) (threatened)

In addition to ESA, the Magnuson-Stevens Fishery Conservation and Management Act requires that projects that may adversely affect essential fish habitat (EFH) consult with NMFS. Appendix A provides an analysis of the impacts of the project on EFH.

1.2 Project Purpose

The purpose of the proposed action is to provide a replacement transportation facility with improved earthquake resistance that will accomplish the following:

- Reduce the risk of catastrophic failure in an earthquake by providing a facility that meets current seismic safety standards.
- Improve traffic safety.
- Provide capacity for automobiles, freight, and transit to efficiently move people and goods to and through downtown Seattle.
- Provide linkages to the regional transportation system and to and from downtown Seattle and the local street system.
- Avoid major disruption of traffic patterns due to loss of capacity on SR99.
- Protect the integrity and viability of nearby activities on the central waterfront and in downtown Seattle.

1.3 Project Location

The proposed bored tunnel will extend approximately 1.7 miles underneath the City of Seattle, extending from S. King Street in the south to Thomas Street in the north. The project is located in Township 24 N Range 4 E Sections 5, 6, 8, and 18; and Township 25 N Range 4 E, Sections 30 and 31.

The project is also located in Water Resource Inventory Areas (WRIAs) 8 and 9, and Hydrologic Unit Codes (HUCs) 171100120302 Cedar River), 171100190401 (Shell Creek), and 1711001303XX (Lower Green River). Tunnel spoils will be barged from the Seattle waterfront to the Mats Mats quarry in Port Ludlow, Washington.

1.4 Consultation History

FHWA, WSDOT, and City of Seattle staff met with both Services on November 4 and December 3, 2009, to discuss the scope of the proposed action and the potential for other projects to be considered as part of the ESA consultation for this proposed action.

WSDOT Biologist George Ritchotte met with Services' liaison Jim Muck (who represents both Services for this consultation) on August 25, October 20, and December 14, 2009; and March 2 and April 27, 2010 to discuss technical details of the project and potential effects to listed species. Draft sections of the BA were provided to Jim Muck for review on January 27 and April 27, 2010. A meeting with WSDOT Biology Program staff and Jim Muck was held on June 9th, 2010, to provide additional information on the project and address Jim Muck's comments on the draft BA. Another meeting was held with WSDOT staff, Jim Muck, and Mike Grady (NOAA Fisheries) on June 25th, 2010 to address any outstanding concerns.

Chapter 2 PROJECT DESCRIPTION

The project consists of tunnel boring, constructing north and south portals and associated tunnel operations buildings and surface street improvements, utility relocations, demolition of the existing viaduct, decommissioning the BST, and stormwater and groundwater management during construction and operation. Portal work includes ground stabilization, construction of cut-and-cover sections of the tunnel, construction of tunnel operations buildings, and surface street improvements.

2.1 Overview of Proposed Action

The project will replace SR 99 between S. Royal Brougham Way and Roy Street with a bored tunnel approximately 1.7 miles long and 49 feet wide. The tunnel will have two lanes in each direction. Beginning at S. Royal Brougham Way, SR 99 will be a side-by-side, surface roadway that will transition to a cut-and-cover tunnel. At approximately S. King Street, SR 99 will become a stacked bored tunnel, with two southbound travel lanes on the top and two northbound travel lanes on the bottom. Numerous environmental minimization measures have been incorporated into the project and are listed in Section 2.5.

The tunnel will continue under Alaskan Way S. to approximately S. Washington Street, where it will curve slightly away from the waterfront and then travel under First Avenue beginning at approximately University Street. At Stewart Street, it will travel in a northern direction under Belltown. At Denny Way, the tunnel will travel under Sixth Avenue N., where it will transition to a side-by-side surface roadway at about Harrison Street.

The tunnel will be constructed using a tunnel boring machine (TBM), which mines below the surface while stabilizing the tunnel face with a precast concrete lining that provides water-tightness and ground support. The TBM is fitted with an automated grout injection system to fill voids behind the completed tunnel lining ring and the cut ground to control surface settlement. Excavated material will be conveyed to the south portal for disposal. Clean soils will be barged to Mats Mats quarry in Port Ludlow, Washington. Any contaminated soils will be sent to an existing commercial facility permitted to accept contaminated waste. Transport of contaminated materials will use existing haul routes, such as state highways. The contractor will provide bills of lading to WSDOT to ensure that contaminated materials have been disposed of properly.

The project will reconfigure surface streets at the north and south portals. Water quality treatment will be provided at both portals as described in Section 6.1.4 and Appendix B. Stormwater detention will be provided at the north portal. Tunnel operations buildings will also be built at both portals.

Following completion of the proposed tunnel, the existing viaduct will be removed. Utilities currently on or under the viaduct will be relocated as necessary, and the BST will be decommissioned.

2.2 Proposed Action

There are three primary components of the project: the south portal area, the bored tunnel, and the north portal area. Each of these areas is discussed in more detail below.

2.2.1 South Portal Area

Full northbound and southbound access to and from SR 99 will be provided in the south portal area between S. Royal Brougham Way and S. King Street. The northbound on-ramp to and southbound off-ramp from SR 99 will be built near S. Royal Brougham Way and will intersect with the east frontage road as shown in Exhibit 2-1.

The southbound on-ramp to and northbound off-ramp from SR 99 will feed directly into Alaskan Way S. The northbound off-ramp will have a general purpose lane and a peak hour, transit-only lane to accommodate transit coming from south or West Seattle. The project will also widen the frontage road east of SR 99 slightly at S. Atlantic Street to accommodate truck turning movements. Railroad Way S. will be replaced by a new one-lane roadway where traffic could travel northbound between S. Dearborn Street and Alaskan Way S.

A tunnel operations building will be constructed in the block bounded by S. Dearborn Street, Alaskan Way S., and the new Railroad Way S. access road. Part of the building will be constructed underground. The remaining portion of the building is expected to be approximately 60 feet tall with vent stacks extending up to 30 feet above the roof. This structure will house tunnel control systems, ventilation systems, maintenance shop functions, equipment storage, and systems support.

2.2.2 Bored Tunnel Alignment

Cut-and-cover excavation will be required at the north and south tunnel entrances where the portals transition into a deep bored tunnel. This method of excavation entails removing soil to approximately 30 feet below the surface, replacing unsuitable materials with controlled density fill (CDF), and covering the site with a precast deck. The cut-and-cover section at the south end will be approximately 1,030 feet long and 440 feet long at the north end.

Exhibit 2-1. South Portal Schematic



**Exhibit 2-1
South Portal Schematic**

Secant piles with a diameter of approximately 6 feet will be used to support the walls of the excavated area. These piles will be drilled holes filled with cast-in-place concrete rather than precast piles drilled into place. The project does not involve any impact pile driving or in-water work.

Beginning in the south, the bored tunnel will connect to SR 99 just south of S. King Street. The tunnel will continue under Alaskan Way S. to approximately S. Washington Street, where it will curve slightly away from the waterfront and then travel under First Avenue beginning at approximately University Street. At Stewart Street, it will travel in a northern direction under Belltown. At Denny Way, the tunnel will travel under Sixth Avenue N., where it will transition to a side-by-side surface roadway near Harrison Street.

The tunnel will have two lanes in each direction. Southbound lanes will be located on the top portion of the tunnel, and the northbound lanes will be located on the bottom. Travel lanes will be approximately 11 feet wide, with a 2-foot-wide shoulder on one side and a 6-foot-wide shoulder on the other side. The wider shoulder will provide emergency vehicle access and space for disabled vehicles to safely stop.

The proposed bored tunnel will be approximately 1.7 miles long with a 49-foot interior diameter. The tunnel will be constructed using a TBM. Depending on the type of TBM used, the cutting wheel will operate within a forward excavation chamber filled with either excavated ground, or a mix of excavated ground and a bentonite slurry fluid. Tunnels spoils will be removed via the south portal for disposal. If a slurry TBM is used for the project, a slurry processing plant will be necessary to separate bentonite from the slurry, return the slurry to the TBM, and stockpile spoils before disposal. Part of the Washington-Oregon Shippers Cooperative Association (WOSCA) site between S. Royal Brougham Way and S. King Street will be used for a slurry separation plant, if one is needed.

Some ground loss that results in surface settlement is expected during tunnel excavation. The magnitude of settlement is a function of tunnel depth and size, tunneling techniques and equipment types used, and in situ geology. During the preliminary engineering phase of the project, all buildings and key utility infrastructure within the tunnel's potential zone of influence will be surveyed initially and then monitored throughout the duration of tunneling to check that any ground movement is not excessive. Preconstruction surveys will include a visual record of cracks and other preexisting signs of distress or damage to structures and pavement.

Where the tunnel is close to the surface and directly beneath sensitive structures or utilities, additional precautions to limit impacts of settlement will be considered, including permeation grouting (injecting grout fluid into soil pore spaces), compaction grouting (injecting a viscous grout into the soil that displaces and

consolidates the soil), compensation grouting (a type of compaction grouting underneath foundations of existing structures), or underpinning (supporting the foundations of an existing structure with alternative support elements).

The proposed project will not impact the existing City of Seattle seawall that extends the entire length of downtown Seattle, although it is possible the seawall could settle as much as ¼-inch during excavation. At the southern end of the project, the tunnel begins at approximately S. King Street and generally parallels the waterfront for more than 900 feet before reaching Washington Street, the southern extent of the seawall. By that distance, the tunnel crown will already be more than 65 feet below the surface, well below the foot of the seawall. As with other structures near the tunnel alignment, the seawall will be monitored during construction to ensure that ground movement is minimal. Because the anticipated settlement is so small, it will not be necessary to shore up or repair the seawall.

2.2.3 North Portal Area

Northbound access from SR 99 and southbound access to SR 99 will be provided via new ramps at Republican Street. The northbound off-ramp to Republican Street will be provided on the east side of SR 99 and routed to an intersection at Dexter Avenue N. Drivers will access the southbound on-ramp via a new connection with Sixth Avenue N. at Republican Street on the west side of SR 99.

Surface streets will be reconfigured and improved in the north portal area (Exhibit 2-2). Signalized intersections will be located at Denny Way and John, Thomas, and Harrison Streets. John Street will be built with one lane in each direction, a center turn lane, and bike lanes and sidewalks on each side of the roadway. Thomas Street will be built with one lane in each direction, a center turn lane, and sidewalks. Harrison Street will be built with two lanes in each direction and sidewalks.

Mercer Street will become a two-way street and will be widened from Dexter Avenue N. to Fifth Avenue N. The rebuilt Mercer Street will have three lanes in each direction with left-hand turn pockets. Broad Street will be filled and closed between Ninth Avenue N. and Taylor Avenue N.

As part of the north portal, a tunnel operations building will be constructed between Thomas and Harrison Streets on the east side of Sixth Avenue N. Part of the building will be constructed underground. The remaining portion of the building is expected to be approximately 65 feet tall with vent stacks extending up to 30 feet above the roof.

2.2.4 Utility Relocation

The current plan is to support and protect as many existing utilities in place as possible. Some utility relocations will, however, be required before construction of the north and south portals. Other relocations may occur during construction. If utilities are relocated, they will be buried as close to their existing alignment as possible. Utilities to be relocated include water, gas, power, communications, and sewer lines.

Communications and power lines that are attached to the viaduct will require relocation before viaduct demolition. These utilities will be buried underneath or next to the viaduct. Utilities currently buried beneath the viaduct are not expected to be affected by viaduct demolition, because they can be adequately protected in place by positioning either timber mats or gravel bedding underneath the viaduct. Mitigation measures will be used to ensure that utilities buried beneath the viaduct are not damaged during demolition. Project staff will develop measures and policies with utility providers to address contingency plan requirements to manage any potential utility service disruptions during construction. If inadvertent damage to underground utilities occurs during construction, the appropriate utility provider will be contacted immediately to minimize damage and restore service.

2.2.5 Removal of Tunnel Spoils

Tunnel spoils will be removed through the South Access Point area to a staging area for stockpiling before disposal. Spoils will be stockpiled at Terminals 46 or 25. BMPs will be implemented at those sites to prevent spoils from entering Elliott Bay or the Duwamish waterway, and prevent surface water runoff from those sites discharging turbid water to Elliott Bay or the Duwamish. No spoils will be stockpiled within 200 feet of surface waters.

If a slurry TBM is used for the project, it will create a mix of water, earth, and bentonite that will be pumped from the tunnel to a separation plant near the south portal. The separation plant will remove solids from the slurry mixture and return the treated slurry to the tunnel. The slurry separation plant will likely be located on the WOSCA site.

Approximately 800,000 cubic yards of material will be removed during tunnel excavation. Another 650,000 cubic yards will be removed for north and south portal and secant pile wall excavation. Clean spoils will be barged from Terminal 46 on the Seattle waterfront to the Mats Mats quarry in Port Ludlow, Washington. The terminal, the quarry, and the shipping lane are existing commercial facilities or routes in areas zoned for industrial and barge use. Approximately 1-2 barge loads per day will be transported to the quarry. Spoils will be loaded onto the barge in such a way as to prevent any material from falling into Elliott Bay or onto the

ground where it could be washed into the bay. Spoils will be offloaded from the barge in a similar manner, ensuring that no material enters Port Ludlow waters.

Any contaminated soils will be trucked to an existing upland disposal location permitted to accept contaminated material. Contaminated spoils will not be stockpiled at the construction site unless they are stored in a manner consistent with WAC 173-303-200 (which specifies that contaminated material must be stored in closed, leak-proof containers and shipped to an off-site designated facility in 90 days or less). Soil transported off site will be in lined and covered trucks. Contaminated soils will be sent to landfills permitted to accept such material. The contractor will be required to provide bills of lading to WSDOT to demonstrate that the material has been disposed of properly.

2.2.6 Demolition of the Existing Viaduct

The existing viaduct is a four- to seven-lane stacked elevated roadway, approximately 11,000 feet long. Most of the viaduct carries two to four lanes with varying roadway widths and minimal shoulders. The existing viaduct will be demolished once the tunnel is operational. Demolition will take approximately nine months. Demolition equipment consists of extended-arm trackhoes with a concrete-pulverizing attachment (concrete muncher), trackhoes with a concrete-breaking hammer attachment, manlifts with 60-foot reach, 60-ton-capacity support cranes, 10-ton capacity forklifts, track-mounted backhoes, pickup trucks, and dump trucks. Concrete munchers will be used exclusively in locations next to existing businesses to control the size and dispersion of concrete debris. A smaller concrete-breaking hammer will be used to further separate the concrete from the reinforcing steel. These materials will be placed into separate stockpiles.

Materials resulting from viaduct demolition will be broken concrete and severed reinforcing steel. Some of the concrete rubble will be recycled and used to fill the BST. Any remaining debris will be trucked off-site for disposal to a commercial facility permitted to accept construction debris. City-designated truck routes will be used for transporting debris.

Fugitive dust will be controlled by regular spraying. Spray water will be collected and discharged to the combined sewer system. Spraying will not be necessary during rainstorms when the capacity of the combined sewer system may be exceeded.

2.2.7 Decommissioning the Battery Street Tunnel

The BST runs for a length of approximately 2,200 feet underneath Battery Street at the north end of the viaduct. The tunnel will be decommissioned as part of the project. Decommissioning will require disconnecting the power, water, and drainage lines, filling the void space with suitable material (potentially recycling the concrete rubble from the demolition of the viaduct structure), closing all of the

street access vents, and blocking off the portals at both ends of the tunnel. The necessary utilities will remain connected as required.

Small utility equipment such as excavators and loaders will be used during decommissioning and restoration of any utilities. Some concrete pavement breaking will be required. Most of the void space will be filled either with imported fill or rubble debris generated from the viaduct demolition. The remaining space will be capped with a fluid material such as CDF. Earth-moving equipment such as loaders, graders, compactors, and haul trucks will transport, spread, and compact the backfill material into the BST. The CDF will be placed by concrete pump trucks that will stage either at the portal ends or along the surface street of Battery Street from above.

2.2.8 Water Management

Groundwater, slurry water, construction stormwater, tunnel seepage, and operational stormwater runoff from the project site will all have to be managed properly to minimize environmental impacts from the project. Wastewater will be discharged to existing City and King County drainage systems. There are two types of drainage systems with the project area:

1. Separated storm drainage system, in which stormwater and wastewater are carried in separate pipes. In separated areas, stormwater runoff from the project area is collected in a separate storm drain system which discharges directly to either Elliott Bay or Lake Union. The storm drain system in the South Royal Brougham TDA is equipped with a low flow diversion. The diversion allows runoff from small storm events to enter the combined sewer system, but most runoff in this area is discharged to Elliott Bay. The storm drains in the Broad TDA are not equipped with a low flow diversion and all runoff is discharged to Lake Union.
2. Combined sewer system, which conveys wastewater and stormwater in a single pipe. In these areas, stormwater runoff from the project area combines with wastewater from surrounding areas and under normal conditions, is routed to the West Point Treatment Plant (WPTP) via a large conveyance pipe (the Elliott Bay Interceptor [EBI]) running underneath Second Avenue before being discharged through a deep water outfall to Puget Sound. However, during large storm events, stormwater can exceed the capacity of the pipe. Under these conditions, the excess flow, which consists of a mixture of wastewater and stormwater, is discharged untreated to Elliott Bay to prevent sewer backups from occurring. These events are referred to as combined sewer overflows or CSOs.

Groundwater Dewatering

The project will require dewatering to manage groundwater infiltration during construction at both the north and south portals. The groundwater table at the north end of the project is more than 80 feet below the surface, so dewatering at the north end will be minimal. The groundwater table at the south end is only approximately 6 to 10 feet below the surface, requiring extensive dewatering during construction. Pumping rates may range from 100 to 1,000 gallons per minute (gpm) per 1,000 feet of excavation (between 144,000 to 1,440,000 gallons per day, or 0.2 to 2 cubic feet per second [cfs]). Groundwater will be disposed of by one of two means:

1. The contractor may discharge groundwater to the combined sewer system. Volumes will be constrained by the King County Wastewater Discharge Authorization or Permit, which limits discharges according to time of year and location. Discharge limitations will prevent any increase in the volume or frequency of overflow events. Once the discharge limitation has been reached, groundwater will be reinjected into the ground (see below). Contaminated water will not be discharged to the combined sewer system. Any contaminated water will be cleaned before disposal, or transported offsite for disposal. As with contaminated soils, contaminated water will be transported to existing commercial facilities permitted to accept contaminated materials. The contractor will use existing haul routes, and will be required to provide WSDOT with bills of lading to ensure that contaminated material has been disposed of properly.
2. Groundwater may also be reinjected back into the ground near the construction site in accordance with the Washington State Department of Ecology (Ecology) Underground Injection Control Program (<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-218>). Reinjection will avoid discharge to the combined sewer system, as well as help prevent ground settlement as soils lose hydrostatic pressure. The location and number of injection wells depends on site accessibility, the required groundwater level maintenance, and the sensitivity of adjacent utilities and structures.

Due to the depth of the proposed tunnel, most excavation will take place below the groundwater table, and dewatering will not be required. Most dewatering will take place within the cut-and-cover section of the tunnel; by the time tunnel boring begins at S. King Street the tunnel will be well below the groundwater table.

Slurry Water

If a slurry TBM is used to construct the tunnel, the machine will create a slurry of water, bentonite, and tunnel spoils at the excavation face. The slurry mix will be piped to a separation plant on the WOSCA site where solids will be removed and

the treated slurry water returned to the tunnel. Slurry water will not be discharged to Elliott Bay.

Construction Stormwater

Construction stormwater is water that runs off active construction sites. Erosion of disturbed soils or soil stockpiles presents the highest risk of construction-related water quality impacts. Stormwater that comes into contact with crushed or curing concrete could also have elevated pH levels. Water quality impacts will be minimized by implementing standard management plans such as a temporary erosion and sediment control plan (TESC) and a spill prevention control and countermeasures plan (SPCC), and a concrete collection, containment, and disposal plan (see Section 2.5, Minimization Measures). Equipment staging and stockpiling will occur at least 200 feet from surface waters.

No construction stormwater will be discharged to the separated storm system during project construction to ensure that no untreated water enters Elliott Bay. Stormwater will only be discharged to the combined sewer system and conveyed to the WPTP for treatment. WSDOT will obtain and comply with a King County Wastewater Discharge Authorization or Permit. Water will be treated to prevent water quality degradation and to limit the amount of water that can be discharged to the system to minimize any potential increase in the frequency or volume of CSOs. As part of the discharge authorization or permit, the contractor will be required to demonstrate they have the capacity to store stormwater for the duration of an overflow event. Runoff from staging areas will necessarily be discharged to the combined sewer system, but will be treated by implementing the best management practices (BMPs) listed above.

Water Management within the Tunnel

Except at the portals, the tunnel will be located underground in areas that will not be exposed to rainfall and consequently will not generate stormwater runoff. Runoff will only be generated on underground surfaces by wash water or the fire suppression system during testing or emergency events. The tunnel will require a pump for (1) bypass water (rainwater that enters the portals during storms or is carried into the tunnel by wet vehicles) (2) seepage from groundwater, and (3) water used as part of the cleaning and fire suppression systems. Estimated frequencies, rates, and durations of these events are summarized in Exhibit 2-3. Since the south portal is closer to the tunnel's lowest vertical elevation, drainage and tunnel seepage will be conveyed to the tunnel sump, located approximately 3,000 feet north of the south portal, and pumped to the south to the combined sewer system.

Exhibit 2-3. Estimated Non-Stormwater Drainage from the Proposed Bored Tunnel

Event	Frequency	Rate (gpm)	Duration
Tunnel seepage	Continuous	22	Continuous
Tunnel washdown	1-2 times per year	35 to 70	Several days
Fire suppression valve testing	Once per year	100	Intermittently over several days
Fire suppression sprinkler system testing	Every five years	2500	Intermittent

Tunnel drainage will be designed and constructed to contain spills of hazardous materials. If a spill occurs, tunnel pumps will be shut down to prevent discharge of material to the stormwater system until the spill can be contained and cleaned.

Bypass Water

Very little water is expected to enter the portals during storms. Rainfall at the portals will be captured and directed away from entering the tunnel. The north and south tunnel approaches will contain depressed sections, called boat sections, that will collect runoff via drains located at the tunnel entrance. Less than 0.1 cfs is expected to enter the tunnel itself during storm events. This water will be discharged to the combined sewer system.

Tunnel Seepage

Underground seepage is a regular occurrence in large-bore tunnels due to their placement beneath the groundwater table. Tunnel seepage is estimated at 22 gpm (0.05 cfs), which will be pumped to the south portal and discharged to the combined sewer system.

Washdown Water

The tunnel will be cleaned approximately twice yearly over a period of several days. Wash water will be water only, with no added detergents or other chemicals. Tunnel washing will generate water volumes of approximately 35 to 70 gpm. The tunnel will not be washed during rain storms to prevent exceeding the capacity of the combined sewer system. Washwater will be discharged to the combined sewer system and conveyed to the WPTP for treatment.

Fire Suppression

Two types of fire suppression system testing will occur. Annual valve testing will take place approximately once per year and will generate flows of approximately 100 gpm (0.22 cfs). The sprinkler system will be tested approximately once every five years. Sprinkler testing will generate much higher volumes of water, up to

2,500 gpm (5.6 cfs). Testing will not take place during wet weather to avoid the possibility of combined sewer overflows. As with washdown water, water from fire suppression system testing will be discharged to the combined sewer system and conveyed to the WPTP for treatment.

Actual fires within the tunnel are anticipated to be very rare. For comparison, the last time the fire suppression system was used in the I-90 Mt. Baker tunnel was in 1994. Transport of hazardous materials will not be permitted through the bored tunnel.

Stormwater Runoff Management at the South and North Portals during Project Operation

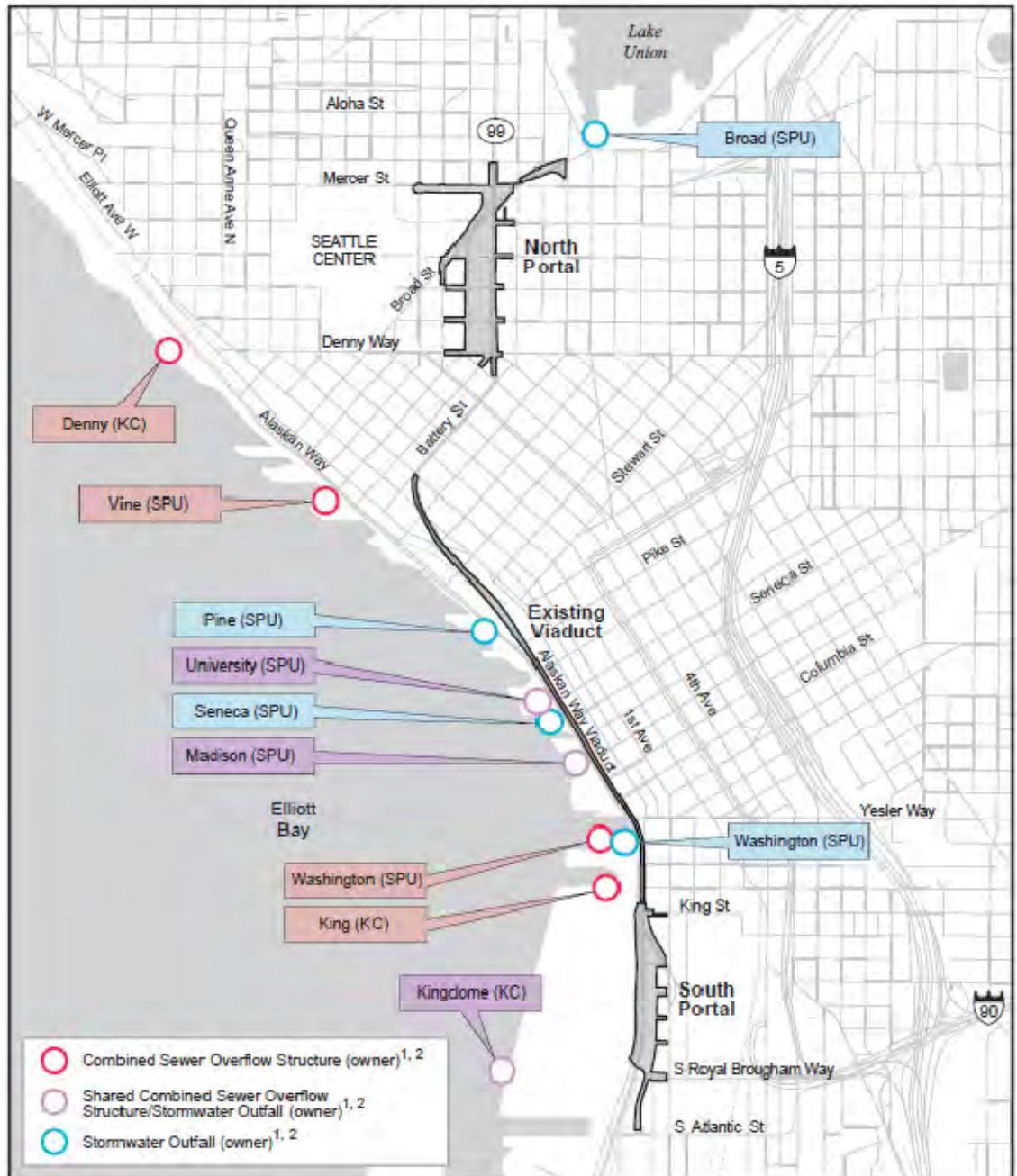
The project area encompasses nearly 55 acres draining to 12 TDAs (Exhibits 2-4 and 2-5). The project is located in an urban area that is almost entirely impervious surface (IS). The project design team investigated every opportunity to reduce pollutant loading from the project. The project will not create any new PGIS, and approximately 10 acres of PGIS will be converted to non-PGIS by replacing existing streets and parking lots with tunnel operations buildings, sidewalks, and landscaped areas. The different TDAs and PGIS in each TDA pre- and post-project are described below. Section 6.1.4 and Appendix B present a detailed stormwater discussion, as well as pollutant loading, concentration, and dilution analysis.

The project will not modify the Washington, Madison, Seneca, University, Pike, Pine and Vine TDAs. The amount of impervious surface and water quality treatment in these basins will remain the same pre-and post-project. These TDAs collect runoff from the existing viaduct, which will be removed by the project; however, once the viaduct is removed, city streets beneath the viaduct will capture and discharge an equivalent amount of water. The project does propose changes to the South and North Royal Brougham, King, Dexter, and Broad TDAs.

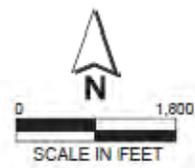
No detention is proposed for stormwater at the south portal. Based on hydraulic flow model simulations of the southern TDAs, detention will not reduce combined sewer overflow events; in fact, the volume of discharge events may actually increase with detention due to the timing of peak flows between the larger tributary basin and the discharge from the detention vaults (Appendix C, City of Seattle exemption letter). Detention will be provided for surface streets at the north portal, where flow control is required due to different stormwater system hydraulics.

Onsite water quality treatment is not proposed for stormwater discharged to the combined sewer system, as this runoff is conveyed to the WPTP for treatment. Treatment will be provided for stormwater in the South Royal Brougham and Broad Street TDAs with a Stormfilter vault. The Stormfilter will be maintained by Seattle Public Utilities and inspected on a yearly basis, or after major storms. Sediment will be removed from the vault and filters will be replaced as needed (generally every 1-3 years).

Exhibit 2-4. Project Outfall Locations



554-1585-030/CC(06) 6/15/10



Notes:
 1 Outfalls shown are those associated with project-related sub-basins. Non project-related outfalls are not shown.
 2 KC indicates outfalls owned and operated by King County. SPU indicates Seattle Public Utilities outfalls.

**Exhibit 2-4
 Project Outfall
 Locations**

Exhibit 2-5. Project Area TDAs and Receiving Water Bodies

TDA	Drainage System Type	Existing Water Quality Treatment	Receiving Water Body
Royal Brougham South	Low-flow diversion	WPTP ¹	Puget Sound or Elliott Bay
Royal Brougham North	Combined	WPTP ¹	Puget Sound or Elliott Bay
King	Combined	WPTP ¹	Puget Sound or Elliott Bay
Washington	Separated storm	None	Elliott Bay
Madison	Separated storm	None	Elliott Bay
Seneca	Separated storm	None	Elliott Bay
University	Separated storm	None	Elliott Bay
Pike	Combined	WPTP ²	Puget Sound or Elliott Bay
Pine	Storm	None	Elliott Bay
Vine	Combined	WPTP ²	Puget Sound or Elliott Bay
Dexter	Combined	WPTP ²	Puget Sound, Elliott Bay
Broad	Storm	None	Lake Union

¹ During high flows water discharges directly to Elliott Bay with no treatment

² Flows from these TDAs are normally sent to WPTP for treatment. During large storms, flows are directed to the Elliott West Combined Sewer Overflow Control Facility. During overflow events, wastewater discharges untreated to Elliott Bay.

South Portal

There are three existing TDAs in the south portal area of the project: South Royal Brougham, North Royal Brougham, and King. The South and North Royal Brougham TDAs have different drainage systems, but share a common outfall (labeled as the Kingdome outfall in Exhibit 2-4). This outfall is located at the Port of Seattle, approximately 150 feet offshore at a depth of 20 feet.

PGIS at the south portal will be decreased by more than 45 percent, largely by converting existing streets and parking lots to trails, buildings, and landscaped areas. Pre- and post-project PGIS for the different TDAs is summarized in Exhibit 2-6.

South Royal Brougham

This threshold discharge area (TDA) is a separated storm drain system equipped with a low-flow diversion regulator. Under low flow conditions, flows are routed to the WPTP for treatment. During heavy rains when the water surface elevation reaches a certain point, the gate is closed, and stormwater is discharged directly to Elliott Bay via the regulator with no treatment.

The project will provide basic water quality treatment for PGIS within this TDA with a Stormfilter vault. Existing PGIS in this TDA is 0.65 acre; post-project, PGIS in this TDA will be 0.27 acre, a reduction of 0.38 acre compared to existing conditions.

North Royal Brougham

The North Royal Brougham TDA discharges to the combined sewer system, and stormwater is conveyed to the WPTP. Total PGIS in this TDA is 6.53 acres. Post project, PGIS will total 3.57 acres, a reduction of 2.96 acres.

Exhibit 2-6. Existing and Proposed PGIS at the South Portal

TDA	Existing PGIS (acres)	PGIS Post-Project (acres)	Percent Change
South Royal Brougham	0.65	0.27	-58.5
North Royal Brougham	6.53	3.57	-45.3
King Street	9.27	5.16	-44.4

King Street

The south portal King Street TDA discharges to the combined sewer system King Street outfall. The outfall for this TDA is next to Terminal 30 at the southeast end of Elliott Bay. The outfall is 150 feet offshore at a depth of 20 feet. The existing PGIS in this TDA is 9.27 acres, which will be reduced to 5.16 acres post-project, a decrease of 4.11 acres.

North Portal

The north portal includes two TDAs, Dexter and Broad. Pre- and post-project PGISs for the different TDAs are presented in Exhibit 2-7. Again, PGIS decreases post-project, largely due to the abandonment of the Broad Street right-of-way. Per the City of Seattle Stormwater Code, which requires flow control for any stormwater from the project area that is routed to the combined sewer system, peak flow control is being provided in the Dexter TDA to prevent any increase in the frequency or volume of combined sewer overflow events. Flow control will be accomplished by installing one or more detention facilities (ponds or vaults).

Exhibit 2-7. Existing and Proposed PGIS at the North Portal

TDA	Existing PGIS	PGIS Post-Project (acres)	Percent Change
Dexter	14.76	11.43	-22.6
Broad	3.76	4.47	+18.9

Dexter

This TDA discharges to the City's combined sewer system Denny outfall. Under normal conditions, runoff is sent to the WPTP for treatment. During rainstorms, however, when the combined system reaches capacity, flows are diverted into the Mercer Tunnel and stored until capacity in the combined system is restored, and flows can once again be transported to the WPTP. In larger storms, the Mercer Tunnel fills up, and flows are routed to the Elliott West Combined Sewer Overflow Facility, a treatment facility on Elliott Ave W near the Seattle waterfront. After treatment, flows are discharged 490 feet offshore through a 60-foot-deep outfall. During the largest storms, when the pumping capacity of the Elliott West facility is exceeded, untreated wastewater is discharged directly to Elliott Bay through the Denny outfall, a 10-foot deep outfall 100 feet offshore. Existing PGIS in this TDA totals 14.76 acres; this will be reduced to 11.43 acres post-project, a decrease of 3.33 acres.

Broad

Stormwater is discharged directly to Lake Union via separated stormwater conveyance piping and outfalls, without treatment. Basic water quality treatment will be provided for project stormwater discharged to Lake Union using a pretreatment settling vault and Stormfilter vault. Existing PGIS in this TDA totals 3.76 acres; post project; this will increase slightly to 4.47 acres, an increase of 0.71 acre. The increase in PGIS is not due to creation of additional PGIS, but because the TDA delineation changes pre- and post-project.

Groundwater Management

Groundwater management is more of a concern at the south portal, where the water table lies about 6 to 10 feet below the surface; groundwater at the north end is approximately 80 feet below the surface. Groundwater flow at the south portal is generally horizontal toward Elliott Bay. Vertical movement of groundwater is limited by the lack of vertical gradient and the presence of silt and clay layers.

Groundwater flow may be interrupted by the presence of the walls supporting the retained cuts and cut-and-cover tunnel and ground improvement areas. The retaining walls will extend approximately 1,000 feet south of the tunnel portal. The walls could block the flow of groundwater and cause groundwater to mound up against the east side of the wall.

Groundwater monitoring devices were installed in the project area to evaluate groundwater levels over time. If monitoring indicates that groundwater mounding may occur, the project will provide a path for groundwater through the retaining walls or ground improvement zones, likely by constructing pipes or trenches that connect groundwater flow between the east and west side of the walls. The presence of the tunnel will therefore not impede normal groundwater flow to Elliott Bay.

Groundwater mounding along the tunnel is not anticipated. The tunnel will be below the groundwater table within the section of cut-and-cover tunnel before it reaches S. King Street. The lower aquifers that intersect the tunnel are widespread, interconnected and highly pervious, allowing water to flow around the tunnel.

2.3 Interrelated and Interdependent Activities

2.3.1 Legal Standards

A BA must evaluate the “effects of the action,” which are defined as “the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.” (50 C.F.R. § 402.02.)

ESA Section 7 regulations define “interrelated” and “interdependent” actions differently. “Interrelated actions” are defined as “those that are part of a larger action and depend on the larger action for their justification,” while “interdependent actions” are defined as “those that have no independent utility apart from the action under consideration.” (50 CFR 402.02).

The Endangered Species Consultation Handbook (“Consultation Handbook”), issued by the USFWS and NOAA Fisheries in 1998, provides further guidance for interpreting these terms. (USFWS and NOAA, 1999.) The Consultation Handbook states that:

- “[T]he relevant inquiry is whether the activity in question should be analyzed with the effects of the action under consultation because it is interrelated to, or interdependent with, the proposed action. Be careful not to reverse the analysis by analyzing the relationship of the proposed action against the other activity.... For example... if the proposed action is the addition of a second turbine to an existing dam, the question is whether the dam (the other activity) is interrelated to or interdependent with the proposed action (the addition of the turbine), not the reverse.”
- “As a practical matter, the analysis of whether other activities are interrelated to, or interdependent with, the proposed action under consultation should be conducted by applying a ‘but for’ test. The biologist should ask whether another activity in question would occur ‘but for’ the proposed action under consultation.”

As described in the Handbook, this test requires the Services to ask whether the other actions would proceed in the absence of the proposed action. This test implies that an action would be considered interrelated or interdependent with the proposed action if the proposed action is a necessary condition for the other action. However, as discussed below, the case law applying this standard shows that in operation, the “but-for” test involves more than simply a determination that the

proposed action might cause the other action to occur; there must be some evidence that the proposed action actually will cause the other action to occur.

Several courts, including the U.S. Court of Appeals for the Ninth Circuit, have adopted the “but-for” test as described in the Consultation Handbook. In doing so, the courts have clarified the circumstances that should be considered interrelated or interdependent. In general, courts have recognized that the “but-for” test is not triggered simply because action A might lead to action B; there must be some evidence that action A will lead to action B. For example, in one recent case, a court upheld the USFWS’s finding that certain actions were not interdependent. The court reasoned that those actions “are independent actions that may or may not be implemented in the future” and held that the other actions can be addressed separately “at the time these [other] projects or operations are authorized, funded and actually come online.” (*Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F.Supp.2d 1122 (E.D. Cal. 2008)). See also *Natural Res. Def. Council v. Kempthorne*, 506 F.Supp.2d 322 (E.D. Cal. 2007) (holding that an action was not interrelated because it was a “separate addition that may or may not be constructed.”). In another recent case, a court held that actions are not interrelated “simply because one federal action causes a discrete component of another to occur differently” and observed that “[i]f that were the case, it would be difficult to imagine any federal action in the Columbia Basin that is not interrelated with the downstream dams.” *American Rivers v. NOAA Fisheries*, 2006 WL 1983178 (D.Or. 2006). By contrast, courts have held that actions are interdependent when the proposed action serves no purpose unless the other actions are also implemented. See, e.g., *Sierra Club v. U.S. Dep’t of Energy*, 255 F.Supp.2d 1177 (D. Colo. 2002) (holding that a mine is an interrelated action with the approval of an easement for a mine access road, “because the road has no purpose other than to provide access to the mine”).

In short, the case law indicates that the “but-for” test is not triggered when the proposed action simply makes it possible for another action to occur at some indefinite point in the future. Rather, the “but-for” test is triggered if the proposed action requires, or leads directly to, the implementation of the other action.

2.3.2 Analysis of Proposed Action and Other Actions

The proposed action – the Alaskan Way Viaduct (AWV) Replacement Project – is one of several projects that improve safety and mobility along SR 99 and the Seattle waterfront from the south of downtown area to Seattle Center. This collection of projects is sometimes referred to as the Alaskan Way Viaduct and Seawall Replacement Program. The program includes the proposed action as well as other actions. The program also includes the following other actions that have not yet been approved:

Roadway Elements

- Alaskan Way Surface Street Improvements

- Elliott/Western Connector
- Mercer West Project

Non-Roadway Elements

- First Avenue Streetcar
- Transit Enhancements
- Seawall Replacement
- Alaskan Way Promenade/Public Space

All of these future elements of the program were analyzed for their potential to be interrelated or interdependent with the AWV Replacement Project. It was determined that these other actions are independent for the following reasons:

- The proposed action (AWV Replacement Project) has independent utility – that is, it serves a useful transportation purpose on its own. Because it has independent utility, the proposed action does not necessitate or lead inevitably to implementation of the other actions.
- There is significant uncertainty about when each of the other actions will occur. It is possible that one or more of the other actions could be indefinitely delayed for funding, permitting, or other reasons.
- There also is significant uncertainty about what the other actions would involve, if and when they actually are implemented. A range of different approaches are being considered for each of the other actions.
- The other actions will require their own environmental reviews. If the action requires federal funding or federal permits, the environmental reviews for that action will include Section 7 consultation.
- While implementation of the proposed action would change the landscape in the project area, it would also leave open a wide range of possible alternatives for each of the other actions and would not necessitate that any of the other actions be implemented.

Based on these considerations, WSDOT and FHWA have concluded that the other actions (listed above) do not constitute “interrelated” or “interdependent” actions for purposes of Section 7 consultation. Instead, these other actions are most appropriately considered as part of the cumulative impacts analysis under NEPA and, to the extent that they fit into the ESA definition of cumulative impacts, they also will be considered as part of the cumulative impacts under ESA (See Section 6.4).

Finally, it is important to note that the Alaskan Way Viaduct and Seawall Program also includes several elements that have been completed or are under construction – for example, the replacement of the S. Holgate Street to S. King Street portion of the Alaskan Way Viaduct. Actions that have been completed or are under construction are considered part of the ‘baseline’ for purposes of Section 7 consultation, which means that they are not considered as part of the effects of the proposed action. For

this reason, completed actions and ongoing construction projects do not have the potential to be considered interrelated or interdependent actions.

2.4 Timeline and Construction Sequencing

Project construction will likely begin in July 2011 and last approximately 66 months. The tunnel will be open to drivers by the close of 2015. Viaduct demolition will begin in late 2015. Appendix D presents a detailed timeline of the project.

The first part of the project will be to support or replace utilities along the tunnel corridor. At the south end, WSDOT will construct the secant pile walls and excavate at Alaskan Way, establish a staging yard at the WOSCA site, and conduct soil improvements in the south along the tunnel alignment north to Madison Street. Alaskan Way S. will be closed between S. King and S. Atlantic Streets, and traffic will be routed to First Avenue. At the north end, the project will relocate utilities along Sixth Avenue N, Republican Street, and Denny Way.

Once the TBM has been procured and assembled, WSDOT will begin the tunnel drive at the south end. At the north end, the project will build support walls for the north portal and TBM retrieval pit and construct the tunnel operations building. As the tunnel is being constructed, tunnel interior structures and systems will be installed.

After the tunnel drive is complete, the project will extract the TBM from the retrieval pit and construct the cut-and-cover tunnel at both the north and south portals. The project will then demolish and remove the viaduct and decommission the BST. The last step will be to restore surface streets at the north and south portals.

Exhibit 2-8 lists the various construction activities and approximate durations.

Exhibit 2-8. Major Construction Activities and Approximate Durations

Primary Construction Activity	Approximate Duration (9 months)
Support or replace utilities along the tunnel corridor.	16 months
Widen Mercer Street.	17 months
Construct secant pile shoring walls and excavate at Alaskan Way, install secant pile wall around staging area, and establish staging yard at WOSCA site.	7 months
Conduct soil improvements in the south along tunnel alignment north to Madison Street.	16 months
North end: Relocate utilities along Sixth Avenue N., Taylor Avenue N., Republican Street, and Denny Way.	8 months
Assemble TBM and complete tunnel drive.	16 months
Construct support walls for north portal and TBM retrieval pit.	6 months

Primary Construction Activity	Approximate Duration (9 months)
Install interior tunnel structures and systems.	20 months
Extract TBM.	1 month
Construct north end cut-and-cover tunnel.	17 months
Construct north end tunnel operations building.	23 months
Construct south end tunnel operations building.	21 months
Construct south portal cut-and-cover tunnel.	9 months
Demolish and remove the existing viaduct.	9 months
Remove detour at south portal.	1 month
Restore north and south portal surface streets.	12 months

2.5 Minimization Measures

The measures presented in the subsections below will be implemented to minimize project effects on listed species.

2.5.1 Compliance

- The Environmental Compliance Manager (ECM) will organize and implement regular meetings during design and construction to ensure that the project design meets the project environmental commitments and to identify which construction elements such as locations, work activities, weather conditions, and times of day present the greatest risk to the environment. In addition, the ECM will review BMPs at these meetings to avoid and minimize risk.
- WSDOT will designate at least one employee as the erosion and spill control (ESC) lead. The ESC lead will be responsible for the oversight of installation and monitoring of erosion control measures and maintaining spill containment and control equipment. The ESC lead will also be responsible for ensuring compliance with all local, state, and federal erosion and sediment control requirements.
- A WSDOT inspector will be on site during construction. The role of the inspector will be to ensure contract and permit requirements.
- A WSDOT biologist will reevaluate the project for changes in design and potential impacts associated with those changes, as well as the status and location of listed species, every six months until project construction is completed. Consultation with the Services will be reinitiated if there are changes in project design that could impact listed species, or changes in species listings.

2.5.2 Management Plans

- WSDOT will prepare an SPCC Plan before beginning construction. The SPCC Plan will identify appropriate spill containment materials that will be available at the project site at all times.
- WSDOT will prepare and implement a Fugitive Dust Control Plan in accordance with the Memorandum of Agreement between WSDOT and Puget Sound Clean Air Agency to control any particulate matter generated by the project and reduce short-term construction impacts on air quality.
- A TESC Plan and a Stormwater Pollution Prevention Plan (SWPPP) will be developed and implemented for all required clearing, vegetation removal, grading, ditching, filling, embankment compaction, or excavation, including ground improvements, drilling, and pouring concrete. The BMPs in the plans will be used to control sediments from all vegetation removal or ground disturbing activities.
- WSDOT will develop a Soil and Groundwater Management Plan (SGMP) to address any contaminated soil and/or groundwater that may be encountered during construction of the project. The SGMP will include field screening methods, notification requirements, soil stockpile management, and sampling and disposal requirements. The SGMP will identify locations where contaminated materials can be safely stored or stockpiled and a list of off-site disposal locations that are permitted to accept various types of contaminated media.

2.5.3 Measures to Address Erosion

- All exposed soils will be stabilized during the first available period and will not be untreated for more than seven days without receiving the erosion control measures specified in the TESC Plan. For western Washington, no soils will remain unstabilized for more than two days from October 1 to April 30 and for more than seven days from May 1 to September 30.
- Erosion control devices will be installed as needed to protect surface waters. The actual location will be specified in the field, based on site conditions.
- Materials subject to erosion that may be temporarily stored for use in project activities will be covered with plastic or other impervious material to prevent sediments from being washed from the storage area to the stormwater system or waters of the state.

- All erosion and sedimentation control measures will be inspected on a regular basis and will be maintained and repaired to ensure continued performance of their intended function.
- Silt fences will be inspected within 24 hours after each rainfall, and at least daily during prolonged rainfall. Sediment will be removed as it collects behind the silt fences and before their final removal.
- All silt fencing and staking will be removed upon project completion.

2.5.4 Measure to Address Water Quality

- Material storage areas will be located in currently developed areas such as parking lots or other developed areas. No material will be stockpiled on boards over water such that material could fall through the boards.
- Staging and storage will occur at least 200 feet from shore.
- All equipment to be used for construction activities will be cleaned and inspected before arrival at the project site to ensure that no potentially hazardous materials are exposed, no leaks are present, and the equipment is functioning properly.
- Heavy equipment will be inspected daily (working days) to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products.
- A concrete truck chute cleanout area will be established to properly contain wet concrete.
- WSDOT will develop a concrete containment and disposal plan.
- No paving, chip sealing, or stripe painting will occur during periods of rain or wet weather.
- There will be no visible sheen from petroleum products in receiving water as a result of project activities.
- Should a leak be detected on heavy equipment used for the project, the equipment will be shut down, and immediate action will be taken to control the source of the pollutant. The equipment will not be reused until the problem is fixed.
- The tunnel fire suppression system will not be tested and the tunnel will not be washed during wet weather when the capacity of the combined sewer system may be exceeded.
- Detergents or other chemicals will not be added to the tunnel washdown water or fire suppression water.

- In the event of a hazardous materials spill within the tunnel, pumps will be shut down until the spill can be contained and cleaned.
- BMPs will be implemented to prevent material from entering waters of the state during loading and unloading of barges.
- Contaminated spoils will not be stockpiled at staging areas unless stored in a manner consistent with WAC 173-303-200.
- Contaminated soils transported off site will be in lined and covered trucks.
- Contaminated soils will be sent to landfills permitted to accept such material.
- Transport of contaminated materials will use existing haul routes, such as state highways. The contractor will provide bills of lading to WSDOT to ensure that contaminated materials have been disposed of properly.
- The project design team has identified every opportunity to reduce pollutant loading to receiving water bodies. PGISs in the project area will be decreased by approximately 10 acres.
- The project will provide detention for stormwater discharged to the combined sewer system at the north portal to prevent any increase in the frequency or volume of overflow events.
- Any stormwater discharge to the combined sewer system during construction will be regulated by the King County Wastewater Discharge Authorization or Permit to prevent degradation of water quality, as well as prevent any increase in the frequency and volume of overflow events.
- For dewatering water, the primary discharge will be to the King County combined sewer system, as long as there is capacity to discharge. Once the capacity threshold has been met, all dewatering water will be disposed of offsite, treated and reinjected as mitigation and managed through Ecology's Underground Injection Control Program (<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-218>), or stored for future discharge per seasonal limits.
- The project will provide water quality treatment for the South Royal Brougham Broad Street TDAs.

Chapter 3 ACTION AREA

The action area is defined as the geographical extent of project impacts and not merely the immediate area directly adjacent to the action. The action area includes the project footprint and all surrounding areas where project activities could potentially affect the environment. The extent of the action area encompasses direct and indirect effects, as well as any effects of interrelated or interdependent actions. The action area for this project includes the construction footprint and staging areas, dilution zones from stormwater outfall pipes, and the barge route (Exhibit 3-1). Seventeen staging areas have been selected for the project. These locations are shown in Exhibit 3-2.

3.1 Terrestrial Considerations

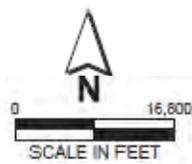
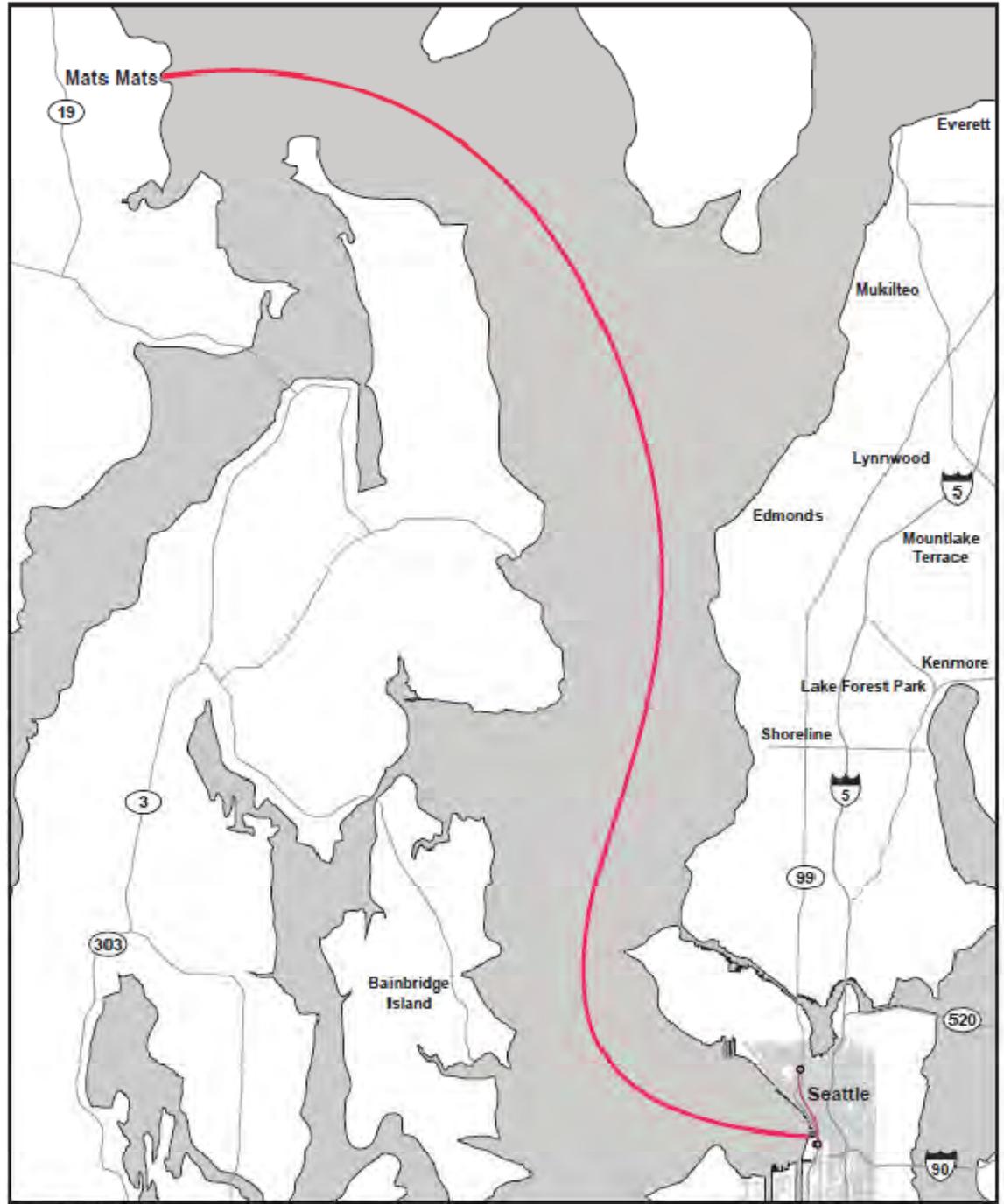
Sound generated by construction impacts will have the greatest extent of terrestrial impacts. Sound measurements are often recorded in acoustic decibels (dBA) using the A-frequency weighing scale. The A-weighted rating of noise is used because it relates to human interpretation of noise. For comparison, some commonly experienced noise levels include a loud outboard motor measured at 3 feet from the source (102 dBA), a passenger car traveling 65 mph at 50 feet (76 dBA), and average traffic on a street corner (75 dBA). Humans rarely detect a sound level difference of 3 dBA or less (WSDOT 2010).

Noise attenuates as the distance from the source of the noise increases. A general equation shows noise propagation loss as 6 dBA for each doubling distance in areas of hard ground cover, such as streets and sidewalks. For example, if sound levels were measured at 85 dBA at 50 feet from the source of the noise, then the sound would decrease to 79 dBA at 100 feet, to 73 dBA at 200 feet, 67 dBA at 400 feet, etc. In areas where landscape features and vegetation exist, noise attenuates at 7.5 dB per doubling distance from the source (WSDOT 2009).

The project is located in a highly urbanized setting that is fully developed for the length of the construction footprint. Typical terrestrial ambient noise levels in the downtown Seattle area near the waterfront range from 71 to 83 dBA, which is consistent with the elevated noise levels of typical urban and downtown major metropolitan areas (Parsons Brinkerhoff Quade & Douglas, Inc. 2004). To define the terrestrial extent of the action area, a conservative noise level of 71 dBA was assumed to be the downtown Seattle ambient noise level.

Project construction activities that will generate the highest noise levels are concrete breaking, jack hammering, and saw cutting. These are point source noises and are expected to produce an estimated combined peak sound pressure of approximately 94 dBA measured 50 feet away from the activity (WSDOT 2009).

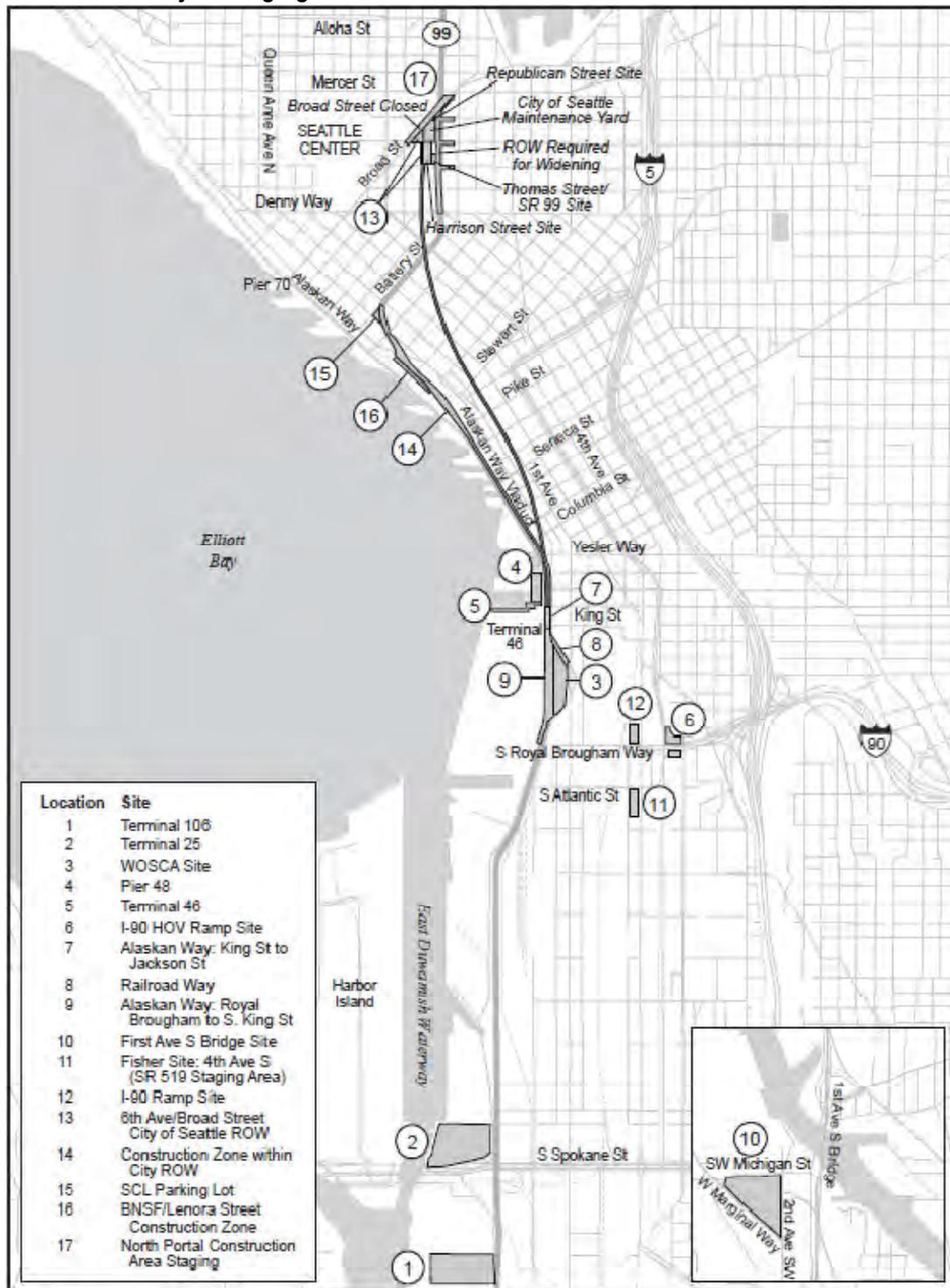
Exhibit 3-1. Action Area Overview



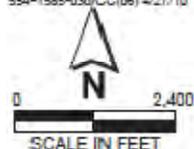
- Barge Route
- Portal
- Tunnel Alignment

Exhibit 3-1
Action Area Overview

Exhibit 3-2. Project Staging Areas



554-1585-030(C)(06) 4/27/10



Staging Areas
 Tunnel Alignment

**Exhibit 3-2
Project Staging Areas**

Using the in-air noise attenuation model of 6 dB per doubling distance, the 94 dBA produced during construction will attenuate to the ambient noise level of 71 dBA at approximately 650 feet from the project footprint (Exhibit 3-3).

3.2 Aquatic Considerations

All construction and demolition will occur in upland areas more than 75 feet from Elliott Bay, and most of the tunnel will be well below sea level. Although ground vibrations will occur, it is highly unlikely that these will generate underwater noise at levels above ambient noise levels in Elliott Bay (147 dB_{PEAK}) (Laughlin 2006), given the distance from the water, the various infrastructure located in the soils (e.g., foundations, utility conduits, etc.), and the presence of the seawall and armoring around the waterway.

Tunnel spoils will be barged to Mats Mats quarry in Port Ludlow, Washington, for disposal. Mats Mats is a commercial facility with consistent mining and material loading/offloading, and those activities will continue regardless of whether this project occurs. Barge operation (loading and unloading of materials) will create noise levels of approximately 137 dB_{PEAK} (Boyle, pers. comm. 2009), lower than ambient noise levels in Elliott Bay.

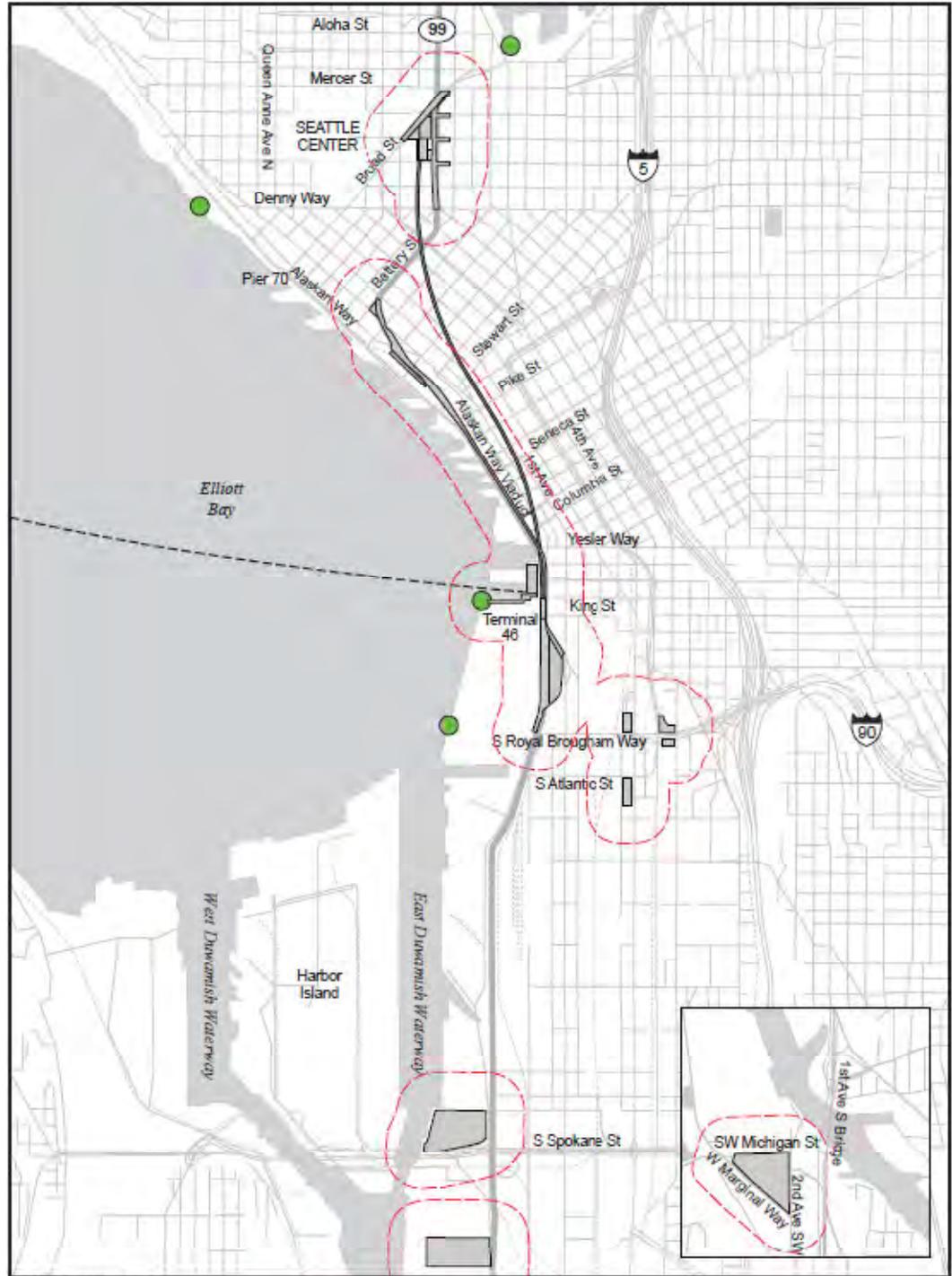
The barge route follows existing shipping lanes that link the ports of Seattle and Tacoma to international shipping routes. Large container ships that frequent the shipping lanes typically generate noise levels of 190 dB_{peak} or greater (FAS 2010). Slow-moving barges generate noise levels of approximately 153 dB_{peak}, well below those levels (URI 2010). Barge noise is therefore lower than ambient sound levels.

The project generates stormwater in five TDAs. Four discharge to Elliott Bay: South and North Royal Brougham (via one single outfall, the Kingdome outfall), King Street, and Dexter (via the Denny outfall). One TDA, Broad, discharges to Lake Union. The dilution zone around each outfall was determined using the HI-RUN model approved by USFWS, NMFS, FHWA, and WSDOT to calculate pollutant loads and concentrations, and the Cormix model, which calculates the area in which stormwater pollutants decrease to background concentrations. Water quality and stormwater analysis are described in detail in Section 6.1.4 and Appendix B. These models predict that the largest dilution plumes are for dissolved zinc (DZn) pre-project. DZn dilutes to 5.6 µg/L above background concentrations (the concentration established by the Services as the threshold for potential water quality effects on salmonids [WSDOT 2008]) within 23.2 feet of the Royal Brougham outfall, 12.5 feet from the King Street outfall, 11.8 feet from the Dexter outfall, and 28.36 feet from the Broad Street outfall.

3.3 Extent of Action Area

The project action area therefore encompasses all above-water areas within 650 feet of the construction footprint and staging areas, the barge route to Mats Mats quarry, and the dilution zones around each of the outfalls to Elliott Bay and Lake Union. No interrelated or interdependent actions have been identified that will affect the size of the action area (see Section 2.3). Indirect effects due to land use changes will also not affect the size of the action area (see Section 6.3).

Exhibit 3-3. Project Action Area



554-1885-030/CC(06) 4/27/10



- 660 Foot Buffer
- Barge Route
- Outfalls
- Staging Areas
- Tunnel Alignment

**Exhibit 3-3
Project Action Area**

Chapter 4 LISTED AND PROPOSED SPECIES AND CRITICAL HABITAT WITHIN THE ACTION AREA

WSDOT identified listed or proposed species that may occur within the action area from species lists on the NMFS web site (NMFS 2010) and the USFWS web site (USFWS 2010). WSDOT obtained information regarding species occurrence and distribution from the WDFW PHS database in December 2009 and a review of available literature. A WSDOT biologist visited the site on September 23 and December 10, 2009, and April 22 and June 8 2010 to evaluate the project area for the potential presence of listed species and suitable habitat.

The Washington Department of Natural Resources Natural Heritage Program database does not indicate that any threatened or endangered plants occur within the action area. No federally listed or proposed plant species have been identified within the action area, nor does suitable habitat for these species exist.

Thirteen federally listed or proposed species are known to occur, or could potentially occur, within the action area; critical habitat is designated for four of these species (Exhibit 4-1). The biology of listed species is presented in Appendix E. Additional species and critical habitat identified by the Services as potentially present in King and Jefferson Counties, but not addressed in this BA, are listed in Exhibit 4-2. Examination of the PHS maps from WDFW, review of existing literature, and an analysis of habitat within the action area demonstrate that no suitable habitat exists in the action area for the species listed in Exhibit 4-2, and they have not been documented in the action area, so they are not addressed further in this BA.

Exhibit 4 1. Federally Listed Species and Critical Habitat that May Occur within the Action Area

Common Name (Scientific Name)	Federal Endangered Species Act Status
Southern Resident killer whale DPS	Endangered
Southern Resident killer whale DPS critical habitat	Designated
Humpback whale	Endangered
Steller sea lion	Threatened
Puget Sound Chinook salmon ESU	Threatened
Puget Sound Chinook salmon ESU critical habitat	Designated
Puget Sound steelhead trout ESU	Threatened
Hood Canal summer run chum ESU	Threatened
Southern DPS green sturgeon	Threatened
Pacific eulachon	Threatened
Coastal/Puget Sound bull trout DPS	Threatened

Common Name (Scientific Name)	Federal Endangered Species Act Status
Coastal/Puget Sound bull trout DPS critical habitat	Designated ¹
Marbled murrelet	Threatened
Yelloweye rockfish	Threatened
Bocaccio	Endangered
Canary rockfish	Threatened

¹ Revisions to designated bull trout critical habitat were proposed on January 14, 2010

Exhibit 4.2. Listed Species and Critical Habitat within King and Jefferson Counties, Not Addressed in this Biological Assessment

Species common name (Scientific name)	ESA status
Canada lynx (<i>Lynx canadensis</i>)	Threatened
Gray wolf (<i>Canis lupus</i>)	Endangered
Grizzly bear (<i>Ursus arctos</i>)	Threatened
Leatherback sea turtle (<i>Dermochelys coriacea</i>)	Endangered
Northern spotted owl (<i>Strix occidentalis caurina</i>)	Threatened
Short-tailed albatross (<i>Phoebastria albatrus</i>)	Endangered
Marsh sandwort (<i>Arenaria paludicola</i>)	Endangered
Golden paintbrush (<i>Castilleja levisecta</i>)	Threatened
Northern spotted owl critical habitat	Designated; does not occur in action area
Marbled murrelet critical habitat	Designated; does not occur in action area

4.1 Killer Whale Southern Resident DPS

In November 2005, NMFS listed the southern resident killer whale (SRKW) DPS as endangered under the ESA (70 FR 69903). Threats to the species include reduction in the quantity or quality of prey, high levels of organochlorine and other contaminants, sound and disturbance from vessel traffic, and oil spills (NMFS 2008a). As of February 2010, the SRKW population was estimated at 89 individuals in three pods: J, K, and L (Orca Network 2010).

Photo-identification and tracking by boats have documented the ranges and movements of SRKW pods since the early 1970s. Ranges are best known from late spring to early autumn. During this period, all three pods are regularly present in the Georgia Basin, but spend relatively little of their time in Puget Sound portion of the action area (Heimlich-Boran 1988; Felleman et al. 1991; Olson 1998; Osborne 1999, Ford et al. 2000). During early autumn, SRKW pods (especially J pod) expand their movements into Puget Sound, where they feed on chum and Chinook salmon (Osborne 1999). Recently, this has been the only time of year that K and L pods regularly use Puget Sound. Similar movements into

other seldom-visited waters to forage on salmon are also most likely to occur during early autumn.

During late autumn, winter, and early spring, the ranges and movements of SRKW are less well known. J pod continues to be seen intermittently in Georgia Basin and Puget Sound (Osborne 1999). Each year since the winter of 1999 to 2000, K and L pods have remained in inland waters until January or February, but are completely absent from Georgia Basin and Puget Sound from early- to mid-February until May or June. Recent evidence suggests that they may forage off the outer Washington, Oregon, and California coasts during this period (NMFS 2005a). SRKWs have been documented in Elliott Bay near the mouth of the Duwamish (NMFS 2008a). Orcas have been seen more recently near Golden Gardens Park and West Seattle (The Whale Museum 2010).

4.1.1 Killer Whale Southern Resident DPS Critical Habitat

On November 29, 2006, NMFS designated critical habitat in Washington for SRKWs (71 FR 69054). The designation covers approximately 2,560 square miles (6,630 square kilometers) of the inland waterways of Washington State more than 20 feet deep relative to extreme high water. This area encompasses almost all of Puget Sound and Elliott Bay. The area defined as critical habitat is within the geographical area occupied by the species and contains the following primary constituent elements (PCEs) required by killer whales:

- PCE #1: Water quality to support growth and development;
- PCE #2: Prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth; and
- PCE #3: Passage conditions to allow for migration, resting and foraging.

4.2 Humpback Whale

Humpbacks were listed as endangered in 1973. The population is slowly recovering, but likely remains below the numbers that existed before whaling (Calambokidis and Barlow 2004). In Washington State, the species is found in coastal waters during its migration from winter grounds in Mexico to feeding grounds from California to Alaska (NMFS 1991).

Humpbacks are rare visitors to Puget Sound, but observations have been increasing in recent years (Falcone et al. 2005). There were two sightings in Puget Sound in 1976 and 1978 and one in 1986 (Everitt et al. 1980; Osborne et al. 1988). The orca network reported three sightings of humpback whales in the Straits of Georgia and Puget Sound in 2001. That number increased to 30 reports in 2004 (Orca Network 2010). The increase in sightings may be due partly to the growth of the orca network and local awareness (Falcone et al. 2005).

On average, humpback whales enter Puget Sound approximately once every two years, usually as single animals (Calambokidis, pers. comm. 1998). An exception occurred in 1988 when two single juvenile whales were reported in south Puget Sound (Calambokidis and Steiger 1990). A lone sighting of a small humpback whale was made on July 1, 1999, off Alki Point, but it was not seen again on any subsequent days. Most sightings appear to be of wandering juveniles apparently looking for a passageway back out of Puget Sound (Calambokidis 1998). Consequently, while humpback whales have been reported in Central Puget Sound in the past, this use is considered to be rare and very short-term. Most humpback whales entering Puget Sound spend less than a week in these waters (Calambokidis 1998).

4.2.1 Humpback Whale Critical Habitat

Critical habitat for humpback whales is not designated or proposed.

4.3 Steller Sea Lion

Steller sea lions were listed as threatened in 1990 (55 FR 50006). The species occurs year-round in Washington waters (NMFS 1992). The Steller sea lions are most abundant in Washington waters in the spring, winter, and fall. Their numbers decline during summer months when they travel to Oregon and British Columbia rookeries for the breeding season.

Steller sea lions feed in open water habitat in nearshore areas, out to the edge of the continental shelf (WDFW 1993a). Stomach and scat analysis in British Columbia indicates that principal prey items include hake (*Merluccius productus*), herring (*Clupea* spp.), octopus (*Octopus* spp.), Pacific cod (*Gadus macrocephalus*), rockfish (*Sebastes* spp.), and salmon (Olesiuk et al. 1990), all of which occur in the action area.

Steller sea lions have been documented in Puget Sound and Elliott Bay and likely occur within the action area. In Washington State inland marine waters, Steller sea lion haul-outs occur primarily around the San Juan Islands. In Puget Sound, one haul-out is located at the Toliva Shoals Buoy in southern Puget Sound, where fewer than ten Steller sea lions have been seen on buoys off south of Steilacoom (Jeffries et al. 2000). Another site is located south of Marrowstone Point, off Marrowstone Island, where approximately 15 animals have been observed (Agness, pers. comm., 2010). None of these documented haul-out sites is within the action area.

Documented sightings in central Puget Sound have occurred near tribal fishing nets in Elliott Bay and in the Duwamish Waterway. Steller sea lions were also seen in Elliott Bay between October 1987 and January 1988 during the steelhead fishing season (Gearin et al. 1988; Chumbley 1993; Gearin et al. 1999; Jeffries et al. 2000).

4.3.1 Steller Sea Lion Critical Habitat

NMFS designated critical habitat for Steller sea lions in 1993 to protect certain rookeries, haul-outs, and foraging areas in Alaska, Oregon, and California (58 FR 45269). There is no critical habitat in Washington State.

4.4 Puget Sound Chinook Salmon ESU

The abundance of Puget Sound Chinook salmon has declined greatly from historic levels. The Puget Sound ESU was listed as threatened in 1999 (64 FR 41836).

4.4.1 Puget Sound and Elliott Bay

Adult Chinook salmon migrate and forage in Puget Sound and may occur there at any time of year. Juveniles migrate, forage, and rear in the nearshore portions of Puget Sound. They are most abundant in the nearshore in June or July once they leave their natal streams, but they remain until October (Fresh 2006).

Chinook salmon occur in the Green-Duwamish and Cedar River basins (WDFW 1993b) and pass through Elliott Bay as they migrate from Puget Sound to the Green River and Lake Washington. Additionally, juvenile Chinook salmon from many other Puget Sound Basin river systems migrate and forage along Elliott Bay shorelines in the spring months.

The Green-Duwamish River Chinook are a mix of wild and hatchery-produced fish. They are considered a healthy stock based on escapement levels (WDFW 2002a). Good et al. (2005, cited in City of Seattle 2007) estimated the average number of adult Chinook spawning in the watershed was 13,815 between 1998 and 2002, with 83 percent of the fish spawning from 1997 to 2001 originating in hatcheries. They are nearly all summer/fall run fish that begin entering the Duwamish River as adults in mid-June, reach peak abundance in August, and continue entering the river through October and early November (Weitkamp and Ruggerone 2000; City of Seattle 2007).

As adult Chinook salmon migrate through Elliott Bay on the way to spawn in the Green-Duwamish River, they typically migrate in deeper waters offshore from the docks and piers of Elliott Bay. Adults also congregate at the mouth of the Duwamish before upstream migration from late June through mid-November (Grette and Salo 1986).

Outmigration of juveniles lasts from January to July. Surveys of the Green/Duwamish conducted from 2001 to 2003 by Nelson et al. (2004) and confirmed by a 2004-to-2005 study by the U.S. Army Corps of Engineers (Corps) (Corps 2005a) observed two peaks of out-migrating juvenile Chinook. The early run arrives in the Duwamish estuary as early as January, with a peak of outmigration generally occurring in mid-March. Lower levels of juvenile

Chinook out-migration are observed from April through July. The majority of out-migration occurs during the earlier window (City of Seattle 2007).

Recent surveys by the University of Washington show similar migration patterns. Chinook fry approximately 5 cm long leave the Duwamish in February and March. Larger (8-10 cm) smolts outmigrate from May-July (Toft 2010 pers. comm.) Juvenile Chinook have been observed along the Seattle Shoreline from late January through September, with a peak in June and July (Toft et al. 2007).

Chinook salmon fry rear and migrate in shallow water along shorelines during their estuarine and early marine residence (Healey 1991). Juveniles are seldom observed in water deeper than approximately 2 meters (6 feet) until they have grown to 70 to 80 millimeters (approximately 3 inches) in length, although they sometimes migrate near the surface water in deeper waters farther from shore. Juveniles migrate offshore beginning in August (Toft 2010 pers. comm.). Both locally spawned and non-local juvenile Chinook use the nearshore areas in the Duwamish estuary and Elliott Bay for rearing, spending from a few days to about three months in the vicinity (Myers et al. 1998; Weitkamp and Ruggerone 2000). These juveniles may re-enter the marine areas of the lower Duwamish during the summer and winter after out-migration (City of Seattle 2007).

No fish surveys have been conducted at project outfalls, but seine netting and snorkel surveys have been conducted by University of Washington researchers at Myrtle Edwards Park and the Olympic Sculpture Park beach, just north of the Denny outfall. Juvenile Chinook are commonly observed at those locations. Juvenile Chinook have been found in all habitat types along the Seattle shoreline (Toft 2010 pers. comm.).

4.4.2 Lake Union

Adults and juveniles from three Chinook stocks migrate through Lake Union. The North Lake Washington Tribes Chinook, which is listed as healthy, is a mixed wild and native stock. Issaquah Chinook are also a mixed stock and are listed as healthy. Cedar River Chinook are a native stock with wild production and listed as depressed (WDFW 2002c). Adult migration occurs from July through October, with spawning from September through November. Spawning takes place outside the action area in the Sammamish River and its tributaries, in Issaquah Creek, and the Cedar River. Chinook salmon fry emerge from gravel beds from January to March. As with Green River fish, juvenile outmigration is bimodal, with fry migrating from January to mid-May and parr migrating between mid-April and July (WDFW 2009).

Juvenile Chinook in the Lake Washington basin generally rear in nearshore areas north of SR520 and south of I-90 Lake Washington from January to May. In mid-May to June, fish begin to migrate through the Ballard Locks to Elliott Bay. Juvenile Chinook are common throughout Lake Washington and Lake Union

beginning in May when the Issaquah and University of Washington hatcheries release their fish (Tabor 2010, pers. comm.). Juvenile Chinook have been observed slightly north of the Broad Street outfall in June and July, but are not likely to be present at the outfall prior to May (Tabor 2010 pers. comm.)

4.4.3 Puget Sound Chinook Salmon ESU Critical Habitat

Critical habitat for Puget Sound Chinook salmon was designated on September 2, 2005 (70 FR 52630). Nearshore marine areas of Puget Sound designated as Chinook salmon critical habitat extend from the extreme high water line out to a depth of 30 meters. Critical habitat within the action area includes the shorelines of Elliott Bay, Lake Union, and Port Ludlow.

NMFS has defined six PCEs for Chinook salmon critical habitat, five of which occur in the action area. Freshwater PCEs occur in Lake Union, and the estuarine and marine PCEs occur along the Seattle waterfront and Port Ludlow.

Lake Union:

- PCE #2: Freshwater rearing sites with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- PCE #3: Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;

Elliott Bay and Puget Sound

- PCE #4: Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh and salt water; natural cover such as submerged and overhanging large woody debris, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
- PCE #5: Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, which support growth and maturation; and which possess natural cover such as submerged and overhanging large woody debris, aquatic vegetation, large rocks and boulders, and side channels.

- PCE #6: Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

4.5 Hood Canal Summer-Run Chum Salmon ESU

The Hood Canal summer-run chum salmon ESU was listed as federally threatened on March 25, 1999 (64 FR 14508). This ESU has declined steadily in past decades. Escapement dropped from 40,000 fish in 1968 to 173 fish in 1989 (WDF et al. 1993). Degradation of spawning habitat, low water flows, and incidental harvest have all been identified as threats to the population (63 FR 11774).

Summer run chum salmon spawn from mid-September to mid-October, primarily in the lower reaches of coastal rivers. Fry emerge between February and April and immediately begin migrating to estuaries, where they inhabit nearshore areas (1.5-5m depth) until they reach a length of approximately 50mm (which occurs around April-June), at which point they begin their migration out to sea. Mats quarry is within the boundary of this ESU, and fish from this population will pass through the barge route on their way to and from feeding grounds in the open ocean (WDFW and Point No Point 2000).

4.5.1 Hood Canal Summer-Run Chum salmon ESU Critical Habitat

Critical habitat for the Hood Canal summer-run Chum salmon ESU was designated on September 2, 2005. Within the action area, the designation includes the nearshore locale around Port Ludlow from the shoreline to a depth no more than 30 meters relative to mean lower low water (70 FR 52630). PCEs within that area include the following:

- PCE #5: Nearshore marine areas free of obstruction and excessive predation with: (i) Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
- PCE #6: Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

4.6 Puget Sound DPS Steelhead

The Puget Sound steelhead DPS was listed as threatened on May 11, 2007 (72 FR 26722). Steelhead are present in Elliott Bay, Lake Union, and Puget Sound (WDFW 2003). Both winter and summer juvenile steelhead from the Green-Duwamish River and other river systems may occur within nearshore Elliott Bay,

Lake Union, or Puget Sound any time of year. During the migration from fresh to saltwater, steelhead may spend a considerable amount of time in Puget Sound and extensively use nearshore habitats for rearing after leaving fresh water (Puget Sound Steelhead Biological Review Team 2005).

4.6.1 Puget Sound and Elliott Bay

Adult steelhead migrate and forage in Puget Sound. They may be found there at any time of year.

Both a summer and winter stock of steelhead are present in the Green-Duwamish River. The summer steelhead population is considered depressed, based on escapement levels (WDFW 2002b). Historically, there is no evidence of summer steelhead in the Green-Duwamish River before hatchery introductions; it is a non-native stock with composite (wild and hatchery) production (WDFW 2002b).

Summer run steelhead return to the Green-Duwamish River watershed from April through October (WDFW and Western Washington Treaty Indian Tribes 1994; City of Seattle 2007). Spawning timing for natural spawners is unknown, but is assumed to be similar to that of hatchery-origin summer steelhead adults in the Green-Duwamish River, extending from mid-January through mid-March (WDFW 2002b).

The Green-Duwamish winter steelhead population is considered healthy based on escapement levels (WDFW 2002b). It is a native stock with wild composition that returns to freshwater from November through May; spawning occurs from February through the end of June, with a peak in mid-May (Grette and Salo 1986; City of Seattle 2007). Both summer and winter steelhead generally spawn above river mile (RM) 30.0.

The principal juvenile out-migration season for steelhead occurs from mid-April through mid-June (Grette and Salo 1986; Corps 1998). Steelhead smolts emigrate from the Green-Duwamish River watershed from the middle of March to the middle of July for both winter and summer stocks (City of Seattle 2007). Average size for steelhead smolts outmigrating from the Duwamish is approximately 14 cm (Toft, 2010, pers. comm.)

No fish surveys have been conducted at project outfalls, but seine netting and snorkel surveys have been conducted by University of Washington researchers at Myrtle Edwards Park and the Olympic Sculpture Park beach, just north of the Denny outfall. Juvenile steelhead have been reported from the nearshore environment of Elliott Bay, but they are rare (Toft, 2010, pers. comm.). One survey involving 390 beach seines in 2002 and 2003 found several hundred juvenile Chinook salmon, but only two juvenile steelhead (Shannon 2006 pers. comm.). Another survey involving 600 beach seines in 2001 and 2002 found 2,400

juvenile Chinook salmon, but only nine juvenile steelhead (Brennan 2006 pers. comm.).

4.6.2 Lake Union

Lake Washington winter steelhead are identified as a distinct stock based on their spawning distribution. It is a native stock with wild production (WDFW 2005). Steelhead stocks in the Cedar-Sammamish watershed (WRIA 8) have generally been declining since the mid-1980s (Kerwin 2001). Lake Washington winter steelhead stock status was downgraded from depressed to critical based on low escapement values and a severe decline in 2000-2001. Escapement for wild Cedar River winter-run steelhead dropped from 1,816 individuals in 1986 to 44 in 2003 (WDFW 2005).

Adult steelhead begin their migration from Puget Sound through the Ballard Locks in November. Spawning occurs from March through early May, peaking in April (NMFS 2005b). Smolts migrate back through the locks in mid-June to early July (Kerwin 2001). No steelhead surveys have been conducted near the Broad Street outfall, but steelhead smolts have a low residence time in the locks, in the order of hours to days (City of Seattle 2007).

4.6.3 Puget Sound Steelhead DPS Critical Habitat

Critical habitat for steelhead is currently under review. It has, however, not been designated or proposed.

4.7 Southern DPS Green Sturgeon

The Southern DPS of green sturgeon was listed as threatened on April 7, 2006. The listing was based on limited and decreasing spawning habitat and negative population trends (71 FR 17757).

Green sturgeon are not frequently observed in the action area, though the extent to which they use Puget Sound is unknown (NMFS 2008b). A few adults and subadults have been incidentally captured in fisheries harvests, and two Southern DPS green sturgeon were observed south of Whidbey Island (outside the action area) in 2006 (Adams et al. 2002, NMFS 2008b). The species may use Puget Sound for foraging and holding or resting (NMFS 2008b). There have been no documented observations in nearshore Elliott Bay.

4.7.1 Southern DPS Green Sturgeon Critical Habitat

NMFS designated critical habitat for Southern DPS green sturgeon on October 9, 2009, but that designation does not include Puget Sound or any portion of the action area.

4.8 Southern DPS Pacific Eulachon

The southern DPS of Pacific eulachon was listed as threatened on March 16, 2010, due to historically low numbers. The effects of climate change on freshwater and marine habitats, by-catch in the pink shrimp fishery, water management changes in the Klamath and Columbia basins, and predation by marine mammals and birds, especially in the Fraser River and coastal rivers in British Columbia, are all threats to the species (75 FR 13012).

Eulachon are endemic to the northeastern Pacific Ocean, ranging from northern California to southwest and south-central Alaska and into the southeastern Bering Sea. The southern DPS consists of populations spawning in rivers from British Columbia to California. Eulachon are very important to the Pacific coastal food web due to their availability during spawning runs and their high lipid content.

Eulachon typically spend three to five years in saltwater before returning to fresh water to spawn from late winter through early summer. Spawning grounds are typically in the lower reaches of larger rivers fed by snowmelt (Hay and McCarter 2000). Juveniles rear in nearshore marine areas at moderate or shallow depths (Barraclough 1964). As eulachon grow, they migrate out to deeper depths and have been found as deep as 625 meters (m) (Allen and Smith 1988). Adult eulachon range from 14 to 30 centimeters (cm) (WDFW and ODFW 2001).

There is little information about eulachon within the action area. Eulachon are not common in Puget Sound. The Puyallup River is the only Puget Sound system in which eulachon are known to spawn; spawning regularity in that river is classified as rare (Gustafson et al. 2008). The species is not likely to occur in either Elliott Bay or Puget Sound.

4.8.1 Critical Habitat

Critical habitat for Southern DPS Pacific eulachon has not been proposed or designated.

4.9 Coastal/Puget Sound Bull Trout DPS

USFWS listed bull trout in the Coastal/Puget Sound DPS as threatened under ESA on November 1, 1999 (USFWS 1999). The decline of bull trout has been attributed to habitat degradation, blockage of migratory corridors by dams, poor water quality, introduction of competing non-native species, and effects of past fisheries management practices (USFWS 1998a).

Anadromous bull trout typically return to fresh water during late spring and summer, where they spawn from August through December in upper tributaries and headwater areas with low water temperatures (Goetz et al. 2004, cited in City of Seattle 2007). Some bull trout may begin their spawning migration as early as

April. Young anadromous bull trout usually rear in fresh water two or three years before migrating to salt water in the late winter and spring (Wydoski and Whitney 2003).

Bull trout are classified as native char by WDFW. Little information exists regarding the current distribution of bull trout in the action area, but some native char have been observed in Lake Washington as well as the Duwamish River mainstem and its major tributaries (King County DNR 2000a; Taylor, pers. comm. in Goetz et al. 2004), and there is conclusive evidence that anadromous bull trout occur in various areas of Puget Sound (Kraemer 1994; Goetz et al. 2004), so they could occur throughout the action area.

4.9.1 Elliott Bay and Puget Sound

The lower Green/Duwamish River system is considered foraging, migrating, and overwintering habitat for bull trout, with individuals observed in the lower Duwamish likely originating from other watersheds (City of Seattle 2007). The number of bull trout, as well as the timing and duration of their use of the Duwamish River estuary and Elliott Bay, is uncertain. Few bull trout have been observed in the Duwamish River. Four adult char were captured near RM 7 in 1978 (Brunner 1999, cited in City of Seattle 2007). More recently, Taylor and Associates, working for the Port of Seattle, captured nine sub-adult char in the turning basin of the lower Duwamish (RM 5.3) (Corps 2005b; City of Seattle 2007). Of these nine char, six were caught in August 2000, two were caught in September 2000, and one was caught in September 2002. The size of these fish ranged from 223 to 370 millimeters (mm) with a mean size of about 290 mm, corresponding mostly to sub-adult sized fish. The most recent capture occurred at Kellogg Island in May 2003. This fish was a large adult (585 mm) (J. Shannon, Taylor and Associates, E. Jeanes, R2 Resource Consultants, pers. comm., cited in Corps 2005b). However, weekly beach seining between December 2004 and July 2005 at a variety of sites between RM 1 and RM 8.5 did not produce any bull trout (G. Ruggerone, NRC, pers. comm. 2006, cited in City of Seattle 2007). These locations are all upstream of the action area.

Bull trout are rarely found in Elliott Bay, and are unlikely to occur near project outfalls. Seine and snorkel surveys along the Seattle waterfront in 200, 2005, 2007, and 2009 documented only one bull trout approximately 20 cm long (Toft 2010 pers. comm.).

Bull trout migrate, forage, and rear in Puget Sound. While occurrences are rare, they may be found there at any time of year.

4.9.2 Lake Union

Reports of native char from Lake Washington are rare (WDFW 1998), and none has been documented in Lake Union. No bull trout were observed in a survey of

Lake Sammamish, and only one was found in a two-year survey of Lake Washington (Bradbury and Pfeiffer 1992). Another two native char were found in the headwaters of Issaquah Creek (WDFW 1998). High water temperatures and low dissolved oxygen likely discourage bull trout use of Lake Union; however, the lake is designated as bull trout critical habitat and identified as core foraging, migratory, and overwintering habitat by USFWS (69 FR 35768).

4.9.3 Coastal/Puget Sound Bull Trout DPS Critical Habitat

Designated Critical Habitat

Critical habitat for bull trout was designated on September 26, 2005 (70 FR 56212), and includes the nearshore areas of Elliott Bay, Lake Union, and Puget Sound. The USFWS has defined eight PCEs for bull trout critical habitat, six of which occur in the action area:

- PCE #1: Water temperatures that support bull trout use. Bull trout have been documented in streams with temperatures from 32 to 72 °F (0 to 22 °C) but are found more frequently in temperatures ranging from 36 to 59 °F (2 to 15 °C). These temperature ranges may vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence.
- PCE #4: A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, currently operate under a biological opinion that addresses bull trout, or a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation.
- PCE #5: Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.
- PCE #6: Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.
- PCE #7: An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- PCE #8: Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.

Proposed Critical Habitat

On January 14, 2010, USFWS announced a proposal to revise designated critical habitat for bull trout (75 FR 2269). The proposal rennumbers and rewords PCEs,

and one PCE has been added. The proposed PCEs found in the action area are as follows:

- PCE #1: Springs, seeps, groundwater sources, and subsurface connectivity to contribute to water quality and quantity and provide thermal refugia.
- PCE #2: Migratory habitats with minimal physical, biological or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
- PCE #3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- PCE #5: Water temperatures ranging from 2-15 degrees Celsius with adequate thermal refugia available for temperatures at the upper end of this range.
- PCE #7: A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.
- PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
- PCE #9: Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.

4.10 Marbled Murrelet

Marbled murrelets are diving sea birds that forage almost exclusively in the marine nearshore environment, usually within 0.6 to 1.2 miles from the shore. They nest in mature conifers, with nesting areas occurring up to 50 miles inland from the marine environment (USFWS 1997). The species was listed as threatened in 1992 (57 FR 45337).

Marbled murrelets are highly mobile birds. Their offshore distribution is linked to various environmental factors including proximity to mature forests, distribution of rocky shorelines and substrates versus sandy shorelines and substrates, and abundance of kelp. The presence of prey species also determines areas of regular marbled murrelet use (USFWS 1997). Marbled murrelets feed on a variety of small fish and invertebrates, including sand lance (*Ammodytes* spp.), Pacific herring (*Clupea pallasii*), northern anchovy (*Engraulis mordax*), smelt (*Spirinchus thaleichthys*), seaperch (family *Embiotocidae*), euphausiids, mysids, and gammarid amphipods (USFWS 1997), all of which may be present in the action area.

Marbled murrelet use of the action area along the Seattle waterfront is not expected due to high levels of human and boat activity on the waterfront and in Lake Union. PHS data do not contain any records of marbled murrelets in that area (WDFW 2009). However, WDFW found low concentrations of marbled murrelets near Elliott Bay, with small groups of one to two birds observed off West Point (approximately one mile north of Elliott Bay) during summer (Nysewander et al. 2005). Murrelets could occur along the barge route at all times of year.

There is no suitable marbled murrelet nesting habitat in the action area, and no mapped nesting sites have been documented within one mile of the highly urbanized project area. No nesting marbled murrelets are expected to occur in the action area.

4.11 Yelloweye Rockfish

Yelloweye rockfish were listed as threatened on April 27th, 2010 (75 FR 22276). Adults are typically found between 300 and 590 feet deep (NMFS 2008c). Adults have very small home ranges and are generally affiliated with caves, crevices, bases of rocky pinnacles, and boulder fields (Richards 1986). As with all rockfish, yelloweye rockfish are livebearers. In Puget Sound, eggs are fertilized between winter and summer months (NMFS 2009). Parturition occurs in early spring through late summer. Although rockfish generally spawn once per year, there is some evidence that yelloweye rockfish in Puget Sound spawn up to twice per year (Washington et al. 1978). Larvae remain pelagic for two months or more and then begin to settle to deeper waters (NMFS 2008c).

This species is rare in Puget Sound south of Admiralty Inlet (NMFS 2008c; Love et al. 2002), and little is known about their presence in the action area. According to surveys, the further south in Puget Sound, the lower the potential for yelloweye rockfish presence or use (REEF 2009). This is likely due to fewer areas of rocky habitat in Southern Puget Sound (Miller and Borton 1980).

Nearshore Elliott Bay is not ideal habitat for yelloweye rockfish due to the lack of rocky substrate, but the species has been observed in Elliott Bay in small numbers (Bargmann, pers. comm. 2009; Miller and Borton 1980).

Critical habitat has not been proposed for yelloweye rockfish.

4.12 Bocaccio

Bocaccio were listed as endangered on April 27, 2010 (75 FR 22276). Bocaccio are large piscivorous rockfish in eastern Pacific coastal waters ranging from Alaska to Baja California (NMFS 2008c; COSEWIC 2002). Most commonly, bocaccio are found from Oregon to California and were once common on steep walls of Puget Sound (Love et al. 2002).

Adults are most commonly found in deeper water (anywhere from 39 to 1,568 feet) (NMFS 2008c) and can be found in nearly all types of substrate. They tend to be more pelagic than other rockfish species (NMFS 2009). Larvae are highly dispersal and generally are associated with surface waters and drifting kelp mats (NMFS 2009). Juveniles settle to shallow, algae-covered rocky areas or eelgrass and sand over several months (Love et al. 1991) and move to deeper waters as they age (Love et al. 2002; NMFS 2009).

In the Puget Sound region, adult bocaccio seem to be limited to areas around Tacoma Narrows and Point Defiance (NMFS 2009). There is little information about their use of the action area. Nearshore Elliott Bay does not provide good habitat for the species due to the lack of rocky substrate, but there are records of bocaccio in the bay (Bargmann, pers. comm. 2009; Miller and Borton 1980).

Critical habitat has not been proposed for bocaccio.

4.13 Canary Rockfish

Canary rockfish were listed as threatened on April 27, 2010 (75 FR 22276). The species is found from the western Gulf of Alaska to northern Baja California. It is most common in outer coastal waters between British Columbia and California (NMFS 2008c). Canary rockfish were once considered fairly common in Puget Sound (Holmberg et al. 1967, cited in NMFS 2008) and were found most often in south Puget Sound (NMFS 2009). Catch surveys have reported declines since 1965 (NMFS 2008c).

Larvae and juveniles typically occur in the upper water column and surface waters. Juveniles settle into tide pools, rocky reefs, kelp beds, low rock, and cobble areas (Miller and Geibel 1973; Love et al. 1991; Love et al. 2002 as cited in NMFS 2008c). At approximately 3 years, juveniles begin to move deeper into rocky reefs.

Canary rockfish adults are generally associated with hard bottom areas and rocky shelves and pinnacles (NMFS 2008c). They are usually found at or near the bottom (PFMC 2003). Adults tend to be in dense schools leading to patchy distribution (Stewart 2007). Based on survey and frequency data, NMFS estimates that there are approximately 300 canary rockfish in Puget Sound Proper (south of Admiralty Inlet), while Northern Puget Sound (north of Admiralty Inlet) has slightly higher numbers (NMFS 2009).

Most available data on canary rockfish is from catch surveys and trawl data from the Strait of Juan de Fuca and around Vancouver Island (DFO 2008, as cited in NMFS 2008c). Surveys between 1996 and 2009 suggest that canary rockfish are most consistently observed in northern waters of Puget Sound, Strait of Juan de Fuca, and the outer coast. There are no observations of canary rockfish in Elliott

Bay. The closest documented occurrences are from the Shilshole area north of West Point (Bargmann, pers. comm. 2009; Miller and Borton 1980).

Critical habitat has not been proposed for canary rockfish.

Chapter 5 ENVIRONMENTAL BASELINE

The Elliott Bay shoreline is a highly modified portion of Puget Sound with significant commercial, industrial, and residential development (Exhibit 5-1). The shoreline consists of a seawall backed by concrete sidewalks, paved roadways, and buildings, and fronted by piers. According to a survey by TerraLogic GIS and Landau Associates (2004), and confirmed by project biologist site visits, no riparian vegetation occurs along the shoreline within the action area. Aquatic vegetation consists of limited areas of algae. There is no documented eelgrass, forage fish spawning, or extensive macroalgae present. The Duwamish River flows into Elliott Bay at the south end of the project.

Lake Union is similarly developed (Exhibits 5-1 and 5-2). Approximately 82 percent of the shoreline is modified by piers, bulkheads, and docks. Aquatic vegetation is depleted and dominated by invasive species such as Eurasian milfoil. Riparian vegetation is limited to small sections of Gasworks Park and other undeveloped areas (King County 1998; Weitkamp et al. 2000). Some riparian restoration is underway near the Broad Street outfall as part of the South Lake Union Park project.

Exhibit 5-1. Overview of the Project Area Showing the Elliott Bay and Lake Union Shorelines



Terrestrial habitat at the south end of the project footprint includes the industrial lands along either side of the viaduct. This area includes rail lines and cargo ship facilities, as well as the U.S. Coast Guard mooring slip, Qwest Field and Safeco Field. The surroundings are densely developed for commercial, residential, and industrial uses and contain very little natural vegetation (Exhibits 5-1 and 5-3). Terrestrial habitat in the north end of the project footprint is also highly modified and is characterized by light industrial and residential development. Vegetation is largely landscaped non-native ornamental species.

Ambient sound levels within the action area are elevated due to high levels of human activity along the waterfront, primarily roadway vehicle and boat traffic. Twenty-four-hour day and night, above-water sound levels measured along the waterfront ranged from 71 to 83 dB (Parsons Brinkerhoff Quade & Douglas 2004). The typical aquatic ambient noise level in Elliott Bay at Pier 70 was found to be 147 dB_{PEAK} (Laughlin 2006).

Puget Sound forms the commercial shipping lane serving the ports of Seattle and Tacoma and also experiences high noise and disturbance levels from containerized ship traffic. Ambient noise levels within Puget Sound are approximately 135 dB_{RMS} (approximately 145 dB_{PEAK}) (WSDOT 2010); however, large ships such as container ships and supertankers, which are common in the shipping lane, produce sound levels of up to 190 dB (FAS 2010).

Mats Mats quarry is located in Port Ludlow, Washington. The barge loading dock is bordered by light commercial and residential development (Exhibit 5-4). The quarry currently accepts approximately one to two bargeloads of tunnel spoils per day from the Brightwater plant.

Exhibit 5-2. South Lake Union near the Broad Street Outfall



Exhibit 5-3. Representative Terrestrial Habitat Along the Viaduct Alignment



Exhibit 5-4. Mats Mats Quarry Loading Dock and Surroundings



5.1 Water Quality

5.1.1 Turbidity

Elliott Bay, Lake Union, and Port Ludlow are not listed by Ecology as exceeding any turbidity standards or otherwise identified as having excessive turbidity. The Duwamish River also is not identified by Ecology as overly turbid, but it provides the primary sediment input to Elliott Bay.

5.1.2 Chemical Contamination/Nutrients

Elliott Bay is on Ecology's 303(d) list of threatened and impaired waters for fecal coliform. Nearshore sediments contain high concentrations of various metals and chemical compounds (Romberg et al. 1984; EPA 1988; Metro 1988, 1989, 1993; Tetra Tech, Inc. 1988; Hart Crowser 1994; King County 1994; Norton and Michelson 1995; Ecology 1995). These contaminants include mercury, silver, lead, zinc, copper, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and other metals and organic compounds. The ambient dissolved copper and DZn concentrations for Elliott Bay are approximately 0.7 and 4.1 micrograms per liter ($\mu\text{g/L}$), respectively (Curl et al. 1988).

Lake Union is on Ecology's 303(d) list of threatened and impaired waters for total phosphorus, lead, zinc, Aldrin (an organochlorine pesticide banned in the U.S. in 1974), 4',4'-DDD, and 4,4'-DDE (Ecology 2009a). Water samples collected from Lake Union in 1990 showed low concentrations of organic compounds (e.g., PAHs, PCBs, and phthalates) (Herrera 2008 cited in Seattle 2009). Although total copper and total lead concentrations have exceeded state water quality criteria in previous years, concentrations have generally been below acute and chronic toxicity levels for state water quality criteria (Herrera 1998; Herrera 2005). Background dissolved copper and DZn levels for Lake Union are 2.0 and 1.8 $\mu\text{g/L}$ (Ecology 2009b).

The waters of Puget Sound and Port Ludlow are not on the 303d list.

5.1.3 Temperature

Elliott Bay is not listed as exceeding water temperature criteria (Ecology 2010). Water temperatures within Elliott Bay were collected during surveys for non-indigenous species at seven sites in 2001, and were recorded between 12°C and 16°C (WDNR 2001). Ecology also has conducted water quality monitoring in Elliott Bay approximately once a month from 1991 until 2002. These data show that water temperature 5 meters deep fluctuates between approximately 7.7°C and 16.4°C (Ecology 2006).

Lake Union is listed as exceeding water temperature: 4 out of 12 samples collected between 1993 and 2001 exceeded water temperature criteria (Ecology

2010). Summer water temperatures range from 16 to 23°C (King County undated), well above levels considered ideal for salmonids (18°C). Temperatures the rest of the year range from 7 to 16°C (City of Seattle 2007).

Puget Sound and Port Ludlow are not listed as exceeding water temperature criteria (Ecology 2010).

5.1.4 Dissolved Oxygen

Elliott Bay is listed as a Category 1 waterbody for dissolved oxygen (DO) (Ecology 2006), meaning that it meets state standards. King County data collected in 2002 and 2003 show four instances of DO levels lower than minimum criteria. However, staff from the Ecology Marine Unit reviewed these data and determined that the sample location is subject to incursions of upwelling with low DO bottom waters. This upwelling shows no evidence of human-caused sources and is, therefore, a natural condition (Ecology 2006).

Lake Union is listed as a Category 2 water body for dissolved oxygen. Six samples showed excursions beyond DO criteria out of 12 samples collected between 1993 and 2001 (Ecology 2010). Samples collected during winter and spring exhibited DO concentrations ranging from 9.5 to 12.6 mg/L; however, concentrations were as low as 1 mg/L during the summer months (Herrera 2008).

Puget Sound and Port Ludlow are not listed for dissolved oxygen.

5.2 Stormwater

5.2.1 Stormwater Quality and Quantity

Stormwater from the project area is either conveyed to the King County Combined Sewer System or discharged to Lake Union (see Section 2.2.9). Most of this stormwater flows from PGIS. Stormwater discharged to the King County Combined Sewer System is normally routed to the EBI, a large County conveyance pipe under Second Avenue. The EBI conveys flows to WPTP for treatment and discharge to Puget Sound. When the combined sewer system exceeds capacity, however, it discharges untreated runoff and sewage directly into Elliott Bay. Stormwater discharged to Lake Union is untreated and is not detained under current conditions.

5.3 Sediment

5.3.1 Sedimentation Sources and Rates

The ShoreZone mapping program, conducted by the Washington Department of Natural Resources, indicates that approximately 90 percent of Elliott Bay's shoreline is riprapped or armored with rubble, and 16.2 percent has vertical bulkheads or seawalls (Nearshore Habitat Program 2001). Along much of the

shoreline, bulkheads or seawalls are present in the upper intertidal zone, with riprap or rubble in the lower zone. Approximately 82 percent of the Lake Union shoreline has been similarly altered (Weitkamp et al. 2000).

Shoreline modifications in Elliott Bay have extensively altered both sediment supply and sediment transport processes. Sediment processes have also been dramatically altered for sediment flowing through the Green-Duwamish River system into Elliott Bay through straightening of the river, construction and operation of Howard Hanson Dam, and periodic maintenance dredging of the lower river.

5.3.2 Sediment Quality

Sediments in Elliott Bay are contaminated with a variety of substances. Studies indicate that several organic compounds such as PCBs and PAHs, as well as metals such as mercury, cadmium and zinc, are present in the sediments of some areas of Elliott Bay at levels that exceed state standards. Chemicals of concern found at elevated concentrations in Elliott Bay include low and high molecular weight PAHs, PCBs, and tributyltin (NMFS and USFWS 2005).

Sediment testing at the Denny outfall in March 2009 revealed elevated levels of PCBs and several other organic compounds. Samples collected at the King Street outfall contained high levels of PCBs and other organic compounds, arsenic, mercury, silver, and zinc. Testing at the Royal Brougham outfall (also referred to as the Kingdome or Connecticut regulator) demonstrated elevated concentrations of PCBs, other organic compounds, and copper. A full description of sediment sampling locations and results can be found online at http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/SedQuality/0912_CompSedQualSumRptCSODischargeLoc.pdf.

Sediments testing in Lake Union has revealed elevated levels throughout the lake with PCBs, PAHs, and bis(2-ethylhexyl)phthalate exceeding the freshwater sediment quality values. Elevated concentrations of mercury (ranging from 0.35 to 9.18 mg/kg) have been found near various south Lake Union CSOs (Herrera 2008), but there are no data from the Broad Street outfall.

The Washington State Department of Ecology does not list any contaminated sediments in the vicinity of Port Ludlow.

5.4 Habitat Condition

5.4.1 Fish Access/Refugia

Substantial habitat alteration and loss have occurred in Elliott Bay. The entire shoreline has been modified by urban and industrial development (King County 2001), greatly decreasing shallow water habitat and refugia. Overwater structures line approximately 65 percent of the shoreline (King County 2001). The King and

Royal Brougham outfalls are located under the docks of the Port of Seattle. The shoreline near the Denny outfall has been heavily armored, but some beach restoration occurred as part of the Denny Way CSO control project (King County 2009a) (Exhibit 5-5). Juvenile Chinook and steelhead have been observed north of the outfall at the Olympic Sculpture Park beach, and one bull trout 20 cm long was also seen there (Toft 2010 pers. comm.).

Exhibit 5-5. Shoreline near Denny Way Outfall



Source: King County Comprehensive Sediment Quality Summary Report for Discharge Locations, December 2009.

Lake Union in the action area has been similarly altered. Bulkheads have been constructed along much of the shoreline near the Broad Street outfall. However some shoreline restoration is underway as part of the Lake Union Park project (Exhibit 5-2). Juvenile Chinook have been documented in the area north of the outfall but none were observed during site visits in May and June of 2010.

The shoreline at the Mats Mats loading dock has been extensively armored and cleared of vegetation, reducing fish habitat at that location.

5.4.2 Depth

Most shorelines around Elliott Bay currently consist of seawalls, bulkheads and/or riprap, with the result that almost no shallow water habitat remains.

Remaining littoral habitats are further limited due to shading by overwater structures, which line much of the Elliott Bay shoreline. The King and Royal Brougham outfalls are approximately 150 feet offshore, at a depth of approximately 20 feet. The Denny outfall is 10 feet deep and 100 feet offshore. The West Point Treatment Plant outfall is approximately 3600 feet offshore at a depth of 240 feet below mean lower low water.

Construction of bulkheads and bank armoring along the Lake Union shoreline have resulted in a similar lack of shallow water areas (City of Seattle 2009). However, the Broad Street outfall is in shallow water right at the shoreline, with approximately half of the outfall submerged (Exhibit 5-6).

The shoreline at Mats Mats quarry has been armored, reducing the amount of shallow water habitat.

Exhibit 5-6. Broad Street Outfall at the Southern End of Lake Union



5.4.3 Substrate

Substrates in Elliott Bay consist of riprap, cobble, gravel, and mud. Substrates in Lake Union at the Broad Street outfall are dominated by mud and sand (Parametrix and NRC 2000).

There is little information about substrates at project outfalls to Elliott Bay. A photo of the King Street outfall shows cobble substrate lining the pipe (Exhibit 5-7). The Royal Brougham (Kingdome) outfall, which is also underneath Terminal 46, is likely similar.

The area around Mats Mats has been dredged and is surrounded by riprap. Bottom substrates range from riprap, quarry rock, and silty sand. Close to shore the substrate is silt with areas of cobble.

5.4.4 Shoreline

All habitat condition indicators discussed above document the altered and degraded condition of the Elliott Bay shoreline and littoral zone. Shoreline armoring has decreased the area of the littoral zone, and overwater structures impair light penetration to the water. The Royal Brougham (Kingdome) and King outfalls are located under Terminal 46, which is heavily armored (Exhibit 5-7). The Denny outfall occurs in a more natural, gently sloping location.

Exhibit 5-7. King Street CSO Outfall at Extreme Low Tide



Source: King County Comprehensive Sediment Quality Summary Report for Discharge Locations, December 2009.

Most of Lake Union is heavily armored and lined with bulkheads, docks, and overwater structures. Approximately 82 percent of the shoreline is altered from its original condition, with only small sections of natural shoreline remaining on the south side of Portage Bay, parts of Gasworks Park, and the south end of Lake Union (Weitkamp et al. 2000; Toft et al. 2003). The shoreline near the Broad Street outfall is mostly lined with bulkheads, although some restoration is underway as part of the Lake Union Park phase two project.

The shoreline along the Mats Mats quarry loading dock has been heavily armored with riprap. Natural beach and bluff habitat can still be found on either side of the loading dock.

5.4.5 Riparian Conditions

ShoreZone mapping indicates that approximately 11 percent of shoreline of Elliott Bay maintains native riparian vegetation due to intensive development (Kerwin and Nelson 2000). There is no vegetation at the Royal Brougham and King outfalls. There is little natural vegetation at the Broad Street outfall, apart from one large willow tree, although the City is currently stabilizing the shoreline and planting native vegetation as part of the Lake Union Park project (Exhibits 5-2 and 5-6). Little vegetation remains at the Mats Mats loading dock.

5.4.6 Flow and Hydrology

The hydrology and influx of fresh water to Elliott Bay has been altered by human-caused changes within the Green-Duwamish River watershed, the Lake Washington watershed, and the Puyallup River watershed. In 1911, the White River was diverted from the Green to the Puyallup River to control flooding. In 1916, the Black and Cedar Rivers were diverted from the Duwamish River to Lake Washington. By 1996, the mean annual flow to the Duwamish had been reduced to about 1,700 cubic feet per second, with substantially lower flow variability compared to natural conditions (Kerwin and Nelson 2000). Flow in the Duwamish River is controlled by the Corps through releases from the Howard Hanson Dam.

The Ballard Locks were constructed in 1916 to facilitate navigation between Lake Washington and Salmon Bay. Construction of the locks (and the smaller channel that preceded it) allowed for saltwater intrusion into Lake Union. The denser saltwater flows along the bottom of the lake and does not mix with the overlying fresh water. The resulting stratification causes anoxic conditions in the lower saline layer in early summer as bacteria in lake sediments deplete oxygen levels, limiting the areas of Lake Union that can provide fish habitat (City of Seattle 2009).

Flows and hydrologic inputs to Port Ludlow are unaltered from natural conditions.

5.4.7 Overwater Structures

Littoral habitat along the Elliott Bay waterfront is more than 75 percent covered by overwater structures. The Royal Brougham and King outfalls are covered by Port of Seattle piers. A pedestrian bridge crosses the southern end of Lake Union near the Broad Street outfall, but the outfall itself is uncovered. The Mats Mats loading facility contains two metal piers extending approximately 30 feet over the water.

5.4.8 Disturbance

Disturbance sources in Elliott Bay include propeller scour, boat mooring, and overwater structures such as piers, debris deposition, and shoreline armoring (Kerwin and Nelson 2000). The east and west waterways are also major shipping routes for containerized and bulk cargo. Consequently, they are subject to high volumes of marine traffic.

Puget Sound also supports a high volume of container ship traffic. It is the shipping lane for the ports of Seattle and Tacoma, respectively the fifth and sixth largest ports in North America, with combined container traffic of over 4.1 million 20-foot equivalent units (AAPA 2006).

The Broad Street outfall is near the Center for Wooden Boats on South Lake Union. Recreational boat traffic such as kayaks and canoes are frequent in that vicinity.

Mats Mats quarry is an existing permitted facility that routinely mines and exports, as well as accepts, material. The facility is currently accepting approximately one to two barge loads of tunnel spoils per day from the Brightwater wastewater treatment plant construction, the same volume and frequency as proposed for the bored tunnel project.

5.5 Biota

5.5.1 Prey – Epibenthic and Pelagic Zooplankton

A considerable amount of nearshore habitat has been lost in Elliott Bay and Lake Union. Historic changes to the nearshore environment include shoreline armoring, removal of riparian vegetation, construction of overwater structures, discharges of wastewater, placement of thousands of piles, and vessel operations. Some of these changes have eliminated important resource inputs such as sunlight, nutrients from nearshore riparian communities, and longshore transport of materials, while other changes have delivered pollutants to the sediments and water column. Such changes are severely detrimental to ecosystem productivity and are likely to have reduced the number and species composition of epibenthic and pelagic zooplankton.

Due to presence of fine-grained sediments near the Mats Mats barge loading facilities, the area is not expected to support moderately healthy populations of epibenthic and benthic organisms.

5.5.2 Prey – Riparian and Terrestrial Insects

As described previously, due to intensive development along the shorelines of Elliott Bay and Lake Union, nearly all natural riparian vegetation has been

destroyed. Thus the habitat for many traditional riparian and terrestrial insects that serve as salmonid prey has been removed.

5.5.3 Benthic Species and Infauna

Benthic infauna abundance within Elliott Bay is likely somewhat lower than in other, less urbanized Puget Sound inlets. Overwater structures, CSO outfalls, contaminated sediments, treated pilings, commercial and recreational boating activity, and upland development all create environmental impacts that will impair benthic ecosystem productivity and diversity.

The most common invertebrates in Lake Union are worms and leeches, followed by insects, amphipods, isopods, and fingernail clams. Other species include flatworms, ribbon worms, midges, water mites, and crayfish (Brown and Caldwell et al. 1994).

5.5.4 Prey – Forage Fish

The closest documented forage fish spawning occurs west of the action area on the northwest shoreline of Alki Point, outside of Elliott Bay. Pacific sand lance (*Ammodytes hexapterus*) and surf smelt (*Hypomesus pretiosus*) spawn in this area. No forage fish spawning has been documented in Elliott Bay (Kerwin and Nelson 2000). Historically, forage fish spawning may have occurred in Elliott Bay; however, the virtual absence of beaches effectively precludes forage fish spawning along the Seattle waterfront.

There are no identified Pacific herring, surf smelt, or sand lance spawning areas near the Mats Mats barge loading facility. The closest Pacific herring spawning areas lie north of the project site in Kilisut Harbor and south of the project site between Foulweather Bluff and Port Gamble.

5.5.5 Aquatic Vegetation

There is little information on aquatic vegetation at project outfalls to Elliott Bay. The depths, substrate types, and steep slopes of the intertidal and shallow subtidal portions of the shoreline do not provide appropriate habitat characteristics for eelgrass (*Zostera marina*). The closest documented eelgrass is several miles to the west of the project area at Duwamish head on the south end and several miles away on the north end of West Point.

Macroalgae are present on suitable hard substrates within the littoral zone. Lower intertidal and shallow subtidal habitat along the shorelines of Elliott Bay and Duwamish Waterways includes a variety of species of green, red, and brown algae commonly found in Puget Sound. These algae were observed covering the shallow water bottom along the waterfront (0 to 30 feet mean low water) in the larger open areas where sufficient light reaches to support their photosynthetic activity and where hard substrates or debris provide attachment surfaces

(Weitkamp et al. 2002). The presence of overwater structures and stressors such as vessel operations and pollutants, however, likely impair aquatic vegetation productivity.

Introduced coontail (*Ceratophyllum demersum*) and Eurasian water milfoil (*Myriophyllum spicatum*) dominate the aquatic plant community in Lake Union. Milfoil is common at the Broad Street outfall. Milfoil can limit the ecological functioning of freshwater lakes (King County 1998).

There are no eelgrass beds at the Mats Mats quarry barge loading facility. The Puget Sound Environmental Atlas shows eelgrass at the mouth of the Mats Mats Bay entrance channel and in the nearshore area north of the entrance channel. The maps do not show the presence of bull kelp (*Nereocystis luetkeana*); the closest kelp beds are approximately 0.5 mile offshore. A dive survey conducted in September 1998 indicated that sea lettuce (*Ulva* spp.) was the most predominant macroalgae in the shallow silt bottom areas. *Laminaria* spp., *Fucus* spp., and *Sargassum* spp. were the predominant brown algae species found in the rocky bottom areas of the project site. In the deeper areas of the constructed bay, red algae was commonly observed.

5.5.6 Non-indigenous Species

The 2000 Washington State Exotics Expedition identified 15 non-indigenous fish species in the waters of Elliott Bay and the Duwamish River estuary (WDNR 2001). Several of the species are native to the north Atlantic, six are from the northwest Pacific Ocean, one is from the Black and Caspian Seas, and one is of unknown origin (WDNR 2001).

Non-native species have also been introduced to Lake Union. They include yellow perch (*Perca flavescens*), black crappie (*Proximus nigromaculatus*), sucker (*Catostomus macrocheilus*), smallmouth bass (*Micropterus dolomieu*), brown bullhead (*Ameiurus nebulosus*), and northern pikeminnow (*Ptychocheilus oregonensis*) (Kerwin 2001; King County 1998; McGreevy 1973).

5.5.7 Ecological Diversity

Elliott Bay and Lake Union have increased amounts of pollutants, more habitat fragmentation, and highly altered disturbance regimes compared with early historic conditions. The diversity of pelagic and groundfish species, infauna, and epifauna in Elliott Bay and Lake Union is relatively unknown. Exotic or non-indigenous species have been documented in both systems, as discussed in the preceding section. Pelagic fish, groundfish, infauna, and epifauna populations are likely smaller and less diverse than in other similar estuaries and lakes that do not have such intensive development or human activity, either in upland or aquatic areas.

Chapter 6 EFFECTS ANALYSIS

This chapter describes the mechanisms of potential effects on the federally listed species described in Chapter 4. Direct effects are divided into those affecting species and those affecting critical habitat. The discussion of effects on species is organized around principal effects (e.g., noise, water quality, etc.). WSDOT analyzed effects using information compiled from site visits, literature reviews, professional knowledge and experience, review of engineering drawings, and discussions with project engineers and permitting agencies.

6.1 Direct Effects to Species

Potential impacts to listed species analyzed for this BA are as follows:

- Construction noise;
- Effects associated with barging of tunnel spoils;
- Groundwater management during construction and operation; and
- Impacts to water quality from stormwater runoff in the project area.

These impacts are described in greater detail in the following sections.

6.1.1 Construction Noise

The project will use saw cutters, jackhammers, and vector trucks, which will create an estimated combined peak sound pressure of approximately 94 dBA at 50 feet. Project activities do not involve impact pile driving. Based on ambient noise levels in downtown Seattle of approximately 71 dbA, project noise will attenuate to background levels within 650 feet of the north and south portals, the viaduct, and staging areas. There are no terrestrial listed species within this area.

The project does not involve any in-water work. Tunnel boring at the south end will take place approximately 75 feet from Elliott Bay and may cause some vibration, but not at levels expected to result in impacts to listed species or critical habitat within the bay.

6.1.2 Barging

Clean tunnel spoils will be transported by barge to the Mats Mats quarry in Port Ludlow, Washington (any contaminated spoils will be trucked to existing facilities that have appropriate permits to accept contaminated material). The project will likely transport one to two bargeloads of tunnel spoils per day for the duration of tunnel construction (as long as 2 years). Loading and operation of barges is not expected to produce noise over ambient levels. Acoustic samples collected at the Glacier Northwest facility in DuPont, Washington, indicate that

barge loading operations generate in-water noise levels of approximately 124 to 131 dBpeak at the source (Boyle, pers. comm. 2009), well below the ambient noise levels in Elliott Bay of 147 dB_{PEAK}.

Barges will use established shipping lanes to transport material. The shipping lanes lead to two of the busiest ports in the world, the ports of Seattle and Tacoma. Large container ships that frequent the shipping lanes typically generate noise levels of 190 dBpeak or greater (FAS 2010). Slow-moving barges generate noise levels of approximately 153 dBpeak, well below those levels (URI 2010). However, barge traffic will create a minimal increase in vessel traffic that could create a physical disturbance for any SRKW present along the barge route.

The Mats Mats quarry is currently accepting approximately one to two barge loads of tunnel spoils per day from the Brightwater wastewater treatment plant construction, the same amount as proposed for the project. Baseline conditions along the barge route and offloading area will not change as a result of project activities. BMPs will be implemented when loading and offloading tunnel spoils to ensure that no material falls into Elliott Bay or Port Ludlow.

6.1.3 Groundwater Management

Groundwater at the south end of the project will have to be pumped out of the construction zone for the duration of construction. Groundwater will be discharged to the combined sewer system for disposal, or reinjected into the ground near the construction site. If groundwater is discharged to the combined sewer system, WSDOT will adhere to the King County Wastewater Discharge Authorization or Permit to ensure that discharges do not degrade water quality or contribute to an increase in the frequency or volume of combined sewer overflow events. Any contaminated water will be treated before being reinjected or discharged to the combined system, or disposed of offsite at an existing commercial facility permitted to accept and handle contaminated material.

Estimated rates of groundwater pumping range from 100 to 1,000 gpm per 1,000 feet of excavation (0.2 to 2 cfs). This figure constitutes a small portion of groundwater that discharges to Elliott Bay and is highly unlikely to have any impacts on water quality indicators in the bay.

The tunnel and retaining walls associated with the cut-and-cover sections of the project will be constructed to allow groundwater to flow unobstructed into Elliott Bay once the tunnel is complete. Therefore, the tunnel will not impede groundwater flows during operation.

6.1.4 Water Quality

Stormwater Runoff

Stormwater generated by roadways contains pollutants detrimental to aquatic life. The primary constituents of concern, with respect to federally protected salmonids, are total suspended solids (TSS), total copper (TCu), dissolved copper (DCu), total zinc (TZn), and DZn. This section presents an analysis of pollutant loads and concentrations in stormwater runoff pre-and post-project.

The project will generate stormwater runoff in five TDAs. Under most circumstances, runoff from four of the TDAs (Royal Brougham South and North, King, and Dexter) is directed to the West Point Treatment Plant for treatment and discharged via a deep water outfall to Elliott Bay. However, during high flows stormwater may discharge untreated to Elliott Bay through several combined sewer outfalls along the Seattle waterfront. (Runoff from the Lake Union TDA currently discharges untreated to Lake Union.) The analysis for this project applies to those occasions when flows exceed the capacity of the combined sewer system and discharge untreated to Elliott Bay.

Pollutant loads and concentrations were analyzed using the HI-RUN program approved by WSDOT, FHWA, and the Services per the 2009 Memorandum of Agreement (http://www.wsdot.wa.gov/NR/rdonlyres/F39C7232-6A97-43C2-AC47-185167D7E8D0/0/BA_AssessingStormwaterEffects.pdf). Cormix Version 6.0GT was used as the dilution modeling program for analyzing DZn and DCu dilution plumes. Although the HI-RUN program has a dilution model subroutine, it is only appropriate for modeling rivers and streams, and not non-linear water bodies such as Elliott Bay and Lake Union. Model inputs and detailed results are presented in Appendix B.

Pollutant Loading and Concentration Analysis

The project area is nearly 100 percent impervious surface. To calculate load and concentration numbers, runoff from pre- and post-project areas was assumed to be isolated from the much larger overall basin associated with each particular CSO outfall. Flow from each TDA was modeled as if there was a separate pipe that carries only flows from the TDA to the outfall. This “pipe within a pipe model” was used for the stormwater analysis for the SR 99 S. Holgate Street to S. King Street Viaduct Replacement Project Biological Assessment (NMFS Tracking No. 2008/02137; USFWS Reference No. 13410-2008-I-0408). This approach provides a high-resolution comparative analysis of pre- and post-project conditions, but does not factor in the effects of dilution from non-project and non-PGIS areas.

Existing PGIS in the project area totals 34.97 acres. PGIS post-project will be reduced by approximately 10.07 acres. PGIS in the TDAs discharging to Elliott Bay decreases by 10.78 acres; PGIS in the Broad Street TDA increases from 3.76 to

4.47 acres (Exhibit 6-1). This increase is not due to creation of additional PGIS by the project; rather, the TDA delineation changes once the Broad Street underpass is abandoned and filled to grade, and runoff from the Dexter TDA is directed to the Broad Street TDA.

Exhibit 6-1. Pre- and Post-Project PGIS

TDA	Existing PGIS (ac)	PGIS Post-Project (ac)	percent change
Royal Brougham South	0.65	0.27	-58
Royal Brougham North	6.53	3.57	-45
King	9.27	5.16	-44
Dexter	14.76	11.43	-23
Broad	3.76	4.47	+19

Overall loads of TSS, TCu, DCu, TZn, and DZn from the project area discharged to Elliott Bay will decrease by 40 percent or more. Pollutant loading to Lake Union will be reduced by 79 percent for TSS, 56 percent for TCu, 63 percent for TZn, and 27 percent for DZn. Loading for DCu in Lake Union will remain the same because the water quality treatment provided for that TDA is offset by the increase in TDA size. Pollutant loads discharged at the WPTP outfall are similarly reduced (Exhibit 6-2). Loading for all pollutants of concern decreases by approximately 34 percent, reflecting the decrease in PGIS in the project.

Pollutant concentrations do not change because the “pipe within a pipe” model assumes that stormwater discharges untreated to Elliott Bay during CSO events (Exhibit 6-3). The exception is the Broad Street TDA, where water quality treatment will be provided as part of the project. Concentrations of TSS in that TDA decrease by 91 percent for TSS, 69 percent for TCu, 25 percent for DCu, 76 percent for TZn, and 41 percent for DZn. Pre-project pollutant concentrations in the S. Royal Brougham TDA are low because water quality treatment in this TDA will be provided as part of the SR-99 S. Holgate Street to S. King Street Viaduct Replacement Project, which is assumed to be the existing condition for this consultation.

Dilution Analysis

Dilution modeling provides an estimate for the distance at which pollutants of concern (specifically DCu and DZn) in stormwater runoff from the project reach the threshold established by the Services for potential water quality effects to salmonids: 2 µg/L above the background concentration for DCu and 5.6 µg/L above the background concentration for DZn (WSDOT 2008). Dissolved copper has been demonstrated to reduce olfactory responsiveness in juvenile salmonids

Exhibit 6-2. Pre- and Post-Project Pollutant Loading by Discharge Location

TDA	Scenario	Pollutant Load (lb/yr)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham	Existing	158	0.05	0.02	0.31	0.12
	Proposed	81	0.03	0.01	0.15	0.06
	<i>Percent reduction</i>	49	40	50	51	58
King	Existing	288	0.07	0.02	0.45	0.13
	Proposed	162	0.04	0.01	0.25	0.07
	<i>Percent reduction</i>	43	43	50	47	46
Dexter	Existing	114	0.03	0.01	0.17	0.05
	Proposed	88	0.02	0.01	0.14	0.04
	<i>Percent reduction</i>	23	33	0	22	22
Broad	Existing	1710	0.43	0.1	2.64	0.75
	Proposed	351	0.19	0.1	0.98	0.55
	<i>Percent reduction</i>	79	56	0	63	27
WPTP	Existing	801	1.64	0.79	7.31	5.88
	Proposed	530	1.08	0.51	4.84	3.88
	<i>Percent reduction</i>	34	34	35	34	34

in freshwater in laboratory studies (Baldwin et al. 2003), and fish have shown avoidance reactions to elevated levels of dissolved zinc (Sprague 1968).

The ambient DCu and DZn concentrations for Elliott Bay are approximately 0.7 and 4.1 µg/L, respectively (Curl et al. 1988), and values for Lake Union are 2.0 and 1.8 µg/L, respectively (Ecology 2009b). As described in Section 2.2.9, stormwater in the South Royal Brougham TDA is normally directed to the combined system except during high flows, when water is discharged untreated to Elliott Bay. Flows in the Broad Street TDA are conveyed to the Lake Union storm drain outfall. All other project TDAs, which comprise approximately 85 percent of the total project area, discharge to the combined sewer system and are conveyed to the WPTP for treatment.

The dilution modeling for the combined sewer system only applies to those situations when the combined system becomes overloaded, and stormwater is discharged untreated to Elliott Bay. Most of the time, water is sent to the WPTP. Only 3.8 percent of annual basin runoff in the Royal Brougham TDA is discharged as overflow events. This figure is 6.9 percent for the King Street TDA and 1.7 percent for the Dexter TDA (King County 2009b). The dilution model

Exhibit 6-3. Pre- and Post-Project Pollutant Concentrations

TDA	Scenario	Pollutant Concentrations (mg/L)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham South	Existing	5.68	0.005	0.003	0.023	0.016
	Proposed	5.68	0.005	0.003	0.023	0.016
	<i>Percent reduction</i>	0.00	0.00	0.00	0.00	0.00
Royal Brougham North	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	<i>Percent reduction</i>	0.00	0.00	0.00	0.00	0.00
King	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	<i>Percent reduction</i>	0.00	0.00	0.00	0.00	0.00
Dexter	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	<i>Percent reduction</i>	0.00	0.00	0.00	0.00	0.00
Broad	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	5.68	0.005	0.003	0.023	0.016
	<i>Percent reduction</i>	91	69	25	76	41

conservatively assumes that 100 percent of stormwater from the TDA will be discharged to Elliott Bay during an overflow event. The analysis also assumed a 99.9th percentile flow rate to represent a likely CSO-inducing runoff event.

Dilution zones will generally be reduced post-project (Exhibits 6-4 and 6-5). Dilution plume lengths for DZn will decrease by 4.7 feet in the Royal Brougham and King TDA (a 20 percent and 38 percent reduction, respectively) and 5.5 feet in the Dexter TDA (46 percent reduction). Stormwater treatment provided in the Broad Street TDA will reduce concentrations of pollutants in stormwater effluent, but because the 99.9th percentile flow is assumed to bypass water treatment facilities in the Broad Street TDA, pre- and post-project dilution zones for DZn in Lake Union remain the same. The 50th percentile flow data are also presented here. At that flow rate the water treatment facilities are not bypassed and the dilution zone for DZn in Lake Union is reduced from 6.67 to 4.15 feet.

Dilution plumes for DCu will also decrease: from 7.9 to 7.5 feet in the Royal Brougham TDA, 10.4 to 6.7 feet in the King TDA, and 10.2 to 5.7 feet in the Dexter TDA. There is no dilution plume for DCu in the Broad Street TDA because

Exhibit 6-4. Dilution Zone Dimensions for Dissolved Copper and Dissolved Zinc Pre- and Post-Project

TDA	Metal	Pre-Project		Post-Project	
		Length	Width	Length	Width
Royal Brougham	DCu	7.9	2.8	7.5	2.8
	DZn	23.2	6.7	18.5	6.2
King	DCu	10.4	1.8	6.7	1.4
	DZn	12.5	3.0	7.8	2.4
Dexter	DCu	10.2	2.2	5.7	1.6
	DZn	11.8	3.6	6.3	2.6
Broad (99.9 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a
	DZn ²	28.36	5.64	28.42	5.64
Broad (50 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a
	DZn	6.67	13.12	4.15	2.69

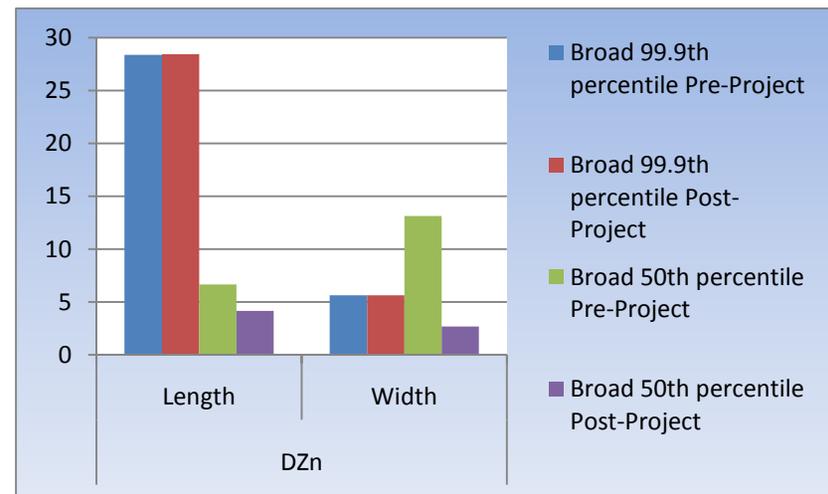
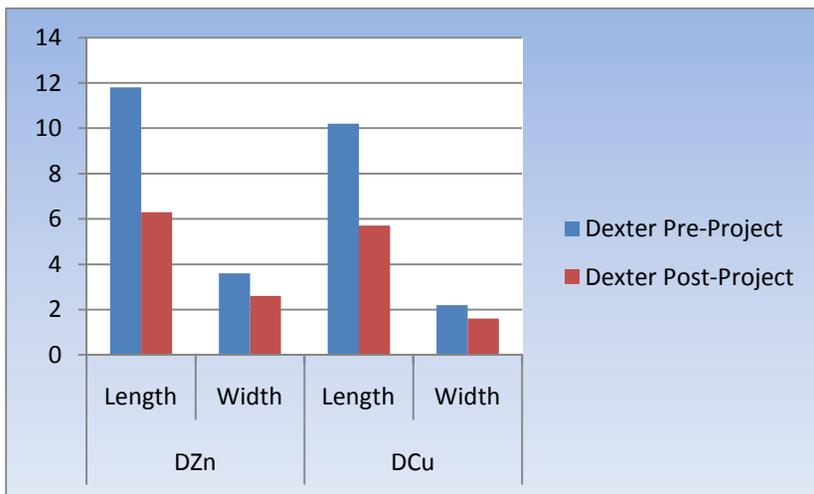
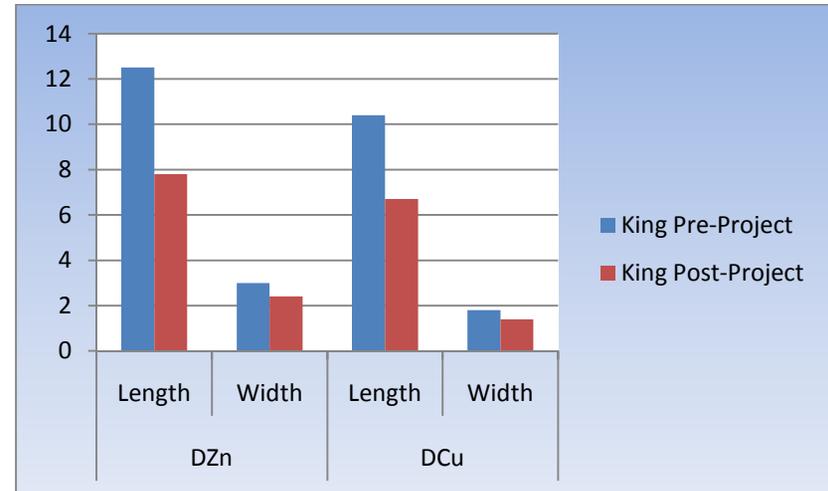
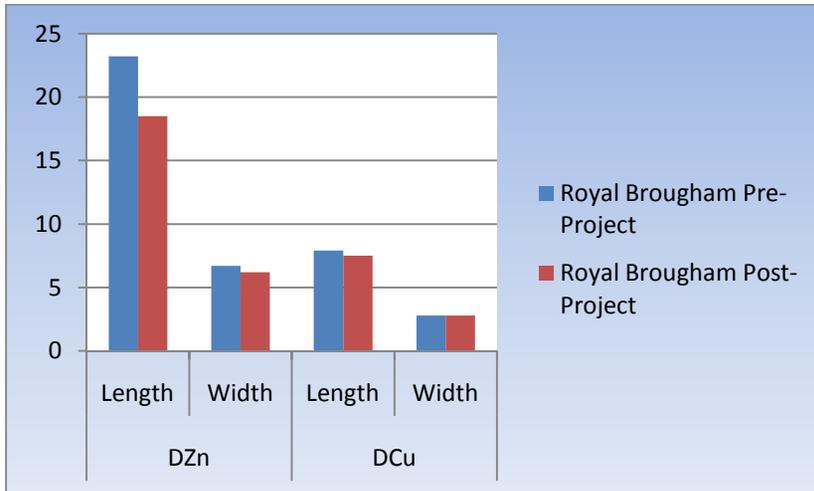
¹ Concentrations of dissolved copper at the Lake Union outfall are 3 µg/L, below the threshold concentration of 2.0 µg/L above background, so there is no dilution plume for dissolved copper in this TDA.

² The dilution zone for dissolved zinc remains unchanged pre- and post-project because dilution modeling assumes the 99.9th percentile flows will bypass water quality treatment.

stormwater is discharged at concentrations below the threshold of 2µg/L above background.

Dilution plumes were not modeled for the WPTP outfall. However, because pollutant loads discharged at the WPTP outfall will be reduced by 34 percent or more, the dilution plume at the WPTP outfall will be smaller post-project. An analysis performed for the SR-99 S. Holgate Street to S. King Street Viaduct Replacement Project indicated that pollutants of concern are highly unlikely to extend beyond 105 feet from the project outfall, and based on the modeling for this project, are likely much smaller than that.

Exhibit 6-5. Pre- and Post-Project Dilution Plume Dimensions (feet) at Project Outfalls



Several conservative assumptions were factored into the dilution model to ensure that the project does not underestimate its contribution of pollutants to receiving water bodies. The analysis errs on the side of caution and likely overestimates the project's contribution of pollutants to receiving water bodies.

- The pipe within a pipe approach does not account for the effects of dilution from non-PGIS areas within the TDA.
- During a CSO event, 100 percent of runoff from the project area is assumed to discharge from the outfall associated with each TDA. In reality, the majority of runoff will be directed to the WPTP.
- The analysis used the 99.9th percentile flow rates to represent a likely CSO event, meaning that 99.9 percent of flows will fall below this rate. In reality, the majority of runoff will be directed to the WPTP.
- CSO events are relatively infrequent, occurring less than 7 times per year at the Royal Brougham outfall, less than 20 times per year at the King outfall and less than 3 times per year at the Denny outfall.
- Relatively little stormwater runoff leaves the system during CSO events: only 3.8 percent, 6.9 percent, and 1.7 percent of flows enter Elliott Bay in the Royal Brougham, King, and Dexter TDAs, respectively.
- Total annual runoff was calculated by multiplying the TDA area by the mean annual precipitation, which assumes that the entire TDA is impervious, and all annual precipitation becomes runoff that enters the combined sewer. In reality, nearly 10 percent of the TDA area is pervious surface that will result in little to no runoff. This calculation slightly overestimates the relative contribution of the project to pollutant loads for each TDA.
- The analysis does not account for runoff from the viaduct that currently discharges untreated to the separate storm system in the Washington, Madison, Seneca, University, Pike, Pine, and Vine TDAs. Post-project, the viaduct will no longer contribute runoff to these TDAs, and pollutant loading will be lower than estimated.

Pollutant Analysis

Although the project will occasionally discharge pollutants at concentrations that exceed the Services' behavioral thresholds, the areas in receiving waters where concentrations of DCu and DZn exceed those thresholds are small. The size of the impacted area reduces risk of contact as well as the likely exposure time. The timing of most CSO events and salmon life history and distribution also minimizes the potential for exposure.

While these factors minimize the risk of adverse impact, the risk of exposure will be further reduced post-project. Reduction of PGIS and implementation of stormwater treatment and detention will reduce loading and concentrations of pollutants in receiving water bodies, decreasing the extent of dilution zones post-project.

Exposure of juvenile salmonids to pollutants of concern along the Seattle waterfront will only occur during overflow events. CSOs are most common from November to March (primarily November to January; Exhibit 6-6). This corresponds to the time of year when juvenile salmonids are less likely to be found in Elliott Bay (see Sections 4.4, 4.6, and 4.9). Adult salmonids could be present at any time of year, but adults are found in deeper water and are therefore unlikely to be in the dilution zone around project outfalls.

Juvenile steelhead outmigration occurs between March and July, with the majority occurring between April and June, as the frequency and volume of overflow events tapers off. Juvenile steelhead and bull trout are rarely found along the Seattle waterfront. Seining and beach snorkel surveys since 2003 have documented very few individuals of either species in that part of the action area (see Sections 4.6 and 4.9).

Stormwater pollutants discharges potentially overlap more with juvenile Chinook presence than juvenile bull trout or steelhead presence. Juvenile Chinook outmigration begins in January, peaking in mid-March. Early outmigrants could be exposed to more frequent overflow events of late winter/early spring, but juvenile Chinook are most common along the Seattle waterfront from April through August, when overflow events are far less frequent. Although juvenile Chinook have never been recorded near project outfalls within the modeled dilution zones, juvenile Chinook have been documented along the Seattle waterfront in all habitat types. However, water quality will be improved post-project, reducing the likelihood that juvenile Chinook will be exposed to pollutants of concern. Also, overflow events are infrequent, and the conservative approaches used in the stormwater analysis likely overestimate pollutant loads and concentrations.

No salmonid surveys have been conducted at the Royal Brougham and King Street outfalls. The outfalls are located on developed Port of Seattle property at a depth of approximately 20 feet. Most juvenile Chinook are found in depths of less than 12 feet. The Denny outfall is 10 feet deep and Chinook are more likely to be found at that location. Juvenile Chinook are frequently observed just north of the outfall near Myrtle Edwards Park and the Olympic Sculpture Park beach. However, overflow events at that outfall are much less frequent. Overflow events are only recorded during the October through February window (Exhibit 6-6), a period when juvenile Chinook are unlikely to occur.

Exhibit 6-6. CSO Average Monthly Frequency and Volume

Month	Royal Brougham		King		Denny	
	Frequency (per month)	Volume (MG ¹)	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)
January	1.67	6.43	5.14	6.76	1.00	0.06
February	0.33	0.91	1.14	0.9	0.33	0.01
March	0.67	1.97	1.57	1.59	0.00	0.00
April	0.67	1.0	0.86	0.29	0.00	0.00
May	0.33	0.3	1.43	0.42	0.00	0.00
June	0.00	0.00	0.29	0.03	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00
August	0.00	0.00	0.43	0.79	0.00	0.00
September	0.00	0.00	0.43	0.05	0.00	0.00
October	0.00	0.00	1.14	1.96	0.25	0.00
November	0.5	0.11	3.86	3.94	0.00	0.00
December	2.75	11.62	2.86	4.59	1.00	2.45
Total Per Year	6.92	21.68	19.14	21.34	2.58	2.51

¹ MG = million gallons

Juvenile Chinook exhibit a similar migration pattern in Lake Washington. Juveniles typically outmigrate from the Cedar and Sammamish Rivers from January through May. During that time, they rear in Lake Washington north of SR520 and south of I-90, and are rarely found in Lake Union. Beginning in May, the fish begin their migration through the Ballard Locks and are commonly observed in Lake Union. Although no surveys have been conducted at the Broad Street outfall, surveys slightly north of the outfall have documented juvenile Chinook in that area from May through July. This time period corresponds to the driest months of the year when little or no rainfall is discharged from the outfall. However, because rainfall could discharge from the Broad Street outfall at any time of year and juvenile Chinook have been documented near that outfall, Chinook could be exposed to levels of DZn about the Services' threshold for potential behavioral effects.

Exposure to pollutants of concern for any species is unlikely at the WPTP outfall. Post-project pollutant loading will be reduced by approximately 34 percent from pre-project conditions. Neither juvenile nor adult salmonids are likely to occur at that depth (240 feet). The substrate at the outfall is primarily sand, which is not preferred habitat for listed species of rockfish. In addition, rockfish have rarely been observed in Elliott Bay.

Although juvenile salmonids can be potentially be found along the Seattle waterfront or Lake Union throughout the year, the timing of outmigration and overflow events minimizes their potential for exposure to pollutants of concern. The project will improve baseline water quality conditions. Even if fish are present during an overflow event, they will experience improved water quality and reduced dilution plume sizes, even under the conservative modeling assumptions used in this analysis. Real-world conditions are expected to be better than those modeled. However, because rainfall could discharge from the Broad outfall at any time of year, and juvenile Chinook have been documented near that outfall, Chinook could be exposed to elevated levels of DZn.

The potential for exposure and risk to juvenile salmonid species at different project outfalls is summarized in Exhibit 6-7.

Exhibit 6-7. Summary of potential for exposure of juvenile salmonids to stormwater pollutants at project outfalls.

Outfall	Depth/Distance offshore (ft)	Habitat	Juvenile Chinook present at outfall	Timing of overflow events ¹	Timing of fish presence ²	Likelihood of Exposure
Royal Brougham	20/150	Cobble/riprap underneath Terminal 46	Less likely due to depth and habitat type	Dec-Apr (Nov-May)	May-Jul (Jan-Sep)	Low
King	20/150	Cobble/riprap underneath Terminal 46	Less likely due to depth and habitat type	Nov-May (Aug-Jun)	May-Jul (Jan-Sep)	Low
Denny	10/100	More naturally sloping shoreline	Likely due to habitat, juvenile Chinook observed nearby	Dec-Feb (Oct, Dec-Feb)	May-Jul (Jan-Sep)	Low
Broad	2/0	Bulkheaded, steeply sloped, some shoreline restoration	Likely due to habitat, juvenile Chinook observed nearby	During rainstorms Oct-April (year-round)	May-Jul	Moderate

¹The first sets of dates are months when most overflow events occur. Months in parentheses represent the full range of dates that overflow events have occurred.

²The first sets of dates are months when listed juvenile salmonids, particularly Chinook, are likely to be found along the Seattle waterfront or in Lake Union. Months in parentheses represent the full range of dates that listed juvenile salmonids have been observed in those locations.

Stormwater volume

The EBI is the main conveyance system for combined sewer flows to the WPTP. The capacity of the EBI can be exceeded during large storm events, which results

in CSOs within the system. The project stormwater management system is designed to prevent an increase in the frequency or volume of overflow events.

The project converts some existing pervious surface to IS, resulting in a slight (1.15 acres) overall increase in IS post-project. Pervious surface in the Royal Brougham and King TDAs that drain to the combined sewer system decreases approximately 0.37 acre. This number constitutes 0.002 percent of the total combined sewer system service area of 18,800 acres. The project is therefore unlikely to contribute to an increase in overflow events. Also, extensive modeling has demonstrated that flow control is unnecessary at the south access project area and may actually worsen overflow conditions at the south access point. Therefore, the project has been granted an exception by the City of Seattle (Appendix C), and no flow control is proposed for the south access area.

Pervious surface will decrease approximately 0.78 acre in the north access area. Modeling of the stormwater systems at the north end demonstrates that flow control is effective in that portion of the project. Therefore, to prevent any potential increase in CSO frequency or volumes, the project will provide stormwater detention at the north access area.

Seepage from the tunnel will be conveyed to the combined sewer system. Tunnel seepage will be approximately 22 gpm. This volume represents approximately 0.00275 percent of the EBI's capacity. It is therefore unlikely to contribute to overflow events.

Tunnel washing and testing of the fire suppression will only occur during dry weather when there is no chance of exceeding the capacity of the EBI. Any wastewater discharged to the combined sewer system during construction will be regulated by the King County Wastewater Discharge Authorization or Permit, which limits the volume of water that can be sent to the combined sewer system to help prevent any increase in the frequency or volume of overflow events.

6.2 Direct Effects to Critical Habitat

PCEs present in the action area for each species are listed below, followed by a discussion of potential effects to each PCE.

6.2.1 Southern Resident Killer Whale

PCEs for SRKW critical habitat are as follows:

- *PCE #1: Water quality to support growth and development;*

Project activities will not affect this PCE. The project will reduce pollutant loads in stormwater runoff, slightly improving water quality along the Seattle waterfront.

- *PCE #2: Prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth;*

Water quality along the Seattle waterfront will be improved by the project and is not likely to affect prey species for SRKW such as Chinook and other salmon. Overflow events are infrequent and occur during times of the year when juvenile salmonids are less likely to be present along the Seattle waterfront. Post-project dilution plumes will be smaller than pre-project, reducing the potential exposure of salmonids to pollutants of concern.

- *PCE #3: Passage conditions to allow for migration, resting and foraging.*

The project will have no impact on this PCE as no in-water work will occur. Barges are slow-moving, barging will occur in existing shipping lanes, will not exceed baseline noise levels, and will not result in any effects to this PCE.

6.2.2 Puget Sound Chinook Salmon ESU

- *PCE #1: Freshwater rearing sites with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.*

Freshwater rearing sites are limited to Lake Union. The project will not affect water quantity or natural cover. Stormwater runoff from the project is currently discharged untreated to Lake Union. The project will provide water quality treatment before discharge to the lake, reducing pollutant loads and concentrations in stormwater (see Section 6.1.4). However, the project may discharge DZn at concentrations above the water quality threshold established by the Services within approximately 28.4 feet of the Broad Street outfall.

- *PCE #2: Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.*

The Lake Union portion of the action area is a freshwater migration corridor. Natural cover will not be affected by the project. Water quality in the lake will be improved by the project. However, the project may discharge DZn at concentrations above the water quality threshold

established by the Services within approximately 28.4 feet of the Broad Street outfall.

- *PCE #3: Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh and salt water; natural cover such as submerged and overhanging large woody debris, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

This PCE is present along the southern portion of the Seattle waterfront. The project will not affect water quantity, salinity, natural cover, or forage conditions. As discussed in Section 6.1.4, water quality along the Seattle waterfront will be improved by the project. Stormwater discharged from the project area will likely contain concentrations of pollutants above the water quality threshold within 18.5 feet of the Royal Brougham outfall, a reduction of 4.7 feet.

- *PCE #4: Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, which support growth and maturation; and which possess natural cover such as submerged and overhanging large woody debris, aquatic vegetation, large rocks and boulders, and side channels.*

This PCE is present along the Seattle waterfront. Water quality along the Seattle waterfront will be improved by the project. Stormwater discharged from the project area will likely contain concentrations of pollutants above the water quality threshold within 7.8 feet of the King Street outfall (a reduction of 4.7 feet) and 5.7 feet of the Dexter outfall (a reduction of 5.5 feet). The project will not affect water quantity, forage, or cover.

- *PCE #5. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

This PCE occurs in Puget Sound. Project activities in Puget Sound will not change baseline environmental conditions, so this PCE will not be affected by the project.

6.2.3 Hood Canal Summer Chum

PCEs within the action area include the following:

- *PCE #1. Nearshore marine areas free of obstruction and excessive predation with: (i) Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and (ii) Natural*

cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

This PCE occurs in the Puget Sound around Port Ludlow where barging and offloading of spoils material will take place. No spoils material will enter state waters or degrade water quality, and no natural cover will be affected. Project activities will not result in any impacts to this PCE.

- *PCE #2: Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

This PCE occurs in Puget Sound and will not be affected by project activities. The only activity that will occur in this portion of the action area is barging of tunnel spoils. Barging will not result in any impacts to water quality or prey species.

6.2.4 Coastal-Puget Sound Bull Trout DPS

Designated Critical Habitat

Designated critical habitat contains the following PCEs in the action area:

- *PCE #1: Water temperatures that support bull trout use.*

Water temperatures will not be affected by the project.

- *PCE #5: Springs, seeps, groundwater sources, and subsurface water to contribute to water quality and quantity as a cold water source.*

Groundwater flows to Elliott Bay at the south portal will be interrupted for the duration of construction; however, the amount of groundwater relative to both the total amount of groundwater discharging to Elliott Bay along the Seattle waterfront, as well as the size of the receiving water body it is discharging to, is too small to affect water quality. Also, groundwater as a cold water source is likely not measurable given the proximity of the Duwamish River to the construction zone.

- *PCE #6: Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows.*

Physical and biological conditions of the migratory corridors will not be affected by project activities. Water quality will be slightly improved post-project, with reduced loading and concentrations. Dilution zones will shrink post-project: stormwater discharged from the project area will likely contain concentrations of pollutants above the water quality threshold established by the Services within 18.5 feet of the Royal Brougham outfall (a reduction of 4.7 feet), 7.8 feet of the King Street outfall

(a reduction of 4.7 feet), 6.3 feet of the Dexter outfall (a reduction of 5.5 feet), and 28.42 feet of the Broad outfall (no change).

- *PCE #7: An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish;*

The proposed project will not affect the food base for bull trout.

- *PCE #8: Permanent water of sufficient quantity and quality such that normal reproduction, growth, and survival are not inhibited.*

Reductions in PGIS and water quality treatment proposed by the project will improve water quality in the action area. Water quantity will not be affected by the project.

Proposed Critical Habitat

PCEs for proposed critical habitat found in the action area are essentially the same as PCEs for designated critical habitat. The analysis for proposed PCEs is the same as that for designated PCEs, above, except for PCE #9.

- *PCE #1: Springs, seeps, groundwater sources and subsurface connectivity to contribute to water quality and quantity and provide thermal refugia.*
- *PCE #2: Migratory habitats with minimal physical, biological or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.*
- *PCE #3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates and forage fish. Water temperatures ranging from 2-15 degrees Celsius with adequate thermal refugia available for temperatures at the upper end of this range.*
- *PCE #5: Water temperatures ranging from 2-15 degrees Celsius with adequate thermal refugia available for temperatures at the upper end of this range.*
- *PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.*
- *PCE #9: Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.*

Project activities will not change the presence, abundance, or distribution of nonnative, competitive, or inbreeding species.

6.3 Indirect Effects

Indirect effects are impacts caused by the action and occur later in time (after the project has been completed), but which are still reasonably certain to occur (50 CFR 402.02). Indirect effects fall into three general categories:

1. Changes to ecological systems resulting in altered predator/prey relationships.
2. Changes to ecological systems resulting in long-term habitat alteration.
3. Anticipated changes in human activities, including changes in land use.

No indirect effects to ecological systems were identified for this project. The following section addresses potential effects relating to land use changes within the project area.

USFWS, NMFS, FHWA, and WSDOT have developed a guidance document for assessing the indirect effects between transportation and land use development (Exhibit 6-7; WSDOT 2009). The document describes a step-by-step approach to assess indirect effects by asking a series of questions about potential land use changes brought about by the project. The relevant steps are listed below:

Step 1: Will the project create a new facility (e.g., new road, new interchange etc.)? If yes, go to step 3.

The project does create a new facility, replacing a stacked viaduct with a deep bored tunnel.

Step 3. Determine if the transportation project has a causal relationship to a land use change by answering the following questions:

- a. *Is there a building moratorium in place that is contingent on the proposed road improvements?*

No moratoria in place are contingent on the proposed road improvements (Hauger 2010, pers. comm.).

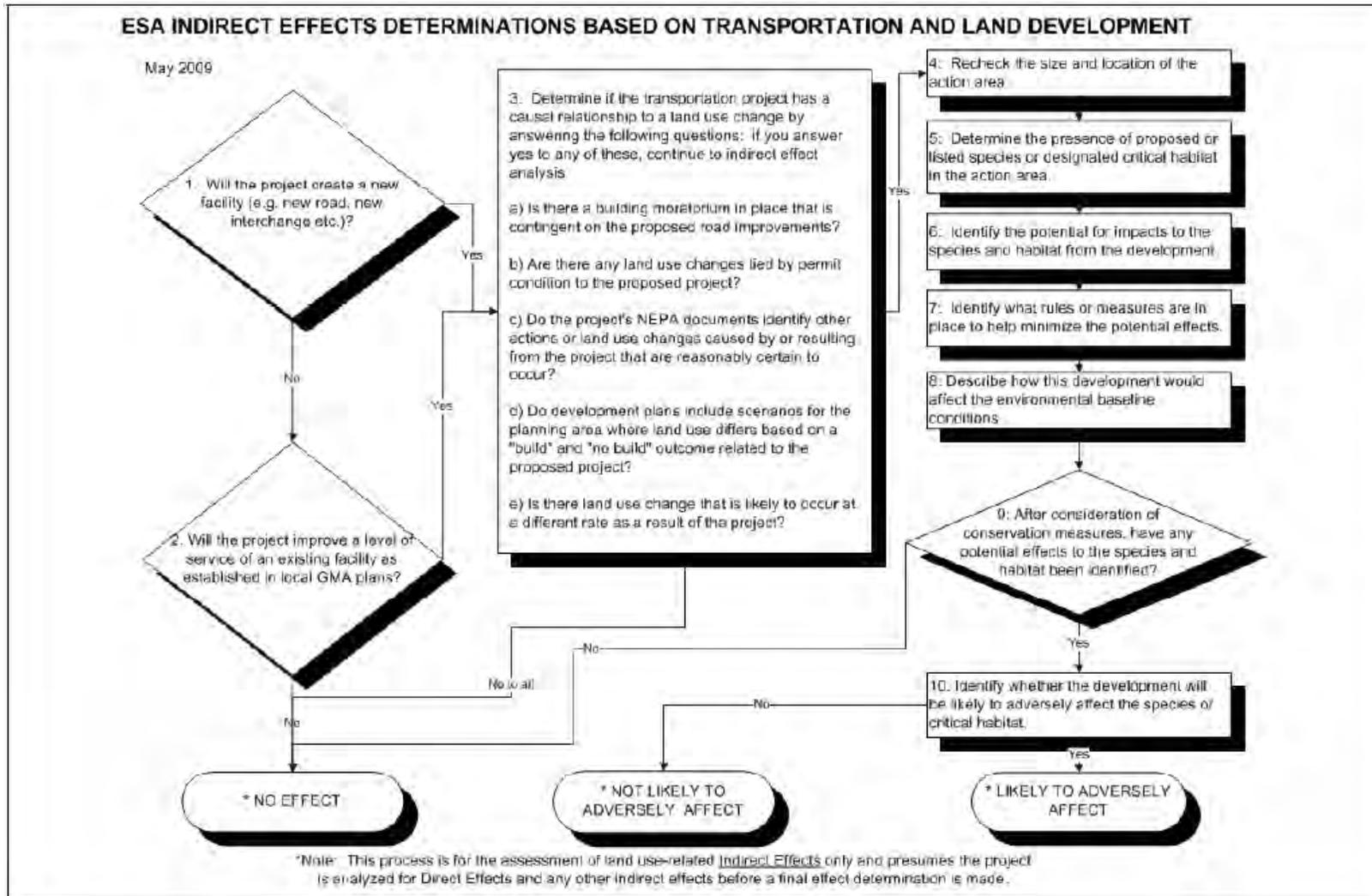
- b. *Are there any land use changes tied by permit condition to the proposed project?*

There are no land use changes tied by permit condition to the proposed project (Hauger 2010, pers. comm.).

- c. *Do the project's NEPA documents identify other actions or land use changes caused by or resulting from the project that are reasonably certain to occur?*

The project's Land Use Discipline Report identifies only a few land use changes that will occur as a result of the project. Some parcels at the north and south tunnel portals will be permanently converted from office, retail, and commercial use to transportation uses due to right-of-way conversions. Land conversion will result in a slight reduction in the

Exhibit 6-8. ESA Indirect Effects Determinations Based on Transportation and Land Development



overall level of development; however, land conversion is not expected to influence development activity or trends in those areas.

- d. *Do development plans include scenarios for the planning area where land use differs based on a "build" and "no build" outcome related to the proposed project?*

The Seattle Waterfront Concept Plan (http://www.seattle.gov/dpd/Planning/Central_Waterfront/Archive/DraftWaterfrontConceptPlan/default.asp) was developed in anticipation of the removal of the viaduct. The plan recommends creating public space along the waterfront that includes preserving waterfront heritage, enhancing the shoreline and aquatic habitat, improving pedestrian access, improving transit and transportation, supporting a residential development enclave, and identifying development opportunities. The development opportunities identified in the plan are all on previously developed sites. There is currently no design or funding for the plan.

- e. *Is there land use change that is likely to occur at a different rate as a result of the project?*

Changes to the street network and overall transportation improvements associated with the proposed project may cause the City of Seattle to consider different land uses in the north and south portal areas; these changes will be consistent with existing land use plans such as the City's Comprehensive Plan ([http://www.seattle.gov/dpd/Planning/Seattle s Comprehensive Plan/ComprehensivePlan/default.asp](http://www.seattle.gov/dpd/Planning/Seattle_s_Comprehensive_Plan/ComprehensivePlan/default.asp)), Seattle's Transportation Strategic Plan (<http://www.seattle.gov/transportation/tsphome.htm>), the Seattle Center Century 21 Master Plan, and several neighborhood plans. No change in zoning or amendment to existing land use plans will be required by the proposed project or are contingent on the project. The Seattle City Council is currently considering zoning changes to the area south of downtown, east of the viaduct, but these zoning changes are not tied to the project (Tom Hauger 2010 pers. comm.).

The tunnel represents only one of many ongoing improvements occurring in the City of Seattle. Several factors influence land use decisions, such as economics, zoning, and land supply. Because the project will replace an existing facility, it is not likely to have a large, if any, influence on those factors. The potential to induce growth or cause changes in growth rates is minor.

Step 4. Recheck the size of the action area.

The project is not likely to result in any induced growth. While the City is developing a comprehensive plan for its waterfront, there is no funding, design, or plan in place for this redevelopment. Therefore, the action area defined in Chapter 3 is appropriate for the proposed project.

6.4 Cumulative Effects

Cumulative effects are those effects of future state, local, or private activities, not involving federal activities, that are reasonably certain to occur within the action area addressed by this BA (50 CFR 402.02).

The action area is in a highly urbanized setting that is almost completely developed. Some of the projects identified in this analysis will have no effect on listed species because there is no suitable habitat for those species within the vicinity of the projects. Other projects that create additional PGIS may generate more pollutants that will be discharged to Elliott Bay or Lake Union, causing adverse effects to listed fish species. However, future projects will be required to comply with the City's stormwater code (SMC 22.800 to 22.808), which requires treatment of stormwater discharged to separated storm systems, stormwater detention to reduce the frequency and volume of combined sewer overflows, and implementation of green stormwater infrastructure that reduces runoff from impervious surfaces.

Over the long term, future projects would likely improve water quality in Elliott Bay and Lake Union through compliance with local and state water quality standards and stormwater code provisions. Measures to reduce impacts include (but are not limited to):

- Retrofit of currently untreated PGIS with, at a minimum, basic water quality treatment BMPs in stormwater sub-basins.
- Reduction of peak flows and the frequency of combined sewer overflows through the application of detention facilities to control runoff from combined sewer sub-basins.
- Conversion of PGIS to non-PGIS or pervious surfaces.

Temporary effects on water quality would potentially be increased by some projects. Construction effects on surface water would generally be the result of staging, material transport, earthwork, stockpiling, storm drainage and/or combined sewer utility work, and dewatering. Construction-related pollutants can increase turbidity and affect other water quality parameters, such as the amount of available oxygen in the water. In addition, pH can be altered if runoff comes in contact with curing concrete, which could result in effects on aquatic species. Implementation of BMPs would minimize or prevent temporary effects.

A list of projects included in this analysis and potential effects of the projects are listed in Exhibit 6-9, below.

Exhibit 6-9. Non-Federal Projects Likely to Occur in the Action Area and Associated Effects to Listed Species

PROJECT	POTENTIAL CUMULATIVE EFFECTS
<p>1. <i>Alaskan Way Surface Street Improvements – S. King Street to Pike Street.</i> The Alaskan Way surface street would be rebuilt and improved between S. King Street and Pike Street. The new surface street would be six lanes wide between S. King and Columbia Streets (not including turn lanes), transitioning to four lanes between Marion and Pike Streets. Generally, the new street would be located east of the existing street where the viaduct is located today. The new street would include sidewalks, bike lanes, parking/loading zones, and signalized pedestrian crossings at cross streets.</p>	<p>This project could result in temporary effects on water quality during construction but would likely improve water quality over the long term through (1) retrofit of currently untreated PGIS with, at a minimum, basic water quality treatment BMPs in stormwater sub-basins, and (2) reduction of peak flows and the frequency of combined sewer overflows by the application of detention facilities to control runoff from combined sewer sub-basins.</p>
<p>2. <i>Elliott/Western Connector – Pike Street to Battery Street.</i> The Elliott/Western Connector would provide a connection from the Alaskan Way surface street to the Elliott Avenue/Western Avenue corridor that provides access to and from Ballard Interbay Northend Manufacturing and Industrial Center and neighborhoods north of Seattle (including Ballard and Magnolia). The connector would be four lanes wide and would provide a grade-separated crossing of the BNSF mainline railroad tracks. Additionally, it would provide local street access to Pike Street and Lenora Street and reintegrate with the street grid at Bell Street, which would improve local street connections in Belltown. The new roadway would include bicycle and pedestrian facilities.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>1. <i>Battery Street Tunnel Maintenance and Repairs</i> WSDOT and the City of Seattle are conducting regular maintenance on the tunnel and repairing its fire and life safety systems, as needed, to ensure it remains safe for drivers.</p>	<p>No effect, as no natural resources occur in the project area and no water quality effects would occur.</p>
<p>4. <i>First Avenue Streetcar between S. Jackson St and Republican St.</i> The First Avenue Streetcar would circulate between S. Jackson Street and Republican Street and function as a local connector. This alignment would travel within several of Seattle’s densest neighborhoods including Pioneer Square, Central Business District, Pike Place Market, Belltown, and Lower Queen Anne.</p>	<p>Effects are expected to be similar to those described for project 3.</p>

PROJECT	POTENTIAL CUMULATIVE EFFECTS
<p>5. <i>Gull Industries on First Avenue S. (2010-2013)</i> This project site is located west of First Avenue S. between S. Atlantic Street and S. Massachusetts Street. The project would redevelop the entire site to include a mix of office, retail, and restaurant uses. The development would include approximately 300 parking spaces designated for events, which is the same number of event parking spaces that exist today, and 500 spaces for the development's occupants.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>6. <i>North Parking Lot Development at Qwest Field(2007-2022)</i> Planned development of Qwest Field's north parking lot includes building a 20-story office tower and three residential towers of 10, 20, and 25 stories on a 3.85-acre site. The project would potentially create 645 new housing units, 19,000 square feet of retail, 480,000 square feet of office space, and about 950 above-grade parking stalls. Completion of the project is expected within 15 years. In addition, Stadium Lofts, an 80-unit mixed-use residential development, is permitted and scheduled for construction on Occidental Avenue S.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>7. <i>Seattle Center Master Plan (EIS) (Century 21 Master Plan) (2010-2030)</i> The plan lays out a vision for the future of the campus over a 20-year period. The focus of the plan is to unify the open space at the heart of the campus and create connections between the buildings on the periphery, the open spaces at the Center, and the growing neighborhoods on the Center's edges. The <i>Century 21 Master Plan</i> calls for increasing the mode and frequency of transit, improving pedestrian connections to and through the campus, and making it easier and safer to access the Center from a vehicle, bike, or on foot. Future transportation-related projects called for in the plan include:</p> <ul style="list-style-type: none"> • A new underground multi-modal transportation center and parking garage, located at the Memorial Stadium site, providing direct bus and truck loading to campus venues and patron parking. • Improved access with new emphasis on pedestrian safety with better connections to and through the site, especially from transit stops. • A proposed Bus Rapid Transit stop on the west side of Seattle Center on First Avenue N. and Republican as part of the new Bus Rapid Transit route from north downtown to Ballard. • Expansion of the South Lake Union Streetcar to Seattle Center along the Central Line route. 	<p>Effects are expected to be similar to those described for project 1.</p>

PROJECT	POTENTIAL CUMULATIVE EFFECTS
<p>8. Bill and Melinda Gates Foundation Campus Master Plan (2008-2014) Elements of the plan will be implemented over a 15-year period. The foundation's campus is east of the Seattle Center. The campus, which covers a city block, will be big enough to house 1,200 employees plus large meetings and events. The campus also will have its own interactive museum, a 15,000-square-foot center telling the story of the Bill & Melinda Gates Foundation's work. In all, the headquarters buildings will encompass some 900,000 square feet.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>9. South Lake Union Redevelopment (2003-2013) The projected build-out of Phase II (with the existing Phase I buildings) will total a net increase of 7.2 million square feet of commercial space, 35 percent of which is assumed to be designed for biotechnology research and development uses, with the remainder in a mix of commercial office (55 percent) and retail uses (10 percent). In addition to the commercial development, 10,000 residential units are projected to be constructed in the South Lake Union area through the development of 7.7 million square feet of new housing units during Phases I and II. Estimates for both commercial and residential development are clearly speculative for Phase II, but they are based on the best information currently available.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>10. Seattle Combined Sewer System Upgrades Seattle intends to construct a new combined sewer overflow storage facility and conveyance system along the central waterfront. (This project could include federal funding.)</p>	<p>This project would improve water quality along the Seattle waterfront by reducing the volume and frequency of combined sewer overflow events.</p>
<p>11. Bridging the Gap Projects(2007-2015) Construction for projects that are part of this Seattle levy began in 2007 and is expected through 2013. Considerable road work is expected on downtown streets and First Avenue S. in 2008. In 2010, Airport Way S. and Fourth Avenue S. north of S. Royal Brougham Way would have partial closures for roadway resurfacing. In 2011, additional resurfacing work is planned for Airport Way S. north of S. Massachusetts Street and on S. Dearborn Street east of Fifth Avenue S.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>16. First Hill Streetcar The First Hill Streetcar project is a proposed 2-mile streetcar connector serving Seattle's Capitol Hill, First Hill, and International District areas with connections to Link light rail and Sounder commuter rail. It was included in the mass transit system expansion ballot that voters approved in November 2008.</p>	<p>Effects are expected to be similar to those described for project 3.</p>

PROJECT	POTENTIAL CUMULATIVE EFFECTS
<p>17. RapidRide (2010-2013) King County Metro has planned service improvements that will substantially improve transit's ability to accommodate increased ridership. This plan includes RapidRide services that provide high-frequency service and bus priority improvements to highly traveled routes within King County Metro's service area. It also includes improved service on high-ridership routes and new peak and midday service in newly developing residential areas, and creates service partnerships with major employers throughout the region. RapidRide is Metro Transit's new, streamlined bus service that will provide frequent, all-day service in the following five corridors:</p> <ul style="list-style-type: none"> C Line – West Seattle to downtown Seattle using Fauntleroy Way SW, California Avenue SW, and SR 99 (2011) D Line – Ballard to Uptown and downtown Seattle along 15th Avenue NW (possible alternate routing along 24th Avenue NW) (2012) E Line – Aurora Avenue N. (SR 99) between Shoreline and downtown Seattle (2013) 	<p>Effects are expected to be similar to those described for project 3.</p>

Chapter 7 EFFECT DETERMINATIONS

This section integrates the various potential effects as described in Chapter 6 to make an effect determination for each listed species and designated critical habitat.

7.1 Southern Resident Killer Whale

The project **may affect** SRKW because:

- Barging of tunnel spoils will create a slight increase in vessel traffic that may disturb SRKW.

The project is **not likely to adversely affect** SRKW because:

- Barging will take place in existing shipping lanes; and
- The increase in barge traffic will be very small (approximately 1-2 barge trips per day).

7.1.1 Southern Resident Killer Whale Designated Critical Habitat

The project will improve the quality of stormwater discharged to Lake Union and Elliott Bay, will not reduce populations of prey species, and will not affect passage conditions. The project will, therefore, have **no effect** on southern resident killer whale critical habitat.

7.2 Humpback whale

Humpback whales are rarely observed in Elliott Bay and Puget Sound. The project involves no in-water work and will not affect humpback whale prey species. Barging will take place in existing shipping lanes, will not increase existing noise or disturbance levels, and will not affect baseline environmental conditions. The project will, therefore, have **no effect** on humpback whales.

7.3 Steller Sea Lion

Steller sea lions have not been documented within nearshore Elliott Bay along the Seattle waterfront in the project area. Project activities will not affect sea lions or their habitat. Stormwater quality will be improved post-project, and any effects to prey species will not be on a scale that will impact sea lions. The project will, therefore, have **no effect** on Steller sea lion.

7.4 Puget Sound Chinook Salmon ESU

The project **may affect** Chinook salmon for the following reasons:

- Adult and juvenile Chinook salmon have been documented in the action area and may occur in the action area during project construction.

The project is **likely to adversely affect** Chinook salmon for the following reasons:

- Stormwater discharges could occur at the Broad Street outfall at any time of year, potentially exposing juvenile Chinook to levels of DZn above the Services' behavioral threshold.

7.4.1 Puget Sound Chinook Salmon ESU Designated Critical Habitat

The project **may affect** designated critical habitat for Chinook salmon for the following reasons:

- The action area includes nearshore areas that are designated critical habitat for Chinook salmon; and
- Stormwater generated during project operation will contain concentrations of pollutants above the Services' water quality thresholds.

The project is **not likely to adversely affect** Chinook salmon critical habitat for the following reason:

- The project will reduce loads and concentrations of pollutants in stormwater discharged by the project, as well as reduce or maintain dilution zones in which pollutant levels attenuate to background concentrations.

7.5 Hood Canal Summer-Run Chum ESU

Hood Canal summer-run chum are found in the action area. The project does not entail any activities that will affect chum; therefore, the project will have **no effect** on Hood Canal summer-run chum.

7.5.1 Hood Canal Summer-Run Chum ESU Critical Habitat

Hood Canal summer-run chum designated critical habitat encompasses the nearshore areas of Port Ludlow; however, project activities will not affect any of the PCEs included in that designation. Therefore, the project will have **no effect** on Hood Canal summer-run chum designated critical habitat.

7.6 Puget Sound Steelhead DPS

The project **may affect** Puget Sound steelhead for the following reasons:

- Adult and juvenile steelhead have been documented in the action area.
- Tunnel spoils will be transported via barge to Mats Mats quarry.

- Stormwater generated during project operation may contain levels of dissolved metals above the Services' water quality thresholds.

The project is **not likely to adversely affect** Puget Sound steelhead for the following reasons:

- Barging will take place in existing shipping lanes, will not increase noise or disturbance levels, and will not affect baseline environmental conditions.
- Post-project loads and concentrations of stormwater pollutants will be reduced compared to baseline conditions.
- Juvenile steelhead are infrequently observed along the Seattle waterfront and are not likely to be in the action area during winter months when most combined sewer overflow events occur.
- Overflow events are infrequent and juvenile salmonids are unlikely to be exposed to stormwater pollutants at combined sewer outfalls.
- The area affected by stormwater flows is so small that the likelihood of exposure is small even if fish are present.

7.7 Southern DPS Green Sturgeon

Green sturgeon are found in Puget Sound, although rarely. However, project activities in that part of the action area will not affect baseline conditions. Therefore, the project will have **no effect** on the southern DPS of green sturgeon.

7.8 Pacific Eulachon

Pacific eulachon are not documented in Elliott Bay and are only rarely found in Puget Sound. The project does not involve any activities in Puget Sound that will change the existing environmental baseline; therefore, the project will have **no effect** on Pacific eulachon.

7.9 Coastal/Puget Sound Bull Trout DPS

The project **may affect** bull trout for the following reasons:

- Adult and sub-adult bull trout may forage within or migrate through the action area during project construction.
- Tunnel spoils will be transported via barge to the Mats Mats quarry.
- Stormwater generated during project operation may contain levels of dissolved metals above the Services' water quality thresholds.

The project is **not likely to adversely affect** bull trout for the following reasons:

- Barging will take place in existing shipping lanes, will not increase noise or disturbance levels, and will not affect baseline environmental conditions.
- Post-project loads and concentrations of stormwater pollutants will be reduced compared to baseline conditions.
- Juvenile bull trout are unlikely to be found in the action area at any time of year.
- Overflow events are infrequent and juvenile salmonids are unlikely to be exposed to stormwater pollutants at combined sewer outfalls.
- The area affected by stormwater flows is so small that the likelihood of exposure is small even if fish are present.

7.9.1 Coastal/Puget Sound Bull Trout DPS *Designated* Critical Habitat

The project **may affect** designated critical habitat for bull trout for the following reasons:

- The action area includes nearshore areas that are designated critical habitat for bull trout.
- Stormwater generated during project operation may contain levels of dissolved metals that have been observed to cause behavioral impacts to juvenile salmonids in laboratory studies.

The project is **not likely to adversely affect** bull trout critical habitat for the following reason:

- The project will reduce loads and concentrations of pollutants in stormwater discharged by the project, as well as the dilution zone in which pollutant levels attenuate to background concentrations.

7.9.2 Coastal/Puget Sound Bull Trout DPS *Proposed* Critical Habitat

The project will **not destroy or adversely modify** proposed critical habitat for bull trout. In the event that proposed critical habitat becomes designated before project completion, the project, **may affect, but is not likely to adversely affect** proposed critical habitat for bull trout for the same reasons enumerated in Section 7.9.1, above.

7.10 Marbled Murrelet

Marbled murrelets have not been documented in Elliott Bay and are unlikely to be found in the highly disturbed areas along the Seattle waterfront. The species has been documented foraging in open water areas near the Mats Mats quarry. However, the only project activities in that part of the action area are barging tunnel spoils. Barging will take place in existing shipping lanes, will not increase

existing noise or disturbance levels, and will not change baseline environmental conditions. Therefore, the project will have **no effect** on marbled murrelets.

7.11 Yelloweye Rockfish

Yelloweye rockfish are rarely observed in Elliott Bay and are highly unlikely to be found in Elliott Bay. Project activities in other portions of the action area will not change the existing environmental baseline. The project will therefore have **no effect** on yelloweye rockfish.

7.12 Bocaccio

There are very few records of bocaccio in Elliott Bay. Project activities in other portions of the action area will not change the existing environmental baseline. The project will therefore have **no effect** on bocaccio.

7.13 Canary Rockfish

Canary rockfish have never been documented in Elliott Bay. Project activities in Puget Sound will not change baseline environmental conditions. The project will have **no effect** on canary rockfish.

Chapter 8 REFERENCES

8.1 Printed and Online References

- Adams, P.B., C.B. Grimes, J.E. Hightower, S.T. Lindley, and M.L. Moser. 2002. Status Review for the North American green sturgeon. NOAA, National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, CA. 49 p.
- American Association of Port Authorities (AAPA). 2006. 2005 North American Container Traffic Statistics. http://www.aapa-ports.org/files/Statistics/2005_NORTH_AMERICAN_CONTAINER_TRAFFIC.pdf.
- Armstrong, R.H. 1984. Migrations of anadromous Dolly Varden char in southeastern Alaska: A manager's nightmare. Pages 559-570 in Johnson, L. and B. Burns, editors. *Biology of Arctic Char: Proceedings of the international symposium on Arctic char*. University of Manitoba Press, Canada.
- Allen, M.J., and G.B. Smith. 1988. Atlas and zoogeography of common fishes in the Bering Sea and northeastern Pacific. NOAA Tech. Rep. NMFS 66, 151 p.
- Baldwin, D.H., J.F. Sandahl, J.S. Labenia, and N.L. Scholz. 2003. Sublethal effects of copper on coho salmon: impacts on non-overlapping receptor pathways in the peripheral olfactory nervous system. *Environmental Toxicology and Chemistry* 22: 2266-2274
- Barracough, W.E. 1964. Contributions to the marine life history of the eulachon (*Thaleichthys pacificus*). *Journal of the Fisheries Research Board of Canada* 21(5): 1333-1337.
- Berg, L. and T.G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. *Canadian Journal of Fisheries and Aquatic Sciences* 42:1410-1417.
- Bloomberg, G., C. Simenstad, and P. Hickey. 1988. Changes in the Duwamish River estuary habitat over the past 125 years. Pages 437-454 In: *Proceedings of the First Annual Meeting on Puget Sound Research. Volume II*. Puget Sound Water Quality Authority, Seattle, WA.
- Bradbury, A. and B. Pfeifer. 1992. Lake Sammamish Creel Survey – 1982-1983. Part IV. Fisheries Investigation of Lake Washington and Sammamish–1980-1990. Washington Department of Fish and Wildlife. Unpublished draft report.

- Calambokidis, J. and J. Barlow. 2004. Abundance of blue and humpback whales in the eastern North Pacific estimated by capture-recapture and line-transect methods. *Marine Mammal Science* 20(1): 63-85.
- Calambokidis, J. and G.H. Steiger, 1990. Sightings and movements of humpback whales in Puget Sound, Washington, *Northwestern Naturalist*, 71:45-49.
- Chumbley, K. 1993. 1991-92 Steller sea lions (research activities). Unpublished report. Seattle, WA: Alaska Fisheries Science Center.
- COSEWIC. 2002. CSEWIC assessment and status report on the bocaccio (*Sebastes paucispinis*) in Canada. Committee in the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
- Cramer, S.P., K.P. O'neal, J. Norris, J.S. Hogle, P.R. Mundy, C. Steward, G. Grette, and P. Bahls. 1999. *Status of Chinook Salmon and Their Habitat in Puget Sound, Volume 2 Final Report*.
- Curl, Jr., H.C., E.T. Baker, T.S. Bates, G.A. Gannon, R.A. Feely, T.L. Geiselman, M.F. Lamb, P.P. Murphy, D.J. Pashinski, A.J. Paulson, and D.A. Tennant. 1988. Contaminant transport from Elliott Bay and Commencement Bay. National Oceanic and Atmospheric Administration.
- Dunstan W.A., W.E. Bostick, C.W. Maib, and A.F. Regenthal. 1955. Green River downstream migration. Puget Sound Stream Studies 1955. Prepared for the State of Washington Department of Fisheries, Olympia, WA.
- Emmett, R. L., G. T. McCabe, Jr., and W. D. Muir. 1988. Effects of the 1980 Mount St. Helens eruption on Columbia River estuarine fishes: Implications for Dredging in Northwest Estuaries. Pates 75-91 in C.A. Simenstad, editor. *Effects of Dredging on Anadromous Pacific Coast Fishes*. University of Washington, Seattle, WA.
- Everitt, R.D., C.H. Fiscus and R.L. DeLong. 1980. Northern Puget Sound marine mammals. DOC/EPA Interagency Energy/Environment R&D Program. Doc. #EPA-6009/7-80-139. U.S. Environmental Protection Agency, Washington DC. 134p.
- Falcone, E, J. Calambokidis, G. Steiger, M. Malleson, and J. Ford. 2005. Humpback whales in the Puget Sound/Georgia Strait Region. Proceedings of the 2005 Puget Sound Georgia Basin Research Conference. 4pp.
- Federation of American Scientists (FAS). 2010. Military Analysis Network. Available at: <http://www.fas.org/man/dod-101/sys/ship/acoustics.htm>.
- Felleman, F.L., J.R. Heimlich-Boran, and R.W. Osborne. 1991. The feeding ecology of killer whales (*Orcinus orca*) in the Pacific Northwest. Pages 113-147 in K Pryor and K.S. Norris, editors. *Dolphin Societies: Discoveries and Puzzles*. University of California Press, Berkeley, CA.

- Federal Highway Administration, Washington State Department of Transportation and City of Seattle. 2006. SR 99: Alaskan Way Viaduct & Seawall Replacement Project Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation. Seattle, WA: WSDOT.
- — —. 2004. SR 99: Alaskan Way Viaduct & Seawall Replacement Project Draft Environmental Impact Statement. Seattle, WA: WSDOT.
- Ford, J. K. B., G. M. Ellis, and K. C. Balcomb. 2000. Killer whales: the natural history and genealogy of *Orcinus orca* in British Columbia and Washington State. 2nd ed. University of British Columbia Press, Vancouver, B.C.
- Fresh, K. 2006. Juvenile Pacific salmon in Puget Sound. Technical Report 2006-06 Prepared in support of the Puget Sound Nearshore Partnership. 28pp. Available at: http://www.pugetsoundnearshore.org/technical_papers/pacjuv_salmon.pdf.
- Gearin, P.J., R. Pfeifer, S. Jeffries, R. DeLong, and M. Johnson. 1988. Results of the 1986–87 California sea lion-steelhead trout predation control program at the Hiram M. Chittenden Locks. Processed Report No. 88-30. Seattle, WA: Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, NWAFC.
- Gearin, P., S. Jeffries, S. Riemer, L. Lehman, K. Hughes and L. Cooke. 1999. Prey of Steller's Sea Lions, *Eumetopias jubatus*, in Washington State. Abstract submitted to the 13th Biennial Conference on the Biology of Marine Mammals, November 28-December 3, 1999. The Society for Marine Mammalogy, Maui, HI.
- Goetz, F. A., E. Jeanes, and E. Beamer. 2004. Bull trout in the nearshore. Unpublished preliminary draft report, Army Corps of Engineers, Seattle, Washington. 157 p.
- Goetz, F., G. Ruggerone, and L. Sievers. 2003. Salmon utilization of restored off-channel habitats in the Duwamish Estuary, 2002. Draft Report, U.S. Army Corps of Engineers, Seattle District, Seattle, Washington.
- Grette, G.B. and E.O. Salo. 1986. The status of anadromous fishes of the Green/Duwamish River system. Prepared for the U.S. Army Corps of Engineers, Seattle District. Seattle, WA.
- Gustafson, R. and nine coauthors. 2008. Summary of scientific conclusions of the review of the status of eulachon (*Thaleichthys pacificus*) in Washington, Oregon, and California. NMFS Northwest Fisheries Science Center. Seattle, WA. 114 p. Online at <http://www.nwr.noaa.gov/Other-Marine-Species/upload/Eulachon-Review.pdf> [accessed April 2009].

- Hart Crowser. 1994. Sediment quality assessment Seattle Ferry Terminal Colman Dock – south area. Technical memorandum dated October 31, 1994. Seattle, Washington. Report J-4134.
- Hay, D.E. and P.B. McCarter. 2000. Status of the eulachon *Thaleichthys pacificus* in Canada. Department of Fisheries and Oceans Canada, Canadian Stock Assessment Secretariat, Research Document 2000-145. Ottawa, Ontario.
- Healey, M.C. 1991. Life history of Chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 in C. Groot and L. Margolis, editors. Pacific salmon life histories. UBC Press, University of British Columbia, Vancouver, British Columbia.
- Heimlich-Boran, J. R. 1988. Behavioral ecology of killer whales (*Orcinus orca*) in the Pacific Northwest. Canadian Journal of Zoology 66:565–578.
- Herrera. 2008. Preliminary Water and Sediment Quality Summary Report for the State of the Waters Report, Vol. 3. March 2008 draft report. Prepared for Seattle Public Utilities. In Seattle, City of. 2009. Draft Shoreline Characterization Report. March. 221 p. Available at: http://www.seattle.gov/dpd/static/FinalReport%20Web_LatestReleased_DPDP016194.pdf.
- — —. 2005. Year 2003 Water Quality Data Report, Green/Duwamish Watershed, Water Quality Assessment. Prepared for King County, Seattle, WA.
- Hilgert, P.J. and E.D. Jeanes. 1999. Juvenile salmonid use of lateral stream habitats middle Green River, Washington. 1998 data report. Prepared by R2 Resource Consultants, Inc. for the U.S. Army Corps of Engineers, Seattle District, and City of Tacoma Public Utilities, Tacoma Water. January 1999. 150 pp.
- Jeanes, E.D. and P.J. Hilgert. 2000. Juvenile salmonid use of lateral stream habitats middle Green River, Washington. 1999 data report. Prepared by R2 Resource Consultants, Inc. for the U.S. Army Corps of Engineers, Seattle District. July 2000. 200 pp.
- Jeffries, S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D.A. Pruett. 2000. Atlas of seal and sea lion haulout sites in Washington. WDFW, Wildlife Science Div., Olympia, WA. 150 pp.
- Jones & Stokes. 2006. Biological Assessment: Alaskan Way Viaduct and Seawall Replacement Project. October (JSA 06339.06) Bellevue, WA. Prepared for Washington Department of Transportation and Federal Highway Administration.

- — —. 2001. Regional King County Wastewater Treatment Division Treatment Plant Discharges to Puget Sound. November. (JSA 09343.99 002.) Bellevue, WA. Prepared for King County Wastewater Treatment Division, Seattle, WA.
- Kerwin, J. and T. Nelson (Eds.). 2000. Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island). Washington Conservation Commission and King County Department of Natural Resources.
- Kerwin, J. 2001. Salmon and Steelhead Habitat Limiting Factors Report for the Cedar – Sammamish Basin (Water Resource Inventory Area 8). Washington Conservation Commission. Olympia, WA.
- King County. 2007a. Regional Wastewater Services Plan (RWSP): 2006 Comprehensive Review and Annual Report. Prepared for King County Wastewater Treatment Division. September.
- King County. 2007b. Combined Sewer Overflow Control Program 2007–2008 Annual Report. King County Natural Resources and Parks, Wastewater Treatment Division. October.
- King County. 2005. King County Water Quality Monitoring: Springbrook Creek (Site 0317). Accessed on December 18, 2007. Available at <http://green.kingcounty.gov/wlr/waterres/streamsdata/watershedinfo.aspx?locator=0317>.
- King County. 2002. Draft Green/Duwamish Watershed Water Temperature Report. Prepared for Green Duwamish Watershed Water Quality Assessment. June. 29 pp.
- King County. 1998. Final SEPA Supplemental Environmental Impact Statement/NEPA Environmental Assessment for Phases 2 & ¾ of the Denny Way/Lake Union Combined Sewer Overflow Control Project. Contract #XP-990384-01. Prepared by King County Department of Natural Resources, Wastewater Treatment Division City of Seattle, Seattle Public Utilities. May 1998.
- King County. 1994. Draft data from: Pier 53–55 sediment cap and enhanced natural recovery area remediation project monitoring program. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. King County Department of Metropolitan Services. November 1993.

- King County Wastewater Treatment Division (King County WTD). 2009a. Comprehensive Sediment Quality Summary Report for CSO Discharge Locations. 180pp.
http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/SedQuality/0912_CompSedQualSumRptCSODischargeLoc.pdf.
- King County Department of Natural Resources and Parks, Wastewater Treatment Division. 2009b. King County Combined Sewer Overflow Control Program. 2008 Annual Report. July 2009.
- King County Department of Natural Resources (King County DNR). 2001. Reconnaissance Assessment of the State of the Nearshore Report Including Vashon and Maury Islands (WRIAs 8 and 9). King County Department of Natural Resources. Seattle, Washington. May.
- King County Department of Natural Resources (King County DNR). 2000a. Literature review and recommended sampling protocol for bull trout in King County. Seattle, Washington. June 12. 42 p.
- King County Department of Natural Resources (King County DNR). 2000b. Green/Duwamish watershed factors of decline water quality report. Working Draft. King County Department of Natural Resources, Water and Land Resources Division, Seattle, Washington. 58pp.
- King County Department of Natural Resources (King County DNR). 1999. King County Combined Sewer Overflow Water Quality Assessment for the Duwamish River and Elliott Bay, Volume I Overview and Interpretation. Seattle, WA.
- King County Wastewater Treatment Division (King County WTD). 1998. Final Environmental Impact Statement for the Regional Wastewater Services Plan. April. 334 pp.
- Keyboard, K. and M. Zimmerman. 2009. Evaluation of Downstream Migrant Salmon Production in 2008 from the Cedar River and Bear Creek. Wild Salmon Production Evaluation Unit Science Division, Fish Program Washington Department of Fish and Wildlife Olympia, Washington.
- Kraemer, C. 1994. Some observations on the life history and behavior of the native char, Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) of the North Puget Sound region. Draft report, Washington State Department of Fish and Wildlife, Mill Creek, Washington.
- Laughlin, J. 2006. Ambient Underwater Sound Measurements in Elliott Bay, March 21, 2006. Washington State Department of Transportation, Seattle, Washington. 4 p.

- Lewis, A.F.J., M.D. McGurk, and M.G. Galesloot. 2002. Alcan's Kemano River eulachon (*Thaleichthys pacificus*) monitoring program 1988-1998. Consultant's report prepared by Ecofish Research Ltd. For Alcan Primary Metal Ltd., Kitimat, British Columbia. 136 p.
- Love, M.S., M.H. Carr and L.J. Haldorson. 1991. The ecology of substrate-associated juveniles of the genus *Sebastes*. *Environ. Biol. Fishes* 30: 225-243.
- Love, M.S., M.M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press, Berkeley, California.
- McGreevy, R. 1973. Seattle Shoreline Environment. City of Seattle, Department of Community Development. Seattle, Washington. *In* Seattle, City of. 2009. Draft Shoreline Characterization Report. March. 221 p. Available online at: http://www.seattle.gov/dpd/static/FinalReport%20Web_LatestReleased_DPDP016194.pdf.
- Meehan, W.R., and T. C. Bjornn. 1991. Salmonid distributions and life histories. American Fisheries Society Special Publication 19:47-82.
- Metro (Municipality of Metropolitan Seattle). 1988. Water quality status report for marine waters, 1988. Municipality of Metropolitan Seattle.
- — —. Metro. 1989. Water quality status report for marine waters, 1989. Municipality of Metropolitan Seattle.
- — —. 1993. Pier 53-55 sediment cap and enhanced natural recovery area remediation project. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. Municipality of Metropolitan Seattle.
- Miller, D.J. and S.F. Borton. 1980. Geographical distribution of Puget Sound fishes: Maps and data source sheets. University of Washington Fisheries Research Institute. 3 vols.
- Morrow, J.E. 1980. The freshwater fishes of Alaska. University of British Columbia, Animal Resources Ecology Library, Vancouver, British Columbia. 248 p.
- Mortensen, D. G., B. P. Snyder, and E. O. Salo. 1976. An analysis of the literature on the effects of dredging on juvenile salmonids. Report to U.S. Navy by Fisheries Research Institute, University of Washington, Seattle, Washington. 37 p.
- Myers, J. M., R. G. Kope, G. J. Bryant, D. Teel, L. J. Lierheimer, T. C. Mainwright, W. S. Grant, F. K. Waknitz, K. Neely, S. T. Lindley, and R. S. Waples. 1998. Status review of Chinook salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35. 443 p.

- National Marine Fisheries Service (NMFS). 2010. Species Lists. Available at: <http://www.nwr.noaa.gov/ESA-Salmon-Listings/upload/snapshot-7-09.pdf>.
- — —. 2008a. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington.
- — —. 2008b. Proposed Designation of Critical Habitat for the Southern Distinct Population Segment of North American Green Sturgeon. Draft Biological Report. Available online at: http://swr.nmfs.noaa.gov/gs/Final_Draft_GS_BioRpt.pdf.
- — —. 2008c. Preliminary Scientific Conclusion of the Review of the Status of Five Species of Rockfish: Bocaccio (*Sebastes paucispinis*), Canary Rockfish (*Sebastes pinniger*), Yelloweye Rockfish (*Sebastes ruberrimus*), Greenstriped Rockfish (*Sebastes elongates*), and Redstripe Rockfish (*Sebastes proriger*) in Puget Sound, Washington. Northwest Fisheries Science Center, National Marine Fisheries Service. Seattle, Washington. December 2, 2008.
- — —. 2005a. Proposed Conservation Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, WA. 183 p.
- — —. 2005b. Status review update for Puget Sound steelhead. Northwest Fisheries Science Center. Seattle, WA. July 25, 2006.
- — —. 1992. Recovery plan for the Steller sea lion (*Eumetopias jubatus*). Prepared by the Steller Sea Lion Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland, 92 p.
- — —. 1991. Final Recovery Plan for the humpback whale. U.S. Department of Commerce, National Marine Fisheries Service Office of Protected Resources. 118pp.
- National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and USFWS). 2005. Biological Opinion, City of Seattle, Seattle Aquarium, Pier 59 Piling Superstructure Maintenance, Fifth Field HUC 1711001904, Puget Sound/East Passage. By National Marine Fisheries Service and U. S. Fish and Wildlife Service, Lacey, Washington. 112 p.
- Nearshore Habitat Program. 2001. The Washington State ShoreZone Inventory. Washington State Department of Natural Resources, Olympia, WA.

- Nelson, T. S., G. Ruggerone, H. Kim, R. Schaefer and M. Boles. 2004. Juvenile Chinook Migration, Growth and Habitat Use in the Lower Green River, Duwamish River and Nearshore of Elliott Bay 2001-2003, Draft Report. King County Department of Natural Resources and Parks. Seattle, Washington. 133 p + appendices.
- Niggle, C. C. 1978. Behavioral, physiological and lethal effects of suspended sediment on juvenile salmonids. Thesis, University of Washington, Seattle, WA.
- Norton, D. and T. Michelson. 1995. Elliott Bay waterfront recontamination study. Volume 1: Field investigation report: results of monitoring conducted along the central Seattle waterfront–October 1993 to October 1994. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. May 1995.
- Nysewander, D.R., J.R. Evanston, B.L. Murphy, and T.A. Kyra. 2005. Report of Marine Bird and Marine Mammal Component, Puget Sound Ambient Monitoring Program, for July 1992 to December 1999. Washington Department of Fish and Wildlife, Olympia, WA.
- Olesiuk, P. E., M. A. Biggs, G. M. Ellis, S. J. Crockford, and R. J. Wigen. 1990. An assessment of the feeding habits of harbor seals (*Phoca vitulina*) in the Strait of Georgia, British Columbia, based on scat analysis. Can. Tech. Rep. Fish. and Aquat. Sci. No. 1730.
- Olson, J.M. 1998. Temporal and spatial distribution patterns of sightings of southern community and transient orcas in the inland waters of Washington and British Columbia. M.S. thesis, Western Washington University, Bellingham, WA.
- Orca Network. 2010. <http://www.orcanetwork.org/>.
- Osborne, R.W. 1999. A historical ecology of Salish Sea “resident” killer whales (*Orcinus orca*): with implications for management. Ph. D. thesis, University of Victoria, Victoria, B.C.
- Osborne, R., J. Calambokidis & E.M. Dorsey. 1988. A guide to marine mammals of Greater Puget Sound. Island Publishers, Anacortes, Wash. 191pp.
- Parametrix and Natural Resources Consultants, Inc. (NRC). 2000. City of Seattle Built Environment Shoreline Surveys. Prepared for Seattle Public Utilities. May 2000. In Seattle, City of. 2009. Draft Shoreline Characterization Report. March. 221 p. Available online at: http://www.seattle.gov/dpd/static/FinalReport%20Web_LatestReleased_DPDP016194.pdf.

- Parsons Brinkerhoff Quade & Douglas, Inc. 2004. SR 99: Alaskan Way Viaduct & Seawall Replacement Project Draft Environmental Impact Statement Appendix F Noise and Vibration Discipline Report. Seattle, WA: Washington State Department of Transportation.
- Partridge, V., K. Welch, S. Aasen and M. Dutch. 2005. Temporal Monitoring of Puget Sound Sediments: Results of the Puget Sound Ambient Monitoring Program, 1989-2000. Prepared for the Washington State Department of Ecology. Pub No. 05-03-016. 267 pp.
- Pautzke, C.F. and R.C. Meigs. 1940. Studies on the life history of the Puget Sound steelhead. Washington Department Game Biol. Bull. No. 3. Olympia, Washington. 24 pp.
- PFMC, 2003. Groundfish Bycatch Program EIS: Appendix A. Biological Environment: Distribution, Life History, and Status of Relevant Species. Pacific Fisheries Management Council. August 11, 2003.
- Puget Sound Steelhead Biological Review Team. 2005. Status Review Update for Puget Sound Steelhead. National Marine Fisheries Service. July 26.
- Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. Physiological effects on coho salmon and steelhead of exposure to suspended solids. Transactions of the American Fisheries Society 116:737-744.
- REEF, 2009. Yelloweye Rockfish (*Sebastes ruberrimus*) Distribution Report. The Reef Environmental Education Foundation. Data range 01/01/1996 to 12/31/2007. <http://www.reef.org/db/reports/dist/PAC>. Accessed May 20, 2009.
- Ricker, W.E., D.F. Manzer, and E.A. Neave. 1954. The Fraser River eulachon fishery, 1941-1953. Fisheries Research Board of Canada, Manuscript Report No. 583. 35 pp.
- Romberg, P., S.P. Pavlou, R.F. Shokes, W. Hom, E.A. Crecelius, P. Hamilton, J.T. Gunn, and J. Vinelli. 1984. Presence, distribution, and fate of toxicants in Puget Sound and Lake Washington. Toxicant pretreatment planning study: technical report C1. Municipality of Metropolitan Seattle.
- Ruggerone, G. and E. Jeanes. 2004. Salmon Utilization of Restored Off-Channel Habitats in the Duwamish Estuary, 2003. Report to U.S. Army Corps of Engineers, Seattle, WA.
- Seattle, City of. 2009. Draft Shoreline Characterization Report. March. 221 p. Available online at: http://www.seattle.gov/dpd/static/FinalReport%20Web_LatestReleased_DPDP016194.pdf.

- Seattle, City of. 2007. Seattle Biological Evaluation. Seattle, WA. May 1, 2007. Available at: http://www.seattle.gov/util/Engineering/Consulting_Resources/Permit_Coordination/SeattleBiologicalEvaluation/.
- Seattle, City of. 2004. Summary of Water Quality and Habitat Conditions for Seattle's Aquatic Areas. City of Seattle, Seattle, Washington.
- Servizi, J. A. and D. W. Martens. 1987. Some effects of suspended Fraser River sediments on sockeye salmon (*Oncorhynchus nerka*). Page 254-264 in Smith, H. D., L. Margolis, and C. C. Wood, editors. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publications in Fisheries and Aquatic Sciences 96.
- — —. 1992. Sublethal responses of coho salmon (*Oncorhynchus kisutch*) to suspended sediments. Canadian Journal of Aquatic Sciences 49:1389-1395.
- Shaffer, J.A., D. Penttila, M. McHenry, and D. Vilella. 2007. Observations of eulachon, *Thaleichthys pacificus*, in the Elwha River, Olympic Peninsula Washington. Northwest Science 81: 76-81.
- Shannon & Wilson, Inc. 2004. Geotechnical Analyses for Alaskan Way Seawall Rebuild Options. Unpublished report to Washington State Department of Transportation, City of Seattle, and Federal Highway Administration by Parsons Brinckerhoff Quade & Douglas, Inc., Seattle, WA. 23 p. + appendices.
- Simenstad, C. A. 1988. Summary and conclusions from workshop and working group discussions. Pages 144-152 in Simenstad, C.A. editor. Effects of dredging on anadromous Pacific coast fishes. University of Washington, Seattle, WA.
- Smith, W.E. and R.W. Saalfeld. 1955. Studies on the Columbia River smelt, (*Thaleichthys pacificus*). Washington Department of Fisheries, Fisheries Research Papers 1(3): 3-26.
- Spangler, E.A.K. 2002. The ecology of eulachon (*Thaleichthys pacificus*) in Twentymile River, Alaska. M.S. Thesis. University of Alaska, Fairbanks.
- Sprague, J.P. 1968. Avoidance reactions of rainbow trout to zinc sulphate solutions. Water Research 2: 367-372.
- Stark, K., A. Grout, S. Mickelson and J. Engebretson. 2006. Water Quality Status Report for Marine Waters, 2004. Prepared for King County Water and Land Resources Division. August.
- Stewart, Ian J. 2007. Status of the U.S. Canary Rockfish resource in 2007. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle WA. October 15, 2007.

- Sturdevant, M.V., T.M. Willette, S. Jewett, E. Deberc. 1999. Diet composition, diet overlap, and size of 14 species of forage fish collected monthly in PWS, Alaska, 1994-1995. Chapter 1. Forage Fish Diet Overlap, 1994-1996. Exxon Valdez Oil Spill Restoration final report 98163C, 12-36.
- Tabor, R.A., H.A. Gearn, C.M. McCoy III, and S. Camacho. 2006. Nearshore habitat use by juvenile Chinook salmon in lentic systems, 2003 and 2004 report. U.S. Fish and Wildlife Service, Lacey WA. 108 pp.
- Taylor Associates and King County. 2004. Green-Duwamish Watershed Water Temperature Report: an Assessment of Surface Water Temperature Conditions. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division. June. 320 pp.
- TerraLogic GIS, Inc. and Landau Associates. 2004. Final Lower Duwamish Inventory Report. Prepared for WRIA 9 Steering Committee and Seattle Public Utilities. May. 37 pp.
- Tetra Tech, Inc. 1988. Elliott Bay action program: Analysis of toxic problem areas. Prepared for U.S. Environmental Protection Agency by Tetra Tech, Inc., Bellevue, Washington.
- Toft, J., C. Simenstad, C. Young and L. Stamatelos. 2003a. Inventory and mapping of City of Seattle shorelines along Lake Washington, the Ship Canal, and Shilshole Bay. Prepared by the Wetland Ecosystem Team, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities. Report SAFS-UW-0302. Available at: <http://www.fish.washington.edu/research/publications/pdfs/0302.pdf>.
- Toft, J.D., J.R. Cordell, C.A. Simenstad, and L.A. Stamatou. 2007. Fish distribution, abundance, and behavior along city shoreline types in Puget Sound. *North American Journal of Fisheries Management* 27: 465-480.
- URI (University of Rhode Island) 2010. Science of Sound in the Sea. Available at: <http://work1.dosits.org/science/ssea/2.htm>.
- U.S. Army Corps of Engineers (Corps). 2005a. Salmonid Presence and Habitat Use in the Lower Duwamish River, Winter 2004/2005. Prepared by Science Applications International Corporation (SAIC), May 2005.
- — —. 2005b. Biological Assessment, FY 2007–2011 Maintenance Dredging, Turning Basin and Navigational Channel, Upper Duwamish Waterway. November. Seattle, WA.
- — —. 1999. Lake Washington Ship Canal Smolt Passage Section 1135 Restoration Project Seattle, Washington: Ecosystem Restoration Report/Environmental Assessment. Final Report Prepared 31 August 1999 by Seattle District.

- — —. 1998. Final Feasibility Study Report and final Environmental Impact Statement. Prepared by the U.S. Army Corps of Engineers, Seattle District, and Seattle, WA. August.
- U.S. Environmental Protection Agency (EPA). 1988. Elliott Bay action program. Analysis of toxic problem area. Final report. Prepared for U.S. Environmental Protection Agency Region X, Office of Puget Sound. July 1988.
- U.S. Fish and Wildlife Service (USFWS). 2010. Western Washington Species List. Available online at <http://www.fws.gov/wafwo/speciesmap.html>. Accessed March 29, 2010.
- — —. 2005. Endangered and threatened wildlife and plants; designation of critical habitat for bull trout: final rule. U.S. Fish and Wildlife Service. Federal Register 70(185): 56211-56311. P 4-12.
- — —. 1999. Endangered and threatened wildlife and plants; determination of threatened status for bull trout in the coterminous United States. Final rule November 1, 1999. U.S. Fish and Wildlife Service. Federal Register 64 (210):58910-58933.
- — —. 1998a. Endangered and threatened wildlife and plants; proposal to list the Coastal Puget Sound, Jarbridge River, and St. Mary-Belly River population segment of bull trout as threatened species. Proposed rule June 10, 1998. U.S. Fish and Wildlife Service. Federal Register 63 (111):31693-31710.
- — —. 1998b. Candidate and listing priority assignment form for the coastal/Puget Sound population segment. U.S. Fish and Wildlife Service. 89 p.
- — —. 1997. Recovery plan for the marbled murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California. Region 1, U.S. Fish and Wildlife Service, Portland, OR. 194 p. + appendices.
- — —. 1996. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Marbled Murrelet; Final Rule. Federal Register 61:26255-26320. P 4-14.
- Washington State Department of Ecology (Ecology). 2010. Water Quality Assessment for Washington. Available at: <http://apps.ecy.wa.gov/wqawa2008/viewer.htm>. Accessed on January 21, 2010.
- — —. 2009b. Puget Sound Boatyards: Zinc, Copper, Lead and Hardness Concentrations in Receiving Waters. October 2009. Publication No. 09-03-051.

- — —. 1995. Elliott Bay waterfront recontamination study Volume 2: Data 17 evaluation and remedial design recommendations report. Publication #95-607. Prepared by the Washington State Department of Ecology, Elliott Bay/Duwamish Restoration Panel, Panel Publication 10. August 1995.
- Washington Department of Fisheries (WDF), Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State Salmon and Steelhead Stock Inventory. Available online at: <http://wdfw.wa.gov/fish/sassi/sassi92.pdf>.
- Washington Department of Fish and Wildlife (WDFW). 2009. Priority Habitat and Species Maps and Data. Olympia, WA.
- — —. 2005. Lake Washington Winter Steelhead Stock Status. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6154.pdf.
- — —. 2003. Washington State Status Report for the Killer Whale. WDFW, Wildlife Program. Olympia, WA.
- — —. 2002a. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, WA. Green River (Duwamish) Chinook Salmon Stock Report. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/1160.pdf. Accessed on December 28, 2009.
- — —. 2002b. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, Washington. Green River (Duwamish) Winter Steelhead Stock Report. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6175.pdf. Accessed on December 28, 2009.
- — —. WDFW 2002c. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, Washington. Lake Washington – North Lake Washington Tribes Chinook. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6175.pdf. Accessed on December 28, 2009.
- — —. 2001. Washington and Oregon eulachon management plan. Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife. Available at: http://wdfw.wa.gov/fish/creel/smelt/wa-ore_eulachonmgmt.pdf. Accessed April 2009.
- — —. 1998. 1998 Washington State salmonid stock inventory. Appendix: Bull trout and Dolly Varden. Washington Department of Fish and Wildlife, Olympia, WA. 437 p.
- — —. 1993a. Status of the Steller (northern) sea lion (*Eumetopias jubatus*) in Washington. Draft unpublished report. Olympia, WA.

- — —. 1993b. 1992 Washington State Salmon and Steelhead Stock Inventory. Western Washington Treaty Tribes, Washington Dept. of Fisheries, Washington Dept. of Wildlife. 211 pp. Olympia, WA.
- Washington Department of Fish and Wildlife (WDFW) and Point No Point Treaty Tribes. 2000. Summer chum salmon conservation initiative. Olympia, WA. 797 pp. <http://wdfw.wa.gov/fish/chum/sumchum.pdf>.
- Washington Department of Fish and Wildlife (WDFW) and Western Washington Treaty Indian Tribes. 1994. 1992 Washington State Salmon and Steelhead Stock Inventory. Appendix One, Puget Sound Stocks, South Puget Sound Volume. Washington Department Fish and Wildlife and Western Washington Treaty Indian Tribes, Olympia, Washington. 371pp.
- Washington Department of Natural Resources (WDNR). 2001. Washington State Exotics Expedition 2000, A rapid survey of exotic species in the shallow waters of Elliott Bay, Totten and Eld Inlets, and Willapa Bay. Olympia, WA.
- WDFW (Washington Department of Fish and Wildlife) and ODFW (Oregon Department of Fish and Wildlife). 2001. Washington and Oregon eulachon management plan. Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife. Online at http://wdfw.wa.gov/fish/creel/smelt/wa-ore_eulachonmgmt.pdf [accessed April 2009].
- Washington State Department of Transportation (WSDOT). 2010. Biological Assessment Preparation for Transportation Projects, Advanced Training Manual. Olympia, WA.
- — —. 2009. BA Writers Guidance for Preparing the Stormwater Section of Biological Assessments. Revised January 10, 2008. Olympia, WA.
- — —. 2008. Highway Runoff Dilution and Loading Model User's Guide. Available online at http://www.wsdot.wa.gov/NR/rdonlyres/85B43C71-DEBE-478C-A468-C6BF64D86B64/0/BA_HighwayRunoffUsersGuide.pdf.
- Weitkamp et al. 2002. Species of Macroalgae Identified in Shallow Subtidal and Intertidal Areas Along the Seawall. p. 5-15.
- Weitkamp, D. E., and G. T. Ruggerone. 2000. Factors affecting Chinook populations, background report. Prepared by Parametrix, Inc, Natural Resources Consultants, and Cedar River Associates for City of Seattle, WA. 224 p.
- Whale Museum, The. 2010. The Whale Hotline Recent Data. Available at: <http://whale-museum.org/hotlinefolder/update.html>.

Wilson, M.F., R.H. Armstrong, M.C. Hermans, and K. Koski. 2006. Eulachon: A review of biology and an annotated bibliography. AFSC Processed Report 2006-12 (August). National Marine Fisheries Service, Alaska Fisheries Science Center, Juneau, Alaska. 229 p.

Wydoski, R. and R. Whitney. 2003. Inland fishes of Washington. Second Edition. University of Washington Press, Seattle, WA.

8.2 Personal Communications

Agness, Alison, NOAA Fisheries Protected Resources Division. Personal communication to George Ritchotte on January 19th, 2010.

Bargmann, G. WDFW. Personal communication to George Ritchotte on December 29, 2009.

Brennan, Jim. Nearshore riparian habitats of Elliott Bay. Talk presented at the Waterfront Ecology Forum, Seattle Center, May 4, 2006.

Boyle, Matthew. Grette Associates. Personal communication to George Ritchotte on November 18, 2009.

Calambokidis, J. Cascadia Research, Olympia, WA. Personal communication to Sasha Visconty on October 27, 2008.

Hauger, Tom. Seattle Department of Planning and Development. Personal communication to George Ritchotte on April 21, 2010.

Shannon, Jim. Juvenile salmon abundance & timing. Talk presented at the Waterfront Ecology Forum, Seattle Center, May 4, 2006.

Stark, Kim. Personal communication to George Ritchotte in January 2010.

Tabor, Roger. US Fish and Wildlife Service. Personal communication to George Ritchotte on June 22, 2010.

Toft, Jason. University of Washington. Personal communication to George Ritchotte on June 10, 2010.

APPENDIX A

Essential Fish Habitat Analysis and Determination

CHAPTER 1 BACKGROUND

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a federal fisheries management plan (FMP). The MSA requires consultation with the National Marine Fisheries Service (NMFS) on all actions or proposed actions that may adversely affect EFH (MSA §305(b)(2)). An adverse effect is defined as any impact that reduces quality and/or quantity of EFH. It may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

MSA defines EFH as those waters and substrate necessary for fish to spawn, breed, feed, or grow to maturity. For the purpose of interpreting this definition of EFH, the following definitions are applied:

“Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate.

“Substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

“Necessary” means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem.

“Spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle (50 CFR 600.10).

CHAPTER 2 DESIGNATED ESSENTIAL FISH HABITAT

The MSA requirements for EFH apply to all species managed under a federal FMP. Three FMPs apply to the Pacific Coast (excluding Alaska). The three FMPs cover groundfish, coastal pelagic species, and Pacific salmon. Project impacts on EFH for these groups of species must be considered.

2.1 Groundfish

EFH for Pacific Coast groundfish is defined as the aquatic habitat necessary to allow for groundfish production to support long-term sustainable fisheries for groundfish and for groundfish contributions to a healthy ecosystem. More than 400 EFHs are identified for the 83 groundfish species and their life stages. Taken together, the groundfish EFH includes all waters from the mean higher high water (MHHW) line, the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California, and seaward to the boundary of the United States exclusive economic zone (EEZ) 230 miles (370 kilometers) offshore.

2.2 Coastal Pelagic Species

Amendment 8 to the Coastal Pelagic Species Fishery Management Plan describes the habitat requirements of five pelagic species: northern anchovy, Pacific sardine, Pacific (chub) mackerel, jack mackerel, and market squid. These four finfish and one market squid are treated as a single species complex because of similarities in their life histories and habitat requirements. The east-west geographic boundary for coastal pelagic species EFH is defined as all marine and estuarine waters from the coastal shorelines of California, Oregon, and Washington, offshore to the limits of the EEZ and above the thermocline where sea surface temperatures range between 10 and 26 degrees Centigrade (°C). The southern boundary is the U.S.-Mexico maritime boundary. The northern boundary is more dynamic, and is defined as the position of the 10°C isotherm, which varies seasonally and annually, but sometimes includes large portions of Puget Sound.

2.3 Pacific Salmon (Chinook, Coho, and Puget Sound Pink Salmon)

EFH for the Pacific Coast salmon fishery is defined as those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. As defined, Pacific salmon EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California. In the estuarine and marine areas, EFH extends from the nearshore and tidal submerged

environments within state territorial waters out to the full extent of the EEZ 230 miles (370 kilometers) offshore of Washington, Oregon, and California, north of Point Conception.

Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable manmade barriers (as identified by the Pacific Fishery Management Council), and longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for several hundred years).

CHAPTER 3 ESSENTIAL FISH HABITAT IN THE ACTION AREA

The various EFH descriptions have been grouped into seven units called ‘composite EFHs’ by the groundfish FMP (Pacific Fisheries Management Council [PFMC] 1988). This grouping by habitat is an ecosystem approach that focuses on ecological relationships, both among and between species and their habitat. Seven major habitat types form the basis for such composites: estuarine, rocky shelf, non-rocky shelf, canyon, continental slope/basin, neritic zone, and oceanic zone.

As defined in Chapter 3.0, the action area includes all habitat within 650 feet of the construction footprint, dilution zones from stormwater outfalls, and the barge route to the Mats Mats quarry. The action area, therefore, comprises boulder, cobble, gravel, and sand habitats along the shoreline of Elliott Bay and Port Ludlow and includes rocky shelf and non rocky shelf composites.

3.1 Rocky Shelf Composite

The rocky shelf composite includes those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the high tide line MHHW to the shelf break (approximately 200 meters [109 fathoms]).

3.2 Non-Rocky Shelf Composite

The non-rocky shelf composite includes those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the MHHW line to the shelf break (approximately 200 meters [109 fathoms]).

3.3 Species Groups

Exhibit A-1 presents the species and life-history stages present in Puget Sound, largely based on information compiled by PFMC (1998).

The groups of fish that could be affected by the project include Pacific salmon and groundfish species. Although the five coastal pelagic species occur within Puget Sound, project activities in Puget Sound will affect neither the environmental baseline nor those species.

**Exhibit A-1. Potential Species of Fishes and Life-History Stages that May Occur
within Composite EFHs of Puget Sound**

Species	Adult	Spawning/ mating	Juvenile	Larvae	Eggs/ parturition
Groundfish					
Leopard shark	X	X	X		X
Soupin shark	X	X	X		X
Spiny dogfish	X	X	X		X
Big skate	X	X	X		X
California skate	X				
Longnose skate	X				X
Ratfish	X				X
Lingcod	X	X	X	X	X
Cabezon	X	X	X	Uncertain	X
Kelp greenling	X	X	X	X	X
Pacific cod	X	X	X	X	X
Pacific whiting (hake)	X		X		
Sablefish	X		X		
Jack mackerel	X			X	
Black rockfish	X		X		
Bocaccio	X	Uncertain	X	X	
Brown rockfish	X	Uncertain	Uncertain	X	
Calico rockfish	X		X		
California scorpionfish	X	X		X	X
Canary rockfish	Uncertain	Uncertain	X		
China rockfish	X		X		
Copper rockfish	X		X	Uncertain	
Kelp rockfish	X		X		X
Darkblotched rockfish	X		X		
Pacific ocean perch	X		X		
Quillback rockfish	X		X	Uncertain	
Redbanded rockfish	X				
Redstripe rockfish	Uncertain				
Rosethorn rockfish	X		X		
Rosy rockfish	Uncertain				
Rougheye rockfish	X		Uncertain		
Sharpchin rockfish	X		Uncertain		
Shortspine	X		X		
Splitnose rockfish	X		X		

Exhibit A-1. Potential Species of Fishes and Life-History Stages that May Occur within Composite EFHs of Puget Sound (continued)

Species	Adult	Spawning/ mating	Juvenile	Larvae	Eggs/ parturition
Stripetail rockfish	X				
Tiger rockfish	X		X		
Vermilion rockfish	X	Uncertain	X		
Yelloweye rockfish	X				
Yellowtail rockfish	X	Uncertain	X		
Arrowtooth flounder	X	X	X		
Butter sole	X	X	X		
Curlfin sole	X				
Dover sole	X	X	X		
English sole	X	X	X	X	X
Flathead sole	X	X	X		
Pacific sanddab	X		X	X	X
Petrale sole	X		X		
Rex sole	X	X	X		X
Rock sole	X	X	X		
Sand sole	X	X	X		
Starry flounder	X	X	X	X	X
Pacific salmon					
Chinook salmon	X		X		
coho salmon	X		X		
Puget Sound pink salmon	X		X		
Coastal pelagic species					
Northern anchovy	X	X	X	X	X
Pacific sardine	X				
Pacific mackerel	X				
Market squid	X				

CHAPTER 4 DIRECT EFFECTS

Although the action area includes portions of Elliot Bay and Puget Sound, no project construction will occur in-water, and no underwater noise will be generated by the project. Terrestrial noise may be audible at the water surface in the action area, but no significant sound pressure waves that could injury or disturb EFH species or their prey will be generated underwater. Barging activity to and from the Mats Mats quarry will not affect baseline environmental conditions within Puget Sound and Elliot Bay.

The project has the potential to modify nearshore habitats and/or affect EFH species within the action area because stormwater generated during project operation and discharged into Elliott Bay could affect EFH species and/or their prey resources due to the pollutant loads and concentrations. However, stormwater runoff quality would be improved over baseline conditions for both loading and concentrations.

CHAPTER 5 INDIRECT EFFECTS

No indirect effects to EFH are anticipated from the project.

CHAPTER 6 INTERDEPENDENT AND INTERRELATED EFFECTS

No interdependent and interrelated effects to EFH are anticipated from the project.

CHAPTER 7 CUMULATIVE EFFECTS

No cumulative effects to EFH are anticipated from the project.

CHAPTER 8 AVOIDANCE AND MINIMIZATION MEASURES

Various avoidance and minimization measures have been incorporated into the project design to avoid and minimize potential impacts to sensitive habitats and species. These measures, which are detailed in Section 2.5, are designed to minimize environmental impacts during project construction.

CHAPTER 9 DETERMINATION OF EFFECT

The project will not adversely affect groundfish, Pacific salmon, or coastal pelagic EFH for the following reasons:

Water quality will be improved over existing conditions by the removal of pollutant generating impervious surfaces and by providing water quality treatment and detention.

The project does not involve any in-water work.

CHAPTER 10 REFERENCES

PFMC (Pacific Fishery Management Council). 1998. Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan (October 1998).

APPENDIX B

Stormwater Analysis

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Chapter 1 INTRODUCTION

1.1 Purpose of Work

This appendix documents the data sources, assumptions, methods, and findings related to the stormwater pollutants associated with the Washington State Department of Transportation's (WSDOT) proposed Alaskan Way Viaduct Replacement Project. The work entailed calculating pollutant loading and concentrations, annual runoff volumes, and pollutant dilution zones for all project threshold discharge areas (TDAs). Pre- and post-project conditions were compared for all analyses.

A 2009 memorandum of agreement (2009 Memo) between Federal Highway Administration (FHWA), National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), and WSDOT, committed these agencies to a common methodology for assessing the impacts of stormwater pollutants on Endangered Species Act (ESA)-listed fish species. The new methodology as applied to the Alaskan Way Viaduct Replacement Project requires: (1) the use of the Western Washington Highway Runoff Dilution and Loading Stormwater Model (HI-RUN) to determine project runoff pollutant loadings, concentrations, and flows; and (2) the use of CORMIX to assess pollutant dilution plumes. The work described in this report follows the new methodology.

1.2 Overview of Project Stormwater Management

The project consists of a South Access Area, the Bored Tunnel, and a North Access Area. The access areas drain to combined sewer systems, except for: (1) a small portion of the North Access Area which drains to Lake Union via a separated storm drain; and (2) a small portion of the South Access Area which discharges to a Royal Brougham storm drain equipped with a low flow diversion structure that allows runoff from small storms to enter the combined sewer, while larger flows are diverted to the storm drain outfall in Elliott Bay. The project's stormwater management requirements are from the City of Seattle 2009 Stormwater Code, Seattle Municipal Code (SMC) 22.800. Exhibit 1-1 summarizes total drainage area (TDA) qualitative information.

Water quality treatment will only be provided at the two TDAs that do not discharge to the combined sewer: Broad and Royal Brougham South. No runoff treatment is proposed for any of the other project TDAs, because under normal conditions these runoff flows will be conveyed via the combined sewer systems to the West Point Wastewater Treatment Plant (WWTP) and receive treatment there.

The entire Dexter TDA will be served by a proposed stormwater detention system designed to conform to the City of Seattle Peak Flow Standard (see Section 5.2.1 for Peak Flow Standard considerations). The South Access Area TDAs were granted an exception from flow control per an October 22, 2009, request by WSDOT filed with Seattle Public Utilities (SPU), which stated that adding detention in the South Access Area would not be expected to decrease the frequency or duration of combined sewer overflow (CSO) events into Elliott Bay. The Broad TDA discharges directly into Lake Union, which is a flow control exempt receiving body.

Exhibit 1-1. Project Areas and Drainage

TDA Identifier	Project Area	Discharge Pathway	Outfall Location	Proposed Stormwater Management
Royal Brougham North	South Access	Combined Sewer to WWTP	Royal Brougham (CSO only)	None
Royal Brougham South	South Access	Low Flows: Combined Sewer to WWTP High Flows: Storm Drain to Elliott Bay	Royal Brougham (High Flows only)	Water Quality (existing and proposed facilities)
King	South Access	Combined Sewer to WWTP	King (CSO only)	None
Dexter	North Access	Combined Sewer to WWTP	Denny/Elliott West (CSO only)	Detention
Broad	North Access	Storm Drain to Lake Union	Lake Union	Water Quality

Chapter 2 METHODOLOGY

2.1 Background Data

The following sources were used to supplement data provided by the project's design team:

- SPU Records Vault for physical information on combined sewer outfalls.

- King County CSO frequency, volume, and event data and outfall basin areas.

- Various research funded by Washington State Department of Ecology (WSDOE), National Oceanic and Atmospheric Administration (NOAA), and King County regarding receiving body ambient conditions.

- Precipitation data for the Seattle area.

2.2 Project and Threshold Discharge Areas

The project is divided into two distinct areas for stormwater runoff: the South Access Area and North Access Area. These areas are subdivided into separate TDAs as determined by the downstream outfalls to which project areas currently drain. All primary project-associated outfalls discharge to Elliott Bay, with the exception of the Broad outfall, which discharges to Lake Union.

The South Access Area project sub-areas drain via three systems which discharge to two outfalls: the West overflow vault to the Royal Brougham outfall (Royal Brougham North TDA), the Connecticut regulator/high flow bypass to the Royal Brougham outfall (Royal Brougham South TDA), and the King Street combined sewer regulator to the King Street outfall (King TDA). The Royal Brougham outfall is also referred to as the Kingdome outfall in some documents.

The North Access Area project sub-areas drain primarily to two outfalls: the Denny/Elliott West outfalls via the Dexter Avenue combined sewer system, and the Lake Union outfall via a separated storm drain system (Broad TDA).

Detailed descriptions of these TDA discharge pathways are provided in Section 3.3.5.

2.3 Combined Sewer System and Outfalls

All project areas, with the exception of the Royal Brougham South TDA and Broad TDA, drain directly to the combined sewer system, managed jointly by King County and SPU. Combined sewer regulators act to control flows such that if the downstream combined sewer system is at capacity, incoming flows from the regulator basin are routed to an outfall pipe that discharges directly into the receiving water body (which for the combined sewer outfalls associated with this project is generally Elliott Bay). Any measurable discharge into local receiving waters from the

combined sewer is called a CSO event. For many years these events have been measured and studied as pollutant sources to receiving waters in Seattle.

Numerous completed, ongoing, and planned projects funded by King County and the City of Seattle are directed at reducing the frequency and volume of CSO events.

2.3.1 CSO-related Assumptions for Analyses

While the actual hydraulics of these CSO events are quite complicated, for the purposes of the pollutant dilution zone modeling, the following simplifying assumptions were made:

Runoff from pre- and post-project areas was assumed to be isolated from the (much larger) overall basin associated with each particular CSO outfall. Flow from each project TDA was modeled as if there was a separate pipe solely carrying flows from the TDA to the outfall. This approach provides a comparative look at the pre- and post-project conditions, but does not factor in the possible effects of dilution mixing with runoff from non-project areas. TDA runoff flow rates and pollutant concentrations were assumed to remain unchanged between the project boundary and the point of discharge. These assumptions can be described as a virtual “pipe within a pipe” model.

During a CSO event, 100 percent of runoff from a project area is assumed to discharge from the primary outfall which this report has associated with each TDA.

Pollution-generating impervious surface (PGIS), non-pollution-generating surface (non-PGIS), and pervious surface areas were provided by the project design team. Any potential non-PGIS or pervious area contributions to runoff pollutant flows, loads, or concentrations were not considered for this report, based on the agreed upon approach from the 2009 Memo.

Per WSDOT guidance, runoff pollutant concentrations and loads were represented by the median value outputs from the HI-RUN model, although for the loading analysis the 25th to 75th percentile values were listed in addition to the median.

2.4 Modeling

2.4.1 HI-RUN

HI-RUN Version 1.1 (“HI-RUN CORMIX combo”), as provided by WSDOT, was used for generating pollutant loading and concentrations as well as runoff flow rates.

Model outputs included runoff pollutant loads and concentrations, and peak flows by TDA for both pre- and post-project conditions. Selected concentrations and loads were modeled for total suspended solids (TSS), total recoverable copper

(TCu), dissolved copper (DCu), total recoverable zinc (TZn), and dissolved zinc (DZn).

2.4.2 CORMIX

CORMIX Version 6.0GT was used for dilution plume analyses for DCu and DZn for all outfalls discharging project runoff.

Model inputs consisted of the following:

Runoff pollutant concentrations for DCu and DZn, by outfall location for pre- and post-project conditions. For the Royal Brougham outfall with two tributary TDAs, Royal Brougham North and Royal Brougham South, outfall pollutant concentrations were calculated as an area-based weighted average for the two TDAs.

The flow data for 50th, 99.5th, and 99.9th percentile flows for each outfall for all pre- and post-project conditions. For the Royal Brougham outfall with two tributary TDAs (Royal Brougham North and Royal Brougham South), the outfall runoff flow rates were the sum of the two respective TDA flow rates. For the Dexter TDA, post-detention values were calculated for 99.5th and 99.9th percentile flows, to represent detention facilities proposed for this TDA.

Physical configuration parameters approximating each outfall, determined to the best degree possible by consulting records obtained from the SPU Records Vault.

Ambient conditions for each receiving body at the outfall location, as determined using a collection of data sources including research published by NOAA, WSDOE, and other sources (Curl et al. 1988; Ebbesmeyer et al. 1998; King County Department of Natural Resources 2010; Northeast Regional Climate Center 2010; WSDOE 2009).

Model output included dimensions of the dilution plume at each outfall, for pre- and post-project conditions, as defined by the discharge-related pollutant concentration being in excess of the established threshold above ambient concentration (see Section 5.5).

Chapter 3 POLLUTANT LOADING AND CONCENTRATION ANALYSIS

3.1 Overview

As required in the 2010 WSDOT Biological Assessment Preparation Advanced Training Manual, Chapter 17, project-related changes in pollutant loads and concentrations must be evaluated in the Biological Assessment. Pollutants to be evaluated in storm runoff from PGIS areas are: TSS, TCu, DCu, TZn, and DZn.

HI-RUN was developed to analyze potential water quality impacts for highway runoff scenarios and was used for this project to determine runoff loading and concentration values for PGIS. The HI-RUN output loadings for areas receiving water quality treatment were adjusted to account for high flow bypasses of treatment.

As the final step of the pollutant loading and concentration analyses, calculations were performed to determine the expected amount of each TDA's pollutant load that will discharge directly to the receiving body (as a storm drain discharge or CSO event) or after processing at the West Point WWTP. For TDAs connected to the combined sewer, the CSO: WWTP discharge ratio was approximated based on CSO discharge volumes for the entire outfall basin, the basin area, and mean annual precipitation. Project areas by TDA are provided in Exhibit 3-1 below.

Exhibit 3-1. Project Areas by TDA

TDA	Existing/ Proposed	Area (acres)			
		Pervious	Non-PGIS	PGIS	Total
Royal Brougham North	Existing	0.63	1.12	6.53	8.28
	Proposed	0.00	4.39	3.57	7.97
Royal Brougham South	Existing	0.02	0.09	0.65	0.76
	Proposed	0.02	0.47	0.27	0.76
King	Existing	0.70	0.33	9.27	10.30
	Proposed	0.96	4.49	5.16	10.61
Dexter	Existing	1.20	4.25	14.76	20.21
	Proposed	0.89	6.91	11.43	19.23
Broad	Existing	0.47	0.63	3.76	4.87
	Proposed	0.00	1.37	4.47	5.84
South Access Area	Existing	1.35	1.54	16.45	19.34
	Proposed	0.98	9.35	9.00	19.34
North Access Area	Existing	1.70	5.44	18.52	26.78
	Proposed	0.84	10.13	15.9	26.78

3.2 PGIS Pollutant Loading and Concentrations

A HI-RUN Outfall Concentration and Load Analysis subroutine was conducted for each TDA. The Puget East 40 time-series was used, and all water quality parameters and all months were assessed, due to the possibility of various listed species being present near outfalls year-round. HI-RUN median pollutant loading and concentration results for PGIS areas are listed in Exhibits 3-2 and 3-3, respectively.

Exhibit 3-2. Runoff Pollutant Loading for PGIS Areas (North Areas)

TDA	Existing/ Proposed	Annual Load (pounds/year)				
		TSS median (25th – 75th percentile)	TCu median (25th – 75th percentile)	DCu median (25th – 75th percentile)	TZn median (25th – 75th percentile)	DZn median (25th – 75th percentile)
Royal Brougham North	Existing	2,947 (1,439-6,060)	0.76 (0.42-1.33)	0.18 (0.10-0.31)	4.59 (2.58-8.18)	1.30 (0.68-2.48)
	Proposed	1,622 (795-3,333)	0.41 (0.23-0.73)	0.10 (0.05-0.17)	2.50 (1.40-4.50)	0.71 (0.37-1.40)
Royal Brougham South	Existing ¹	51 ¹ (22-117) ²	0.03 ¹ (0.02-0.04) ¹	0.02 ¹ (0.01-0.02) ¹	0.14 ¹ (0.09-0.22) ¹	0.08 ¹ (0.05-0.13) ¹
	Proposed ¹	21 ¹ (9-49) ¹	0.01 ¹ (0.01-0.02) ¹	0.01 ¹ (0.00-0.01) ¹	0.06 ¹ (0.04-0.09) ¹	0.03 ¹ (0.02-0.05) ¹
King	Existing	4,183 (2,046-8,612)	1.07 (0.60-1.89)	0.25 (0.14-0.44)	6.51 (3.66-11.60)	1.85 (0.97-3.52)
	Proposed	2,344 (1,148-4,818)	0.60 (0.34-1.10)	0.14 (0.08-0.24)	3.60 (2.00-6.50)	1.00 (0.54-2.00)
Dexter	Existing	6,723 (3,263-13,690)	1.70 (0.96-3.01)	0.40 (0.22-0.70)	10.30 (5.78-18.30)	2.95 (1.54-5.62)
	Proposed	5,183 (2,541-10,643)	1.30 (0.75-2.30)	0.31 (0.17-0.54)	8.00 (4.50-14.00)	2.30 (1.20-4.40)
Broad	Existing	1,710 (829-3,482)	0.43 (0.25-0.76)	0.10 (0.06-0.18)	2.64 (1.48-4.72)	0.75 (0.39-1.44)
	Proposed ¹	351 ¹ (155-814) ¹	0.19 ¹ (0.13-0.29) ¹	0.10 ¹ (0.07-0.16) ¹	0.98 ¹ (0.62-1.53) ¹	0.55 ¹ (0.35-0.86) ¹

1. Loading values are a volume-weighted average of 91% receiving basic treatment and 9% receiving no treatment to account for high flows bypassing water quality treatment.

Basic treatment (with 0 percent infiltration) was modeled for the Royal Brougham South TDA for both pre- and post-project conditions, as well as for the Broad TDA post-project, in order to represent the existing and proposed runoff treatment for these TDAs.

Exhibit 3-3. Pollutant Concentrations for PGIS Areas (HI-RUN Output)

TDA	Existing/Proposed	Median Concentration (mg/L)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham North	Existing	61.70	0.016	0.0040	0.095	0.0270
	Proposed	61.70	0.016	0.0040	0.095	0.0270
Royal Brougham South	Existing	5.68	0.005	0.0030	0.023	0.0160
	Proposed	5.68	0.005	0.0030	0.023	0.0160
King	Existing	61.70	0.016	0.0040	0.095	0.0270
	Proposed	61.70	0.016	0.0040	0.095	0.0270
Dexter	Existing	61.70	0.016	0.0040	0.095	0.0270
	Proposed	61.70	0.016	0.0040	0.095	0.0270
Broad	Existing	61.70	0.016	0.0040	0.095	0.0270
	Proposed	5.68	0.005	0.0030	0.023	0.0160
Royal Brougham Weighted Combined	Existing	n/a ¹	n/a ¹	0.0040	n/a ¹	0.0270
	Proposed	n/a ¹	n/a ¹	0.0039	n/a ¹	0.0262

1. Median concentrations for TSS, TCu, and TZn were not calculated for Royal Brougham Weighted Combined, since these pollutants are not included in the dilution zone analysis.

Using data from the March 2010 Final Conceptual Hydraulic Report, it was determined that typical 99.9th percentile flows (~0.25 cfs/ac) will exceed typical maximum water quality flows (0.18 cfs/ac). Thus, for the Royal Brougham South TDA and Broad TDA, for high flows represented by the 99.9th percentile flow condition, it was assumed that water quality facilities will be bypassed and that effluent pollutant concentration could be conservatively described as being untreated for the purposes of dilution zone analysis. Typical 99.5th percentile flows (~0.12 cfs/ac) were below the water quality flow; therefore, treated concentrations were used for dilution zone analysis.

The HI-RUN model loading output does not account for high flows that bypass water quality treatment. To compensate for this, annual loads for the TDAs receiving water quality treatment (Royal Brougham South and Broad), as presented in the HI-RUN output, were adjusted. Per WSDOE and City of Seattle design standards, stormwater treatment facilities are designed to treat 91 percent of the total runoff volume. The adjusted post-project pollutant loads for the Royal Brougham South TDA and Broad TDA represent a volume-weighted average loading of 91 percent receiving basic treatment and 9 percent receiving no treatment.

3.3 Pollutant Loading Discharge Analysis

As part of the evaluation of pollutant loading and concentrations, the ultimate downstream discharge fates for pollutant loadings were analyzed. Removal of runoff pollutants through treatment was considered as part of this exercise.

The Royal Brougham South and Broad TDAs will receive basic treatment via filter cartridge vaults (i.e., Stormfilter or similar) located to intercept all TDA flows (up to the water quality flow rate) prior to discharging at an outfall. Loading adjustments to account for high flow bypasses of water quality treatment for these TDAs are described in Section 3.2. Runoff from areas that are routed to the combined sewer system receives treatment at the West Point WWTP.

To estimate the pollutant loads that will be discharged as CSO events, the percentages of annual runoff discharging as CSO events for each outfall basin were calculated. It was assumed that the proportion of annual runoff discharge to CSO for the project area(s) within the outfall basin will be the same percentage. This percentage was determined by identifying the maximum recent annual CSO volume for each project-related outfall and dividing that by the expected total annual runoff. Only recent annual CSO data were used to accurately represent of the most current configurations of the combined sewer systems. The total annual runoff was calculated by multiplying the outfall basin area by the mean annual precipitation (~38 inches). This conservatively assumes that the entire basin area is impervious and that all annual precipitation becomes runoff that enters the combined sewer. Basin areas were taken from GIS files provided by King County; a large area of overlap between the King and Royal Brougham basin boundaries was assigned to the King outfall for the purposes of this exercise. Only the smaller sub-area for the Dexter basin within the larger Denny outfall basin was chosen, to adjust upwards that basin's CSO percentage to 1.7 percent, which approaches the percentage of the other basins. Annual CSO volumes were calculated from CSO event data provided by King County selected to represent records for only the most current combined sewer configurations (King outfall 2002-2008, Royal Brougham/Connecticut/Kingdome outfall 2004-2008, Denny outfall 2005-2008). Exhibit 3-4 summarizes the results of this exercise.

Details of the specific downstream discharge systems, as well as any assumptions or calculations made for determining the fate of pollutants associated with each TDA, are described in the following subsections.

3.3.1 Royal Brougham North TDA

Runoff from this TDA is routed to the combined sewer and is connected to King County's Elliott Bay Interceptor (EBI), which runs northward along the Seattle waterfront and eventually to the West Point WWTP. For CSO events, Royal

Brougham North TDA discharges via the West overflow vault directly to Elliott Bay at the Royal Brougham outfall.

Exhibit 3-4. Estimated Percent of Annual Runoff Discharged as CSO

CSO Outfall	Associated TDA(s)	Maximum Annual CSO Volume (MG) ¹	Year of Maximum CSO Volume	Basin Area (ac)	Total Annual Runoff (MG)	Percent of Annual Basin Runoff to CSO
Royal Brougham	RB-N, RB-S	28.6	2007	735	758.1	3.8%
King	King	26.0	2006	366	377.6	6.9%
Denny	Dexter	8.9	2007	510	526.0	1.7%

1. Includes wastewater volumes.

Based upon the percentage of annual runoff discharged as CSO for the Royal Brougham basin shown in Exhibit 3-5, it is expected that 3.8 percent of the Royal Brougham North TDA runoff will directly discharge to Elliott Bay at the Royal Brougham outfall. The remaining 96.2 percent of annual runoff will be conveyed to the WWTP for treatment.

3.3.2 Royal Brougham South TDA

Runoff from this TDA receives localized water quality treatment at a filter canister vault prior to entering the City of Seattle’s Connecticut (high flow diversion) regulator. Water quality treatment is assumed for this TDA’s existing condition based upon the final condition of WSDOT’s SR 99: S. Holgate Street to S. King Street Viaduct Replacement Project, assumed to be complete prior to the Bored Tunnel project. This existing treatment facility will be expanded as necessary to accommodate any proposed changes within the basin. From the Connecticut regulator, low flows are routed via the EBI to the West Point WWTP for further treatment; high flows are discharged via the Connecticut regulator directly to Elliott Bay.

Based upon previous work funded by WSDOT (2008), it is assumed that 10 percent of the Royal Brougham South TDA annual runoff will be collected by the combined sewer system, routed to the WWTP. Of this 10 percent, it is assumed that 7 percent will reach the WWTP, while the remainder is discharged as a CSO. The remaining 90 percent of annual runoff will be routed through the high flow bypass and discharged directly to Elliott Bay at the Royal Brougham combined sewer outfall.

3.3.3 King TDA

This TDA discharges to the City of Seattle's King Street combined sewer regulator, which in turn discharges via the EBI to the West Point WWTP. For CSO events, the King TDA discharges directly to Elliott Bay at the King Street regulator outfall.

Based upon the percentage of annual runoff discharged as CSO for the King basin shown in Exhibit 3-5, it is expected that 6.9 percent of King TDA runoff will directly discharge to Elliott Bay at the King outfall. The remaining 93.1 percent of annual runoff will be conveyed to the WWTP for treatment, and discharged to the Puget Sound.

3.3.4 Dexter TDA

Runoff from the Dexter TDA will be routed to the combined sewer, and under normal operating conditions will be conveyed to the WWTP for treatment, and discharged to the Puget Sound.

During "wet weather" events, as defined by insufficient capacity in Central Trunk, flows will be diverted into storage within the Mercer Street Tunnel. Once capacity is again available in the EBI, runoff detained at the Mercer Street Tunnel is released to the WWTP.

For precipitation events during which the Mercer Street Tunnel and EBI have both reached capacity, additional incoming flows will effectively be conveyed to the wet weather treatment plant (consisting of floatables control, chlorination, and dechlorination) and discharged to Elliott Bay at the Elliott West outfall. It should be noted that wet weather treatment is assumed not to remove any significant amount of the stormwater pollutants of interest described in Section 3.1.

When wet weather treatment capacity is exceeded, untreated flows will discharge directly into Elliott Bay at the Denny Way regulator outfall.

During emergency events, such as severe system overloads or partial or complete system shutdown, untreated discharges could occur into Elliott Bay via the Denny and Elliott West outfalls and/or into Lake Union via the Dexter outfall.

Because the Denny and Elliott West outfalls are located immediately adjacent to one another, they can effectively be regarded as a single outfall for the purposes of this dilution zone analysis. As a means of simplification, any wet weather discharges occurring at the Elliott West outfall and/or additional untreated discharges occurring at the Denny outfall are considered CSOs at the Denny outfall. Any Dexter TDA runoff discharges to Lake Union via the Dexter outfall are assumed to be too infrequent and too complicated in nature to be meaningfully modeled.

Based upon the percentage of annual runoff discharged as CSOs for the Dexter basin shown in Exhibit 3-4, it is expected that 1.7 percent of the Dexter TDA runoff will directly discharge to Elliott Bay at the Denny outfall. The remaining 98.3 percent of annual runoff will be conveyed to the WWTP for treatment, and discharged to the Puget Sound.

3.3.5 Broad TDA

The Broad TDA discharges via a City of Seattle separated stormwater system to the Lake Union outfall. Runoff from this TDA is untreated in the pre-project condition. Under the proposed design condition, basic treatment (in the form of a filter cartridge vault) will be applied to all TDA runoff.

3.3.6 Pollutant Loading Discharge Analysis Results

To determine the annual pollutant loading discharge for each outfall location, the total annual pollutant loads for each TDA (as shown in Exhibit 3-2) were multiplied by the respective flow volume percentages to direct discharge and to WWTP (if applicable), as listed above. For TDA runoff receiving localized water quality treatment, pollutant loading output by the HI-RUN model was further adjusted as described in Section 3.2. For runoff routed to the WWTP, removal percentages (as shown in Exhibit 3-4) were applied to loading discharge amounts. Royal Brougham North and Royal Brougham South pollutant loads were summed because they share a common outfall. The results are presented in Exhibit 3-5.

Exhibit 3-5. Total Annual Pollutant Loads by Discharge Location

Discharge Location	Existing/ Proposed	Pollutant Load (pounds/year)				
		TSS median (25 th – 75 th percentile)	TCu median (25 th – 75 th percentile)	DCu median (25 th – 75 th percentile)	TZn median (25 th – 75 th percentile)	DZn median (25 th – 75 th percentile)
Elliot Bay						
Royal Brougham CSO	Existing	158 (75-337)	0.05 (0.03-0.09)	0.02 (0.01-0.03)	0.31 (0.18-0.51)	0.12 (0.07-0.21)
	Proposed	81 (39-171)	0.03 (0.02-0.04)	0.01 (0.01-0.02)	0.15 (0.09-0.25)	0.06 (0.03-0.10)
King CSO	Existing	288 (141-594)	0.07 (0.04-0.13)	0.02 (0.01-0.03)	0.45 (0.25-0.80)	0.13 (0.07-0.24)
	Proposed	162 (79-332)	0.04 (0.02-0.08)	0.01 (0.01-0.02)	0.25 (0.14-0.45)	0.07 (0.04-0.14)
Denny/W Elliott CSO (via Dexter CS)	Existing	114 (55-232)	0.03 (0.02-0.05)	0.01 (0.00-0.01)	0.17 (0.10-0.31)	0.05 (0.03-0.10)
	Proposed	88 (43-180)	0.02 (0.01-0.04)	0.01 (0.00-0.01)	0.14 (0.08-0.24)	0.04 (0.02-0.07)
Lake Union						
Broad SD	Existing	1,710 (829-3,482)	0.43 (0.25-0.76)	0.10 (0.06-0.18)	2.64 (1.48-4.72)	0.75 (0.39-1.44)
	Proposed	351 (155-814)	0.19 (0.13-0.29)	0.10 (0.07-0.16)	0.98 (0.62-1.53)	0.55 (0.35-0.86)

Chapter 4 VOLUME ANALYSIS

4.1 Overview

A comparison of pre- and post-project-estimated average annual runoff volumes was conducted for this report. Unlike the pollutant loading and concentration analysis and dilution zone analysis, runoff from project-related non-PGIS and pervious areas (in addition to the PGIS areas) was considered for the volume analysis. The volume analysis methodology was independent of HI-RUN and CORMIX modeling, and volume analysis results were not used as input data for any other modeling.

Impervious surface runoff volumes were estimated by multiplying the average annual precipitation depth for Seattle (~38 inches) by the overall TDA impervious. All precipitation was conservatively assumed to become runoff for impervious areas.

For pervious areas, 30 percent of all precipitation was estimated to become runoff. This value is based upon results from modeling that assumes grass-covered, moderately-sloped till soils and generates output based on various precipitation events for the Des Moines Creek HSPF parameters and the regionalized parameter set developed by the U.S. Geological Survey. For the purposes of this analysis, pervious area runoff is considered to include both surface runoff as well as shallow interflow. Thirty percent is a conservative value representing the upper range of the runoff-to-precipitation percentages generated by this modeling exercise.

4.2 Results

Estimated average annual runoff volumes for pre- and post-project conditions by TDA are presented in Exhibit 4-1. Volumes are rounded to the nearest ten thousand gallons.

Exhibit 4-1. Average Annual Runoff Volume Comparison

TDA	Existing/ Proposed	Volume (Million gallons)				Discharge Pathway
		Pervious	Non-PGIS	PGIS	Total	
Royal Brougham North	Existing	0.20	1.16	6.74	8.09	Combined Sewer
	Proposed	n/a ¹	4.53	3.68	8.21	
Royal Brougham South	Existing	0.01	0.09	0.67	0.77	Separated Storm
	Proposed	0.01	0.48	0.28	0.77	
King	Existing	0.22	0.34	9.56	10.12	Combined Sewer
	Proposed	0.30	4.63	5.32	10.25	
Dexter	Existing	0.37	4.39	15.23	19.99	Combined Sewer
	Proposed	0.28	7.13	11.79	19.20	
Broad	Existing	0.15	0.65	3.88	4.68	Separated Storm
	Proposed	n/a ¹	1.41	4.61	6.03	
South Access Area	Existing	0.42	1.59	16.97	18.98	n/a
	Proposed	0.30	9.65	9.29	19.24	
North Access Area	Existing	0.52	5.04	19.11	24.66	n/a
	Proposed	0.28	8.54	16.41	25.22	

1. No post-project pervious area.

4.3 Discussion

Clear trends are difficult to discern from the volume analysis results by TDA. It is more useful to consider the volume analysis results for the overall North and South Access Area volume changes, because their overall areas do not change between pre- and post-project conditions. Conversion of pre-project pervious area to post-project impervious area was the primary source of changes to access area runoff volumes.

The South Access Area generates approximately 260,000 gallons more total runoff than the pre-project conditions, due to a net loss of approximately 0.37 acre of pervious area (see Exhibit 3-1 for area comparisons).

The North Access Area generates approximately 560,000 total gallons more than the pre-project conditions, due to a net loss of approximately 0.78 acre of pervious area.

Chapter 5 DILUTION ZONE ANALYSIS

5.1 Overview

The 2010 WSDOT Biological Assessment Preparation Advanced Training Manual, Chapter 17, establishes criteria based upon HI-RUN results (see Section 3) to determine the necessity of performing dilution modeling for a project. The criteria are based upon the HI-RUN output for the P(exceed) value for DZn loading. P(exceed) is defined as the probability that the loading for the proposed project will exceed the loading for the baseline condition. The P(exceed) values of 0.45 and 0.35 or below are used as first and second threshold levels, respectively, to determine if dilution analysis is necessary, as described in the HI-RUN Model User's Guide. Exhibit 5-1 displays the P(exceed) values for the HI-RUN models for project PGIS areas.

Exhibit 5-1. P(exceed) Values for DZn Loading for HI-RUN Results for PGIS Areas

TDA	HI-RUN P(exceed) for DZn Loading
Royal Brougham North	0.33
Royal Brougham South	0.18
King	0.33
Dexter	0.42
Broad	0.37

While the P(exceed) value for DZn loading was below the threshold value of 0.35 for several project TDA proposed conditions, it was determined from Figure 17-2 of the 2010 BA Preparation Manual that a receiving water dilution analysis would be required for all TDAs due to the heavily urbanized receiving water bodies of Elliott Bay and Lake Union. Specifically, it was assumed that water quality indicators in the project's Pathways and Indicators Matrices will show that all of the project's receiving waters are not properly functioning.

While HI-RUN has a receiving water dilution subroutine, it is to be used for free-flowing streams and rivers. The HI-RUN dilution subroutine is not appropriate for tidally-influenced water bodies or lakes such as Elliott Bay and Lake Union. Therefore, CORMIX Version 6.0GT was used as the dilution modeling program to estimate the change in the pollutant plumes (DCu and DZn) due to project impacts for all project outfalls.

Required model inputs included runoff pollutant concentrations for DCu and DZn, by outfall location for pre- and post-project conditions; 50th, 99.5th, and 99.9th percentile flow rates for each outfall, pre- and post-project; physical

configuration parameters for each outfall; and ambient conditions for each receiving body at the outfall location.

Model output included dimensions of the dilution plume at each outfall, for pre- and post-project conditions, as defined by the discharge-related pollutant concentration exceeding the regulatory threshold above ambient concentration.

Sensitivity analyses were conducted for various model input parameters in order to test the reliability, validity, and range of selected values. Attachment A describes these sensitivity analyses.

5.2 Effluent Characteristics

CORMIX requires input data for effluent including flow rates and concentrations for the pollutants of interest, DCu and DZn. Effluent density was also required, and for the purposes of this study was assumed to be fresh (non-saline) water at 11.5 degrees Celsius. The temperature relationship between effluent and receiving water was investigated as part of the sensitivity analyses.

5.2.1 Flow Rates

The flow rates chosen for dilution zone modeling were based upon the flow rate described in the 2008 Parametrix technical memo used for the stormwater analysis in the SR99: S. Holgate Street to S. King Street Viaduct Replacement Project Biological Assessment. In this memo, flow rates determined by 50th, 95th, and 99th percentile 24-hour precipitation events (from Sea-Tac rain gauge data) were used for dilution zone modeling. The flow rates associated with these storms were developed using an event-based model (i.e., StormSHED). These flow rates were chosen to represent various runoff conditions that could be encountered within a typical year: 50th percentile flow representing a “typical” precipitation event; 95th percentile flow representing an event that might possibly trigger a CSO; and the 99th percentile flow representing a likely CSO-inducing event.

For the present report, flow rates output from HI-RUN were utilized per direction from WSDOT. To ensure consistency with the methodology of the 2008 Parametrix tech memo, the HI-RUN flow rates were compared with StormSHED-produced flows. These correlations led to the selection of 50th, 99.5th, and 99.9th percentile flows output from HI-RUN.

Flow rates were determined using the HI-RUN Receiving Water Concentration subroutine for each TDA pre- and post-project condition. Flow data for the month of November was chosen because November had the highest flows of the year. Concentration and flow data were exported to a .CSV file to produce the raw flow data.

Each .CSV export file contained 65,533 separate flow entries for both existing and proposed conditions. The lowest 10 percent of flows (which represented only negligible amounts) were removed from the data set.

From the remaining flow data, three percentiles were chosen to approximate three flow conditions:

- 50th percentile flows, to represent high frequency runoff events
- 99.5th percentile flows, to represent a possible CSO-inducing runoff event
- 99.9th percentile flows, to represent a likely CSO-inducing runoff event

These flow percentiles exported from HI-RUN were found (via a sensitivity analysis using the StormSHED hydrologic model) to approximately correlate with peak 24-hour runoff flow rates associated with various precipitation events. Attachment A, Section A.5, describes this exercise.

For the Dexter TDA, a stormwater detention system is proposed requiring that the HI-RUN-based flow rates for post-project conditions be adjusted to account for the expected reductions in post-detention flow rates. A detention facility model was created within MGS Flood based upon the City of Seattle Peak Flow Standard, which requires flow control limiting the 2-year storm event discharge to 0.15 cfs/acre and the 25-year storm event discharge to 0.4 cfs/acre. A partial duration analysis was conducted on the MGS Flood results in order to find peak flow for more frequent return intervals. The relationship between the undetained-detained flows was then evaluated to estimate the reduction in the 99.5th and 99.9th percentile flows that will result due to detention. These values for the Dexter TDA are listed in Exhibit 5-2.

Exhibit 5-2. Dexter TDA Peak Standard Flow Adjustments

HI-RUN Output 99.5 th Percentile Flow (cfs)	Post-detention Adjusted 99.5 th Percentile Flow (cfs)	HI-RUN Output 99.9 th Percentile Flow (cfs)	Post-detention Adjusted 99.9 th Percentile Flow (cfs)
1.39	0.98	2.86	1.71

Because the effects of detention on flow rates were accounted for using MGS Flood and partial duration analysis, the option to “apply detention” within HI-RUN was not utilized for any project conditions.

Results in cubic feet per second are shown in Exhibit 5-3. Flow rates were converted from cubic feet per second to cubic meters per second for CORMIX input.

Exhibit 5-3. Flow Rate Inputs to CORMIX

TDA	Existing/Proposed	Percentile Flow (cfs)		
		50 th	99.5 th	99.9 th
Royal Brougham North	Existing	0.02	0.77	1.61
	Proposed	0.01	0.44	0.89
Royal Brougham South	Existing	0.00	0.08	0.18
	Proposed	0.00	0.03	0.07
Royal Brougham (Combined North and South)	Existing	0.02	0.85	1.80
	Proposed	0.01	0.47	0.96
King	Existing	0.03	1.09	2.29
	Proposed	0.02	0.63	1.29
Dexter	Existing	0.05	1.74	3.65
	Proposed	0.04	0.98 ²	1.71 ²
Broad	Existing	0.01	0.44	0.93
	Proposed	0.02	0.55	1.12

5.2.2 Pollutant Concentrations

CORMIX requires effluent pollutant concentrations to be presented in terms of concentration above the ambient receiving water concentration.

The ambient DCu and DZn concentrations for Elliott Bay were found to be 0.7 and 4.1 ug/L, respectively. These values were calculated using salinity-dissolved metal linear relation equations provided in Curl et al. (1988) Figures II.31 and II.33. A salinity value of 27.1 parts per thousand was used. See Attachment D for calculations. The ambient DCu and DZn concentrations for Lake Union were listed as 2.0 and 1.8 ug/L, respectively, in the 2009 WSDOE Puget Sound Boatyards publication.

To calculate effluent concentration over background, receiving water ambient pollutant concentrations were subtracted from the project area effluent pollutant concentrations for DCu and DZn shown in Exhibit 3-3. For the Royal Brougham outfall, an area-based weighted average of the North and South TDA concentrations was calculated. The results of this exercise are shown in Exhibit 5-4.

Exhibit 5-4. Effluent Pollutant Concentration Inputs to CORMIX

TDA	Existing/ Proposed	Effluent Concentration (µg/L)		Ambient Concentration (µg/L)		Effluent Concentration Above Ambient (µg/L)	
		DCu	DZn	DCu	DZn	DCu	DZn
Royal Brougham North	Existing	4.0	27.0	0.7	4.1	3.3	22.9
	Proposed	4.0	27.0	0.7	4.1	3.3	22.9
Royal Brougham South	Existing	3.0	16.0	0.7	4.1	2.3	11.9
	Proposed	3.0	16.0	0.7	4.1	2.3	11.9
Royal Brougham Weighted	Existing	4.0	27.0	0.7	4.1	3.3	22.9
	Proposed	3.9	26.2	0.7	4.1	3.2	22.1
King	Existing	4.0	27.0	0.7	4.1	3.3	22.9
	Proposed	4.0	27.0	0.7	4.1	3.3	22.9
Dexter	Existing	4.0	27.0	0.7	4.1	3.3	22.9
	Proposed	4.0	27.0	0.7	4.1	3.3	22.9
Broad	Existing	4.0	27.0	2.0	1.8	2.0	25.2
	Proposed	3.0	16.0	2.0	1.8	1.0	14.2

5.3 Receiving Water Ambient Conditions

CORMIX requires input data for the receiving water ambient conditions, including density as calculated based upon temperature and salinity, current state (steady or non-steady) and velocity, stratification (if applicable), and wind velocity. Multiple sources of data were sought to determine the values for input parameters for the CORMIX model. Chosen values are conservative but representative of the normal range of year-round conditions. Effects of the selected values for various parameters on the overall dilution plume resultant dimensions were investigated as part of the sensitivity analyses described in Attachment A.

Manning's n is a required input for CORMIX for modeling bottom roughness effect on dilution plumes. A Manning's n value of 0.025 was selected to represent typical drop offs at outfall locations and open water plume conditions for both Elliott Bay and Lake Union.

5.3.1 Temperature, Salinity, and Density

For Elliott Bay, the ambient temperature chosen was 10.5 degrees Celsius, as given in Table II.3 from Curl et al. (1988): the mean annual temperature at a 1-meter depth as measured by an instrument moored in Elliott Bay during 1985-

86. Temperature data from Ebbesmeyer et al. (1998) showed an average annual temperature around 10 degrees Celsius at a depth of 150 meters.

Elliott Bay salinity was 27.1 parts per thousand, also according to Table II.3 from Curl et al. (1988). Any variations in Elliott Bay salinity due to stratification will be discussed in Section 5.3.2. CORMIX found the ambient Elliott Bay receiving saltwater density based upon temperature and salinity; the calculated density was 1020.71 kg/m³.

For Lake Union, the representative ambient temperature selected was 11.5 degrees Celsius, as determined from several annual temperature graphics in the 2007 Major Lakes Continuous Temperatures Study by King County. These annual temperature cycles range from late summer high temperatures of approximately 22 degrees C to winter lows of about 8 degrees C. This range of temperatures was later considered as part of the sensitivity analyses in Section A.1.

Although the northern portions of Lake Union can exhibit a deep saltwater intrusion wedge originating at the Ballard locks, no significant salinity would be expected at the project's shallow Lake Union outfall at the extreme southern end of the lake. CORMIX calculated an ambient density of 999.55 kg/m³ for Lake Union based upon the lake temperature.

5.3.2 Stratification

CORMIX can model for homogeneously-dense (unstratified) water bodies or for various density profiles of stratified water bodies. For stratified bodies, a typical density profile must be selected, and critical depths and densities entered as input.

Curl et al. (1988) and Ebbesmeyer et al. (1998) discuss the presence of an Elliott Bay pycnocline (defined as a strong, vertical density gradient) boundary generally between 1 to 8 meters deep along the Seattle waterfront consisting of a thin layer of brackish freshwater originating at the Duwamish River estuary on top of higher-density, saltier water. Due to its relative thinness and transitory nature, this layer was considered relatively insignificant and the receiving body was modeled as unstratified. However, various stratifications were modeled as part of the sensitivity analyses in Section A.3.

As previously mentioned, the outfall location for Lake Union is significantly removed from the typical extents of the deep saltwater intrusions from the Ballard locks, and was modeled as unstratified.

5.3.3 Currents

CORMIX has the ability to model for either steady-state currents (which typically flow in one direction at one velocity) or unsteady currents, typically represented

by tidal currents which can vary significantly in velocity and direction over short periods of time.

Elliott Bay currents were described by Curl et al. (1988) as consisting of a steady flow at 4 m depth to the west-northwest at 0.03 m/s, with a low-frequency surface flow up to 0.30 m/s. Ebbesmeyer et al. (1998) describe a generally northward-moving current along the Seattle waterfront with velocities around the magnitude of 0.03 m/s. After researching the effects of various steady-state and unsteady currents at various velocities, it was determined that using a steady-state current of 0.03 m/s produced the most conservative, applicable results.

The Lake Union flushing rate was described in the 2009 WSDOE Puget Sound Boatyards publication as being one week (WSDOE 2009). The Lake Union project outfall is located in the extreme southwest corner of the lake and far removed from any of the major currents flowing through the northern part of the lake. A slow current based upon the flushing rate can be calculated at 0.004 m/s moving northward from the outfall site.

See Section A.2 for sensitivity analysis of currents.

5.3.4 Wind

CORMIX models wind speed for surface mixing conditions, but does not consider direction. The Northeast Regional Climate Center lists Seattle's average annual wind speed as 8.9 mph (4.0 m/s) with winter months having an average wind speed of 9.6 mph (4.2 m/s). Curl et al. (1988) describe the highest sustained wind speeds at Sea-Tac during a 1985 study as averaging 6.1 m/s and ranging from 4.5 to 8.0 m/s. The CORMIX User's Guide recommends using 4.5 m/s as a typical conservative value, so that value was used. Other wind speeds were modeled for the sensitivity analysis (Section A.4).

5.4 Discharge Configurations at Outfall

CORMIX requires information regarding the outfall size, depth, orientation, distance from shore, etc., to be included in the model. Physical configuration information for the various project outfalls was obtained from the City of Seattle's Public Utilities Records Vault. See Exhibit 5-5 for a graphical presentation of various outfall dimensions. Specific configuration information for each outfall is presented in Exhibit 5-6.

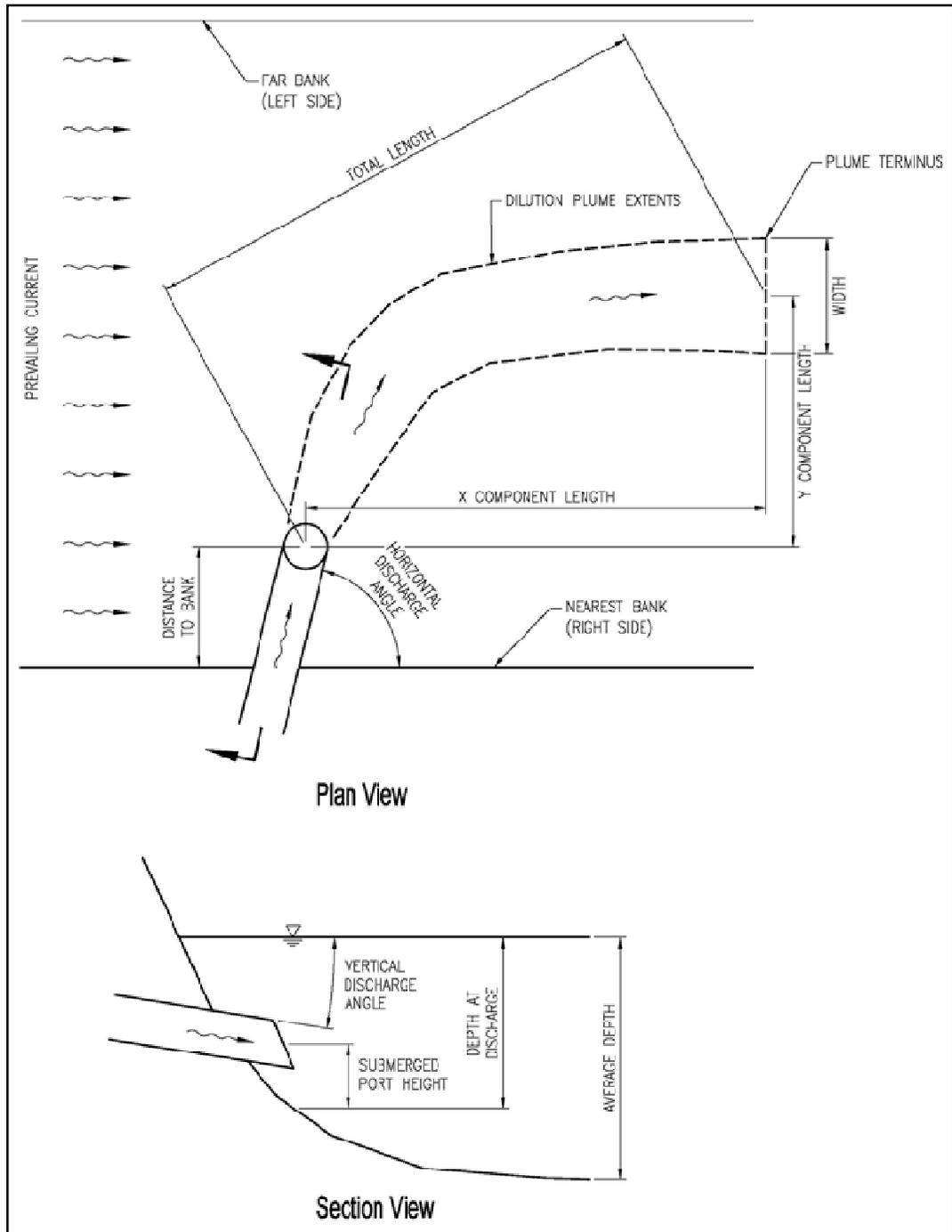


Exhibit 5-5. Outfall Dimensions

Exhibit 5-6. Discharge Configurations at Outfalls

Outfall	Royal Brougham	King	Denny	Broad
Depth at Discharge (m)	2.5	5.2	4.9	1.0
Average Depth (m) ¹	3.2	6.7	6.3	1.3
Nearest Bank ⁴	Right	Right	Right	Left
Distance to Bank (m)	150	7.6	52	4
Port Diameter, Actual (inches)	Dual 51.5	48	120	30
Port Diameter, "Virtual" ² (inches)	12	12	18	12
Vertical Discharge Angle (Degrees) ⁶	0	0	0	0
Horizontal Discharge Angle (Degrees) ⁶	90	90	90	270
Submerged Port Height (m) ³	0	0	0	0

1. CORMIX will not allow an average depth more than 30 percent deeper than the depth at discharge. The average depths used in the model represent this limitation; actual average depths of the receiving water bodies are much deeper.
2. "Virtual" port diameter represents an approximation based upon the pipe-within-a-pipe assumption so that pipe capacity and because velocity for the model will have sufficient velocities to minimize receiving water intrusion, since CORMIX models for upstream intrusions and in-pipe mixing. Virtual port diameters have been checked to ensure that there are no constriction effects.
3. Submerged port height is the height of the outfall invert above the receiving body bottom.
4. Nearest bank typically represents the bank from which the outfall pipe originates, and directionality is determined by handedness of the bank relative to an observer facing directly downstream of the prevailing current.
5. Vertical discharge angle is the angle of the outfall pipe above horizontal. Zero degrees means the outfall pipe is flat.
6. Horizontal discharge angle is the plan angle of the outfall pipe relative to the prevailing current. Zero degrees means the outfall discharge vector is parallel to the prevailing current. Ninety degrees means that the outfall pipe is perpendicular to the prevailing current, which moves left to right relative to the pipe alignment. Two-hundred-seventy degrees means that the outfall pipe is perpendicular to the prevailing current, which moves right to left relative to the pipe alignment.

Both Elliott Bay and Lake Union are sufficiently large water bodies to be considered "unbounded," so that for CORMIX the opposite bank distance did not need to be considered.

5.5 Dilution Plume Dimensions

CORMIX dilution plume models were created for all four project outfalls, King, Royal Brougham, Dexter, and Lake Union for dissolved copper and dissolved zinc runoff pollutant concentrations, pre- and post-project conditions, and 50th, 99.5th, and 99.9th percentile flows.

Fiftieth percentile flow results for Dexter/Denny and King outfalls were discarded, because the rainfall amount seems to be below a typical CSO-

triggering threshold. Fiftieth percentile flows originating from Royal Brougham South only (from the diversion structure) were considered for the Royal Brougham outfall. As a separated storm system, the Lake Union outfall was modeled for the 50th percentile flow.

Dilution plume extents are defined as the distance from the outfall to the location at which the plume concentration is diluted to within the threshold amount above the background concentration. This criterion can be found within in the WSDOT BA Writers Guidance (WSDOT 2008) where it is referred to as the “adverse sub-lethal effect threshold.” For DCu this threshold amount is 2.0 ug/L over background levels of 3.0 ug/L or less, while for DZn it is 5.6 ug/L over background concentrations between 3.0 ug/L and 13.0 ug/L. CORMIX output data includes a three-dimensional description of plume length, as well as the plume width at its terminus. Due to variations in outfall depths, plume results are presented as length (in plan view), as well as the plume width.

DCu modeling for the Lake Union outfall would yield no measurable plume, because the effluent concentration was below the behavioral threshold.

Results are presented in the following tables and figures, by outfall.

5.5.1 Royal Brougham

Post-project plumes are shorter for all Royal Brougham conditions, as would be expected by reductions in PGIS area.

Exhibit 5-7. Royal Brougham Dilution Plume Dimensions

Percentile Flow	Metal	Pre-Project		Post-Project	
		Length (feet)	Width (feet)	Length (feet)	Width (feet)
50 th	DCu	0.5	1.4	0.2	0.6
	DZn	1.0	2.2	0.7	1.6
99.5 th	DCu	7.4	2.8	5.9	2.6
	DZn	17.5	6.0	15.3	5.1
99.9 th	DCu	7.9	2.8	7.5	2.8
	DZn	23.2	6.7	18.5	6.2

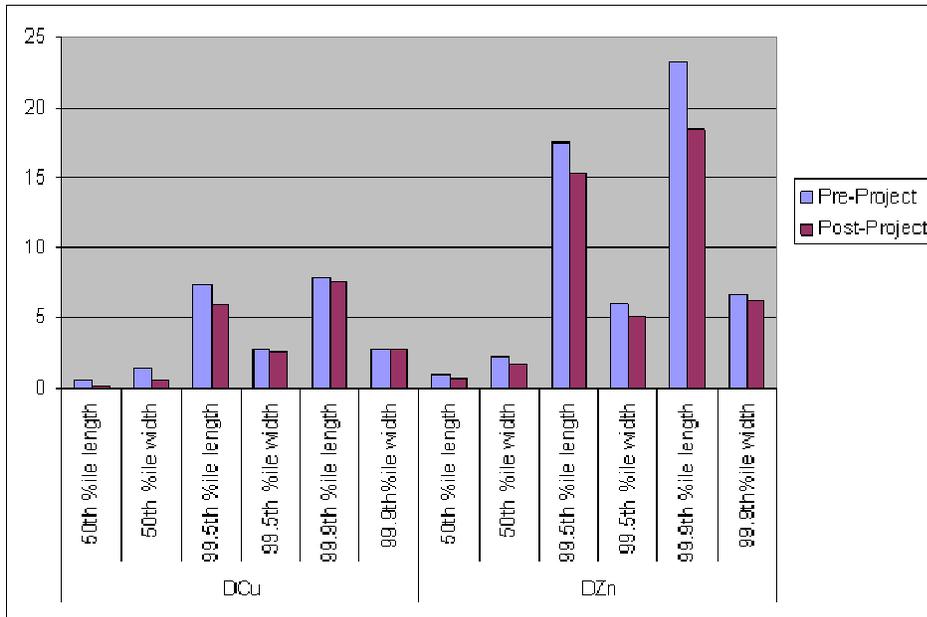


Exhibit 5-8. Royal Brougham Outfall Plumes (distance in feet)

5.5.2 King

Post-project plumes are shorter for all King conditions, as would be expected by reductions in PGIS area.

Exhibit 5-9. King Dilution Plume Dimensions

Percentile Flow	Metal	Pre-Project		Post-Project	
		Length (feet)	Width (feet)	Length (feet)	Width (feet)
99.5 th	DCu	5.9	1.3	3.8	1.0
	DZn	6.7	2.2	4.3	1.8
99.9 th	DCu	10.4	1.8	6.7	1.4
	DZn	12.5	3.0	7.8	2.4

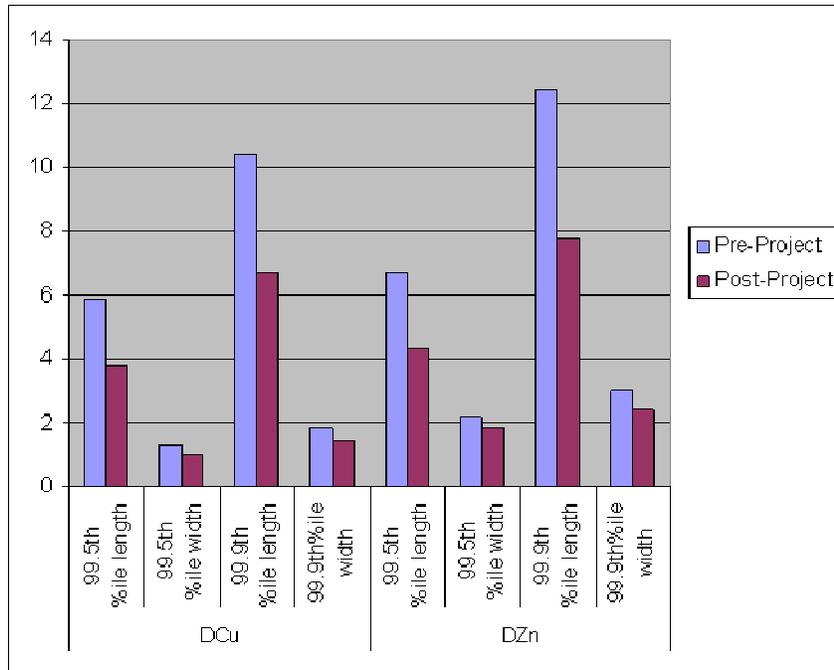


Exhibit 5-10. King Outfall Plumes (distance in feet)

5.5.3 Dexter

Post-project plumes are shorter for the Dexter TDA, as could be expected by reductions in effluent flows due to the addition of detention.

Exhibit 5-11. Dexter Dilution Plume Dimensions

Percentile Flow	Metal	Pre-Project		Post-Project	
		Length (feet)	Width (feet)	Length (feet)	Width (feet)
99.5 th	DCu	5.8	1.6	3.9	1.2
	DZn	6.4	2.7	4.4	2.1
99.9 th	DCu	10.2	2.2	5.7	1.6
	DZn	11.8	3.6	6.3	2.6

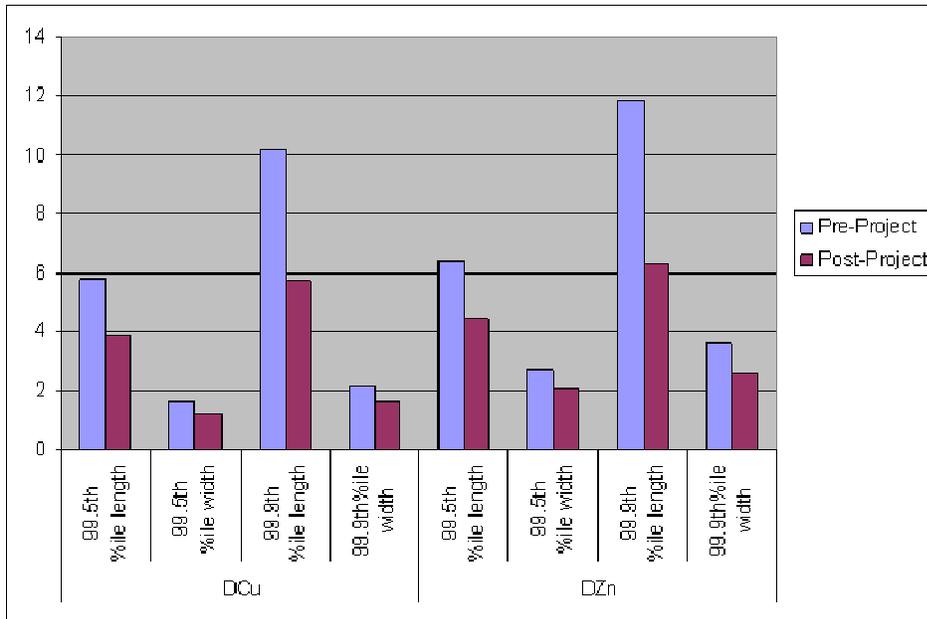


Exhibit 5-12. Dexter TDA Dilution Plume Dimensions (distance in feet)

5.5.4 Broad

Post-project plume lengths are shorter for DZn 50th and 99.5th percentile conditions. Post-project plume lengths approximately match existing for DZn 99.9th percentile conditions. This is to be expected as water quality treatment is being bypassed at these flows.

Exhibit 5-13. Broad Dilution Plume Dimensions

Percentile Flow	Metal	Pre-Project		Post-Project	
		Length (feet)	Width (feet)	Length (feet)	Width (feet)
50 th	DCu	n/a	n/a	n/a	n/a
	DZn	6.67	13.12	4.15	2.69
99.5 th	DCu	n/a	n/a	n/a	n/a
	DZn	27.80	5.38	14.81	4.27
99.9 th	DCu	n/a	n/a	n/a	n/a
	DZn	28.36	5.64	28.42	5.64

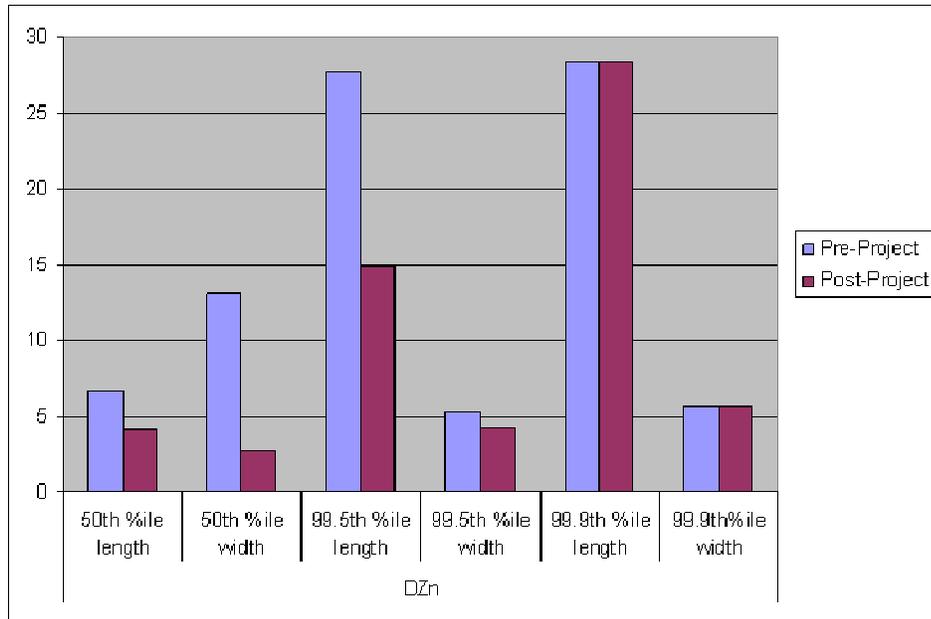


Exhibit 5-14. Broad TDA Outfall Plumes (distance in feet)

5.6 Discussion

The results for the dilution zone analyses were similar to those for the pollutant loading and concentration analyses (Section 3), with the addition of one more variable: detention. Pre- and post-project changes in dilution plume dimensions could be expected to be solely dependent upon: (1) changes in PGIS areas area; (2) the addition of localized water quality treatment; and/or (3) the addition of detention. The results supported this supposition.

All outfall conditions, with one exception, showed a reduction in dilution plume dimensions from pre- to post-project conditions, for both pollutants and for all applicable flow conditions.

The exception was at the Broad outfall for DZn only. For 99.9th percentile flows, post-project DZn plumes are approximately equal to pre-project plumes due to the assumption that water quality treatment is bypassed by high flows. Plume dimension reductions for lower flow conditions at the Broad outfall are attributable to the proposed water quality treatment system.

Dexter saw reductions in post-project plume dimensions due to the reduction of effluent flows resultant from the addition of detention.

Plume dimension reductions at the King and Royal Brougham outfalls are largely attributable to post-project reductions in PGIS areas.

The plume dimensions for all conditions were relatively small, ranging from a few inches to no more than 30 feet in length; width never exceeded length, with a single exception for Broad 50th percentile pre-project flows. Because the plumes

were generally short, there was no need to consider overlapping plume areas between King and Royal Brougham outfalls, which are separated by several hundred feet.

Chapter 6 CONCLUSIONS

The results for the pollutant loading and concentration analyses and dilution zone analyses were similar: pre- and post-project changes in pollutant loads and concentrations and dilution plume dimensions were dependent upon changes in proportions of PGIS area and the addition of localized water quality treatment. The addition of detention was also found to be a factor in the reduction of plume dimensions.

Generally, project TDA and outfall conditions showed reductions in pollutant loads, pollutant concentrations, and dilution plume dimensions from pre- to post-project conditions. However, for the Broad TDA 99.9th percentile flows, the dilution plume did not exhibit a reduction. This is due to the assumption that 99.9th percentile flows will exceed the capacity of the water quality system, effectively bypassing treatment. However, for pollutant loading and concentration, the Broad TDA exhibited clear reductions from pre- to post-project conditions. The addition of water quality treatment mitigated the increase in PGIS areas for 50th and 99.5th percentile flows.

Chapter 7 REFERENCES

- CH2M Hill. 2010. Alaskan Way Viaduct Replacement Project: Final Conceptual Hydraulic Report. March 2010.
- CORMIX User Manual: A Hydrodynamic Mixing Zone Model and Decision Support System for Pollutant Discharges into Surface Waters (Doneker, Robert L. and Jirka, Gerhard H.). United States Environmental Protection Agency.
- Curl, Jr., H.C., E.T. Baker, T.S. Bates, G.A. Cannon, R.A. Feely, T.L. Geiselman, M.F. Lamb, P.P. Murphy, D.J. Pashinski, A.J. Paulson, and D.A. Tennant. 1988. Contaminant transport from Elliott Bay and Commencement Bay. National Oceanic and Atmospheric Administration (NOAA).
- Des Moines Creek Rain Gauge daily precipitation data for October 1, 1991-October 14, 2009.
- Ebbesmeyer, C. C., C. A. Coomes, J. M. Cox, T. J. Crone, K. A. Kurrus, E. C. Noah, R. Shuman. 1998. Current structure in Elliott Bay, Washington: 1977-1996, Puget Sound Research '98 Proceedings, Washington State Convention and Trade Center, Seattle, Washington, 12-13 March.
- Huber, Karen. CSO Control Program, King County Department of Natural Resources and Parks, Wastewater Treatment Division. December 1, 2009 email communication containing "CSO_Basins_KC_viaduct.shx" and other associated files (CSO basin boundaries in GIS); December 7, 2009 email communication containing "Data for WSDOT 12-09.xls" (CSO event data).
- King County Department of Natural Resources and Parks, Water and Land Resources Division, Science Section (DeGasperi, Curtis). Major Lakes Continuous Temperature Study: Interim Progress Report. February 2007.
- King County Department of Natural Resources and Parks, Wastewater Treatment Division. King County Combined Sewer Overflow Control Program 2008 Annual Report. July 2009.
- King County Department of Natural Resources and Parks, Water and Land Resources Division. <http://green.kingcounty.gov/lakes/LakeUnion.aspx>. Major Lakes Monitoring, Lake Union information. (Accessed March 29, 2010).
- Northeast Regional Climate Center. Average wind speeds for US cities. <http://www.nrcc.cornell.edu/ccd/wndspd.html>. (Accessed March 29, 2010).

- Parametrix. 2008. Technical memorandum: Dilution Study Results SR99: S. Holgate Street to S. King Street. To Phil Block, WSDOT, and Angela Freudenstein, WSDOT. April 7, 2008.
- Parsons Brinckerhoff. 2009. SR 99 Bored Tunnel Alternative – Endangered Species Act Stormwater Design Checklist (October 2008). File dated October 14, 2009.
- Seattle Public Utilities Record Vault. Miscellaneous historical drawings and side sewer cards for combined sewer outfalls: King outfall, file numbers 3189-14, 859-64-1, 859-64-2, and 5340-A39; Connecticut (Royal Brougham) outfall, file numbers 36-42-1 and 3189-21; Denny outfall, side sewer card 3189-11C and record drawing C3107 from 2003 Denny Way/Lake Union CSO Project Marine Outfalls; Dexter (assumed as similar to Lake Union) outfall, file numbers 782-13-16, 782-13-17, and 4234.
- WSDOE (Art Johnson, Randy Coots, and Casey Deligeannis). 2009. Puget Sound Boatyards: Zinc, Copper, Lead, and Hardness Concentrations in Receiving Waters. October 2009. Publication No. 09-03-051.
- WSDOT. 2010. Biological Assessment Preparation for Transportation Projects-Advanced Training Manual.
- WSDOT. 2008. Appendix B – Stormwater Analysis from Biological Assessment for SR99: S Holgate Street to S King Street.

ATTACHMENT A

Sensitivity Analyses

SENSITIVITY ANALYSES

Sensitivity analyses were conducted to test the effects of various CORMIX input values upon the results. The King outfall (in Elliott Bay) was chosen as a suitable representation of the project outfalls for the sensitivity tests. For the parameters that were tested, various scenarios were created to investigate reasonable extreme conditions that might be encountered within the receiving bodies. The effects of these scenarios were then qualitatively compared to the results of the original models.

Temperature

Three temperature effluent-ambient scenarios were investigated: (1) warmer effluent and ambient temperatures that could occur in summertime ($T_E > T_A$, $T_E = 24^\circ\text{C}$, $T_A = 18^\circ\text{C}$); (2) colder effluent and ambient temperatures that could occur during winter snowmelt conditions ($T_E < T_A$, $T_E = 4^\circ\text{C}$, $T_A = 8^\circ\text{C}$); and (3) equivalent effluent and ambient temperatures ($T_E = T_A = 10.5^\circ\text{C}$).

Results showed very little sensitivity in the plume dimensions due to temperature changes alone. Scenario 1 showed very slight decreases in plume dimensions, while the other two scenarios had negligible differences.

Currents

Both steady-state and unsteady (tidal) currents were tested for the sensitivity analyses.

Alternative steady-state currents investigated represented hypothetical maximum (1.0 m/s) and minimum (0.01 m/s) currents that might be encountered at the Elliott Bay outfall locations.

Resultant plumes for the maximum steady-state current condition were much smaller than the original run, while the minimum steady-state current condition dimensions were nearly identical to the original run.

For unsteady currents, four scenarios were analyzed for sensitivity: (1) Maximum current speeds (tidal velocity, $U_{aMAX} = 1.5$ m/s; instantaneous ambient velocity, $U_A = 0.3$ m/s) at $T_{sim} = -3$ hrs; (2) maximum current speeds at $T_{sim} = +3$ hrs; (3) maximum current speeds at $T_{sim} = 0$ hrs; and (4) minimum current velocities ($U_{aMAX} = 0.1$ m/s; $U_A = 0.01$ m/s) at $T_{sim} = -3$ hrs.

Resultant plume dimensions for various tidal scenarios could be generalized as follows: all maximum current scenarios, regardless of the T_{sim} value, resulted in shorter plume conditions than the original inputs; the minimum current scenario results closely matched the original results.

Stratification

Two pycnocline conditions were analyzed to compare to the unstratified input for the original model. Pycnocline 1 modeled a 0.5-meter-deep freshwater layer at the surface; Pycnocline 2 modeled a 2.0-meter-deep freshwater layer at the surface. Resultant plume dimensions for both pycnocline conditions were virtually identical to the original, unstratified results.

Wind

Wind speeds of 0 m/s and 6.5 m/s were tested for effects on plume dimensions. Results were identical to each other as well as to the original results.

Flows

In order to determine a relationship between the HI-RUN-produced flow rate percentiles and precipitation-based flow rate percentiles, hydrologic models created during a preliminary phase of this analysis were consulted.

For hydrologic modeling, StormSHED Release 6.1.6.8 was used. Inputs consisted of the following:

- Impervious area as provided by project design team (CN=98).

- Time of concentration was determined to be 0.24 hour for the King TDA, using assumed maximum drainage path lengths and associated slopes based upon figures provided by project design team, SPU GIS files, and approximate elevations from Google Earth.

- Three precipitation amounts were used: the 50th, 95th and 99th percentile precipitation events. Rainfall amounts used (and their associated return frequencies) were taken from previous work funded by WSDOT (Parametrix 2008). They were later independently verified for this project using an 18-year continuous record from the Des Moines Creek Rain Gauge from October 1991 to October 2009. Precipitation event percentiles for both the values used and the verified values are shown in Table A-1.

Table A-1. Precipitation Event Percentiles

Precipitation event	Values used (previously determined)		Independently verified values	
	Depth (inches)	Return frequency (days)	Depth (inches)	Return frequency (days)
50 th percentile	0.14	5	0.14	5
95 th percentile	0.83	48	0.85	46
99 th percentile	1.45	232	1.49	235

StormSHED model output consisted of peak runoff flow rates, pre- and post-project, for 50th, 95th, and 99th percentile precipitation events.

Comparisons of the results revealed a rough correlation between StormSHED 50th, 95th, and 99th percentile precipitation-associated flows and HI-RUN 50th, 99.5th, and 99.9th percentile exported flows, respectively. It should be noted that selected HI-RUN percentile flows are not directly correlated with any of the return frequencies shown in Table A-1.

CSO Frequency, Volume, and Precipitation Relation

It is important to consider the conditions leading to discharges at each project-related outfall. As mentioned earlier, the Lake Union storm drain outfall will discharge all flows from the Broad TDA. The Connecticut regulator will route low flows from the Royal Brougham South TDA to the combined sewer system, while the remaining majority of annual storm flows will discharge to Elliott Bay via the Royal Brougham outfall.

All of the other project TDAs, which constitute at least 85 percent of the total project area, are connected to the combined sewer system and will discharge directly to Elliott Bay only during CSO events (percentages of pollutant loads discharging as CSO events are discussed in Section 3.5).

As part of the dilution analysis, CSO frequency, volume, and relationship to rainfall depths were investigated. From this, the effluent flow rates can be estimated for a CSO event of a particular recurrence interval. Only the most recent CSO data reflecting current conditions of the system was used. CSO data considered for this analysis ranged from January 2002 to December 2008 for the King outfall, May 2005 to December 2008 for the Denny outfall, and December 2004 to May 2005 and December 2006 to December 2008 for the Royal Brougham outfall. Table A-2 shows average monthly CSO volume and frequency for the date range listed above for each outfall.

It should be noted that a "CSO event" was counted as any day with a measured CSO discharge volume. A 24-hour storm spread out over 2 days by some definitions would be considered a single precipitation event, but would have been counted as multiple CSO events in Table A-2.

CSO frequencies and volumes are highest from November to March, which correlates with the wettest months. CSO events occur at lower frequencies and volumes from April to October. CSO frequencies and volumes were also relatively low at the Denny outfall, high at the King outfall, while the Royal Brougham outfall exhibited low frequencies but high volumes.

Table A-2. CSO Average Monthly Frequency and Volume

Month	Dexter		King		Royal Brougham	
	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)
January	1.00	0.06	5.14	6.76	1.67	6.43
February	0.33	0.01	1.14	0.90	0.33	0.91
March	0.00	0.00	1.57	1.59	0.67	1.97
April	0.00	0.00	0.86	0.29	0.67	0.10
May	0.00	0.00	1.43	0.42	0.33	0.03
June	0.00	0.00	0.29	0.03	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00
August	0.00	0.00	0.43	0.79	0.00	0.00
September	0.00	0.00	0.43	0.05	0.00	0.00
October	0.25	0.00	1.14	1.96	0.00	0.00
November	0.00	0.00	3.86	3.94	0.50	0.11
December	1.00	2.45	2.86	4.59	2.75	11.62
Total	2.58	2.51	19.14	21.34	6.92	21.18

The above data records for CSO events at the three outfalls were correlated with daily precipitation data from the Des Moines Creek rain gauge. CSO events occurring on a day immediately after another CSO event were dropped, in order to isolate precipitation amounts correlated with the “onset” of a CSO event. Of the 99 CSO-onset rainfall events associated with the three outfalls, all but three were related to a daily precipitation amount of 0.2 inch or greater. The median CSO-onset rainfall event was approximately 0.7 inch.

There is a general data trend of larger daily rainfall amounts being correlated with larger CSO volumes, but there are many exceptions. This could be due to the complexities of the combined sewer system itself, or due to the limitations of looking at only daily precipitation amounts. For instance, a short-duration but very intense rainfall event during an otherwise dry day may be more likely to trigger a large CSO event than a moderate amount of rain falling all day long.

Nonetheless, when comparing CSO frequencies to the precipitation record percentiles, it is reasonable to assume that the 50th percentile rainfall amount, 0.14 inch, would not normally be expected to trigger a CSO event at any of the project outfalls. The 95th percentile rainfall amount, 0.83 inch, could be correlated as a possible CSO event onset. The 99th percentile rainfall amount, 1.45 inches, could generally be associated with a likely CSO event. See the section under “Flows”, above, for further correlations between precipitation percentiles and HI-RUN output flow percentiles.

Discussion

The sensitivity analyses provided verification for model inputs used and valuable insight on how various parameters could be expected to affect output plume dimensions. Effluent-ambient temperature relationships (and, by extension, density relationships), wind conditions, stratification conditions, and modeling steady vs. unsteady currents do not appear to have any kind of major effect on the overall plume dimensions, or on the pre- and post-project plume relationships. It is possible this trend exists only because the plume dimensions for this project are relatively small; larger plumes (along the magnitude of tens or hundreds of meters) might be affected more by these parameters.

Plume dimensions for the project do appear to be significantly affected by ambient current velocity. Plume lengths increase for lower ambient current velocities, but there appears to be a threshold value of lower current speed, somewhere around 0.03 m/s, a value below which plume dimensions do not increase any more. So it is conservative, but reasonable, to perform dilution modeling for a minimum ambient current velocity like the value used for this study, 0.03 m/s.

ATTACHMENT B

Elliott Bay Background Concentrations

Elliott Bay Background metal concentrations

Ambient dissolved metal-salinity equations

Salinity: 27.1

	<u>Equation</u>	Value		
DCu:	$3540 - 105 * \text{salinity} =$	694.5	ng/L =	0.000695 mg/L
DZn:	$29500 - 936 * \text{salinity} =$	4134.4	ng/L =	0.004134 mg/L

Equations from 1988 Curl et al.

APPENDIX C

Exemption Letter from the City of Seattle



City of Seattle

Gregory J. Nickels, Mayor

Seattle Public Utilities

Ray Hoffman, Acting Director

July 2, 2009

Mark W. Anderson, P.E., Project Engineer
Washington State Department of Transportation
Alaskan Way Viaduct
MS: NB82-230
999 3rd Avenue
Seattle, Washington 98104

Subject: Request for Stormwater Code Exception, South Holgate Street to South King
Street Viaduct Replacement Project Request for Stormwater Code Exception

Dear Mr. Anderson:

Seattle Public Utilities (SPU) has reviewed your exception request dated May 28, 2009. The proposed project involves the construction of new impervious surface and the replacement of existing impervious surface which triggers the requirements of the Stormwater, Grading & Drainage Control Code (SMC 22.800 – 22.808) for detention prior to discharging to the combined sewer system.

Your request for an Equally Protective Exception (SMC 22.808.010{B}) to the flow control requirement is based on hydraulic flow modeling, which demonstrates that the construction of stormwater detention facilities will not reduce the frequency of combined sewer overflows (CSOs). Additionally, due to the timing of the peak flows between the larger tributary basin and the discharge from the detention vaults, the volume discharge of CSOs may actually increase.

Typically, redevelopment projects are required to "separate" stormwater from the combined sewer system by constructing a dedicated public storm drain and provide water quality treatment before discharging to receiving waters. Due to the impaired functions of Elliot Bay, this requirement will unacceptably raise the pollutant levels in the receiving water. This portion of the central waterfront is currently served by the combined sewer system, and this is where stormwater runoff from the existing viaduct structure is discharged. By maintaining the current flow regime and point of discharge, Elliot Bay water quality will not be adversely impacted.

SPU concurs that this project qualifies for an exception to the Stormwater, Grading and Drainage Control Code. SPU grants an exception for this project.

July 2, 2009
Request for Stormwater Code Exception
Page 2 of 2

Please feel free to contact me at (206) 386-1832 if you have any questions or concerns.

Sincerely,



Trish Rhay
Director - Drainage and Wastewater Division

cc: Bruce Bacher, SPU
Joy Keniston-Longrie
Robert Chandler, SPU
Andrew Lee, SPU
Gavin Patterson, SPU
Rick Johnson, SPU
Cristofer Horbelt, SPU

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APPENDIX D

Construction Sequencing and Timeline

APPENDIX E

Biology of Listed Species

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Chapter 1 KILLER WHALE

1.1 Status

The Southern Resident Killer Whale (SRKW) distinct population segment (DPS) (*Orcinus orca*) was listed as endangered on November 18, 2005 (effective February 16, 2006) (70 FR 69903).

1.2 Critical Habitat

On November 29, 2006, the National Marine Fisheries Service (NMFS) designated critical habitat in Washington for SRKWs (71 FR 69054). Under this designation, SRKW critical habitat includes approximately 2,560 square miles (6,630 square km) of the inland waterways of Washington State. The area defined as critical habitat is within the geographical area occupied by the species and contains primary constituent elements (PCEs) required by killer whales. Eighteen military sites are excluded from the designation due to national security impacts.

The shallow waters of Puget Sound (waters less than 20 feet [6.1 meters] deep relative to extreme high water) are not considered to be within the geographical area occupied by the species. Because of their large size, killer whales may experience limited maneuverability in water less than 20 feet deep, and SRKWs are seldom observed in such conditions. However, due to a lack of information regarding SRKW usage of shallow habitat and the fact that transient and Northern Resident killer whales are both known to utilize shallow waters, NMFS has requested further information.

NMFS did not include coastal and offshore areas in the Pacific Ocean or waters inside Hood Canal as part of SRKW critical habitat. While coastal and offshore areas are a known part of the geographical area occupied by the species, there is not enough information regarding SRKW distribution, behavior, or habitat usage in those areas to determine PCEs. Therefore, while NMFS recognizes the importance of coastal or offshore areas, it did not designate them at this time. There is not sufficient evidence of SRKWs in Hood Canal to consider it within the geographical area occupied by the species.

NMFS has designated the following PCEs for the SRKW DPS critical habitat: 1) water quality to support growth and development; 2) prey species of sufficient quantity, quality and availability to support individual growth, reproduction, and development, as well as overall population growth; and 3) passage conditions to allow for migration, resting, and foraging. At this time, NMFS lacks sufficient information about the effects of sound disturbance on Killer Whale critical habitat in order to include it as a PCE (71 FR 69055). However, NMFS will continue to consider sound in any future revisions of the critical habitat designation.

1.3 Life History

Killer whales occurring in the eastern North Pacific region are classified by ecotypes as residents, transients, and offshore whales. Significant genetic differences occur among resident, transient, and offshore killer whales (Stevens et al. 1989; Hoelzel and Dover 1991; Hoelzel et al. 1998; Barrett-Lennard 2000; Barrett-Lennard and Ellis 2001; Carretta et al. 2003; Hoelzel et al. 2002). These three forms vary in morphology, ecology, and behavior.

Both resident and transient forms of killer whale occur in Puget Sound. The SRKW DPS is the group most commonly observed in Puget Sound. This group contains three pods (J, K, and L) and is considered a stock under the Marine Mammal Protection Act. Their range during the spring, summer, and fall includes the inland waterways of Puget Sound, Strait of Juan de Fuca, and Southern Georgia Strait. They occur in the coastal waters of Oregon, Washington, and Vancouver Island and recently have been identified as far from Puget Sound as the coast of central California to the south and the Queen Charlotte Islands to the north. Little is known about the winter movements and range of the southern resident stock. SRKWs have not been seen to associate with other resident whales. The SRKW population is genetically isolated and rarely interbreeds with other killer whale populations, based on mitochondrial and nuclear genetic data (Hoelzel et al. 1998; Barrett-Lennard 2000; Barrett-Lennard and Ellis 2001).

SRKWs spend substantial amounts of time in Puget Sound, travel in relatively large pods, and generally eat fish (Krahn et al. 2004). Most of the information available for SRKWs has been collected in Puget Sound during the summer months. Resident killer whales occur at various locations in central Puget Sound each summer, typically for a few days, but they may remain in the area for more than a month. They tend to remain outside Elliott Bay, or along its western edge, as they move through the central Puget Sound area. Commonly, they are only present in the Elliott Bay vicinity for 1 or 2 days several times each year.

SRKWs have apparently never been abundant; estimated numbers range from 100 to 200 before 1960. The number of whales was fewer than 70 when an annual census of the killer whale population began in 1976. The 2003 census counted 84 southern residents, including a solitary killer whale that has been living off Canada's Vancouver Island since 2001. The peak abundance in recent years occurred in 1996, when 97 whales were counted.

NMFS has identified the following activities that they believe could result in violation of Section 9 prohibitions against "take" of the southern resident killer whale DPS:

Coastal development (e.g., dredging, land clearing and grading, waste treatment) that may adversely affect southern resident killer whales.

Discharging or dumping toxic chemicals or other pollutants into areas used by southern resident killer whales.

Operating vessels in a manner that disrupts foraging, resting, or care for young or results in noise levels that disrupt foraging, communication, resting, or care for young.

Land/water use or fishing practices that result in reduced availability of prey species during periods when southern resident killer whales are present.

The factors limiting SRKW numbers have not been clearly defined by scientific investigations.

Southern resident killer whales differ from transient killer whales in that they rely exclusively on fish as a food source. Fish are the major dietary component of resident killer whales in the northeastern Pacific (Wiles 2004), with 22 species of fish and one species of squid (*Gonatopsis borealis*) known to be eaten (Ford et al. 1998, 2000; Saulitis et al. 2000). Observations from this region indicate that salmon are a preferred prey. Species such as rockfish (*Sebastes* spp.), Pacific halibut (*Hippoglossus stenolepis*), a number of flatfish, lingcod (*Ophiodon elongatus*), and greenling (*Hexagrammos* spp.) are likely consumed regularly by SRKWs (Ford et al. 1998).

Chapter 2 HUMPBACK WHALE

2.1 Status

Humpback whales (*Megaptera novaeangliae*) were listed as endangered in 1973 (NMFS 1991).

2.2 Critical Habitat

Critical habitat for humpback whales has not been designated or proposed at this time.

2.3 Life History

Humpback whales are a moderately large baleen whale found in all the world's oceans (Clapham and Mead 1999). They spend summer months feeding in productive high-latitude waters and migrate to low-latitude areas in the winter to mate and give birth. North Pacific populations declined severely in the twentieth century due to commercial whaling, which ceased in 1967 (Rice 1978, Clapham et al. 1997). The population is slowly recovering, but likely remains below the numbers that existed before whaling (Calambokidis and Barlow 2004). Current threats to the species include subsistence hunting, entrapment and entanglement in fishing gear, ship collisions, disturbance from shipping and boating, pollutants, gas and mineral exploration, habitat loss from coastal development, and competition with fisheries from prey species (NMFS 1991).

In Washington State, the species is found in coastal waters during its migration from winter grounds in Mexico to feeding grounds from California to Alaska (NMFS 1991). Humpbacks are rare visitors to Puget Sound, but observations have been increasing in recent years (Falcone et al. 2005).

Chapter 3 STELLAR SEA LION

3.1 Status

Steller sea lions (*Eumetopias jubatus*) were listed as threatened April 10, 1990, because of a dramatic decline in populations in the Gulf of Alaska and Aleutian Islands since the 1960s (55 FR 50006). On June 4, 1997, Steller sea lions west of 144° W longitude (near Cape Suckling, Alaska) were reclassified as endangered; the remainder of the population, including populations in Washington, remained threatened (62 FR 30772).

3.2 Critical Habitat

Critical habitat has been identified for Steller sea lions and is associated with breeding, haul-out, and foraging areas in Alaska, California, and Oregon (50 FR 22612). No critical habitat has been designated in Washington.

3.3 Life History

The Steller sea lion is the largest of 14 species in the eared seal family, Otariidae. Steller sea lions range along the North Pacific Rim from northern Japan to California (Loughlin et al. 1992), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands, respectively. The species is not known to migrate, but individual sea lions disperse widely outside of the breeding season (late May through early July).

Two separate stocks of Steller sea lions are recognized in U.S. waters—an eastern and a western stock—with an approximate separation at Cape Suckling, Alaska (144° W). Steller sea lions from the eastern stock use rookeries and haul-outs in the coastal waters of Southeast Alaska, British Columbia, Washington, Oregon, and California. There are no rookeries for this species in Washington. Common haul-outs near Puget Sound include Sucia Island, in the San Juan Islands, and Race Rock off Vancouver Island. Although haul-outs occur in a variety of areas, individual locations used are specific and change little from year to year (WDFW 1993a).

Steller sea lions occur year-round in Washington waters, but populations decline during the summer breeding season as sea lions return to rookeries in California, Oregon, British Columbia, and Southeast Alaska. Unlike the observed decline in the western U.S. stock, eastern stock abundance has remained relatively stable, with some increases in the northern portion of the species' range in Southeast Alaska and British Columbia (Hill and DeMaster 1999).

Steller sea lions feed in open water habitat in nearshore areas, out to the edge of the continental shelf (WDFW 1993a). Their diet consists of a variety of fish and

invertebrates, predominately demersal and off-bottom schooling fish (Jones 1981), and less frequently other pinnipeds such as harbor seals (Pitcher and Fay 1982). Stomach and scat analysis in British Columbia indicates that principal prey items include hake (*Merluccius productus*), herring (*Clupea* spp.), octopus (*Octopus* spp.), Pacific cod (*Gadus macrocephalus*), rockfish (*Sebastes* spp.), and salmon (Olesiuk et al. 1990).

Western U.S. stock declines have been correlated with increased commercial harvests of walleye pollock (*Theragra chalcogramma*) (Lowry et al. 1989). Reduced prey availability remains a concern for eastern U.S. stocks, although population declines have not been observed.

Chapter 4 CHINOOK SALMON

4.1 Status

The Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU) was listed as threatened on March 24, 1999 (64 FR 41836). This ESU includes all naturally spawned populations of Chinook salmon originating in rivers and streams flowing into Puget Sound. This includes the Strait of Juan de Fuca from the Elwha River eastward, as well as the rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington. Several hatchery stocks are considered part of the listed ESU.

4.2 Critical Habitat

Critical habitat for Puget Sound Chinook salmon was designated on September 2, 2005 (70 FR 52630). NMFS has defined six primary constituent elements (PCEs) for critical habitat designated for Chinook salmon:

- (1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development.
- (2) Freshwater rearing sites with (i) water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) water quality and forage supporting juvenile development; and (iii) natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- (3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.
- (4) Estuarine areas free of obstruction and excessive predation with (i) water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (ii) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (iii) juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
- (5) Nearshore marine areas free of obstruction and excessive predation with (i) water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and (ii) natural

cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.

- (6) Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

4.3 Life History

Adult Chinook salmon migrate into freshwater streams to spawn. Before spawning, Chinook may remain in larger downstream waters. Adult Chinook salmon pass through the estuary as they move up the river to their natal streams to spawn during the fall, with peak spawning occurring in September (summer stock) and October (fall stocks) (Behnke 2002; WDFW 1993b).

Chinook salmon require clean, cool water and clean gravel in which to spawn. Eggs are deposited and buried in gravel nests. Eggs then incubate in the gravel nest until hatching at 90 to 150 days, depending on water temperature. After hatching, fry rear in their natal streams for up to five months. Rearing occurs from February through June. The best rearing habitat is generally associated with pools and wetland areas where woody debris and overhanging vegetation can provide cover and protection. The young fish begin their migration to salt water in March through July, moving downstream through the estuary into Puget Sound and then to the Pacific Ocean. Peak migration occurs in June. The salmon then mature in marine waters until they reach an age between 2 and 6 years old, when they return to their natal streams to spawn. The average age of spawning Chinook is 4 years (Myers et al. 1998).

Puget Sound Chinook salmon exhibit a variety of life strategies. Juvenile Chinook salmon populations or individuals may spend days to months in estuarine areas before migrating to salt water. Estuarine wetlands provide rearing habitat that enhances the subsequent ocean survival of migrating juvenile salmon by providing foraging opportunities, optimal growth, and refuge from predation, and acclimation to salinity during the transition from fresh water to ocean habitat (Miller and Simenstad 1994).

Chapter 5 HOOD CANAL SUMMER-RUN ESU CHUM

5.1 Status

Hood Canal Summer-run chum (*Oncorhynchus keta*) ESU were listed as a federally threatened species on March 25, 1999 (64 FR 14508). That status was reaffirmed on June 28, 2005 (70 FR 37160).

5.2 Critical Habitat

Critical habitat for Hood Canal Summer-run ESU chum was designated on September 2, 2005 (70 FR 52630). The PCEs for chum critical habitat are the same as those for Chinook salmon, above.

5.3 Life History

Chum salmon are anadromous and semelparous, migrating from coastal waters many miles upstream to where they were spawned to reproduce. Members of the Salmonidae family, chum (the second largest of any salmon), are found in the North Pacific Ocean and associated streams. Suitable in-stream habitat for both juveniles and adults consists of large woody debris, undercut banks, pools, slides, and runs. These attributes are necessary for protection against predators and floods, as well as spawning grounds. Summer chum spawning occurs from late August through late October, generally within the lowest one to two miles of the streams. Depending upon temperature regimes in spawning streams, eggs and alevins develop in the redds for approximately 18 to 20 weeks before emerging as fry between February and the last week of May. Summer chum fry emerge from stream gravels and immediately begin migrating downstream to estuarine areas, with total brood year migration from freshwater ending within roughly 30 days for smaller streams and rivers.

In Puget Sound, chum fry have been observed through annual estuarine area fry surveys to reside for their first few weeks in the top 2 to 3 centimeters of surface waters and extremely close to the shoreline. Chum fry maintain a nearshore distribution until they reach a size of about 45 to 50 millimeters, at which time they move to deeper off-shore areas.

Summer chum entering the estuary are thought to commence immediate migration seaward. After 2 to 4 years of rearing in the northeast Pacific Ocean, maturing Puget Sound-origin chum salmon follow a southerly migration path parallel to the coastlines of southeast Alaska and British Columbia. Summer chum mature primarily at 3 and 4 years of age with low numbers returning at age 5 (Quinn 2005).

Chapter 6 PUGET SOUND DPS STEELHEAD

6.1 Status

The Puget Sound DPS of steelhead trout (*Oncorhynchus mykiss*) was listed as threatened under the Endangered Species Act (ESA) on May 11, 2007, by NMFS (72 FR 26722).

6.2 Critical Habitat

Critical habitat has not been proposed or designated for Puget Sound ESU steelhead trout at this time.

6.3 Life History

Steelhead are anadromous rainbow trout. Steelhead have the greatest diversity of life history patterns of any Pacific salmonid species, featuring varying degrees of anadromy, differences in reproductive biology, and plasticity of life history between generations. Juvenile steelhead may rear in freshwater from 1 to 3 years, but most smolting occurs after 2 years (Wydoski and Whitney 1979).

Within the range of West Coast steelhead, spawning migrations occur throughout the year, with seasonal peaks of activity. In any given river basin, there may be one or more peaks of migration activity. Since these runs are generally named for the season in which they occur, some rivers may have runs known as winter, spring, summer, or fall steelhead. For example, large rivers such as the Columbia, Rogue, and Klamath have migrating adult steelhead runs at all times of the year. Through time, the names of seasonal runs in the Pacific Northwest have generally been consolidated into winter and summer steelhead runs. In northern California, some biologists have retained the terms “spring” and “fall” steelhead to name what others would call summer steelhead.

NMFS (Busby et al. 1996) has identified 15 steelhead ESUs, including 12 for coastal forms and three for inland forms. Two ESUs (Southern California and Upper Columbia River) are presently listed as endangered; nine (Central California Coast, South-Central California Coast, Snake River basin, Lower Columbia River, California Central Valley, Upper Willamette River, Middle Columbia River, Northern California, and Puget Sound) are listed as threatened; one (Oregon Coast) is a species of concern; and three steelhead ESUs (Southwest Washington, Olympic Peninsula, and Klamath Mountains Province) are not presently in significant danger of becoming endangered or threatened, although some individual stocks within these ESUs may be at risk.

In general, steelhead ESUs include resident rainbow trout in cases where they have the opportunity to interbreed with anadromous fish. Resident populations

above long-standing natural barriers and those that have resulted from the introduction of non-native rainbow trout are not considered part of the ESUs. Resident populations that inhabit areas upstream from artificial migration barriers (e.g., Grand Coulee Dam, the Hells Canyon Dam complex, and numerous smaller barriers in California) may contain genetic resources similar to those of anadromous fish in the ESU, but little information is available on these fish or the role they might play in conserving natural populations of steelhead. With respect to steelhead ESUs, the status of resident fish upstream from human-caused migration barriers must be evaluated on a case-by-case basis as more information becomes available.

Chapter 7 SOUTHERN DPS GREEN STURGEON

7.1 Status

The Southern DPS of green sturgeon (*Acipenser medirostris*) was listed as threatened on April 7, 2006. The listing was based on limited and decreasing spawning habitat and negative population trends (71 FR 17757).

7.2 Critical Habitat

Critical habitat for Southern DPS green sturgeon was designated on October 9, 2009 (74 FR 52325). NMFS identified PCEs for freshwater riverine systems, estuarine areas, and nearshore marine waters to include the different systems that green sturgeon occupy at different life stages.

PCEs for freshwater riverine systems are as follows:

1. **Food resources** – Abundant prey items for larval, juvenile, subadult, and adult life stages.
2. **Substrate type or size** (i.e., structural features of substrates) – Substrates suitable for egg deposition and development, larval development, and subadults and adults.
3. **Water flow** – A flow regime necessary for normal behavior, growth, and survival of all life stages.
4. **Water quality** – Water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.
5. **Migratory corridor** – A migratory pathway necessary for the safe and timely passage of Southern DPS fish within riverine habitats and between riverine and estuarine habitats.
6. **Water depth** – Deep (≥ 5 m) holding pools for both upstream and downstream holding of adult or subadult fish, with adequate water quality and flow to maintain the physiological needs of the holding adult or subadult.
7. **Sediment quality** – Sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages.

Estuarine areas:

1. **Food resources** – Abundant prey items within estuarine habitats and substrates for juvenile, subadult, and adult life stages.

2. **Water quality** – Water quality, including temperature, salinity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.
3. **Migratory corridor** – A migratory pathway necessary for the safe and timely passage of Southern DPS fish within estuarine habitats and between estuarine and riverine or marine habitats.
4. **Water depth** – A diversity of depths necessary for shelter, foraging, and migration of juvenile, subadult, and adult life stages (shallow depths of less than 10 m for adults and subadults; and shallow waters of 1 to 3 m for juveniles).
5. **Sediment quality** – Sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages.

Nearshore marine waters:

1. **Migratory corridor** – A migratory pathway necessary for the safe and timely passage of Southern DPS fish within marine and between estuarine and marine habitats.
2. **Water quality** – Coastal marine waters with adequate dissolved oxygen levels and acceptably low levels of contaminants.
3. **Food resources** – Abundant prey items for subadults and adults, which may include benthic invertebrates and fishes.

7.3 Life History

Green sturgeon are an anadromous fish species of the *Ancipenseridae* family. The species ranges from Mexico to Alaska. In Washington State, they are commonly found in the Columbia River, Willapa Bay, and Grays Harbor (Moyle et al. 1992). A few have been captured in Puget Sound in trawl fisheries (68 FR 4435).

The species spawns in the Sacramento, Klamath, and Rogue Rivers in California (68 FR 4434). Females spawn every 2 to 5 years, laying eggs in the deep, turbulent mainstems (70 FR 17386). They spawn from March to July; spawning peaks in mid-April to mid-June (Moyle et al. 1992).

Juveniles spend 1 to 4 years in fresh and estuarine waters before migrating into salt water, where they disperse widely. Juveniles in the Sacramento-San Joaquin delta feed on opossum shrimp and amphipods (Radtke 1966) Adults feed on benthic invertebrates such as shrimp, mollusks, and amphipods, as well as small fish (Moyle et al. 1992). Individuals can live for 70 years or more.

Chapter 8 EULACHON

8.1 Status

The southern DPS of Pacific eulachon (*Thaleichthys pacificus*) was listed as threatened on March 16, 2010.

8.2 Critical Habitat

Critical habitat has not been proposed or designated at this time.

8.3 Life History

Eulachon (also called Columbia River smelt, candlefish, or hooligan) are a member of the osmerid family (smelts) and are endemic to the northeastern Pacific Ocean, ranging from northern California to southwest and south-central Alaska and into the southeastern Bering Sea. The southern DPS of eulachon consists of populations spawning in rivers south of the Nass River in British Columbia, Canada, to, and including, the Mad River in California. Within this range, major production areas, or core populations, for this species include the Columbia and Frasier Rivers.

The Columbia River and its tributaries support the largest known eulachon run in the world (Gustafson et al. 2008). Within the Columbia River Basin, the major and most consistent spawning runs return to the mainstem of the Columbia River (from just upstream of the estuary, river mile [RM] 25, to immediately downstream of Bonneville Dam, RM 146), and the Cowlitz, Grays, Kalama and Lewis Rivers. Exhibit 8-1 contains a list and classification of all known eulachon spawning areas in Washington, based on the 2008 Eulachon Status Review (Gustafson et al. 2008; online at <http://www.nwr.noaa.gov/Other-Marine-Species/upload/Eulachon-Review.pdf>).

Exhibit 8-1. Eulachon Spawning and Estuarine Areas in Washington (Gustafson et al. 2008)

Eulachon Spawning Areas	Spawning Regularity ¹	Estuary
Columbia River Mainstem	Regular	Columbia River
Grays River	Regular	Columbia River
Skamokawa Creek	Rare	Columbia River
Elochoman River	Irregular	Columbia River
Cowlitz River	Regular	Columbia River
Toutle River	Rare	Columbia River
Kalama River	Regular	Columbia River
Lewis River	Regular	Columbia River
Washougal River	Rare	Columbia River
Klickitat River	Anecdotal	Columbia River
Bear River	Occasional	Willapa Bay
Naselle River	Occasional	Willapa Bay
Nemah River	Rare	Willapa Bay
Wynoochie River	Rare	Grays Harbor
Quinault River	Occasional	Coast
Queets River	Occasional	Coast
Quillayute River	Rare	Coast
Elwha River	Occasional	Juan de Fuca
Puyallup River	Rare	Puget Sound

¹**Regular** – occurring yearly or in most years; **Rare, Irregular, Anecdotal, Occasional** – sporadic, infrequent occurrence that does not occur every year and may not occur in most years, especially those rivers with a spawning regularity of “rare.” Eulachon are described as “common” in Grays Harbor and Willapa Bay on the Washington coast, and “abundant” in the Columbia River (Gustafson *et al.* 2008).

Eulachon typically spend 3 to 5 years in saltwater before returning to fresh water to spawn from late winter through early summer. River entry and spawning begin as early as December and January in the Columbia River Basin, and last through May with peak entry and spawning during February and March (Exhibit 8-2) (WDFW and ODFW 2001; Gustafson et al. 2008). Entry into the spawning rivers appears to be related to water temperature and the occurrence of high tides (Ricker et al. 1954; Smith and Saalfeld 1955; Spangler 2002), although eulachon have been observed ascending well beyond tidally influenced areas (Wilson et al. 2006; Lewis et al. 2002).

Exhibit 8-2. Range (Gray Shading) and Peak (Black Shading) Timing of Documented Washington River-Entry and/or Spawn-Timing for Eulachon (Gustafson et al. 2008)

Basin	Source	December	January	February	March	April	May
Columbia Basin							
Columbia River	1						
Cowlitz River, WA	1						
Juan de Fuca							
Elwha River, WA	2						

¹ WDFW and ODFW 2001; 2 – Shaffer et al. 2007

Spawning grounds are typically in the lower reaches of larger rivers fed by snowmelt (Hay and McCarter 2000). Spawning typically occurs at night. Spawning occurs at temperatures from 4 to 10 degrees Celsius (°C) in the Columbia River and tributaries (WDFW and ODFW 2001). In the Cowlitz River, spawning generally occurs at temperatures from 4 to 7°C (Smith and Saalfeld 1955). Eulachon broadcast spawn over sand, coarse gravel, or detrital substrates. Preferred spawning habitat consists of course, sandy substrates (WDFW and ODFW 2001).

Eggs are fertilized in the water column, sink, and adhere to the river bottom typically in areas of gravel and coarse sand. Approximately 7,000 to 31,000 eggs are laid, depending on the size of the female (WDFW and ODFW 2001). Eggs are spherical and 1 mm in diameter (WDFW and ODFW 2001). Eulachon eggs hatch in 20 to 40 days, with incubation time dependent on water temperature. Within days of hatching, the larvae, ranging from 4 to 8 mm long, are rapidly carried downstream and dispersed by estuarine and ocean currents. Eulachon larvae are found in the scattering layer of near-shore marine areas when they reach the sea (Morrow 1980). Juveniles rear in near-shore marine areas at moderate or shallow depths, and acquire lengths of 46 to 51 mm within 8 months (Barraclough 1964). As eulachon grow, they migrate out to deeper depths and have been found as deep as 625 m (Allen and Smith 1988). Adult eulachon range in size from 14 to 30 cm and return to freshwater to spawn at 3 to 5 years of age, with most adults returning as 3-year-olds (WDFW and ODFW 2001). Although adults can repeatedly spawn, most die shortly after spawning (WDFW and ODFW 2001).

Similar to salmon, juvenile eulachon are thought to imprint on the chemical signature of their natal river basins. However, juvenile eulachon spend less time in freshwater environments than do juvenile salmon. Researchers believe that this short freshwater residence time may cause returning eulachon to stray more from their natal spawning sites than salmon (Hay and McCarter 2000). This short freshwater residence time may result from the spawning grounds occurring in snowmelt-fed rivers that have a pronounce peak freshet in the spring, rapidly

flushing eggs and larvae out of the spawning river reach. As such, eulachon may tend to imprint and hone in on the larger local estuary rather than to individual spawning rivers (Hay and McCarter 2000).

Eulachon feed on zooplankton, primarily eating crustaceans such as copepods and euphausiids, including *Thysanoessa* spp. (Barraclough 1964, Hay and McCarter 2000), unidentified malacostraceans (Sturdevant et al. 1999), and cumaceans (Smith and Saalfeld 1955). Eulachon larvae and post-larvae eat phytoplankton, copepods, copepod eggs, mysids, barnacle larvae, worm larvae, and eulachon larvae (WDFW and ODFW 2001). Adults and juveniles commonly forage at moderate depths (15 to 182 m) in inshore waters (Hay and McCarter 2000).

Eulachon are very important to the Pacific coastal food web due to their availability during spawning runs and their high lipid content. Avian predators include harlequin ducks, pigeon guillemots, common murrelets, mergansers, cormorants, gulls, and eagles. Marine mammal predators include baleen whales, orcas, dolphins, pinnipeds, and beluga whales. Fish that feed on eulachon include white sturgeon, spiny dogfish, sablefish, salmon sharks, arrowtooth flounder, salmon, Dolly Varden, Pacific halibut, and Pacific cod. Eulachon and their eggs provide a significant food source for white sturgeon in the Columbia River.

Chapter 9 BULL TROUT

9.1 Status

The Coastal/Puget Sound bull trout (*Salvelinus confluentus*) DPS was listed as threatened by the U.S. Fish and Wildlife Service (USFWS) on November 1, 1999 (64 FR 58932). This DPS includes all bull trout populations supported in Pacific Coast drainages within Washington, including Puget Sound.

9.2 Critical Habitat

USFWS designated critical habitat for the Coastal/Puget Sound DPS of bull trout on September 26, 2005 (70 FR 56212). Nearshore marine areas within the Action Area are designated as critical habitat.

As with Pacific salmon and steelhead, critical habitat for bull trout is described in terms of PCEs. The PCEs comprise those physical and biological components deemed essential for the conservation and recovery of the species, including space for individual and population growth; normal behavior; food, water air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species (70 FR 56212).

For marine nearshore areas, the inshore extent of critical habitat is the mean higher high water (MHHW) line. MHHW refers to the average of all the higher high water heights of the two daily tidal levels. In marine nearshore areas, critical habitat thus includes the tidally influenced freshwater heads of estuaries. Adjacent shoreline riparian areas, bluffs, and uplands are not designated as critical habitat. It should be recognized, however, that the quality of marine habitat along shorelines is intrinsically related to the character of these adjacent features, and human activities that occur outside of the MHHW line can have major effects on the physical and biological features of the marine environment (70 FR 56212).

9.3 Life History

Bull trout exhibit resident and migratory life history strategies through much of their current range. Resident bull trout complete their life cycles in the tributary streams in which they spawn and rear. Migratory bull trout spawn in tributary streams from August to November. Juvenile bull trout rear from 1 to 4 years before migrating to a lake, a river, or saltwater (Rieman and McIntyre 1993).

Bull trout require relatively cold water. Temperatures above 15°C are believed to limit their distribution. Spawning may be initiated when water temperatures

drop below 9 to 10°C (39 to 50°F). Such water temperatures are often associated with cold-water springs or groundwater upwellings. Incubation of eggs is also significantly influenced by water temperature. Incubation normally takes between 100 and 145 days, with temperatures ranging between 1.2 and 5.4°C (34.2 to 41.7°F), with an optimum range of 2 to 4°C (36 to 39°F) (50 FR 72136–72138). Temperature preferences of bull trout may be so cold as to exclude other fish, (including salmonids) particularly during spawning and incubation (USFWS 1998).

Bull trout need complex cover, such as large woody debris (LWD), undercut banks, boulders, and pools, throughout all their life history stages. Juvenile and adult bull trout frequently use side channels, stream margins, and pools that have suitable cover. Fry hide in the interstitial spaces within gravel and cobble substrates (67 FR 71237). Because of this strong association with cover, bull trout eggs and juvenile bull trout are susceptible to adverse effects associated with sediment deposition and bedload movement during incubation, emergence, and rearing (USFWS 1998).

Similarly, channel form and stability are also significant aspects of bull trout habitat requirements. Bull trout are vulnerable to fluctuations in flow during spawning and during incubation and emergence (67 FR 72137). Watershed conditions and activities within the watershed can affect channel stability and flow patterns, which can directly affect bull trout. Alterations of natural flow patterns may affect spawning bull trout, and channel instability may decrease survival of eggs and juvenile bull trout (61 FR 72137).

The extended duration of incubation of bull trout eggs makes them proportionately more susceptible to decreased survival resulting from channel instability (USFWS 1998). Bull trout demonstrate a preference for low-gradient reaches with loose, clean gravel as spawning habitat (67 FR 72137). Bull trout seek out spawning areas with spring influence or groundwater upwelling and loose clean gravel and cobble (USFWS 1998). Bull trout eggs can incubate for 220 days or more from deposition to emergence, which makes eggs and fry susceptible to bedload movement and sediment deposition (USFWS 1998).

Bull trout, particularly resident and non-anadromous migratory forms (i.e., fluvial and adfluvial), require access to large, connected, high quality freshwater habitat that includes cool water temperatures, deep pools, LWD and other forms of complex cover, clean substrates, and unimpaired flow regime and channel floodplain interactions. Open migratory corridors, both within and between tributary streams, large rivers, and lake systems, are critical for maintaining bull trout populations (USFWS 1998).

Chapter 10 MARBLED MURRELET

10.1 Status

USFWS lists the marbled murrelet (*Brachyramphus marmoratus marmoratus*) as threatened (57 FR 45337). The North American subspecies of marbled murrelet occurs from the Aleutian Islands south along the coasts of Alaska, Washington, Oregon, and northern California (Carter and Erickson 1988). Population declines have been attributed to fragmentation and loss of nesting habitat (Csuti et al. 1997), reduced food availability (Burkett 1995) from overharvesting of fish (Ainley et al. 1995), and direct mortality associated with gill-net fishing, predation, urbanization, and the effects of oil spills (Fry 1995, Carter and Kuletz 1995; WDFW 1993c).

10.2 Critical Habitat

USFWS designated critical habitat for the marbled murrelet in 1996 (61 FR 26256). The following biological and physical features determine the designation of critical habitat for marbled murrelet: space for growth and normal behavior; nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distribution of a species. Recently, USFWS proposed revising critical habitat for marbled murrelets (71 FR 53838); however, to date a final rule has not been issued.

10.3 Life History

The marbled murrelet belongs to the diving seabird family, Alcidae. Murrelets live primarily in a marine environment, but they fly inland to nest during the summer nesting season, typically nesting in low-elevation old growth and mature coniferous forests (Hamer 1995; Hamer and Cummins 1991). At sea, murrelets can be found as dispersed pairs, in flocks, or in aggregates (crowded or massed into a dense cluster). (Strachan et al. 1995; Strong et al. 1996). Strong et al. (1996) found that most murrelets occurred within one mile of the shoreline, regardless of their ages. Fledglings remain closer to shore than adults. Marbled murrelets feed in the marine environment and forage by pursuit diving. They forage in marine waters at distances of 0.3 to 32 km from shore. They consume a diversity of prey consisting of fish and invertebrates, and will alternate food sources according to season and abundance (61 FR 26258).

Murrelets typically nest in low-elevation old-growth and mature coniferous forests, usually within 50 miles of the coast (Csuti et al. 1997, Hamer 1995). Murrelet nests are usually located high in older conifers with wide horizontal

limbs, mistletoe, or deformities. Most murrelet nests have been found in large intact stands of old growth forest (Miller and Ralph 1995), although nests have been found in stands as small as seven acres (Hamer and Nelson 1995). Suitable habitat is defined as old-growth forests and mature forests with old-growth components (trees greater than 46 centimeters in diameter) with large moss-covered branches at the upper half of the tree (Ralph et al. 1995). The percentage of old-growth tree crown cover appears to be an important factor associated with nest sites (Miller and Ralph 1995, Hamer and Nelson 1995).

Marbled murrelets are asynchronous breeders (the onset of breeding differs significantly within the population), and have a longer breeding season than other alcids. Breeding occurs between late March and late September (61 FR 26257). In Washington, egg laying and incubation begin around April 30, and incubation continues through July 31 (Hamer and Nelson 1995).

Chapter 11 YELLOWEYE ROCKFISH

11.1 Status

Yelloweye rockfish (*Sebastes ruberrimus*) were listed as threatened on April 27, 2010. The listing becomes effective on July 27, 2010 (75 FR 22276). NMFS convened a biological review team (BRT), which concluded that yelloweye rockfish was at moderate risk of extinction throughout its range (74 FR 18516).

11.2 Critical Habitat

Critical habitat has not been designated or proposed for yelloweye rockfish at this time.

11.3 Life History

Yelloweye rockfish are one of the longest lived in the scorpaenid family (rockfish); living up to 118 years (NMFS 2009). They are also one of the largest (up to 25 pounds) and most noticeable, given the bright yellow eyes and red-orange coloring. Yelloweye rockfish are also known by the common names rock cod, red snapper, rasphead rockfish, red cod, and turkey-red rockfish. This species ranges from northern Baja California to the Aleutian Islands in Alaska. Most commonly, yelloweye rockfish are found between central California and the Gulf of Alaska, but are rare in Puget Sound Proper (Exhibit 11-1), south of Admiralty Inlet (NMFS 2008; Love et al. 2002).

Exhibit 11-1. Observations and Distribution of Yelloweye Rockfish in Inland Washington Waters as Reported in REEF Surveys Between January 1996 and May 2009 (REEF 2009)

Survey Area	Individual Sighting Frequency ¹	YOY Sighting Frequency ¹
Strait of Georgia	10.7	-
Texada Island (NE Georgia Strait)	60	-
Jervis Inlet (NE Georgia Strait)	64.3	-
Agamemnon Bay Area (N Georgia Strait)	70	-
Gulf Islands (N. of Orcas Island)	23.8	-
Pt Atkinson – Squamish (N. of Vancouver, BC)	2.3	-
Saanich Inlet (Eastern Vancouver Is.)	2.3	-
Moses Point/Albert Head, Victoria (W. Orcas Is)	2.4	-
Straight of Juan de Fuca	1.9	-
W. of Discovery Island and Cadboro Point	2.3	-
San Juan Islands	1.5	-
Orcas Island	3.2	-

Exhibit 11-1. Observations and Distribution of Yelloweye Rockfish in Inland Washington Waters as Reported in REEF Surveys Between January 1996 and May 2009 (REEF 2009) (continued)

Survey Area	Individual Sighting Frequency ¹	YOY Sighting Frequency ¹
Cypress Island	2.7	-
Decatur Island	14.3	-
Hood Canal	1.4	-
Dabob Bay	1.4	-
Quatsap Pt/Misery Pt – Potlatch State Park	1.3	-
Mt Vernon/Everett	1.5	-
Whidbey Island	1.5	-
Everett to Seattle	0.5	0.2
Edmonds	0.5	0.2
Seattle/Olympia	0.1	0.1
Vashon Island	1.6	-
Tacoma	-	0.2
Olympic Peninsula	1.7	-
Dungeness Bay to Kydaka Point	1.0	-
Kydaka Point - Cape Flattery	2.5	-

¹ Sighting frequency represents the percentage of surveys conducted that contained individuals of yelloweye rockfish. Individual – Adults and juveniles combined. YOY – Young of year only

Yelloweye rockfish are observed consistently throughout the Georgia Basin. However, significantly higher observation frequencies occur in North Puget Sound and the Georgia Strait within British Columbian waters (Exhibit 11-1). REEF surveys indicate that the farther south in Puget Sound, the lower the potential for yelloweye rockfish presence or use, except around Decatur Island in the San Juan Islands where there is a spike in observations (REEF 2009). This is likely due to the fewer areas of rocky habitat in Southern Puget Sound (Miller and Borton 1980). General distribution occurs in the Georgia Strait and around the Gulf Islands in British Columbia (Yamanaka et al. 2006; NMFS 2008; REEF 2009). Between 2000 and 2008, Washington State Department of Fish and Wildlife recreational catch surveys have documented a progressive decline in the number of yelloweye rockfish caught (WDFW 2009). In 2000, approximately 5,800 individuals were caught in recreational catches. By 2008, fewer than 1,000 were recorded (WDFW 2009).

As with other rockfish species, juveniles are generally shallow and move deeper as they age. Juveniles are found throughout the life stage between 49 and 1,801 feet deep (NMFS 2008). As juveniles settle, they are found in high relief areas, crevices and sponge gardens (NMFS 2009; Love et al. 1991). Adults are typically found at depths between 300 and 590 feet (NMFS 2008). The adult

yelloweye rockfish tend also toward rocky, high relief zones (NMFS 2009). The adults have very small home ranges, generally site-attached and affiliated with caves, crevices, bases of rocky pinnacles and boulder fields (Richards 1986). Rarely, adult yelloweye rockfish are found in congregations, but are more commonly seen as solitary individuals (Love et al. 2002; PFMC 2003).

Males generally have slightly larger mean sizes than females, with both species topping out at approximately 35 inches (NMFS 2008). Maturity in yelloweye rockfish is attained much later than some rockfish; normally between 15 and 20 years but may occur as early as 7 years (NMFS 2008). As with all rockfish, yelloweye rockfish are livebearers (Exhibit 11-2). Sperm is stored for many months (September to April) before internal fertilization. Females can produce up to 300 eggs per gram of body weight, which totals between 1.2 and 2.7 million eggs per cycle (Hart 1973). In Puget Sound, eggs are fertilized between winter and summer months (NMFS 2009). Parturition occurs in Puget Sound in early spring through late summer. Although rockfish generally spawn once per year, there is some evidence that yelloweye rockfish in Puget Sound spawn up to twice per year (Washington et al. 1978). Larvae remain pelagic for two months or more and then begin to settle to deeper waters (NMFS 2008). Although the specific larval duration is unknown, it is assumed to be similar to that of bocaccio or canary rockfish (116 to 155 days) (NMFS 2009). Settling size is slightly less than an inch.

Yelloweye rockfish have a diverse diet and are typically opportunistic feeders (NMFS 2008). As larvae and juveniles, they typically eat larval krill, diatoms, dinoflagellates, fish larvae, copepods, and krill. Prey size increases and diversifies as yelloweye rockfish age due to their large size to include small yelloweye rockfish, sand lance, gadids, flatfishes, shrimp, crabs, and gastropods. Typical predators of yelloweye rockfish include salmon and orcas (Love et al. 2002; NMFS 2009).

Exhibit 11-2. Life Stage, Water Column, and Timing of Yelloweye Rockfish in the Georgia Basin (NMFS 2008)

Life stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Copulation/Fertilization	Light Gray	Light Gray	Dark Gray	Dark Gray	Light Gray	Light Gray	Light Gray					
Embryonic Development			Light Gray	Light Gray	Dark Gray	Light Gray	Light Gray	Light Gray				
Larval Release				Light Gray	Dark Gray	Dark Gray	Light Gray	Light Gray	Light Gray			
Pelagic Juveniles						Light Gray	Dark Gray	Dark Gray	Light Gray	Light Gray		
Settlement of Juveniles								Light Gray	Light Gray	Light Gray		

Note: Range (light gray); peak (dark gray)

Chapter 12 BOCACCIO

12.1 Status

Bocaccio were listed as endangered on April 27, 2010. The listing becomes effective on July 27, 2010 (75 FR 22276). The population in Puget Sound has declined in Puget Sound since the 1970s and is considered to be at high risk of extinction throughout its range (74 FR 18516).

12.2 Critical Habitat

Critical habitat has not been designated for bocaccio at this time.

12.3 Life History

Bocaccio (*S. paucispinis*) are large piscivorous rockfish (of the scorpaenid family) ranging in eastern Pacific coastal waters from Stepovac Bay, Alaska to Punta Blanca, Baja California (NMFS 2008; COSEWIC 2002). Bocaccio are most notably identified by a large jaw that extends often past the eye. They can range from olive orange in color to burnt orange or brown on the back. Bocaccio are one of the largest rockfish reaching up to 36 inches long and living up to 55 years. Other names for bocaccio include rock salmon, salmon rockfish, Pacific red snapper, Pacific snapper, and Oregon snapper (Stanley et al, 2001). Most commonly, bocaccio are found from Oregon to California and were once common on steep walls of Puget Sound (Love et al, 2002). Genetic studies suggest that there are two DPSs of coastal bocaccio consisting of northern (north of the Oregon/California border) and southern (California south). Based on the limited mobility and typical travel distance of rockfish species, however, it was determined that the Georgia Basin represented a third DPS for the species (NMFS 2008).

Recreational catch data reported between the mid-1960s and the 1970s suggested that bocaccio were rare in Puget Sound proper (south of Admiralty Inlet) (NMFS 2008). Throughout the late 1970s, however, WDFW Washington State Sport Catch Reports documented that 8-9 percent of catches included bocaccio. These reports were primarily (66 percent) in punch card area 13 (south of Tacoma Narrows Bridge). Specifically, the reports indicated high abundance numbers of bocaccio at Point Defiance and the Tacoma Narrows from 1975 to 1986 (NMFS 2008). Between 1996 and 2007, bocaccio were not documented in dockside surveys of recreational catches. WDFW catch reports and REEF surveys between 1994 and 2001 contain sporadic observations of bocaccio in Areas 5 (Seiku), 6 (Port Townsend/Port Angeles), 7 (Island County) and 11 (Tacoma and Vashon Island) (NMFS 2008). REEF survey data for January 1996 through May 2009 indicates that bocaccio are identified in less than 0.1 percent of surveys, and those observed

were in the Tacoma Area (REEF 2009). The latest records of bocaccio sightings in 2001 documented three observations of 2 to 10 fish in Area 13 (Tacoma Narrows south). In North Puget Sound and the Straight of Georgia, records and observations of bocaccio are rare, sparse, in isolated inlets, and often based on anecdotal reports (NMFS 2008).

Male bocaccio are somewhat smaller than females and mature slightly earlier between ages three and seven. Females typically mature between age four and eight (Wyllie Echeverria 1987). At maturity, males range from 16.5 to 21.6 inches (42 to 55 cm) long, while females are 18.9 to 23.6 inches (48 to 60 cm). Maturity is reached at later ages in the northern populations of the species (NMFS 2008). Bocaccio, as all rockfish, are livebearers. Females produce 20,000 to 2,298,000 eggs annually. Copulation and fertilization generally occur in the fall between August and November (Exhibit 12-1). Embryonic development takes about a month. In Washington, the females release the larvae beginning in January through April, peaking in February (NMFS 2008).

Exhibit 12-1. Life Stage, Water Column, and Timing of Bocaccio in the Georgia Basin (NMFS 2008)

Life stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Copulation/Fertilization								Light Gray	Light Gray	Dark Gray	Light Gray	
Embryonic Development	Light Gray										Light Gray	Dark Gray
Larval Release	Light Gray	Dark Gray	Light Gray	Light Gray								
Pelagic Juveniles			Light Gray									
Settlement of Juveniles							Light Gray	Dark Gray	Dark Gray	Light Gray	Light Gray	Light Gray

Note: Range (light gray); peak (dark gray)

Larvae are more than 0.2-inch (4.0 to 5.0 mm) long at release, generally well-developed, have functional organs and the ability to swim and regulate buoyancy (NMFS 2008). Larvae are highly dispersal and are generally associated with surface waters and drifting kelp mats (NMFS 2009). The larvae metamorphose into pelagic juveniles after 3.5 to 5.5 months (typically 155 days) and settle to shallow, algae-covered rocky areas or eelgrass and sand over several months (Love et al. 1991). As the juveniles age into adulthood, the fish move into deeper waters where they are found on rocky reefs and near oil platforms. As juveniles age, they move into deeper waters. Tagging data indicates that juveniles will migrate as much as 92 miles (0.9 to 148 km) within 2 years of tagging (NMFS 2008). Once bocaccio reach adulthood, however, they settle and remain relatively localized as they age.

Bocaccio will make short forays outside home ranges or vertically in the water column to feed (COSEWIC 2002; NMFS 2008). Adults are most commonly found

in waters between 164 and 820 feet deep, but can inhabit waters between 39 to 1568 feet deep (NMFS 2008). Although rockfish are generally associated with hard substrata, bocaccio are found in nearly all types of substrate. They are typically not associated with the bottom and tend to be more pelagic than other rockfish species (NMFS 2009). Adult bocaccio seem to be limited to certain areas in Southern Puget Sound around the Tacoma Narrows and Point Defiance (NMFS 2009). The diet of larval bocaccio consists of larval krill, diatoms, and dinoflagellates. Pelagic juveniles continue to be planktivores eating fish larvae, copepods, krill, and other small prey. As adults, bocaccio are piscivorous and eat other rockfish, hake, sablefish, anchovies, lanternfish, and squid. Chinook salmon, terns, and harbor seals are known predators of bocaccio (Love et al. 2002).

Chapter 13 CANARY ROCKFISH

13.1 Status

Canary rockfish were listed as threatened on April 27, 2010. The listing becomes effective on July 27, 2010 (75 FR 22276). The BRT concluded that canary rockfish were at moderate risk for extinction throughout their range based on declining catch frequencies between the 1960s and 1990s (74 FR 18516).

13.2 Critical Habitat

Critical habitat has not been designated or proposed for canary rockfish at this time.

13.3 Life History

Canary rockfish (*S. pinniger*) are located from the western Gulf of Alaska to northern Baja California. The species is most common in outer coastal waters between British Columbia and California (NMFS 2008). No published studies are available on the genetic structure of canary rockfish stocks and differentiation between Puget Sound and coastal individuals (NMFS 2008). However, based on genetic differences between the two regions in other rockfish species, NMFS determined that canary rockfish likely have two DPS separating coastal and Puget Sound/Georgia Basin populations. Canary rockfish are primarily orange with a pale gray or white background and can live up to 84 years (NMFS 2009). This species is also known by the common names of rock cod and orange rockfish.

Canary rockfish were once considered fairly common in Puget Sound (Holmberg et al. 1967 cited in NMFS 2008). Historically, canary rockfish were most common in southern Puget Sound (NMFS 2009). Declines in canary rockfish observations have been documented since 1965 and are consistently reported in catch surveys today (NMFS 2008). REEF surveys indicate 1 to 2 percent of rockfish captured in Puget Sound Proper (south of Admiralty Inlet) are canary rockfish. This percentage is slightly higher at 2 to 5 percent in North Puget Sound (around San Juan Islands and Georgia Strait). Most canary rockfish are reported in catch surveys and trawl data from the Strait of Juan de Fuca and around Vancouver Island (DFO 2008, as cited in NMFS 2008). Washington REEF surveys between 1996 and 2009 suggest that canary rockfish are most consistently observed in northern waters of Puget Sound, Strait of Juan de Fuca and the outer coast (Exhibit 13-1).

Exhibit 13-1. Observations and Distribution of Canary Rockfish in Inland Washington Waters During REEF Surveys Between January 1996 and May 2009 (REEF 2009)

Survey Area	Individual Sighting Frequency¹	YOY Sighting Frequency¹
Strait of Georgia	0.8	-
Gulf Islands (N. of Orcas Island)	2.3	-
Saanich Inlet (Eastern Vancouver Is.)	1.1	-
Straight of Juan de Fuca	6.3	-
W of Discovery Island – Albert Head, Victoria	6.9	-
W of Christopher Point – Possession Point	14.3	-
Hood Canal	3.4	-
Dabob Bay	8.1	-
Quatsap Pt/Misery Pt – Potlatch State Park	1.6	-
Mt Vernon/Everett	0.3	0.1
Whidbey Island	0.3	0.2
Seattle/Olympia	0.3	0.0
Vashon Island	1.9	-
West Seattle	0.5	0.3
Tacoma	0.2	-
Olympic Peninsula	6.8	0.6
Kydaka Point - Cape Flattery	10.9	1.0
Kitsap Peninsula/Sound Sound	0.5	-
Kitsap Peninsula	0.9	-
Cape Flattery – North Columbia River	18.5	-
Cape Flattery – Cape Alava	18.5	-

¹ Sighting frequency represents the percentage of surveys conducted that contained individuals of canary rockfish. Individual – Adults and juveniles combined. YOY – Young of year only

Most female canary rockfish are mature by age seven to nine, while males mature by age seven to twelve (Wyllie Echeverria 1987; NMFS 2008). At maturity, males range from 16.0 to 18.9 inches (41 to 48 cm) in length, while females are 13.7 to 17.7 inches (35 to 45 cm). Maturity is reached at later ages in the northern populations of the species (NMFS 2008). As with all rockfish, canary rockfish are livebearers. Females produce 260,000 to 1,900,000 eggs annually with larger females producing more eggs. Copulation and fertilization generally occur in the fall between September and December (Exhibit 13-2). Embryonic development takes about a month. In Oregon and Washington, parturition occurs between September and March, peaking in December and January (NMFS 2008).

Exhibit 13-2. Life Stage, Water Column, and Timing of Canary Rockfish in the Georgia Basin (NMFS 2008)

Life stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Copulation/Fertilization									Peak	Peak	Range	Range
Embryonic Development	Range	Range	Range						Range	Peak	Peak	Range
Larval Release	Peak	Range	Range						Range	Range	Range	Peak
Pelagic Juveniles	Range	Range	Range	Range	Range						Range	Range
Settlement of Juveniles				Range								

Note: Range (light gray); peak (dark gray)

Larvae and juveniles are typically found in the upper water column and surface waters. However, occasional observations of juveniles have occurred at depths up to 2750 ft (Love et al. 2002). The larval stage lasts for one to four months (typically 166 days) in the top 328 feet of the water column until reaching approximately 0.72 inches long (NMFS 2008; NMFS 2009). Juveniles settle into tide pools, rocky reefs, kelp beds, low rock, and cobble areas (Miller and Geibel 1973; Love et al. 1991; Love et al 2002 as cited in NMFS 2008). Juveniles exhibit diel migratory patterns by hanging in groups near the rock sand interface at shallow depths during the day and moving to sandy areas at night (Love et al. 2002). At approximately 3 years, juveniles begin to move deeper into rocky reefs.

Canary rockfish adults are generally associated with hard bottom areas and along rocky shelves and pinnacles (NMFS 2008). They are usually found at or near the bottom (PFMC 2003). Adults tend to move in dense schools leading to patchy distribution (Stewart 2007). As adults, canary rockfish appear to be somewhat migratory and will travel as many as 435 miles over several years (NMFS 2008). The migration is seasonal, with more distance traveled in late winter over summer months (NMFS 2008). Based on survey and frequency data, NMFS estimates that there are approximately 300 canary rockfish in Puget Sound proper (south of Admiralty Inlet) while Northern Puget Sound (north of Admiralty Inlet) has slightly higher frequencies (NMFS 2009).

Larvae feed primarily on nauplii, invertebrate eggs, and copepods (Love et al. 2002; NMFS 2008). Canary rockfish juveniles are zooplanktivorous, feeding on small crustaceans, barnacles cyprids, euphasiid eggs and larvae, and juvenile polychaetes (Gaines and Roughgarden 1987; NMFS 2008). Adults feed on euphasiids, crustaceans, small fish like short belly rockfish, mytophids, and stomiatids (NMFS 2008). Canary rockfish predators include sharks, salmon, lingcod, yelloweye rockfish, porpoises, and seals (NMFS 2008).

Chapter 14 REFERENCES

- Ainley, D. G., S. G. Allen, and L. B. Spear. 1995. Offshore occurrence patterns of marbled murrelets in Central California. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Allen, M.J., and G.B. Smith. 1988. Atlas and zoogeography of common fishes in the Bering Sea and northeastern Pacific. NOAA Tech. Rep. NMFS 66, 151 p.
- Barraclough, W.E. 1964. Contributions to the marine life history of the eulachon (*Thaleichthys pacificus*). Journal of the Fisheries Research Board of Canada 21(5): 1333-1337.
- Barrett-Lennard, L. G. 2000. Population structure and mating patterns of killer whales as revealed by DNA analysis. Doctoral thesis. Univ. British Columbia, Vancouver, BC, Canada.
- Barrett-Lennard, L. G. and G. M. Ellis. 2001. Population structure and genetic variability in northeastern Pacific killer whales: Towards an assessment of population viability. Research Document 2001/065, Fisheries and Oceans Canada, Nanaimo, BC, Canada.
- Behnke, R.J. 2002. Trout and Salmon of North America. Simon and Schuster.
- Burkett, E. E. 1995. Marbled murrelet food habits and prey ecology. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Busby, P. J., T. C. Wainwright, G. J. Bryant, L. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status review of West Coast steelhead from Washington, Idaho, Oregon, and California. Technical Memorandum NMFS-NWFSC-27. Seattle, WA: National Oceanic and Atmospheric Administration, U.S. Department of Commerce.
- Calambokidis, J. and J. Barlow. 2004. Abundance of blue and humpback whales in the eastern North Pacific estimated by capture-recapture and line-transect methods. Marine Mammal Science 20(1): 63-85.
- Carretta, J. V., K. A. Forney, M. M. Muto, J. Barlow, J. Baker, and M. Lowry. In press. U.S. Pacific marine mammal stock assessments: 2003. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-358, 291 p.
- Carter, H. R., and R. A. Erickson. 1988. Population status and conservation problems of the marbled murrelet in California, 1892–1987. (Final Report, Contract F67569). California Department of Fish and Game. Sacramento, CA.

- Carter, H. R., and K. J. Kuletz. 1995. Mortality of marbled murrelets due to oil pollution in North America. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Clapham, P.J. & Mead, J.G. 1999. Megaptera novaeangliae. Mammalian Species 604: 1-9.
- Clapham, P. J., S. Leatherwood, I. Szepaniak and R. L. Brownell, Jr. 1997. Catches of humpback and other whales from shore stations at Moss Landing and Trinidad, California, 1919–1926. Marine Mammal Science 13:368–394.
- COSEWIC. 2002. CSEWIC assessment and status report on the bocaccio (*Sebastes paucispinis*) in Canada. Committee in the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
- Csuti, B., A. J. Kimerling, T. A. O'Neil, M. M. Shaughnessy, E. P. Gaines, and M. M. P. Huso. 1997. Atlas of Oregon wildlife. Oregon State University Press. Corvallis, OR.
- DFO (Department of Fisheries and Oceans Canada), 2008. Fisheries and Oceans Canada, Pacific region regional data services unit.
- Everitt, R.D., C.H. Fiscus and R.L. DeLong. 1980. Northern Puget Sound marine mammals. DOC/EPA Interagency Energy/Environment R&D Program. Doc. #EPA-6009/7-80-139. US Environmental Protection Agency, Washington DC. 134p.
- Federal Register (FR): March 13, 2009. National Oceanic Atmospheric Administration, National Marine Fisheries Service. Proposed threatened status for southern distinct population segment of eulachon. 74 FR 10857. Available online <http://edocket.access.gpo.gov/2009/pdf/E9-5403.pdf>.
- Falcone, E, J. Calambokidis, G. Steiger, M. Malleson, and J. Ford. 2005. Humpback whales in the Puget Sound/Georgia Strait Region. Proceedings of the 2005 Puget Sound Georgia Basin Research Conference. 4pp.
- Ford, J. K. B., G. M. Ellis, L. G. Barrett-Lennard, A. B. Morton, R. S. Palm, and K. C. Balcomb III. 1998. Dietary specialization in two sympatric populations of killer whales (*Orcinus orca*) in coastal British Columbia and adjacent waters. Canadian Journal of Zoology 76:1456–1471.
- Fry, D. M. 1995. Pollution and fishing threats to marbled murrelets. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Gaines, S.D. and J. Roughgarden. 1987. Fish in offshore kelp forests affect recruitment to intertidal barnacle populations. Science 235: 479-481.

- Gustafson, R. et al. 2008. Summary of scientific conclusions of the review of the status of eulachon (*Thaleichthys pacificus*) in Washington, Oregon, and California. NMFS Northwest Fisheries Science Center. Seattle, WA. 114 p. Online at <http://www.nwr.noaa.gov/Other-Marine-Species/upload/Eulachon-Review.pdf> [accessed April 2009].
- Hamer, T. E. 1995. Inland habitat associations of marbled murrelets in western Washington. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Hamer, T.E. and E. Cummins. 1991. Relationship between forest characteristics and use of inland sites by marbled murrelets in northwestern Washington. Olympia, WA: Washington Department of Wildlife, Wildlife Management Division, Nongame Program.
- Hamer, T. E., and S. K. Nelson. 1995. Characteristics of marbled murrelet nest trees and nesting stands. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Hart, J.L. 1973. Pacific Fishes of Canada. Fisheries Research Board of Canada Bulletin 180.
- Hay, D.E. and McCarter, P.B. 2000. Status of the eulachon *Thaleichthys pacificus* in Canada. Department of Fisheries and Oceans Canada, Canadian Stock Assessment Secretariat, Research Document 2000-145. Ottawa, Ontario.
- Hill, P. S., and D. P. DeMaster. 1999. Draft Alaska marine mammal stock assessments 1999. National Marine Mammal Laboratory, Alaska Fisheries Science Center. Seattle, WA.
- Hoelzel, A. R., A. Natoli, M. E. Dahlheim, C. Olavarria, R. W. Baird, and N. A. Black. 2002. Low worldwide genetic diversity in the killer whale (*Orcinus orca*): implications for demographic history. Proceedings of the Royal Society of London, Biological Sciences, Series B 269:1467-1473.
- Hoelzel, A. R., M. Dahlheim, and S. J. Stern. 1998. Low genetic variation among killer whales (*Orcinus orca*) in the eastern north Pacific and genetic differentiation between foraging specialists. Journal of Heredity 89:121-128.
- Hoelzel, A.R. and G.A. Dover. 1991. Genetic differentiation between sympatric killer whale populations. Heredity 66:191-195.
- Holmberg, E.K., D. Day, N. Pasquale, and B Pattie. 1967. Research report on the Washington trawl fishery 1962-64. Technical report, Washington Department of Fisheries, Research Division, unpublished report.
- Johnsgard, P.A. 1990. Hawks, Eagles and Falcons of North America. Smithsonian Institution Press. Washington D.C.

- Jones, R. E. 1981. Food habits of smaller marine mammals from northern California. *Proc. Nat. Acad. Sci.* 42:409-433.
- Krahn, M.M., M.J. Ford, W.F. Perrin, P.R. Wade, R.P. Angliss, M.B. Hanson, B.L. Taylor, G.M. Ylitalo, M.E. Dahlheim, J.E. Stein, and R.S. Waples. 2004. 2004 Status review of Southern Resident killer whales (*Orcinus orca*) under the Endangered Species Act. U.S. Dept. Commer. NOAA Tech. Memo. NMFSNWFSC-62, 73 p.
- Lewis, A.F.J., M.D. McGurk, and M.G. Galesloot. 2002. Alcan's Kemano River eulachon (*Thaleichthys pacificus*) monitoring program 1988-1998. Consultant's report prepared by Ecofish Research Ltd. Fir Alcan Primary Metal Ltd., Kitimat, British Columbia. 136 p.
- Love, M.S., M.H. Carr and L.J. Haldorson. 1991. The ecology of substrate-associated juveniles of the genus *Sebastes*. *Environ. Biol. Fishes* 30: 225-243.
- Love, M.S., M.M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press, Berkeley, California.
- Loughlin, T. R., A. S. Perlov, and V. A. Vladimirov. 1992. Range-wide survey and estimation of total number of Steller sea lions in 1989. *Mar. Mammal Sci.* 8: 220-239.
- Lowry, L.F., K.J. Frost, and T.R. Loughlin. 1989. Importance of walleye pollock in the diets of marine mammals in the Gulf of Alaska and Bering Sea, and implications for fishery management, Pp. 701-726, in *Proceedings of the international symposium on the biology and management of walleye pollock*, November 14-16, 1988, Anchorage, AK. Univ. Alaska Sea Grant Rep. AK-SG-89-01.
- Miller, J.M. and C.A. Simenstad. 1994. Growth of Juvenile Coho Salmon in Natural and Created Estuarine Habitats: A Comparative Study Using Otolith Microstructure Analysis. FRI-UW-9406. Fisheries Research Institute. University of Washington. Seattle, WA.
- Miller, D.J. and S.F. Borton. 1980. Geographical distribution of Puget Sound fishes: Maps and data source sheets. University of Washington Fisheries Research Institute. 3 vols.
- Miller, D.J., and J.J. Geibel, 1973. Summary of blue rockfish and lingcod life histories; a reef ecology study; and giant kelp, *Macrocystis pyrifera*, experiments in Monterey Bay, California. *Fish Bulletin*: 137.
- Miller, J. A. and C. A. Simenstad. 1994. Growth of juvenile coho salmon in natural and created estuarine habitats: A comparative study using otolith microstructure analysis. Univ. of Wash., Fish. Res. Inst., Seattle, WA. FRI-UW-9405.
- Miller, S. L., and C. J. Ralph. 1995. Relationship of marbled murrelets with habitat characteristics at inland sites in California. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds), *Ecology and conservation of the marbled murrelet*. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA.
- Morrow, J.E. 1980. The freshwater fishes of Alaska. University of British Columbia, Animal Resources Ecology Library, Vancouver, British Columbia. 248 p.

- Moyle, P. B., P. J. Foley, and R. M. Yoshiyama. 1992. Status of green sturgeon, *Acipenser medirostris*, in California. Final Report submitted to the National Marine Fisheries Service, University of California, Davis. 11 pp.
- Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Mainwright, W.S. Grant, F.K. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon and California. U.S. Department of Commerce, NOAA Technical Memorandum – NMFS-NWFSC-35, 443 pp.
- NMFS. 1991. Final Recovery Plan for the humpback whale. US Department of Commerce, National Marine Fisheries Service, Office of Protected Resources. 118pp.
- NMFS. 2008. Preliminary Scientific Conclusion of the Review of the Status of Five Species of Rockfish: Bocaccio (*Sebastes paucispinis*), Canary Rockfish (*Sebastes pinniger*), Yelloweye Rockfish (*Sebastes ruberrimus*), Greenstriped Rockfish (*Sebastes elongates*), and Redstripe Rockfish (*Sebastes proriger*) in Puget Sound, Washington. Northwest Fisheries Science Center, National Marine Fisheries Service. Seattle, Washington. December 2, 2008.
- NMFS. 2009. Endangered and Threatened Wildlife and Plants: Proposed Endangered, Threatened and Not Warranted Status for Distinct Population Segments of Rockfish in Puget Sound. Federal Register. Vol. 74, No. 77, pp. 18516-18542.
- Olesiuk, P. E., M. A. Biggs, G. M. Ellis, S. J. Crockford, and R. J. Wigen. 1990. An assessment of the feeding habits of harbor seals (*Phoca vitulina*) in the Strait of Georgia, British Columbia, based on scat analysis. Can. Tech. Rep. Fish. and Aquat. Sci. No. 1730.
- Osborne, R., J. Calambokidis & E.M. Dorsey, 1988, A guide to marine mammals of Greater Puget Sound. Island Publishers, Anacortes, Wash. 191pp.
- PFMC, 2003. Groundfish Bycatch Program EIS: Appendix A. Biological Environment: Distribution, Life History, and Status of Relevant Species. Pacific Fisheries Management Council. August 11, 2003.
- Pitcher, K. W. and F. H. Fay. 1982. Feeding by Steller sea lions on harbor seals. Mar. Fish. Rev. 63:70-71.
- Quinn, TP. 2005. The Behavior and Ecology of Pacific Salmon and Trout. University of Washington Press, Seattle. 378 pages.
- Radtko, L. D. 1966. Distribution of smelt, juvenile sturgeon, and starry flounder in the Sacramento-San Joaquin Delta with observations on food of sturgeon. Pages 115-129 in: J. L. Turner and D. W. Kelley (editors). Ecological studies of the Sacramento-San Joaquin Delta Part II: Fishes of the Delta. California Department of Fish and Game Fish Bulletin.

- Ralph, C. J., G. L. Hunt, M. G. Raphael, and J. F. Platt. 1995. Ecology and Conservation of the Marbled Murrelet in North America: an Overview. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Platt (eds), Ecology and conservation of the marbled murrelet. (General Technical Report PSW-GTR-152). U.S. Forest Service, Pacific Southwest Research Station. Albany, CA. 420 p.
- Rieman, B.E. and J.D. McIntyre. 1993. Demographic and Habitat Requirements for Conservation of Bull Trout. General Technical Report. U.S. Forest Service Intermountain Research Station. Ogden, UT. 38 pp.
- REEF, 2009. Bocaccio (*Sebastes paucispinis*) Distribution Report. The Reef Environmental Education Foundation. Data range 01/01/1996 to 12/31/2007. <http://www.reef.org/db/reports/dist/PAC> . Accessed May 26, 2009.
- REEF, 2009. Canary Rockfish (*Sebastes pinniger*) Distribution Report. The Reef Environmental Education Foundation. Data range 01/01/1996 to 12/31/2007. <http://www.reef.org/db/reports/dist/PAC> . Accessed May 20, 2009.
- REEF, 2009. Yelloweye Rockfish (*Sebastes ruberrimus*) Distribution Report. The Reef Environmental Education Foundation. Data range 01/01/1996 to 12/31/2007. <http://www.reef.org/db/reports/dist/PAC> . Accessed May 20, 2009.
- Richards, L.J. 1986. Depth and habitat distributions of three species of rockfish (*Sebastes*) in British Columbia: observations from the submersible PISCES IV. Environ. Biol. Fishes 17: 13-21.
- Rice, D.W. 1978. The humpback whale in the North Pacific: Distribution, exploitation, and numbers, In: K.S. Norris and R.R. Reeves (Eds.). Report on a workshop on problems related to humpback whales, (*Megaptera novaeangliae*) in Hawaii. Rep. MMC-77/03 to U.S. Marine Mammal Commission, Washington D.C. (NTIS #PB280 794). pp 29-44.
- Ricker, W.E., D.F. Manzer, and E.A. Neave. 1954. The Fraser River eulachon fishery, 1941-1953. Fisheries Research Board of Canada, Manuscript Report No. 583. 35 p.
- Saulitis, E., C. Matkin, L. Barrett-Lennard, K. Heise and G. Ellis. 2000. Foraging strategies of sympatric killer whale (*Orcinus orca*) populations in Prince William Sound, AK. Marine Mammal Science 16:94–109.
- Shaffer, J.A., D. Penttila, M. McHenry, and D. Vilella. 2007. Observations of eulachon, *Thaleichthys pacificus*, in the Elwha River, Olympic Peninsula Washington. Northwest Science 81: 76-81.
- Smith, W.E. and R.W. Saalfeld. 1955. Studies on the Columbia River smelt, (*Thaleichthys pacificus*). Washington Department of Fisheries, Fisheries Research Papers 1(3): 3-26.
- Spangler, E.A.K. 2002. The ecology of eulachon (*Thaleichthys pacificus*) in Twentymile River, Alaska. M.S. Thesis. University of Alaska, Fairbanks.

- Stanley, R.D., K. Rutherford and N. Olsen. 2001. Preliminary status report on bocaccio (*Sebastes paucispinis*). Stock Assessment Division, Science Branch, Pacific Region, Fisheries and Oceans, Canada. Pacific Biological Station, Nanaimo, BC.
- Stevens, T.A., D.A. Duffield, E.D. Asper, K.G. Hewlett, A. Bolz, L.J. Gage, and G.D. Bossart. 1989. Preliminary findings of restriction fragment differences in mitochondrial DNA among killer whales (*Orcinus orca*). Canadian Journal of Zoology 67(10):2592-5.
- Stewart, Ian J. 2007. Status of the U.S. Canary Rockfish resource in 2007. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle WA. October 15, 2007.
- Strachan, G., M. McAllister, and C. J. Ralph. 1995. Marbled murrelet at-sea and foraging behavior. In C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds.), Ecology and conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station.
- Strong, C.S., J. Jacobsen, D.M. Fix, M.R. Fisher, R. Levalley, C. Striplen, W.R. McIver, and I. Gaffney. 1996. Distribution, abundance, and reproductive performance of marbled murrelets along the northern California coast during the summers of 1994 and 1995 Final report. Crescent Coastal Research and Mad River Biologists. Prepared for the Marbled Murrelet Study Trust, McKinleyville, CA.
- Sturdevant, M.V., T.M. Willette, S. Jewett, E. Deberc. 1999. Diet composition, diet overlap, and size of 14 species of forage fish collected monthly in PWS, Alaska, 1994-1995. Chapter 1. Forage Fish Diet Overlap, 1994-1996. Exxon Valdez Oil Spill Restoration final report 98163C, 12-36.
- U.S. Fish and Wildlife Service (USFWS). 1998. Bull Trout Interim Conservation Guidance. U.S. Fish and Wildlife Service, Lacey, WA. 47 pp.
- Washington Department of Fish and Wildlife (WDFW). 2009. Recreation Groundfish: Rockfish Common to the Waters off Washington State. Recreational yelloweye rockfish harvest. <http://wdfw.wa.gov/fish/bottomfish/rockfish.htm#yelloweye> Accessed May 26, 2009.
- — —. 1993a. Status of the Steller (northern) sea lion (*Eumetopias jubatus*) in Washington. Draft unpublished report. Olympia, WA.
- — —. 1993b. Washington State Salmon and Steelhead Stock Inventory (SaSSI) 1992. Appendix One. Puget Sound Stocks. North Puget Sound Volume.
- — —. 1993c. Status of the marbled murrelet (*Brachyramphus marmoratus*) in Washington. Unpublished report. Washington Department of Fish and Wildlife, Olympia, WA.
- WDFW (Washington Department of Fish and Wildlife) and ODFW (Oregon Department of Fish and Wildlife). 2001. Washington and Oregon eulachon management plan. Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife. Online at http://wdfw.wa.gov/fish/creel/smelt/wa-ore_eulachonmgmt.pdf [accessed April 2009].

- Washington, P.M., R. Gowan, and D.H. Ito. 1978. A biological report on eight species of rockfish (*Sebastes* spp.) from Puget Sound, Washington. Northwest and Alaska Fisheries Center Processed Report, National Marine Fisheries Service, Seattle.
- Wiles, G. J. 2004. Washington State status report for the killer whale. Washington Department Fish and Wildlife, Olympia, WA.
- Wilson, M.F., R.H. Armstrong, M.C. Hermans, and K. Koski. 2006. Eulachon: A review of biology and an annotated bibliography. AFSC Processed Report 2006-12 (August). National Marine Fisheries Service, Alaska Fisheries Science Center, Juneau, Alaska. 229 p.
- Wydoski, R.S. and R.R. Whitney. 1979. Inland fishes of Washington. University of Washington Press, Seattle, WA.
- Wyllie Echeverria, T. 1987. Thirty-four species of California rockfishes: maturity and seasonality of reproduction. Fish. Bull. 85:229-250.
- Yamanaka, K.L., L.C. Lacko, R. Withler, C. Grandin, J.K. Lochead, J.C. Martin, N. Olsen and S.S. Wallace. 2006. A review of yelloweye rockfish *Sebastes ruberrimus* along the Pacific coast of Canada: biology, distribution, and abundance trends Research Document 2006/076.



United States Department of the Interior

FISH AND WILDLIFE SERVICE



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In Reply Refer To:
13410-2010-I-0505

Daniel M. Mathis
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Federal Highway Administration
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711 S. Capitol Way, Suite 501
Olympia, Washington 98501

Dear Mr. Mathis:

Subject: Alaskan Way Viaduct Bored Tunnel Alternative Project

This correspondence is in response to your request for consultation under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). The Washington State Department of Transportation (WSDOT), as the non-Federal representative for the Federal Highway Administration, submitted a letter and Biological Assessment for the above referenced project. The letter requests the U.S. Fish and Wildlife Service's (Service) concurrence with a determination of "may affect, not likely to adversely affect" for the Coastal-Puget Sound bull trout (*Salvelinus confluentus*) and its designated critical habitat.

The Federal Highway Administration will provide funding to WSDOT in order to replace the deteriorating State Route-99 (SR-99) also known as the Alaska Way Viaduct (AWV) with a bored tunnel from South Royal Brougham Way in the south to Roy St. in the north. This information was received by the Service on August 16, 2010. A complete record of this consultation is on file at the Service's Washington Fish and Wildlife Office in Lacey, Washington.

Currently the AWV is structurally unsound and vulnerable to failure during an earthquake. The Bored Tunnel Alternative would replace SR 99 with a bored tunnel, construct south and north portals and associated tunnel operations buildings, relocate utilities currently on or under the viaduct, remove the existing viaduct, decommission the Battery Street Tunnel (BST), improve surface streets in the tunnel's south and north portal areas, manage groundwater during construction, and provide stormwater treatment and detention. The project is proposed to begin construction in 2011 and take approximately 66 months to complete. The following summarizes the three primary components of the project:



- South Portal Area (Enclosure A): Full northbound and southbound access to and from SR 99 will be provided in the south portal area between S. Royal Brougham Way and S. King St. Beginning at S. Royal Brougham Way, SR 99 will be a side-by-side, surface roadway that will transition to a cut-and-cover tunnel. The cut-and-cover tunnel will be 1,030 ft long. On and off ramp access to surface streets are provided to S. Charles St., S. Dearborn St., Alaskan Way S., and the east frontage road. A tunnel operations building will be constructed in the block bounded by S. Dearborn St., Alaskan Way S., and the new Railroad Way S. access road. This building will house the tunnel control systems, ventilation systems, maintenance shop functions, equipment storage, and systems support.
- North Portal Area (Enclosure B): Northbound and southbound access to and from SR 99 will be provided in the north portal area between Roy St. and Thomas St. Beginning at Roy St. SR 99 will be a side-by-side, surface roadway that will transition to a cut-and-cover tunnel. The cut-and-cover tunnel will be 440 ft long. A tunnel operations building, similar to that in the south portal area, will be constructed between Thomas and Harrison St. on the east side of Sixth Ave. N. On and off access to surface streets are provided to Republican St., Sixth Avenue N., and Aurora Avenue. Numerous surface streets will be reconfigured and improved.
- Bored Tunnel (Enclosure C): The cut-and-cover tunnels at the south and north portal areas provide the transition into a deep bored tunnel. The tunnel will be approximately 1.7 miles long with a 49-foot interior diameter. The tunnel will be constructed using a tunnel boring machine with all tunnel construction equipment and staging being conducted from the south portal area. Traveling from the south, the bored tunnel begins just south of S. King St., continues under Alaskan Way S. to approximately S. Washington St. where it will curve slightly away from the waterfront and then travel under First Avenue beginning at approximately University St. At Stewart St., it will travel in a northern direction under Belltown. At Thomas St., the bored tunnel transitions into the north portal area cut-and-cover tunnel where it will transition to a side-by-side surface roadway near Harrison St.
 - Tunnel spoils will be removed through the south portal area to Terminals 25 and 46 for stockpiling before disposal. Approximately 800,000 cubic yards of material will be removed during tunnel excavation. Another 650,000 cubic yards will be removed for the north and south portal areas. Clean spoils will be barged from Terminal 46 on the Seattle waterfront to the Mats Mats quarry in Port Ludlow, Washington. The terminal, the quarry, and the shipping lane are existing commercial facilities or routes in areas zoned for industrial and barge use. Approximately 1 to 2 barge loads per day will be transported to the quarry. Any contaminated soils will be trucked to an existing upland disposal location permitted to accept contaminated material.

Other project components include the following:

- Utility Relocation – The project proposes to protect as many existing utilities in place as possible. Some utility relocation will be required before construction of the south and north portals. If utilities are relocated during construction, they will be buried as close to the existing alignment as possible. Utilities to be relocated include water, gas, power, communications, and sewer lines.
- Demolition of the Existing Viaduct – The existing viaduct is a four- to seven-lane stacked elevated roadway, approximately 11,000 ft long. The existing viaduct will be demolished once the tunnel is operational. Demolition will take approximately nine months. Materials resulting from viaduct demolition will be broken concrete and severed reinforcing steel. Some of the concrete rubble will be recycled and used to fill the BST. Any remaining debris will be trucked off-site for disposal to a commercial facility permitted to accept construction debris. City-designated truck routes will be used for transporting debris.
- Decommissioning of the Battery Street Tunnel – The BST runs for a length of approximately 2,200 ft underneath Battery St. at the north end of the existing viaduct. Decommissioning will require disconnecting the power, water, and drainage lines, filling the void space with suitable material, closing all of the street access vents, and blocking off the portals at both ends of the tunnel. The material used to fill void space will either be from imported fill or rubble debris generated from the viaduct demolition. The remaining space will be capped with a fluid material such as controlled density fill which is a self-compacting, cement material.

The proposed project is located in an urban setting with close to 100 percent impervious surface levels. No in-water work is proposed. However, during project construction and operation, water management will be needed to minimize environmental impacts from the project. The project area encompasses nearly 55 acres consisting of 12 threshold discharge areas (TDAs). Two types of drainage systems are within the project area:

1. Separated storm drainage system, in which stormwater and wastewater are carried in separate pipes. In separated areas, stormwater runoff from the project area is collected in a storm drain system that discharges directly to either Elliott Bay or Lake Union.
2. Combined sewer system, which conveys wastewater and stormwater in a single pipe. In these areas, stormwater runoff from the project area combines with wastewater from surrounding areas. Under normal conditions, this wastewater is routed to the West Point Treatment Plant (WPTP) via a large conveyance pipe (the Elliott Bay Interceptor [EBI] that runs underneath Second Avenue) before it is discharged through a deep water outfall to Puget Sound. During large storm events, stormwater can exceed the capacity of the pipe. Under these conditions, the excess flow is discharged untreated to Elliott Bay to prevent sewer backups. These events are referred to as combined sewer overflows (CSOs).

The type of drainage system, the existing water quality treatment, and the receiving water body for each TDA within the project area are shown in Table 1. The outfall locations are shown in Enclosure D. For combined sewer systems, the WPTP discharges from an outfall approximately 490 ft offshore in 60 ft of water in Elliott Bay. All CSO events discharge through outfalls located along the nearshore of Elliott Bay. The Broad TDA is a storm drainage system that discharges to Lake Union through an outfall located along the shore of south Lake Union.

Table 1: Outfalls , drainage systems, existing water quality treatment and receiving waterbodies per TDA.

TDA	Outfall Associated With TDA	Drainage System Type	Existing Water Quality Treatment	Receiving Water Body
Royal Brougham South	Kingdome	Low-flow diversion	WPTP ¹	Puget Sound or Elliott Bay
Royal Brougham North	Kingdome	Combined	WPTP ¹	Puget Sound or Elliott Bay
King	King	Combined	WPTP ¹	Puget Sound or Elliott Bay
Washington	Washington	Separated storm	None	Elliott Bay
Madison	Madison	Separated storm	None	Elliott Bay
Seneca	Seneca	Separated storm	None	Elliott Bay
University	University	Separated storm	None	Elliott Bay
Pike	Pike	Combined	WPTP ²	Puget Sound or Elliott Bay
Pine	Pine	Storm	None	Elliott Bay
Vine	Vine	Combined	WPTP ²	Puget Sound or Elliott Bay
Dexter	Denny	Combined	WPTP ²	Puget Sound, Elliott Bay
Broad	Broad	Storm	None	Lake Union

¹ Discharges directly to Elliott Bay with no treatment during high flows

² Flows from these TDAs are normally sent to WPTP for treatment. During large storms, flows are directed to the Elliott West Combined Sewer Overflow Control Facility. During overflow events, wastewater discharges untreated to Elliott Bay.

The following describes the approach to managing water during project construction and operation.

Groundwater Dewatering: The project will require dewatering to manage groundwater infiltration during construction at both the north and south portals. The groundwater table at the north end of the project is more than 80 ft below the surface, so dewatering at the north end will be minimal. The groundwater table at the south end is approximately 6 to 10 ft below the surface, requiring extensive dewatering during construction. Pumping rates may range from 100 to 1,000 gallons per minute (gpm) per 1,000 ft of excavation (between 144,000 to 1,440,000 gallons per day, or 0.2 to 2 cubic ft per second [cfs]). Most dewatering will take place within the cut-and-cover section of the tunnel at the south portal area; by the time tunnel boring begins at S. King St. the tunnel will be well below the groundwater table. Groundwater will be disposed of by one of two means:

1. Discharge to the combined sewer system. Volumes will be constrained by the King County Wastewater Discharge Permit, which limits discharges according to time of year and location. Discharge limitations will prevent any increase in the volume or

frequency of overflow events. Once the discharge limit has been reached, groundwater will be reinjected into the ground (see below). Contaminated water will not be discharged to the combined sewer system. Any contaminated water will be treated before disposal, or transported offsite for disposal. As with contaminated soils, contaminated water will be transported to existing commercial facilities permitted to accept contaminated materials.

2. Reinjection near the construction site in accordance with the Washington State Department of Ecology's Underground Injection Control Program. Reinjection will avoid discharge to the combined sewer system, and help prevent settling. The location and number of injection wells depends on site accessibility, the required groundwater level maintenance, and the sensitivity of adjacent utilities and structures.

Slurry Water: If a slurry tunnel boring machine is used to construct the tunnel, the machine will create a slurry of water, bentonite, and tunnel spoils at the excavation face. The slurry mix will be piped to a separation plant where solids will be removed and the treated slurry water returned to the tunnel. Slurry water will not be discharged to Elliott Bay.

Construction Stormwater: No construction stormwater will be discharged to the separated storm system during project construction to ensure that no untreated water enters Elliott Bay or Lake Union. Stormwater will be discharged to the combined sewer system and conveyed to the WPTP for treatment. WSDOT will obtain and comply with a King County Wastewater Discharge Permit. Water will be treated to prevent water quality degradation and to limit the amount of water that can be discharged to the system to minimize any potential increase in the frequency or volume of CSOs. As part of the discharge permit, the contractor will be required to demonstrate they have the capacity to store stormwater for the duration of an overflow event.

Twenty-three staging areas have been identified for the project. Equipment staging and stockpiling will occur at least 200 ft from surface waters. Depending on the location of each staging area, some stormwater from the staging areas will discharge to the combined system, and some will drain to the separated stormwater system. Stormwater leaving staging areas will be treated by implementing BMPs to address water quality. All staging areas are paved, and are already pollution-generating impervious surfaces (PGIS). Project staging will not create additional PGIS or result in activities that would increase levels of pollutants discharged to the stormwater system.

Water Management within the Tunnel: Since it is not exposed to rainfall, runoff will be limited from the underground surfaces of the tunnel to the following sources: (1) bypass water (rainwater that enters the portals during storms or is carried into the tunnel by wet vehicles) (2) seepage from groundwater, and (3) water used as part of the cleaning and fire suppression systems. Table 2 provides estimated frequencies, rates, and durations of these events. Since the south portal is closer to the tunnel's lowest vertical elevation, drainage and tunnel seepage will be conveyed to the tunnel sump, approximately 3,000 ft north of the south portal, and pumped to the south to the combined sewer system. Drainage within the tunnel will be designed and constructed to contain spills of hazardous materials. If a spill

occurs, the tunnel pumps will be shut down to prevent discharge of material to the combined sewer system until the spill can be cleaned.

Table 2: Estimated frequencies, rates and durations of water within the bored tunnel.

Event	Frequency	Rate (gpm)	Duration
Tunnel seepage	Continuous	22	Continuous
Tunnel washdown	1-2 times per year	35 to 70	Several days
Fire suppression valve testing	Once per year	100	Intermittently over several days
Fire suppression sprinkler system testing	Every five years	2500	Intermittent

Bypass Water

Very little water is expected to enter the portals during storms. Rainfall at the portals will be captured and directed away from entering the tunnel. The north and south tunnel approaches will contain depressed sections, called boat sections, that will collect runoff via drains located at the tunnel entrance. Less than 0.1 cfs is expected to enter the tunnel itself during storm events. This water will be discharged to the combined sewer system.

Tunnel Seepage

Underground seepage is a regular occurrence in large-bore tunnels due to their placement beneath the groundwater table. Tunnel seepage is estimated at 22 gpm (0.05 cfs), which will be pumped to the south portal and discharged to the combined sewer system.

Washdown Water

The tunnel will be cleaned approximately twice yearly over a period of several days. Wash water will be water only, with no added detergents or other chemicals. Tunnel washing will generate water volumes of approximately 35 to 70 gpm. The tunnel will not be washed during rain storms to prevent exceeding the capacity of the combined sewer system. Washwater will be discharged to the combined sewer system.

Fire Suppression

Two types of fire suppression system testing will occur. Annual valve testing will take place approximately once per year and will generate volumes of approximately 100 gpm (0.22 cfs). The sprinkler system will be tested approximately once every five years. Sprinkler testing will generate much higher volumes of water, up to 2,500 gpm (5.6 cfs). Testing will not take place during wet weather to prevent exceeding the capacity of the combined sewer system. As with washdown water, water from fire suppression system testing will be discharged to the combined sewer system. Actual fires within the tunnel are anticipated to be very rare. For comparison, the last time the fire suppression system was used in the I-90 Mt. Baker tunnel was in 1994. Transport of hazardous materials will not be permitted through the bored tunnel.

Stormwater Runoff Management during Project Operations

The project area contains 12 TDAs. During rainfall events, the stormwater runs off the viaduct and drains untreated into Elliott Bay. After the viaduct is removed it will no longer contribute runoff to seven TDAs: Washington, Madison, Seneca, University, Pike, Pine and Vine. The project therefore will not modify or discharge stormwater to these TDAs once the project is complete.

The project will generate stormwater at the south and north portal areas in the remaining five TDAs. The project will not create any new PGIS, and approximately 10 acres of PGIS will be converted to non-PGIS by replacing existing streets and parking lots with tunnel operations buildings, sidewalks, and landscaped areas. Table 3 shows the existing and proposed PGIS at the south and north portal areas. The increase in PGIS at the Broad TDA is not due to creation of additional PGIS, but because the TDA delineation changes pre- and post-project.

Table 3: Existing and Proposed PGIS at the South and North Portals.

TDA	Existing PGIS (acres)	PGIS Post-Project (acres)	Percent Change
South Portal			
South Royal Brougham	0.65	0.27	-58.5
North Royal Brougham	6.53	3.57	-45.3
King St.	9.27	5.16	-44.4
North Portal			
Dexter	14.76	11.43	-22.6
Broad	3.76	4.47	+18.9
Total	34.97	24.9	-28.8

No detention is proposed for stormwater at the south portal. Based on hydraulic flow model simulations of the southern TDAs, detention will not reduce CSO events; in fact, the volume of discharge events may actually increase with detention due to the timing of peak flows between the larger tributary basin and the discharge from the detention vaults (City of Seattle 2009 found in WSDOT 2010a, Enclosure C). Detention will be provided for surface streets at the north portal, where flow control is required due to different stormwater system hydraulics.

Onsite water quality treatment is not proposed for stormwater discharged to the combined sewer system, as this runoff is conveyed to the WPTP for treatment. Treatment will be provided for stormwater in the South Royal Brougham and Broad TDAs with a Stormfilter vault. The Stormfilter will be maintained by Seattle Public Utilities and inspected on a yearly basis, or after major storms. Sediment will be removed from the vault and filters will be replaced as needed (generally every 1 to 3 years).

The South Royal Brougham TDA is also part of the SR-99 S. Holgate St. to S. King St. Viaduct Replacement Project that is currently under construction. That Stormfilter vault

for the bored tunnel project is being installed to treat runoff from the SR-99 S. Holgate St. to S. King St. Viaduct Replacement Project. Additional filters will be added to treat the stormwater resulting from the bored tunnel project.

Numerous conservation or minimization measures are included in the project design to avoid or minimize potential effects to listed species. Some of the conservation measures include:

1. Construction spoils will not be stockpiled within 200 ft of surface waters.
2. Spoils will be loaded and unloaded from the barge in such a way as to prevent any material from falling into Elliott Bay or onto the ground, where it would be washed into the bay.
3. Construction stormwater will not be discharged to the separated storm system to ensure that untreated water does not enter Elliott Bay. Construction stormwater will be discharged to the combined sewer system. The contractor will be required to demonstrate they have the capacity to store construction stormwater for the duration of an overflow event.

Because the proposed project discharges stormwater into two separate waterbodies, the effects analysis on bull trout has been divided up into two sections, Elliott Bay and Lake Union. The overall effects from the project relating to pollutant loading is similar at both locations.

Elliott Bay

Elliott Bay is considered foraging, migration, and overwintering habitat for bull trout, and bull trout will use this area as they migrate to and from core areas. The distribution of bull trout in marine waters is closely timed with the distribution of forage fish and their spawning beaches (Kraemer 1994). Goetz et al. (2004) documented that bull trout were most abundant in Puget Sound waters during spring and late summer and relatively few were captured during the fall and winter months when adults are near spawning areas.

Relatively few bull trout have been observed or captured within nearshore areas of Elliott Bay or the surrounding area. Sixteen char have been captured in the Golden Gardens area north of Elliott Bay from 1929 to 2002. Eight adult and subadult bull trout were caught in Shilshole Bay at the entrance of the Lake Washington Ship Canal in 2000 (Footen 2000, 2003). A total of 34 bull trout have been captured in Shilshole Bay since 1949. In Elliott Bay, one adult bull trout was captured in a Muckleshoot Tribal net near Pier 91 (Brunner 1999) and one bull trout was observed during snorkeling surveys at the Olympic Sculpture Park in June 2009 (J. Toft, UW, pers. comm. 2010). Fifteen bull trout have been captured in the lower Duwamish River in April, May, August, and September of various years.

The Service designated critical habitat for the Coastal-Puget Sound bull trout on September 26, 2005 (70 FR 56212). On October 18, 2010, the Service revised the 2005 critical habitat designation (75 FR 63898) based on extensive review of the previous critical habitat proposals and designation, as well as new information received during the 2010 public review process.

The final rule identified nine primary constituent elements (PCEs) essential for the conservation of bull trout. Elliott Bay is designated critical habitat for bull trout. Five of the nine PCEs of bull trout critical habitat are present in Elliott Bay:

- PCE #2: Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
- PCE #3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- PCE #4: Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
- PCE #5: Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.
- PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The proposed project has the following overall impacts:

- Construction noise;
- Effects associated with barging of tunnel spoils;
- Groundwater management during construction and operation; and
- Impacts to water quality from stormwater runoff in the project area.

Construction noise, barging, and groundwater management will not result in impacts to bull trout in Elliott Bay. Construction noise results in increased overwater or in-air noise that will not transmit underwater and not impact bull trout. The tunnel will be located over 900 ft from Elliott Bay. Tunnel boring will cause increased noise and vibrations, but the vibrations are not expected to result in any impacts to bull trout in Elliott Bay. Clean tunnel spoils will be transported by barge to the Mats Mats quarry in Port Ludlow, Washington. One to two barge trips daily will occur for the duration of the tunnel excavation (as long as two years). The barge route is along existing shipping lanes used by large container ships and will not result in impacts to bull trout. Groundwater that is intercepted during construction will be discharged to the combined sewer

system or during rain events will be injected into the ground. Groundwater management will not result in changes to groundwater inflow into Elliott Bay and therefore have no impact on bull trout.

Water quality from stormwater runoff: Pollutants in stormwater runoff can contaminate surface waters at concentrations toxic to fish and other aquatic life (Spence et al. 1996). Exposure to stormwater pollutants cause a range of physiological and behavioral effects, resulting in, but not limited to, reduced growth, impaired migratory ability, impaired reproduction, and avoidance behavior. The extent and severity of these effects vary depending on the extent, timing, and duration of the exposure, ambient water quality conditions, the species and life history stage exposed, pollutant toxicity, and synergistic effects with other contaminants (EPA 1980). The primary pollutants of concern in stormwater from road surfaces are total suspended solids (TSS), total zinc (TZn), dissolved zinc (DZn), total copper (TCu), and dissolved copper (DCu) (WSDOT 2008, 2009).

Pollutant loading is the total quantity of a pollutant in stormwater runoff. There are numerous complex factors and interactions that occur in aquatic ecosystems to determine the ultimate significance or impact of pollutant loading. There is no singular, measurable outcome or indicator that can be used to determine the overall effect of pollutant loading. Stormwater analyses focus on pollutant concentrations to determine potential impacts to the aquatic environment and listed species. Pollutant concentration contributes to pollutant loading, but the effects of pollutant loading itself, for instance how loading causes a gradual building up in a pollutant in the environment, is difficult to determine. Pollutant loading, however, does exert a functional influence at the community level and is a reasonable indirect measure with which to gauge potential effects.

The Service relies on toxicity data for other salmonids when specific information on toxicity to bull trout is not available. Due to taxonomic similarity, species in the Salmonidae family are expected to be better surrogates for bull trout than non-salmonids. However, Hansen et al. (2002) demonstrate that even among the members of Salmonidae specific sensitivities to chemical contaminants and mixtures of contaminants may differ.

Even at low concentrations, copper is toxic to fish. In addition, studies have shown that low concentrations of copper result in reduced olfactory sensory responsiveness and avoidance behavior. Olfactory inhibition decreases the ability of salmonids to recognize and avoid predators and navigate back to natal streams for spawning purposes, resulting in decreased adult spawning success and increased predation on juvenile salmonids. Baldwin et al. (2003) found that short pulses of DCu, at concentrations as low as 2 µg/L reduced olfactory sensory responsiveness by approximately 10 percent within 10 minutes, and by 25 percent within 30 minutes. In saltwater, Chinook salmon (*Oncorhynchus tshawytscha*) have been found to avoid water containing copper (F. Sommers, NMFS. pers. comm. 2010). Rainbow trout (*O. mykiss*) fry have also been found to avoid copper concentrations as low as 0.1 µg/L (Folmar 1976; EPA 1980).

Zinc occurs naturally in the environment and is an essential trace element for most organisms. However, in sufficient concentrations and through bioaccumulation by aquatic organisms, excess zinc is toxic. Similarly to copper, salmonids have been found to avoid zinc concentrations as low as 5.6 µg/L (Sprague 1968).

Pollutants in stormwater not only result in water quality degradation, but many adsorb to particulates and are sequestered in sediments where they enter the food chain via the benthic community (benthic invertebrates are a prey species for salmonids). When benthic invertebrates are exposed to and assimilate many of these pollutants, they can become sources of contamination for salmonids that prey on them. Perhaps more importantly, declining numbers and diversity of invertebrates provide less food for salmonids at critical times in their lives.

The post-project condition is likely to improve the overall trajectory of water and sediment quality impairment in the project area. The project will significantly reduce pollutant loading to Elliott Bay, though loading will continue and may continue to degrade the aquatic community.

The project area consists of 11 TDAs that drain to Elliott Bay, of which 4 will generate stormwater runoff after the existing viaduct is removed and the south tunnel portal is constructed. Under most circumstances, runoff from four TDAs (Royal Brougham South and North, King, and Dexter) is directed to the WPTP for treatment and discharged via a deep water outfall to Elliott Bay. However, during high flows, untreated stormwater may discharge to Elliott Bay through several combined sewer outfalls along the Seattle waterfront. The analysis for these four TDAs addresses those occasions when flows exceed the capacity of the combined sewer system and discharge untreated to Elliott Bay.

To conduct the stormwater analysis, WSDOT modeled the flows using the “pipe within a pipe” scenario. The analysis models stormwater as if there is a separate pipe that carries only the flows from the TDA to the outfall. The stormwater does not go into a larger pipe or system with non-project stormwater. This analysis does not factor in any beneficial or detrimental effects that may occur within the system from non-project water. Beneficial effects occur through dilution from water from non-PGIS areas. Detrimental effects occur through synergistic effects of pollutant mixing within the system.

This approach provides a good analysis for all but the Dexter TDA, which discharges through the Denny Outfall through the combined sewer system. This system is more complex. Under normal conditions, runoff is sent to the WPTP for treatment. During rainstorms, when the combined system reaches capacity, flows are diverted into the Mercer Tunnel and stored until capacity in the combined system is restored, and flows can be transported to the WPTP. In larger storms, the Mercer Tunnel fills up, and flows are routed to the Elliott West Combined Sewer Overflow Facility, a treatment facility on Elliott Ave W. near the Seattle waterfront. After treatment, flows are discharged 490 ft offshore through a 60-foot-deep outfall. During the largest storms, when the pumping capacity of the Elliott West facility is exceeded, untreated wastewater is discharged directly to Elliott Bay through the Denny Outfall. Even with this complex system, the analysis for the Denny Outfall uses a “pipe within a pipe” scenario. During a CSO event, stormwater from the Dexter TDA goes directly out the Denny Outfall.

Overall, pollutant loading of TSS, TCu, DCu, TZn, and DZn from the project area discharged to Elliott Bay will decrease by 40 percent or more (Table 4, WSDOT 2010a). Pollutant loads discharged at the WPTP outfall are similarly reduced. Loading for all pollutants of concern discharged at the WPTP outfall decreases by approximately 34 percent, reflecting the decrease in PGIS in the project. The following analysis addresses the pollutants from 4 of the 12 TDAs, discharging at 3 outfalls into Elliott Bay. The expected reduction in pollutant loading does not account for the decrease in pollutants generated by traffic on the current viaduct. When the viaduct is removed, traffic levels on the surface streets below the viaduct will be higher than current conditions, but the stormwater generated from traffic on the viaduct is no longer running off and discharging into Elliott Bay. With the existing conditions, approximately 56,100 vehicles travel northbound on the viaduct (top level of the viaduct) (WSDOT 2010b). Approximately 11,100 vehicles travel on the surface street of Alaskan Way. The stormwater from both these roads discharge into Elliott Bay. When the viaduct is removed, the stormwater from the 56,100 vehicles is removed as these cars go through the tunnel. The WSDOT estimates that by 2030 approximately 17,800 vehicles will be on Alaskan Way. This reduces pollutant loading from approximately 38,300 vehicles that is not identified in Table 4.

Table 4: Pre- and post-project pollutant loading by discharge location (WSDOT 2010a).

TDA	Scenario	Pollutant Load (lb/yr)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham	Existing	158	0.05	0.02	0.31	0.12
	Proposed	81	0.03	0.01	0.15	0.06
	Percent reduction	49	40	50	51	58
King	Existing	288	0.07	0.02	0.45	0.13
	Proposed	162	0.04	0.01	0.25	0.07
	Percent reduction	43	43	50	47	46
Denny	Existing	114	0.03	0.01	0.17	0.05
	Proposed	88	0.02	0.01	0.14	0.04
	Percent reduction	23	33	0	22	22
WPTP	Existing	801	1.64	0.79	7.31	5.88
	Proposed	530	1.08	0.51	4.84	3.88
	Percent reduction	34	34	35	34	34

The ambient DCu and DZn concentrations for Elliott Bay are approximately 0.7 and 4.1 µg/L, respectively (Curl et al. 1988 as cited in WSDOT 2010a). Given the uncertainties of the numerous variables affecting ambient concentrations of pollutants in Elliott Bay, it is difficult to specifically quantify the likelihood of, or extent to which, pollutant loading may result in an exceedance of biological thresholds.

Pre- and post-construction pollutant concentrations do not change because the stormwater analysis uses the “pipe within a pipe” model that assumes that stormwater discharges untreated to Elliott Bay during CSO events (Table 5). Concentrations of TSS in that TDA decrease by 91 percent for TSS, 69 percent for TCu, 25 percent for DCu, 76 percent for TZn, and 41 percent for DZn (WSDOT 2010a). Pre-project pollutant concentrations in the S. Royal Brougham TDA are low because water quality treatment in this TDA will be provided as part of the SR-99 S. Holgate St. to S. King St. Viaduct Replacement Project, which is assumed to be the existing condition for this consultation.

Table 5: Pre- and Post-project Pollutant Concentrations (WSDOT 2010a)

TDA	Scenario	Pollutant Concentrations (mg/L)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham South	Existing	5.68	0.005	0.003	0.023	0.016
	Proposed	5.68	0.005	0.003	0.023	0.016
	Percent reduction	0.00	0.00	0.00	0.00	0.00
Royal Brougham North	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00
King	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00
Dexter	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00

Dilution modeling provides an estimate for the distance at which pollutant concentrations (specifically DCu and DZn) in stormwater runoff from the project reach the threshold established by the Service for potential water quality effects to salmonids: 2 µg/L above the background concentration for DCu and 5.6 µg/L above the background concentration for DZn (WSDOT 2008 as cited in WSDOT 2010a). The dilution modeling for the combined sewer system only applies to those situations when the combined system becomes overloaded, and stormwater is discharged untreated to Elliott Bay. Most of the time, water is sent to the WPTP. Only 3.8 percent of annual basin runoff in the Royal Brougham TDA is discharged as overflow events. This figure is 6.9 percent for the King St. TDA and 1.7 percent for the Dexter TDA (King County 2009b as cited in WSDOT 2010a). The dilution model conservatively assumes that 100 percent of stormwater from the TDA will be discharged to Elliott Bay during an overflow event. The analysis also assumes a 99.9th percentile flow rate to represent a likely CSO-inducing runoff event.

Dilution zones will generally be reduced post-project (Table 6). Dilution plume lengths for DZn will decrease by 4.7 ft in the Royal Brougham and King TDA (a 20 percent and 38 percent reduction, respectively) and 5.5 ft in the Dexter TDA (46 percent reduction) (WSDOT 2010a).

Table 6: Dilution Zone Dimensions (in ft) for DCu and DZn Pre- and Post-Construction (WSDOT 2010a).

TDA	Metal	Pre-Project		Post-Project	
		Length	Width	Length	Width
Royal Brougham	DCu	7.9	2.8	7.5	2.8
	DZn	23.2	6.7	18.5	6.2
King	DCu	10.4	1.8	6.7	1.4
	DZn	12.5	3.0	7.8	2.4
Dexter	DCu	10.2	2.2	5.7	1.6
	DZn	11.8	3.6	6.3	2.6

Dilution plumes for DCu will also decrease from 7.9 to 7.5 ft in the Royal Brougham TDA, 10.4 to 6.7 ft in the King TDA, and 10.2 to 5.7 ft in the Dexter TDA (WSDOT 2010a).

Dilution plumes were not modeled for the WPTP outfall. However, because pollutant loads discharged at the WPTP outfall will be reduced by 34 percent or more, the dilution plume at the WPTP outfall will be smaller post-project. An analysis performed for the SR-99 S. Holgate St. to S. King St. Viaduct Replacement Project indicated that pollutants of concern are highly unlikely to extend beyond 105 ft from the project outfall, and based on the modeling for this project, are likely much smaller than that.

In Elliott Bay, although the project will discharge pollutants at concentrations that exceed the Service's behavioral threshold for effects, the location of the three outfalls, the response of bull trout to the contaminants, the timing and duration of the CSO events, and the discharge velocities from the outfalls minimizes the potential exposure of bull trout to the pollutants.

The three outfalls discharging in Elliott Bay are separated from each other which minimizes potential exposure to bull trout by not having continuous impacts or affects. The King and Kingdome Outfalls are located approximately 1,500 ft apart. The Denny and King Outfalls are approximately 10,000 ft from each other.

The King and Kingdome (S and N Royal Brougham TDAs) Outfalls both discharge under Pier 46 along the waterfront. The King Outfall is located under the northeast edge of Pier 46 and about half of the pipe is exposed at extreme low tides. The outfall is located 150 ft offshore at a depth of 20 ft. The outfall is located at the base of the riprap along the seawall under the pier. The Kingdome Outfall is located under the west side of the pier approximately 400 ft from the southern edge. The outfall discharges 150 ft offshore at a depth of 20 ft. No information is available on habitat conditions around the outfall, but conditions should be similar to the King Outfall.

The Denny Outfall is located within Myrtle Edwards Park approximately 1,900 ft north of the Olympic Sculpture Park at Broad St. and Alaskan Way. The outfall discharges 100 ft offshore at a depth of 10 ft. The habitat around the outfall consists of sand-gravel habitat mix, cobble, and boulders (King County 2009a).

All three outfalls discharge to Elliott Bay which is a large waterbody. Unlike an outfall that discharges to a river, migrating bull trout that encounter an outfall which is discharging do not have to enter the plume, but can either avoid the discharge by migrating away from the plume or migrate around the plume. For the King and Kingdome outfalls that discharge under Pier 46, bull trout may not encounter the plume if they do not go under the pier, or they may go around the pier and avoid the plume. For the Denny Outfall that discharges 150 feet offshore, bull trout may avoid the plume by migrating closer to the shore.

As described above, salmonids avoid copper and zinc at low concentrations (F. Sommers, NMFS. pers. comm. 2010, Sprague 1968). As bull trout approach a discharging outfall, they will detect the increased copper and zinc concentrations and can avoid the discharge plume by migrating around the outfall, or swimming away from the outfall.

An analysis on the timing of the overflow events of the three outfalls discharging to Elliott Bay shows that most events occur from November through January (Table 7) when adult bull trout

are not in the marine waters but are in rivers near their spawning grounds. The average frequency and volume in Table 7 is an average of CSO events over the past 5 years. The frequency of discharges from these CSO outfalls has been greatly reduced over the past 20 years. This is due to King County and the City of Seattle reducing the number of CSO events to meet their National Pollutant Discharge Elimination System permit. The permit requires King County and the City of Seattle to control CSO events to an average of one event per year. Enclosure E shows the number of CSO events between 1991 and 2009 (King County 2010a).

Table 7: CSO Average Monthly Frequency and Volume of Discharges (WSDOT 2010a).

Month	Kingdome		King		Denny	
	Frequency (per month)	Volume (MG ¹)	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)
January	1.67	6.43	5.14	6.76	1.00	0.06
February	0.33	0.91	1.14	0.9	0.33	0.01
March	0.67	1.97	1.57	1.59	0.00	0.00
April	0.67	1.0	0.86	0.29	0.00	0.00
May	0.33	0.3	1.43	0.42	0.00	0.00
June	0.00	0.00	0.29	0.03	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00
August	0.00	0.00	0.43	0.79	0.00	0.00
September	0.00	0.00	0.43	0.05	0.00	0.00
October	0.00	0.00	1.14	1.96	0.25	0.00
November	0.5	0.11	3.86	3.94	0.00	0.00
December	2.75	11.62	2.86	4.59	1.00	2.45
Total Per Year	6.92	21.68	19.14	21.34	2.58	2.51

¹ MG = million gallons

Beginning in 2008, King County began monitoring the duration of CSO events. In 2008 and 2009, the Denny Outfall discharged six times (Enclosure F). The duration of the CSO events ranged from approximately one minute on October 26, 2009 to 13.5 hours on October 16, 2009 (King County 2009b; 2010a). The average discharge time for the Denny Outfall is approximately 3.5 hours.

The King Outfall discharged 18 times in 2008 and 2009 with an average duration of 6.5 hours (Enclosure G) (King County 2009b; 2010a). Durations ranged from six minutes on September 29, 2009, to 35.5 hours on November 6, 2009. The Kingdome Outfall discharged nine times with an average duration of 50 minutes (Enclosure H) (King County 2009b; 2010a). Durations ranged for the Kingdom Outfall from 12 minutes on November 7, 2009, to 2.5 hours on January 7, 2009.

The duration of the discharge from the outfalls is important in determining the risk of bull trout being exposed to the plume and the associated contaminants, and therefore impairing migration along the Seattle waterfront. Discharges of long duration would increase the potential for exposure if bull trout were in the area. If bull trout were not able to migrate around an outfall, discharges of long duration may prevent bull trout from migrating past the outfall. This results in decreased foraging opportunities and increased energy expenditures.

As previously stated, the location of the outfalls is also important when analyzing the potential impacts of the duration of outfall discharges to potential exposure of bull trout to pollutants. The locations of the outfalls minimize the potential exposure of the pollutants even with long discharge times. The worse-case scenario is the 35.5 hour discharge from the King Outfall. The King Outfall is located under Pier 46 and discharges at the base of the seawall in 20 feet of water. If bull trout were not able to avoid the outfall, a discharge of 35.5 hours may result in significant effects to bull trout. The bull trout would have to migrate through the plume exposing them to the pollutants. However, the locations of the outfalls and the size of the dilution plumes decrease the potential for exposure to bull trout as they are able to avoid and migrate around the plumes.

An attempt was made to analyze the plume velocity of discharges from CSO outfalls and compare them to the swimming speed of bull trout. If the outfall discharge is greater than the swimming speed of a fish, the fish is likely to be deterred from entering the discharge plume. Table 8 shows the swimming speeds for different size bull trout.

Table 8: Mean Swim Speeds for Prolonged Swimming for Bull Trout.

Fish Size (cm)	Mean Swim Speed (m/s)¹	Reference²
14.8	0.48	Mesa et al (2004)
36.2	0.74	Mesa et al (2004)
19.3	0.55	Mesa et al (2004)

¹ meters per second

² As cited by U.S. Forest Service 2010.

The King County Department of Natural Resources (DNR) (1999a) modeled outfall plume velocities to determine the number of days in which plume velocities exceeded the swimming speed for bull trout (actually modeled for coho salmon [*O. kisutch*]). A velocity of 1.0 m/s, greater than the mean swimming speed of most fish, was used to evaluate the plume velocity during a CSO discharge. Table 9 identifies the number of days in which plume velocity exceeded 1.0 m/s (King County DNR 1999a). Baseline hydrology data used for the model was September 1996 through April 1997 and May through August 1981. This data represents a typical year in terms of annual CSO volume, and includes large CSO events during both high and low flow conditions (King County DNR 1999b).

Table 9: The number of days in which the plume velocity resulting from a CSO discharge exceeded 1.0 m/s at the CSO outfalls (King County DNR 1999).

CSO Outfall	Number of Days in Which Plume Velocity Exceeded 1.0 m/s
Denny	32
King	7
Kingdome	4

The King County DNR (1999) data do not compare the modeled number of days in which plume velocities exceed 1.0 m/s against the actual number of CSO events that occurred during the modeled year. King County estimates that the modeled number is over 90 percent of the actual number of CSO events (K. Huber, King County pers. comm.). This indicates that for the majority of CSO events the discharge velocity is greater than the mean swim speed of bull trout, and bull trout should be deterred from entering the plume.

Integration and Synthesis

Bull trout use Elliott bay as a migratory corridor to and from core areas. Few bull trout have been observed or captured in Elliott Bay. Most of the known occurrences were just north of Elliott Bay at the entrance of the Lake Washington Ship Canal or in the lower Duwamish River. Bull trout have been found at these locations from April through September. This time period is when few CSO events occur, limiting exposure of bull trout to elevated pollutant concentrations. For bull trout that may be in Elliott Bay during the winter when most CSO events occur, their potential exposure to elevated pollutant concentrations is minimized by the location of the three outfalls, the duration of the CSO events, the discharge velocities of the outfalls, and the behavior of bull trout in response to the pollutants.

We expect that bull trout encountering a discharging outfall would first detect, and then likely avoid the discharge plume. The dilution plumes from each outfall are small in comparison to the overall size of Elliott Bay and bull trout are not a nearshore-obligate species. The three outfalls discharge into Elliott Bay at depths of approximately 20 ft, which is expected to enable bull trout to avoid the plumes. Bull trout not avoiding the plumes would encounter discharge velocities greater than their median swimming speed. These discharge velocities are expected to deter bull trout from entering the plume.

The three project outfalls are greater than 1,500 ft from each other. The Denny Outfall is over 10,000 ft away from the King and Kingdome Outfalls. This separation creates three dilution zones that can be avoided by bull trout, rather than one large continuous plume. As the dilution zones all less than 115 sq ft, bull trout are expected to be able to avoid the plumes, and continue feeding or migrating through Elliott Bay. The average durations of the discharges are 3.5 hours, 6.5 hours, and 50 minutes at the Denny, King, and Kingdome Outfalls, respectively. With the average number of discharges at each outfall per month (Table 7), and the duration of each discharge, the potential exposure of bull trout to the elevated pollutants concentrations is low.

Effects Determination

Based on the above analysis of project impacts on bull trout in Elliott Bay, the Service expects many of the potential effects will be extremely unlikely because:

1. No in-water work will occur.
2. Overwater or in-air noise from construction will not transmit underwater.

3. Groundwater intercepted during construction will be discharged to the combined sewer or injected in the ground.
4. Few bull trout use Elliott Bay and their distribution is closely timed with the distribution of forage fish. Bull trout that have been captured in and around Elliott Bay have been in spring and summer. Most CSO events occur in the winter when bull trout have not been found in Elliott Bay.

The Service expects the remaining effects of the project to bull trout in Elliott Bay will not be measureable for the following reasons:

1. The expected 1 to 2 barge trips per day from Seattle to the Mats Mats facility at Port Ludlow, Washington will occur in existing shipping lanes.
2. The project will result in significant reductions of overall pollutant loading.
3. Exposure to the stormwater contaminants is minimal because bull trout are expected to avoid the CSO outfalls since:
 - a. The three CSO outfalls are separated from each other by over 1,500 ft. Avoidance of three isolated areas is more possible than avoidance of one long continuous impact area.
 - b. Discharges from the CSO are not continuous, but discharge periodically throughout the year. The average number of discharges at the Denny Outfall is approximately three per year, 20 per year at King Outfall, and seven per year at the Kingdome Outfall. These discharges occur primarily in late fall through winter when adult bull trout are in streams spawning and would not be exposed.
 - c. Dilution plumes at each outfall are small compared to the size of Elliott Bay allowing bull trout to avoid the outfalls or migrate around the outfalls during discharges. Dilution plume sizes for DCu are 21 sq. ft. for the Kingdome Outfall, 9.38 sq. ft for the King Outfall, and 9.12 sq. ft. at the Denny Outfall. For DZn, dilution plume sizes are 114.7 sq. ft. for the Kingdome Outfall, 18.72 sq. ft for the King Outfall, and 16.38 sq. ft. at the Denny Outfall.
 - d. DCu and DZn result in an avoidance behavior to salmonids. Bull trout encountering low concentrations of DCu and DZn are expected to avoid higher the dilution plumes.
 - e. Discharge velocities from the three outfalls exceed the prolonged swimming speed of bull trout. Bull trout encountering a outfall that is discharging would be deterred from entering the plume because of the velocity of the discharge.
 - f. Discharges from the CSO outfalls average 3.5 hours at Denny Outfall, 6.5 hours at King Outfall, and 50 minutes at the Kingdome Outfall. The maximum duration

of a discharge is 35.5 hours at the King Outfall. With the size of the dilution zones and the location of outfalls bull trout are able to avoid or migrate around the dilution plume. The duration of the discharges would not increase the risk of exposure of bull trout to the contaminants.

The effects of the proposed project on designated bull trout critical habitat are considered insignificant for the following reasons in Elliott Bay:

- PCE #2: The stormwater discharges through the CSOs may cause a temporary impact to the migratory corridor within Elliott Bay. However, bull trout use of the Elliott Bay is limited and the size of the dilution plumes is small compared to the size of Elliott Bay. Both DCu and DZn result in avoidance behavior and bull trout would avoid the dilution plume and migrate around the plume.
- PCE #3: The proposed project will not result in any long term changes in the abundance of the prey base. The stormwater discharge through the CSOs into Elliott Bay may result in a localized decrease in the prey numbers surrounding the three outfalls. The dilution plumes associated with each outfall are small compared to the overall size of Elliott Bay.
- PCE #4: The proposed project does not alter the marine shoreline aquatic environment of Elliott Bay. The three project outfalls are existing structures. The project periodically discharges stormwater through the outfalls. The project does not involve any in-water work and therefore does not change the marine shoreline.
- PCE #5: CSO discharges into Elliott Bay will not increase water temperatures. Most of the CSO occur during the fall, winter, and early spring when water temperatures are cool and runoff discharge temperatures are also low.
- PCE #8: The project will not permanently change the quantity and quality of the water in Elliott Bay. The overall pollutant loading significantly decreases because of the removal of the existing viaduct and the discharging of the portal stormwater into the combined sewer system. Water quality will temporarily change during discharges of the CSO outfalls, but the dilution zones are small and will dilute to below the biological threshold altering or impairing biological processes and negatively impacting salmonids.

Lake Union

Lake Union is considered foraging, migration, and overwintering habitat for bull trout. Adult and subadult bull trout have been observed infrequently in Lake Washington and the Lake Washington Ship Canal. There are no records of bull trout occurrence in Lake Union. Five adult bull trout were captured within, and immediately below, the Hiram M. Chittenden Locks (Locks) in 2001. One bull trout was captured within the large locks in June; in May, one adult upstream migrant was captured in the adult steelhead trap at the head of the fish ladder. Three adult bull trout were also captured below the tailrace during the peak of juvenile salmon migration on June 18, 2001 (F. Goetz, Corps, pers. comm. 2003). Warm temperatures during the summer months (May through September) may limit bull trout use of Lake Union (Enclosure I).

Lake Union is designated critical habitat for bull trout. Seven of the nine PCEs of bull trout critical habitat are in Lake Union:

- PCE #2: Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
- PCE #3: An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- PCE #4: Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
- PCE #5: Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.
- PCE #7: A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
- PCE #8: Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
- PCE #9: Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Similar to the Elliott Bay discussion, construction noise and groundwater management will not result in impacts to bull trout in Lake Union. Surface street construction from the project is approximately 500 ft from Lake Union, and tunnel boring is over 1,200 ft. Construction will not result in any impacts to bull trout. Groundwater intercepted from the project during tunnel boring will drain to the South Portal area. The groundwater at the North Portal is more than 80 ft below the surface and will not be intercepted during construction. Groundwater management will not impact bull trout in Lake Union.

Water quality from stormwater runoff: Please see the description of overall pollutant impacts to salmonids under the *Water quality from stormwater runoff* section above under the Elliott Bay section.

The Lake Union project area consists of 1 TDA (Broad) that drains to Lake Union. For the Broad TDA untreated runoff currently discharges into Lake Union. The project will provide stormwater treatment for the Broad TDA and it will continue to discharge into Lake Union. As such, the analysis for this TDA applies to all events where treated stormwater is discharged.

Pollutant loading to Lake Union will be reduced by 79 percent for TSS, 56 percent for TCu, 63 percent for TZn, and 27 percent for DZn (Table 10). Loading for DCu in Lake Union will remain the same because the water quality treatment provided for Broad TDA is offset by the increase in TDA size. This analysis addresses the pollutants discharge out the Broad Outfall into Lake Union.

Table 10: Pre- and post-project pollutant loading by discharge location (WSDOT 2010a).

TDA	Scenario	Pollutant Load (lb/yr)				
		TSS	TCu	DCu	TZn	DZn
Broad	Existing	1710	0.43	0.1	2.64	0.75
	Proposed	351	0.19	0.1	0.98	0.55
	<i>Percent reduction</i>	79	56	0	63	27

The ambient DCU and DZn concentrations for Lake Union are 2.1 and 1.8 µg/L, respectively (Ecology 2009b as cited in WSDOT 2010a). Pre- and post-construction pollutant concentrations change at the Broad TDA because water quality treatment will be provided as part of the project (Table 11). Concentrations of TSS decrease by 91 percent for TSS, 69 percent for TCu, 25 percent for DCu, 76 percent for TZn, and 41 percent for DZn (WSDOT 2010a).

Table 11: Pre- and Post-project Pollutant Concentrations (WSDOT 2010a)

TDA	Scenario	Pollutant Concentrations (mg/L)				
		TSS	TCu	DCu	TZn	DZn
Broad	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	5.68	0.005	0.003	0.023	0.016
	<i>Percent reduction</i>	91	69	25	76	41

Stormwater treatment provided in the Broad TDA will reduce concentrations of pollutants in stormwater effluent, but because the 99.9th percentile flow is assumed to bypass water treatment facilities in the Broad TDA, pre- and post-project dilution zones for DZn in Lake Union remain the same. The 50th percentile flow data are also presented here. At that flow rate the water treatment facilities are not bypassed and the dilution zone for DZn in Lake Union is reduced from 6.67 to 4.15 ft (Table 12). There is no dilution plume for DCu in the Broad TDA because stormwater is discharged at concentrations below the threshold of 2 µg/L above background.

Table 12: Dilution Zone Dimensions (in ft) for DCu and DZn Pre- and Post-Construction (WSDOT 2010a).

TDA	Metal	Pre-Project		Post-Project	
		Length	Width	Length	Width
Broad (99.9 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a
	DZn ²	28.36	5.64	28.42	5.64
Broad (50 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a
	DZn	6.67	13.12	4.15	2.69

¹ Concentration of DCu at the Lake Union outfall is 3 µg/L, below the threshold concentration of 2.0 µg/L above background, so there is no dilution plume for DCu in this TDA.

² The dilution zone for DZn remains unchanged pre- and post-project because dilution modeling assumes the 99.9th percentile flows will bypass water quality treatment.

In Lake Union, the project will discharge DZn at concentrations that exceed the Service's behavioral threshold at the Broad Outfall. However, the location of the outfall and timing of stormwater discharge minimizes exposure of bull trout to the pollutant.

The Broad Outfall is located on the southern end of Lake Union in Waterway #3. Waterway #3 is like a narrow cove, approximately 190 ft wide, with the shoreline on the three sides being a City of Seattle park. The eastern shoreline is mostly a vertical seawall. The depth of Waterway #3 is approximately 30 ft in the north gradually decreasing to about 6 ft at the outfall.

As described above under the Elliott Bay section, the Broad Outfall discharges into a large waterbody, which allows bull trout to avoid the discharge plume. The Broad Outfall discharges at the extreme southwestern end of Lake Union, bull trout encountering the plume can bypass the plume by migrating around the shallow water of the narrow cove.

The Broad Outfall in Lake Union is a separated stormwater system and will discharge during normal rain events and not just during major storm events that cause CSO events. The Service was unable to find any information on the frequency and duration of outfall events from the Broad Outfall. Because the Broad Outfall is a separated stormwater system, most discharges will occur during the wet season (late September through April) in the Seattle area although discharges may occur year-round (Enclosure J). Bull trout use of Lake Union and the Lake Washington Ship Canal appears to be tied to the migration of juvenile salmon migration which is from late April through July, which is not during the wet season in Seattle. Adult bull trout are in the rivers spawning during the late fall and winter when most of the discharges would occur from the Broad outfall. Water temperatures from late spring through early fall may be too warm for bull trout (Enclosure I).

Integration and Synthesis

No bull trout have been observed or captured in Lake Union. Bull trout have been captured downstream of Lake Union at the Locks and upstream in Lake Washington. Potential exposure of bull trout to elevated pollutant concentrations in Lake Union is minimized by the location of

the outfall discharging project stormwater and the behavior of bull trout to the pollutants. The Broad Outfall discharges at the extreme southern end of Lake Union in Waterway #3. The outfall discharges along the shoreline in shallow water. The dilution zone of the outfall is less than 154 sq ft at the 99.9th percentile flows. We expect that bull trout migrating through Lake Union near the Broad Outfall would be able to detect the slightly elevated pollutant concentrations, and then could avoid the discharge plume.

Effects Determination

Based on the above analysis of project impacts on bull trout in Lake Union, the Service expects many of the potential effects will be extremely unlikely because:

1. No in-water work will occur.
2. Overwater or in-air noise from construction will not transmit underwater.
3. Groundwater will not be intercepted in the North Portal area.
4. While bull trout have not been captured or observed in Lake Union, they have been captured at the Locks and in Lake Washington. Therefore, bull trout must migrate through Lake Union. However, most stormwater discharges occur in late fall through winter when bull trout will be in streams spawning.

The Service expects the remaining effects of the project to bull trout in Lake Union will not be measureable for the following reasons:

1. The project will result in significant reductions in pollutant loading.
2. Bull trout are expected to avoid the stormwater discharge at the Broad Outfall or the exposure to the stormwater contaminants is minimized for the following reasons:
 - a. The Broad Outfall is located along the extreme southwestern shore of Lake Union, in Waterway #3. Waterway #3 is a narrow cove with shallow depths which provides a migration corridor for bull trout.
 - b. DZn is the contaminant of concern at the Broad Outfall. DZn results in an avoidance behavior to salmonids. Bull trout encountering low concentrations of DZn would avoid the outfall and migrate around the dilution plume
 - c. The dilution plume for DZn at the Broad Outfall is small compared to the size of Lake Union, allowing bull trout to avoid the outfall or migrate around the outfall during discharges. The dilution plume size is 11.2 ft² during the 50th percentile flow rate and 153.5 ft² during the 99.9 percentile flow rate.

The effects of the proposed project on designated bull trout critical habitat are considered insignificant for the following reasons in Lake Union:

- PCE #2: The stormwater discharges may cause a temporary impact to the migratory corridor within Lake Union. However, bull trout use of Lake Union is limited and the size of the dilution plume is small compared to the size of Lake Union. DZn results in avoidance behavior and bull trout would avoid the dilution plume and migrate around the plume.
- PCE #3: The proposed project will not result in any long term changes in the abundance of the prey base. The stormwater discharge into Lake Union may result in a localized decrease in the prey numbers surrounding the Broad Outfall. The dilution plume associated with the outfall is small compared to the overall size of Lake Union.
- PCE #4: The proposed project does not alter the lake (or reservoir) shoreline aquatic environment of Lake Union. The Broad Outfall is an existing structure. The project periodically discharges stormwater through the outfall during rain events. The project does not involve any in-water work and therefore does not change the lake shoreline.
- PCE #5: Stormwater discharge into Lake Union will not increase water temperatures. Most of the discharges occur during the fall, winter, and early spring when water temperatures are cool and runoff discharge temperatures are also low.
- PCE #7: The Broad Outfall discharges stormwater in Lake Union. Lake Union water elevations are controlled by the Locks. The project will not change the hydrograph of Lake Union.
- PCE #8: The project is not anticipated to measurably affect the quantity and quality of the water in Elliott Bay. The overall pollutant loading significantly decreases because of the removal of the existing viaduct and the discharging of the portal stormwater into the combined sewer system. Water quality will temporarily change during discharges of the CSO outfalls, but the dilution zones are small and will dilute to below the biological threshold altering or impairing biological processes and negatively impacting salmonids.
- PCE #9: The project will not change any of the environmental conditions that influence nonnative predatory species numbers and distribution within Lake Union. Therefore, no effects to nonnative predatory species within Lake Union are expected.

The Service believes that sufficient information was provided to determine the effects of the proposed project to federally listed species and to conclude whether this project is likely to adversely affect those species. We, therefore, concur with your “may affect, not likely to adversely affect” for bull trout and designated critical habitat.

This concludes informal consultation in accordance with 50 CFR 402.13. The WSDOT should re-analyze this Act consultation if (1) new information reveals effects of the action that may affect listed species in a way not previously considered; (2) the action is modified in a manner

that causes an effect to the listed species or critical habitat that was not previously considered; or
(3) a new species is listed, or critical habitat designated, that may be affected by the identified action.

We appreciate your efforts to comply with requirements under the Act. If you have questions, please contact Jim Muck of the Service's Washington Fish and Wildlife Office at (206) 526-4740, or by electronic mail at jim.muck@noaa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken S. Berg". The signature is fluid and cursive, with a long horizontal stroke at the end.

Ken S. Berg, Manager
Washington Fish and Wildlife Office

Enclosure(s)

cc:

USFWS, Lacey, WA (E. Teachout)
WSDOT, Seattle, WA (M. Meade)

LITERATURE CITED

- Baldwin, D.H., I.F. Sandahl, I.S. Labenia, and N.L. Scholz. 2003. Sublethal effects of copper on coho salmon: impacts on nonoverlapping receptor pathways in the peripheral olfactory nervous system. *Environmental Toxicology and Chemistry* 22(10):2266-74.
- Brunner, K. 1999. Meeting notes from November 4, 1999, Minutes of the First Bull Trout Working Group Meeting. Port of Seattle. Seattle District, U.S. Army Corps of Engineers. Seattle, WA.
- EPA (U.S. Environmental Protection Agency). 1980. Ambient Water Quality Criteria for Copper - 1980. EPA, Publication 440/5-80-036, Washington, DC (October 1980). 162 p.
- Folmar, L. 1976. Overt avoidance reaction of rainbow trout fry to nine herbicides. *Bulletin of Environmental Contamination & Toxicology* 15(5):509-14.
- Footen, B. 2000. Preliminary results of an investigation into the impacts of piscivorous predation on juvenile chinook (*Oncorhynchus tshawytscha*) and other salmonids in Salmon and Shilshole Bays, King County, Washington. 2000 Lake Washington Chinook Salmon Workshop. King County Department of Natural Resources. Seattle, WA.
- Footen, B. 2003. Piscivorous impacts on Chinook (*Oncorhynchus tshawytscha*) and other salmonids in Salmon and Shilshole Bays, King County, Washington. 2003 Lake Washington Chinook Salmon Workshop. King County Department of Natural Resources. Seattle, WA.
- Goetz, F. 2003. Personal Communication. Email subject: RE: Ballard ladder observation. U.S. Army Corps of Engineers, Seattle District, Seattle, Washington.
- Goetz, F., E. Jeanes, and E. Beamer. 2004. Bull trout in the nearshore. Preliminary draft. Prepared by U.S. Army Corps of Engineers, Seattle District. Seattle, WA.
- Hansen, J.A., P.G. Welsh, I. Lipton, D. Cabela, and A.D. Dailey. 2002. Relative sensitivity of bull trout (*Salvelinus confluentus*) and rainbow trout (*Oncorhynchus mykiss*) to acute exposures of cadmium and zinc. *Environmental Toxicology and Chemistry* 21 (1):67-75.
- Huber, K. 2010. Phone call on King County data used to model CSO discharge velocities. October 25, 2010. King County CSO Control Program, Wastewater Treatment Division.
- King County. 1997. 1996/97 Annual Combined Sewer Overflow Report. King County Department of Natural Resources Wastewater Treatment Division. Seattle WA. October 1997. Available at:
http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/AnnualReport/1996-97_CS0Annual.pdf

- King County. 1998. 1997/98 Annual Combined Sewer Overflow Report. King County Department of Natural Resources Wastewater Treatment Division. Seattle WA. October 1998. Available at:
http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/AnnualReport/1997-98_CSAnnual.pdf.
- King County. 2009a. Comprehensive Sediment Quality Summary Report for CSO Discharge Locations. Seattle, WA. December 2009. Located at:
http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/SedQuality/0912_CompSedQualSumRptCSODischargeLoc.pdf.
- King County. 2009b. Combined Sewer Overflow Control Program. 2008 Annual Report. King County Department of Natural Resources and Parks. Wastewater Treatment Division. Seattle, WA. July 2010.
- King County. 2010a. Combined Sewer Overflow Control Program. 2009 Annual Report. King County Department of Natural Resources and Parks. Wastewater Treatment Division. Seattle, WA. August 2010.
- King County. 2010b. Lake Union: Major Lakes Monitoring. King County Water and Land Resources Division. Water temperature data available at:
<http://green.kingcounty.gov/lakes/LakeUnion.aspx>.
- King County DNR (Department of Natural Resources). 1999a. King County Combined Sewer Overflow Water Quality Assessment for the Duwamish River and Elliott Bay. Appendix B: Methods and Results, B4: Aquatic Life Risk Assessment. King County DNR, Seattle, WA. Available at <http://your.kingcounty.gov/dnrp/library/archive-documents/wlr/waterres/wqa/B4.pdf>.
- King County DNR (Department of Natural Resources). 1999b. King County Combined Sewer Overflow Water Quality Assessment for the Duwamish River and Elliott Bay. Appendix C: Issue Papers. King County DNR, Seattle, WA. Available at <http://your.kingcounty.gov/dnrp/library/archive-documents/wlr/waterres/wqa/C.pdf>.
- Kraemer, C. 1994. Some observations on the life history and behavior of the native char, Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) of the North Puget Sound Region. Washington Department of Wildlife. Draft.
- Seattle Northwest Weather. 2010. Monthly rainfall in Seattle. Available at www.see-seattle.com/weather.htm.
- Sommers, F. 2010. Phone call discussion on Sommer's thesis results on the effects of dissolved copper on Chinook salmon in saltwater. September 9, 2010.

- Spence, B. C., G. A. Lomnický, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR. Available at: <http://www.nwr.noaa.gov/Publications/Reference-Documents/ManTech-Report.cfm>.
- Sprague, J.B. 1968. Avoidance reactions of rainbow trout to zinc sulphate solutions. *Water Research* 2:367-372.
- Toft, J. 2010. Personal Communication. Telephone conversation with Jim Muck (USFWS/NMFS) on bull trout use of Elliott Bay on 1/22/10. University of Washington, Seattle, Washington.
- U.S. Forest Service. 2010. Aquatic Organism Passage, FishXing Software and Learning Systems for Fish Passage through Culverts, Swim Speed Table, Available at http://www.fsl.orst.edu/geowater/FX3/help/FX3_Help.html.
- WSDOT (Washington Department of Transportation). 2008. Highway Runoff Dilution and Loading Model User's Guide – Analysis of Highway Stormwater Water Quality Effects for Endangered Species Act Consultations. Prepared for the Washington State Department of Transportation by Herrera Environmental Consultants, October 6, 2008.
- WSDOT (Washington Department of Transportation). 2009. Highway Runoff Dilution and Loading Model Documentation - Analysis of Highway Stormwater Water Quality Effects for Endangered Species Act Consultations. Prepared for the Washington State Department of Transportation by Herrera Environmental Consultants, January 7, 2009.
- WSDOT (Washington Department of Transportation). 2010a. Biological Assessment. SR99: Alaskan Way Viaduct Replacement Project. Seattle, WA. August 2010.
- WSDOT (Washington Department of Transportation). 2010b. Alaskan Way Viaduct Replacement Project, 2010 Supplemental Draft Environmental Impact Statement, Appendix C: Transportation Discipline Report. Available at <http://www.wsdot.wa.gov/NR/ronlyres/E9E70AA9-BA9C-4F92-8FA0-3322EA5F9DAD/0/2010SDEISAppendixC.pdf>

Enclosure A – South Portal Schematic

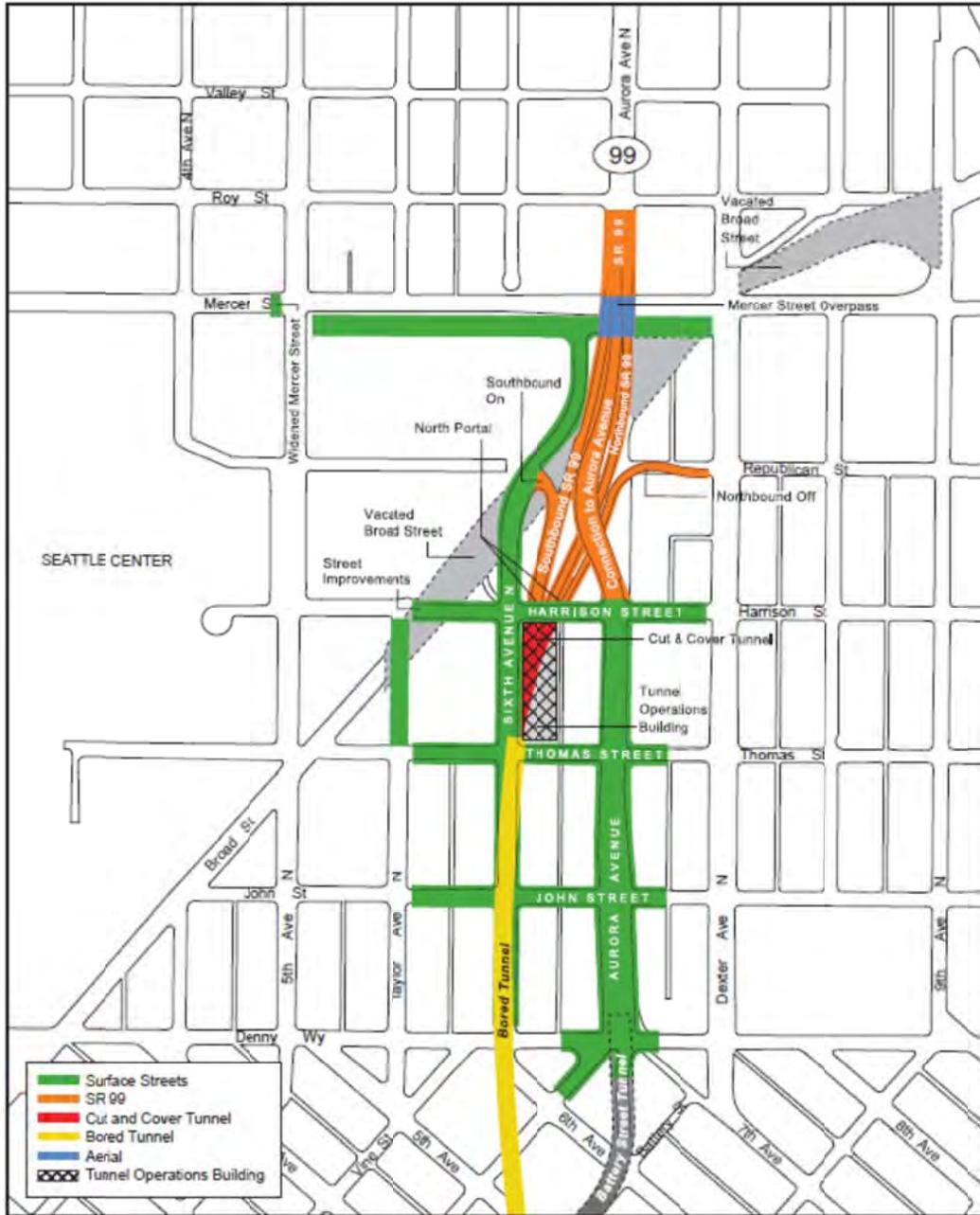


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Exhibit 2-1
South Portal Schematic

Enclosure B – North Portal Schematic

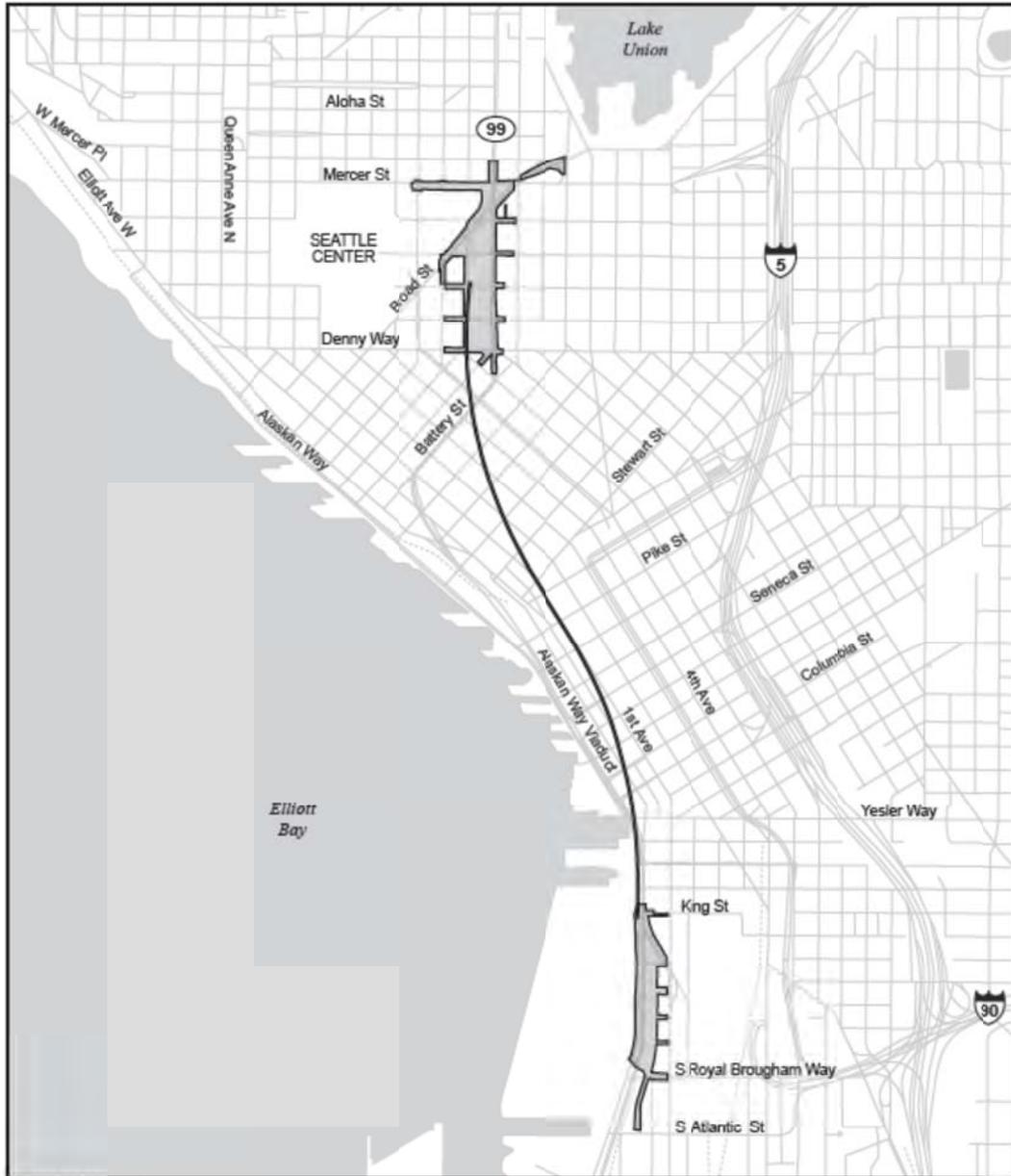


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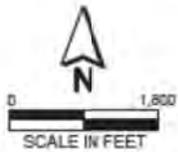


Exhibit 2-2
North Portal Schematic

Enclosure C – Bored Tunnel Schematic



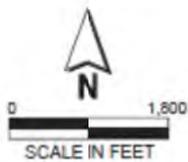
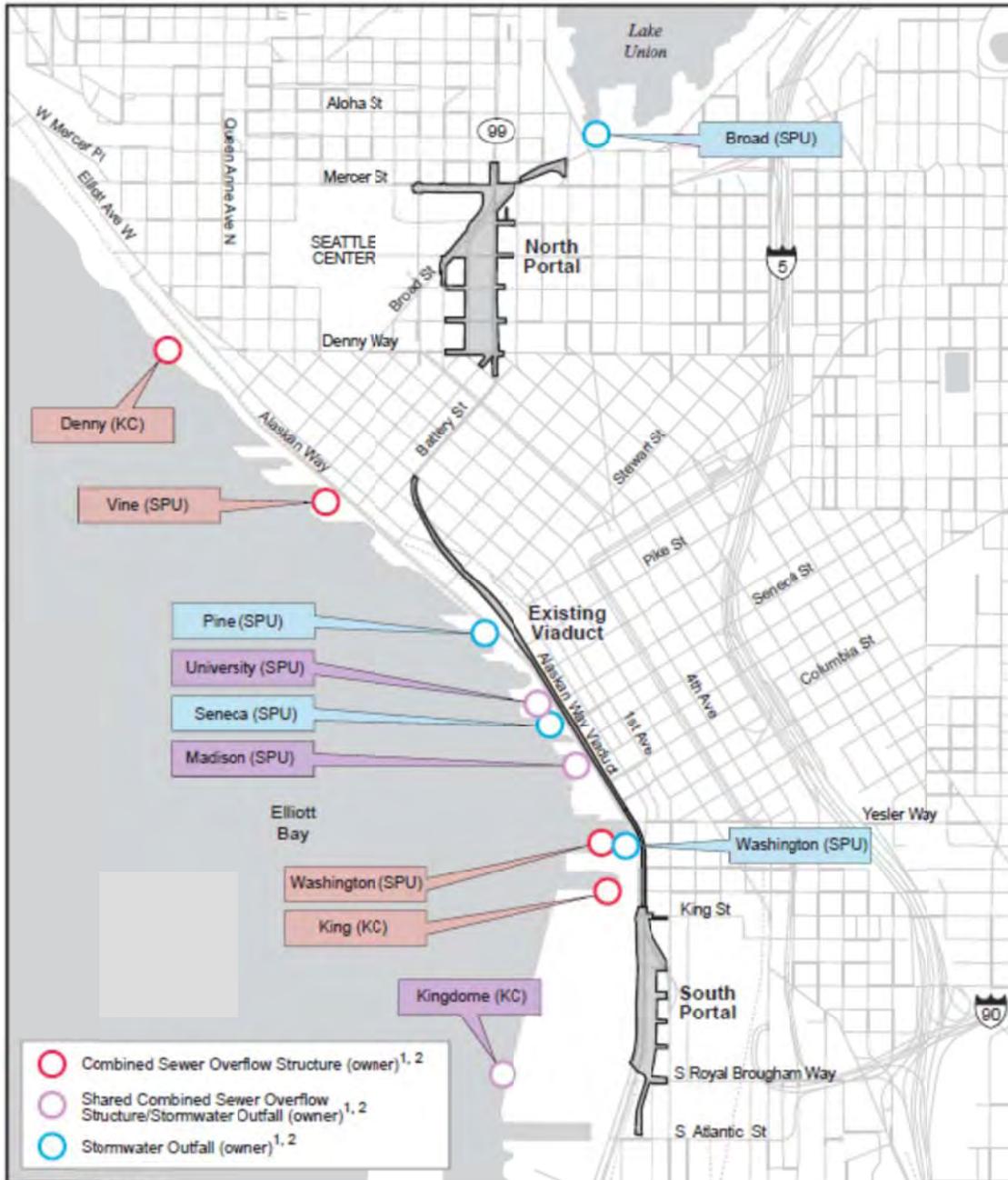
594-1585-030(CIC97) 5/5/10



- Portal
- Tunnel Alignment

**Exhibit 1-1
Alaskan Way Viaduct
Replacement Project**

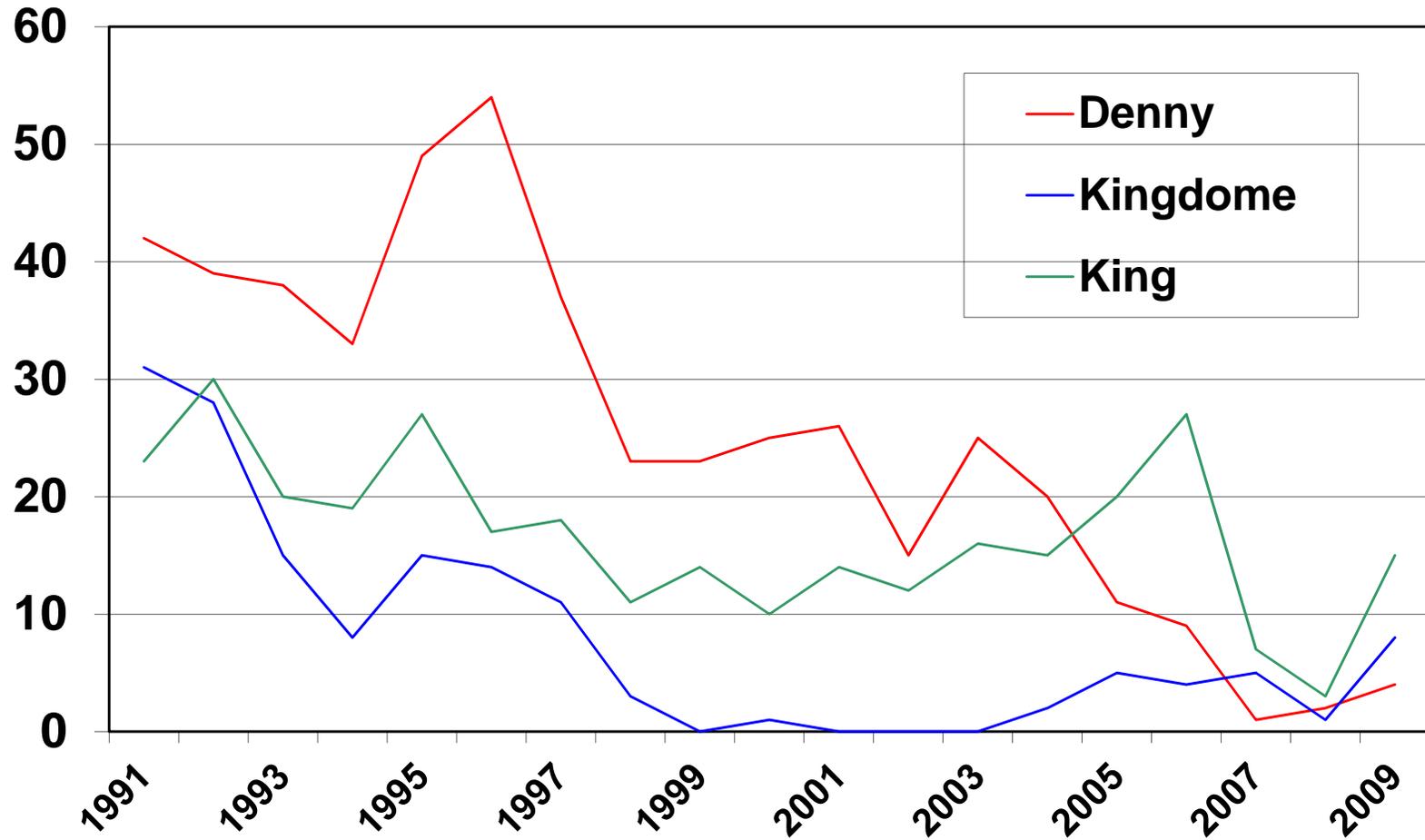
Enclosure D: Project Outfall Locations



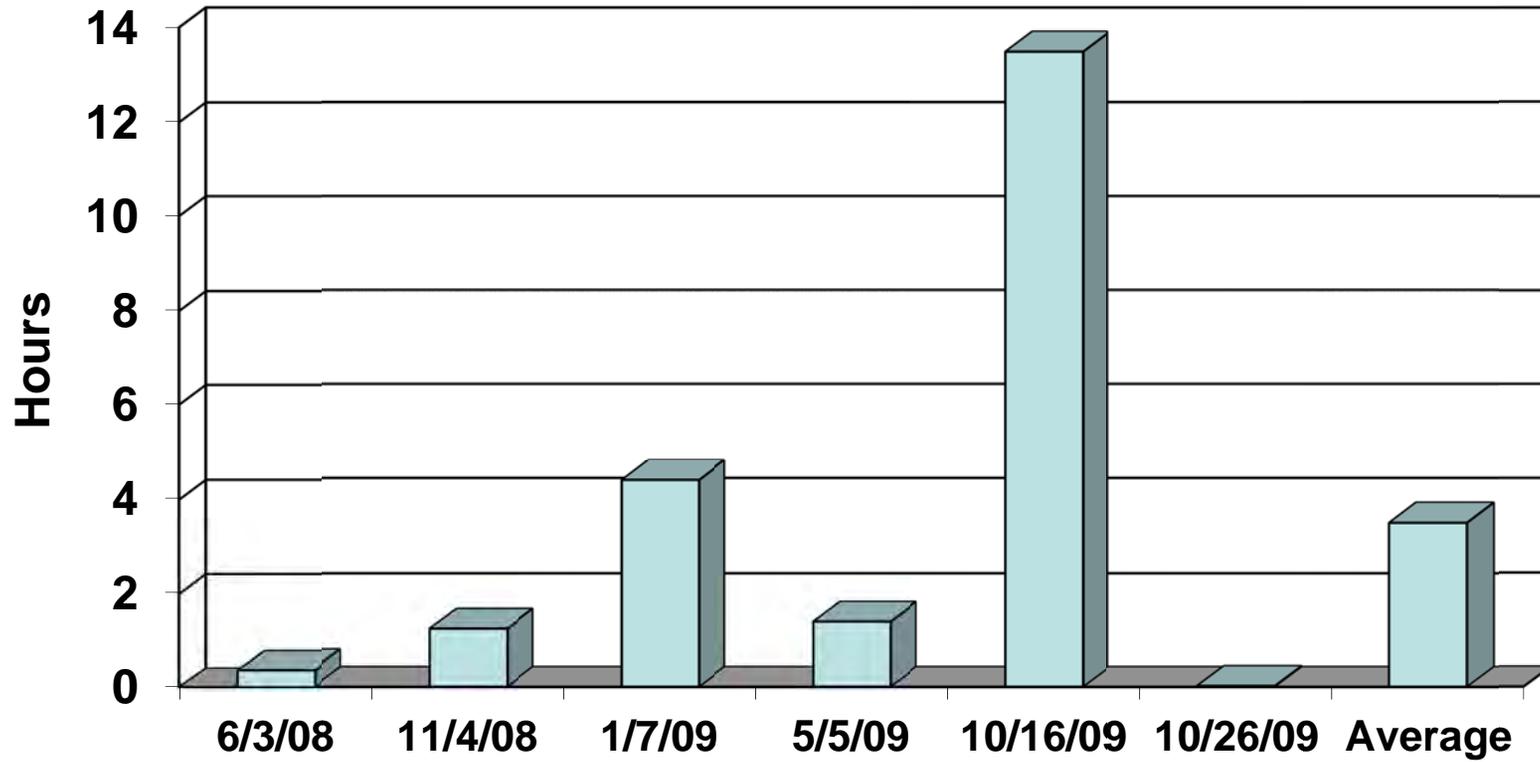
Notes:
 1 Outfalls shown are those associated with project-related sub-basins. Non project-related outfalls are not shown.
 2 KC indicates outfalls owned and operated by King County. SPU indicates Seattle Public Utilities outfalls.

**Exhibit 2-4
 Project Outfall
 Locations**

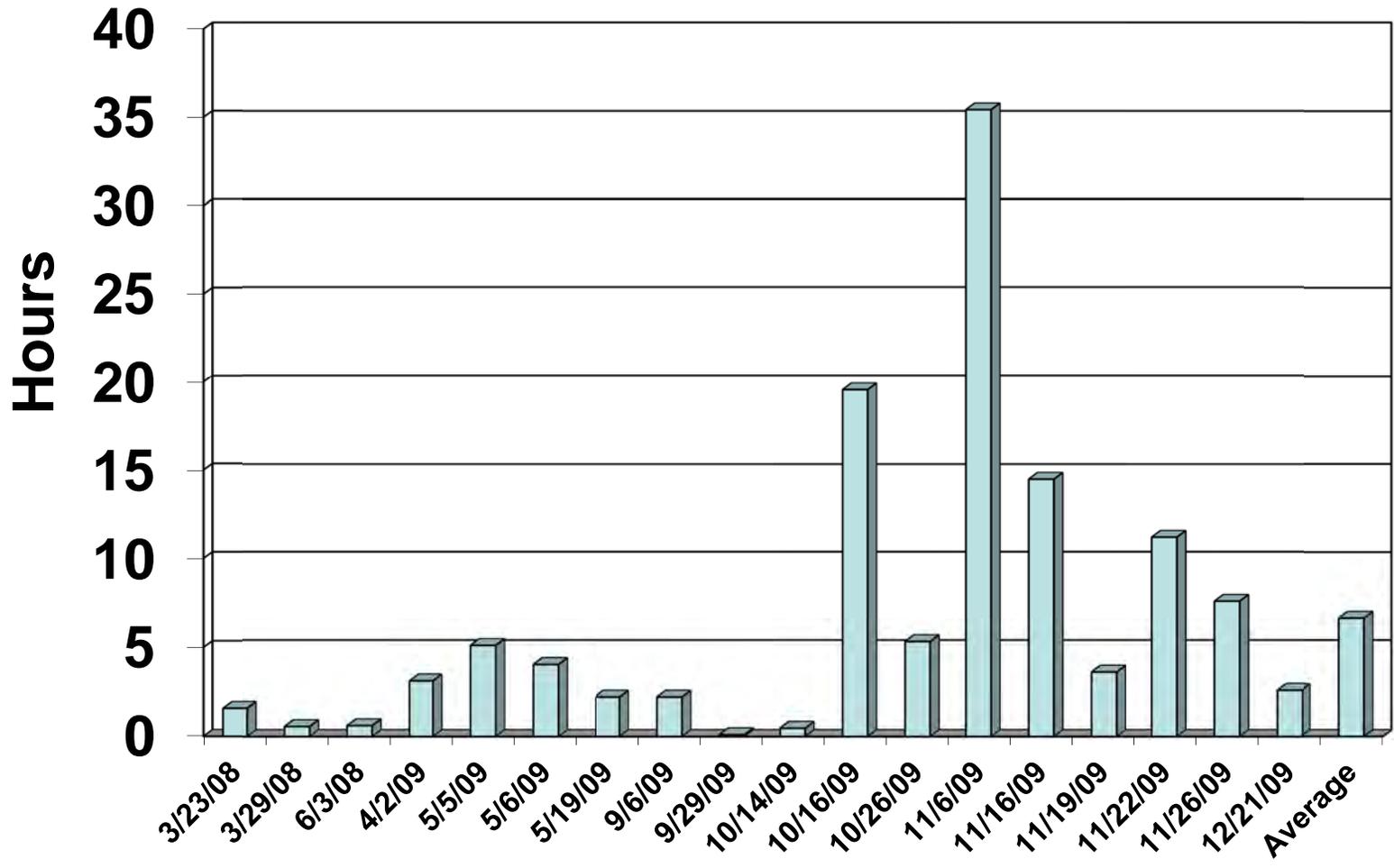
Enclosure E: Number of CSO Events at the Denny, Kingdome, and King Outfalls between 1991 and 2009 (King County 2010a).



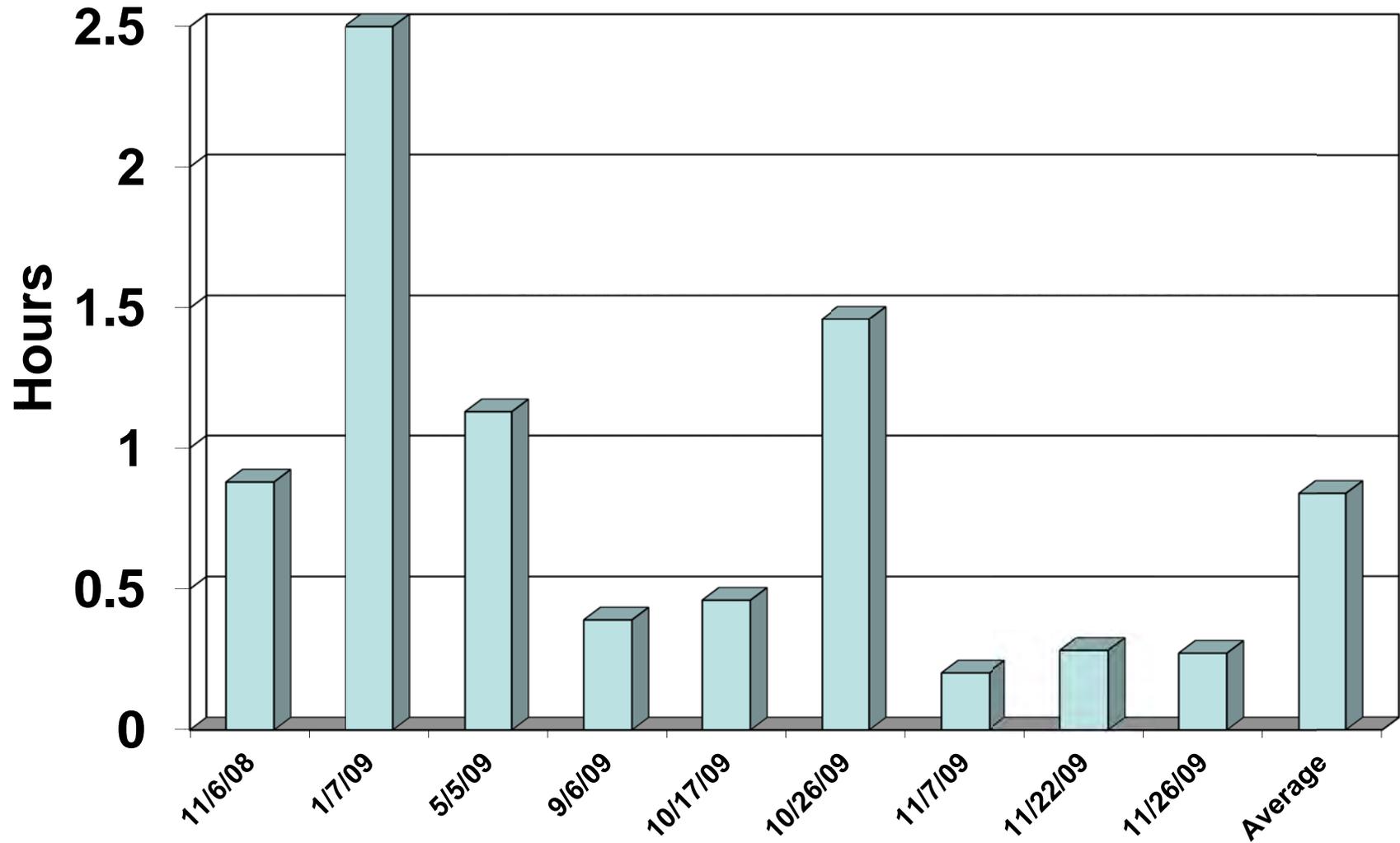
Enclosure F: Denny CSO Event Durations in 2008 and 2009 (King County 2009; 2010).



Enclosure G: King CSO Event Durations in 2008 and 2009 (King County 2009b; 2010).



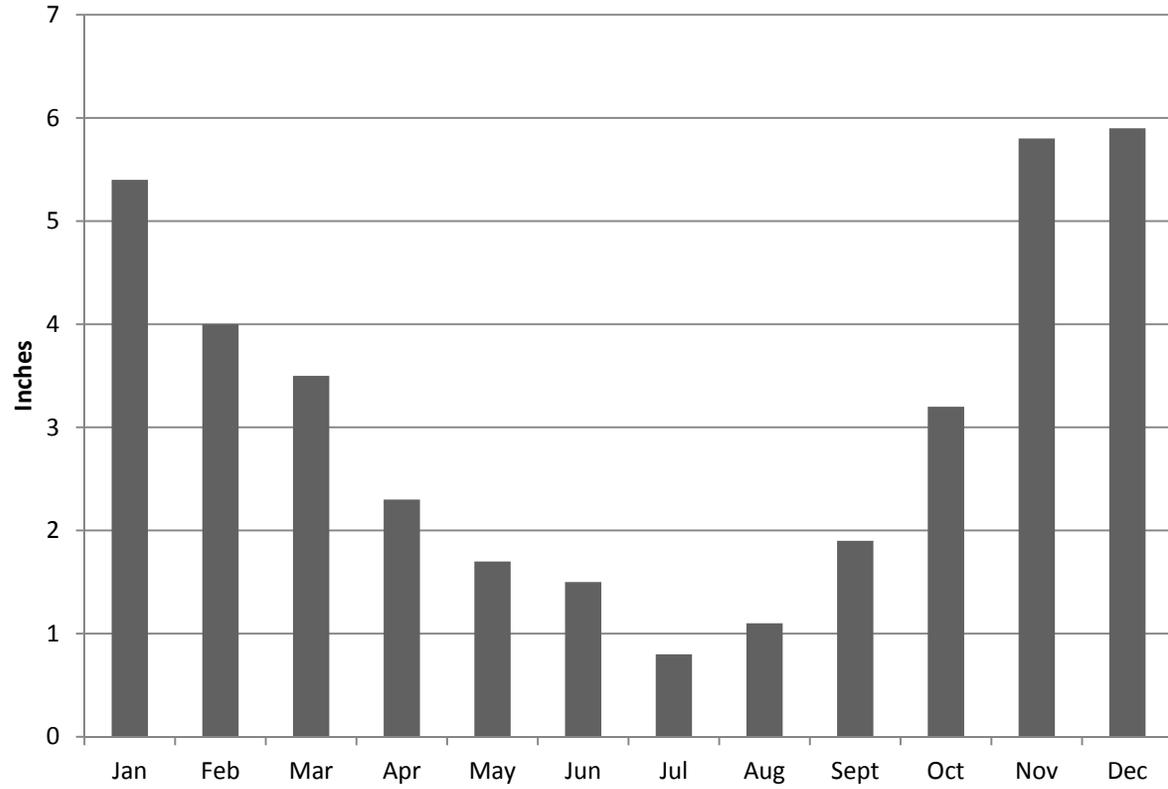
Enclosure H: Kingdome CSO Event Durations in 2008 and 2009 (King County 2009b; 2010)



Enclosure I: Lake Union Monthly Temperatures. Temperatures at a Depth of Approximately 5 ft.



Enclosure J: Average Monthly Rainfall for the City of Seattle (Seattle Northwest Weather 2010b).





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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Reply to:
NMFS Tracking No.:
2010/04009

January 27, 2011

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Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the State Route 99: Alaskan Way Viaduct Replacement Project, Fifth Field HUC 1711001904, Puget Sound/East Passage, Seattle, Washington.

Dear Mr. Mathis:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the Federal Highway Administration's funding of the State Route (SR) 99 Alaskan Way Viaduct Replacement Project, in King County, Washington. In this Opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Puget Sound Chinook salmon and will not result in the destruction or adverse modification of designated critical habitat for Chinook salmon.

As required by Section 7 of the ESA, NMFS provided an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal agency and any person who performs the action must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH.



These recommendations are complementary to the ESA terms and conditions in the Opinion. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, the FHWA must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

If you have any questions, please contact Jim Muck at (206) 526-4740, email jim.muck@noaa.gov, or Michael Grady at (206) 526-4645, email michael.grady@noaa.gov, or by mail at the letterhead address.

Sincerely,



William W. Stelle, Jr.
Regional Administrator

cc Randy Everett, FHWA

Endangered Species Act – Section 7(a)(2)

Biological Opinion

And

**Magnuson-Stevens Fisheries Conservation and Management Act
Essential Fish Habitat Consultation**

SR 99: Alaskan Way Viaduct Replacement Project
King County, Washington
Fifth Field HUC 1711001904, Puget Sound/East Passage

NMFS Consultation Number: 2010/04009

Action Agencies: Federal Highway Administration
Washington Department of Transportation

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date: January 27, 2010

Issued By:



WWS
William W. Stelle, Jr.
Regional Administrator

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1.0 INTRODUCTION

This document contains a biological opinion (Opinion) and incidental take statement (ITS) prepared in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531, et seq.), and implementing regulations at 50 CFR 402. The essential fish habitat (EFH) consultation element of this document was conducted in accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600. The administrative record for this consultation is on file at the Washington State Habitat Office in Lacey, Washington.

1.1 Background

The Opinion and ITS portions of this document were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.), and implementing regulations at 50 CFR 402. The Opinion complies with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) (44 U.S.C. 3504(d)(1) and 3516), and underwent pre-dissemination review.

1.2 Consultation History

The Federal Highway Administration (FHWA) proposes to appropriate funds to the Washington State Department of Transportation (WSDOT) for the replacement of the Alaskan Way Viaduct (AWV), with a bored tunnel underneath the City of Seattle from South Royal Brougham Way to Roy Street. NMFS has been coordinating with FHWA and WSDOT on the proposed project for almost 10 years. Since 2001, FHWA, WSDOT, and the City have held numerous meetings with representatives of federal and state resource and regulatory agencies as part of the environmental impact analysis process. The project began with the development and refinement of project alternatives which at the beginning included replacement of both the AWV and the Seattle Seawall to the proposed action of constructing a bored tunnel.

More recently, FHWA, WSDOT, and City of Seattle staff met with NMFS on November 4 and December 3, 2009, to discuss the scope of the proposed action and the potential for other projects to be considered as part of the ESA consultation for this proposed action. WSDOT met with NMFS on August 25, October 20, and December 14, 2009; and March 2 and April 27, 2010 to discuss technical details of the project and potential effects to listed species. Draft sections of the BA were provided to NMFS for review on January 27 and April 27, 2010. A meeting with WSDOT Biology Program staff and NMFS was held on June 9, 2010, to provide additional information on the project and address NMFS' comments on the draft BA. Another meeting was held with WSDOT staff and NMFS on June 25, 2010 to address any outstanding concerns. WSDOT submitted the biological assessment on August 15, 2010 formally requesting consultation under the ESA.

In their biological assessment, WSDOT concluded that the project was likely to adversely affect Puget Sound Chinook salmon; may affect, but would not likely adversely affect Southern Resident killer whales or Puget Sound steelhead; and would have no effect on Southern Resident

killer whale critical habitat, or three Puget Sound/Georgia Basin rockfish Distinct Population Segments (DPSs). Through an email dated August 27, 2010, and a meeting on September 7, 2010, NMFS informed WSDOT that it disagreed with the “no effect” determinations. NMFS conducted an informal consultation regarding Puget Sound steelhead, Southern Resident killer whales and their critical habitat, and the three rockfish DPSs and concluded that the project may effect, but is not likely to adversely affect, those species and designated critical habitat. The bases for these determinations are presented in Appendix 2. These determinations foreclose the need for formal ESA section 7 consultation on those species and they are not discussed further in this biological opinion. The project’s effects on Puget Sound Chinook salmon are discussed below.

1.3 Proposed Action

The FHWA proposed to provide partial funding for the removal of the AWW and construction of the bored SR99 tunnel. All construction and demolition will occur in upland areas more than 75 feet from Elliott Bay, and most of the tunnel will be well below sea level. There is no pile driving or in-water work associated with the project. Although ground vibrations will occur, it is highly unlikely that these will generate underwater noise at levels above ambient noise levels in Elliott Bay (147 dB_{peak}) (Laughlin 2006), given the distance from the water, the various infrastructure located in the soils (e.g., foundations, utility conduits, etc.), and the presence of the seawall and armoring around the waterway. Therefore, noise from these sources is not considered further as effects of this proposed action.

Currently, the AWW is structurally unsound and vulnerable to failure during an earthquake. The proposed project will replace the AWW with a bored tunnel, construct south and north portals and associated tunnel operations buildings, relocate utilities, remove the existing AWW, decommission the Battery Street Tunnel (BST), improve surface streets in the tunnel’s south and north portal areas, manage groundwater during construction, and provide stormwater treatment and detention. The project is proposed to begin construction in 2011 and take approximately 66 months to complete. The three primary components of the project are the South Portal Area, North Portal Area, and the bored tunnel.

For purposes of its analysis in the biological assessment, WSDOT assumes that the daily traffic that uses SR 99 north of Seneca Street will use the tunnel after the project is constructed. Although the possibility of tolling for the tunnel has been raised, it was rejected because WSDOT does not have authorization from the Washington State Legislature to toll SR 99. Tolling is not part of the proposed project and is not analyzed in WSDOT’s draft supplemental environmental impact statement. Our analysis of the project’s effects is based on WSDOT’s assumptions that the project does not include tolling and that all traffic currently using the AWW will use the tunnel. If these assumptions change, our analysis may no longer be valid and may require reinitiation of the consultation.

South Portal Area (Appendix 1, Figure 1): Full northbound and southbound access to and from SR 99 will be provided in the south portal area between South Royal Brougham Way and South King Street. Beginning at South Royal Brougham Way, SR 99 will be a side-by-side, surface roadway that will transition to a cut-and-cover tunnel. The cut-and-cover tunnel will be 1,030 feet long. On- and off-ramp access to surface streets is provided to South Charles Street, South

Dearborn Street, Alaskan Way South, and the east frontage road. A tunnel operations building will be constructed in the block bounded by South Dearborn Street, Alaskan Way South, and the new Railroad Way South access road. This building will house the tunnel control systems, ventilation systems, maintenance shop functions, equipment storage, and systems support.

North Portal Area (Appendix 1, Figure 2): Northbound and southbound access to and from SR 99 will be provided in the north portal area between Roy and Thomas Streets. Beginning at Roy St. SR 99 will be a side-by-side, surface roadway that will transition to a cut-and-cover tunnel. The cut-and-cover tunnel will be 440 feet long. A tunnel operations building, similar to that in the south portal area, will be constructed between Thomas and Harrison Streets on the east side of Sixth Avenue North. On- and off-SR 99 access to surface streets is provided to Republican Street, Sixth Avenue North, and Aurora Avenue. Numerous surface streets will be reconfigured and improved.

Bored Tunnel (Appendix 1, Figure 3): The cut-and-cover tunnels at the south and north portal areas will provide the transition into a deep bored tunnel. The tunnel will be approximately 1.7 miles long with a 49-foot interior diameter. The tunnel will be constructed using a tunnel boring machine with all tunnel construction equipment and staging being conducted from the south portal area. Traveling from the south, the bored tunnel will begin just south of South King Street, continue under Alaskan Way South to approximately South Washington Street where it will curve slightly away from the waterfront and then travel under First Avenue beginning at approximately University Street. At Stewart Street, the bored tunnel will travel in a northerly direction under the Belltown neighborhood of downtown Seattle. At Thomas Street, the bored tunnel will transition into the north portal area where it will transition to a side-by-side surface roadway near Harrison St.

Other project components include the following:

Tunnel Excavation: Tunnel spoils will be removed through the south portal area to Terminals 25 and 46 for stockpiling before disposal. Approximately 800,000 cubic yards of material will be removed during tunnel excavation. Another 650,000 cubic yards will be removed for the north and south portal areas. Clean spoils will be barged from Terminal 46 on the Seattle waterfront to the Mats quarry in Port Ludlow, Washington. The terminal, the quarry, and the shipping lane are existing commercial facilities or routes in areas zoned for industrial and barge use. Approximately one to two barge loads per day will be transported to the quarry. Any contaminated soils will be trucked to an existing upland disposal location permitted to accept contaminated material.

Barge operation (loading and unloading of materials) will create noise levels of approximately 137 dB_{peak} (WSDOT 2010a), lower than ambient noise levels in Elliott Bay. The barge route follows existing shipping lanes that link the ports of Seattle and Tacoma to international shipping routes. Large container ships that frequent the shipping lanes typically generate noise levels of 190 dB_{peak} or greater (WSDOT 2010a). Slow-moving barges generate noise levels of approximately 153 dB_{peak}, well below those levels (WSDOT 2010a). Barge noise is therefore lower than ambient sound levels and is not considered further in this consultation as an effect of the action.

Utility Relocation: The project includes retaining as many existing utilities in place as possible. Some utility relocation will be required before construction of the south and north portals. If utilities are relocated during construction, they will be buried as close to the existing alignment as possible. Utilities to be relocated include water, gas, power, communications, and sewer lines.

Demolition of the Existing Viaduct: The existing viaduct is a four- to seven-lane stacked elevated roadway, approximately 11,000 feet long. The existing viaduct will be demolished once the tunnel is operational. Demolition will take approximately nine months. Materials from viaduct demolition will be broken concrete and severed, reinforcing steel. Some of the concrete rubble will be recycled and used to fill the BST. Any remaining debris will be trucked off-site for disposal to a commercial facility permitted to accept construction debris. City-designated truck routes will be used for transporting debris.

Decommissioning of the Battery Street Tunnel: The BST runs for a length of approximately 2,200 feet underneath Battery Street at the north end of the existing viaduct. Decommissioning will require disconnecting the power, water, and drainage lines, filling the void space with suitable material, closing all of the street access vents, and blocking off the portals at both ends of the tunnel. The material used to fill void space will either be from imported fill or rubble debris generated from the viaduct demolition. The remaining space will be capped with a fluid material such as controlled density fill which is a self-compacting, cement material.

The proposed project is located in an urban setting with close to 100 percent impervious surface cover. No in-water work is proposed. However, during project construction and operation, water management will be needed to minimize environmental impacts from the project. The project area encompasses nearly 55 acres consisting of 12 threshold discharge areas (TDAs). Two types of drainage systems are within the project area: separated and combined. The separated storm drainage system carries stormwater and wastewater in separate pipes. In separated areas, stormwater runoff from the project area is collected in a separate storm drain system which discharges directly to either Elliott Bay or Lake Union.

In contrast, the combined sewer system conveys wastewater and stormwater in a single pipe. In these areas, stormwater runoff from the project area combines with wastewater from surrounding areas and under normal conditions, is routed to the West Point Treatment Plant (WPTP) via a large conveyance pipe (the Elliott Bay Interceptor, EBI) running underneath Second Avenue before being discharged through a deep water outfall to Puget Sound. However, during large storm events, stormwater can exceed the capacity of the pipe. Under these conditions, the excess flow consisting of a mixture of wastewater and stormwater is discharged untreated to Elliott Bay to prevent sewer backups from occurring. These events are referred to as combined sewer overflows (CSOs).

The type of drainage system, the existing water quality treatment, and the receiving water body for each TDA within the project area are shown in Table 1. The outfall locations are shown in Appendix 1, Figure 4. For combined sewer systems, the WPTP discharges out an outfall located approximately 490 feet offshore in 60 feet of water in Elliott Bay (not shown in Figure 4). All CSO events discharge through outfalls located along the nearshore of Elliott Bay. The Broad

TDA is a storm drainage system that discharges to Lake Union through an outfall located along the shore of south Lake Union. Further information on the stormwater management is described below in the Stormwater Runoff Management during Project Operations section.

Table 1: The type of drainage system, existing water quality treatment and the receiving water for each TDA within the project area.

TDA	Outfall Associated With TDA	Drainage System Type	Existing Water Quality Treatment	Receiving Water Body
Royal Brougham South	Kingdome	Low-flow diversion	WPTP ¹	Puget Sound or Elliott Bay
Royal Brougham North	Kingdome	Combined	WPTP ¹	Puget Sound or Elliott Bay
King	King	Combined	WPTP ¹	Puget Sound or Elliott Bay
Washington	Washington	Separated storm	None	Elliott Bay
Madison	Madison	Separated storm	None	Elliott Bay
Seneca	Seneca	Separated storm	None	Elliott Bay
University	University	Separated storm	None	Elliott Bay
Pike	Pike	Combined	WPTP ²	Puget Sound or Elliott Bay
Pine	Pine	Storm	None	Elliott Bay
Vine	Vine	Combined	WPTP ²	Puget Sound or Elliott Bay
Dexter	Denny	Combined	WPTP ²	Puget Sound, Elliott Bay
Broad	Broad	Storm	None	Lake Union

¹ During high flows water discharges directly to Elliott Bay with no treatment.

² Flows from these TDAs are normally sent to WPTP for treatment. During large storms, flows are directed to the Elliott West Combined Sewer Overflow Control Facility. During overflow events, wastewater discharges untreated to Elliott Bay.

The following provides a description of the different types of water discharges that will be managed during project construction and operation:

Groundwater Management: The project will require dewatering to manage groundwater infiltration during construction at both the north and south portals. The groundwater table at the north end of the project is more than 80 feet below the surface, so dewatering at the north end will be minimal. The groundwater table at the south end is only approximately 6 to 10 feet below the surface, requiring extensive dewatering during construction. Pumping rates may range from 100 to 1,000 gallons per minute (gpm) per 1,000 feet of excavation (between 144,000 to 1,440,000 gallons per day, or 0.2 to 2 cubic feet per second (cfs). Most dewatering will take place within the cut-and-cover section of the tunnel at the south portal area. By the time tunnel boring begins at South King Street, the tunnel will be well below the groundwater table.

Groundwater will be discharged to the combined sewer system. Volumes will be constrained by the King County Wastewater Discharge Permit, which limits discharges according to time of year and location. Discharge limitations will prevent any increase in the volume or frequency of overflow events. Once the discharge limit has been reached, groundwater will be reinjected into

the ground (see below). Contaminated water will not be discharged to the combined sewer system. Any contaminated water will be treated before disposal, or transported offsite for disposal. As with contaminated soils, contaminated water will be transported to existing commercial facilities permitted to accept contaminated materials.

Groundwater may also be reinjected back into the ground near the construction site in accordance with the Washington State Department of Ecology's Underground Injection Control Program. Reinjection will avoid discharge to the combined sewer system, as well as help prevent ground settlement as soils lose hydrostatic pressure. The location and number of injection wells depends on site accessibility, the required groundwater level maintenance, and the sensitivity of adjacent utilities and structures.

Groundwater at the south end of the project will have to be pumped out of the construction zone for the duration of construction. Groundwater will be discharged to the combined sewer system for disposal, or reinjected into the ground near the construction site. If groundwater is discharged to the combined sewer system, WSDOT will ensure that discharges do not degrade water quality or contribute to an increase in the frequency or volume of combined sewer overflow events. Any contaminated water will be treated before being reinjected or discharged to the combined system, or disposed of offsite at an existing commercial facility permitted to accept and handle contaminated material.

Groundwater pumped from the project represents a small portion of total groundwater discharges to Elliott Bay and is highly unlikely to have any impacts on water quality indicators in the bay. The tunnel and retaining walls associated with the cut-and-cover sections of the project will be constructed to allow groundwater to flow unobstructed into Elliott Bay once the tunnel is complete. Therefore, the tunnel will not impede groundwater flows during operation or result in adverse effects to Chinook salmon, and these effects are not considered further in this consultation.

Slurry Water: If a slurry tunnel boring machine is used to construct the tunnel, the machine will create a slurry of water, bentonite, and tunnel spoils at the excavation face. The slurry mix will be piped to a separation plant at the south portal where solids will be removed and the treated slurry water returned to the tunnel and reused. Tunnel spoils will be stockpiled and disposed of at an authorized location. Any slurry water that needs to be disposed of will be sent to an existing commercial facility permitted to accept contaminated materials; slurry water will not be discharged to Elliott Bay.

Construction Stormwater: Equipment staging and stockpiling will occur at least 200 feet from surface waters. No construction stormwater will be discharged to the separated storm system during project construction to ensure that no untreated water enters Elliott Bay or Lake Union. Stormwater will only be discharged to the combined sewer system and conveyed to the WPTP for treatment. Water will be treated to prevent water quality degradation and to limit the amount of water that can be discharged to the system to minimize any potential increase in the frequency or volume of CSOs. The contractor will be required to demonstrate they have the capacity to store stormwater for the duration of an overflow event.

Twenty-three staging areas have been identified for the project. Depending on the location of each staging area, some stormwater from the staging areas will discharge to the combined system, and some will drain to the separated stormwater system. Stormwater leaving staging areas will be treated by implementing best management practices (BMPs) to improve water quality (BMPs listed on page 28 and 29 of the BA). All staging areas are previously developed, paved sites such as parking lots, off-ramps, city streets, or in street right of ways, which are all pollution generating impervious surfaces (PGIS). Project staging will not create additional PGIS or result in activities that would increase levels of pollutants discharged to the stormwater system.

Water Management within the Tunnel: Except at the portals, the tunnel will be located underground in areas that will not be exposed to rainfall and consequently will not generate stormwater runoff. Runoff will only be generated on underground surfaces by wash water or the fire suppression system during testing or emergency events. The tunnel will require a pump for (1) bypass water (rainwater that enters the portals during storms or is carried into the tunnel by wet vehicles) (2) seepage from groundwater, and (3) water used as part of the cleaning and fire suppression systems. Table 2 provides estimated frequencies, rates, and durations of these events. Since the south portal is closer to the tunnel’s lowest vertical elevation, drainage and tunnel seepage will be conveyed to the tunnel sump, located approximately 3,000 feet north of the south portal, and pumped to the south to the combined sewer system. Drainage within the tunnel will be designed and constructed to contain spills of hazardous materials. If a spill occurs, the tunnel pumps will be shut down to prevent discharge of material to the combined sewer system until the spill can be contained and cleaned.

Table 2: Estimated frequencies, rates and durations of water within the bored tunnel.

Event	Frequency	Rate (gpm)	Duration
Tunnel seepage	Continuous	22	Continuous
Tunnel washdown	1-2 times per year	35 to 70	Several days
Fire suppression valve testing	Once per year	100	Intermittently over several days
Fire suppression sprinkler system testing	Every five years	2500	Intermittent

Bypass Water: Very little water is expected to enter the portals during storms. Rainfall at the portals will be captured and directed away from entering the tunnel. The north and south tunnel approaches will contain depressed sections, called boat sections, that will collect runoff via drains located at the tunnel entrance. Less than 0.1 cfs is expected to enter the tunnel itself during storm events. This water will be discharged to the combined sewer system and treated at the WPTP.

Tunnel Seepage: Underground seepage is a regular occurrence in large-bore tunnels due to their placement beneath the groundwater table. Tunnel seepage is estimated at 22 gpm (0.05 cfs), which will be pumped to the south portal and discharged to the combined sewer system and sent to the WPTP for treatment.

Washdown Water: The tunnel will be cleaned approximately twice yearly over a period of several days. Wash water will be water only, with no added detergents or other chemicals. Tunnel washing will generate water volumes of approximately 35 to 70 gpm. The tunnel will not be washed during rain storms to prevent exceeding the capacity of the combined sewer system. Washwater will be discharged to the combined sewer system and sent to the WPTP for treatment.

Fire Suppression: Two types of fire suppression system testings will occur. Annual valve testing will take place approximately once per year and will generate volumes of approximately 100 gpm (0.22 cfs). The sprinkler system will be tested approximately once every five years. Sprinkler testing will generate much higher volumes of water, up to 2,500 gpm (5.6 cfs). Testing will not take place during wet weather to prevent exceeding the capacity of the combined sewer system. As with washdown water, water from fire suppression system testing will be discharged to the combined sewer system. Actual fires within the tunnel are anticipated to be very rare. For comparison, the last time the fire suppression system was used in the I-90 Mt. Baker tunnel was in 1994. Transport of hazardous materials will not be permitted through the bored tunnel.

Stormwater Runoff Management during Project Operations: As described above, the project area currently consists of 12 TDAs. During rainfall events, the stormwater runs off the viaduct and drains untreated into Elliott Bay. After the viaduct is removed it will no longer contribute runoff to seven TDAs: Washington, Madison, Seneca, University, Pike, Pine and Vine. The project therefore will not discharge stormwater to these TDAs once the project is complete.

The project will collect stormwater at the south and north portal areas in the remaining five TDAs. The project will not create any new PGIS, and approximately 10 acres of PGIS will be converted to non-PGIS by replacing existing streets and parking lots with tunnel operations buildings, sidewalks, and landscaped areas. This will reduce the amount of untreated stormwater discharged in the action area. Table 3 shows the existing and proposed PGIS at the south and north portal areas. The increase in PGIS at the Broad TDA is not due to creation of additional PGIS, but because the TDA delineation changes pre- and post-project. As part of the project, a portion of Broad St. is vacated and the underpass beneath Aurora Ave is abandoned and filled to grade. This results in runoff from the Dexter TDA being directed to the Broad TDA.

No detention is proposed for stormwater at the south portal. Based on hydraulic flow model simulations of the southern TDAs, detention will not reduce combined sewer overflow events; in fact, the volume of discharge events may actually increase with detention due to the timing of peak flows between the larger tributary basin and the discharge from the detention vaults (in WSDOT 2010a, Appendix C). Detention will be provided for surface streets at the north portal, where flow control is required due to different stormwater system hydraulics.

Table 3: Existing and Proposed PGIS at the South and North Portals.

TDA	Existing PGIS (acres)	PGIS Post-Project (acres)	Percent Change
South Portal			
South Royal Brougham	0.65	0.27	-58.5
North Royal Brougham	6.53	3.57	-45.3
King St.	9.27	5.16	-44.4
North Portal			
Dexter	14.76	11.43	-22.6
Broad	3.76	4.47	+18.9
Total	34.97	24.9	-28.8

Onsite water quality treatment is not proposed for stormwater discharged to the combined sewer system, as this runoff is conveyed to the WPTP for treatment. Treatment will be provided for stormwater in the South Royal Brougham and Broad Street. The TDAs with a StormFilter vault. The StormFilter vault will be maintained by Seattle Public Utilities and inspected on a yearly basis, or after major storms. Sediment will be removed from the vault and filters will be replaced as needed (generally every one to three years).

The South Royal Brougham TDA is also part of the SR 99-South Holgate Street to South King Street Viaduct Replacement Project that is currently under construction. That StormFilter vault for the bored tunnel project is being installed to treat runoff from the SR 99-South Holgate Street to South King Street Viaduct Replacement Project. Additional filters will be added to treat the stormwater resulting from the bored tunnel project.

1.4 Action Area

The action area is defined as the geographical extent of project impacts and not merely the immediate area directly adjacent to the action. The action area includes the project footprint and all surrounding areas where project activities could potentially affect the environment. The extent of the action area encompasses direct and indirect effects, as well as any effects of interrelated or interdependent actions. The action area encompasses the dilution zones around each outfall and all of Elliott Bay and Lake Union. As pollutants beyond the dilution zones can accumulate in the sediments and increase ambient levels within the water column, the action area includes all of Elliott Bay and Lake Union. (Appendix 1, Figure 5 and Appendix 1, Figure 6). No interrelated or interdependent actions have been identified that will affect the size of the action area (see Section 2.3). There are no indirect effects that will affect the size of the action area.

1.5 Associated Informal Consultations

The NMFS determined that the proposed project may affect, but is not likely to adversely affect Puget Sound steelhead, Southern Resident killer whales and their critical habitat, and Puget Sound/Georgia Basin yelloweye rockfish, canary rockfish, and bocaccio. The analysis to support these determinations is appended to this Opinion (Appendix 2). This Opinion will not address these species further.

2.0 ENDANGERED SPECIES ACT: BIOLOGICAL OPINION

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. To jeopardize the continued existence of a listed species means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). This Opinion does not rely on the regulatory definition of 'destruction or adverse modification' of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat¹.

The Opinion included below records the results of the consultation. Section 7(b)(4) requires the provision of an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts. The ITS follows the Opinion in this document.

2.1 Introduction

This Opinion presents the results of NMFS' consultation with WSDOT regarding whether the proposed action will jeopardize listed species or adversely modify or destroy their designated critical habitat. For the jeopardy analysis, NMFS reviewed the status of PS Chinook salmon, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this assessment, NMFS discerns whether effects on individual animals in the action area are meaningful enough, in view of existing risks, to appreciably reduce the likelihood of the survival and recovery of the affected listed species.

For the critical habitat adverse modification analysis, NMFS considers the status of critical habitat, the functional condition of critical habitat in the action area (environmental baseline), the likely effects of the action on that level of function, and the cumulative effects. From this assessment, NMFS discerns whether any predicted change in the function of the primary constituent elements (PCEs) of critical habitat in the action area would be enough, in view of existing risks, to appreciably reduce the conservation value of the critical habitat at the

¹ Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005).

designation scale. This analysis does not employ the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02. Instead, this analysis relies on statutory provisions of the ESA, including those in section 3 that define "critical habitat" and "conservation," in section 4 that describe the designation process, and in section 7 that set forth the substantive protections and procedural aspects of consultation, and on agency guidance for application of the "destruction or adverse modification" standard (Hogarth 2005).

2.2 Rangewide Status of the Species and Critical Habitat

This section describes the current status and limiting factors affecting the conservation of ESA-listed species occurring within the project action area. Those species facing a high risk of extinction are more vulnerable to the aggregate effects of existing degraded conditions, new effects imposed by a proposed action, and the cumulative effects of future local, state, and federal actions.

Status of the Species

The NMFS reviews the condition of listed species affected by the proposed action using criteria that describe a 'Viable Salmonid Population' (VSP) (McElhany et al. 2000). Attributes associated with a VSP include abundance, productivity, spatial structure, and genetic diversity that maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced, in turn, by habitat and other environmental conditions. The Puget Sound Technical Recovery Team (TRT) has developed VSP-based recovery criteria for the Chinook salmon (Shared Strategy 2007).

The PS Chinook salmon evolutionarily significant unit (ESU) encompasses all runs of Chinook salmon in the Puget Sound region from the Elwha River in the Strait of Juan de Fuca eastward, including rivers and streams flowing into Hood Canal, South, Central, and North Puget Sound, and the Strait of Georgia in Washington. The boundaries of the Puget Sound ESU correspond generally with the boundaries of the Puget Lowland Ecoregion. The Puget Sound ESU is comprised of 31 historically quasi-independent populations of Chinook salmon, of which 22 are believed to be extant. Several stocks within this ESU are identified as being "at risk" or "of concern." Long term trends in abundance and median population growth rates for naturally spawning populations of Chinook salmon indicate that approximately half of the populations are declining and the other half are increasing in abundance over the length of available time series. Eight of 22 populations are declining over the short-term, compared to 11 or 12 populations that have long-term declines (Good et al. 2005). Factors contributing to the downward trends are widespread blockages of streams, degraded freshwater and marine habitat, upper river tributaries widely affected by poor forest practices, and lower tributaries and mainstem rivers affected by urbanization and agriculture. Hatchery production and release of Chinook salmon is widespread and more than half of the recent total escapement returned to hatcheries. Widespread declines and extirpations of spring- and summer run Chinook salmon populations represent a significant reduction in the life history diversity of this ESU (Myers et al. 1998).

According to peak recorded harvest landings in Puget Sound in 1908, the historic run size of the ESU was estimated to be between 670,000 and 690,000 (Bledsoe et al. 1989, Good et al. 2005). The estimated total return of Chinook salmon to Puget Sound in the early 1990s was 240,000

Chinook salmon, down from an estimated 690,000 historical run size. Most populations had natural spawners numbering in the hundreds (median recent natural escapement is 766), and of the six populations with greater than 1,000 natural spawners, only two have a low fraction of hatchery fish. In comparison, estimates of historical equilibrium abundance (based on pre-European settlement habitat conditions), range from 1,700 to 51,000 potential spawners per population (Good et al. 2005).

The artificial propagation of fall run salmon is widespread throughout this region. Summer or fall-run Chinook salmon transfers between watersheds within and outside the region have been commonplace throughout the last century; thus, the purity of naturally spawning stocks varies from river to river. Returns to hatcheries have accounted for 57 percent of the total spawning escapement, although the hatchery contribution to spawner escapement is probably much higher in some populations due to hatchery derived strays on the spawning grounds (Good et al. 2005).

Chinook salmon adults spawn in freshwater rivers and large streams. The eggs are deposited in gravel that has well oxygenated water percolating through it (Healey 1991). The eggs over-winter and hatch in the gravel to become juveniles with a yolk-sac (called a yolk-sac fry). At about the time the yolk sac is absorbed the juveniles emerge from the gravel, usually in late winter, and begin to forage on their own. The juveniles forage and move downstream into estuaries where they continue to forage before moving into the North Pacific Ocean where they reside for one to five or more years (Healey 1991). There are two typical life history strategies known as stream-type and ocean-type (Healey 1991; Myers et al. 1998).

Stream-type individuals overwinter in their natal river systems, smolting at a sufficient size (generally greater than 70 to 85 millimeters (mm)) to move freely into deep water marine habitats. Ocean-type individuals emerge from the gravel, forage, and move downstream into estuaries within weeks to a few months, depending on the distance from the spawning grounds to the river estuary. These fish are small, usually less than 40 mm and during the daylight hours can be found almost exclusively in the nearshore areas, showing a strong preference for the shoreline. Ocean-type fish leave the nearshore and migrate to open marine waters near the end of their first summer. A small percentage of ocean-type individuals, known as residuals or holdovers, may overwinter in freshwater. These individuals display similar size and behavior to stream-type fish (Healey 1991).

Timing of adult returns is dependent on the life history type. Stream-type individuals are commonly called spring-run Chinook salmon since adults with this life history migrate into nearshore waters and return to natal streams in spring to early summer. They usually spawn greater distances from saltwater than the ocean-type stocks. The ocean-type life history is commonly called the fall-run Chinook salmon since most of the adults move to their natal streams in late summer and early fall. The majority of Chinook salmon are ocean-type (Good et al. 2005).

Status of Critical Habitat

The NMFS designated critical habitat for this ESU on September 2, 2005 (70 FR 52630). To be included in a critical habitat designation, habitat must be essential to the conservation of the species. Critical habitat designations identify, to the extent known and using the best scientific

data available, habitat areas that provide at least one physical or biological feature essential to the conservation of the species. These physical or biological features are known as “primary constituent elements” (PCEs) as defined by 50 CFR 424.12(b). The NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of the PCEs throughout the designated area. In estuarine and nearshore marine areas, critical habitat includes areas contiguous with the shoreline from the line of extreme high water out to a depth no greater than 98 feet (30 m) relative to the mean lower low water line.

The following are the six PCEs for PS Chinook salmon ESU critical habitat:

- **Freshwater Spawning:** Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
- **Freshwater Rearing:** Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels and undercut banks.
- **Freshwater Migration:** Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.
- **Estuarine Areas:** Estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fish, supporting growth and maturation.
- **Nearshore Marine:** Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fish, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
- **Offshore Marine:** Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fish, supporting growth and maturation.

The PCEs throughout designated critical habitat for the PS Chinook salmon ESU have variable degrees of degradation. Floodplain connectivity is significantly degraded by diking, filling, and adjacent development. Water quantity is systemically degraded by hydrograph alterations. Water quality is systemically degraded by agricultural, silvicultural, municipal, residential, commercial, and industrial point and non-point discharges. Natural cover and riparian functions are systemically degraded by agricultural, silvicultural, municipal, residential, commercial, and

industrial development. Forage base taxonomy and abundance has been negatively influenced by agricultural, silvicultural, municipal, residential, commercial, and industrial development.

Effects of Climate Change

Salmon and their habitat throughout Washington State have likely been affected by climate change, and these effects are expected to continue into the future. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin et al. 2007; ISAB 2007). While the intensity of effects will vary by region (ISAB 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009) – changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

In Washington State, most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation. Average temperatures in Washington State are likely to increase 0.1 - 0.6 °C per decade (Mote and Salathé 2009). Warmer air temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing stream flow timing and increasing peak river flows, which may limit salmon survival (Mantua et al. 2009). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which scour the streambed and destroy salmon eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows, together with increased magnitude of winter peak flows are all likely to increase salmon mortality. Higher ambient air temperatures will likely cause water temperatures to rise (ISAB 2007). Salmon require cold water for spawning and incubation. As climate change progresses and stream temperatures warm, thermal refugia will be essential to persistence of many salmonid populations. Thermal refugia are important for providing salmon with patches of suitable habitat while allowing them to undertake migrations through or to make foraging forays into areas with greater than optimal temperatures. To avoid waters above summer maximum temperatures, juvenile rearing may be increasingly found only in the confluence of colder tributaries or other areas of cold water refugia (Mantua et al. 2009).

Climate change is expected to make recovery targets for PS Chinook salmon populations more difficult to achieve. Habitat action can address the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters, protecting and restoring riparian vegetation to ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

2.3 Environmental Baseline

The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

Elliott Bay/Puget Sound

The Elliott Bay shoreline is a highly modified portion of Puget Sound with significant commercial, industrial, and residential development. The shoreline consists of a seawall backed by concrete sidewalks, paved roadways, and buildings, and fronted by piers. More than 75 percent of the Elliott Bay shoreline along the seawall is covered by overwater structures. Shoreline armoring has decreased the area of the littoral zone, and overwater structures impair light penetration to the water. The Duwamish River flows into Elliott Bay at the south end of the project area.

Water and sediment quality is highly influenced by the development surrounding the action area. Approximately 50 individual outfalls are located along the seawall that discharge untreated stormwater runoff into Elliott Bay. No information is available on the frequency or amount of stormwater discharged into Elliott Bay. Sewer wastewater is discharged during CSO events from seven King County and City of Seattle outfalls. From 2005 through 2009, there was an average of 33 CSO events ranging from nine in 2008 to 51 in 2006 (King County 2010, City of Seattle 2010).

Water temperatures within Elliott Bay at five meters deep fluctuate between approximately 7.7°C and 16.4°C (Ecology 2006). Dissolved oxygen concentrations ranged from 4.5 to 14.1 mg/L between 2001 and 2003 (Stark et al. 2005). Incursions of upwelling with low dissolved oxygen bottom waters causes localized areas of concern. Nearshore sediments contain high concentrations of various metals and chemical compounds (Romberg et al. 1984; EPA 1988; Metro 1988, 1989, 1993; Tetra Tech, Inc. 1988; Hart Crowser 1994; King County 1994; Norton and Michelson 1995; Ecology 1995). These contaminants include mercury, silver, lead, zinc, copper, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and other metals and organic compounds. The ambient dissolved copper and dissolved zinc concentrations for Elliott Bay are approximately 0.7 and 4.1 micrograms per liter (µg/L), respectively (WSDOT 2010a).

No riparian vegetation occurs along the shoreline within the action area. Aquatic vegetation consists of limited areas of algae. There is no documented eelgrass, forage fish spawning, or extensive macroalgae present. The modified shoreline has resulted in reduced number and species of epibenthic and pelagic zooplankton, riparian and terrestrial insects, and benthic invertebrates. Shoreline restoration activities at the Olympic Sculpture Park in Elliott Bay at the north end of the action area have improved habitat for forage fish and benthic invertebrates. In 2006 and 2007 restoration activities at the Olympic Sculpture Park Habitat created a shallow

water habitat bench, and converted a riprap revetment to beach and nearshore habitat for invertebrates and juvenile salmon rearing.

Lake Union

Lake Union, like Elliott Bay, is highly developed. Approximately 82 percent of the shoreline is modified by piers, bulkheads, and docks. Aquatic vegetation is depleted and dominated by invasive species such as Eurasian milfoil (*Myriophyllum spicatum*). Riparian vegetation is limited to small sections of Gasworks Park and other undeveloped areas (King County 1998; Weitkamp et al. 2000). Some riparian restoration is underway near the Broad Outfall as part of the South Lake Union Park project. The South Lake Union Park project is a long-term redevelopment effort to create a park with waterfront access to Lake Union. Part of the project included improving and enhancing the shoreline by removal of creosote treated piles and debris and planting riparian vegetation.

Water and sediment quality is influenced by the surrounding development and stormwater runoff. Water levels in Lake Union are controlled by the Hiram M. Chittenden Locks located west of Lake Union. Lake Union is on Ecology's 303(d) list of threatened and impaired waters for total phosphorus, lead, zinc, Aldrin (an organochlorine pesticide banned in the U.S. in 1974), 4',4'-DDD, and 4,4'-DDE (Ecology 2009a). Total copper and total lead concentrations have exceeded state water quality criteria (Herrera 2008). Background dissolved copper and dissolved zinc levels for Lake Union are 2.0 and 1.8 µg/L (Ecology 2009b).

Water temperature and dissolved oxygen concentrations are a concern in Lake Union. Summer water temperatures range from 16 to 23°C, well above levels considered ideal for salmonids (18°C). Temperatures the rest of the year range from 7 to 16°C (City of Seattle 2007). Dissolved oxygen concentrations range from 9.5 to 12.6 mg/l during the winter and spring, but concentrations as low as 1 mg/L can be found during the summer (Herrera 2008).

Status of the Species in the Action Area

Elliott Bay. Adult Chinook salmon migrate and forage in Puget Sound and may occur there at any time of year. Juveniles migrate, forage, and rear in the nearshore portions of Puget Sound. They are most abundant in the nearshore in June or July once they leave their natal streams, but they remain until October (Fresh 2006).

Chinook salmon occur in the Green-Duwamish and Cedar River basins (WDFW 1993) and pass through Elliott Bay as they migrate from Puget Sound to the Green River and Lake Washington. Additionally, juvenile Chinook salmon from many other Puget Sound Basin river systems migrate and forage along Elliott Bay shorelines in the spring months.

The Green-Duwamish River Chinook are a mix of wild and hatchery-produced fish. They are considered a healthy stock based on escapement levels (WDFW 2002a). Good et al. (2005) estimated the average number of adult Chinook spawning in the watershed was 13,815 between 1998 and 2002, with 83 percent of the fish spawning from 1997 to 2001 originating in hatcheries. They are nearly all summer/fall run fish that begin entering the Duwamish River as adults in mid-

June, reach peak abundance in August, and continue entering the river through October and early November (Weitkamp et al. 2000; City of Seattle 2007).

As adult Chinook salmon migrate through Elliott Bay on the way to spawn in the Green-Duwamish River, they typically migrate in deeper waters offshore from the docks and piers of Elliott Bay. Adults also congregate at the mouth of the Duwamish before upstream migration from late June through mid-November (Grette and Salo 1986).

Outmigration of juveniles lasts from January to July. Surveys of the Green/Duwamish conducted from 2001 to 2003 by Nelson et al. (2004) and confirmed by a 2004-to-2005 study by the U.S. Army Corps of Engineers (Corps 2005) observed two peaks of out-migrating juvenile Chinook. The early run arrives in the Duwamish estuary as early as January, with a peak of outmigration generally occurring in mid-March. Lower levels of juvenile Chinook out-migration are observed from April through July. The majority of out-migration occurs during the earlier window (City of Seattle 2007).

Recent surveys by the University of Washington show similar migration patterns. Chinook fry approximately 5 cm long leave the Duwamish in February and March. Larger (8-10 cm) smolts outmigrate from May-July (WSDOT 2010a). Juvenile Chinook have been observed along the Seattle Shoreline from late January through September, with a peak in June and July (Toft et al. 2007).

Chinook salmon fry rear and migrate in shallow water along shorelines during their estuarine and early marine residence (Healey 1991). Juveniles are seldom observed in water deeper than approximately 2 meters (6 feet) until they have grown to 70 to 80 millimeters (approximately 3 inches) in length, although they sometimes migrate near the surface water in deeper waters farther from shore. Juveniles migrate offshore beginning in August (WSDOT 2010a). Both locally spawned and non-local juvenile Chinook use the nearshore areas in the Duwamish estuary and Elliott Bay for rearing, spending from a few days to about three months in the vicinity (Myers et al. 1998; Weitkamp et al. 2000). These juveniles may re-enter the marine areas of the lower Duwamish during the summer and winter after out-migration (City of Seattle 2007).

No fish surveys have been conducted at project outfalls, but seine netting and snorkel surveys have been conducted by University of Washington researchers at Myrtle Edwards Park and the Olympic Sculpture Park beach, just north of the Denny outfall. Juvenile Chinook are commonly observed at those locations. Juvenile Chinook have been found in all habitat types along the Seattle shoreline (WSDOT 2010a).

Lake Union. Adults and juveniles from three Chinook stocks migrate through Lake Union. The North Lake Washington Tributary Chinook, which is listed as healthy, is a mixed stock of wild and hatchery fish, with composite (wild and hatchery) production (WDFW 2002b). The Issaquah Chinook is a non-native stock, derived from the Soos Creek Hatchery Chinook stock, with composite production (WDFW 2002c). The Cedar River Chinook are a native stock with wild production and listed as depressed (WDFW 2002d). Adult migration occurs from July through October, with spawning from September through November.

Spawning takes place outside the action area in the Sammamish River and its tributaries, in Issaquah Creek, and the Cedar River. Chinook salmon fry emerge from gravel beds from January to March. As with Green River fish, juvenile outmigration is bimodal, with fry migrating from January to mid-May and parr migrating between mid-April and July (WDFW 2009).

Juvenile Chinook salmon in the Lake Washington basin generally rear in nearshore areas north of the SR 520 Bridge and south of the I-90 Bridge in Lake Washington from January to May. In mid-May to June, fish begin to migrate through the Ballard Locks to Elliott Bay. Juvenile Chinook are common throughout Lake Washington and Lake Union beginning in May when the Issaquah and University of Washington hatcheries release their fish (WSDOT 2010a). Juvenile Chinook have been observed slightly north of the Broad Street outfall in June and July, but are not likely to be present at the outfall prior to May (WSDOT 2010a).

Status of Puget Sound Chinook Salmon Critical Habitat in the Action Area

The action area includes the dilution zones around each of the outfalls to Elliott Bay and Lake Union. Two PCEs of designated critical habitat for Chinook salmon are in the aquatic action area for Elliott Bay:

- Nearshore marine areas: free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, which support growth and maturation; and which possess natural cover such as submerged and overhanging large woody debris, aquatic vegetation, large rocks and boulders, and side channels.
- Offshore Marine areas with: water quality conditions and forage, including aquatic invertebrates and fish, supporting growth and maturation.

In Lake Union, two PCEs are in the action area:

- Freshwater rearing sites with: water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- Freshwater migration corridors: free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

The current condition of the various elements of the nearshore critical habitat is degraded due to the intense urban development in Elliott Bay. The shoreline consists of a seawall and numerous overwater structures that can impede Chinook migration. Development along the shoreline has removed all natural cover. The only natural cover is located near the Denny outfall where restoration activities at the Olympic Sculpture Park have improved in-water habitat. Water quality is influenced by discharge of stormwater and CSO events. Nearshore sediments contain high concentrations of mercury, silver, lead, zinc, copper, PAHs, and PCBs.

The offshore marine habitat is important to Chinook salmon. Elliott Bay and Puget Sound contain international shipping routes that results in constant barge traffic through the area.

In Lake Union, development has also degraded the Chinook salmon PCE elements. The shoreline is heavily developed that has removed the natural cover around the lake. The City of Seattle has begun restoring much of the area around the Broad outfall with the South Lake Union Project. Riparian planting have been installed around the south western shore of the lake. Water quality is influenced by the residential, commercial, and industrial development. Water temperatures during the summer can reach 23°C which can affect rearing and migration.

2.4 Effects of the Action

'Effects of the action' means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The NMFS used the most current, site-specific data and information to assess the direct effects on Chinook salmon and critical habitat. In cases where information is lacking, NMFS has relied upon relevant peer-reviewed literature to evaluate the likely effects. Where site-specific data and information were lacking, NMFS exercised best professional judgment and applied the benefit of doubt in favor of Chinook salmon as necessary to draw conclusions. The results of this assessment led to the determination of adverse effects on Chinook salmon and its designated critical habitat.

Effects on Species

Construction of the project will not result in any in-water work. Direct effects of the project on Chinook salmon include impacts to water quality from stormwater runoff in the project area.

Water Quality from Stormwater Runoff

Pollutants in stormwater runoff can contaminate surface waters at concentrations toxic to fish and other aquatic life (Spence et al. 1996). Exposure to stormwater pollutants may cause a range of physiological and behavioral effects, resulting in, but not limited to, reduced growth, impaired migratory ability, impaired reproduction, and avoidance behavior. The extent and severity of these effects vary depending on the extent, timing, and duration of the exposure, ambient water quality conditions, the species and life history stage exposed, pollutant toxicity, and synergistic effects with other contaminants (EPA 1980). The primary pollutants of concern in stormwater from road surfaces are total suspended solids (TSS), total zinc (TZn), dissolved zinc (DZn), total copper, and dissolved copper (WSDOT 2008, 2009).

The NMFS relies on toxicity data for other salmonids when specific information on toxicity to Chinook salmon is not available. Species within the Salmonidae family are used whenever possible versus using non-salmonids. However, Hansen et al. (2002) demonstrate that even

among the members of Salmonidae specific sensitivities to chemical contaminants and mixtures of contaminants may differ.

Effects of Exposure to Stormwater Pollutant Loading. Pollutant loading is the total quantity of a pollutant in stormwater runoff. The post-project condition will decrease pollutant loading by discharging stormwater into the combined sewer system, in the south portal area, to be treated at the WPTP and providing basic treatment in the north portal where none currently exists. The project will significantly reduce pollutant loading to Elliott Bay as well as in Lake Union. However, pollutant loading will continue and may result in degradation of the aquatic community. It is not possible to ascertain and describe quantitatively the incremental effects of pollutant loading of the proposed action and its effects on the environment; therefore we discuss these effects qualitatively.

There are numerous complex factors and interactions that occur in aquatic ecosystems that determine the significance or impact of pollutant loading. There is no singular, measurable outcome or indicator that can be used to determine the overall affect of pollutant loading. Stormwater analysis focuses on pollutant concentrations to determine potential impacts to the aquatic environment and listed species. Pollutant concentration contributes to pollutant loading, but the effects of pollutant loading itself, for instance how loading causes a gradual building up in a pollutant in the environment, is unclear. Pollutant loading, however, does exert a functional influence at the community level and is a reasonable indirect measure with which to gauge potential effects.

Stormwater pollutant loading can adversely affect Chinook salmon through several mechanisms. Most aquatic sediments are highly susceptible to the uptake of common stormwater pollutants such as metals and organic contaminants (Pitt et al. 1995). Many of these pollutants, particularly metals, resist biodegradation and accumulate over time (Horner et al. 1994). Sediments that collect in depositional areas of streams can contain pollutant concentrations several orders of magnitude greater than those in surface waters, exceeding biological effects thresholds where surface water concentrations do not (Chapman 1973; Clements 1994; Davies 1986; Hoiland and Rabe 1992; Kiffney and Clements 1993). Salmonid eggs and alevins are particularly vulnerable to sediment bound pollutant exposure because they are closely associated with stream substrates during incubation and early rearing (Welch et al. 1998).

Benthic macrofauna, the organisms that constitute the primary prey resource for juvenile salmonids, are closely associated with the substrates and therefore at risk of pollutant exposure (Welch et al. 1998). Macrofauna communities are notably sensitive to changes in water quality, hydrology and other habitat elements associated with urbanization and land use change (Jones and Clark 1987), to the extent that indices of biotic integrity based on community characteristics are in common use as indicators of water and habitat quality. Benthic Index of Biotic Integrity (B-IBI) scores in Puget Sound lowland streams show a demonstrable negative correlation with impervious surface area (Booth et al. 2004; Karr and Chu 1997; Morley and Karr 2002) and the urban character of the drainage (King County, Pierce County, and Snohomish County 2009). Similar biological responses indicative of the adverse effects of urbanization on stream hydrology and water quality have been demonstrated in a diversity of watersheds throughout Washington

State and throughout the country (Cuffney et al. 2005; Morley and Karr 2002; Kratzer et al. 2006).

There is a strong positive relationship between the availability and quality of the macrofauna prey resource and juvenile salmonid abundance (Chapman 1966). While this interaction is complex, salmonid density, growth rates, and abundance are usually positively correlated with macroinvertebrate biomass (Chapman and Bjornn 1969; Murphy et al. 1981). Laboratory studies have clearly demonstrated that salmonid growth rates and carrying capacity can be limited by food availability (Keeley 2001; Mason 1976).

Bioaccumulation of pollutants in the food chain presents an additional mechanism through which adverse effects can occur. Benthic macroinvertebrates can bioaccumulate metals and other pollutants in their tissues, making these pollutants biologically available for uptake at higher levels in the food chain (Kiffney and Clements 1993). Dietary exposure to metals and other pollutants can cause a range of adverse effects in fish and other aquatic life forms (Rand and Petrocelli 1985). These adverse effects have been demonstrated in several salmonid species. For example, Lundebye et al. (1999) found that dietary exposure to copper significantly reduced growth rates in juvenile Atlantic salmon. Handy et al. (1999) exposed rainbow trout to dietary copper uptake and found that the metabolic costs of detoxification and excretion limited the energy available for normal swimming behavior. Effects of this nature have significant implications for survival and fitness.

Effects of Exposure to Elevated Water Column Contaminant Concentrations--Copper. Copper is acutely toxic to fish at low concentrations. Sprague (1964, 1965) reported a 7-day Incipient Lethal Level (ILL)₁₂ of 48 µg/L and 32 µg/L at water hardness of 20 mg/L and 14 mg/L, respectively, for juvenile Atlantic salmon (*Salmo salar*) exposed to dissolved copper. The ILL does not account for delayed mortality beyond the exposure period, suggesting potential underestimation of adverse effects.

At very low concentrations, copper can cause sublethal and behavioral effects that have significant implications for survival and fitness, such as impaired disease resistance, osmoregulatory disruption, kidney, liver and gill pathologies, altered blood chemistry and enzyme activity, and impaired respiration, olfactory ability and brain function, hyperactivity, impaired avoidance behavior, and delayed migration (Eisler 1998). Olfactory inhibition decreases the ability of salmonids to recognize and avoid predators, it disrupts the ability to imprint on natal waters, and impairs or delays homing and migration. Olfactory inhibition and behavioral effects can be triggered at relatively low exposure concentrations and they are readily linked to demonstrable adverse effects. Recent studies have considered the effects of altered copper concentration relative to typical background levels. Sandahl et al. (2007) observed the onset of olfactory disruption and behavioral alteration at a nominal increase in copper concentration of 2.0 µg/L in juvenile coho salmon acclimated to a background concentration of 3.0 µg/L. Baldwin et al. (2003) found that 30 to 60 minute exposures to dissolved copper at 2.3 µg/L above background concentrations caused significant olfactory inhibition in juvenile coho salmon. Exposure to 10 µg/L of dissolved copper for 30 minutes, a concentration and duration typical of stormwater effluent from modern treatment BMPs, reduced olfactory capacity by 67 percent, an effect that appears independent of water hardness. In saltwater, Chinook have been found to avoid water containing copper (F. Sommers, NMFS. pers. comm. 2010).

Salmonids will actively avoid copper where possible and because the dilution zones to background levels are small compared to the overall size of Elliott Bay and Lake Union, salmonids in the action area should generally be able to avoid acute exposure. In the event they are unable to do so, olfactory function impairment will begin to occur within minutes of exposure. The resulting physiological injury can persist from days to weeks. Saucier et al. (1991a) found that extended exposure of rainbow trout to dissolved copper at 22 µg/L caused an evident decrease in olfactory sensitivity that persisted for weeks after exposure. Saucier et al. (1991b) exposed rainbow trout eggs and alevins to similar concentrations over periods ranging from 37 to 41 weeks and found evidence of persistent olfactory tissue necrosis. Some healing of damaged tissue occurred after the subjects were removed from exposure, but the potential for injured fish to fully recover remains unclear.

Behavioral alteration is a temporary effect, but it can lead to ancillary effects on survival and fitness. Avoidance of elevated copper concentrations can lead fish to abandon preferred habitats, potentially leading to competitive stress, increased predation exposure, and/or reducing foraging efficiency. Adverse behavioral responses to dissolved copper have been observed at very low concentrations *in-vitro*. Folmar (1976) observed avoidance responses in rainbow trout fry when exposed to a Lowest Observed Effect Concentration (LOEC) of 0.1 µg/L of dissolved copper (at 90 mg/L water hardness). The EPA (1980) also documented avoidance by rainbow trout fry of dissolved copper concentrations as low as 0.1 µg/L during a 1 hour exposure. These concentrations are well below typical background levels and prohibitively difficult to measure in the field, limiting their practical utility as effects thresholds. More recent studies have considered the effects of altered copper concentration relative to typical background levels. Sandahl et al. (2007) observed the onset of olfactory disruption and behavioral alteration at a nominal increase in copper concentration of 2.0 µg/L in juvenile coho salmon acclimated to a background concentration of 3.0 µg/L. Based on these findings, NMFS has concluded that this threshold (2.0 µg/L over background concentrations of 3.0 µg/L or less) is representative of the onset of adverse effects for the purpose of ESA consultations.²

Effects of Exposure to Elevated Water Column Contaminant Concentrations--Zinc. Zinc occurs naturally in the environment and is an essential trace element for most organisms. However, in sufficient concentrations and through bioaccumulation by aquatic organisms, excess Zn is toxic. Zinc toxicity depends on water hardness and varies widely depending on organism sensitivity, the extent and duration of exposure, and site specific factors (De Schampelaere and Janssen 2004). Lethality typically requires exposure at high concentrations over long periods. For example, Hansen et al. (2002) found worst case 120-hour LC₅₀ values³ of 35.6 µg/L for juvenile bull trout averaging 30 mm total length, and 23.9 µg/L for juvenile rainbow trout averaging 54 mm total length (at pH 7.5, hardness 30, and 8.0 degrees C).

² Grady, Mike. 2007. E-mail to Sharon Love, U.S. Department of Transportation, Federal Highway Administration, regarding best available science on salmonid olfactory sensory responsiveness impairment caused by elevated dissolved copper and dissolved zinc. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, WA. August 23, 2007.

³ 120 LC₅₀ = the concentration at which 50 percent of organisms expire after a 120-hour exposure

Sublethal effects from zinc exposure occur at lower concentrations. These effects include reduced growth, altered behavior (avoidance), reproductive impairment, elevated respiration, impaired swimming ability, developmental abnormalities of the jaw and bronchial tissues, hyperactivity, and hyperglycemia (Eisler 1993), all adversely affecting survival and fitness. Saunders and Sprague (1968) observed delayed migration and spawning in adult Atlantic salmon exposed to surface waters contaminated with zinc from mining pollution. Juvenile salmonids are more sensitive to elevated zinc concentrations than adults (EPA 1987). Coho salmon and cutthroat trout (*O. clarkii*) fry were observed to avoid nominal dissolved zinc concentrations ranging from 6.54-28 µg/L at hardness of 15-100 mg/L (Woodward et al. 1997). Sprague (1968) observed that juvenile rainbow trout demonstrated avoidance behavior when exposed to a 5.6 µg/L increase in dissolved zinc concentrations when background levels ranged between 3.0 µg/L and 13 µg/L at water hardness from 13 mg/L to 15 mg/L.⁴

The implications of behavioral effects caused by zinc exposure are similar to those described for copper, meaning that exposure to zinc above an established behavioral effects threshold would be expected to lead to adverse effects on survival and fitness. However, the identification of an appropriate biological effects threshold is complicated by the broad range of concentration, water hardness, and life history dependent responses. NMFS relies on the lowest documented effects threshold that can be practically applied for the purpose of ESA consultation. On this basis, NMFS has concluded that the exposure threshold observed by Sprague (1968) (i.e. a 5.6 µg/L increase in dissolved zinc concentrations when background levels ranged between 3.0 µg/L and 13 µg/L) is representative of the onset of adverse effects.⁵

The Project-Specific Effects of Water Quality Changes from Stormwater Runoff. The project area consists of 12 TDAs. During rainfall events, stormwater currently runs off the top level of the viaduct and drains untreated into Elliott Bay. The lower level of the viaduct is directly underneath the top level and therefore contributes minimal additional stormwater discharge. After the viaduct is removed, it will no longer contribute runoff to seven TDAs: Washington, Madison, Seneca, University, Pike, Pine, and Vine. The project therefore will not discharge stormwater to these TDAs once the project is complete. When the viaduct is removed, some of the existing streets and parking lots will be replaced by tunnel operations buildings, sidewalks, and landscaped areas. This will reduce the existing pollution-generating impervious surface area by approximately 10 acres (Table 3) and will therefore reduce the amount of untreated stormwater and pollutants discharged in the action area.

The project will continue to generate stormwater runoff in five TDAs, discharging into the combined sewer system. Under most circumstances, runoff from four of the TDAs (Royal Brougham South and North, King, and Dexter) will be directed to the WPTP for treatment and discharged via a deep water outfall to Elliott Bay. However, during high flow events, combined stormwater and wastewater may be discharged untreated to Elliott Bay through three combined sewer outfalls along the Seattle waterfront. The following analysis of the project's effects on pollutant levels applies to those occasions when flows exceed the capacity of the combined sewer system and discharge untreated to Elliott Bay.

⁴ These hardness values are fairly typical of those observed in larger rivers in Western Washington, including the EF Lewis River (WDOE 2009).

⁵ See footnote 3.

The three outfalls discharging in Elliott Bay are separated from each other, which minimizes potential exposure to Chinook salmon by preventing continuous impacts or effects. The King and Kingdome Outfalls are located approximately 1,500 feet apart. The Denny and King Outfalls are approximately 10,000 feet from each other.

The King and Kingdome (South and North Royal Brougham TDAs) Outfalls both discharge under Pier 46 along the waterfront. The King Outfall is located under the northeast edge of Pier 46 and about half of the pipe is exposed at extreme low tides. The outfall is located 150 feet offshore at a depth of 20 feet. The outfall is located at the base of the riprap along the seawall under the pier. The Kingdome Outfall is located under the west side of the pier approximately 400 feet from the southern edge. The outfall discharges 150 feet offshore at a depth of 20 feet. No information is available on habitat conditions around the outfall, but conditions should be similar to the King Outfall, because they both discharge under Pier 46 and are in close proximity to each other.

The Denny Outfall is located within Mrytle Edwards Park approximately 1,900 feet north of the Olympic Sculpture Park at Broad Street and Alaskan Way. The outfall discharges 100 feet offshore at a depth of 10 feet. The habitat around the outfall consists of sand-gravel habitat mix, cobble, and boulders (King County 2009a).

The fifth TDA, Broad, is a separated stormwater system that currently discharges untreated stormwater into Lake Union. The project will provide basic stormwater treatment for the Broad TDA, which will continue to discharge into Lake Union. Unlike the analysis for stormwater discharges into Elliott Bay, which occurs only during CSO events, the analysis for the Broad Outfall applies to all rain events large enough to cause stormwater discharges into Lake Union.

The Broad Outfall is located on the southern end of Lake Union in Waterway #3. Waterway #3 is like a narrow cove, approximately 190 feet wide, with the shoreline on the three sides being a City of Seattle park. The eastern shoreline is mostly a vertical seawall. The depth of Waterway #3 is approximately 30 feet in the north gradually decreasing to about 6 feet at the outfall.

To conduct the stormwater analysis for the combined sewer-stormwater outfalls outlined above, WSDOT modeled the flows using the “pipe within a pipe” scenario. This model analyzes stormwater as if there is a separate pipe that carries only the flows from the TDA to the outfall. It does not analyze the stormwater as taken into the combined sewer system and mixed with non-project stormwater and wastewater. Thus the analysis does not factor in any beneficial or detrimental effects that may occur within the system due to mixing with non-project water. Beneficial effects could occur through dilution of project stormwater when mixed with water from non-PGIS areas. Detrimental effects could occur through synergistic effects of pollutants mixing within the system. Unfortunately, the best available scientific information currently does not exist to allow NMFS to analyze the potential synergistic effects and as such, whether the actual effects of the combined outflows would be lesser or greater as compared with the effects if the discharges were separate. Until additional scientific information becomes available, NMFS assumes that the synergistic effects, if any, will be similar to the effects of copper and zinc and would affect only a small number of individuals due to the size of the dilution zone.

Overall, pollutant loading of TSS, TCu, DCu, TZn, and DZn from the project area discharged to Elliott Bay will decrease by 40 percent or more (Table 4, WSDOT 2010a), due to a decrease in impervious surface area as well as the implementation of stormwater treatment where none previously existed. Pollutant loading to Lake Union will be reduced by 79 percent for TSS, 56 percent for TCu, 63 percent for TZn, and 27 percent for DZn. Loading for DCu in Lake Union will remain the same because the water quality treatment provided for that TDA is offset by the increase in TDA size. Pollutant loads discharged at the WPTP outfall are similarly reduced. Loading for all pollutants of concern decreases by approximately 34 percent, reflecting the decrease in PGIS from the project (i.e., the reduced PGIS results in decreased flows and pollutants leaving the TDA). This analysis is only for the pollutants from five of the 12 TDAs, discharging out four outfalls.

The expected reduction in pollutant loading does not take into account the decrease in pollutants through the reduction of untreated runoff contaminated by pollution from the high traffic levels that currently use the viaduct. When the viaduct is removed, traffic levels on the surface streets below the viaduct likely will be higher than current conditions, due to changes in the Ballard/Interbay access to SR 99 and the removal of the midtown ramps. However, the pollutant loading generated from traffic on the viaduct will no longer run off and discharge into Elliott Bay. Under existing conditions, approximately 56,100 vehicles per day travel northbound on the upper level of the viaduct (WSDOT 2010b). Approximately 11,100 vehicles per day travel on the surface street of Alaskan Way, north of Pine Street, and 12,000 vehicles per day on Alaskan Way, north of Seneca Street. The stormwater from both the viaduct and Alaskan Way and associated pollutants discharges into Elliott Bay. When the viaduct is removed, the pollutants from the 56,100 vehicles will be removed as these cars go through the tunnel. The WSDOT estimates that by 2030 approximately 17,800 vehicles per day will travel on Alaskan Way, north of Pine Street, and 18,600 vehicles on Alaskan Way, north of Seneca Street. Thus construction of the project will reduce pollutant loading from 37,500 to 38,300 vehicles per day (i.e., $56,100 - 18,600 = 37,500$ vehicles), which is not reflected in Table 4.

Table 4: Pre- and post-project pollutant loading by discharge location (WSDOT 2010a).

TDA	Scenario	Pollutant Load (lb/yr)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham	Existing	158	0.05	0.02	0.31	0.12
	Proposed	81	0.03	0.01	0.15	0.06
	Percent reduction	49	40	50	51	58
King	Existing	288	0.07	0.02	0.45	0.13
	Proposed	162	0.04	0.01	0.25	0.07
	Percent reduction	43	43	50	47	46
Denny	Existing	114	0.03	0.01	0.17	0.05
	Proposed	88	0.02	0.01	0.14	0.04
	Percent reduction	23	33	0	22	22
Broad	Existing	1710	0.43	0.1	2.64	0.75
	Proposed	351	0.19	0.1	0.98	0.55
	Percent reduction	79	56	0	63	27
WPTP	Existing	801	1.64	0.79	7.31	5.88
	Proposed	530	1.08	0.51	4.84	3.88
	Percent reduction	34	34	35	34	34

The ambient DCu and DZn concentrations for Elliott Bay are approximately 0.7 and 4.1 µg/L, respectively (WSDOT 2010a), and values for Lake Union are 2.0 and 1.8 µg/L, respectively (WSDOT 2010a). In the absence of information to describe how pollutant loading changes ambient concentrations of these waters, it is not possible to say definitively that the reduced pollutant loading resulting from the proposed project will cause or contribute to any changes in the ambient pollutant concentrations that may result in any exceedance of one pollutant’s biological threshold for altering or impairing their biological processes and negatively impacting salmonids.

Pre- and post-construction pollutant concentrations do not change because the stormwater analysis uses the “pipe within a pipe” model that assumes that stormwater discharges untreated to Elliott Bay during CSO events (Table 5). The exception is the Broad St. TDA, where water quality treatment will be provided as part of the project. Concentrations of TSS in that TDA decrease by 91 percent for TSS, 69 percent for TCu, 25 percent for DCu, 76 percent for TZn, and 41 percent for DZn (WSDOT 2010a). Pre-project pollutant concentrations in the S. Royal Brougham TDA are low because water quality treatment in this TDA will be provided as part of the SR 99 S. Holgate St. to S. King St. Viaduct Replacement Project, which is assumed to be the existing condition for this consultation.

Table 5: Pre- and Post-Project Pollutant Concentrations (WSDOT 2010a)

TDA	Scenario	Pollutant Concentrations (mg/L)				
		TSS	TCu	DCu	TZn	DZn
Royal Brougham South	Existing	5.68	0.005	0.003	0.023	0.016
	Proposed	5.68	0.005	0.003	0.023	0.016
	Percent reduction	0.00	0.00	0.00	0.00	0.00
Royal Brougham North	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00
King	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00
Dexter	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	61.7	0.016	0.004	0.095	0.027
	Percent reduction	0.00	0.00	0.00	0.00	0.00
Broad	Existing	61.7	0.016	0.004	0.095	0.027
	Proposed	5.68	0.005	0.003	0.023	0.016
	Percent reduction	91	69	25	76	41

Dilution modeling provides an estimate for the distance at which pollutant concentrations (specifically DCu and DZn) in stormwater runoff from the project reach the threshold established by the NMFS for potential water quality effects to salmonids: 2 µg/L above the background concentration for DCu and 5.6 µg/L above the background concentration for DZn (WSDOT 2010a). The dilution modeling for the combined sewer system only applies to those situations when the combined system becomes overloaded, and stormwater is discharged untreated to Elliott Bay. Most of the time, water is sent to the WPTP. Only 3.8 percent of annual basin runoff in the Royal Brougham TDA is discharged as overflow events. This figure is 6.9 percent for the King St. TDA and 1.7 percent for the Dexter TDA (WSDOT 2010a). The dilution model conservatively assumes that 100 percent of stormwater from the TDA will be discharged to Elliott

Bay during an overflow event. The analysis also assumes a 99.9th percentile flow rate to represent a likely CSO-inducing runoff event.

Dilution zones will generally be reduced post-project (Table 6). Because the outfalls discharge to large water bodies where the plumes could travel in different directions based on tidal currents or wind direction, the area of the dilution zone was calculated in square feet. Dissolved zinc has the larger dilution plumes. Dilution plumes for DZn will decrease by 40.7 square feet (26.2 percent) at the Royal Brougham TDA, 18.8 square feet (50.1 percent) at the King TDA, and 26.1 square feet (61.4 percent) at the Dexter TDA. Stormwater treatment provided in the Broad St. TDA will reduce concentrations of pollutants in stormwater effluent, but because the 99.9th percentile flow is assumed to bypass water treatment facilities in the Broad St. TDA, pre- and post-project dilution zones for DZn in Lake Union remain the same. The 50th percentile flow data are also presented here. At that flow rate the water treatment facilities are not bypassed and the dilution zone for DZn in Lake Union is reduced from 87.5 square feet to 11.2 square feet, or by 87.2 percent.

Table 6: Dilution Zone Dimensions (in feet) and Area (in square feet) for Dissolved Copper and Dissolved Zinc Pre- and Post-Construction (WSDOT 2010a).

TDA	Metal	Pre-Project			Post-Project		
		Length	Width	Area	Length	Width	Area
Royal Brougham	DCu	7.9	2.8	22.1	7.5	2.8	21.0
	DZn	23.2	6.7	155.4	18.5	6.2	114.7
King	DCu	10.4	1.8	18.7	6.7	1.4	9.4
	DZn	12.5	3.0	37.5	7.8	2.4	18.7
Dexter	DCu	10.2	2.2	22.4	5.7	1.6	9.1
	DZn	11.8	3.6	42.5	6.3	2.6	16.4
Broad (99.9 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a	n/a	n/a
	DZn ²	28.36	5.64	160.0	28.42	5.64	160.3
Broad (50 th percentile flow rate)	DCu ¹	n/a	n/a	n/a	n/a	n/a	n/a
	DZn	6.67	13.12	87.5	4.15	2.69	11.2

¹ Concentrations of dissolved copper at the Lake Union outfall are 3 µg/L, below the threshold concentration of 2.0 µg/L above background, so there is no dilution plume for dissolved copper in this TDA.

² The dilution zone for dissolved zinc remains unchanged pre- and post-project because dilution modeling assumes the 99.9th percentile flows will bypass water quality treatment.

Dilution plumes for DCu will also decrease from 7.9 to 7.5 feet in the Royal Brougham TDA, 10.4 to 6.7 feet in the King TDA, and 10.2 to 5.7 feet in the Dexter TDA (WSDOT 2010a). There is no dilution plume for DCu in the Broad St. TDA because stormwater is discharged at concentrations below the threshold of 2 µg/L above background.

Dilution plumes were not modeled for the WPTP outfall. However, because pollutant loads discharged at the WPTP outfall will be reduced by 34 percent or more, the dilution plume at the WPTP outfall will be smaller post-project. An analysis performed for the SR 99 S. Holgate St. to

S. King St. Viaduct Replacement Project indicated that pollutants of concern are highly unlikely to extend beyond 105 feet from the project outfall, and based on the modeling for this project, are likely much smaller than that.

An analysis of the timing of the overflow events of the three outfalls discharging to Elliott Bay shows that most events occur from November through January (Table 7). The average frequency and volume in Table 7 are an average of CSO events over the past 5 years. The frequency of discharges from these CSO outfalls has been greatly reduced over the past 20 years from 1991 to 2009. Appendix 1, Figure 7 shows the number of CSO events between 1991 and 2009 (King County 2010).

Beginning in 2008, King County began monitoring the duration of CSO events. In 2008 and 2009, the Denny Outfall discharged six times (Appendix 1, Figure 8). The duration of the CSO events ranged from approximately one minute on October 26, 2009 to 13.5 hours on October 16, 2009 (King County 2009b; 2010). The average discharge time for the Denny Outfall is approximately 3.5 hours.

Table 7: Average Monthly Frequency and Volume of CSO Discharges (WSDOT 2010a).

Month	Kingdome		King		Denny	
	Frequency (per month)	Volume (MG ¹)	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)
January	1.67	6.43	5.14	6.76	1.00	0.06
February	0.33	0.91	1.14	0.9	0.33	0.01
March	0.67	1.97	1.57	1.59	0.00	0.00
April	0.67	1.0	0.86	0.29	0.00	0.00
May	0.33	0.3	1.43	0.42	0.00	0.00
June	0.00	0.00	0.29	0.03	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00
August	0.00	0.00	0.43	0.79	0.00	0.00
September	0.00	0.00	0.43	0.05	0.00	0.00
October	0.00	0.00	1.14	1.96	0.25	0.00
November	0.5	0.11	3.86	3.94	0.00	0.00
December	2.75	11.62	2.86	4.59	1.00	2.45
Total Per Year	6.92	21.68	19.14	21.34	2.58	2.51

¹ MG = million gallons

The King Outfall discharged 18 times in 2008 and 2009 with an average duration of 6.5 hours (Appendix 1, Figure 9) (King County 2009b; 2010). Durations ranged from six minutes on September 29, 2009, to 35.5 hours on November 6, 2009. The Kingdome Outfall discharged nine times with an average duration of 50 minutes (Appendix 1, Figure 10) (King County 2009b; 2010). Durations ranged for the Kingdom Outfall from 12 minutes on November 7, 2009, to 2.5 hours on January 7, 2009.

The duration of the discharge from the outfalls is important to determine exposure risk to Chinook salmon from the outfall plume and the associated contaminants as well as from impeding migration along the Seattle waterfront. Discharges of long duration would increase the potential for exposure. If Chinook salmon are not able to migrate around an outfall, discharges of long duration could prevent Chinook from migrating past the outfall. This could result in decreased foraging opportunities and increased energy expenditures.

An attempt was made to analyze the plume velocity of discharges from CSO outfalls and compare them to the swimming speed of Chinook salmon. If the outfall discharge is greater than the swimming speed of a fish, the fish could be deterred from entering the discharge plume. Table 8 shows the swimming speeds for different size Chinook salmon.

Table 8: Mean Swim Speeds for Prolonged Swimming for Chinook Salmon.

Fish Size (cm)	Mean Swim Speed (m/s) ¹	Reference ²
75.5	1.55	Geist et al (2003)
4.1	0.21	Smith and Carpenter (1987)
3.5	0.16	Smith and Carpenter (1987)
4.0	0.14	Smith and Carpenter (1987)

¹ meters per second

² As cited by U.S. Forest Service 2010.

The King County Department of Natural Resources (DNR) (1999a) modeled outfall plume velocities to determine the number of days in which plume velocities exceeded the swimming speed for Chinook salmon (actually modeled for coho (*Oncorhynchus kisutch*) species). A velocity of 1.0 m/s, greater than the mean swimming speed of most fish, was used to evaluate the plume velocity during a CSO discharge. Table 9 identifies the number of days in which plume velocity exceeded 1.0 m/s (King County DNR 1999a). Baseline hydrology data used for the model was September 1996 through April 1997 and May through August 1981. This data represents a typical year in terms of annual CSO volume, and includes large CSO events during both high and low flow conditions (King County DNR 1999b).

Table 9: The number of days in which the plume velocity resulting from a CSO discharge exceeded 1.0 m/s at the CSO outfalls (King County DNR 1999a).

CSO Outfall	Number of Days in Which Plume Velocity Exceeded 1.0 m/s
Denny	32
King	7
Kingdome	4

The King County DNR (1999a) data does not compare the modeled number of days in which plume velocities exceed 1.0 m/s against the actual number of CSO events that occurred during the modeled year. King County estimates that the modeled number is over 90 percent of the actual number of CSO events (K. Huber, King County pers. comm. 2010). This indicates that for the majority of CSO events the discharge velocity is greater than the mean swim speed of smaller Chinook salmon; mean swim speed for larger Chinook salmon is faster than 1.0 m/s.

Modeled estimates of effluent concentrations and calculated dilution zone dimensions at the four operational combined sewer and stormwater outfalls indicate a small but measurable potential for exposure to pollutant concentrations in excess of biological effects thresholds. Within Elliott Bay, the calculated dilution zones areas at each outfall is less than 21.1 square feet for DCu and 114.7 square feet for DZn. In Lake Union, the dilution zone area for DZn is 11.2 square feet for the 50th percentile flow and 160.3 square feet for the 99.9th percentile flow.

The results of this analysis indicate the following:

- The proposed action will result in episodic discharges of untreated stormwater several times per year that are likely to exceed biological effects thresholds for dissolved copper (DCu) and dissolved zinc within the following dilution zones in Elliott Bay and Lake Union:

Elliott Bay

- Royal Brougham TDA (Kingdome outfall): Within 115 square feet.
- King TDA (King outfall): Within 18.7 square feet.
- Dexter TDA (Denny outfall): Within 17 square feet.

Lake Union

- Broad TDA (Broad outfall): Within 161 square feet.

- These episodic discharges will occur over the life of the project.
- Chinook salmon have an unquantifiable probability of occurrence within these dilution zones during one or more of these episodic discharges.
- Therefore, Chinook salmon could potentially be exposed to one or more pollutants at concentrations that exceed biological effects thresholds.

Relevance of Action Area Effects to Salmonid Population Viability. To assess whether the effects on habitat and individual fish in the action area will jeopardize the affected species, NMFS considers whether the effects of a proposed action at individual scale are sufficient to alter the viability characteristics of the affected populations (McElhany, et al, 2000). If local effects will bear on population viability, NMFS assesses whether population-scale effects will be sufficient to increase the risk of long term survival and recovery of the species to which the affected populations belong. As discussed in the Sythesis section below, the proposed action will result in some long-term adverse effects to individual Chinook salmon, but those effects are not likely to bear on the viability of the affected populations of PS Chinook salmon or PS steelhead, and the overall effects of the project will result in a decrease of pollutants discharging into Elliott Bay.

Operational stormwater discharge represents a permanent, intermittent impact on habitat quality in Elliott Bay and Lake Union. The small area affected by stormwater discharges that approach injury thresholds in both Elliott Bay and Lake Union means that the project is likely to affect only a few individuals per year. Therefore, the number of affected fish would not be expected to bear on VSP factors of abundance or productivity to a degree that reduces the viability of the affected populations. Three of the four Chinook salmon populations impacted by the project, the Green-

Duwamish River, North Lake Washington Tributary, and the Issaquah Creek stocks, are all considered healthy. The fourth population, the Cedar River population, is considered depressed. The proposed project occurs in a highly developed and urbanized area where these populations are exposed to degraded shoreline habitats. Because of the location of the project, in rearing habitat and along the migratory corridors for these four populations, the project will impact only a few individuals as they forage and migrate along the Seattle waterfront or through Lake Union.

Effects on Designated Critical Habitat

Designated CH within the Elliott Bay action area consists of nearshore and offshore marine areas. The offshore marine area PCE is within the action area. Lake Union includes PCEs for freshwater rearing and freshwater migration.

Nearshore Marine Areas Primary Constituent Elements in the Action Area. *Water Quality:* The proposed action will result in continued annual loading of DCu and DZn in Elliott Bay throughout the life of the project at the three outfalls that occasionally discharge untreated stormwater and wastewater into Elliott Bay. The project does significantly decrease pollutant loading into Elliott Bay, because stormwater will be discharged to the combined sewer system, and the existing viaduct and associated pollutant loading from traffic will be removed. The outfalls are separated from each other by over 1,500 feet. The project will discharge stormwater pollutants at levels above the biological threshold levels for salmonids during episodic CSO events. Stormwater pollutants will dilute to levels below the biological threshold level within 115 square feet, 19 square feet, and 17 square feet at the Kingdome, King, and Denny Outfalls, respectively. Beyond the dilution zones, the project will improve the water quality in Elliott Bay.

Freshwater Rearing and Migration Corridors Primary Constituent Elements in the Action Area. *Water Quality:* The proposed action will result in continued annual loading of DCu and DZn in Lake Union. Water quality treatment is provided prior to stormwater discharges into Lake Union. Pollutant loading of DCu and DZn will occur throughout the life of the project at the Broad Outfall. The project discharges stormwater pollutants at levels above the biological threshold level for zinc. Stormwater pollutants will dilute to levels below the biological threshold level within 12 square feet during 50 percentile flows and 161 square feet at the 99.9th percentile, high storm event. Beyond the dilution zones, the project will not changes to the water quality in Elliott Bay.

2.5 Cumulative Effects

'Cumulative effects' are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Appendix 1, Attachment 1 contains a list of projects that are reasonably certain to occur within the action area, along with a summary of the anticipated effects of those projects. The action area is in a highly urbanized setting that is almost completely developed. Some of the projects identified in Attachment 1 will have no effect on listed species because there is no suitable habitat

for those species within the vicinity of the projects. Other projects that create additional PGIS may generate more pollutants that will be discharged to Elliott Bay or Lake Union. However, over the long term, these future projects would likely improve water quality in Elliott Bay and Lake Union, due to implementation of the following legally-required measures:

- Retrofit currently untreated PGIS with, at a minimum, basic water quality treatment BMPs in stormwater sub-basins.
- Reduction of peak flows and the frequency of combined sewer overflows through the application of detention facilities to control runoff from combined sewer sub-basins.
- Conversion of PGIS to non-PGIS or pervious surfaces.

Temporary effects on water quality would potentially be increased by some projects. Construction effects on surface water would generally be the result of staging, material transport, earthwork, stockpiling, storm drainage and/or combined sewer utility work, and dewatering. Construction-related pollutants can increase turbidity and affect other water quality parameters, such as the amount of available oxygen in the water. In addition, pH can be altered if runoff comes in contact with curing concrete, which could result in effects on aquatic species. Implementation of BMPs would minimize or prevent temporary effects.

Climate change is expected to continue within the action area. Climate change alters the water yield, flows, and temperatures of the aquatic environment. Future projects must incorporate climate change impacts into their design to help counter potential adverse effects that may result. Projects must consider changes in seasonal precipitation patterns to provide stormwater treatment for different hydrologic patterns. With the action area being highly modified, the cumulative effects of future project must alleviate potential climate change impacts to the aquatic environment, especially stormwater input to provide improve water quality for Chinook salmon.

2.6 Integration and Synthesis

Integration and synthesis is the final step of NMFS' assessment of the risk posed to species and critical habitat putting the effects of the proposed action in context of the species and critical habitat status, environmental baseline, and cumulative effects. In this section, we add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to assess whether it is reasonable to expect that the proposed action is not likely to: (1) result in appreciable reductions in the likelihood of the survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

Four Chinook salmon populations migrate and rear within the project's action areas. In Elliott Bay, the Green-Duwamish Chinook population is considered healthy. In Lake Union, the North Lake Washington Tributary and the Issaquah stocks are considered healthy, and the Cedar River stock is considered depressed. Elliott Bay and Lake Union are both highly urbanized with over 75 percent and 82 percent, respectively, of their shorelines having been modified. In Elliott Bay,

sediment and water quality is highly influenced by the 50 outfalls that discharge untreated stormwater and wastewater into the bay. Water temperatures, dissolved oxygen, total copper (TCu), and total lead concentrations are a high concern in Lake Union.

The effects of the project will mainly be localized impacts to the Green-Duwamish Chinook salmon population within Elliott Bay, and the three Lake Washington stocks within Lake Union. A few individuals from other populations within Puget Sound may also be exposed to stormwater contaminants as they migrate through Elliott Bay. The project will expose a small number of Chinook salmon to elevated contaminants within the dilution zones of the three outfalls in Elliott Bay and one outfall in Lake Union during combined sewer overflow events.

The project will significantly reduce pollutant loading from current levels with the removal of the viaduct and addition of stormwater treatment at the north portal area. However, stormwater discharges will continue to result in concentrations of zinc and copper that are above the biological threshold levels for altering or impairing the biological process and negatively impacting salmonids. The dilution zones from the project are relatively small, and a small number of Chinook salmon will be exposed to elevated copper and zinc concentrations above the biological threshold level. Other factors such as the outfall discharge velocities being greater than the mean swimming speed of Chinook salmon also reduces potential risks of exposure to elevated copper and zinc concentrations.

Future projects will create additional PGIS, however, required conservation measures applied to those projects will improve water quality in Elliott Bay and Lake Union. Long-term projects of reducing the frequency of combined sewer overflow events, and converting PGIS to non-PGIS will further improve water quality. Climate change may have additional adverse effects, but the action area is already highly developed, and future projects can be designed to minimize potential adverse effects.

Because the viability of the Chinook populations in the Green-Duwamish, north Lake Washington Tributaries, Issaquah, and the Cedar River are not impaired by the effects of the proposed action, and there are no reasonably likely adverse cumulative effects, the project will not increase the risk for the survival or recovery of the PS Chinook salmon ESU.

2.7 Conclusion

After reviewing the status of PS Chinook salmon and their designated critical habitat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of PS Chinook salmon and is not likely to destroy or adversely modify designated critical habitat for PS Chinook salmon.

3.0 ENDANGERED SPECIES ACT: INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. Harm in the definition of "take" means an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (50 CFR 222.102). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (50 CFR 222.102). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise legal agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this incidental take statement.

3.1 Amount and Extent of Take

The PS Chinook salmon will be present in the action area and be exposed to long-term operational stormwater impacts. Some of the exposed fish will respond to exposure by expressing impaired normal behaviors to an extent that actually injures or kills them. Therefore, incidental take of Chinook salmon is reasonably certain to occur.

Take in the form of harm can be difficult if not impossible to quantify because harm results from habitat modification and fish exposed to habitat changes are likely to express variable responses to exposure. Furthermore, both the range of individual fish responses and the number of individuals likely to be exposed are highly variable. Both of these situations are present for this consultation. When the number of individuals taken by the action cannot be calculated, NMFS relies on a description of the extent of habitat modified to quantify the extent of anticipated take. The extent of habitat change to which present and future generations of fish will be exposed is readily discernable and presents a reliable measure of the extent of take that can be monitored and tracked. These factors also mean that action agencies can determine when the extent of anticipated take is exceeded triggering the need to reinitiate consultation. Therefore, when the specific number of individuals "harmed" cannot be predicted, NMFS quantifies the extent of take based on the extent of habitat modified (51 FR 19926 at 19954; June 3, 1986). Based on the analysis of the effects of the proposed action and the foregoing, the following bullet quantifies the extent of anticipated take, which according to ESA section 7(o) and this statement, is exempted from the prohibition against take:

- Increased dissolved copper and dissolved zinc beyond the biological effects thresholds in Elliott Bay within a) 115 square feet of the Kingdom outfall (Royal Brougham N & S TDAs); b) 19 square feet of the King outfall (King TDA); c) 17 square feet of the Denny outfall (Dexter TDA); and in Lake Union within a) 161 square feet of the Broad outfall (Broad TDA).

3.2 Reasonable and Prudent Measures

Reasonable and prudent measures are nondiscretionary measures to avoid or minimize take that must be carried out by cooperators for the exemption from the prohibition against taking listed species in ESA section 7(o)(2) to apply. The WSDOT has the continuing duty to regulate the activities covered in this incidental take statement where discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of

section 7(o)(2) will lapse if the WSDOT fails to exercise its discretion to adhere to, or to require adherence (where an applicant is involved), to the terms and conditions of the incidental take statement.

Full application of conservation measures included as part of the proposed action, together with use of the reasonable and prudent measures and terms and conditions described below, are necessary and appropriate to minimize the impact of incidental take of listed species from the proposed action.

The WSDOT shall:

1. Minimize incidental take from pollutant concentrations in operational stormwater discharges.
2. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take from permitted activities.

3.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the WSDOT and its cooperators, including the applicant, if any, must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that implement the reasonable and prudent measures described above.

1. To implement reasonable and prudent measure no. 1, the WSDOT shall ensure that:

a. The points of compliance for surface water concentrations of dissolved copper and dissolved zinc, estimated using the Hi-Run model, are as follows:

- i. Elliott Bay: 115 square feet of the Kingdom outfall (Royal Brougham N & S TDAs); 19 square feet of the King outfall (King TDA); and 17 square feet of the Denny outfall (Dexter TDA).
- ii. Lake Union: 161 square feet of the Broad outfall (Broad TDA).

The biological effects thresholds at these points of compliance are: 2.0 µg/L over ambient levels not exceeding 3.0 µg/L for dissolved copper; and 5.6 µg/L over ambient levels between 3.0 µg/L and 13.0 µg/L for dissolved zinc.

b. If the final stormwater design differs from the design evaluated in this Opinion, then the WSDOT shall evaluate stormwater pollutant loadings and concentrations to determine if they differ significantly from those considered in this consultation. If predicted pollutant loadings or concentrations exceed those addressed in the Opinion, then the WSDOT shall provide NMFS a description of the design change(s) and a revised stormwater analyses. The WSDOT and NMFS shall jointly consider any potential change(s) to exposure or effects, and the need for reinitiation of consultation.

2. To implement reasonable and prudent measure no.2 (monitoring), the WSDOT shall ensure that:
 - a. The WSDOT and FHWA shall implement the programmatic approach to stormwater monitoring (titled: Programmatic Monitoring Approach for Highway Stormwater Runoff in Support of Endangered Species Act (ESA) Section 7 Consultation, dated June 2009). This programmatic effort will include the following elements:
 - i. Accurate characterization of stormwater BMP effectiveness and "end-of-pipe" effluent/discharge concentrations for treated and untreated stormwater runoff (total and dissolved Cu; total and dissolved Zn; total suspended solids).
 - ii. Sampling, data collection, analysis, and reporting (including quality control/quality assurance procedures) consistent with the requirements of the WSDOT's Municipal Stormwater NPDES (National Pollutant Discharge Elimination System) and State Waste Discharge General Permit.
 - iii. An experimental design that is representative of conditions within the action area, including annual average daily traffic (AADT) and seasonal/temporal variations in stormwater runoff quantity and quality.
 - iv. Annual reporting of monitoring activities and findings to NMFS.
 - b. The WSDOT shall notify NMFS immediately if the results of this program trigger any of the relevant reinitiation requirements specified in the *Reinitiation of Consultation* section of this Opinion.

All monitoring reports will be sent to the NMFS Washington State Habitat Office, Attention Michael Grady, 510 Desmond Drive SE, Suite 107, Lacey, Washington 98503.

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the action area, the finder must notify NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this Opinion, or through the NMFS Washington State Habitat Office. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder should carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not disturbed unnecessarily.

NOTICE: The WSDOT shall provide an annual project report even if no actual work was completed in a particular year, in order for NMFS to track inactive projects and, if necessary, withdraw Opinions for incomplete projects.

3.4 Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the federal action agency or by NMFS where discretionary federal involvement or control over the action has been retained or is authorized by law. Reinitiation shall also be required if: (a) If the amount or extent of take specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that has an effect to the listed species or designated critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat is designated that may be affected by the identified action (50 CFR 402.16).

In addition, reinitiation of consultation may be warranted if the results of the Programmatic Monitoring Approach for Highway Stormwater Runoff in Support of ESA Section 7 Consultation and related project model validation indicate that:

- Hi-Run model estimates used in this consultation are likely to have underestimated end of pipe effluent concentrations, and/or;
- Cormix model estimates of dilution zone dimensions necessary to reduce dissolved copper and dissolved zinc concentrations below biological effects thresholds have been underestimated.

Finally, the FHWA and WSDOT shall analyze project effects if tolling is authorized on SR 99. Reinitiation shall be required if project impacts relating to stormwater discharge to Elliott Bay changes due to vehicles traveling on surface streets through the City of Seattle rather than in the tunnel.

Should any of these conditions occur, WSDOT and NMFS shall jointly consider if the resulting change(s) in ESA-listed species exposure and effects analysis warrant reinitiation.

4.0 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of Section 305(b) of the Magnuson-Stevens Act (MSA) directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect Essential fish Habitat (EFH). The MSA (section 3) defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

This analysis is based, in part, on information provided by FHWA and descriptions of EFH for Pacific coast groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Pacific coast salmon (PFMC 1999) contained in the Fishery Management Plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

4.1 Essential Fish Habitat in Project Area

The proposed action and action area for this consultation are described in the Introduction to this document, above (Section 1.0). The action area includes areas designated as EFH for various life-history stages of 31 species of Pacific coast groundfish, four species of coastal pelagics, and three species of Pacific salmon (Table 10). The EFH guidelines also identify habitat areas of particular concern (HAPC) based on their importance of ecological function, extent of habitat sensitivity to human degradation, stress associated with developmental activities and rarity of the habitat. Seagrass is identified as the HAPC for Elliott Bay. No HAPCs are identified for freshwater.

4.2 Adverse Effects to Essential Fish Habitat

Based on information provided in the BA and the analysis of effects presented in the Opinion portion of this document (Section 2.4), NMFS concludes that the proposed action will have adverse effects on EFH for at least some of those species and life history stages in Table 10. Adverse effects are due to changes in water quality associated with increased loading of dissolved copper and/or dissolved zinc in operational stormwater discharges to Elliott Bay and Lake Union. Exposure to pollutants cause physiological and behavioral effects such as reduced growth, impaired migratory ability, impaired reproduction, and avoidance behavior. The extent and severity varies with level of exposure, ambient water quality conditions, pollutant toxicity, synergistic effects, and the species and life history stage exposed.

Discharges from CSO events occur most often from November through January (Table 7). EFH species exposed to the elevated pollutant concentrations within the discharge plume will vary based on their life history stage. Those EFH species that are more dependent on the shallow nearshore habitat and intertidal areas will have greater risk of exposure during CSO events.

4.3 Essential Fish Habitat Conservation Recommendations

The following two conservation recommendations are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. NMFS believes that the terms and conditions limiting the effects of pollutant concentrations in operational stormwater on affected fish would be appropriately protective of their EFH. Therefore, NMFS incorporates the term and condition here as EFH conservation recommendations necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. The conservation recommendations are a subset of the ESA term and conditions.

1. If the final stormwater design differs from the design evaluated in this Opinion, then the WSDOT will evaluate stormwater pollutant loadings and concentrations to determine if they differ significantly from those considered in this consultation. If predicted pollutant loadings or concentrations exceed those addressed in the Opinion, then the WSDOT will

provide NMFS a description of the design change(s) and a revised stormwater analyses (Term and Condition 1.b).

2. The WSDOT and FHWA shall implement the programmatic approach to stormwater monitoring (titled: Programmatic Monitoring Approach for Highway Stormwater Runoff in Support of Endangered Species Act (ESA) Section 7 Consultation, dated June 2009). This programmatic effort will include the following elements (Term and Condition 2.a):
 - a. Accurate characterization of stormwater BMP effectiveness and "end-of-pipe" effluent/discharge concentrations for treated and untreated stormwater runoff (total and dissolved Cu; total and dissolved Zn; total suspended solids).
 - b. Sampling, data collection, analysis, and reporting (including quality control/quality assurance procedures) consistent with the requirements of the WSDOT's Municipal Stormwater NPDES (National Pollutant Discharge Elimination System) and State Waste Discharge General Permit.
 - c. An experimental design that is representative of conditions within the action area, including annual average daily traffic (AADT) and seasonal/temporal variations in stormwater runoff quantity and quality.
 - d. Annual reporting of monitoring activities and findings to NMFS.

NMFS expects that full implementation of these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 4.2 above, approximately 0.1 acres of designated EFH for Pacific coast groundfish, coastal pelagic species, and Pacific coast salmon.

4.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the Federal agency must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation from NMFS. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations, unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

4.5 Supplemental Consultation

This concludes consultation under the MSA. The FHWA must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(1)]

Table 10. Essential fish habitat species and life history stage associated with shallow nearshore water in Puget Sound.

Scientific Name	Common Name	Adult	Juvenile	Larvae	Egg
Groundfish Species					
<i>Anoplopoma fimbria</i>	Sablefish	X	X	X	X
<i>Citharichthys sordidus</i>	Pacific sanddab	X			
<i>Eopsetta jordani</i>	Petrale sole	X			
<i>Glyptocephalus zachirus</i>	Rex sole	X			
<i>Hexagrammos decagrammus</i>	Kelp greenling	X		X	
<i>Hippoglossoides elassodon</i>	Flathead sole	X			
<i>Hydrolagus colliei</i>	Spotted ratfish	X	X		
<i>Isopsetta isolepis</i>	Butter sole	X			
<i>Lepidopsetta bilineata</i>	Rock sole	X			
<i>Merluccius productus</i>	Pacific hake	X	X		
<i>Ophiodon elongates</i>	Lingcod			X	
<i>Parophrys vetulus</i>	English sole	X	X		
<i>Platichthys stellatus</i>	Starry flounder	X	X		
<i>Psettichthys melanostictus</i>	Sand sole	X	X		
<i>Raja binoculata</i>	Big skate	X			
<i>Raja rhina</i>	Longnose skate	X	X		X
<i>Scorpaenichthys marmoratus</i>	Cabezon	X	X	X	X
<i>Sebastes auriculatus</i>	Brown rockfish	X			
<i>Sebastes caurinus</i>	Copper rockfish	X	X		
<i>Sebastes diploproa</i>	Splitnose rockfish		X	X	
<i>Sebastes entomelas</i>	Widow rockfish		X		
<i>Sebastes flavidus</i>	Yellowtail rockfish	X			
<i>Sebastes maliger</i>	Quillback rockfish	X	X		
<i>Sebastes melanops</i>	Black rockfish	X	X		
<i>Sebastes mystinus</i>	Blue rockfish	X	X	X	
<i>Sebastes nebulosus</i>	China rockfish	X	X		
<i>Sebastes nigrocinctus</i>	Tiger rockfish	X			
<i>Sebastes paucispinis</i>	Bocaccio		X	X	
<i>Sebastes pinniger</i>	Canary Rockfish		X	X	
<i>Sebastes ruberrimus</i>	Yelloweye rockfish			X	
<i>Squalus acanthias</i>	Spiny dogfish	X			
Coastal Pelagic Species					
<i>Engraulis mordax</i>	Anchovy	X	X	X	X
<i>Sardinops sagax</i>	Pacific sardine	X	X	X	X
<i>Scomber japonicas</i>	Pacific mackerel	X			
<i>Loligo opalescens</i>	Market squid	X	X	X	
Pacific Salmon					
<i>Oncorhynchus tshawytscha</i>	Chinook salmon	X	X		
<i>Oncorhynchus kisutch</i>	Coho salmon	X	X		
<i>Oncorhynchus gorbuscha</i>	Pink salmon	X	X		

5.0 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The users are the FHWA and WSDOT.

Individual copies were provided to the above-listed entities. This consultation will be posted on the NMFS Northwest Region website (<http://www.nwr.noaa.gov>). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, *et seq.*

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion contains more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

LITERATURE CITED

- Baldwin, D.H., J.F. Sandahl, J.S. Labenia, and N.L. Scholz. 2003. Sublethal effects of copper on coho salmon: impacts on nonoverlapping receptor pathways in the peripheral olfactory nervous system. *Environmental Toxicology and Chemistry* 22(10): 2266-2274.
- Battin, J., M. W. Wiley, M. H. Ruckelshaus, R. N. Palmer, E. Korb, K. K. Bartz, and H. Imaki. 2007. Projected impacts of climate change on salmon habitat restoration. *Proceedings of the National Academy of Sciences, USA* 104(16):6720-6725.
- Bledsoe, L.J., D.A. Somerton, and C.M. Lynde. 1989. The Puget Sound runs of salmon: An examination of the changes in run size since 1896. *Canadian Special Publication of Fisheries and Aquatic Sciences* 105: 50-61.
- Booth, D.B., J.R. Karr, S. Schauman, C.P. Konrad, S.A. Morley, M.G. Larson, and S.J. Burges. 2004. Reviving Urban Streams: Land Use, Hydrology, Biology, and Human Behavior. *Journal of the American Water Resources Association* 40(5):1351-1364.
- Chapman, D.W. 1966. Food and space as regulators of salmonid populations in streams. *American Naturalist* 100(913):345-357.
- Chapman, G. 1973. Effects of heavy metals on fish. Oregon State University Water Resources Research Institute (OSU-WRI) Report SEMN-WR-D16. 73, Corvallis, OR. USA.
- Chapman, D.W. and T.C. Bjornn. 1969. Distribution of salmonids in streams, with special reference to food and feeding. Pages 153-176 in T.G. Northcote (ed.), *Symposium on Salmon and Trout in Streams*. H.R. MacMillan Lectures in Fisheries. University of British Columbia, Institute of Fisheries, Vancouver, BC.
- City of Seattle. 2007. Seattle Biological Evaluation. Seattle, WA. May 1, 2007.
- City of Seattle. 2010. Unpublished data: number, volume and duration of CSO events from 2005 through 2009. CSO Program, Seattle Public Utilities. November, 2010.
- Clements, W. 1994. Benthic invertebrate community responses to heavy metals in the upper Arkansas River basin, Colorado. *Journal of the North American Benthological Society* 13(1)30-44.
- Corps (U.S. Army Corps of Engineers). 2005. Salmonid Presence and Habitat Use in the Lower Duwamish River, Winter 2004/2005. Prepared by Science Applications International Corporation (SAIC), May 2005.
- Cuffney, T.F., H. Zappia, E.M.P. Giddings, and J.F. Coles. 2005. Effects of urbanization on benthic macroinvertebrate assemblages in contrasting environmental settings: Boston,

- Massachusetts; Birmingham, Alabama; and Salt Lake City, Utah. American Fisheries Society Symposium 47:361–407.
- Davies, P. 1986. Toxicology and chemistry of metals in urban runoff. Pages 60-78 in Urbonas and Roesner (eds) *Urban Runoff Quality-Impact and Quality Enhancement Technology*. American Society of Civil Engineers (ASCE), New York, NY, USA.
- De Schamphelaere, K.A.C. and C.R. Janssen. 2004. Bioavailability and Chronic Toxicity of Zinc to Juvenile Rainbow Trout (*Oncorhynchus mykiss*): Comparison with Other Fish Species and Development of a Biotic Ligand Model. *Environmental Science and Technology* 38(23): 6201- 6209.
- Ecology (Washington State Department of Ecology). 1995. Elliott Bay waterfront recontamination study Volume 2: Data 17 evaluation and remedial design recommendations report. Publication #95- 607. Prepared by the Washington State Department of Ecology, Elliott Bay/Duwamish Restoration Panel, Panel Publication 10. August 1995.
- Ecology (Washington State Department of Ecology). 2006. Washington State's Water Quality Assessment [303(d)]. Washington State Department of Ecology. Olympia, WA. <http://www.ecy.wa.gov/programs/wq/303d/index.html>.
- Ecology (Washington State Department of Ecology). 2009a. Washington State's Water Quality Assessment [303(d)]. Washington State Department of Ecology. Olympia, WA. <http://www.ecy.wa.gov/programs/wq/303d/index.html>.
- Ecology (Washington State Department of Ecology). 2009b. Puget Sound Boatyards: Zinc, Copper, Lead and Hardness Concentrations in Receiving Waters. October 2009. Publication No. 09-03-051.
- Eisler, R. 1993. Zinc Hazards to Fish, Wildlife, and Invertebrates: a Synoptic Review. United States Fish and Wildlife Service, Patuxent Wildlife Research Center, Biological Report 10, Laurel, Maryland. 106 p. <http://www.pwrc.usgs.gov/infobase/eisler/reviews.cfm>
- Eisler, R. 1998. Copper Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. United States Geological Survey, Biological Resources Division, Patuxent Wildlife Research Center, Biological Science Report USGS/BRD/BSR--1998-0002, Laurel, Maryland. 120 p. <http://www.pwrc.usgs.gov/infobase/eisler/reviews.cfm>
- EPA (U.S. Environmental Protection Agency). 1980. Ambient Water Quality Criteria for Copper - 1980. EPA, Publication 440/5-80-036, Washington, DC (October 1980). 162 p.
- EPA (U.S. Environmental Protection Agency). 1987. Ambient Water Quality Criteria for Zinc - 1987. EPA, Publication 440/5-87-003, Washington, DC (February 1987). 207 p.

- EPA (U.S. Environmental Protection Agency). 1988. Elliott Bay action program. Analysis of toxic problem area. Final report. Prepared for U.S. Environmental Protection Agency Region X, Office of Puget Sound. July 1988.
- Folmar, L. 1976. Overt avoidance reaction of rainbow trout fry to nine herbicides. *Bulletin of Environmental Contamination & Toxicology* 15(5): 509-514.
- Fresh, K. 2006. Juvenile Pacific salmon in Puget Sound. Technical Report 2006-06 Prepared in support of the Puget Sound Nearshore Partnership. 28pp. Available at: http://www.pugetsoundnearshore.org/technical_papers/pacjuv_salmon.pdf.
- Good, T.P., R.S. Waples, and P. Adams, editors. 2005. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. U.S. Department of Commerce, National Marine Fisheries Service, Northwest Fisheries Science Center, NOAA Technical Memo. NMFS-NWFSC-66, Seattle, Washington. 598 p.
- Grette, G.B. and E.O. Salo. 1986. The status of anadromous fishes of the Green/Duwamish River system. Prepared for the U.S. Army Corps of Engineers, Seattle District. Seattle, WA.
- Handy, R.D., D.W. Sims, A. Giles, H.A. Campbella, and M.M. Musonda. 1999. Metabolic trade-off between locomotion and detoxification for maintenance of blood chemistry and growth parameters by rainbow trout (*Oncorhynchus mykiss*) during chronic dietary exposure to copper. *Aquatic Toxicology* 41(1):23-41.
- Hansen, J.A., P.G. Welsh, J. Lipton, and P.G. Welsh. 2002. Relative Sensitivity of Bull Trout (*Salvelinus confluentus*) and Rainbow Trout (*Oncorhynchus mykiss*) to Acute Exposures of Cadmium and Zinc. *Environmental Toxicology and Chemistry* 21(1): 67-75.
- Hart Crowser. 1994. Sediment quality assessment Seattle Ferry Terminal Colman Dock – south area. Technical memorandum dated October 31, 1994. Seattle, Washington. Report J-4134.
- Healey, M.C. 1991. Life history of Chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 in C. Groot and L. Margolis, editors. *Life History of Pacific Salmon*. University of British Columbia Press, Vancouver, BC.
- Herrera. 2008. Preliminary Water and Sediment Quality Summary Report for the State of the Waters Report, Vol. 3. March 2008 draft report. Prepared for Seattle Public Utilities. In Seattle, City of. 2009. Draft Shoreline Characterization Report. March. 221 p. Available at: http://www.seattle.gov/dpd/static/FinalReport%20Web_LatestReleased_DPDP016194.pdf.
- Hogarth, W.T. 2005. Memorandum from William T. Hogarth, to Regional Administrators, Office of Protected Resources, NMFS, Regarding Application of the "Destruction or

- Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act, 3p. (November 7, 2005).
- Hoiland, W. and F. Rabe. 1992. Effects of increasing zinc levels and habitat degradation on macroinvertebrate communities in three north Idaho streams. *Journal of Freshwater Ecology* 7:373-380.
- Horner, R.R., J.J. Skupien, E.H. Livingston, and H.E. Shaver. 1994. Fundamentals of urban runoff management: Technical and institutional issues. Terrene Institute and United States Environmental Protection Agency, Washington, DC, USA.
- Huber, K. 2010. Phone call on King County data used to model CSO discharge velocities. October 25, 2010. King County CSO Control Program, Wastewater Treatment Division.
- Independent Scientific Advisory Board (ISAB). 2007. Climate change impacts on Columbia River basin fish and wildlife. Northwest Power and Conservation Council, Portland, Oregon. <http://www.nwcouncil.org/library/isab/ISAB%202007-2%20Climate%20Change.pdf>.
- Jones, R.C. and C.C. Clark. 1987. Impact of watershed urbanization on stream insect communities. *Water Resources Bulletin* 23(6): 1047-1055.
- Karr, J.R. and E.W. Chu. 1997. Biological monitoring and assessment: using multimetric indexes effectively. Prepared for the U.S. Environmental Protection Agency. EPA 235-R97-001. University of Washington, Seattle. 149 pp.
- Keeley, E.R. 2001. Demographic responses to food and space competition by juvenile steelhead trout. *Ecology* 82(5):1247-1259.
- Kiffney, P. and W. Clements. 1993. Bioaccumulation of heavy metals by benthic invertebrates at the Arkansas River, Colorado. *Environmental Toxicology and Chemistry* 12:1507-1517.
- King County. 1994. Draft data from: Pier 53–55 sediment cap and enhanced natural recovery area remediation project monitoring program. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. King County Department of Metropolitan Services. November 1993.
- King County. 1998. Final SEPA Supplemental Environmental Impact Statement/NEPA Environmental Assessment for Phases 2 & ¾ of the Denny Way/Lake Union Combined Sewer Overflow Control Project. Contract #XP-990384-01. Prepared by King County Department of Natural Resources, Wastewater Treatment Division City of Seattle, Seattle Public Utilities. May 1998.
- King County. 2009a. Comprehensive sediment quality summary report for CSO discharge locations. King County Department of Natural Resources and Parks. Wastewater Treatment Division. Seattle, WA. December 2010.

- King County. 2009b. Combined Sewer Overflow Control Program. 2008 Annual Report. King County Department of Natural Resources and Parks. Wastewater Treatment Division. Seattle, WA. July 2009.
- King County. 2010. Combined Sewer Overflow Control Program. 2009 Annual Report. King County Department of Natural Resources and Parks. Wastewater Treatment Division. Seattle, WA. August 2010.
- King County DNR (Department of Natural Resources). 1999a. King County Combined Sewer Overflow Water Quality Assessment for the Duwamish River and Elliott Bay. Appendix B: Methods and Results, B4: Aquatic Life Risk Assessment. King County DNR, Seattle, WA. Available at <http://your.kingcounty.gov/dnrp/library/archive-documents/wlr/waterres/wqa/B4.pdf>
- King County DNR (Department of Natural Resources). 1999b. King County Combined Sewer Overflow Water Quality Assessment for the Duwamish River and Elliott Bay. Appendix C: Issue Papers. King County DNR, Seattle, WA. Available at <http://your.kingcounty.gov/dnrp/library/archive-documents/wlr/waterres/wqa/C.pdf>.
- King County, Pierce County, and Snohomish County. 2009. Benthic Index of Biotic Integrity monitoring scores for Puget Sound Streams. Downloaded from the Puget Sound Stream Benthos database on June 15, 2009. Available at: <http://www.pugetsoundstreambenthos.org/default.aspx>
- Kratzer, E.B., J.K. Jackson, D.B. Arscott, A.K. Aufdenkampe, C.L. Dow, L.A. Kaplan, J.D. Newbold, and B.W. Sweeney. 2006. Macroinvertebrate distribution in relation to land use and water chemistry in New York City drinking-water-supply watersheds. *Journal of the North American Benthological Society*, 2006, 25(4):954–976.
- Laughlin, J. 2006. Ambient Underwater Sound Measurements in Elliott Bay, March 21, 2006. Washington State Department of Transportation, Seattle, Washington. 4 p.
- Lundebye, A.K., M.H.G. Berntssena, S.E. Wendelaar Bongab, and A. Maagea. 1999. Biochemical and Physiological Responses in Atlantic Salmon (*Salmo salar*) Following Dietary Exposure to Copper and Cadmium. *Marine Pollution Bulletin* 39:137-144.
- Mantua, N., I. Tohver, and A. F. Hamlet. 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State. In: *Washington Climate Change Impacts Assessment: Evaluating Washington's future in a changing climate*. Climate Impacts Group, University of Washington, Seattle, Washington. <http://ces.washington.edu/db/pdf/wacciach6salmon649.pdf>.
- Mason, J.C. 1976. Response of underyearling coho salmon to supplemental feeding in a natural stream. *Journal of Wildlife Management* 40(4):775–788.

- Metro (Municipality of Metropolitan Seattle). 1993. Pier 53-55 sediment cap and enhanced natural recovery area remediation project. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. Municipality of Metropolitan Seattle.
- Metro (Municipality of Metropolitan Seattle). 1989. Water quality status report for marine waters, 1989. Municipality of Metropolitan Seattle.
- Metro (Municipality of Metropolitan Seattle). 1988. Water quality status report for marine waters, 1988. Municipality of Metropolitan Seattle.
- McElhany, P., M.H. Ruckelshaus, M.J. Ford, T. Wainwright, and E. Bjorkstedt. 2000. Viable Salmon Populations and the Recovery of Evolutionarily Significant Units. National Marine Fisheries Service, Northwest Fisheries Science Center, NOAA Technical Memo, NMFS-NWFSC-42. 156 p.
<http://www.nwfsc.noaa.gov/publications/techmemos/tm42/tm42.pdf>
- Morley, S.A. and J. R. Karr. 2002. Assessing and restoring the health of urban streams in the Puget Sound Basin. *Conservation Biology* 16:1498-1509.
- Mote, P. W. and E. P. Salathé. 2009. Future climate in the Pacific Northwest. In: Washington Climate Change Impacts Assessment: Evaluating Washington's future in a changing climate. Climate Impacts Group, University of Washington, Seattle, Washington.
<http://www.cses.washington.edu/db/pdf/wacciach1scenarios642.pdf>.
- Murphy, M.L., C.P. Hawkins, and N.H. Anderson. 1981. Effects of canopy modification and accumulated sediment on stream communities. *Transactions of the American Fisheries Society* 110(4):469-478.
- Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, National Marine Fisheries Service, Northwest Fisheries Science Center, NOAA Technical Memo. NMFS-NWFSC-35, Seattle, Washington (February 1998). 443 p.
<http://www.nwfsc.noaa.gov/publications/techmemos/tm35/index.htm>
- Nelson, T. S., G. Ruggerone, H. Kim, R. Schaefer and M. Boles. 2004. Juvenile Chinook Migration, Growth and Habitat Use in the Lower Green River, Duwamish River and Nearshore of Elliott Bay 2001-2003, Draft Report. King County Department of Natural Resources and Parks. Seattle, Washington. 133 p + appendices.
- NMFS (National Marine Fisheries Service). 2005. Status review update for Puget Sound steelhead. Northwest Fisheries Science Center. Seattle, WA. July 25, 2006.

- Norton, D. and T. Michelson. 1995. Elliott Bay waterfront recontamination study. Volume 1: Field investigation report: results of monitoring conducted along the central Seattle waterfront–October 1993 to October 1994. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. May 1995.
- Pitt, R., R. Field, M. Lalor, and M. Brown. 1995. Urban stormwater toxic pollutants: assessment, sources, and treatability. *Water Environment Research*. 67(3):260-275.
- Rand, G.M. and S.R. Petrocelli. 1985. *Fundamentals of Aquatic Toxicology: Methods and Applications*. Hemisphere Publishing, New York, NY.
- Romberg, P., S.P. Pavlou, R.F. Shokes, W. Hom, E.A. Crecelius, P. Hamilton, J.T. Gunn, and J. Vinelli. 1984. Presence, distribution, and fate of toxicants in Puget Sound and Lake Washington. Toxicant pretreatment planning study: technical report C1. Municipality of Metropolitan Seattle.
- Sandahl, J.F., D.H. Baldwin, J.J. Jenkins, and N.L. Scholz. 2007. A Sensory System Interface between Urban Stormwater Runoff and Salmon Survival. *Environmental Science and Technology* 41(8):2998-3004.
- Saucier, D., L. Astic, and P. Rioux. 1991a. The effects of early chronic exposure to sublethal copper on the olfactory discrimination of rainbow trout, *Oncorhynchus mykiss*. *Environmental Biology of Fishes* 30:345-351.
- Saucier, D., L. Astic, P. Rioux, and F. Godinot. 1991b. Histopathological changes in the olfactory organ of rainbow trout (*Oncorhynchus mykiss*) induced by early chronic exposure to a sublethal copper concentration. *Canadian Journal of Zoology* 69:2239-2245.
- Saunders, R.L. and J.B. Sprague. 1968. Effects of copper-zinc mining pollution on spawning migration of Atlantic salmon. Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick, Canada
- Shared Strategy (Shared Strategy Development Committee). 2007. Puget Sound Salmon Recovery Plan. Formally adopted January 19, 2007. Shared Strategy for Puget Sound, Seattle, Washington. 494 p. <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Puget-Sound/PS-Recovery-Plan.cfm>.
- Sommers, F. 2010. Phone call discussion on Sommer's thesis results on the effects of dissolved copper on Chinook salmon in saltwater. September 9, 2010.
- Spence, B. C., G. A. Lomnický, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR. Available at: <http://www.nwr.noaa.gov/Publications/Reference-Documents/ManTech-Report.cfm>.
- Sprague, J.B. 1964. Avoidance of copper-zinc solutions by young salmon in the laboratory. *Journal - Water Pollution Control Federation* 36: 990-1004.

- Sprague, J.B. 1965. Lethal levels of mixed copper-zinc solutions for juvenile salmon. *Journal of the Fisheries Research Board of Canada* 22(2): 425-432.
- Sprague, J.B. 1968. Avoidance reactions of rainbow trout to zinc sulphate solutions. *Water Research* 2: 367-372.
- Stark, K., A. Grout, J. Engebretson, and B. Nairn. 2005. Water quality status report for marine waters, 2002 and 2003. King County Department of Natural Resources and Parks, Water and Land Resources Division. Seattle, WA.
- Tetra Tech, Inc. 1988. Elliott Bay action program: Analysis of toxic problem areas. Prepared for U.S. Environmental Protection Agency by Tetra Tech, Inc., Bellevue, Washington.
- Toft, J.D., J.R. Cordell, C.A. Simenstad, and L.A. Stamatiou. 2007. Fish distribution, abundance, and behavior along city shoreline types in Puget Sound. *North American Journal of Fisheries Management* 27: 465-480.
- U.S. Forest Service. 2010. Aquatic Organism Passage, FishXing Software and Learning Systems for Fish Passage through Culverts, Swim Speed Table, Available at http://www.fsl.orst.edu/geowater/FX3/help/FX3_Help.html.
- WDFW (Washington State Department of Fish and Wildlife). 1993. 1992 Washington State Salmon and Steelhead Stock Inventory. Western Washington Treaty Tribes, Washington Dept. of Fisheries, Washington Dept. of Wildlife. 211 pp. Olympia, WA.
- WDFW (Washington State Department of Fish and Wildlife). 2002a. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, WA. Green River (Duwamish) Chinook Salmon Stock Report. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/1160.pdf. Accessed on December 28, 2009.
- WDFW (Washington State Department of Fish and Wildlife). 2002b. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, Washington. Lake Washington – North Lake Washington Tribes Chinook. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/1128.pdf. Accessed on December 28, 2009.
- WDFW (Washington State Department of Fish and Wildlife). 2002c. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, Washington. Lake Washington – Issaquah Chinook. Available at: http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/1136.pdf. Accessed on December 28, 2009.

- WDFW (Washington State Department of Fish and Wildlife). 2002d. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, Washington. Lake Washington – Cedar Chinook. Available at:
http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/1144.pdf. Accessed on December 28, 2009.
- WDFW (Washington State Department of Fish and Wildlife). 2009. Priority Habitat and Species Maps and Data. Olympia, WA.
- Weitkamp, D.E., G.T. Ruggerone, L. Sacha, J. Howell, and B. Bachen. 2000. Factors affecting Chinook populations, background report. Prepared by Parametrix, Inc, Natural Resources Consultants, and Cedar River Associates for City of Seattle, WA. 224 p.
- Welch, E.B., J.M. Jacoby, and C.W. May. 1998. Stream Quality. Chapter 4 in R. Naiman and B. Bilbey (eds.) *River Ecology and Management: Lessons from the Pacific Coastal Ecoregion*. Springer-Verlag, New York, NY. 705p.
- WSDOT (Washington State Department of Transportation). 2008. Highway Runoff Dilution and Loading Model User's Guide – Analysis of Highway Stormwater Water Quality Effects for Endangered Species Act Consultations. Available online at:
http://www.wsdot.wa.gov/NR/rdonlyres/85B43C71-DEBE-478C-A468-C6BF64D86B64/0/BA_HighwayRunoffUsersGuide.pdf.
- WSDOT (Washington State Department of Transportation). 2009. Highway Runoff Dilution and Loading Model Documentation - Analysis of Highway Stormwater Water Quality Effects for Endangered Species Act Consultations. Prepared for the Washington State Department of Transportation by Herrera Environmental Consultants, January 7, 2009.
- WSDOT (Washington State Department of Transportation). 2010a. SR 99: Alaskan Way Viaduct Replacement Project. Biological Assessment. Washington Department of Transportation. Seattle WA.
- WSDOT (Washington State Department of Transportation). 2010b. Alaskan Way Viaduct Replacement Project, 2010 Supplemental Draft Environmental Impact Statement, Appendix C: Transportation Discipline Report. Available at
<http://www.wsdot.wa.gov/NR/rdonlyres/E9E70AA9-BA9C-4F92-8FA0-3322EA5F9DAD/0/2010SDEISAppendixC.pdf>
- Woodward, D.F., J.N. Goldstein, A.M. Farag, and W.G. Brumbaugh. 1997. Cutthroat trout avoidance of metals and conditions characteristic of a mining waste site: Coeur d'Alene River, Idaho. *Transactions of the American Fisheries Society* 126:699-706.

Appendix 1

Figures

Figure 1 – South Portal Schematic



554-1585-030/CC/06/ 4/27/10

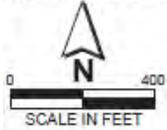
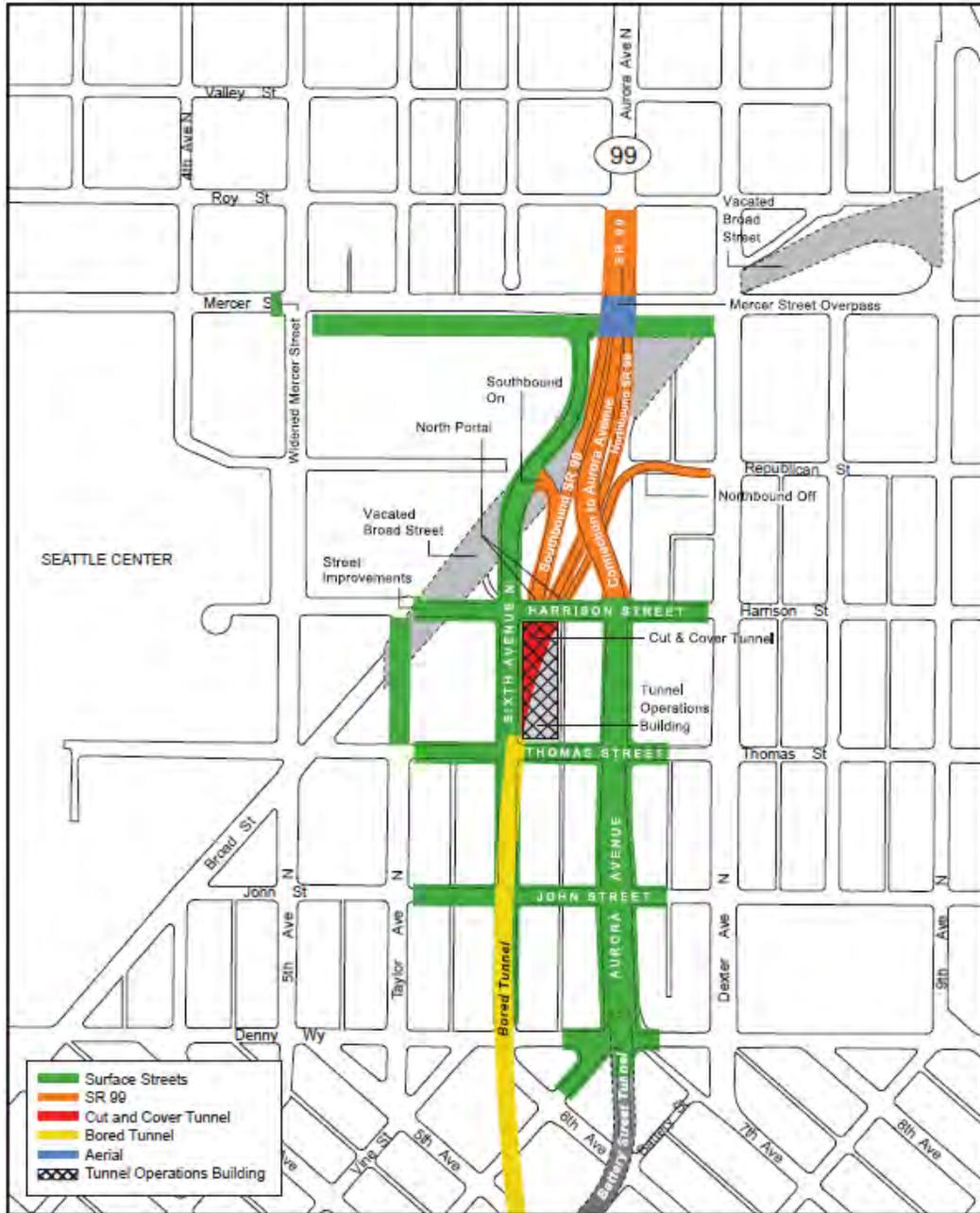


Exhibit 2-1
South Portal Schematic

Figure 2 – North Portal Schematic



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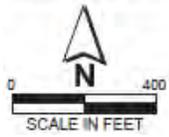
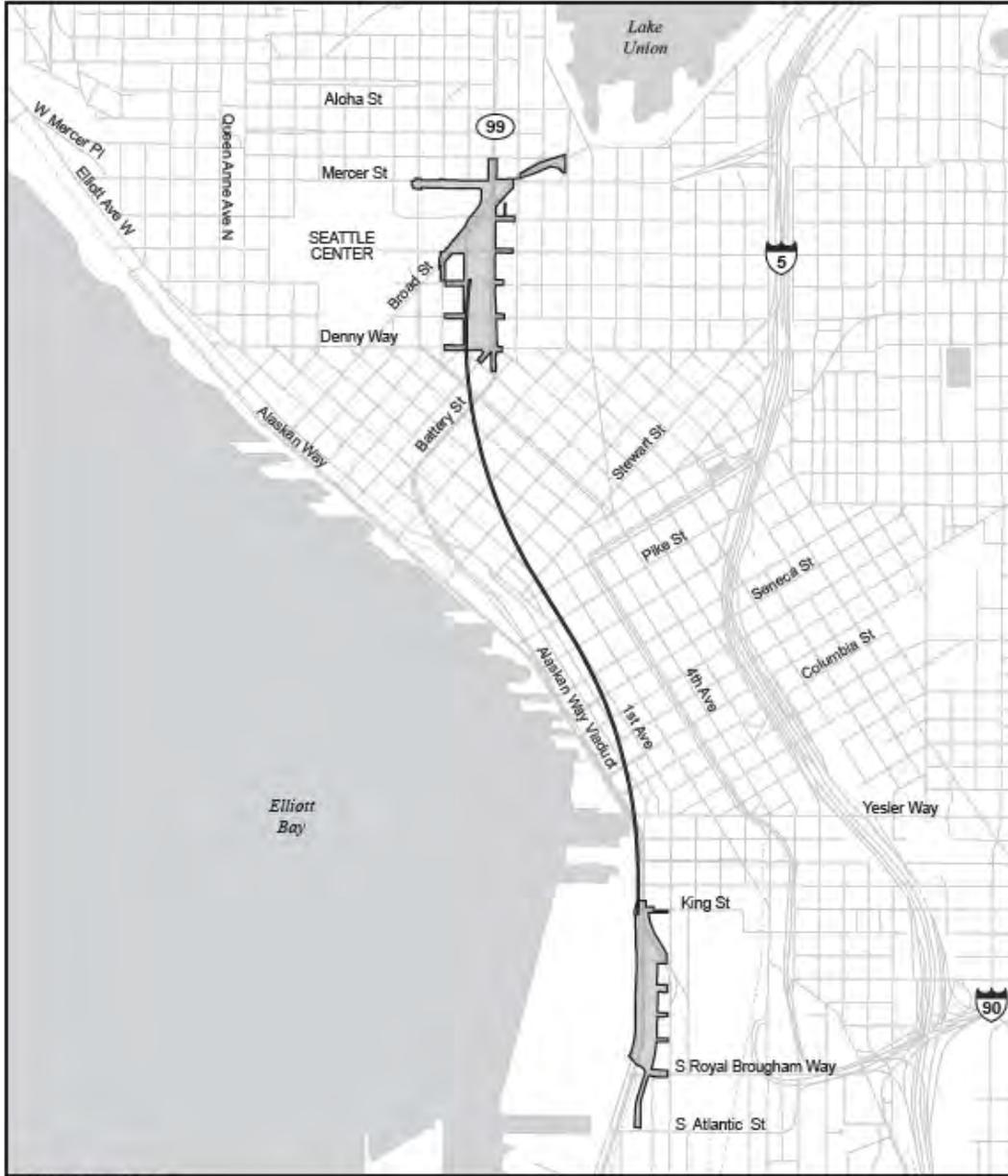
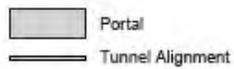
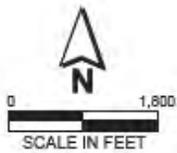


Exhibit 2-2
North Portal Schematic

Figure 3 – Bored Tunnel Schematic



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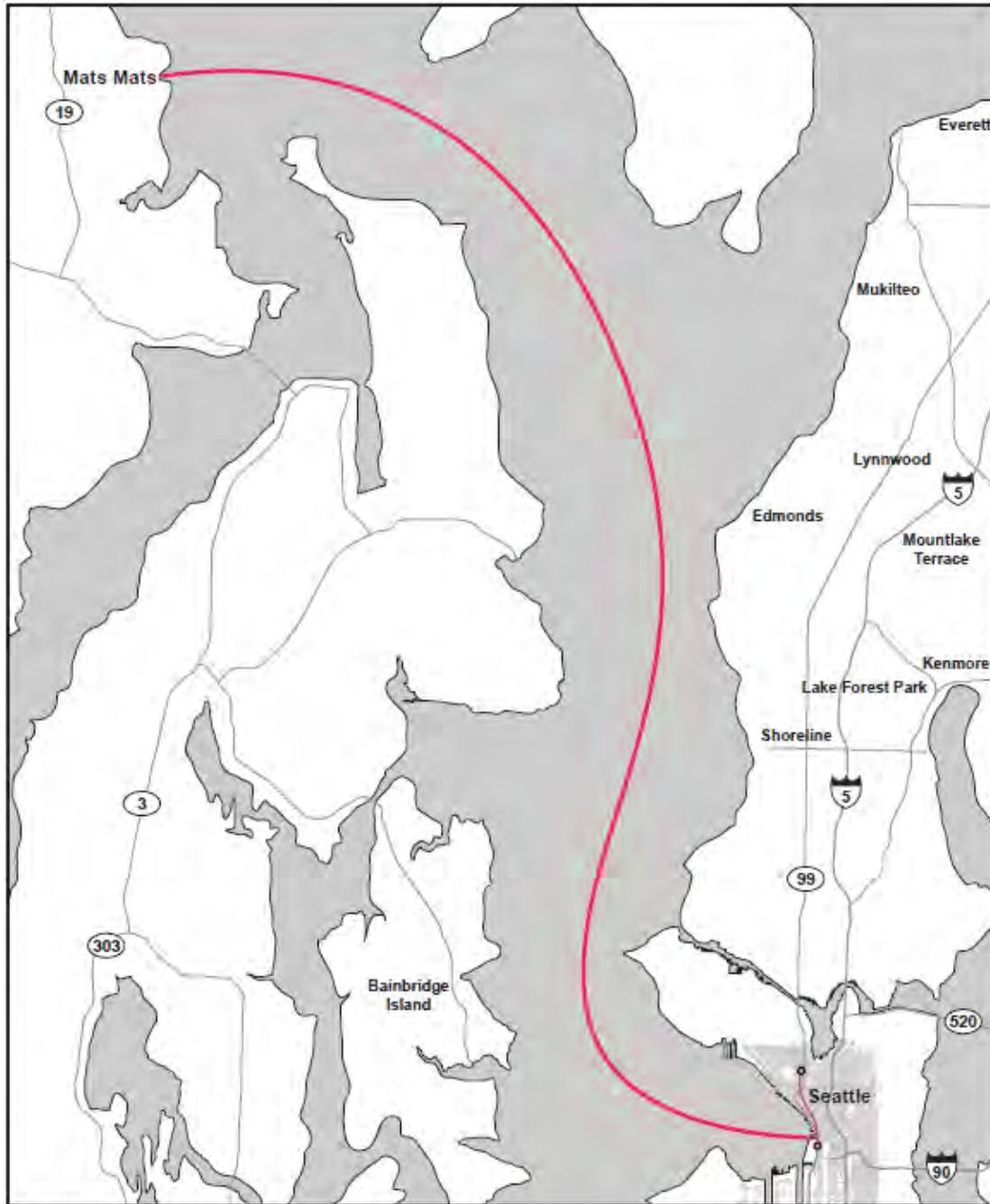
**Exhibit 1-1
Alaskan Way Viaduct
Replacement Project**

Figure 4 – Project Outfall Locations

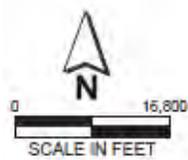


**Exhibit 2-4
Project Outfall
Locations**

Figure 5: Action Area of the Barge Route between the City of Seattle and the Mats Mats Facility at Port Ludlow, WA.



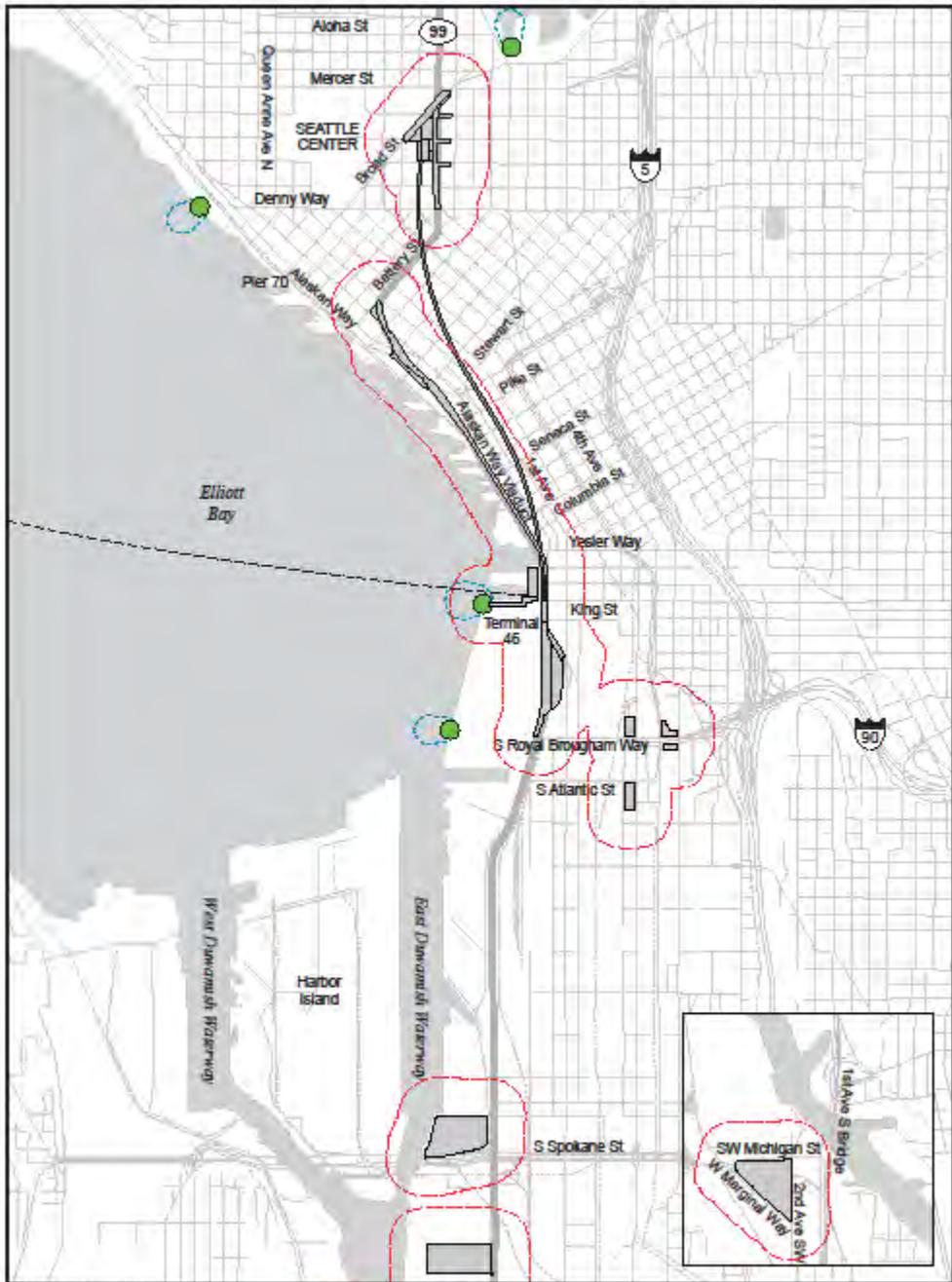
554-1585-030/CC(07) 5/14/10



- Barge Route
- Portal
- Tunnel Alignment

**Exhibit 3-1
Action Area Overview**

Figure 6: Action Area showing construction footprint, staging areas, and the dilution zones from the stormwater outfall pipes.



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- 650 Foot Buffer
- Barge Route
- Outfalls
- Staging Areas
- Tunnel Alignment
- Dilution Zone (not to scale)

Exhibit 3-3
Project Action Area

Figure 7: Number of CSO Events at the Denny, Kingdome, and King Outfalls between 1991 and 2009 (King County 2010).

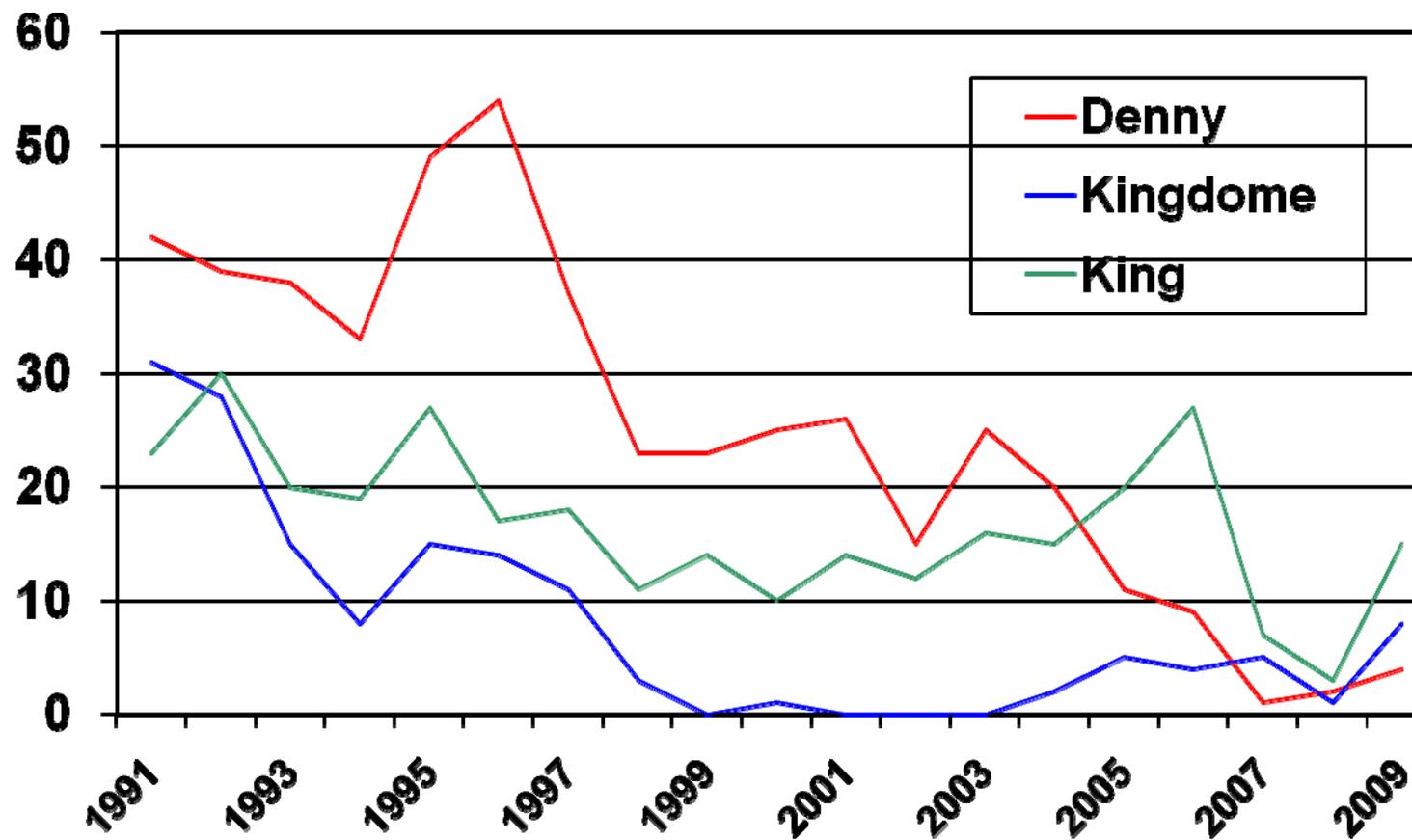


Figure 8: Denny CSO Event Durations in 2008 and 2009 (King County 2009b; 2010).

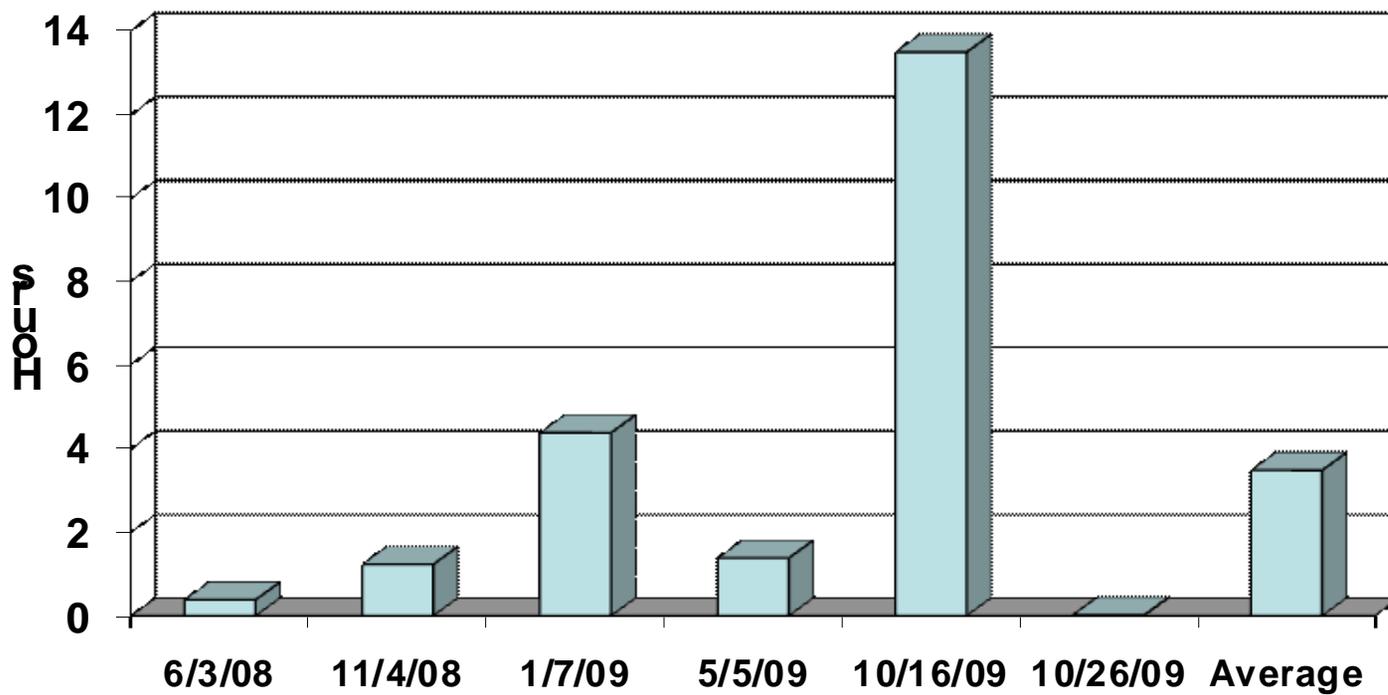


Figure 9: King CSO Event Durations in 2008 and 2009 (King County 2009b; 2010).

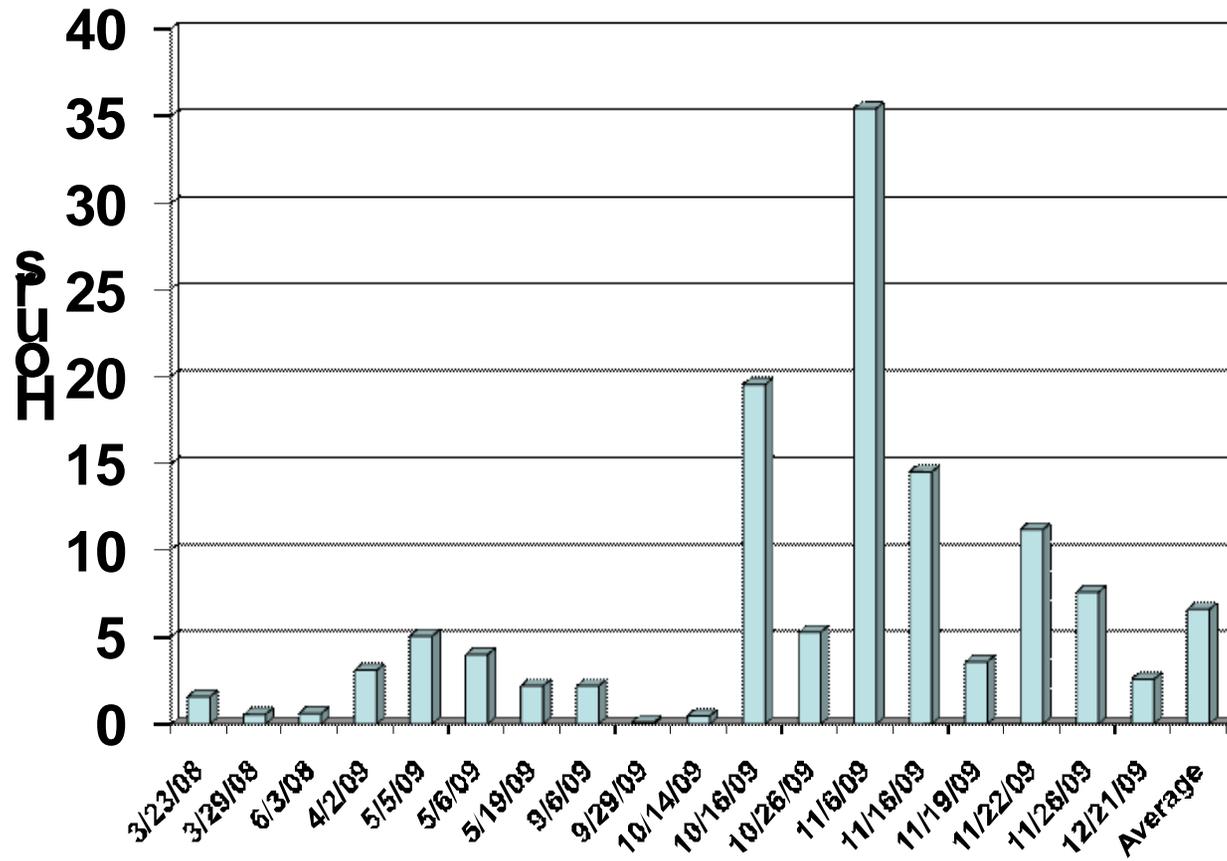
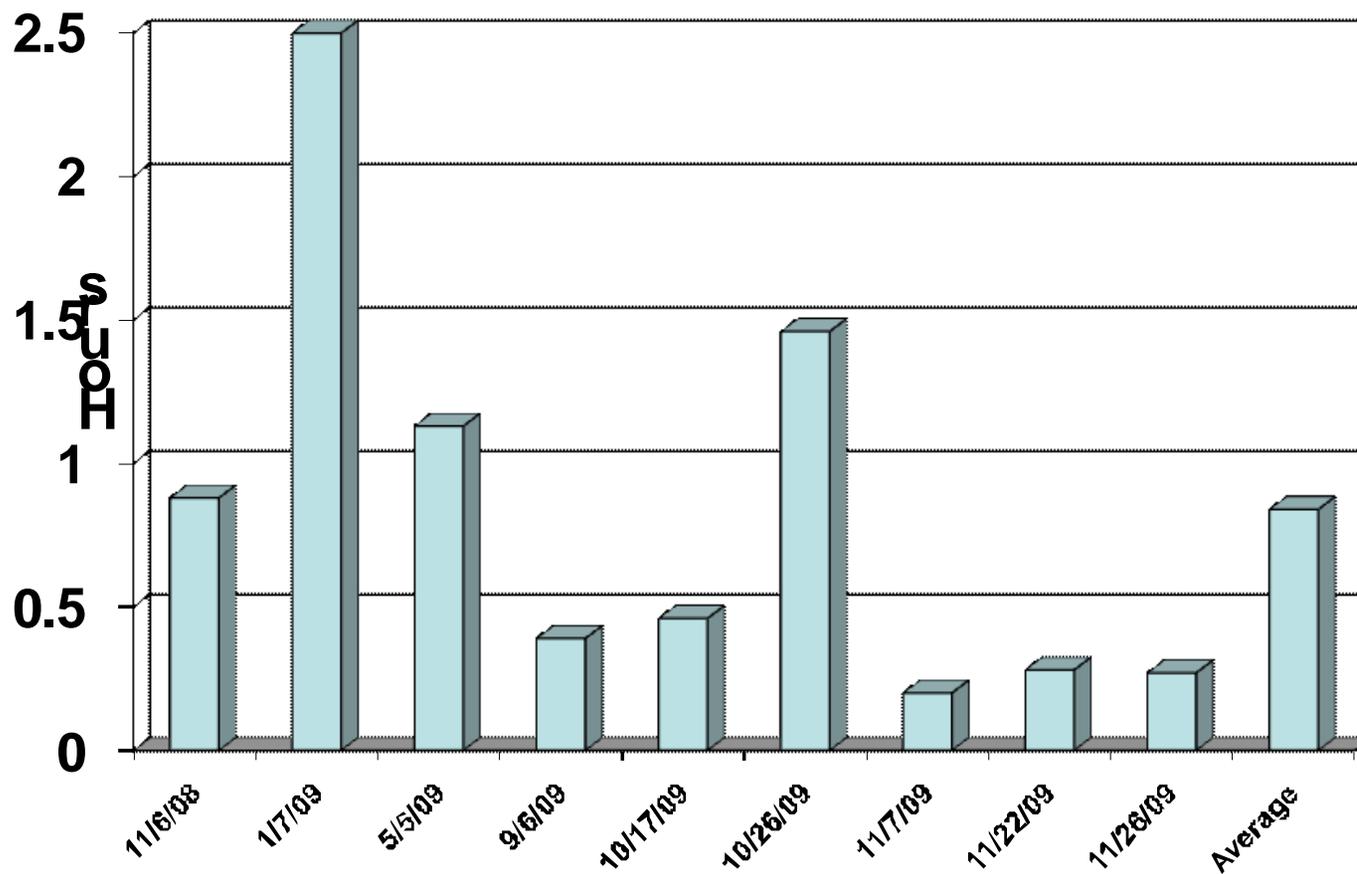


Figure 10: Kingdome CSO Event Durations in 2008 and 2009 (King County 2009b; 2010)



Attachment 1: Future State or Private Activities or Projects that are Reasonably Certain to Occur within the Action Area. Analyzed under the Cumulative Effects Section.

PROJECT	POTENTIAL CUMULATIVE EFFECTS
<p>1. <i>Alaskan Way Surface Street Improvements – S. King Street to Pike Street.</i> The Alaskan Way surface street would be rebuilt and improved between S. King Street and Pike Street. The new surface street would be six lanes wide between S. King and Columbia Streets (not including turn lanes), transitioning to four lanes between Marion and Pike Streets. Generally, the new street would be located east of the existing street where the viaduct is located today. The new street would include sidewalks, bike lanes, parking/loading zones, and signalized pedestrian crossings at cross streets.</p>	<p>This project could result in temporary effects on water quality during construction but would likely improve water quality over the long term through (1) retrofit of currently untreated PGIS with, at a minimum, basic water quality treatment BMPs in stormwater sub-basins, and (2) reduction of peak flows and the frequency of combined sewer overflows by the application of detention facilities to control runoff from combined sewer sub-basins.</p>
<p>2. <i>Elliott/Western Connector – Pike Street to Battery Street.</i> The Elliott/Western Connector would provide a connection from the Alaskan Way surface street to the Elliott Avenue/Western Avenue corridor that provides access to and from Ballard Interbay Northend Manufacturing and Industrial Center and neighborhoods north of Seattle (including Ballard and Magnolia). The connector would be four lanes wide and would provide a grade-separated crossing of the BNSF mainline railroad tracks. Additionally, it would provide local street access to Pike Street and Lenora Street and reintegrate with the street grid at Bell Street, which would improve local street connections in Belltown. The new roadway would include bicycle and pedestrian facilities.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>3. <i>Battery Street Tunnel Maintenance and Repairs</i> WSDOT and the City of Seattle are conducting regular maintenance on the tunnel and repairing its fire and life safety systems, as needed, to ensure it remains safe for drivers.</p>	<p>No effect, as no natural resources occur in the project area and no water quality effects would occur.</p>
<p>4. <i>First Avenue Streetcar between S. Jackson St and Republican St.</i> The First Avenue Streetcar would circulate between S. Jackson Street and Republican Street and function as a local connector. This alignment would travel within several of Seattle’s densest neighborhoods including Pioneer Square, Central Business District, Pike Place Market, Belltown, and Lower Queen Anne.</p>	<p>Effects are expected to be similar to those described for project 3.</p>

<p>5. <i>Gull Industries on First Avenue S. (2010-2013)</i> This project site is located west of First Avenue S. between S. Atlantic Street and S. Massachusetts Street. The project would redevelop the entire site to include a mix of office, retail, and restaurant uses. The development would include approximately 300 parking spaces designated for events, which is the same number of event parking spaces that exist today, and 500 spaces for the development’s occupants.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>6. <i>North Parking Lot Development at Qwest Field(2007-2022)</i> Planned development of Qwest Field’s north parking lot includes building a 20-story office tower and three residential towers of 10, 20, and 25 stories on a 3.85-acre site. The project would potentially create 645 new housing units, 19,000 square feet of retail, 480,000 square feet of office space, and about 950 above-grade parking stalls. Completion of the project is expected within 15 years. In addition, Stadium Lofts, an 80-unit mixed-use residential development, is permitted and scheduled for construction on Occidental Avenue S.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>7. <i>Seattle Center Master Plan (EIS) (Century 21 Master Plan) (2010-2030)</i> The plan lays out a vision for the future of the campus over a 20-year period. The focus of the plan is to unify the open space at the heart of the campus and create connections between the buildings on the periphery, the open spaces at the Center, and the growing neighborhoods on the Center’s edges. The <i>Century 21 Master Plan</i> calls for increasing the mode and frequency of transit, improving pedestrian connections to and through the campus, and making it easier and safer to access the Center from a vehicle, bike, or on foot. Future transportation-related projects called for in the plan include:</p> <ul style="list-style-type: none"> • A new underground multi-modal transportation center and parking garage, located at the Memorial Stadium site, providing direct bus and truck loading to campus venues and patron parking. • Improved access with new emphasis on pedestrian safety with better connections to and through the site, especially from transit stops. • A proposed Bus Rapid Transit stop on the west side of Seattle Center on First Avenue N. and Republican as part of the new Bus Rapid Transit route from north downtown to Ballard. • Expansion of the South Lake Union Streetcar to Seattle Center along the Central Line route. 	<p>Effects are expected to be similar to those described for project 1.</p>

<p>8. <i>Bill and Melinda Gates Foundation Campus Master Plan (2008-2014)</i> Elements of the plan will be implemented over a 15-year period. The foundation's campus is east of the Seattle Center. The campus, which covers a city block, will be big enough to house 1,200 employees plus large meetings and events. The campus also will have its own interactive museum, a 15,000-square-foot center telling the story of the Bill & Melinda Gates Foundation's work. In all, the headquarters buildings will encompass some 900,000 square feet.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>9. <i>South Lake Union Redevelopment (2003-2013)</i> The projected build-out of Phase II (with the existing Phase I buildings) will total a net increase of 7.2 million square feet of commercial space, 35 percent of which is assumed to be designed for biotechnology research and development uses, with the remainder in a mix of commercial office (55 percent) and retail uses (10 percent). In addition to the commercial development, 10,000 residential units are projected to be constructed in the South Lake Union area through the development of 7.7 million square feet of new housing units during Phases I and II. Estimates for both commercial and residential development are clearly speculative for Phase II, but they are based on the best information currently available.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>10. <i>Seattle Combined Sewer System Upgrades</i> Seattle intends to construct a new combined sewer overflow storage facility and conveyance system along the central waterfront. (This project could include federal funding.)</p>	<p>This project would improve water quality along the Seattle waterfront by reducing the volume and frequency of combined sewer overflow events.</p>
<p>11. <i>Bridging the Gap Projects(2007-2015)</i> Construction for projects that are part of this Seattle levy began in 2007 and is expected through 2013. Considerable road work is expected on downtown streets and First Avenue S. in 2008. In 2010, Airport Way S. and Fourth Avenue S. north of S. Royal Brougham Way would have partial closures for roadway resurfacing. In 2011, additional resurfacing work is planned for Airport Way S. north of S. Massachusetts Street and on S. Dearborn Street east of Fifth Avenue S.</p>	<p>Effects are expected to be similar to those described for project 1.</p>
<p>16. <i>First Hill Streetcar</i> The First Hill Streetcar project is a proposed 2-mile streetcar connector serving Seattle's Capitol Hill, First Hill, and International District areas with connections to Link light rail and Sounder commuter rail. It was included in the mass transit system expansion ballot that voters approved in November 2008.</p>	<p>Effects are expected to be similar to those described for project 3.</p>

17. RapidRide (2010-2013)

King County Metro has planned service improvements that will substantially improve transit's ability to accommodate increased ridership. This plan includes RapidRide services that provide high-frequency service and bus priority improvements to highly traveled routes within King County Metro's service area. It also includes improved service on high-ridership routes and new peak and midday service in newly developing residential areas, and creates service partnerships with major employers throughout the region.

RapidRide is Metro Transit's new, streamlined bus service that will provide frequent, all-day service in the following five corridors:

- **C Line** – West Seattle to downtown Seattle using Fauntleroy Way SW, California Avenue SW, and SR 99 (2011)
- **D Line** – Ballard to Uptown and downtown Seattle along 15th Avenue NW (possible alternate routing along 24th Avenue NW) (2012)
- **E Line** – Aurora Avenue N. (SR 99) between Shoreline and downtown Seattle (2013)

Effects are expected to be similar to those described for project 3.

Appendix 2

Not Likely to Adversely Affect Determinations

Not Likely to Adversely Affect Determinations

Steelhead

The Puget Sound steelhead DPS was listed as threatened on May 11, 2007 (72 FR 26722). Critical habitat has not been proposed. Steelhead are present in Elliott Bay, Lake Union, and Puget Sound (WDFW 2008). Both winter and summer adult and juvenile steelhead from the Green-Duwamish River and other river systems may occur within nearshore Elliott Bay, Lake Union, or Puget Sound any time of year.

Adult steelhead migrate and forage in Puget Sound. The summer steelhead population is considered depressed, based on escapement levels (WDFW 2002a). Historically, there is no evidence of summer steelhead in the Green-Duwamish River before hatchery introductions; it is a non-native stock with composite (wild and hatchery) production (WDFW 2002a).

Summer run steelhead return to the Green-Duwamish River watershed from April through October (WDFW and Western Washington Treaty Indian Tribes 1994; City of Seattle 2007). Spawning timing for natural spawners is unknown, but is assumed to be similar to that of hatchery-origin summer steelhead adults in the Green-Duwamish River, extending from mid-January through mid-March (WDFW 2002a).

The Green-Duwamish winter steelhead population is considered healthy based on escapement levels (WDFW 2002b). It is a native stock with wild composition that returns to freshwater from November through May; spawning occurs from February through the end of June, with a peak in mid-May (Grette and Salo 1986; City of Seattle 2007). Both summer and winter steelhead generally spawn above river mile (RM) 30.0.

The principal juvenile out-migration season for steelhead occurs from April through May (NMFS 2005). Steelhead smolts emigrate from the Green-Duwamish River watershed from the middle of March to the middle of July for both winter and summer stocks (City of Seattle 2007). Average size for steelhead smolts outmigrating from the Duwamish is approximately 14 cm (WSDOT 2010a). During the migration from fresh to saltwater, steelhead may spend a considerable amount of time in Puget Sound and extensively use nearshore habitats for rearing after leaving fresh water (NMFS 2005).

No fish surveys have been conducted at project outfalls, but seine netting and snorkel surveys have been conducted by University of Washington researchers at Myrtle Edwards Park and the Olympic Sculpture Park beach, just north of the Denny Outfall. Juvenile steelhead have been reported from the nearshore environment of Elliott Bay, but they are rare (WSDOT 2010a). One survey involving 390 beach seines in 2002 and 2003 found only two juvenile steelhead. Another survey involving 600 beach seines in 2001 and 2002 found only nine juvenile steelhead (WSDOT 2010a).

Lake Washington winter steelhead are identified as a distinct stock based on their spawning distribution. It is a native stock with wild production (WDFW 2002c). Steelhead stocks in the

Cedar-Sammamish watershed (WRIA 8) have generally been declining since the mid-1980s (Kerwin 2001). Lake Washington winter steelhead stock status was downgraded from depressed to critical based on low escapement values and a severe decline in 2000-2001. Escapement for wild Cedar River winter-run steelhead dropped from 1,816 individuals in 1986 to 44 in 2003 (WDFW 2002c).

Adult steelhead begin their migration from Puget Sound through the Hiram M. Chittenden Locks in November. Spawning occurs from March through early May, peaking in April (NMFS 2005). Smolts migrate back through the locks in mid-June to early July (Kerwin 2001). No steelhead surveys have been conducted near the Broad Outfall, but steelhead smolts have a low residence time in the locks, in the order of hours to days (City of Seattle 2007).

The project will discharge stormwater pollutants out three outfalls in Elliott Bay and one in Lake Union. The outfalls in Elliott Bay are all separated from each other by over 1,500 feet. Stormwater pollutant concentrations for dissolved zinc and dissolved copper will exceed the biological threshold level for salmonids for altering or impairing their biological processes and negatively impacting salmonids. In Elliott Bay the project discharges stormwater during combined sewer overflow (CSO) events. The average number of CSO events are 7 at the Kingdome Outfall, 19 at the King Outfall, and 3 at the Denny Outfall. Most of the discharges occur in late fall and winter (October through February). In Lake Union, pollutants are discharged out a stormwater outfall. No information is available on the number of discharges from the Broad Outfall, but the discharges are associated with rain events which mainly occur in the City of Seattle from October through March.

The dilution zones at the three outfalls in Elliott Bay where pollutant concentrations fall below the biological threshold level are less than 115 square feet at the Kingdome Outfall, 19 square feet at the King Outfall, and 17 square feet at the Denny Outfall. For the Broad Outfall in Lake Union, the dilution zone is approximately 11 square feet for the 50th percentile flow and 160 square feet for the 99.9th percentile flows.

The NMFS expects the effects of the project to Puget Sound steelhead to be insignificant because 1) no in-water work will be conducted, 2) steelhead adults and juveniles are not nearshore dependent, 3) very few steelhead have been captured or observed near the outfalls in Elliott Bay, and steelhead spend very little time in the Lake Union as they migrate through Lake Union, 4) steelhead can avoid the outfall plume by migrating around the outfall, unlike a river system where the plume can cause a barrier across the entire river, and 5) the discharges from both the CSOs and the stormwater outfalls occur periodically most often in late fall and winter which reduces exposure to steelhead as they would be near spawning locations.

The NMFS believes that sufficient information was provided to determine the effects of the proposed project to federally listed species and to conclude whether this project is likely to adversely affect those species. We therefore concur with The FHWA “may affect, not likely to adversely affect determination” for PS steelhead.

Southern Resident Killer Whales

Species Determination

The final rule listing Southern Resident (SR) killer whales as endangered identified several potential factors that may have caused their decline or may be limiting recovery. These are: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel traffic. The rule also identified oil spills as a potential risk factor for this species. The final recovery plan includes more information on these potential threats to SR killer whales (73 FR 4176).

SR killer whales spend considerable time in the Georgia Basin from late spring to early autumn, with concentrated activity in the inland waters of the state of Washington around the San Juan Islands, and then move south into Puget Sound in early autumn. While these are seasonal patterns, Southern Resident killer whales have the potential to occur throughout their range (from Central California north to the Queen Charlotte Islands) at any time of the year.

The Whale Museum manages a long-term database of SR killer whale sightings and geospatial locations in inland waters of Washington. While these data are predominately opportunistic sightings from a variety of sources (public reports, commercial whale watching, Soundwatch, Lime Kiln State Park land-based observations, and independent research reports), SR killer whales are highly visible in inland waters, and widely followed by the interested public and research community. The dataset does not account for level of observation effort by season or location; however, it is the most comprehensive long-term dataset available to evaluate broad scale habitat use by SR killer whales in inland waters. For these reasons, NMFS relies on the number of past sightings to assess the likelihood of SR killer whale presence in a project area when work would occur. A review of this dataset from the years 1990 to 2008 indicates that SR killer whales are observed in the project vicinity (e.g. in Elliot Bay, along the barge route, or off Port Ludlow) throughout the year.

Clean tunnel spoils would be transported by barge to the Mats Mats quarry in Port Ludlow, Washington. Barges would use established shipping lanes to transport material. The project would likely transport one to two barge loads of tunnel spoils per day for the duration of tunnel construction (as long as 2 years). In the unlikely event of an interaction, any temporary disturbance would be short-term and localized, with no lasting effects. NMFS is not able to quantify existing traffic conditions across this vast area to provide context for the addition of 2 transits per day for approximately 2 years. However, the available information does not indicate that an additional 2 transits per day would result in anything other than insignificant effects. Vessel strikes of marine mammals are extremely unlikely because the barge-sized vessels are slow moving, follow a predictable course, do not target marine mammals, and should be easily detected and avoided by marine mammals. Potential effects from vessel strikes are therefore discountable. Most of the sound pressure produced by a tug towing a loaded barge is expected to be below the level of peak hearing sensitivity for killer whales. Additionally, sound produced by a tug in motion would be transient and therefore would not persist in any one location for very

long. Thus, tug/barge sound is unlikely to mask acoustic signals of biological significance to SR killer whales.

The proposed action may affect the quantity of Chinook salmon (primary prey of SR killer whales). However, the extent of anticipated Chinook take is limited in area (within four dilution zones ranging in size from tens to approximately 100 square feet) and as a result is also anticipated to be limited in amount, as described in the incidental take statement. Therefore, the NMFS anticipated that the proposed action would result in an insignificant reduction in prey resources for SR killer whales that may intercept these species within their range. The proposed action is not anticipated to affect prey quality in the short term.

Therefore, NMFS finds that the potential adverse effects to SR killer whales are discountable or insignificant and concurs with the determination of “may affect, not likely to adversely affect” for SR killer whales.

Critical Habitat Determination

Critical habitat includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. The PCEs for SR killer whale critical habitat are:

- (1) Water quality to support growth and development; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

The project is not expected to adversely affect water quality but is expected to decrease overall pollutant loadings discharged into Elliott Bay and Lake Union. Also, BMPs would be implemented when loading and offloading tunnel spoils to ensure that no material falls into Elliott Bay or Port Ludlow. As described in the incidental take statement, the proposed action is likely to adversely affect Chinook salmon (the primary prey of SR killer whales). Any salmonid take up to the aforementioned maximum extent and amount would result in an insignificant reduction in prey resources for Southern Resident killer whales that may intercept these species within their range. Therefore, the NMFS anticipates direct or indirect effects on SR killer whale prey quantity and quality would be insignificant in the action area, which includes designated critical habitat of SR killer whales. Additionally, the potential for vessels to interfere with SR killer whale passage is expected to be insignificant or discountable (i.e. any vessel disturbance would be short-term and localized with no lasting effects).

Therefore, NMFS finds that the potential adverse effects to SR killer whale critical habitat are discountable or insignificant and provides a determination of “may affect, not likely to adversely affect” SR killer whale critical habitat.

Puget Sound/Georgia Basin Yelloweye Rockfish, Canary Rockfish, and Bocaccio

The NMFS listed the Puget Sound/Georgia Basin DPSs of yelloweye rockfish and canary rockfish as threatened and bocaccio rockfish as endangered under the ESA on April 27, 2010 (75 FR 22276). We first describe the life-history, presence and habitats used by yelloweye rockfish, canary rockfish and bocaccio within Elliott Bay. We then assess the proposed actions' anticipated effects for three distinct life-stages of ESA-listed rockfish.

Rockfish fertilize their eggs internally and the young are extruded as larvae. There have been few studies within the Puget Sound region that document the timing, abundance and species assemblages of larvae. Larval rockfish occur throughout the year along the Pacific coast (Westrheim and Harling 1975, Wylie Echerverria 1987, Moser and Boehert 1991, Love et al., 2002). Yelloweye rockfish, canary rockfish and bocaccio produce from several thousand to over a million eggs (Love et al., 2002). Larvae can make small local movements to pursue food immediately after birth (Tagal et al., 2002), but are nonetheless passively distributed with prevailing currents (NMFS 2003). Larvae are often observed under free-floating algae, seagrass and detached kelp (Shaffer et al., 1995, Love et al., 2002) and also occupy a variety of depths (Moser and Boehert 1991, Weis 2004).

When bocaccio and canary rockfish reach sizes of 3 to 9 cm and are approximately 3 to 6 months old, they settle onto shallow nearshore waters in rocky or cobble substrates that support kelp (Love et al., 1991, Love et al., 2002). Areas with floating and submerged kelp species support the highest densities of most juvenile rockfish (Carr 1983, Halderson and Richards 1987, Matthews 1989, Hayden-Spear 2006). These habitats likely feature a beneficial mix of warmer temperatures, food, and refuge from predators (Love et al., 1991). Most juvenile rockfish move to deeper waters as temperatures and kelp overstory decrease in the fall and winter months (Mathews 1989, Love et al., 1991). Juvenile yelloweye rockfish settle near the upper depth range used by adults (Yamanaka and Lacko 2001) and do not typically occupy intertidal waters (Love et al., 1991; Studebaker et al. 2009). Adult yelloweye rockfish, canary rockfish and bocaccio occupy habitats that are typically deeper than 120 feet (Love et al., 2002).

Rockfish feed upon diverse assemblages of invertebrates and fish within their larval, juvenile and adult life-stages. Larvae feed upon very small organisms that include zooplankton, copepods and phytoplankton. Juvenile rockfish feed upon small invertebrates and fish that occur within the water column and near the bottom. Subadult and adult rockfish feed upon benthic invertebrates and fish (Washington et al., 1978, Love et al., 2002, Palsson et al., 2009).

Adult yelloweye rockfish, canary rockfish, and bocaccio have been documented within Elliott Bay (Washington et al., 1978, WDFW unpublished data, Dinnel et al., 1986). Portions of the shoreline of Elliott Bay also support kelp, thus juvenile canary rockfish and bocaccio could occupy these areas, particularly during spring and summer months. Larval rockfish have been documented within Elliott Bay, but were not documented to species (Waldron 1972). Larvae of ESA-listed rockfish could occur within Elliott Bay throughout the year.

As described in Section 1.3 of this opinion, the project would reduce the existing stormwater discharge points from 11 sites to three existing outfall locations in Elliott Bay. The CSO outfalls discharge into waters less than 20 feet deep.

The CSO events would deliver various concentrations of total suspended solids, total zinc, dissolved zinc, total copper, and dissolved copper (Table 6, Section 2.4). Dissolved zinc would have the largest dilution plume. As stated in this opinion, WSDOT modeled the dilution zones for each pollutant to estimate the distance at which pollutant concentrations reached the biological threshold for salmonids. The biological threshold value is where reduced olfactory sensory responsiveness and avoidance behaviors occur. We presume that biological thresholds for ESA-listed rockfish would be comparable to salmonids because their physiology is similar (Groot and Margolis 1991, Love et al., 2002). Dilution plume sizes for salmonids for dissolved copper are 21 square feet for the Kingdome Outfall, 9.38 square feet for the King Outfall, and 9.12 square feet at the Denny Outfall. For dissolved zinc, dilution plume sizes are 114.7 square feet for the Kingdome Outfall, 18.72 square feet for the King Outfall, and 16.38 square feet at the Denny Outfall. The discharges from CSO events average approximately 3.5 hours at the Denny Outfall, 6.5 hours at King Outfall, and 50 minutes at the Kingdome Outfall.

Larvae. Larval yelloweye rockfish, canary rockfish or bocaccio could occur within the dilution zone during a CSO event, though they are readily dispersed by currents after they are born, making the concentration or probability of presence of larvae in any one location extremely small (NMFS 2003). To calculate the approximate density of larvae of ESA-listed rockfish within the water column that could be affected by CSO events, we used the most recent ichthyoplankton study and catch data within the Puget Sound⁶. Larval rockfish were documented to occur throughout the water column at densities ranging from approximately 0.75 to 2.5 fish per 10,763 square feet in the San Juan Region (Weis 2004). Rockfish larvae are difficult to identify from morphological features alone until they are several weeks to months old (Love et al., 2002), thus Weis did not identify the rockfish species composition of the catch.

We used the densities of all rockfish larvae reported in Weis (2004), and the proportion of yelloweye rockfish, canary rockfish and bocaccio caught within recent recreational fisheries⁷ (WDFW unpublished data) to calculate estimated larval density. We presume that the proportion of ESA-listed rockfish caught by recreational anglers would be similar to the proportion of ESA-listed rockfish larval caught in the San Juan Region study. The San Juan region rockfish population (of all species) is greater than central Puget Sound (Palsson et al., 2009). Thus the densities of rockfish larvae caught in the San Juan region and reported by Weis (2004) are probably greater than would occur in Elliott Bay.

We multiplied the percentage of the recreational catch times the larval density ranges reported by Weis (2004) to get estimated densities of yelloweye rockfish, canary rockfish and bocaccio

⁶ This calculation assumes that rockfish larval density would be the same throughout the year, and that their distribution would be uniform. Larval rockfish density is not typically uniform, and fish can collect in areas due to currents and other factors (Love et al., 2002). We do not anticipate larval rockfish to be of particularly higher density in the nearshore of Elliot Bay than anywhere else within the Central Puget Sound.

⁷ The proportion of adult yelloweye rockfish caught by recreational anglers from 2004 to 2008, as a proportion of the total rockfish catch, was 0.008 percent (WDFW 2010). Canary rockfish were 0.012 percent of the catch, and bocaccio were 0.00026 of the total rockfish caught (WDFW unpublished data).

larvae. This results in an estimated density from 0.006 to 0.02 yelloweye rockfish larvae, 0.0093 to 0.031 canary rockfish larvae, and 0.00019 to 0.0006 bocaccio larvae per 10,763 square feet.

It is extremely unlikely and therefore discountable that a larval yelloweye rockfish, canary rockfish or bocaccio would be present and therefore exposed to a CSO event because of their low densities, the small size of the dilution zone at each of the three outfalls, and the relatively short duration of each event.

Juveniles. Juvenile yelloweye rockfish do not typically occupy shallow waters (Love et al., 1991) and are very unlikely to be near any of the three outfalls. Of the three outfall sites, only the Denny Outfall is located near kelp⁸, thus juvenile canary rockfish and bocaccio may occur near this discharge site. Juvenile canary rockfish and bocaccio are unlikely to occur near the Kingdome Outfall and King Outfall because of the lack of kelp. Discharge of stormwater would occur during sporadic CSO events throughout the year, with most occurring during winter months (Table 7 of this opinion). The CSO events that occur between April and September have the greatest likelihood of exposure to juvenile canary rockfish and bocaccio (Table 1). CSO events are infrequent during these periods, and have not occurred from the Denny Way outfall within the past five years.

Table 1: CSO Average Monthly Frequency and Volume of Discharges (WSDOT 2010), modified from Table 7 of this opinion.

Month	Kingdome		King		Denny	
	Frequency (per month)	Volume (MG ¹)	Frequency (per month)	Volume (MG)	Frequency (per month)	Volume (MG)
April	0.67	1.0	0.86	0.29	0.00	0.00
May	0.33	0.3	1.43	0.42	0.00	0.00
June	0.00	0.00	0.29	0.03	0.00	0.00
July	0.00	0.00	0.00	0.00	0.00	0.00
August	0.00	0.00	0.43	0.79	0.00	0.00
September	0.00	0.00	0.43	0.05	0.00	0.00
Average	0.17	0.22	0.57	0.26	0	0

It is extremely unlikely and therefore discountable that juvenile canary rockfish or bocaccio would be present and thus exposed to a CSO event because such events are infrequent and occur during times that juveniles would not occupy the nearshore of Elliott Bay near the Denny Outfall. Similarly, juvenile yelloweye rockfish do not occupy shallow intertidal habitats, therefore it is extremely unlikely and therefore discountable that juveniles would be present and thus exposed to a CSO event.

Adults. It is also extremely unlikely and therefore discountable that an adult yelloweye rockfish, canary rockfish and bocaccio would be exposed to a CSO event because they prefer deep water habitat and each of the CSO outfalls are located in waters shallower than 20 feet, and are in areas of relatively low habitat complexity.

⁸Washington State Coastal Atlas, <https://fortress.wa.gov/ecy/coastalatlant/viewer.htm>, accessed October 27, 2010

Though each life stage of ESA-listed rockfish are unlikely to be directly exposed to a CSO event, each event would deliver pollutants that can join particulates and become sequestered in sediments where they may enter the food chain via the benthic invertebrates. When benthic invertebrates are exposed to and assimilate these pollutants, they can become sources of contamination for other invertebrates and fish species that are prey of rockfish. However, the post-project condition is likely to significantly reduce pollutant loading to Elliott Bay. Overall, pollutant loading from the project area discharged to Elliott Bay would decrease by 40 percent or more (Table 4 of this opinion, WSDOT 2010a). The reduction in pollutant loading does not take into account the decreased pollutants from the high traffic levels from the viaduct which currently discharges untreated into Elliott Bay. When the viaduct is removed, traffic levels on the surface streets that are below the viaduct would have less vehicles than the current viaduct (WSDOT 2010b), and therefore pollutant loading would be greatly reduced. Further, NMFS anticipates that any effects on prey quality of ESA-listed rockfish beyond the mixing zone, where contaminant concentrations are minimal, are so small as to be immeasurable and are therefore insignificant.

Because all potential effects are discountable, NMFS concurs with the FHWA determination of “may affect, not likely to adversely affect” for Puget Sound/Georgia Basin yelloweye rockfish, canary rockfish and bocaccio.

Literature Cited

- Carr, M.H. 1983. Spatial and temporal patterns of recruitment of young of the year rockfishes (genus *Sebastes*) into a central California kelp Forest. Masters thesis, San Francisco State University, CA 94132, 104p).
- City of Seattle. 2007. Seattle Biological Evaluation. Seattle, WA. May 1, 2007.
- Dinnel, P.A., Armstrong, D.A., Miller, B.S. and R.F. Donnelly. 1986. Puget Sound Dredge Disposal Analysis disposal site investigations: Phase 1 trawl studies in Saratoga Passage, Port Gardner, Elliott Bay and Commencement Bay, Washington. FRI-UW-8615.
- Grette, G.B. and E.O. Salo. 1986. The status of anadromous fishes of the Green/Duwamish River system. Prepared for the U.S. Army Corps of Engineers, Seattle District. Seattle, WA.
- Halderson, L. and L.J. Richards. 1987. Habitat use and young of the year copper rockfish in British Columbia. In Proc. In. Rockfish Symp., Anchorage, Alaska, p. 129-141. Alaska Sea grant Rep. 87-2, Fairbanks 99701.
- Hayden-Spear, J. 2006. Nearshore habitat associations of young-of-year copper (*Sebastes caurinus*) and quillback (*S. maliger*) rockfish in the San Juan Channel, Washington.
- Kerwin, J. 2001. Salmon and Steelhead Habitat Limiting Factors Report for the Cedar – Sammamish Basin (Water Resource Inventory Area 8). Washington Conservation Commission. Olympia, WA.
- Love, M.S., M. Carr, and L. Halderson. 1991. The ecology of substrate-associated juveniles of the genus *Sebastes*. *Env. Bio. Fish.* 30:225-243.
- Love, M.S., M. M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press, Berkeley, California.
- Matthews, K.R. 1989. A comparative study of habitat use by young-of-the year, subadult, and adult rockfishes on four habitat types in Central Puget Sound. *Fishery Bulletin, U.S.* 88-223-239.
- Moser, G.H. and G.W. Boehert. 1991. Ecology of pelagic larvae and juveniles of the genus *Sebastes*. *Environmental biology of fishes* 30: 203-224.
- NMFS (National Marine Fisheries Service). 2003. Alaska Fishery Science Center, processed report 2003-10. Marine protected areas and early life-history of fishes.
- NMFS (National Marine Fisheries Service). 2005. Status review update for Puget Sound steelhead. Northwest Fisheries Science Center, Seattle, WA. July 26, 2005. Available at

<http://www.nwr.noaa.gov/Publications/Biological-Status-Reviews/loader.cfm?csModule=security/getfile&pageid=29161>.

- Shaffer, J. A. Doty, D.C., Buckley, R.M., and J. E. West. 1995. Crustacean community composition and trophic use of the drift vegetation habitat by juvenile splitnose rockfish *Sebastes diploproa*. Marine Ecology Progress Series. Vol. 123, pp 13-21. 1995.
- Studebaker, R.S., Cox, K.N., and T. J. Mulligan. 2009. Recent and historical spatial distributions of juvenile rockfish species in rocky intertidal tide pools, with emphasis on black rockfish. Transactions of the American Fisheries Society 138:645-651, 2009.
- Tagal, M, K. C. Masee, N. Ashton, R. Campbell, P. Plesha, and M. B. Rust. 2002. Larval development of yelloweye rockfish, *Sebastes ruberrimus*. National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center.
- Washington, P. M., R. Gowan, and D. H. Ito. 1978. A biological report on eight species of rockfish (*Sebastes* spp.) from Puget Sound, Washington. Northwest and Alaska Fisheries Center Processed Report, National Marine Fisheries Service, Seattle.
- WDFW (Washington State Department of Fish and Wildlife). 2002a. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, WA. Green River (Duwamish) summer steelhead. Available at http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6168.pdf.
- WDFW (Washington State Department of Fish and Wildlife). 2002b. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, WA. Green River (Duwamish) winter steelhead. Available at http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6175.pdf.
- WDFW (Washington State Department of Fish and Wildlife). 2002c. Salmonid Stock Inventory (SaSI). WDFW, Wildlife Program. Olympia, WA. Lake Washington winter steelhead. Available at http://wdfw.wa.gov/webmaps/salmonscape/sasi/full_stock_rpts/6154.pdf.
- WDFW (Washington State Department of Fish and Wildlife). 2008. *Oncorhynchus mykiss*: assessment of Washington State's steelhead populations and programs. Washington Department of Fish and Wildlife, Olympia, WA. February 1, 2008.
- WDFW (Washington Department of Fish and Wildlife) and Western Washington Treaty Indian Tribes. 1994. 1992 Washington State Salmon and Steelhead Stock Inventory. Appendix One, Puget Sound Stocks, South Puget Sound Volume. Washington Department Fish and Wildlife and Western Washington Treaty Indian Tribes, Olympia, Washington. 371pp.
- Washington State Department of Fish and Wildlife. Unpublished locations of yelloweye rockfish, canary rockfish and bocaccio within the Puget Sound/Georgia Basin. On file

with the National Marine Fisheries Service, 7600 Sandpoint Way NE, Seattle, WA 98115.

WSDOT (Washington State Department of Transportation). 2010a. SR 99: Alaskan Way Viaduct Replacement Project. Biological Assessment. Washington Department of Transportation. Seattle WA.

WSDOT (Washington Department of Transportation). 2010b. Alaskan Way Viaduct Replacement Project, 2010 Supplemental Draft Environmental Impact Statement, Appendix C: Transportation Discipline Report. Available at <http://www.wsdot.wa.gov/NR/rdonlyres/E9E70AA9-BA9C-4F92-8FA0-3322EA5F9DAD/0/2010SDEISAppendixC.pdf>.

Weis, L.J. 2004. The effects of San Juan County, Washington, marine protected areas on larval rockfish production. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science, University of Washington.

Westrheim, S. J., and W. R. Harling. 1975. Age-length relationships for 26 scorpaenids in the northeast Pacific Ocean. Technical Report 565, Fisheries and Marine Service Research Division, Nanaimo, British Columbia.

Wylie Echeverria, T. 1987. Thirty-four species of California rockfishes: maturity and seasonality of reproduction. Fisheries Bulletin of the U.S. 85 (2):229-250.

Yamanaka K.L., and L.C. Lacko. 2001. Inshore Rockfish (*Seb. ruberrimus*, *S. malinger*, *S. cauinus*, *S. melanops*, *S. nigrocinctus*, and *S. nebulosus*). Stock assessment for the west coast of Canada and recommendation for management. SSC 2000.



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June 15, 2011

HMP-WA/WA 646

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**Evaluation of effects to ESA-listed
species relating to tolling for the SR 99
Alaskan Way Viaduct Replacement
Project**

Dear Mr. Landino:

This letter provides an analysis of project effects due to changes in vehicle traffic in the event that tolling is implemented as part of the *SR-99 Alaskan Way Viaduct Replacement Project* (project), and supersedes a previous letter sent to the National Marine Fisheries Service (NMFS) on this subject dated May 10, 2011. As documented below, the analysis concludes that tolling will not change the amount or extent of take specified in the incidental take statement issued by NMFS in its Biological Opinion (BO) issued for the project on January 27, 2011 (NMFS Tracking No. 2010/04009) and reinitiation is not warranted.

The BO states that the FHWA and WSDOT shall analyze project effects if tolling is authorized on SR 99, and that reinitiation is required if project impacts related to stormwater discharge to Elliott Bay change due to vehicles traveling on surface streets through the City of Seattle rather than in the tunnel. When consultation was first initiated on the project, tolling was not included as a component of the proposed preferred alternative (the Bored Tunnel Alternative), and was therefore not addressed in the BA. Based on recent conversations between FHWA and WSDOT, FHWA anticipates that a Tolloed Bored Tunnel Alternative will be the preferred alternative in the FEIS to be published in July of this year. However, WSDOT still needs authorization from the Washington State Legislature to impose tolls on the bored tunnel. If the legislature grants this authority, WSDOT, SDOT and other agencies will work to optimize the bored tunnel's toll configuration in order to minimize diversion to city streets while maintaining efficient traffic flow on SR 99 and generating revenue.

Section 7 regulations specify four general conditions requiring reinitiation of formal consultation: (1) the amount or extent of incidental take is exceeded; (2) new information reveals

effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the action is modified in a manner causing effects to listed species or critical habitat not previously considered; (4) a new species is listed or critical habitat designated that may be affected by the action. The FHWA and WSDOT have evaluated project changes and have determined that none of the four reinitiation conditions have been met. Therefore, this letter serves as an information update and not a reinitiation request.

Changes in Vehicle Traffic Patterns Due to Tolling

The project analyzed vehicle volumes on SR 99, I-5, and City arterials under the Non-Tolled and Tolled Bored Tunnel alternatives. The analysis determined that under the Tolled Bored Tunnel Alternative some traffic from SR 99 will be diverted onto other streets in the project study area. The study area boundaries are Elliott Bay to the west, I-5 to the east, S. Spokane Street to the south and Aloha Street to the north. The volume of traffic diverted depends on the location in the study area. Under the Tolled Bored Tunnel Alternative approximately four percent to 32 percent more vehicles will be diverted from SR 99 onto arterial streets in the study area compared to the Non-tolled Bored Tunnel Alternative (Exhibit 1). A much smaller volume (0.6-4.4 percent) of traffic will also be diverted onto I-5. Exhibit 2 shows the increase of traffic on I-5 as well as projected changes in traffic volumes on SR 99 under the two bored tunnel alternatives.

Although the facilities on which vehicles travel will differ under the tolled and non-tolled bored tunnel alternatives, the total number of vehicles traveling through the study area will remain virtually the same (Exhibit 3). With or without tolling on SR 99, the highway and street network in the study area would support the same vehicle demand

Stormwater Analysis Methodology for WSDOT Biological Assessments

On February 16, 2009, the FHWA, NMFS, United States Fish & Wildlife Service (USFWS) and WSDOT signed a [Memorandum of Agreement](#) committing those four agencies to use a common methodology for analyzing the effects of stormwater on fish species listed under the Endangered Species Act (http://www.wsdot.wa.gov/NR/rdonlyres/F39C7232-6A97-43C2-AC47-185167D7E8D0/0/BA_AssessingStormwaterEffects.pdf). The methodology includes the new Western Washington Highway Runoff Dilution and Loading Stormwater Model (HI-RUN Model), its user guide, and accompanying stormwater assessment guidance. The model was developed over the course of 18 months through monthly meetings with key policy and technical staff from the signatory agencies and consultants. A series of white papers were developed to summarize the state of knowledge of stormwater pollutants, their effects on fish, and analytical approaches for evaluating stormwater impacts. These white papers were provided the basis for identifying the information that should be incorporated into the model. The white papers and documentation for the model are available online at <http://www.wsdot.wa.gov/Environment/Biology/BA/BAguidance.htm#Stormwater>.

As noted in the HI-RUN model user's guide

([http://www.wsdot.wa.gov/NR/rdonlyres/85B43C71-DEBE-478C-A468-](http://www.wsdot.wa.gov/NR/rdonlyres/85B43C71-DEBE-478C-A468-C6BF64D86B64/0/BA_HIRUNUsersGuide.pdf)

[C6BF64D86B64/0/BA_HIRUNUsersGuide.pdf](http://www.wsdot.wa.gov/NR/rdonlyres/85B43C71-DEBE-478C-A468-C6BF64D86B64/0/BA_HIRUNUsersGuide.pdf)), potential relationships between average annual daily traffic (AADT) and pollutant concentrations in roadway runoff at any given site cannot be directly quantified based on the monitoring data that are currently available; therefore, the HI-RUN model outputs are independent of changes in AADT. Pollutant loads and concentrations are determined instead by the amount of pollutant-generating impervious surface (PGIS) within the project area and levels of stormwater treatment provided by the project, the only editable fields on the HI-RUN model data entry page (Exhibit 4). To compensate for the limitations of the model a conservative default risk threshold of 5 percent is applied when interpreting whether fish may be exposed to pollutant concentrations exceeding the established effects thresholds. The threshold value was selected to provide a level of confidence that proposed conditions would not be degraded when compared to existing conditions given the inherent uncertainty and variability in the data.

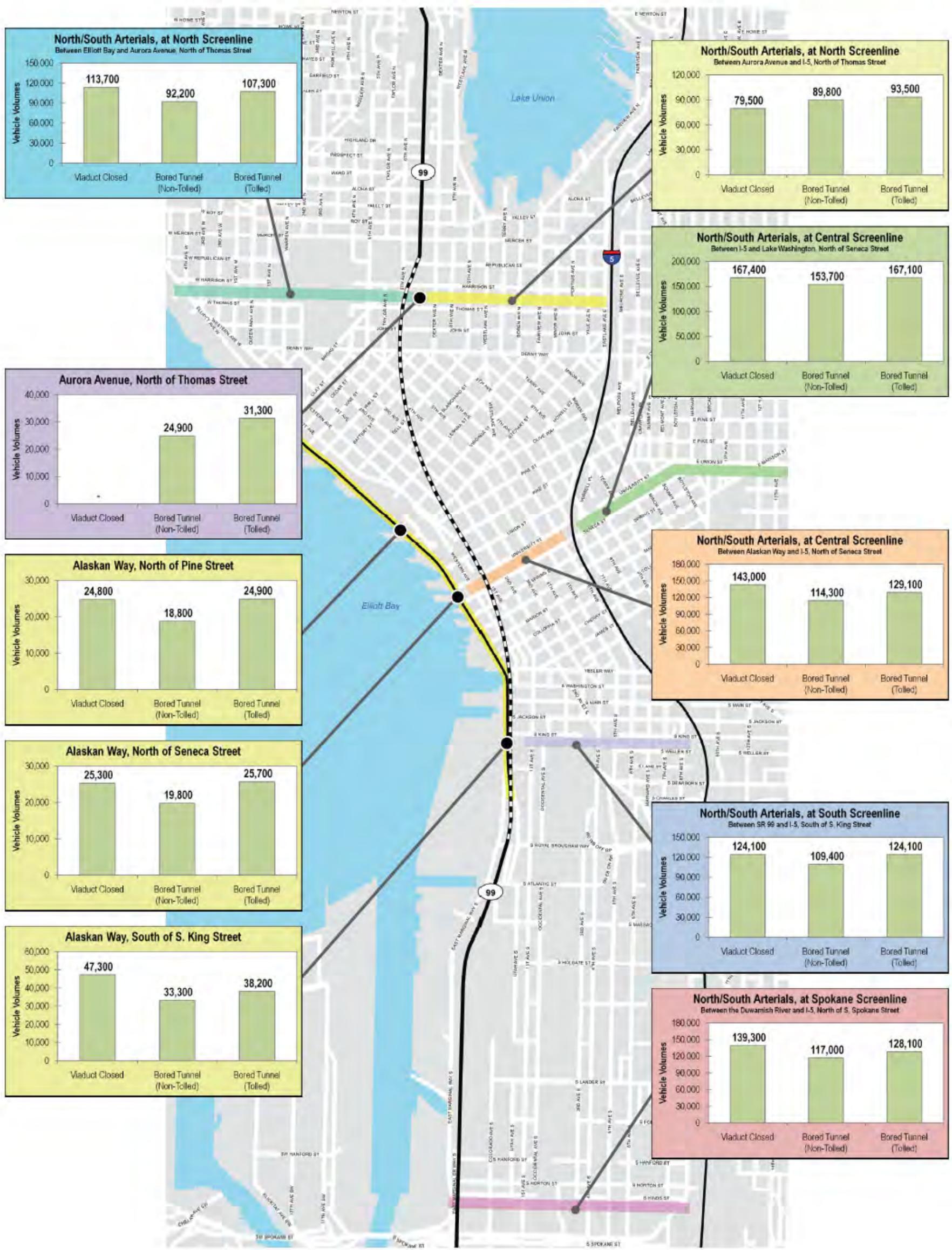


Exhibit 1
Estimated Daily Vehicle Volumes on Arterials
under the Viaduct Closed, Non-Tolled Bored Tunnel,
and Tolled Bored Tunnel Alternatives

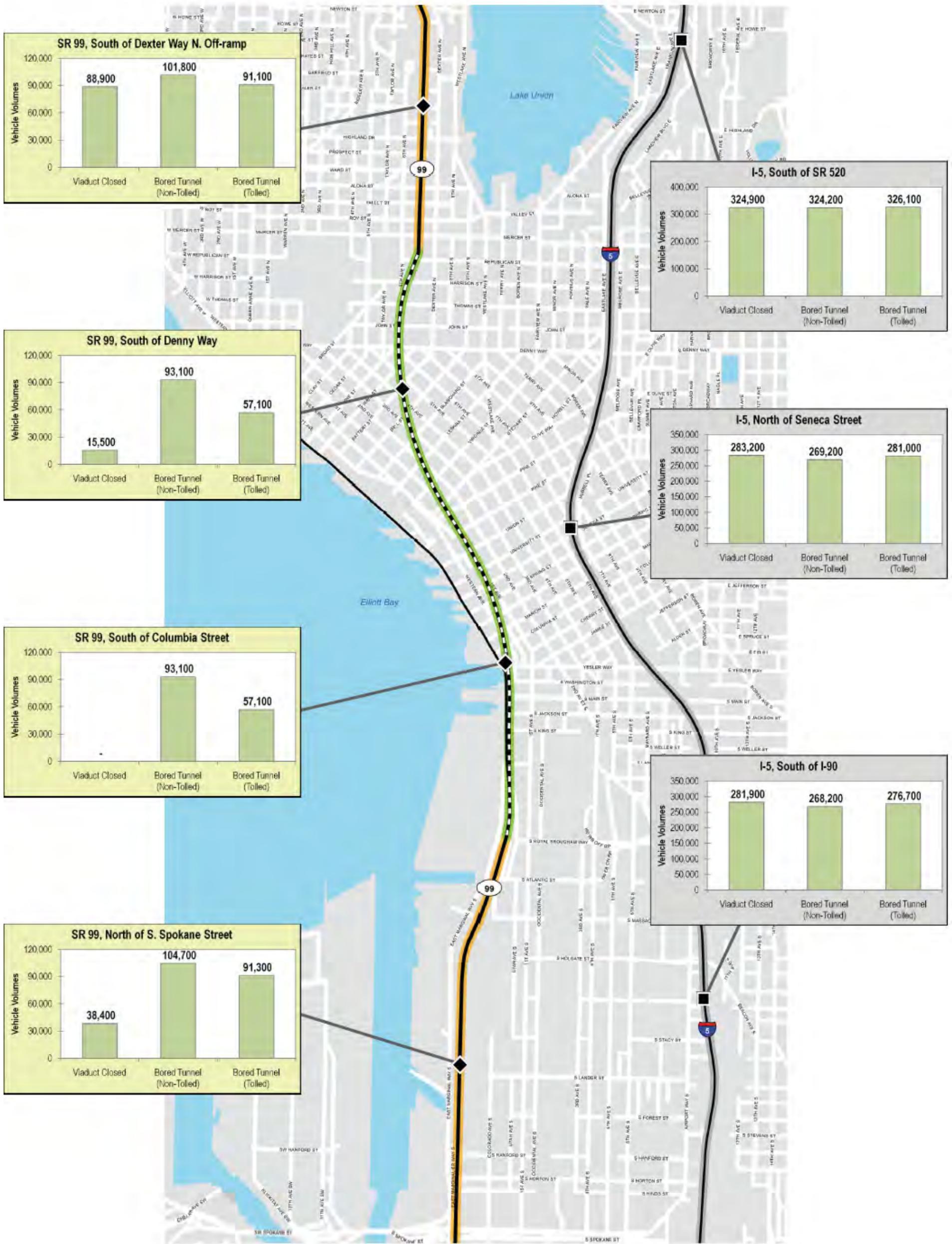


Exhibit 2
Estimated Daily Vehicle Volumes on SR 99 and I-5
under the Viaduct Closed, Non-Tolled Bored Tunnel,
and Tolled Bored Tunnel Alternatives

Exhibit 3: Estimated Vehicle Volumes under the Non-Tolled and Tolled Bored Tunnel Alternatives

	Bored Tunnel (Non-Tolled)	Bored Tunnel (Tolled)
Spokane Screenline (North of S. Spokane Street)		
AM peak hour	34,590	34,850
PM peak hour	38,400	38,550
Daily	495,900	500,000
South Screenline (South of S. King Street)		
AM peak hour	37,360	37,630
PM peak hour	43,430	43,220
Daily	559,000	561,500
Central Screenline (North of Seneca Street)		
AM peak hour	33,580	33,300
PM peak hour	37,410	37,100
Daily	491,100	490,800
North Screenline (North of Thomas Street)		
AM peak hour	40,370	40,600
PM peak hour	45,880	45,970
Daily	578,000	572,200
Total	2124000	2124500

On April 14, 2011, the FHWA, NMFS, USFWS, and WSDOT also agreed on a methodology for analyzing the indirect effects of stormwater based on land use changes that might reasonably occur as a result of the project (http://www.wsdot.wa.gov/NR/rdonlyres/52B62D8B-6151-4CF1-8A50-D7A09C588E3A/0/BA_IndirectEffectAgreement.pdf). The method calculates pollutant loading from acres of different land use types such as forestry, agriculture, low-medium development, and high development, and compares loading from pre- and post-project land use types.

Stormwater Analysis for the SR 99 Alaskan Way Viaduct Replacement Project BA

The HI-RUN model was used in the project's BA to estimate pollutant loading and concentrations at stormwater outfalls in the project area. A separate model, Cormix Version 6.0GT, was used as the dilution modeling program for estimating the distance from project discharge points at which pollutants of concern dilute to a given threshold. Because stormwater runoff from the project co-mingles with stormwater from City streets and other parcels of land in the project area, greatly complicating the analysis, WSDOT and NMFS agreed to use a "pipe within a pipe" approach to analyzing stormwater impacts. This approach assumes that stormwater from WSDOT property does not combine with water from other sources prior to the discharge point and allows the analysis to specifically analyze stormwater contributions from the project.

The models predict that pollutant loads will be reduced by approximately 34 percent post-project and that dilution zones for outfalls to Elliott Bay will also decrease, resulting in a slight overall improvement in water quality in the project area. The reduction is largely due to a 10-acre decrease in PGIS post-project, and to a lesser extent to stormwater quality treatment provided by the project. Due to conservative assumptions factored into both the HI-RUN model and "pipe within a pipe" approach, the analysis presented in the BA likely overestimates both pollutant loading and dilution zones.

The BA did not analyze potential indirect effects from stormwater because there will be no land use changes as a result of the project. The project area is already 100 percent developed. Per discussions with City of Seattle planners and a review of the City of Seattle's Comprehensive Plan, Transportation Strategic Plan, the Seattle Center Century 21 Master Plan, and relevant local neighborhood plans, there are no proposed changes in zoning or amendments to existing land use plans that would result from the proposed bored tunnel project. A standard indirect effects analysis carried out for the BA determined that the project will not result in any induced growth or land use changes; the BO was consistent with this conclusion.

Highway Runoff Dilution and Loading model (HI-RUN) Version 2.0 For Excel 2007

This model is for stormwater analysis associated with biological assessments, and is not a design tool.

Run Loading Model	Load Inputs	Save Inputs	Clear TDA Inputs
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Data Inputs - End-of-Pipe Loading Subroutine

Description: This model provides risk-based predictions of stormwater quality at the outfall and Threshold Discharge Area (TDA) scale. The Highway Runoff Manual provides a thorough discussion of TDA delineation specific to transportation drainage systems. The analysis of water quality concentrations is conducted at a subbasin scale, with subbasins being divisions of TDAs that have discrete discharge points in the receiving water. If a TDA has only one discharge point, data need only be entered under Subbasin 1. The analysis of pollutant loadings is done at the TDA scale only. Water quality parameters analyzed by this tool are Total Suspended Solids (TSS), Total Copper (TCu), Dissolved Copper (DCu), Total Zinc (TZn), and Dissolved Zinc (DZn).

Project/TDA ID:

Precipitation Timeseries:

Water Quality Parameters	Month
All	January
TSS	February
Copper - Total	March
Copper - Dissolved	April
Zinc - Total	May
Zinc - Dissolved	June
	July
	August
	September
	October
	November
	December

TDA Information - Baseline Conditions							
Treatment Type	Level of Incidental Infiltration (%)	Subbasin Area (acres)					TDA Impervious Area (acres)
		1	2	3	4	5	
Basic	0						0
	20						0
	40						0
	60						0
	80						0
Enhanced	0						0
	20						0
	40						0
	60						0
	80						0
Infiltration BMP	100						0
None	0						0
Total		0	0	0	0	0	0

TDA Information - Proposed Conditions							
Treatment Type	Level of Incidental Infiltration (%)	Subbasin Area (acres)					TDA Impervious Area (acres)
		1	2	3	4	5	
Basic	0						0
	20						0
	40						0
	60						0
	80						0
Enhanced	0						0
	20						0
	40						0
	60						0
	80						0
Infiltration BMP	100						0
None	0						0
Total		0	0	0	0	0	0

Last Revision Date: December 1, 2010

Exhibit 4
Data entry page for the BA HI-RUN model.

Potential Impacts to Listed Species from Tolling SR 99

Implementation of tolling on SR 99 would result in changes in traffic patterns as described above. However, tolling would not result in changes to pollutant loads or concentrations in Elliott Bay for the following reasons:

- Tolling would not change PGIS in the study area, which is the primary factor in determining stormwater pollutant concentrations;
- Tolling would not change the amount or level of stormwater treatment provided by the project;
- Levels of vehicle traffic within the study area would remain virtually unchanged under the tolled and non-tolled scenarios; and,
- There are no land use changes that would occur as a result of tolling.

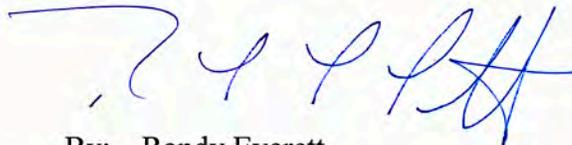
This analysis concludes that if tolling is implemented on the SR 99 Alaskan Way Viaduct Replacement Project, the amount and extent of take issued by NMFS in the BO will not be exceeded, and reinitiation is therefore not required.

In accordance with a programmatic stormwater monitoring agreement between FHWA, NMFS, USFWS, and WSDOT (http://www.wsdot.wa.gov/NR/rdonlyres/0B027B4A-F9FF-4C88-8DE0-39B165E4CD94/64282/BA_ProgMonitoringApproach.pdf), WSDOT will monitor various stormwater discharge points throughout the year to obtain additional data for improving the HI-RUN model's predictions.

Please contact George Ritchotte at (206) 805-2891 or ritchog@wsdot.wa.gov if you require additional information or have any questions about this project.

Sincerely,

DANIEL M. MATHIS, P.E.
Division Administrator



By: Randy Everett
Major Projects Oversight Manager