

# *SR 99*

## *S. HOLGATE STREET to S. KING STREET VIADUCT REPLACEMENT PROJECT*

Environmental Assessment  
and Draft Section 4(f) Evaluation





# SR 99: S. HOLGATE STREET TO S. KING STREET VIADUCT REPLACEMENT PROJECT

## Environmental Assessment and Draft Section 4(f) Evaluation

*Submitted pursuant to:*

The National Environmental Policy Act (NEPA),  
(42 U.S.C. 4322(2)(c)) and 23 C.F.R. Part 771 and  
Section 4(f) of the Department of Transportation Act  
(49 U.S.C. 303(c))

*Submitted by:*

FEDERAL HIGHWAY ADMINISTRATION

*and*

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

*Cooperating Agency:*

CITY OF SEATTLE

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The S. Holgate Street to S. King Street Viaduct Replacement Project is one in  
a series of six independent safety and mobility projects under the larger  
Alaskan Way Viaduct and Seawall Replacement Program.

In compliance with the National Environmental Policy Act, this Environmen-  
tal Assessment (EA) describes the plan to replace the existing Alaskan Way  
Viaduct (State Route 99) between S. Holgate Street and S. King Street with a  
structure capable of withstanding earthquakes and to ensure that people and  
goods can travel safely and efficiently through the project corridor. The analy-  
sis concludes that the project would not have a significant adverse effect on  
the environment.

Copies of this EA may be purchased for \$25.00, which does not exceed the  
cost of reproduction. The EA is also available for review through the Seattle  
Public Library, Downtown Neighborhood Service Center, and online:

<http://www.wsdot.wa.gov/Projects/Viaduct/Library.htm>.

Comments must be received or postmarked by August 11, 2008, and  
should be directed to:

Email: [southviaductEA@wsdot.wa.gov](mailto:southviaductEA@wsdot.wa.gov)

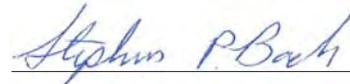
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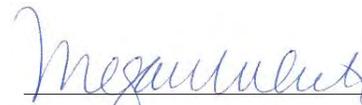
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Date of Approval

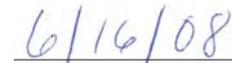


Megan White

Director of Environmental Services

Washington State Department of Transportation

Lead for State Environmental Policy Act (SEPA)



Date of Approval





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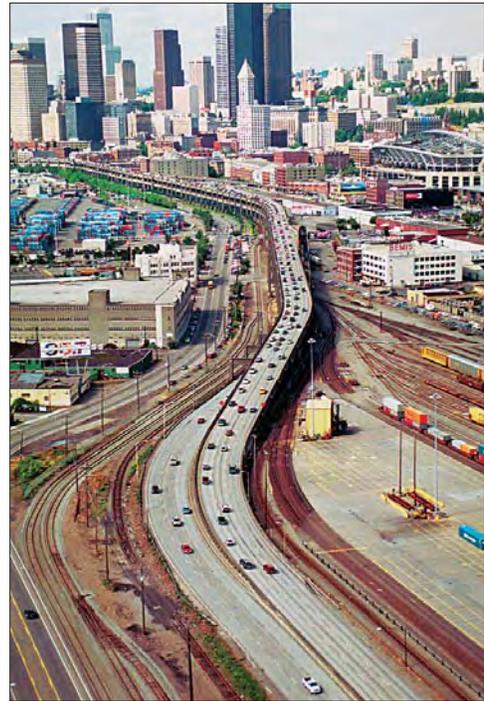
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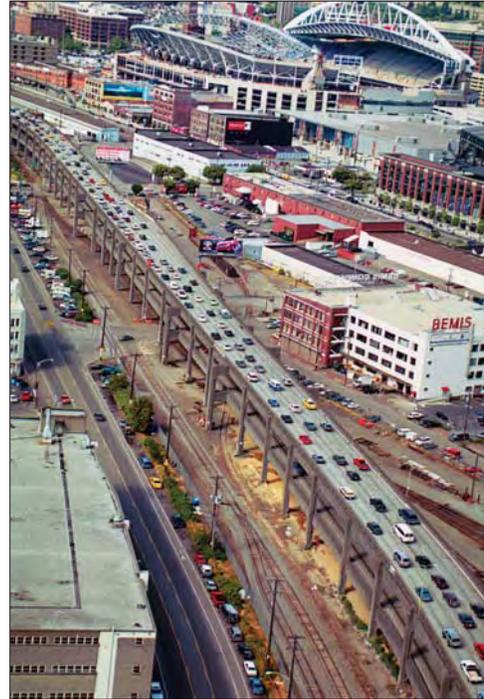


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Environmental Assessment and Draft Section 4(f) Evaluation

# Project Area Map



## EXECUTIVE SUMMARY

### **1 What is the SR 99: S. Holgate Street to S. King Street Viaduct Replacement Project and where is it located?**

This project involves replacing about one mile of the State Route (SR) 99 mainline (also known as the Alaskan Way Viaduct) located between S. Holgate Street and S. King Street, as shown in Exhibit S-1. The project would take about 4 years and 4 months to construct, beginning in mid-2009. Construction is expected to be completed in fall 2013.

### **2 What would the project accomplish?**

The project would replace the seismically vulnerable portion of SR 99 (shown in Exhibit S-2) between approximately S. Holgate Street and S. King Street with a seismically sound structure that is designed to current roadway and safety standards. The new SR 99 facility would maintain or improve access to, from, and across SR 99 for general purpose vehicles, transit, and freight.

This section of SR 99 and E. Marginal Way S./Alaskan Way S. interacts with the Port of Seattle, railyards, two sports stadiums, and the Seattle Ferry Terminal. The transportation system in the area plays a crucial role in the movement of goods and services for the entire state and the Pacific Northwest region. The new structure would benefit the transportation system by improving safety for vehicles and freight traveling on the structure. The new grade-separated access associated with the project, just north of S. Atlantic Street, would reduce conflicts and delays with rail traffic when the tail track is in use.

### **3 How does this project fit in the Alaskan Way Viaduct and Seawall Replacement Program?**

The larger Alaskan Way Viaduct and Seawall Replacement Program covers a variety of planned improvements in the SR 99 corridor located between S. Spokane Street and Roy Street. In March 2007, Governor Christine Gregoire, Seattle Mayor Greg Nickels, and King County Executive Ron Sims

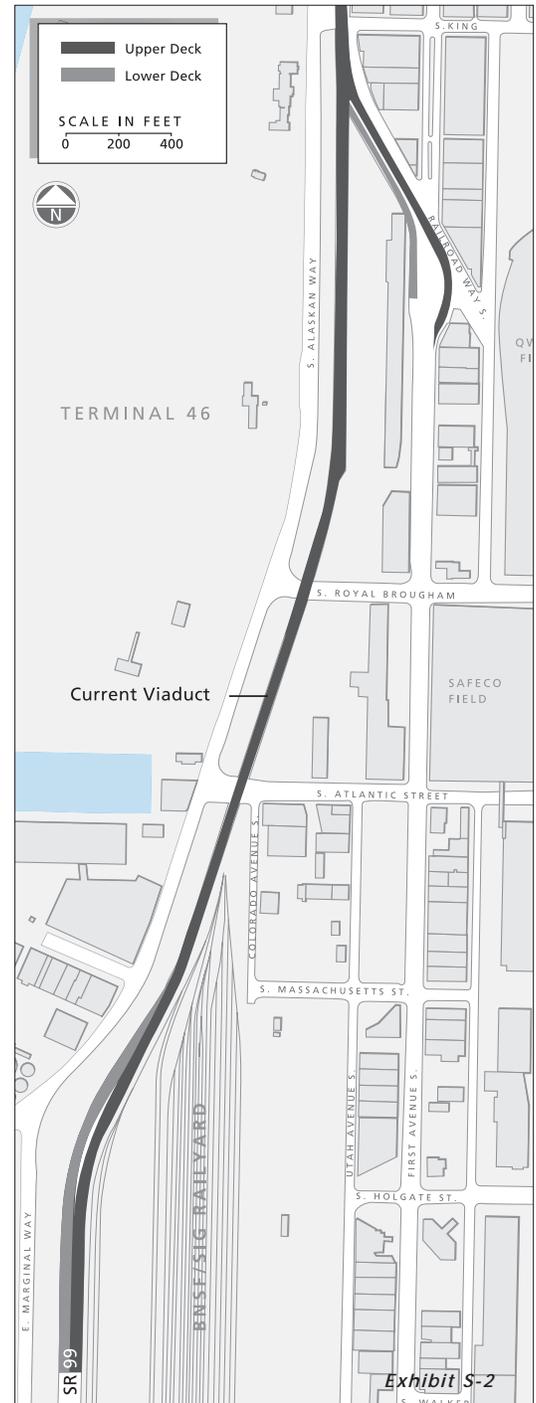


Exhibit S-2

identified six safety and mobility projects in the SR 99 corridor that could be developed and constructed independently. This project is one of the six projects to address earthquake vulnerabilities and improve and enhance mobility as part of the larger Alaskan Way Viaduct and Seawall Replacement Program.

#### 4 What are the alternatives?

Two alternatives are evaluated in this Environmental Assessment (EA): the Build Alternative and the No Build Alternative.

The Build Alternative would replace the existing viaduct between S. Holgate Street and S. King Street, as shown in Exhibit S-1. This is approximately 40 percent of the existing viaduct structure located between S. Holgate Street and the Battery Street Tunnel.

In addition to replacing the existing viaduct between S. Holgate Street and S. King Street, the Build Alternative would:

- Add a new SR 99 southbound on-ramp and northbound off-ramp near S. King Street.
- Provide a new grade-separated access for freight and general purpose traffic north of S. Atlantic Street.
- Improve Colorado Avenue S. between S. Massachusetts Street and S. Atlantic Street.
- Provide northbound and southbound frontage roads that would provide access between Alaskan Way S. and E. Marginal Way S.
- Provide access from the northbound frontage road to the new remote holding area for the Seattle Ferry Terminal.
- Reconfigure the intersections on S. Atlantic Street that are west of First Avenue S.
- Relocate the BNSF tail track.

The No Build Alternative assumes that the existing viaduct between S. Holgate and S. King Streets would continue to remain in operation with routine maintenance until Washington State Department of Transportation (WSDOT) determines that the structure is too unsafe to use, possibly as early as 2012.

#### What is the 2030 No Build Alternative?

We know it is highly unlikely that the viaduct would remain operational until 2030. However, we studied what traffic would be like if the existing facility were operational in 2030 because it provides a baseline that can be compared with traffic conditions for the proposed Build Alternative.

The 2030 No Build Alternative takes into account future population growth and other funded transportation projects, such as the SR 519 Intermodal Access Project Phase 2.

#### What is the tail track?

The tail track is a single railroad track that connects the BNSF Seattle International Gateway (SIG) Railyard on the east side of SR 99 to the Whatcom Railyard located west of SR 99. The tail track is used to assemble and sort railroad cars for both railyards.

## 5 What is the project area like today?

Today the project area is in a highly developed commercial, warehouse, and industrial district just south of downtown Seattle. Safeco Field, Qwest Field, and the Qwest Field Event Center are located along the east side of the project. The project area also has a few residential uses and the St. Martin de Porres Shelter, located at S. Massachusetts Street and Alaskan Way S., which serves homeless men. This area south of downtown Seattle was first developed in the 1870s through the early 1900s and has a long and varied land use history. However, before the land was settled and developed, the region was shaped by glacial events and other geologic forces such as earthquakes.

The project area is located in the central portion of the Puget Sound Basin, an elongated, north-south depression carved by glacial events, situated between the Olympic Mountains and the Cascade Range. The project area is located in a region where numerous small to moderate earthquakes and occasional strong shocks have occurred in recorded history. The project area lies just north of the Seattle Fault Zone.

Long before the city of Seattle developed, Native American communities whose descendants are now members of the Duwamish Tribe, Muckleshoot Indian Tribe, Snoqualmie Indian Tribe, Suquamish Tribe, Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation occupied the project vicinity. No historic-era properties or locations are known from historical references to be in the project area.

Tideflats covered the project area when the city of Seattle was founded. The City started to regrade hills and fill in the tideflats to create room for industrial plants in the 1870s. By the early 1900s, over 1,400 acres of tideflats were reclaimed.

In the 1880s, piers and trestles were built along the waterfront to accommodate both local and national rail lines. Today the Whatcom and BNSF SIG Railyards operate in the project area and transport freight across the region and country. A large amount of freight also travels by truck in and out of the nearby terminals, such as Terminal 46. The railroad, freight, and industrial activities in the area have created some areas that are contaminated. Contaminants include elements of petroleum, oil and gas, and metals. In addition, the buried piles and timbers used to build piers and trestles were probably treated with creosote, which likely has leached into the adjoining soil and groundwater.

The project is located within two City of Seattle neighborhood planning areas, the Greater Duwamish Manufacturing and Industrial Center and the Pioneer Square neighborhood. The project is also adjacent to the Pioneer Square-Skid Road Historic District. There are two nearby buildings listed in the National Register of Historic Places (NRHP). Six nearby industrial buildings, which now have primarily nonindustrial uses, have been identified as eligible for listing in the NRHP. In addition, the Alaskan Way Viaduct itself has been determined eligible for the NRHP.

Trails that pass through the neighborhoods in the project area include the E. Marginal Way Bicycle/Pedestrian Facility and Waterfront Bicycle/Pedestrian Facility, and the planned Mountains to Sound Greenway Trail. These facilities are primarily considered transportation facilities but are also used for recreation. The Jack Perry Memorial Viewpoint is also located along the water on Pier 36.

Typical of an urban environment, the project area contains a number of utilities, including electrical lines, water, sewer, natural gas, and telecommunications services. Stormwater runoff from the project area currently discharges directly into Elliott Bay and the Duwamish River or to the combined sewer system. Approximately 60 percent of the stormwater runoff from the project area is combined with sanitary sewer flows in the City of Seattle and King County wastewater conveyance systems for treatment at the West Point Wastewater Treatment Plant prior to discharge into Puget Sound. During a large storm event, stormwater in the combined sewer system is sometimes discharged directly to Elliott Bay as a combined sewer overflow.

Noise in the project area is also typical of urban and major downtown metropolitan areas. Arterial traffic is the primary noise source in the area.

The project is entirely located in a carbon monoxide (CO) maintenance area, and the area just south of the existing viaduct is a particulate matter (PM<sub>10</sub>) maintenance area. These areas were previously not in compliance with the National Ambient Air Quality Standards, established by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act, but have since demonstrated attainment and are classified as maintenance areas. The study area is designated as being in attainment for all other EPA-regulated pollutants.

## 6 How would the completed project change access?

The project would change access and improve transportation connections by:

- Building an undercrossing to eliminate vehicle and rail conflicts near S. Atlantic Street.
- Adding an SR 99 southbound on-ramp and northbound off-ramp near S. King Street.
- Providing new frontage roads on Alaskan Way S. between S. Atlantic Street and Railroad Way S.
- Improving Colorado Avenue S.
- Reconfiguring intersections along S. Atlantic Street between Alaskan Way S. and Utah Avenue S.
- Widening bike lanes on Alaskan Way S., E. Marginal Way S., and S. Atlantic Street and adding bike lanes on the northbound and southbound Alaskan Way S. frontage roads.
- Providing a new 14-foot-wide shared-use bicycle and pedestrian path along the east side of SR 99 between the remote ferry holding area and SR 99. The existing Waterfront Bicycle/Pedestrian Facility would be replaced on the west side of the tail track adjacent to Terminal 46.
- Providing access to the new remote ferry holding area via the northbound Alaskan Way S. frontage road. Ferry traffic in the holding area would connect to the two-way Alaskan Way S. near S. King Street at a signalized intersection. Ferry traffic would share Alaskan Way S. with general purpose traffic as it does today.
- Providing transit with access via the new ramps near S. King Street. This would provide transit with new options for routes using SR 99 to access downtown farther south near S. King Street.
- Providing freight access via the new ramps near S. King Street. This would provide freight with improved access in the project area. Additionally, building the new undercrossing would allow freight to travel east and west under the tail track when the track is in use.

## 7 How would the completed project affect the surrounding area?

The new SR 99 structure would generally have a minimal effect on resources in the area, because it would occupy approximately the same footprint as the existing Alaskan Way Viaduct. The project would not affect any cultural resources, wildlife, vegetation, habitat, hazardous materials, or low-income or minority people. The project would not change the

### Why are freight connections and movements important considerations?

SR 99, Alaskan Way S., and E. Marginal Way S. are important freight routes that provide direct access to the Port of Seattle and the Duwamish Manufacturing and Industrial Center, which is a major hub for international and interstate freight in the Puget Sound region.

character of the surrounding neighborhood or of any park and recreational resources.

One historic resource would be permanently affected, the existing viaduct. Demolition of a portion of the existing viaduct structure would potentially affect the viaduct’s eligibility for the NRHP. Mitigation for effects to historic resources, including the viaduct, is being addressed in a Memorandum of Agreement.

A total of seven properties would be affected by partial property acquisitions and/or utility easements. The project would not displace any residents or businesses or change the existing land use designations.

The project would permanently remove approximately 1,267 parking spaces as shown in Exhibit S-3. About 418 free long-term spaces would be removed. Surrounding businesses could be affected by reduced parking if their customers and employees have to pay or park farther away. However, south of S. Atlantic Street, there is free parking with 1- and 2-hour limits along First Avenue S. In addition, several blocks of free parking with no time limits are currently located near the project south of S. Massachusetts Street on Utah Avenue S. and Occidental Avenue S. Pay parking lots are also available near the businesses. Therefore, businesses are not expected to lose patrons.

*Exhibit S-3*

**Project Parking Effects**

	Approximate Parking Spaces Removed
On-street short-term	29
On-street long-term	418
Off-street	820
<b>Total</b>	<b>1,267</b>

According to the Puget Sound Regional Council<sup>1</sup>, about 37 percent of the off-street parking spaces in the stadium area are used on an average non-event weekday. This means that on an average weekday, about 4,100 off-street parking spaces are available within a quarter-mile of the project. In addition, there is free or metered on-street parking on the streets surrounding the project area. However, during events, parking spaces are often very full, and many private lots charge a premium for parking.

The City of Seattle’s policy is to provide enough parking for mobility and economic needs, while limiting parking to

**What is on-street parking?**

There are two types of on-street parking, short-term and long-term. On-street short-term parking includes metered spaces, time-restricted public parking spaces (such as 1-hour parking and loading zones), bus/taxi zones, and spaces reserved for police parking. On-street long-term parking includes unmetered, unrestricted on-street public parking spaces.

**What is off-street parking?**

Off-street parking includes parking garages and lots where people pay to park. Most off-street parking is privately owned and operated.

<sup>1</sup> PSRC 2006

encourage people to use other modes of transportation. This project is consistent with the policies listed in Seattle's Comprehensive Plan (section C-3).

Typical urban and city noise levels range from 65 to 80 dBA. With the project, noise levels are expected to remain the same or decrease by 1 to 2 dBA. A change of 1 to 2 dBA would be barely perceptible to most people.

The project would not substantially change views to and from the new SR 99 roadway. Since the new roadway has some at-grade sections, views to the northeast of Elliott Bay and the Olympic Mountains from the at-grade SR 99 roadway are likely to be more obstructed by stacked shipping containers and other Port of Seattle structures. The lower portions of the new roadway would be less intrusive for viewers looking towards SR 99.

The new undercrossing near S. Atlantic Street and new access ramps to and from SR 99 near S. King Street would improve access and generally maintain or improve response times for both emergency and non-emergency police and fire services in the surrounding area.

The project would retrofit reconstructed surface streets and SR 99 with Best Management Practices (BMPs) to treat or detain stormwater runoff and reduce pollutants in the runoff from the project area. The reduced pollutant load would improve water quality and the nearshore sediments compared to existing conditions.

For the new SR 99 structure to meet current earthquake standards, the soils on which the project is built would be strengthened. This would help protect the new SR 99 structure, and potentially other adjacent structures, from liquefaction in the event of an earthquake.

## **8 How would the project be built?**

We expect construction to take about 4 years and 4 months beginning in mid-2009. After 8 months of utility relocations, construction activities have been organized into five stages that include distinct traffic restrictions or detours, as shown in Exhibit S-4. Construction would typically take place 5 days per week, 10 hours per day, but may occur up to 24 hours per day, 7 days per week at times. Construction over and above the typical 50-hour work week would only occur when needed to keep the project on schedule. Some night or weekend work

### **What is dBA?**

Sound levels are expressed on a logarithmic scale in units called decibels (dB). A-weighted decibels (dBA) are the commonly used frequency that measures sound at levels that people can hear.

To the human ear, a 1- to 3-dBA change is hard to distinguish, but a 5-dBA change in noise levels is readily noticeable. A 10-dBA decrease would sound like the noise level has been cut in half.

### **What is liquefaction?**

Liquefaction is what can happen to loose soils when shaking motion from an earthquake causes the soils to turn into a quicksand-like material. This can cause foundations to fail.

may also be required for roadway crossings, tail track relocation, or other critical construction phases.

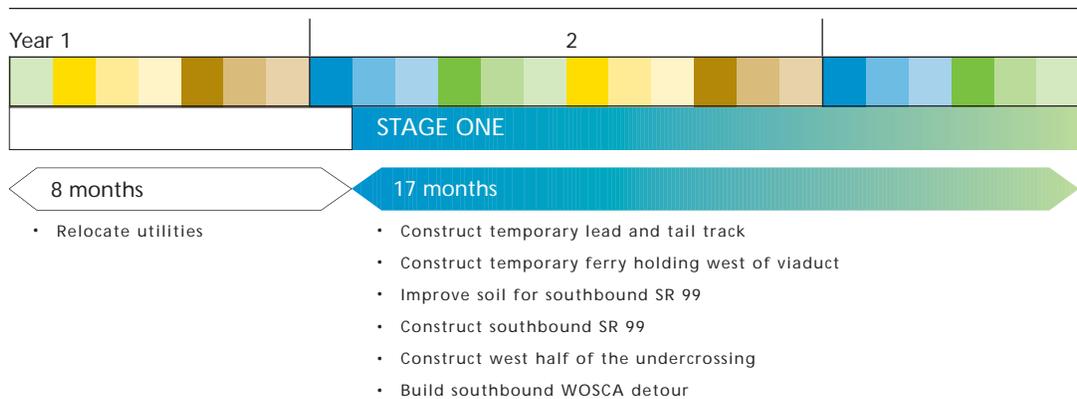
Construction would occur simultaneously at several locations throughout the project area, and the intensity of construction at each location would vary. Construction activities would progress throughout the project area so that a specific location would not experience intense activities outside their front door for the entire construction duration. Construction is likely to pass by properties located in the construction zone more than once. The duration of each construction activity would vary greatly, ranging from a few days to several months depending on the type of activity.

Construction activities would be staged within the existing right-of-way for SR 99 and affected local streets, where possible. Once utilities are relocated, construction of the bridge structure, street-level facilities, and retained cuts that would compose the new SR 99 roadway and ramps would require the following construction activities:

- Demolishing and removing the existing viaduct and support structures
- Soil improvements
- Building bridge foundations
- Retained cut-and-fill construction
- At-grade roadway construction

Exhibit S-4

### Construction Activities



### 9 How would construction affect traffic?

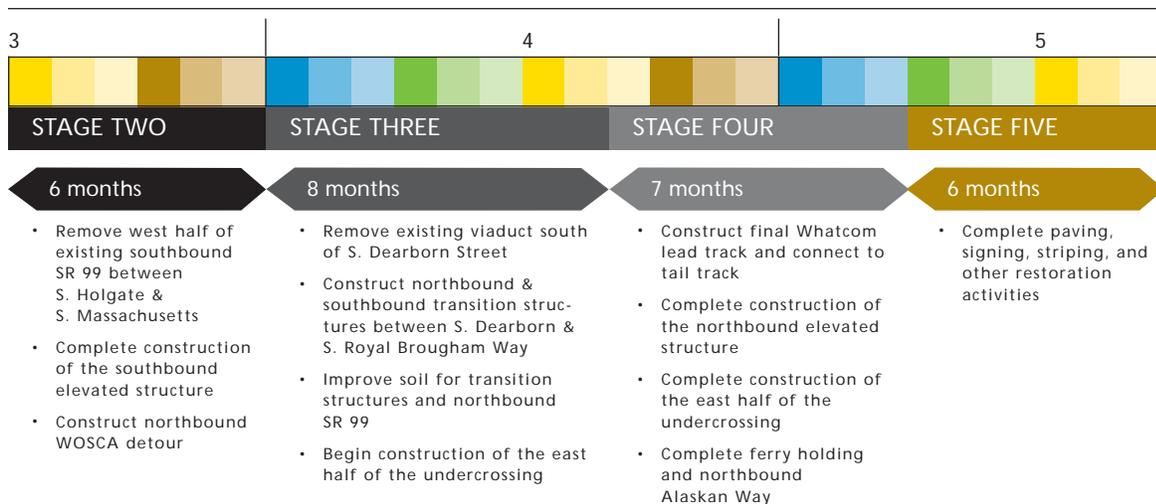
Distinct traffic restrictions or detours would occur during each stage of construction, as shown in Exhibit S-5. Traffic would be restricted on SR 99 by major construction activities for approximately 2 years and 3 months. On Alaskan Way S., traffic would be restricted for about 2 years and 9 months due to construction for the undercrossing as well as SR 99.

Vehicles would experience the most traffic disruption on SR 99 during Stage 3, when both directions of traffic on the SR 99 mainline are detoured onto the Washington-Oregon Shippers Cooperative Association (WOSCA) property for approximately 8 months. Congested conditions and changes in travel times during the construction period could result in more trips being made midday than normal.

Traffic disruptions caused by construction would also affect traffic conditions on nearby local streets. Some drivers would choose alternate routes. In particular, First and Fourth Avenues S. offer direct, alternate routes to SR 99 in the project area.

During all stages of construction, WSDOT would make it a priority to maintain traffic capacity on SR 99 as much as possible, minimize effects to First Avenue S., and maintain access to and from area businesses and the stadiums. These priorities would be accomplished by:

- Maintaining a minimum of two lanes of SR 99 traffic in each direction during peak traffic hours or providing a comparable detour.
- Allowing full closures of SR 99 only during nights and weekends.



- Maintaining access to and from the North SIG Railyard and the Port of Seattle’s Terminal 46 at all times.
- Keeping the railroad tracks and the Whatcom Railyard in service, except for short periodic closures of 8 hours or less to facilitate construction activities. Any closures would be coordinated with BNSF and Union Pacific Railroad.

Up to \$125 million has been set aside for funding enhancements and improvements to keep traffic moving during construction. This could include additional transit service hours and capital equipment (i.e., buses), transit speed and reliability improvements, traveler information systems, improving arterial and street traffic operations, and supporting demand management efforts and other projects. These improvements will also benefit projects in the overall Alaskan Way Viaduct and Seawall Replacement Program.

**10 How would construction affect nearby areas?**

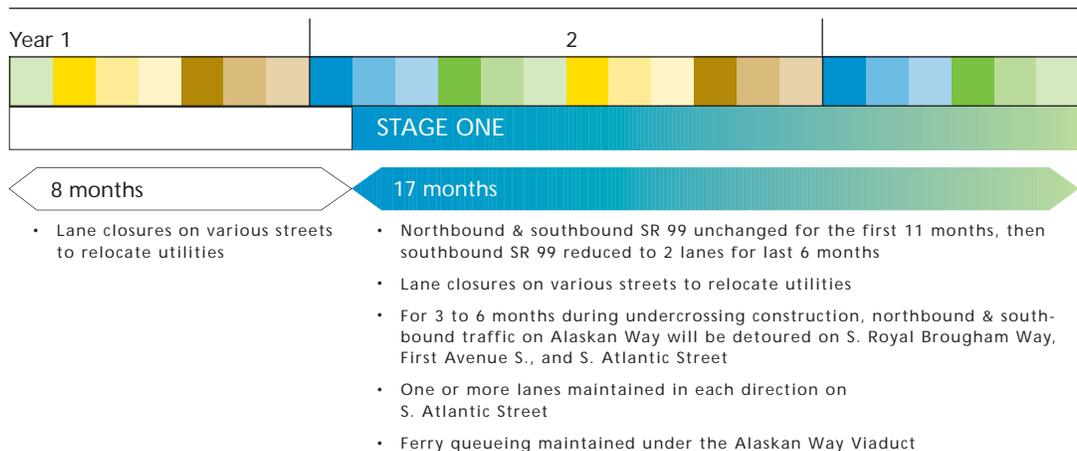
Construction would cause temporary disruptions. Construction noise would be bothersome to nearby businesses and residents. The loudest construction activity would be the demolition of the existing viaduct, which would take approximately 3 months. The most common noise source near construction work zones would be engine noise from the construction equipment. Construction noise could last for several weeks in any one area. Construction noise would be intermittent, occurring at different times and locations during the construc-

**Appendix F Transportation Discipline Report**

*Appendix F* contains supporting traffic information that explains how the construction traffic analysis was conducted and documents the conclusions contained within the text of this EA.

Exhibit S-5

**Construction Roadway Closures, Restrictions, and Detours**



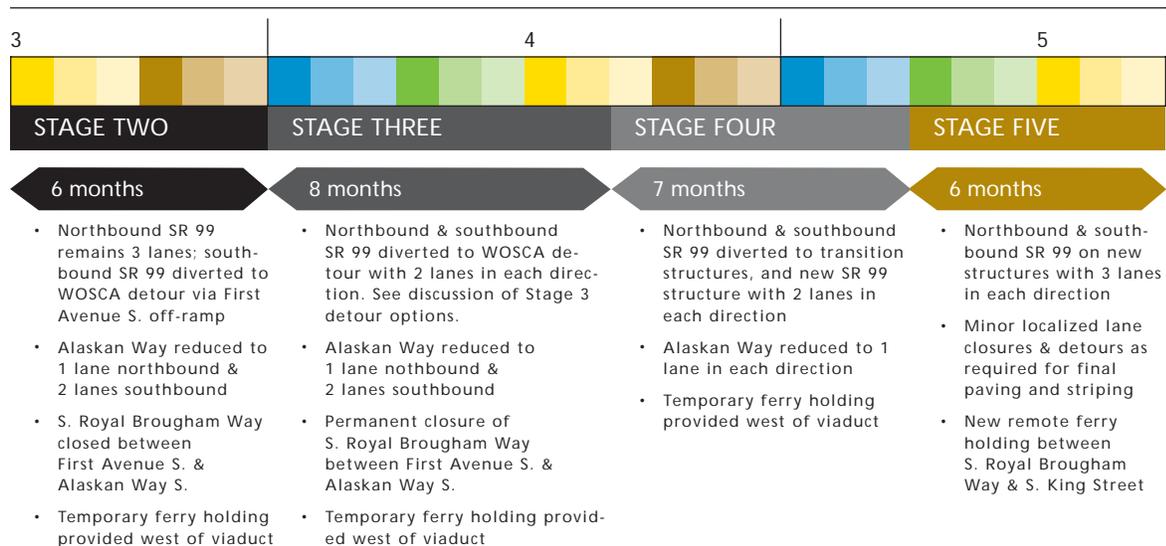
tion. Temporary noise variances would need to be obtained prior to any nighttime construction work.

Dust from demolition, excavation, and truck-hauling activities and emissions from heavy-duty construction equipment could affect air quality in the immediate vicinity of construction activities. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Six properties would require construction easements. Only one easement would be used for the duration of construction. The other easements would be needed for approximately 1 to 4 months for sidewalk or sewer line construction.

During construction, a total of 1,472 to 1,633 parking spaces would be removed, depending on the stage of construction. This is approximately 205 to 366 more spaces than would be permanently removed. About 37 percent of the off-street parking spaces in the stadium area are utilized on an average non-event weekday, according to the Puget Sound Regional Council<sup>2</sup>. This means that on an average weekday, about 4,100 off-street parking spaces are available within a quarter-mile of the project. During events such as Seahawks and Mariners games, parking is in high demand, and many private lots charge a premium for event parking. During construction, it could become more difficult to find parking during an event. As they are today, event-goers would be encouraged to use bus and rail service and to carpool to the stadiums.

During construction, the Waterfront Bicycle/Pedestrian Facility along Alaskan Way S. would not be available for use in the



project area. Until the new pathway is complete, bicyclists and pedestrians would use alternate routes such as First Avenue S. People using the proposed route for the Mountains to Sound Greenway Trail along S. Atlantic Street west of First Avenue S. would also be required to use an alternate route during construction. Temporary sidewalks, bike lanes, and detour routes would be signed. The experience of bicyclists and pedestrians on the alternative routes would likely be less scenic and perhaps less conducive to recreational walking and bicycling than the existing pathways.

Police and fire services would be affected by traffic delays and detours caused by construction activities. Construction could require additional police support services to direct and control traffic and pedestrian movements and could result in increased response times to certain destinations. Law enforcement services outside of the project area may be affected due to changes in traffic patterns on local roads. During construction, fire hydrants may need to be relocated, which could temporarily affect water supplies used for fire suppression. The City of Seattle and Port of Seattle police and fire departments will be closely coordinated with to ensure that general emergency management services are not compromised.

Soil excavation and soil improvement activities may affect unknown, important pre-contact and historic-era archaeological deposits potentially located on the former tideflats of Elliott Bay and in historic-era fill layers. There is a moderate to high probability that construction could affect historic-era archaeological resources associated with industrial, commercial, and residential development of the Elliott Bay tideflats in the 1890s through early twentieth-century development. Because the project could have an adverse effect on significant, eligible sites, mitigation measures will be described in a Memorandum of Agreement among WSDOT, the Federal Highway Administration (FHWA), the Washington State Department of Archaeology and Historic Preservation (DAHP), Advisory Council on Historic Preservation (ACHP), affected tribes, and the City of Seattle.

The project has the potential to generate approximately 222,000 cubic yards of excavated soil, materials, and spoils. This amount of material would bury a football field just over 100 feet deep. Approximately 204,000 cubic yards of the material is potentially contaminated. Contaminated soil and material would require special handling and would be treated and disposed of according to State regulations.

The single indirect adverse effect from construction activities on a historic resource would be to the Bemis Building. Construction would prevent use of their primary loading dock at some periods. Because preventing use of the loading dock would potentially affect the economic viability of the building, it is considered an adverse effect. This effect would be mitigated by improvements to an alternative loading dock facing the south parking lot, which will allow business operations to continue.



## 11 How can you be involved?

There are several ways you can be involved and submit your comments on this EA.

1. You are invited to attend any of the public hearings listed below:

### **Town Hall**

Thursday, July 10, 2008  
1119 8<sup>TH</sup> Avenue, Seattle, WA 98101  
4:00 - 7:00 p.m.

### **Madison Middle School**

Tuesday, July 15, 2008  
3429 45<sup>TH</sup> Avenue SW, Seattle WA 98116  
5:00 - 8:00 p.m.

2. You may submit your comments on this document by email or in writing.

**Email:** [southviaductEA@wsdot.wa.gov](mailto:southviaductEA@wsdot.wa.gov)

**In Writing:** Angela Freudenstein  
WSDOT  
999 Third Avenue, Suite 2424  
Seattle, WA 98104-4019

Your comments on the EA must be emailed or postmarked by Monday, August 11, 2008.

# Project Area Map



## CHAPTER 1 - PURPOSE & NEED

### What's in Chapter 1?

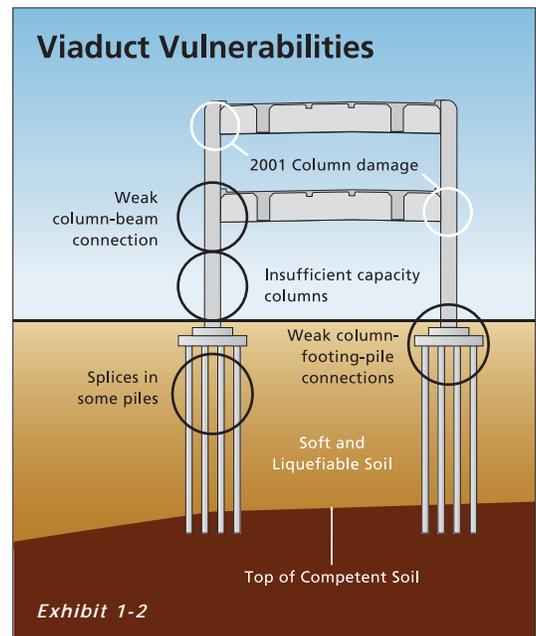
Chapter 1 explains the purpose of the project, why the viaduct needs to be replaced, how this project fits in with the broader Alaskan Way Viaduct and Seawall Replacement Program, and who is leading the project.

#### 1 What is the SR 99: S. Holgate Street to S. King Street Viaduct Replacement Project?

This project involves replacing about one mile of the State Route (SR) 99 mainline (also known as the Alaskan Way Viaduct) located between S. Holgate Street and S. King Street, as shown in Exhibit 1-1. Construction is expected to begin in mid-2009 and be completed in fall 2013.

#### 2 What is the purpose of this project?

The purpose of this project is to replace the seismically vulnerable SR 99 mainline with a seismically sound facility between approximately S. Holgate Street and S. King Street. This portion of SR 99 is vulnerable to earthquakes and is deteriorating. The new SR 99 facility would maintain or improve access to, from, and across SR 99 for general purpose vehicles, transit, and freight.



### 3 Why do we need this project?

#### Seismic Vulnerability

The ability of the Alaskan Way Viaduct to withstand earthquakes needs to be improved. The viaduct is vulnerable to earthquakes because of its age, design, and location. The viaduct was constructed in the 1950s and conformed to the design standards of that time. The structure was designed to seismic criteria that are less than one-third as stringent as today's criteria. The viaduct's existing foundations and column footings are embedded in liquefiable soil, and the structure is deteriorating, as shown in Exhibit 1-2. These factors make the structure vulnerable to earthquakes and necessitate its replacement. If another earthquake were to damage portions of SR 99, Washington State Department of Transportation (WSDOT) would likely restore the section of the SR 99 corridor south of downtown first because it provides transportation functions critical to south Seattle and the region.

#### Roadway Design Deficiencies

The Alaskan Way Viaduct does not meet current roadway design standards and has deficiencies that need to be improved. Specifically, the viaduct has narrow lanes that can adversely affect traffic safety, operating speeds, and roadway capacity. Substantial sections of the viaduct roadway have minimal or no shoulders. Lack of shoulders or narrow shoulder widths can also adversely affect roadway safety, operations, and capacity.

#### Transportation Functions

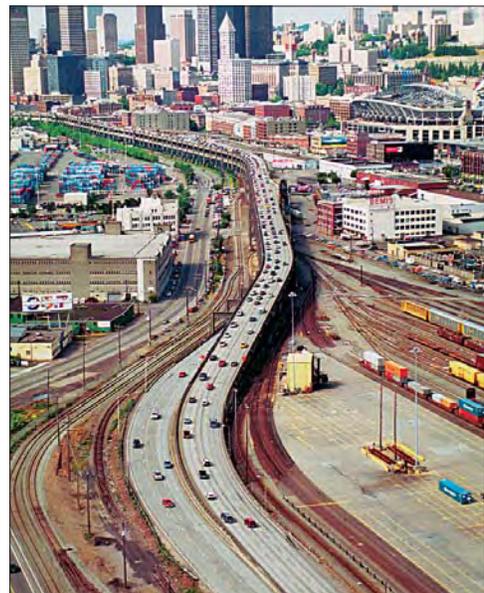
This section of SR 99 and E. Marginal Way S./Alaskan Way S. interacts with one of the largest ports on the west coast, the Port of Seattle. The Port/Duwamish industrial area surrounding this portion of SR 99 is home to one of the West Coast's largest industrial ports and just over 80 percent of Seattle's designated industrial lands. The transportation system in this area plays a crucial role in the movement of goods and services for the entire state and the Pacific Northwest region. As such, this surrounding area is a vital international trade and transportation crossroads, where goods are distributed via roadway, water, rail, and air. It is home to the Port of Seattle's primary shipping operations; the main Amtrak and freight railyards for Washington State; and the intersection of several major highway routes, including Interstate 5 (I-5), I-90, SR 99, and SR 519. Connections between these facilities are often

#### What is liquefiable soil?

When soil liquefies, it transforms from a solid material that can support roadways and other structures to a quicksand-like material that flows like a liquid, potentially damaging roadways or structures built on it.



*Exposed rebar in viaduct column.*



*SR 99 view towards the north with the Whatcom Railyard to the left and the BNSF/SIG Railyard to the right. Qwest Field is visible in the upper right corner, and a portion of Terminal 46 can be seen above the Whatcom Railyard.*

congested, and railyard operations often block freight and local traffic.

This area is also home to two professional sports stadiums and an event center. On game days and during special events, thousands of people, vehicles, pedestrians, and buses are present. This area also serves traffic getting to the Seattle Ferry Terminal, also known as Colman Dock, which is WSDOT's busiest ferry terminal. Hundreds of cars can queue up during the peak summer and holiday seasons to use the ferry's service in this section of the SR 99 corridor. Vehicles waiting to enter the Seattle Ferry Terminal during these peak periods line up along Alaskan Way and underneath the viaduct. In addition, this section of SR 99 supports transit to and from West Seattle and other areas south of downtown.

Specific areas where access needs to be improved to support key transportation functions along this section of SR 99 include:

- **Transit access into downtown.** Transit access to and from downtown is currently provided at Seneca and Columbia Streets, which are located in the middle of downtown. Transit access could be improved if access to and from SR 99 were provided south of downtown.
- **East-west access across SR 99** between Port/Duwamish industrial facilities, railyards, and the stadiums. This access is currently provided via at-grade connections at S. Atlantic Street and S. Royal Brougham Way and is often blocked by trains.

#### **4 How does this project fit in with the Alaskan Way Viaduct and Seawall Replacement Program?**

This project is one in a series of six independent safety and mobility projects underway to address earthquake vulnerabilities and improve and enhance mobility as part of the larger Alaskan Way Viaduct and Seawall Replacement Program. The larger Alaskan Way Viaduct and Seawall Replacement Program covers a variety of planned improvements in the SR 99 corridor located between S. Spokane Street and Roy Street.

Originally, replacing SR 99 between S. Holgate and S. King Streets was part of the evaluation of alternatives in the Draft and Supplemental Draft Environmental Impact Statements (EISs) for the Alaskan Way Viaduct and Seawall Replacement Project, which extended from S. Spokane Street to Roy Street. The 2004 Draft EIS evaluated the effects of five build alterna-

### **Additional Information**

There is a CD attached to the back cover of this document. This CD provides additional project information, including the *Transportation Discipline Report, Air Quality Discipline Report, Draft Section 4(f) Parts A, B, and C, Technical Memoranda, and Draft Memorandum of Agreement.*

tives. The 2006 Supplemental Draft EIS narrowed the number of build alternatives evaluated to two: the Elevated Structure Alternative and the Tunnel Alternative. On March 13, 2007, Seattle voters were asked to vote yes or no to the Elevated Structure Alternative and yes or no to a modified version of the Tunnel Alternative. Citizens voted “no” to both options.

As a result, Governor Christine Gregoire, Seattle Mayor Greg Nickels, and King County Executive Ron Sims held a post-vote press conference where they vowed to work collaboratively to find a solution for the central waterfront portion of the SR 99 corridor. In the press conference, they identified the six safety and mobility projects located in the SR 99 corridor that could be developed and constructed independently. These projects are to be built as soon as possible to provide direct benefits to the traveling public. The environmental effects of one of these safety projects, removing and replacing the SR 99 mainline between S. Holgate Street and S. King Street, is evaluated in this Environmental Assessment (EA).

## **5 What is the purpose of this Environmental Assessment?**

This EA is being prepared to:

- Evaluate the environmental effects of replacing the existing SR 99 mainline between S. Holgate Street and S. King Street.
- Inform and receive feedback from the public and decision makers about the environmental effects of the project.
- Determine whether effects are significant and require an EIS or if project effects can be sufficiently documented through a Finding of No Significant Impact (FONSI).

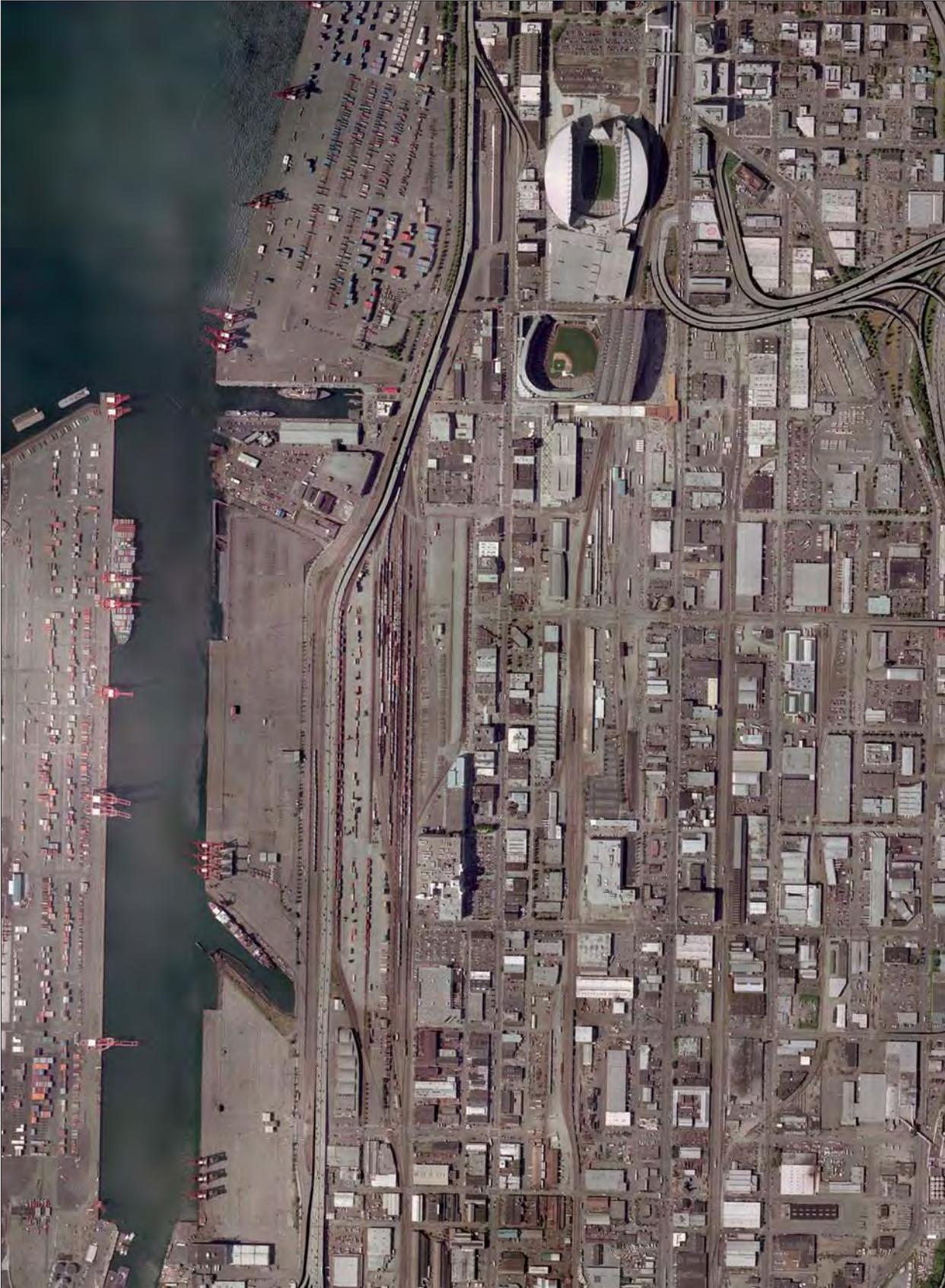
## **6 Who is leading this project?**

This project is being led by a partnership between the Federal Highway Administration (FHWA) and WSDOT. FHWA is involved because they are funding a portion of the project. As the federal lead agency for this project, FHWA has the primary responsibility for the content and accuracy of this National Environmental Policy Act (NEPA) EA.

Most of the project’s funding is being provided from state funds allocated to WSDOT. WSDOT owns SR 99 and is responsible for structural inspections and major maintenance. WSDOT is the lead for the State Environmental Policy Act (SEPA). For these reasons, WSDOT is a co-lead agency with FHWA.

The City of Seattle is involved as a cooperating agency for this project. The City is responsible for viaduct traffic operations and minor maintenance. The City also owns and maintains the E. Marginal Way S./Alaskan Way S. surface street, the area underneath the viaduct, and many of the utilities located in the project area. Additionally, the City is responsible for issuing several of the permits needed to construct the project.

### Project Area Overview



## CHAPTER 2 - ALTERNATIVES DEVELOPMENT

### What's in Chapter 2?

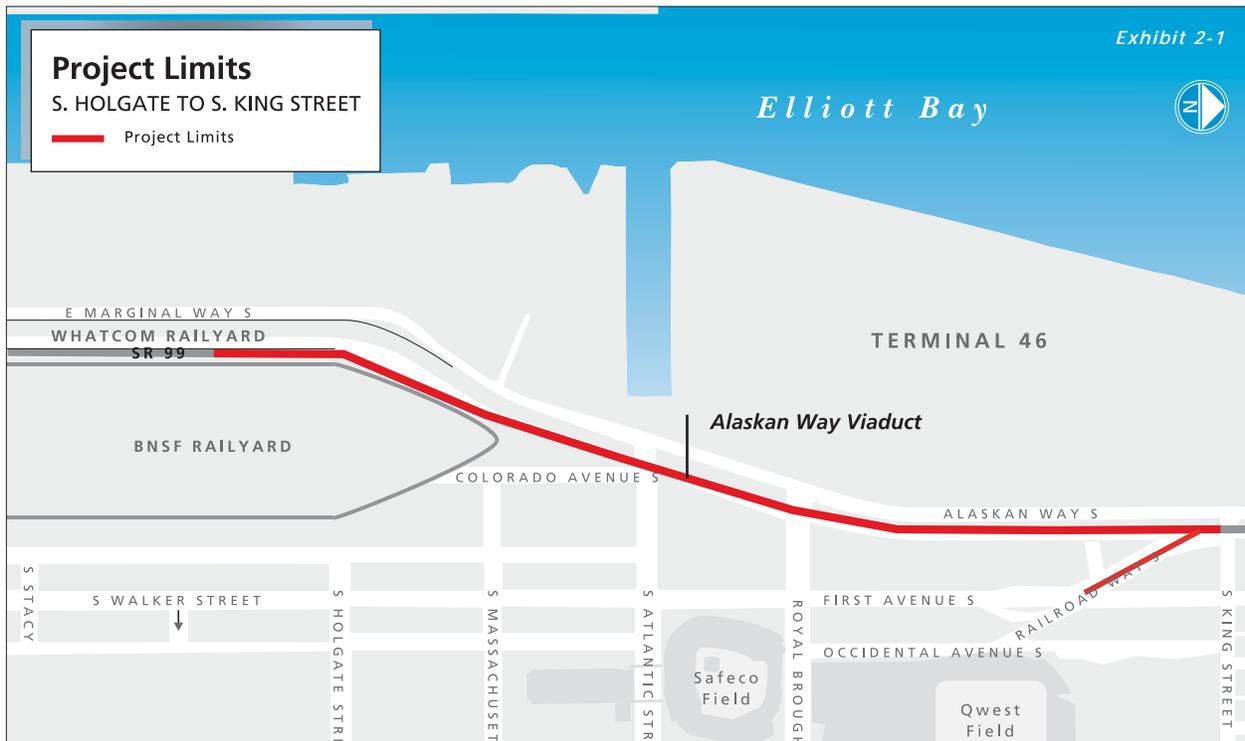
Chapter 2 identifies the project limits, identifies and briefly describes the alternatives evaluated in this EA, and explains how the alternatives were developed and how the public shaped these alternatives.

#### 1 What are the project limits and why were they selected?

The project limits are shown in Exhibit 2-1 and are defined as S. Walker Street in the south, which is just south of S. Holgate Street, and S. King Street in the north.

##### Southern Endpoint - S. Walker Street

S. Walker Street is defined as the southern endpoint to allow for the transition between the at-grade section of SR 99 and the seismically vulnerable, elevated roadway north of S. Holgate Street that needs to be replaced.



## Proposed Build Alternative



Exhibit 2-2

## Northern Endpoint – S. King Street

S. King Street was selected as the northern endpoint because there are unique transportation needs south of this point on SR 99 and Alaskan Way S. due to the mix of freight, rail, transit, commuter, event, bicycle, and pedestrian traffic. This section of SR 99 and Alaskan Way S. interacts with the Port of Seattle and is a vital international trade and transportation crossroads. Key transportation routes and connections for freight in this area are provided by I-5, I-90, SR 99, SR 519, Alaskan Way S., E. Marginal Way S., and one of the busiest railyards in the Pacific Northwest.

In addition, two sports stadiums and an event center are located adjacent to SR 99 in this area. On game days and during special events, thousands of people, vehicles, pedestrians, and buses are present. This area also serves traffic getting to the Seattle Ferry Terminal. Hundreds of cars use this section of the SR 99 corridor each day to access ferry service. In addition, this section of SR 99 supports transit to and from West Seattle and other areas south of downtown.

South of S. King Street, alternatives for SR 99 and Alaskan Way S. should support surrounding industrial, freight terminal, warehouse, and stadium-related land uses south of downtown, which are substantially different than land uses surrounding SR 99 north of S. King Street. North of S. King Street, surrounding land uses include a mix of commercial office space, retail, tourist and recreational waterfront, and residential areas.

## 2 What alternatives are evaluated in this EA?

Two alternatives are evaluated in this EA: the Build Alternative and the No Build Alternative.

### Build Alternative

The Build Alternative, shown in Exhibit 2-2, would replace the existing viaduct between S. Holgate Street and S. King Street with a safer facility that meets current seismic and roadway design standards. These improvements would replace approximately 40 percent of the existing viaduct structure located between S. Holgate Street and the Battery Street Tunnel.

Near S. Holgate Street, SR 99 would transition from an at-grade roadway to a side-by-side aerial roadway crossing over S. Atlantic Street and the BNSF tail track. SR 99 would return to grade for a short distance north of S. Royal Brougham

#### What is the tail track?

The tail track is a single railroad track that connects the BNSF Seattle International Gateway (SIG) Railyard on the east side of SR 99 to the Whatcom Railyard located west of SR 99. The tail track is used to assemble and sort railroad cars for both railyards.

Way. SR 99 would then transition to a stacked, aerial structure to match the existing viaduct at about S. King Street. Between S. Atlantic Street and S. King Street the northbound lanes of Alaskan Way S. would be routed along the east side of SR 99 and the southbound lanes would be along the west side of SR 99. As part of the design, S. Royal Brougham Way would no longer cross SR 99. S. Royal Brougham Way would be permanently closed between the new northbound and southbound Alaskan Way S. roads. A new northbound off-ramp and southbound on-ramp would be provided just south of S. King Street. The existing northbound on-ramp and southbound off-ramp at First Avenue S. near Railroad Way S. would be maintained.

New roadways and connections would be provided near S. Atlantic Street. These connections include:

- Providing a new grade-separated access for freight and general purpose traffic traveling between the Seattle International Gateway (SIG) Railyard, SR 519, the Port of Seattle, and the stadiums. This access would be provided by a new U-shaped undercrossing below SR 99 on the north side of S. Atlantic Street. This new connection would improve vehicle access by providing a route for east-west traffic when railroad cars on the tail track block the at-grade roadway.
- Improving Colorado Avenue S. to enhance access to the new North SIG Railyard. These improvements include providing two southbound and one northbound dedicated truck-only lanes on the west side of the street, and one general purpose traffic lane in each direction on the east side of the street.
- Providing northbound and southbound frontage roads that would provide access between Alaskan Way S. and E. Marginal Way S. In addition, the northbound frontage road would provide access from S. Atlantic Street to the new remote holding area for Seattle Ferry Terminal traffic and to Alaskan Way S.
- Reconfiguring the intersections where S. Atlantic Street meets the new Alaskan Way S. frontage roads, the new U-shaped undercrossing, and Colorado Avenue S.

### ***Rail***

The existing BNSF tail track would be relocated west of the new SR 99 roadway and would extend north from the SIG Railyard to the vicinity of S. King Street. The Whatcom lead track would also be relocated to connect to the relocated tail track so that railroad cars could be maneuvered between the

#### **What is the Whatcom lead track?**

The Whatcom lead track connects the Whatcom Railyard, which is located on the west side of SR 99, to the BNSF tail track.

Whatcom Railyard on the west side of SR 99 and the SIG Railyard on the east side of SR 99.

### ***Ferry Holding***

A remote ferry holding area would be added between S. Royal Brougham Way and S. King Street along the east side of SR 99. The ferry holding area would be accessed at the intersection of northbound Alaskan Way S. and S. Royal Brougham Way.

### ***Bicycle and Pedestrian Facilities***

Existing bicycle and pedestrian access would be maintained or improved as part of this project. Detailed information about changes to bicycle and pedestrian facilities is provided in Chapter 3.

### **No Build Alternative**

If no action is taken, the Governor has indicated that the viaduct should be torn down in 2012 to protect public safety. For purposes of providing a comparison between the proposed Build Alternative and the No Build Alternative, we have assumed that the existing viaduct between S. Holgate and S. King Streets would continue to remain in operation with routine maintenance until WSDOT determines the structure is too unsafe to use, possibly as early as 2012.

### **3 How long would it take to build the project?**

The project is expected to take approximately 4 years and 4 months to build and cost approximately \$550 million. During the first 8 months, early utility relocations would take place prior to the major construction stages. The major construction stages are expected to take 3 years and 2 months. The final 6 months of construction would involve surface restoration in the project area.

Construction activities are expected to affect traffic on SR 99 for 2 years and 3 months. Construction would typically take place 5 days per week, 10 hours per day, but may occur up to 24 hours per day, 7 days per week at times. Construction over and above the typical 50-hour work week would only occur when needed to keep the project on schedule. Some night or weekend work may be required for roadway crossings, tail track relocation, or other critical construction phases.

During construction, WSDOT would make it a priority to maintain traffic capacity on SR 99 as much as possible, minimize traffic effects on First Avenue S. and other local streets,

#### **What is remote ferry holding?**

Remote ferry holding is an area where vehicles would wait to enter the Seattle Ferry Terminal when the dock is full. Typically, remote ferry holding is needed during the peak summer season and on holidays.

and maintain access to and from area businesses and the stadiums. Details about construction effects are provided in Chapter 4.

#### 4 How was the Build Alternative developed?

Many different viaduct replacement concepts have been considered since the February 2001 Nisqually earthquake demonstrated the need to replace the viaduct structure north of S. Holgate Street. This discussion summarizes WSDOT, FHWA, and the City of Seattle’s work over the past several years to develop, evaluate, and refine various south end design concepts for the Build Alternative evaluated in this EA.

##### South End Design Development, 2001 through 2004

Between 2001 and 2004, we worked with the public and multiple stakeholders, including King County, the Port of Seattle, the U.S. Coast Guard, the freight community, BNSF and Union Pacific Railroads, the stadiums, a volunteer community leadership group, and resource agencies, to identify and develop desirable design concepts to evaluate. This effort was documented in the *Final Revised Screening of Design Concepts, June 2003*<sup>1</sup> and *SR 99: Alaskan Way Viaduct and Seawall Replacement Project Draft EIS, March 2004*<sup>2</sup>, which are incorporated by reference into this EA.

<sup>1</sup>Parametrix 2003

<sup>2</sup>WSDOT et al. 2004

A total of 76 concepts were considered for replacing SR 99 between S. Spokane Street and Roy Street. We considered several different possible structure types for replacing the viaduct (such as tunnels, elevated structures, and at-grade roadways). We also considered concepts such as retrofitting the existing viaduct, or tearing it down and replacing it with a new roadway in a different location (such as a tunnel under Fourth Avenue or a bridge in Elliott Bay) or making improvements to other roadways such as I-5.

As part of this screening effort and subsequent studies that have followed, we determined that options such as replacing the viaduct with a new roadway alignment outside the existing corridor or retrofitting it are not feasible. A new roadway alignment is problematic because very little land is available for a new highway corridor through Seattle. Studies of various retrofitting concepts over the years have shown that a retrofit would fail to provide a cost-effective, long-term solution that adequately addresses the weakened state of the existing structure. Furthermore, replacing the viaduct is superior to retro-

fitting it when seismic performance, aesthetics, cost, and risk are balanced<sup>3</sup>.

<sup>3</sup>Parsons Brinckerhoff 2002 and 2003

In addition to a new alignment or retrofit, we considered three possible structure types to replace the existing viaduct: another elevated structure, an at-grade roadway, or a tunnel. We concluded that an elevated structure or at-grade roadway would be feasible replacement options in the south end, but that replacing the south end viaduct with a tunnel was not feasible due to poor soil conditions.

In addition to structure types, we considered a wide range of concepts that could improve SR 99 south of S. King Street. These concepts included ideas such as:

- Providing additional ramps to improve connections between SR 99 and S. Spokane Street, the West Seattle Bridge, the stadiums, Sixth Avenue S., Fourth Avenue S., S. Hanford Street, and Airport Way S.
- Extending the SR 99 grade-separated roadway to the First Avenue S. Bridge.
- Adding an SR 99 grade-separated access between S. Spokane and S. Atlantic Streets.
- Adding a remote ferry holding area for Seattle Ferry Terminal traffic.
- Improving pedestrian and bicycle conditions and connections.

Most of the concepts above were dropped from further consideration because they were not directly related to the purpose of the project, which focuses on improving seismic stability and maintaining or improving roadway capacity. Furthermore, the ideas that were dropped (such as adding ramps to S. Hanford Street) would not be precluded by viaduct replacement concepts considered in the south end, meaning that these ideas could be considered and pursued in the future once the viaduct is replaced. A few concepts were advanced for further study, including:

- Improving access near the stadium area.
- Improving connections between SR 99 and SR 519.
- Adding a remote ferry holding area.
- Improving pedestrian and bicycle conditions and connections.

These concepts were advanced and reflected in the four south end designs evaluated in the *SR 99: Alaskan Way Viaduct and Seawall Replacement Project Draft EIS*, which evaluated effects of the following replacement designs:

## SR 99 South End – Draft EIS Design

SR 99 At-Grade with SR 519 Interchange Elevated



Exhibit 2-3

- SR 99 At-Grade with SR 519 Interchange Elevated** – Replace the viaduct with a side-by-side at-grade roadway and a full aerial interchange connecting to SR 519 at S. Atlantic Street and S. Royal Brougham Way. This design was the most common design in the Draft EIS, evaluated with three of the five alternatives, and is shown in Exhibit 2-3.
- SR 99 Stacked Aerial with SR 519 Interchange At-Grade** – Replace the viaduct with a stacked aerial roadway and a full at-grade interchange connecting to SR 519 at S. Atlantic Street and S. Royal Brougham Way.
- SR 99 Side-by-Side Aerial with SR 519 Interchange At-Grade** – Replace the viaduct with a side-by-side aerial roadway and a full at-grade interchange connecting to SR 519 at S. Atlantic Street and S. Royal Brougham Way.
- SR 99 At-Grade with SR 519 Interchange At-Grade** – Replace the viaduct with a side-by-side at-grade roadway and a full at-grade interchange connecting to SR 519 at S. Atlantic Street and S. Royal Brougham Way.

The analysis completed for the four designs evaluated in the 2004 Draft EIS indicated that substantial effects were associated with these designs. Specifically, all four of the designs

would have required extensive property acquisitions on important industrial properties such as Terminal 46. Furthermore, all of the designs assumed that the Whatcom Railyard would be closed for several years during construction, which was determined to be an unacceptable and unmitigatable project effect.

**South End Designs Developed and Evaluated in the 2006 Supplemental Draft EIS**

The four designs evaluated in the 2004 Draft EIS were refined into two designs evaluated in the 2006 *SR 99: Alaskan Way Viaduct and Seawall Replacement Project Supplemental Draft EIS*<sup>4</sup>. The two designs evaluated in the 2006 Supplemental Draft EIS were called:

<sup>4</sup>WSDOT et al. 2006

- **SR 99 At-Grade with a Reconfigured Whatcom Railyard**, which was the preferred south end design at the time, and is shown in Exhibit 2-4.
- **SR 99 At-Grade with a Relocated Whatcom Railyard**.

The designs evaluated in the 2006 Supplemental Draft EIS had fewer adverse effects than the 2004 Draft EIS designs.

**SR 99 South End – Supplemental Draft EIS Design**

*SR 99 At-Grade with Reconfigured Whatcom Railyard*

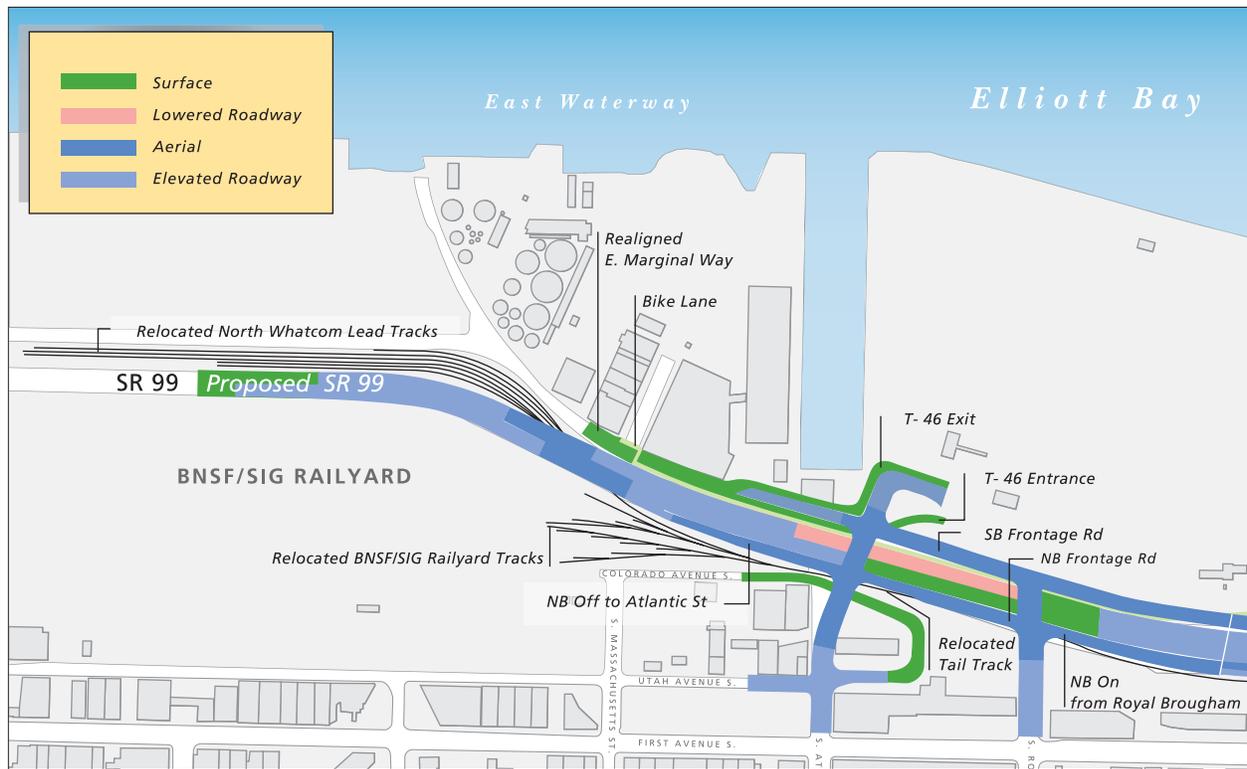


Exhibit 2-4

Specifically, they required fewer property acquisitions. They were also less expensive, but provided the same functions and ramp connections provided by the 2004 Draft EIS designs. Finally, the designs could be built without closing the Whatcom Railyard for several years, but would require closing SR 99 entirely or detouring traffic down First Avenue S. for about 2 years.

### **South End Supplemental Draft EIS Designs Refined**

In late 2005 through mid-2007, we convened an engineering study and design team to continue work to reduce the proposed size and cost of the designs evaluated in the 2006 Supplemental Draft EIS. This led to the development of ten additional south end designs and variations that were examined and documented in the *SR 99 South End Alignment Study*<sup>5</sup>, which is incorporated by reference into this EA. The ten designs were screened to one design, called 10C.

<sup>5</sup> Parsons Brinckerhoff, Quade, & Douglas, Inc. and Jacobs Civil Inc. 2006

In April 2007, it became clear that a decision on the central waterfront portion of SR 99 would not be reached soon, although the entire viaduct structure still needed to be replaced.

Beginning in May 2007, we worked to refine the 10C design to be consistent with a wide variety of potentially feasible viaduct replacement concepts in the central waterfront area north of S. King Street. This effort led to the evaluation of six new designs, including a modified version of the 10C design from 2006. These six designs were evaluated and documented in a July 2007 report called the *Alaskan Way Viaduct Removal Project South Holgate Street to South King Street Concept Planning Study Memorandum*<sup>6</sup>, which is incorporated by reference into this EA. The costs associated with building each of the concepts were similar, but ultimately the design selected was called Option 6, and it is the design evaluated as the Build Alternative in this EA. Option 6 was selected as the recommended design because, compared to the other designs, it:

<sup>6</sup> PB Americas and Jacobs Civil Inc. 2007

- Further reduces effects to adjacent properties.
- Offers the most flexibility for tying in to a wide range of reasonably foreseeable viaduct replacement options in the central waterfront.
- Reduces visual effects and offers the greatest opportunities for creating an aesthetically pleasing urban design with the surrounding area.
- Offers improvements to freight mobility.
- Provides good access to and from downtown via SR 99.

## 5 How has the public been involved?

The public has been provided with multiple opportunities to learn about the Alaskan Way Viaduct and Seawall Replacement Program since it began in 2001. Our public involvement efforts associated with the larger program are documented in the 2004 Draft EIS, 2006 Supplemental Draft EIS, and the program website.

Since the 2006 Supplemental Draft EIS was published, we have provided many opportunities for people to learn about the project and ask questions:

- We hosted an open house in Pioneer Square on August 22, 2007. About 75 people attended the open house. The purpose of the open house was to provide information about upcoming construction to stabilize a section of the viaduct that was damaged in the 2001 Nisqually earthquake. The open house didn't focus on the S. Holgate Street to S. King Street Viaduct Replacement Project, but it highlighted the project because of its proximity to Pioneer Square.
- We hosted two public scoping meetings that took place on September 24 and September 26, 2007. Combined attendance for the two events was approximately 110 people. The purpose of the meetings was to gather public comments on environmental issues that should be considered in this EA and to show proposed design plans for the project. Comments were received via paper surveys, a Web-based survey, public testimony, or submitted as letters/handwritten items. A total of 59 comment items were received, including seven agency letters, three letters from businesses, 20 testimonies, and 29 citizens' submittals. A summary of scoping comments received is contained in Question 8 of this chapter.
- We provided project briefings at 57 community meetings between March and December 2007. These briefings were presented to various stakeholders, including neighborhood groups, businesses, organizations, and interest groups.
- We attended 27 community fairs and festivals between March and December 2007, where we passed out updated project information and answered questions.
- We have continued to provide updated project information on our program website, via email messages, through brochures and fact sheets, and via telephone from our project information line. Many brochures and fact sheets have been translated into languages other than English to reach a larger audience.

### Where can I learn more about the project and comment on this EA?

There are several ways you can learn more about the project and submit your comments on this document:

#### Attend Public Hearings

You are invited to attend the hearings listed below:

##### *Town Hall*

Thursday, July 10, 2008  
1119 8<sup>TH</sup> Avenue, Seattle, WA 98101  
4:00 - 7:00 p.m.

##### *Madison Middle School*

Tuesday, July 15, 2008  
3429 45<sup>TH</sup> Avenue SW, Seattle WA 98116  
5:00 - 8:00 p.m.

#### Submit Comments

You may submit your comments on this document by email or in writing.

#### E-mail

southviaductEA@wsdot.wa.gov

#### In Writing

**Angela Freudenstein**  
**WSDOT**  
**999 Third Avenue, Suite 2424**  
**Seattle, WA 98104-4019**

Your comments on the EA must be post-marked by August 11, 2008.

### **How have we been engaging low-income people, minorities, social service providers, and minority-owned businesses?**

We have been working with social service organizations that provide information to minority and low-income people in and near the project area. Outreach to these groups is part of an ongoing effort that began in 2002.

Since March 2007, we have met with eight social service organizations located in or near the project area. The purpose of the meetings has been to discuss the project and potential effects, learn about the organizations and the groups they serve, and identify ways to keep low-income and minority populations informed and engaged in the project. In these meetings, many service providers have indicated that they are most concerned about construction effects to traffic and public transportation.

Other examples of our coordination with these groups include leading community briefings, providing project information in languages other than English, attending fairs and festivals, and targeting outreach efforts to small and/or minority-owned businesses. On September 10, 2007, we held a briefing for the community at the monthly International District Forum. People representing various small and/or minority-owned businesses and community organizations located in the International District attended this meeting. At this briefing, we shared information about the S. Holgate Street to S. King Street Viaduct Replacement Project, answered questions, and listened to concerns voiced mostly about potential construction effects. On September 27, 2007, we also held a briefing for service providers in and around the downtown area to engage them in early conversations on how to best protect the well-being and safety of the homeless population in the project area when construction begins.

### **6 How have government agencies been involved?**

We continue to proactively involve several agencies and project area organizations in ongoing discussions about the project. On September 24, 2007, we hosted an EA scoping meeting to gather information from agencies, organizations, and tribes on what environmental issues they think should be considered in this EA. Approximately 15 agencies and organizations participated, and many of them submitted formal scoping comments. A summary of comments received as part

#### **Why do we target outreach efforts and seek input from minority and low-income populations?**

A federal executive order issued in 1994 requires federal agencies to provide affected minority and low-income populations opportunities to be involved in projects. The executive order also requires federal agencies to make sure projects do not disproportionately affect these traditionally underserved groups.

of that scoping meeting is provided in Question 8 of this chapter.

In addition, we have ongoing discussions with several agencies and organizations in the project area, such as various departments within King County and the City of Seattle, BNSF, Union Pacific Railroad, the Port of Seattle, and the U.S. Coast Guard, to discuss project effects and help our team refine the project design to minimize effects.

## **7 How have tribal governments been involved?**

We understand that the project area has cultural and historic significance for local tribes. We seek to address the concerns of tribal nations using the process outlined in Section 106 of the National Historic Preservation Act and the WSDOT Tribal Consultation Policy adopted in 2003 by the Transportation Commission as part of the WSDOT Centennial Accord Plan<sup>7</sup>.

<sup>7</sup>WSDOT 2003

Section 106 requires federal agencies to consult with tribes where projects could affect tribal areas with historic or cultural significance. As such, we are consulting with tribes that have active cultural interests in the project area. These tribes are the Muckleshoot Indian Tribe, Snoqualmie Indian Tribe, Suquamish Tribe, Tulalip Tribes, and the Confederated Bands and Tribes of the Yakama Nation. We also coordinated with the Duwamish Tribe.

Since publication of the 2006 Supplemental Draft EIS, we have continued to communicate with tribes by providing project updates, coordinating and attending meetings, and soliciting feedback. We will continue to meet with the tribes throughout project development to provide project updates and consult per Section 106.

In addition to tribal consultation and coordination, the project team has conducted archaeological studies of the area to better understand where cultural sites or sensitive cultural resources may be located. As part of this work, we have used historical accounts and geotechnical information to identify high probability areas where archaeological resources may be located. The purpose of this work is to develop measures to avoid or minimize potential effects to archaeological resources before construction begins. We will use the information gathered from these studies as we work with the tribes and the Washington State Department of Archaeology and Historic Preservation (DAHP) to develop a monitoring and treatment plan for properly addressing any inadvertent discoveries

### **Section 4(f)**

The Draft Section 4(f) Evaluation is included in this EA following Chapter 4.

found during construction. A Memorandum of Agreement will be made with the appropriate agencies. Any archaeological site encountered during construction that is historically significant would be subject to Section 4(f) provisions, unless it is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

## 8 What issues were identified as part of scoping?

As part of project scoping for this EA, we received a variety of comments from:

- 7 government agencies.
- 3 businesses.
- 49 individual citizens.

The purpose of the scoping process is to provide interested members of the public with an opportunity to provide input on the analysis and information presented in this EA. Information and comments gathered during project scoping were used to shape the environmental analysis and information contained in this EA. A wide variety of comments were received during scoping. Many reoccurring themes and questions were echoed by the commenters and are summarized below:

- **Alternatives Development** – How was the proposed Build Alternative developed and what other options were considered and screened? This topic is discussed throughout this chapter and is specifically addressed in Question 4.
- **Climate Change** – How is the project assessing potential effects related to greenhouse gas emissions? Greenhouse gas emissions are discussed in Chapter 3, Question 7.
- **Cumulative Construction Effects** – What are cumulative construction effects of this project and other planned projects such as SR 519 in the nearby area? How would general purpose traffic, transit, freight, bicyclists, and pedestrians be affected? What mitigation is planned? Cumulative construction effects and proposed mitigation are discussed in Chapter 4, Question 14.
- **Cumulative Operational Effects** – Once this project and others in the area are built, what are expected cumulative effects as they relate to land use and transportation for general purpose traffic, transit, freight, bicyclists, and pedestrians? Cumulative operational effects are discussed in Chapter 3, Question 8.

## **9 Are there any controversial issues?**

### **Does the design for this project restrict alternatives that can be considered to replace SR 99 along the central waterfront?**

Some people have expressed concern that the design for this project might restrict alternatives that can be considered along the central waterfront. The design for the S. Holgate Street to S. King Street Viaduct Replacement Project does not restrict the range of alternatives that are feasible for replacing SR 99 along Seattle's central waterfront. The proposed roadway design can connect to any number of transportation solutions in the central waterfront, including a surface street, a new elevated structure, or a tunnel.

### **How much traffic congestion would be caused by construction?**

Many people have expressed concern about traffic congestion during construction, particularly along First Avenue S. Construction traffic effects are discussed in Chapter 4 of this EA. As discussed in Chapter 4, people traveling in and through the area would be affected by increased congestion during construction. However, it is important to note that these effects are expected to be short-term. Southbound SR 99 would be detoured for 6 months during Stage 2, and both directions of SR 99 would be detoured for 8 months during Stage 3. Furthermore, WSDOT has dedicated up to \$125 million to a variety of mitigation projects and efforts that will keep people and vehicles moving in, around, and through the area during construction of this project and other elements of the Alaskan Way Viaduct and Seawall Replacement Program. During construction, we plan to minimize disruption to the extent feasible by making it a priority to maintain traffic capacity on SR 99 as much as possible, minimizing traffic effects to First Avenue S., and maintaining access to and from area businesses and the stadiums.

### Proposed Build Alternative



## CHAPTER 3 - PERMANENT EFFECTS & MITIGATION

### *What's in Chapter 3?*

*Chapter 3 identifies permanent project effects and proposed mitigation. Only affected elements of the environment are discussed. Energy, fisheries, wildlife, habitat, hazardous materials, and cultural resources will not be permanently affected by the project and are therefore not discussed in this chapter.*

#### **1 How would the project change access for vehicles, transit, and freight?**

##### **How would vehicle access change?**

The project would change access as shown in Exhibit 3-1 by improving connections to local streets and SR 519 by:

- Building an undercrossing to eliminate vehicle and rail conflicts near S. Atlantic Street.
- Adding an SR 99 southbound on-ramp and northbound off-ramp near S. King Street.
- Providing new frontage roads.
- Improving Colorado Avenue S.
- Reconfiguring intersections along S. Atlantic Street between Alaskan Way S. and Utah Avenue S.

##### ***New Undercrossing***

A new undercrossing would be built just north of S. Atlantic Street to carry traffic underneath the tail track when trains block S. Atlantic Street. While primarily designed for freight, the undercrossing would be open to all vehicles. Due to the location of the undercrossing, S. Royal Brougham Way would be permanently closed under SR 99 east of Alaskan Way S. Also, when the undercrossing is occupied, southbound traffic on Alaskan Way S. wanting to continue to E. Marginal Way S. would need to divert to First Avenue S. at S. Atlantic Street and reach E. Marginal Way S. via S. Hanford Street.

##### ***New Ramps Near S. King Street***

The new SR 99 ramps near S. King Street would improve access for vehicles traveling on SR 99 to or from downtown. The ramps would provide another option for travelers on

##### **What is the tail track?**

The tail track is a single railroad track that connects the BNSF Seattle International Gateway (SIG) Railyard on the east side of SR 99 to the Whatcom Railyard located west of SR 99. The tail track is used to assemble and sort railroad cars for both railyards.

SR 99 to enter or exit the south and central downtown areas, reducing demand for the Columbia and Seneca Street ramps.

### ***Frontage Roads***

Northbound and southbound frontage roads would be built parallel to SR 99 to provide access between Alaskan Way S. and E. Marginal Way S. The northbound frontage road would also provide vehicle holding for ferry traffic bound for the Seattle Ferry Terminal.

### ***Improving Colorado Avenue S.***

Colorado Avenue S. south of S. Atlantic Street would be improved to separate freight and vehicle traffic. The changes to Colorado Avenue S. are intended to provide a clear and reliable freight path while also continuing to preserve access to adjacent properties.

### ***Reconfigured Intersections along S. Atlantic Street***

S. Atlantic Street would be improved between Alaskan Way S. and Utah Avenue S. Reconfigured intersections on S. Atlantic Street would be located at the new U-shaped undercrossing, new Alaskan Way S. frontage roads, Colorado Avenue S., and Utah Avenue S.

### **How would vehicle access to the ferry terminal change?**

Access to the Seattle Ferry Terminal at Colman Dock would be provided from northbound Alaskan Way S. Vehicles traveling west on S. Royal Brougham Way or S. Atlantic Street would travel on a northbound Alaskan Way S. frontage road that would connect to two-way Alaskan Way S. near S. King Street. SR 99 traffic heading to or from the Seattle Ferry Terminal would be able to access the ferry via the new ramps near S. King Street. Ferry traffic would continue north to Yesler Way and enter the terminal, except during peak periods when overflow traffic is held in a new remote holding area.

The new remote holding area will be located along the east side of SR 99 between S. Royal Brougham Way and S. King Street. Access to ferry holding would be provided via the northbound Alaskan Way S. frontage road and would connect to two-way Alaskan Way S. near S. King Street at a signalized intersection. Ferry traffic would share Alaskan Way S. with general purpose traffic as it does today.

Access would not change for vehicles heading north after leaving the Seattle Ferry Terminal. The signal at Alaskan Way and

Yesler Way would be timed to allocate for ferry traffic exiting the terminal.

### **How would transit access change?**

The project would provide additional access for transit to both the south and central downtown areas via the new ramps near S. King Street. Buses traveling to and from the south via SR 99 currently enter and exit downtown using the ramps at Seneca and Columbia Streets. The new ramps would provide an option for these routes to instead access downtown farther south near S. King Street.

King County Metro Transit may or may not choose to adjust routes to use the new ramps. If Metro does decide to adjust routes, transit coverage could be expanded to include a larger portion of the downtown area, particularly the Pioneer Square area. Bus travel times to most areas would remain similar to the No Build Alternative, depending on the rider's final destination. Bus travel times to areas near Pioneer Square could decrease, though travel times for riders bound for areas toward the north end of downtown might increase because buses would enter downtown farther south.

### **How would freight access change?**

The project would improve freight connections, particularly between Terminal 46, the SIG Railyard, and SR 519, which connects with I-90 and I-5. The new northbound and southbound ramps near S. King Street would provide improved access; however, an even bigger improvement for freight would be the addition of the undercrossing just north of S. Atlantic Street. The U-shaped undercrossing would allow freight traffic to travel to areas east and west of the tail track when it is occupied. This would improve traffic operations affected by vehicle and rail conflicts compared to existing conditions.

Freight trucks heading north on E. Marginal Way S. would have a freight-only connection to Colorado Avenue S. that would lead directly to the SIG Railyard. This would be an improvement for both freight and general purpose traffic traveling on Colorado Avenue S., because freight and general purpose traffic would be separated.

### **How would railroad access change?**

Rail operations would remain similar to today. The project would relocate the tail track to the west of its current location.

#### **What is the 2030 No Build Alternative?**

We know it is highly unlikely that the viaduct would remain operational until 2030. However, we studied what traffic would be like if the existing facility were operational in 2030 because it provides a baseline that can be compared with traffic conditions for the proposed Build Alternative.

The 2030 No Build Alternative takes into account future population growth and other funded transportation projects, such as the SR 519 Intermodal Access Project Phase 2.

#### **Why are freight connections and movements important considerations?**

SR 99, Alaskan Way S., and E. Marginal Way S. are important freight routes that provide direct access to the Port of Seattle and the Duwamish Manufacturing and Industrial Center, which is a major hub for international and interstate freight in the Puget Sound region.

## Bicycle and Pedestrian Facilities



Exhibit 3-2

The track would extend north from the SIG Railyard to the vicinity of S. King Street.

### How would access change for bicyclists and pedestrians?

Bicycle and pedestrian facilities would be improved in several locations. Shared-use bicycle and pedestrian facilities are shown in Exhibit 3-2. Exhibit 3-3 shows what the design of the facility could look like on the east side of SR 99 between S. Royal Brougham Way and Railroad Way S. Bike lanes would be widened on Alaskan Way S., E. Marginal Way S., and S. Atlantic Street and would be added on the northbound and southbound Alaskan Way S. frontage roads. These facilities provide a link for bicycles and pedestrians between West Seattle and downtown Seattle, and between the Seattle waterfront and the Mountains to Sound Greenway Trail.

Facilities between S. Holgate Street and S. Atlantic Street would include a 5-foot-wide bike lane on both sides of E. Marginal Way S./Alaskan Way S. A minimum 8-foot-wide sidewalk would also be provided for pedestrians on the west side of the street.

Between S. Atlantic Street and S. Royal Brougham Way, 5 foot-wide bike lanes and shared-use paths would be provided on both northbound and southbound Alaskan Way S. The bike lane and shared-use path on the northbound Alaskan Way S. frontage road would cross under SR 99 and connect to the existing shared-use path on the east side of Alaskan Way S. near S. King Street.

Bicycles and pedestrians traveling east and west on S. Atlantic Street would be able to use an 8-foot-wide sidewalk in the new undercrossing just north of S. Atlantic Street to connect between the stadium area and the waterfront while the tail track is occupied. The undercrossing would be almost four city blocks in length, or about 1,100 feet.

As part of the Mountains to Sound Greenway Trail, a 10- to 12-foot-wide bicycle and pedestrian path would be added to the north side of S. Atlantic Street between First Avenue S. and Alaskan Way S. Connecting to the Mountains to Sound Greenway Trail will ultimately provide access to this larger trail system, which will cross I-90 to locations east of Seattle.

## Design for Bike/Pedestrian Facility

ROMA Design Group

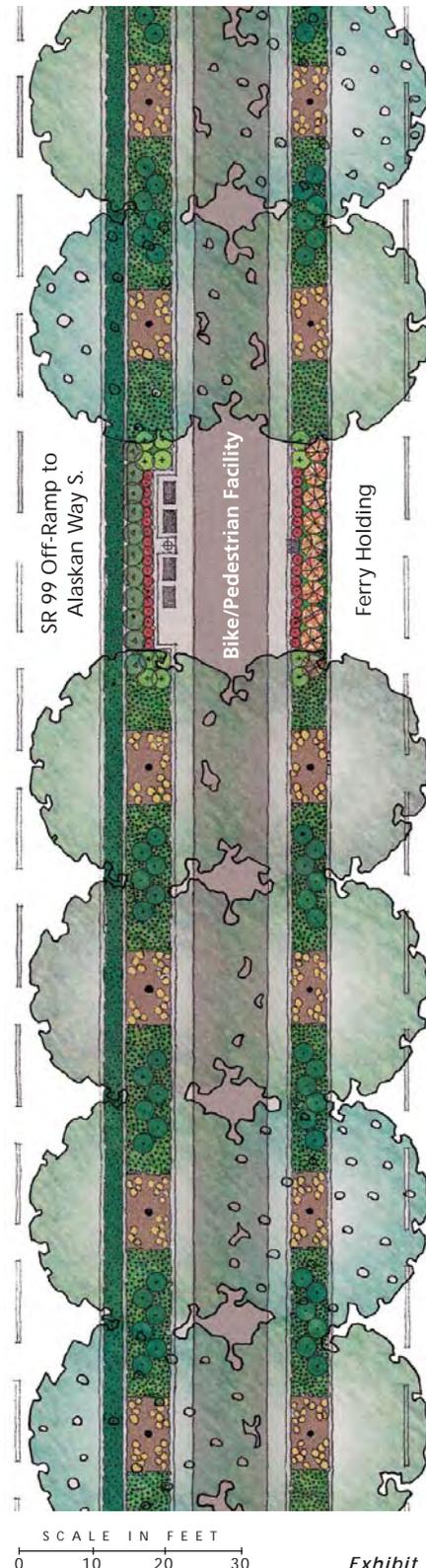


Exhibit 3-3

### How would access to the stadiums and event center change?

New on- and off-ramps to SR 99 would be provided near S. King Street in addition to the existing SR 99 on- and off-ramps on First Avenue S. at Railroad Way S. This would improve vehicle access in the stadium area.

### 2 How would the project affect traffic?

#### How would traffic patterns and volumes on SR 99 change with the project?

Mainline SR 99 and ramp volumes in the project area would change with the project, due to the addition of new ramps

### 2030 No Build Alternative

SR 99 MAINLINE VOLUMES  
AM/PM Peak

RAMP VOLUMES  
AM/PM Peak

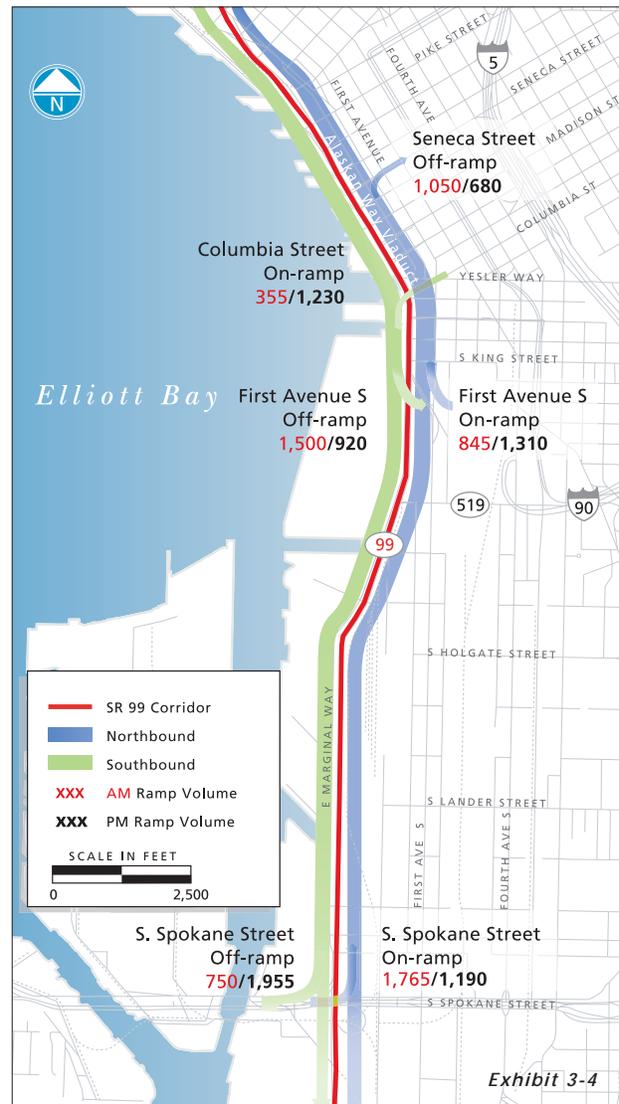
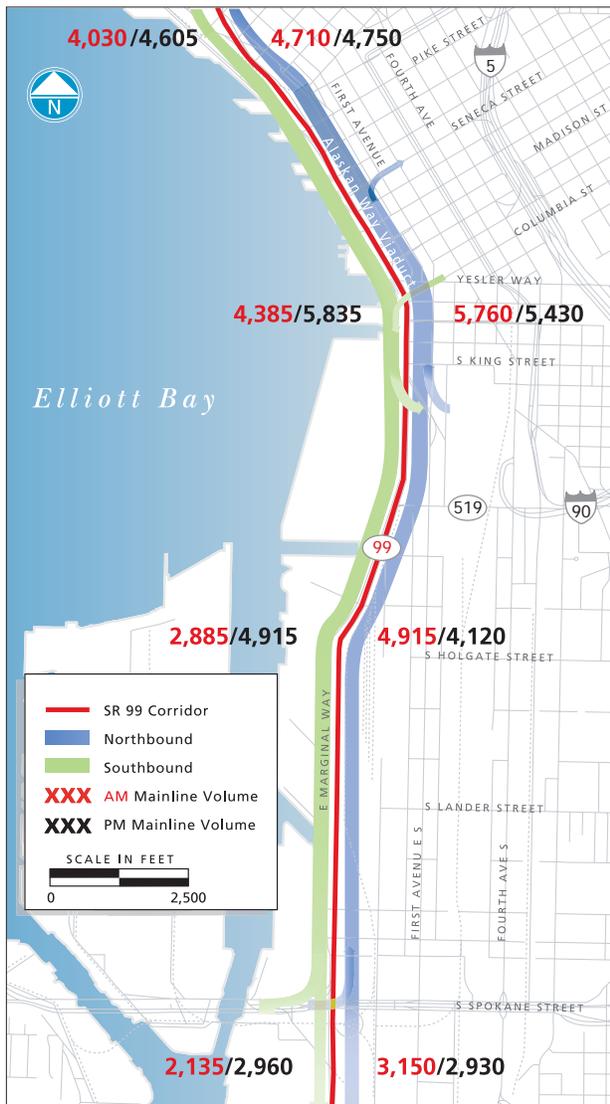


Exhibit 3-4

near S. King Street. These new ramps would improve downtown access for vehicles traveling to or from locations south of downtown Seattle, such as West Seattle. Traffic volumes at the Columbia and Seneca Street ramps would decrease because drivers traveling to or from downtown could exit closer to their destinations. For example, for the 2030 Build Alternative, ramp volumes during the PM peak period at Seneca Street and Columbia Street are expected to decrease by 10 percent and 15 percent, respectively, as shown in Exhibits 3-4 and 3-5.

**What are the AM and PM peak hours?**

The AM and PM peak hours are the periods when traffic is heaviest during the morning and late afternoon commutes. On SR 99, the AM peak hour occurs from 8:00 to 9:00 a.m. and the PM peak hour occurs from 5:00 to 6:00 p.m.

In addition, north of the S. King Street ramps, mainline SR 99 traffic volumes with the Build Alternative are expected to be

### 2030 Build Alternative

SR 99 MAINLINE VOLUMES  
AM/PM Peak

RAMP VOLUMES  
AM/PM Peak

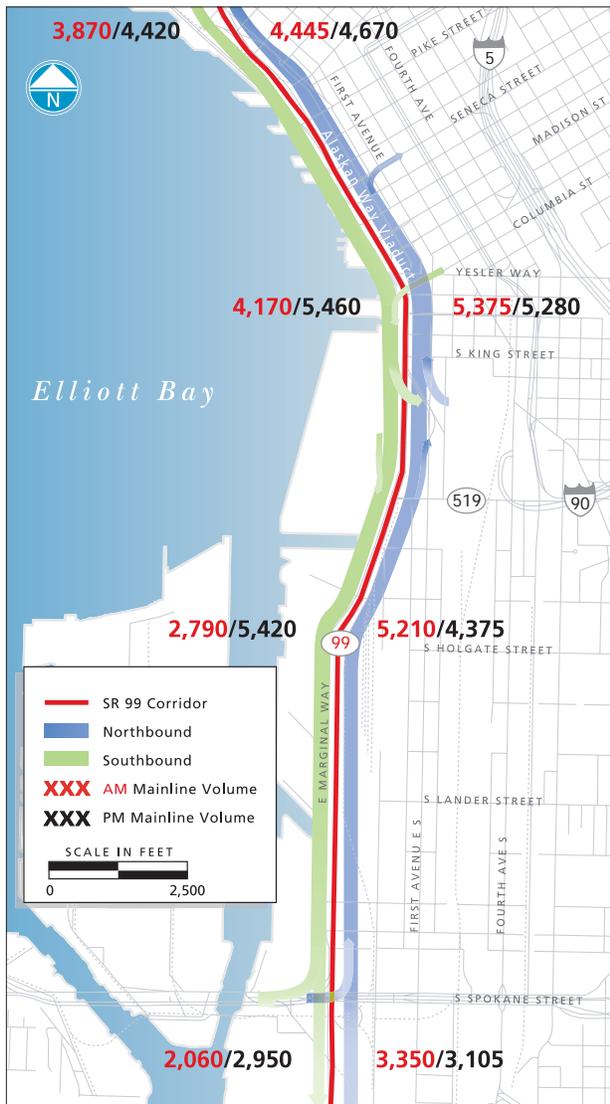


Exhibit 3-5

lower than for the No Build Alternative because some of the traffic that currently uses the Seneca and Columbia ramps to access downtown would divert to the new ramps at S. King Street. In the PM peak hour for the 2030 Build Alternative, northbound traffic north of S. King Street is estimated to decrease by 5 percent, and southbound traffic is estimated to decrease by 10 percent.

Mainline SR 99 volumes in the south end of the project area are expected to increase because the new ramps near S. King Street would likely attract additional traffic away from parallel arterial routes such as First and Fourth Avenues S. In the PM peak hour for the 2030 Build Alternative, northbound traffic south of S. King Street is estimated to increase by about 5 percent, and southbound traffic is estimated to increase by 10 percent.

In addition, the Build Alternative provides a new undercrossing that would allow traffic to avoid vehicle delays caused when the BNSF tail track is occupied. SR 99 mainline and ramp operations would not be noticeably affected when the tail track is occupied and vehicles are using the undercrossing.

The trends described above for the 2030 Build Alternative are similar for the year 2012, when construction is completed and the Build Alternative is expected to be fully operational. The main difference is that traffic volumes are expected to be lower than in the year 2030.

**How would travel speeds change on SR 99?**

Expected travel speeds north and south of S. King Street for both the 2030 No Build and Build Alternatives are shown in Exhibits 3-6 and 3-7.

*Exhibit 3-6*

**SR 99 AM Peak Hour Speeds**

*Shown as miles per hour (mph)*

	<b>2030 No Build Alternative</b>	<b>2030 Build Alternative</b>
<b>SOUTHBOUND</b>		
North of Stadium Area	40	40
South of Stadium Area	50	45
<b>NORTHBOUND</b>		
South of Stadium Area	50	40
North of Stadium Area	40	40

*Exhibit 3-7***SR 99 PM Peak Hour Speeds***Shown as miles per hour (mph)*

	2030 No Build Alternative	2030 Build Alternative
<b>SOUTHBOUND</b>		
North of Stadium Area	30	40
South of Stadium Area	45	40
<b>NORTHBOUND</b>		
South of Stadium Area	50	45
North of Stadium Area	20	40

North of the stadium area, travel speeds are expected to be similar during the AM peak hour and are expected to improve during the PM peak hour. SR 99 traffic volumes north of the stadium area would be lower because of the new ramps located near S. King Street. The new ramps would help to improve traffic flow, especially in the northbound direction during the PM peak hour, when most traffic is using SR 99 to leave downtown.

South of the stadium area, travel speeds on SR 99 are forecasted to decrease during both the AM and PM peak hours due to increased traffic volumes. The traffic volumes would be higher because the new ramps near S. King Street would improve access and draw traffic that currently uses E. Marginal Way S. and First Avenue S. Additional vehicles that would otherwise use parallel arterial routes such as First and Fourth Avenues S. are also expected to use the SR 99 mainline to reach their destinations.

The trends described above for the 2030 Build Alternative are similar for the year 2012, when construction is completed and the Build Alternative is expected to be fully operational. The main difference is that traffic volumes are expected to be lower than in the year 2030, so travel speeds may be slightly higher than those shown above.

**How would intersections be affected?**

The Build Alternative includes new traffic signals and changes to the street grid that are expected to improve traffic conditions. Congested intersections that are expected to operate poorly during the PM peak hour with the 2030 No Build and Build Alternatives are identified in Exhibit 3-8. The First Avenue S. and S. Royal Brougham Way intersection is expected to operate better with the 2030 Build Alternative than it would with the No Build Alternative.

**Appendix F Transportation Discipline Report**

*Appendix F* contains supporting traffic information that explains how the traffic analysis was conducted for this project and documents the conclusions contained within the text of this EA.

Exhibit 3-8 shows that with the tail track open, three intersections in the transportation study area would operate poorly with the 2030 No Build Alternative (First Avenue S. and S. Royal Brougham Way, First Avenue S. and S. Atlantic Street, and Colorado Avenue S. and S. Atlantic Street). For the Build Alternative, two intersections would operate poorly in the year 2030 (First Avenue S. and S. Atlantic Street, and Colorado Avenue S. and S. Atlantic Street).

**What are congested intersections?**

For the traffic analysis conducted for this project, congested intersections are intersections that cause drivers considerable delay. A driver might wait one minute or more to get through a traffic signal at a congested intersection.

### Congested Intersections

2030 NO BUILD ALTERNATIVE  
PM Peak – Rail Operations Not Blocking  
S. Atlantic Street

2030 BUILD ALTERNATIVE  
PM Peak – Rail Operations Not Blocking  
S. Atlantic Street

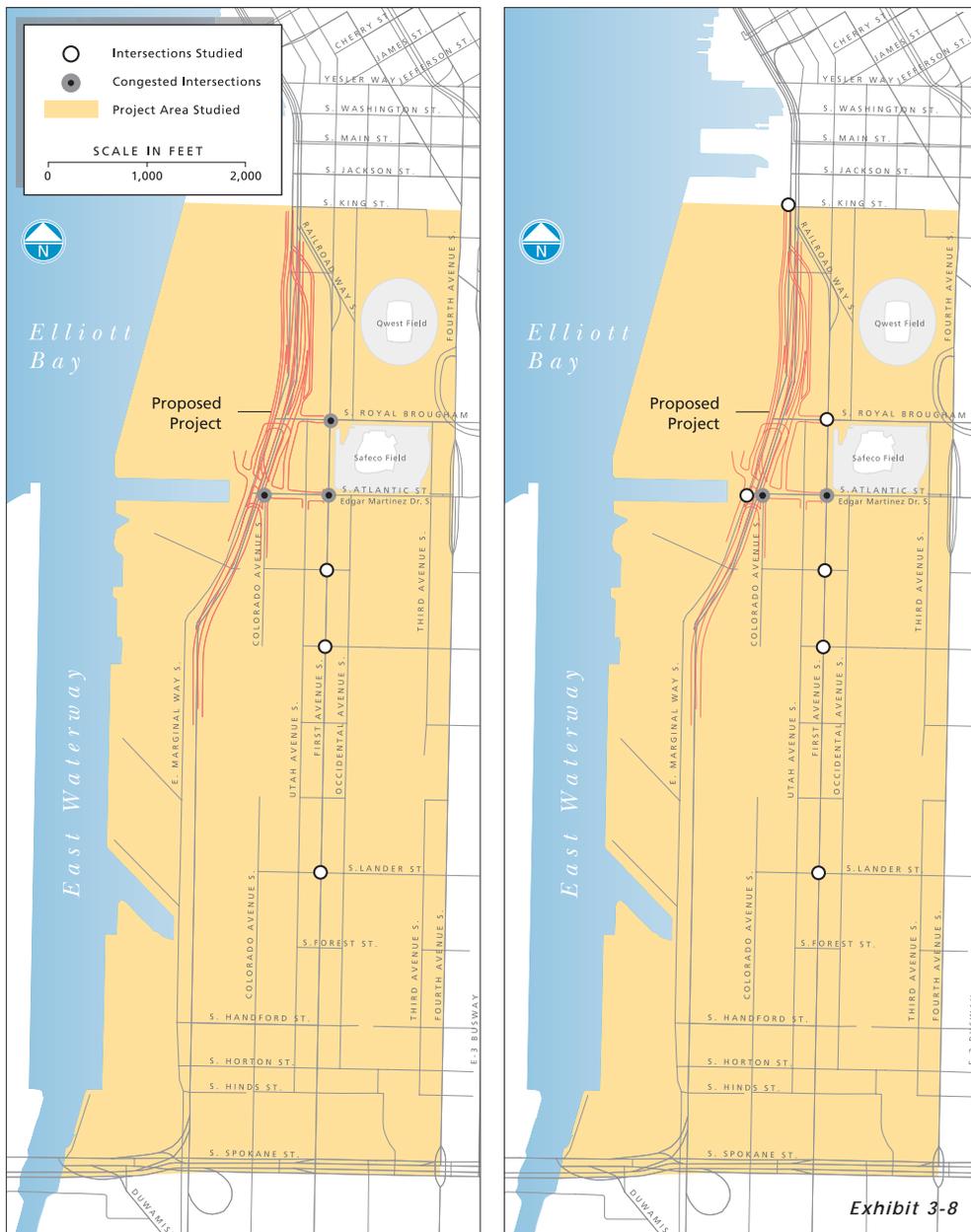


Exhibit 3-8

The new U-shaped undercrossing would provide continuous access across the tail track, which is not possible today or under future baseline conditions. The new undercrossing would result in a complex set of intersections at the convergence of E. Marginal Way S., Terminal 46, Alaskan Way S., Colorado Avenue S., and S. Atlantic Street. Especially long traffic signal cycle lengths, as much as 165 to 220 seconds, would be needed to accommodate all movements at this location. As a result, average vehicle delays at this location are expected to be relatively high. However, overall conditions are expected to improve relative to existing conditions given the continuous access across the tail track.

The First Avenue S. and S. Atlantic Street intersection would operate poorly in the year 2030 whether or not the tail track is occupied. Overall, intersections in the project area are expected to operate better with the 2030 Build Alternative than with the No Build Alternative.

The trends described above for the 2030 Build Alternative are similar for the year 2012, when construction is completed and the Build Alternative is expected to be fully operational. The main difference is that traffic volumes are expected to be lower in 2012 than in the year 2030, so the intersections will function with fewer delays.

### ***Traffic Queues***

Traffic flows throughout the project area would be stable with the project. However, travelers may experience delays and queues at the following locations:

- **Utah Avenue S. and S. Atlantic Street** – During the PM peak hour, vehicles traveling northbound on Utah Avenue S. may experience long queues and delays when turning right onto S. Atlantic Street. With high traffic volumes on S. Atlantic Street, northbound vehicles stopped at the stop sign would have few opportunities to turn right and enter the traffic stream. Some drivers would likely divert to the First Avenue S. and S. Massachusetts Street intersection to avoid these long queues and delays, particularly when the tail track is occupied.
- **Colorado Avenue S. and S. Atlantic Street** – During the AM peak hour, trucks traveling from Colorado Avenue S. into the undercrossing would experience some queues and delays. This is primarily caused by the large number of Port of Seattle trucks that are expected to travel between Terminal 46 and the North SIG Railyard in the year 2030. The signal system for this location must provide for not only movements that occur specifically at this intersection, but also for those at the adjacent E. Marginal

Way S./Terminal 46 driveway/S. Atlantic Street intersection as well. The signal system includes provisions to accommodate rail crossings on the BNSF tail track while diverting traffic to the new undercrossing. As a result, even under moderately congested conditions, such as during the PM peak hour, travelers would face delays at this location as the traffic signal cycles through all necessary signal phases. Delays would be substantially greater without these improvements under the No Build Alternative.

- **Undercrossing** – Traffic in the undercrossing may queue during both the morning and evening peak hours due to high traffic volumes. During the AM peak hour, overall vehicle volumes are not expected to be very high, but a large percentage of the vehicles using the undercrossing would be trucks. Because trucks are much longer than typical passenger vehicles, queues would form with fewer vehicles. During the PM peak hour, overall traffic volumes are expected to be higher. However, queues are anticipated to be similar to the AM peak hour.
- **Alaskan Way S. between S. King Street and Yesler Way** During the PM peak hour, northbound vehicles on Alaskan Way S. turning left onto Yesler Way to access the Seattle Ferry Terminal would likely experience queues and delays while ferry vessels load and unload. This may cause upstream delays on S. King Street.
- **S. Atlantic Street and First Avenue S.** – During both the AM and PM peak hours, vehicles heading west on S. Atlantic Street would experience some delay due to the high volume of vehicles turning left to head southbound on First Avenue S. The queue from the westbound left turn pocket is expected to spill into the through lane and impede drivers wishing to travel westbound or make right turns onto First Avenue S.

Even with queues and delays anticipated at the locations described above, the transportation system is expected to operate better and with fewer congested locations with the Build Alternative than the No Build Alternative.

#### **How would the project affect roadway safety?**

The Build Alternative would improve roadway safety over existing conditions. All drivers in the surrounding area would benefit from the improved seismic safety provided by the new roadway. The new SR 99 structure would be designed to last for 75 years and built to withstand most earthquakes that are likely to occur in the area. The new SR 99 roadway would also have wider shoulders compared to the existing facility, which would improve safety for vehicles compared to existing conditions. As part of project design, WSDOT will consult and coor-

dinate with the City of Seattle in all safety-related decisions affecting City streets and sidewalks to ensure that they meet City standards. All signage will follow FHWA's *Manual on Uniform Traffic Control Devices*.

Adding ramps near S. King Street increases the number of conflict points that travelers along SR 99 will experience, potentially increasing accident rates in the future. However, the benefits of the new ramps and increased shoulder widths are considered to outweigh the potential for conflicts at ramp locations.

For pedestrian safety, sidewalks and paths would remain along Alaskan Way S. and the nearby surface streets. Sidewalks and paths would not be located directly adjacent to the SR 99 mainline. The tail track would be located to the east of the mixed-use path on the west side of SR 99. The additional bike lanes and improved pedestrian facilities on surface streets would reduce the potential for conflicts between vehicles and bicycles and pedestrians.

#### **How would traffic during special events at the stadiums and event center be affected?**

During stadium and event center events, such as Seahawks and Mariners games, the project is not expected to make traffic circulation and operations worse than existing conditions. Traffic flow during events is managed by the Seattle Police Department. Access to and from the stadium area would be improved with the addition of the new S. King Street ramps.

Safeco Field, Qwest Field, and Qwest Field Event Center have prepared transportation management plans to reduce and manage the traffic and parking demand associated with events. Measures developed in these transportation management plans, such as pedestrian improvements, high-occupancy vehicle (HOV) incentives, and transit service, help control and improve event traffic.

In addition to vehicle traffic, there is a high level of pedestrian traffic during events. The project would provide pedestrian and bicycle facilities that are similar to or better than the existing conditions along Alaskan Way S. and adjacent surface streets, as described in Question 1 of this chapter.

### 3 How would economic conditions in surrounding areas be affected?

The project is located within two business districts, the Duwamish Manufacturing and Industrial Center (which includes South of Downtown [SODO]) and the south end of Pioneer Square. General economic effects and benefits associated with the project include improved access between SR 99 and local streets, and improved access for freight between existing industrial areas, Terminal 46, and the SIG Railyard. Access improvements to Terminal 46 would diminish freight truck and rail conflicts and improve travel times between existing industrial areas, which contribute to the cost of transporting goods and materials. Improved freight connections and enhanced mobility would increase business efficiency and decrease the costs due to congestion.

Business employees and customers would experience changes in parking availability in the area. The project would remove approximately 1,267 parking spaces, as shown in Exhibits 3-9 and 3-10. The majority of the parking spaces that would be removed are off-street pay spaces. About 418 free long-term spaces would be removed. South of S. Atlantic Street, there is free parking with 1- and 2-hour limits along First Avenue S. In addition, several blocks of free parking with no time limits are currently located near the project south of S. Massachusetts Street on Utah Avenue S. and Occidental Avenue S.

The City of Seattle's policy is to provide enough parking for mobility and economic needs, while limiting parking to encourage people to use other modes of transportation. The City manages on-street parking according to the goals and policies listed in Seattle's Comprehensive Plan section C-3; specifically, goal TG18 and policy T42 are applicable to this project. These policies state that the primary purpose of arterials is to move people and goods, and short-term parking only needs to be replaced when there is a concentrated substantial loss. Generally the City does not replace long-term free parking. The City does not have a policy for replacing long-term off-street parking. The changes to parking that would result from the project are consistent with City policy.

#### What is on-street parking?

There are two types of on-street parking, short-term and long-term. On-street short-term parking includes metered spaces, time-restricted public parking spaces (such as 1-hour parking and loading zones), bus/taxi zones, and spaces reserved for police parking. On-street long-term parking includes unmetered, unrestricted on-street public parking spaces.

#### What is off-street parking?

Off-street parking includes parking garages and lots where people pay to park. Most off-street parking is privately owned and operated.

*Exhibit 3-9***Project Parking Effects**

	Parking Spaces Removed
On-street short-term	29
On-street long-term	418
Off-street	820
<b>Total</b>	<b>1,267</b>

The affected off-street pay parking is located on two properties, the Washington-Oregon Shippers Cooperative Association (WOSCA) property and a property just east of the viaduct between S. Atlantic Street and S. Royal Brougham Way. WSDOT purchased these properties in 2007 for use by the Alaskan Way Viaduct Program. The 820 off-street pay parking spaces on these properties will not be available during construction of the S. Massachusetts Street to Railroad Way S. Electrical Line Relocation Project. The S. Holgate Street to S. King Street Viaduct Replacement Project would permanently change these areas to a transportation facility and reduce the total supply of parking in the area.

Many pay lots in the area are underutilized. According to the Puget Sound Regional Council<sup>1</sup>, about 37 percent of the off-street parking spaces in the stadium area are used on an average non-event weekday. This means that on an average weekday, about 4,100 off-street parking spaces are available within a quarter-mile of the project. However, during events, paid parking spaces are often very full. As a result, a large number of event attendees currently use other modes such as Metro buses and the Sounder commuter train.

<sup>1</sup> PSRC 2007

A new development project with Home Plate, located near S. Atlantic Street and First Avenue S., will add about 800 parking spaces by 2010; 300 spaces would be designated for events, and 500 spaces would be for the development's occupants. The Home Plate spaces will increase the parking inventory in the area, but these new spaces are not included in the available parking counts for this project.

Because off-street pay lots are generally underused in the stadium area, parking spaces are not anticipated to be difficult to find on typical days. In addition, there is free or metered on-street parking on the streets surrounding the project area. With about 418 on-street long-term spaces removed from under the viaduct and along Alaskan Way S., some drivers who currently park for free all day may need to look for on-

### Parking Permanently Removed



Exhibit 3-10

street long-term parking several streets away or would need to pay to park. Additionally, removing 1,267 total parking spaces in the stadium area could make it more difficult to find parking during an event at the stadiums or the event center. Many businesses near the stadiums and event center already offer their lots for paid parking during events. This is one example of how the private market would adjust to the demand.

The loss of 29 short-term, metered spaces would decrease local government revenues from parking by about \$72,500 per year.

Surrounding businesses could be affected by reduced parking if their customers and employees have to pay or park farther away. However, off-street pay lots are generally underused in the stadium area and parking spaces are not anticipated to be difficult to find on typical days. In addition, there is free or metered on-street parking on the streets surrounding the project area. Therefore, businesses are not expected to lose patrons.

#### **4 How would the project affect properties located in the area?**

A total of seven properties would be affected by partial property acquisitions and/or utility easements. All of the properties required are zoned for industrial or industrial/commercial uses and are primarily used for terminal operations, warehouses, or parking. None of the acquisitions or easements require residents, businesses, or their employees to be relocated.

The following acquisitions and/or utility easements would be needed:

- Three partial property acquisitions would be needed for the roadway alignment. Permanent utility easements would also be required on two of these parcels.
- Four parcels would be affected by permanent utility easements only.

The three partial property acquisitions would total approximately 2.09 acres. The permanent utility easements would affect about 1.31 acres.

The partial property acquisitions shown in Exhibit 3-11 consist of narrow strips of Port of Seattle land on Pier 36 and Terminal 46, and a narrow strip of Pyramid Alehouse property parallel to the east side of SR 99. Some parking spaces on these partially acquired parcels would be removed, but existing

#### **Appendix G Technical Memoranda**

*Appendix G* contains technical memoranda that support conclusions discussed in this EA:

- *Alternative Description and Construction*
- *Archaeological Resources*
- *Economics*
- *Environmental Justice*
- *Geology and Soils*
- *Hazardous Materials*
- *Historic Resources*
- *Land Use and Shorelines*
- *Noise and Vibration*
- *Parks and Recreation*
- *Public Involvement*
- *Public Services and Utilities*
- *Relocations*
- *Social Resources*
- *Visual Quality*
- *Water Resources*

### Properties Partially Acquired



Exhibit 3-11

buildings on these properties would not be altered, and current functions on the remaining portions would not be affected.

The permanent utility easements are located on Port of Seattle land south of S. Massachusetts Street, Pier 36, Terminal 46, the Pyramid Alehouse parking lot, Fortune Warehouse, and a small piece of vacant BNSF land. They are not expected to affect long-term property use. The purpose of the easements is to allow utility providers limited rights to a specific portion of property that is owned by someone else. The utility easements would allow the utility providers to maintain or upgrade their lines.

### **How would these effects be mitigated?**

Compensation for parcel acquisitions, including easements, would be provided at fair market value and would comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. We would work with affected property owners to minimize the amount of disruption caused by the project.

### **5 What is Section 106, and how does it affect the way we evaluate historic and archaeological resources?**

Section 106 of the National Historic Preservation Act requires agencies to consider the effects of federal actions to historic properties. In compliance with Section 106 requirements, we have consulted and will continue to consult with the State Historic Preservation Officer (SHPO), tribes, and other interested parties in developing mitigation measures. As part of our consultation with the SHPO, we will do the following:

- Develop a Memorandum of Agreement regarding how we will address effects to historic resources.
- Develop resource-specific agreements to document and mitigate effects. The project has already begun documenting known historic effects to the viaduct.

Depending on the type of resource, mitigation of adverse effects will be developed on a case-by-case basis with the SHPO. When the parties agree on how the adverse effects will be resolved, a Memorandum of Agreement will be signed and implemented. The draft Memorandum of Agreement is included in Appendix H.

No permanent effects to archaeological resources are expected. Potential construction effects to archaeological resources are discussed in Question 12 of Chapter 4.

### **Appendix B Potential Mitigation Measures**

*Appendix B* Appendix B lists the potential mitigation measures being considered for this project.

### **Section 4(f) and Protection of Historic Resources**

*Section 4(f)* is a provision of federal law pertaining only to transportation projects that requires project proponents to carefully consider protection of resources identified as Section 4(f) resources. These include public parks and recreation land and historic resources listed in or eligible for the National Register of Historic Places.

The viaduct itself is eligible for listing in the National Register of Historic Places and is protected as a Section 4(f) resource. It is one of the resources included in the Draft Section 4(f) Evaluation found at the end of this document on page 130. The attachments are provided in *Appendix D, Draft Section 4(f) Parts A, B, and C*.

## **6 How would the project affect historic resources?**

The project would demolish the southern portion of the Alaskan Way Viaduct, which has been determined to be eligible for listing in the National Register of Historic Places. The existing on- and off-ramps at First Avenue S. near Railroad Way S. would remain, with the same effects and benefits as they have today.

The new SR 99 structure would generally have a minimal effect on historic resources in the area, because it would occupy approximately the same footprint as the existing Alaskan Way Viaduct, and therefore would not displace or otherwise disturb any historic resources. The structure would be located southwest of the Pioneer Square National Register historic district and local preservation district in an area that is largely occupied by railyards, parking lots, and industrial buildings.

When the project is completed, tenants of the Bemis Building (located near the viaduct on S. Atlantic Street) may experience increased traffic congestion nearby. This building, a former bag factory built in 1904, is eligible for the National Register of Historic Places. Both north- and southbound access to the Bemis Building loading dock will be maintained on Colorado Avenue S.

### **How would these effects be mitigated?**

A Memorandum of Agreement is being developed to ensure that adverse effects to historic resources, as defined by Section 106, are avoided, minimized, or mitigated. The draft Memorandum of Agreement is included in Appendix H.

Before any demolition is done, we will document the viaduct with photos and a narrative history that describes its role in Seattle's history, in accordance with Historic American Engineering Record (HAER) standards. Photos taken for HAER could be displayed at public venues around Seattle.

## **7 What other elements of the environment were evaluated, and what were the results?**

Elements of the environment discussed in this question include noise, air quality, climate change, views, land use, parks and recreation, neighborhoods, low-income and minority populations, police and fire services, water resources, endangered species, and soils. These elements are discussed together in this section because the project would cause minor, if any, permanent effects to these elements of the environment.

### Would noise levels change?

Noise levels in the project area are typical of urban and major downtown metropolitan areas. Typical urban and city noise levels range from 65 to 80 dBA. Without the project, the peak traffic noise levels in 2030 are expected to increase by 1 to 2 dBA. With the project, noise levels are expected to remain the same or decrease by 1 to 2 dBA. These minor changes in noise levels would barely be perceptible to most people.

Traffic noise levels currently approach or exceed the exterior FHWA noise abatement criterion of 67 dBA at three of the sites modeled along First Avenue S. between Railroad Way S. and S. King Street. These sites represent 235 current and planned residential units and two outdoor dining areas. Noise levels would remain the same or decrease slightly with the project at these sites. Traffic noise in the area is primarily generated by the high traffic volumes on surface streets. Because the high traffic volumes will generate noise regardless of any project effects, mitigation is not feasible.

### Would air quality change?

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has established the National Ambient Air Quality Standards (NAAQS). The NAAQS specify maximum concentrations for carbon monoxide (CO), particulate matter less than 10 micrometers in size (PM<sub>10</sub>), particulate matter less than 2.5 micrometers in size (PM<sub>2.5</sub>), ozone, sulfur dioxide, lead, and nitrogen dioxide.

Areas that once did not meet the NAAQS but have since demonstrated attainment are classified as maintenance areas. The project is located entirely within a CO maintenance area, and the area just south of the existing viaduct is a PM<sub>10</sub> maintenance area. Future pollutant concentrations for CO and particulate matter with the project are estimated to be below the NAAQS.

In accordance with FHWA guidelines, the annual mobile source air toxics (MSAT) pollutant burdens (in tons per year) were calculated for six pollutants that were previously (prior to the 2007 EPA Final Rule) classified as priority MSAT. To assess potential project effects, pollutant levels for these six MSAT were compared to existing and future conditions with and without the project. Future MSAT levels are predicted to be lower than existing levels with or without the project.

#### What is a dBA?

Sound levels are expressed on a logarithmic scale in units called decibels (dB). A-weighted decibels (dBA) are the commonly used frequency that measures sound at levels that people can hear.

To the human ear, a 1- to 3-dBA change is hard to distinguish, but a 5-dBA change in noise levels is readily noticeable. A 10-dBA decrease would sound like the noise level has been cut in half.

#### What is a noise abatement criterion?

The noise abatement criterion is the standard defined by FHWA that noise levels should meet. If noise levels exceed the abatement criterion, FHWA may require mitigation to reduce noise, if reasonable and feasible.

#### What are Mobile Source Air Toxics (MSAT)?

To help protect air quality, the U.S. Environmental Protection Agency (EPA) identified a group of 21 pollutants as mobile source air toxics (MSAT) in a 2001 final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235). From the list of 21, EPA identified six priority MSAT. These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene.

In 2007, EPA finalized a rule to reduce hazardous air pollutants from mobile sources. However, EPA has not yet established regulatory concentration targets for relevant MSAT appropriate for use in the project development process.

Traffic flow improvements will reduce emissions from idling vehicles and improve air quality. No exceedances of the NAAQS are anticipated, and MSAT pollutant emissions will decrease over time, hence no adverse air quality effects are expected and no mitigation measures are needed.

### How would the project address climate change?

The Intergovernmental Panel on Climate Change defines adaptation as the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.” Furthermore, the Panel concluded that adaptation will be necessary to address effects resulting from the warming that is already unavoidable due to past emissions. The effectiveness of any specific adaptation requires consideration of the expected value of the avoided damages against the costs of implementing the adaptation strategy.

Governor Gregoire committed the state to preparing for and adapting to the effects of climate change as part of Executive Order 07-02. A new focus sheet entitled “Preparing for Impacts” is available online at:

<http://www.ecy.wa.gov/climatechange/index.htm>.

The focus sheet provides a brief summary of the key areas that Washington State is likely to experience over the next 50 years:

- Increased temperature (heat waves, poor air quality).
- Changes in volume and timing of precipitation (reduced snowpack, increased erosion, flooding).
- Ecological effects of change (spread of disease, altered plant and animal habitats, human health and well-being).
- Sea-level rise, coastal erosion.

The S. Holgate Street to S. King Street Viaduct Replacement Project is being designed to last 75 years. The project has incorporated features as part of its standard design that would provide greater resilience and function with the potential effects brought on by climate change. These include detention and treatment Best Management Practices (BMPs) to treat stormwater and improve the water quality, and adding landscaping with vegetation that is suitable for the urban environment.

The project will help reduce greenhouse gas emissions by creating a more efficient route for some drivers, and decreasing

### Appendix E Air Quality

Supporting information about air quality standards and conditions with the Build Alternative can be found in Appendix E, Air Quality Discipline Report.

*Appendix E* also contains additional information about greenhouse gases and climate change.

### What are greenhouse gases?

Climate-changing greenhouse gases come in several forms. The gases associated with transportation are water vapor, carbon dioxide (CO<sub>2</sub>), methane (also known as marsh gas), and nitric oxide (found in dentists’ offices as laughing gas). CO<sub>2</sub> makes up the bulk of the emissions from transportation and is the focus of this evaluation. Any process that burns fossil fuel releases CO<sub>2</sub> into the air. Vehicles are a significant source of greenhouse gas emissions and contribute to global warming primarily through the burning of gasoline and diesel fuels.

traffic volumes and vehicle delays at the Columbia and Seneca Street ramps. The vehicle capacity of SR 99 will not increase. The U-shaped undercrossing would decrease the amount of idle time for traffic and freight trucks when rail operations block traffic. The project would create smoother driving and minimize stop and go conditions, which could reduce fuel consumption and greenhouse gas emissions. Emissions from vehicles are a significant source of greenhouse gases and contribute to climate change. The project would also improve pedestrian and bicycle facilities, hence making these emission-free transportation modes more attractive.

### **How would the project affect views?**

Views from the new SR 99 roadway would not be substantially different than views from the existing viaduct. Motorists traveling northbound would still experience panoramic views of the downtown skyline. Views of the stadiums and SODO area for southbound motorists would improve somewhat with the new roadway configuration, because these views would no longer be blocked by the upper roadway. Since the new roadway has some at-grade sections, views to the northeast of Elliott Bay and the Olympic Mountains are likely to be more obstructed by stacked shipping containers and other Port of Seattle structures.

Views toward the new SR 99 roadway would also not be substantially different than views toward the existing viaduct. Like the existing viaduct, the new roadway would lie beneath the line of sight from public areas on the upper levels of the stadiums (Safeco Field and Qwest Field) where people are able to see Elliott Bay, the Kitsap Peninsula, and the Olympic Mountains. Views from the portion of the Pioneer Square neighborhood that is south of S. King Street include the elevated viaduct, which contrasts with the materials, scale, and character of this historic area. The lower portions of the new roadway would be less intrusive than the existing viaduct.

Views from surface streets near SR 99 are likely to be similarly affected by the new roadway as they are by the existing viaduct, except for the view down S. Royal Brougham Way, which would feature a retaining wall as the terminus of the view. The stacked shipping containers and cranes at Terminal 46 would continue to be the dominant skyline feature.

Long-term effects are not expected because once the project is built, views from and toward the new SR 99 structure would be similar to views from and toward the existing Alaskan Way



*View of the viaduct at S. Royal Brougham Way and First Avenue S.*

Viaduct. Additionally, the project will be designed to fit in with the surrounding visual environment to the extent practicable. During design, WSDOT will work with the City of Seattle and other stakeholders to develop design standards for project elements such as signs, lighting, columns, walls, barriers, fencing, railings, plantings, and paving.

### **Would land uses be affected?**

The project would affect land uses in much the same way as the existing viaduct, with traffic noise, exhaust, and visual concerns like view blockage and shadow. The project would not change land use designations or the City's Stadium Transition Area Overlay District, which allows uses that are complementary to event activities near the stadiums.

The project would require acquisition of approximately 2.09 acres of land that is zoned for industrial and industrial/commercial uses, which is currently used for terminal operations, warehouses, and parking. These acquisitions would consist of narrow strips of Port of Seattle owned property that is parallel to the west side of SR 99, and a narrow strip from the Pyramid Alehouse property parallel to the east side of SR 99, as shown previously in Exhibit 3-11. Some on-street and off-street parking spaces on privately owned property would also be removed from use as a result of the project.

Although the project would convert a small amount of property from industrial and industrial/commercial uses to transportation use, these partial property acquisitions would be small compared to the amount of similar land available in the area. Additionally, these partial acquisitions are not expected to change current uses on the remainder of the affected properties. No mitigation measures would be needed.

### **Would any park or recreational facilities be affected?**

The project area is home to some of the most popular public facilities in the city, including viewpoints (Jack Perry Memorial Viewpoint), trails (Mountains to Sound Greenway Trail and Waterfront Bicycle/Pedestrian Facility), and large event venues (Safeco Field, Qwest Field, and Qwest Field Event Center).

Southbound access to Jack Perry Memorial Viewpoint would change slightly, as vehicles would need to navigate the reconfigured intersection at S. Atlantic Street to reach the viewpoint off of Alaskan Way S. Noise reaching the viewpoint from the new Alaskan Way S. roadway is likely to decrease slightly compared to existing conditions.

### **What is the Stadium Transition Area Overlay District**

As part of the City of Seattle's Comprehensive Plan, the Stadium Transition Area Overlay District allows complementary uses around the Safeco and Qwest Field facilities. The district's provisions and development standards are intended to contribute to a safer pedestrian environment for those attending events and permit a mix of uses that support the pedestrian-oriented character of the area as well as the surrounding industrial zone (Chapter 23.74 of the Seattle Municipal Code).

The project includes changes and improvements to bicycle and pedestrian facilities, which were described in Question 1 of this chapter. Because park or recreation facilities would not be adversely affected by the project, mitigation measures are not needed.

### **How would neighborhoods be affected?**

Although it is wider in places than the existing viaduct, the new SR 99 roadway would not result in many day-to-day changes to areas adjacent to SR 99. Access to Pioneer Square and the SODO area would be improved by the new northbound off-ramp and southbound on-ramp, which could benefit local businesses. Population and employment along SR 99 would change very little, if at all, as a result of the project.

Neighborhood cohesion can be affected by several factors, including acquisition of property, loss of jobs, reduction in parking, and whether the project would alter the community connections, either physically or by separating residents from their resources. Relatively small amounts of property would need to be acquired, and some very small portions of parcels would be needed for utility easements, but no jobs would be displaced as a result of property acquisitions. An estimated 1,267 parking spaces would be permanently removed from the project area. Because off-street pay lots are generally underused in the stadium area, parking spaces are not anticipated to be difficult to find on typical days. Over 4,100 off-street parking stalls are located within several blocks of the project area, with even more stalls available in the greater stadium area. In addition, several blocks of free parking with no time limits are currently located near the project south of S. Massachusetts Street on Utah Avenue S. and Occidental Avenue S.

Closing S. Royal Brougham Way immediately east of SR 99 and rerouting traffic from both directions of E. Marginal Way S./Alaskan Way S. through S. Atlantic Street would change the existing street network and links to existing community facilities and services, but would not limit access to neighborhood resources.

Once construction is completed, neighborhood effects are likely to be short-term as people adjust to the changes in the transportation infrastructure. To help with this transition, WSDOT will conduct community outreach and communication activities prior to the opening of the new facilities to educate and prepare people for changes in their community. WSDOT's prior community outreach efforts are discussed in

Appendix B. Because the project would not result in a loss of neighborhood cohesion, no mitigation measures are needed.

### **Would low-income or minority populations be affected?**

Government agencies use a combination of laws, policies, and an executive order called Environmental Justice (Executive Order 12898, issued 1994) to identify and address effects to low-income residents, minorities, the elderly, and those with disabilities.

Less than 800 people reside in the project area. The population is slightly more racially diverse than the rest of Seattle, though few households have limited English proficiency. Most residents are adults, and almost half live alone. Household income in this area is substantially below the city's median, and almost half of the population lives at or below the poverty level. Annual surveys also document a substantial homeless population in the downtown Seattle area. One social service provider, St. Martin de Porres Shelter, is located in the project area. Several other social service providers operate shelters and support outlets near the project area.

The revised flow of traffic through the new interchange at S. Atlantic Street would change access to the St. Martin de Porres Shelter. Many of the overnight visitors at the shelter are transported to and from the facility by an agency van from downtown Seattle. The van would need to drive a slightly longer, more circuitous route compared to the existing route along Alaskan Way S.

An estimated 30 to 40 percent of the nighttime visitors, however, walk to and from the shelter. Access to the facility by these clients would change slightly compared to current conditions. However, the proposed design maintains pedestrian walkways and improves crosswalks, which would provide pedestrians a safe travel route to St. Martin de Porres Shelter and the U.S. Coast Guard facilities.

Project effects also include permanent loss of long-term parking used for car camping by homeless persons. Other long-term parking is available throughout the Duwamish industrial area. Efforts would be made to inform social service providers and people who live out of vehicles of proposed changes to parking.

Once construction is completed, most effects to low-income and minority populations are likely to be short-term as people and service providers adjust to the changes in the transporta-

tion infrastructure. To help with this transition, WSDOT will conduct community outreach and communication activities prior to the opening of the new facilities to educate and prepare people for changes in their community. With mitigation, the project will not have a high or disproportionate effect on low-income or minority populations.

### **Would police and fire services be affected?**

Police and fire services would primarily be affected by changes in traffic patterns within the project area. The intersection at S. Atlantic Street, the split northbound and southbound lanes of Alaskan Way S., and the new undercrossing could potentially increase travel times to certain destinations. On the other hand, the undercrossing would provide an alternate route for all traffic when railroad operations block S. Atlantic Street. This enhancement and the new access ramps to and from SR 99 at S. King Street would improve access and maintain or improve response time for both emergency and non-emergency services.

Although Fire Station No. 5 is outside the project area (near the Seattle Ferry Terminal at the foot of Madison Street), it is an important emergency service facility. The proposed project would not degrade traffic conditions along the waterfront, so it is not expected to affect operations at this fire station.

Because any potential for adverse effects to police and fire services would be minor, no mitigation measures are needed.

### **Would utilities be affected?**

Operational effects to utilities are not expected since the project will be designed to avoid or minimize effects and adequate access to utilities will be maintained for maintenance purposes.

### **How would water resources be affected?**

The project area has been developed for over a hundred years and is assumed to be covered with 100 percent impervious surfaces. Stormwater runoff from the project area currently discharges directly into Elliott Bay and the Duwamish River's east waterway. Additionally, approximately 60 percent of the stormwater runoff from the project area is combined with sanitary sewer flows in the City of Seattle and King County wastewater conveyance systems for treatment at the West Point Wastewater Treatment Plant prior to discharge into Puget Sound. During heavy rains, stormwater in the combined sewer

system is sometimes discharged directly to Elliott Bay as a combined sewer overflow.

The project would improve how stormwater is managed and reduce pollutants such as total suspended solids (TSS), zinc, and copper, which are carried in stormwater runoff. This would help to improve the quality of runoff from the project area that discharges to Elliott Bay and the combined sewer system compared to existing conditions.

The project would manage stormwater by separating portions of it from the combined sewer system and providing basic water quality treatment BMPs, as defined in the 2006 WSDOT *Highway Runoff Manual*, or detention BMPs as required prior to discharge. The project would retrofit reconstructed surface streets and SR 99 with water quality BMPs to treat runoff from the project area. Treatment BMPs would be used in areas where stormwater discharges into the Duwamish River's East Waterway or Elliott Bay, and detention BMPs would be used in areas that drain to the combined sewer system. Although the final BMPs have not been designed, the types of treatment BMPs being considered for these areas include wet vaults or StormFilters with ZPG™ media. Other BMPs that achieve basic treatment include bioinfiltration swales, sand filters, filter strips, wetponds, bioretention/rain gardens, and other types of facilities. The project would reduce the volume of stormwater diverted into the combined sewer system. This would reduce the annual volume of water and associated pollutants conveyed to the West Point Wastewater Treatment Plant, and therefore reduce the amount of treated effluent discharged to Puget Sound from the West Point Wastewater Treatment Plant outfall.

The pollutant loading to the Duwamish River's East Waterway, Elliott Bay, and Puget Sound from these discharges would be substantially reduced compared to existing conditions (No Build), as shown in Exhibit 3-12. The reduced pollutant load would have a benefit to water quality and also a long-term benefit to nearshore sediments by reducing annual pollutant load collected in the sediments. Because the project would result in a net benefit to the environment, improving both water quality and nearshore sediments as compared to existing conditions, no mitigation is needed.

#### What is a BMP?

A Best Management Practice (BMP) is an action or structure that reduces or prevents pollution from entering the stormwater or treats stormwater to reduce possible degradation of water quality.

**Exhibit 3-12****Reduction of Annual Pollutant Loading**

Receiving Water	Pollutant	Percent Reduction
Duwamish River/Elliott Bay	TSS	77%
	Total Copper	51%
	Dissolved Copper	15%
	Total Zinc	58%
	Dissolved Zinc	32%
Puget Sound <sup>1</sup>	TSS	18%
	Total Copper	18%
	Dissolved Copper	18%
	Total Zinc	18%
	Dissolved Zinc	18%

<sup>1</sup> Discharged at the West Point Wastewater Treatment Plant outfall

Note: Additional information on annual pollutant loading can be found in Appendix G, Water Resources Technical Memorandum.

**Would endangered species be affected?**

Consultation under Section 7 of the Endangered Species Act (ESA) has found that the project “may affect, but is not likely to adversely affect” listed species. Stormwater runoff from the project could carry pollutants, which might affect species listed under ESA. However, the project is expected to benefit water quality by reducing the pollutant load in the stormwater runoff compared to existing conditions.

Species listed or proposed for listing under ESA who have suitable habitat in the Puget Sound area are the bald eagle, coastal-Puget Sound bull trout, Puget Sound Chinook salmon, Puget Sound steelhead, leatherback sea turtle, southern resident killer whale, humpback whale, and Steller sea lion. The project is not located near suitable habitat for these species; however, juvenile salmon are located in nearby water bodies. The project is not likely to adversely affect any listed species.

**How would soil be affected?**

Soil in the project area mainly consists of loose fill, soft sediment, sand, and gravel over dense glacial deposits. Extensive dredging and filling occurred in the area south of downtown Seattle between 1895 and the early 1900s. In the project area, 5 to 50 feet of fill was placed along E. Marginal Way S. and Alaskan Way S. These soils are not strong and could liquefy during an earthquake.

For the new SR 99 structure to meet current earthquake standards, the soils on which the project is built need to be strengthened. We plan to strengthen these soils by mixing them with cement-like materials through a combination of processes such as deep soil mixing, jet grouting, and stone columns. This would be done along the length of the project within an area about 50 to 100 feet wide and up to 100 feet

**What is Section 7 of the Endangered Species Act?**

Section 7 provides guidance for consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service. Section 7 requires federal agencies to:

- Identify listed species in the project vicinity.
- Determine if any listed species would be adversely affected by the project.
- Protect listed species in the project area.
- Ensure that funding, permitting, and project actions would not destroy critical habitat or jeopardize the existence of listed species.

**What is liquefaction?**

Liquefaction is what can happen to loose soils when shaking motion from an earthquake causes the soils to turn into a quicksand-like material. This can cause foundations to fail.

deep. Similar ground improvement techniques or drilled concrete shafts would stabilize the soil for the retained fill sections. These improvements would add density to the soil, which would make it a stronger material.

The project includes building retaining walls where there are cut and fill sections. Some soil would be permanently removed where the alignment is cut below grade, such as for the new undercrossing, and soil would be added in fill sections where the alignment is transitioning to an elevated structure. Constructing the project would be a benefit because the new structures would be designed to withstand effects to soils (such as liquefaction) associated with most earthquakes. The ground improvement installed for the new structure would also partially protect adjacent utilities and other structures from soil movement due to liquefaction in the event of an earthquake.

**Would the project generate any hazardous materials?**

The completed project would not generate any hazardous materials. To prevent migration of contaminants in shallow groundwater, the project could install controlled-density fill or trench dams at intervals along utility corridors where contamination is suspected.

**8 What are cumulative effects, and does the project have any?**

**What are cumulative effects?**

Cumulative effects result from the total effects of a proposed project, when added to other past, present, and reasonably foreseeable future projects or actions. They may be partly caused by the proposed project, but they may also be caused by other projects. Cumulative effects are studied so that the public, decision-makers, and project proponents take time to consider the “big picture” effects a project could have on the community and environment.

The best way to describe cumulative effects is to give an example of what they are. On its own, the S. Holgate Street to S. King Street Viaduct Replacement Project would affect the surrounding area in several ways. For example, during construction, the number of lanes available on SR 99 would be reduced. By itself, this effect may not be considered substantial. However, other major construction projects are planned in the nearby area, such as the SR 519 Intermodal Access Project Phase 2 and the S. Spokane Street Viaduct Widening. These projects could also require detours during the early

stages of the S. Holgate Street to S. King Street Viaduct Replacement Project. Collectively, these projects could have a short-term cumulative effect on area traffic and transit if adequate upfront planning and coordination does not occur.

**What cumulative effects are expected once the project is built?**

Most of the possible undesirable cumulative effects that could occur in the surrounding area would occur during construction. These construction-related cumulative effects are discussed in Chapter 4, Question 14 of this EA. Once the project is built, it would result in very few cumulative effects, and most of these possible effects would be positive rather than negative.

The cumulative effect of the S. Holgate Street to S. King Street Viaduct Replacement Project combined with other planned projects described below would improve and strengthen the overall transportation network in the SODO and Duwamish industrial area. Planned projects in the area include:

- **Sound Transit Link Light Rail** – Central Link is expected to be operational from Seattle-Tacoma International Airport to Westlake Station (in downtown Seattle) by 2010, with joint operations with buses in the Downtown Seattle Transit Tunnel.
- **SR 519 Intermodal Access Project Phase 2** – This project will connect a westbound off-ramp from I-5 and I-90 to the current S. Atlantic Street Overpass. Improvements at the intersections of First Avenue S./S. Atlantic Street will also be made. Additionally, a grade-separated crossing at S. Royal Brougham Way will be built to eliminate conflicts between cars, nonmotorized traffic, and trains.
- **Mountains to Sound Greenway Pro-Parks Project** – The SR 519 Intermodal Access Project Phase 2 includes a Greenway trail connection. The missing link from SR 519 downtown to the beginning of the Mountains to Sound/I-90 Trail on Beacon Hill would also be completed.
- **Spokane Street Viaduct Phase 1** – This project includes widening the upper roadway between SR 99 and First Avenue S.
- **Spokane Street Viaduct Phase 3, Fourth Avenue S. Loop Ramp** – This project includes building an east-bound loop ramp that would touch down on Fourth Avenue S. south of S. Spokane Street.

**Cumulative project effects**

Supporting information about cumulative effects is included in *Appendix G, Technical Memoranda* and **Section 7.1 of Appendix F, the Transportation Discipline Report**.

- **S. Lander Street Overcrossing Project** – A bridge structure would be built over the BNSF railroad tracks to touch down at First and Fourth Avenues S., ultimately providing a roadway that is no longer affected by railroad operations.
- **Home Plate Development** – 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.
- **Port of Seattle Terminal 46 and Terminal 30** – The Port of Seattle projects an increased volume of container processing at these terminals. Terminal 30 is in the process of being converted from a cruise ship terminal to a container terminal.
- **Downtown Seattle Transit Corridor** – This includes maintaining the existing transit-only corridor on Third Avenue.
- **King County Metro Transit Now Service Changes and RapidRide Corridors** – 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.
- **Transit Agency Six-Year Plans** – Other regional capital projects include park-and-ride expansions, direct access facilities, HOV lane construction, and other improvements.

These transportation improvements described above would benefit all travelers, but several have been designed to improve freight movements in the area. This project, combined with the SR 519 Intermodal Access Project Phase 2, would create an east-west corridor at S. Royal Brougham Way and S. Atlantic Street, which would improve conditions for all vehicles by eliminating existing vehicle/rail conflicts.

Once these and other proposed projects are constructed in the surrounding area, they would cumulatively improve:

- Roadway safety for all drivers.
- Roadway operations and mobility for general purpose traffic, freight, and transit.
- Nonmotorized connections for bicyclists and pedestrians.

Other cumulative benefits may accrue once these planned projects in the area are constructed. These benefits likely include:

- Improved quality of stormwater discharges to the Duwamish River and Elliott Bay. The quality of storm water discharges to area water bodies would improve as stormwater treatment technologies are incorporated into project designs.
- Improved utility infrastructure due to utility enhancements and upgrades.
- Improved east-west connections for all traffic, especially freight and emergency and public service vehicles across S. Atlantic Street.
- Improved mobility for all drivers due to reduced vehicle and rail conflicts.

Over the past several years, the SODO area north of S. Atlantic Street has experienced several redevelopment projects due in part to the construction of Safeco and Qwest Fields and the Qwest Field Event Center. Specific planned projects in the area include redeveloping a portion of Qwest Field's north parking lot, a planned mixed-use development on the WOSCA site west of Qwest Field, and the planned Home Plate mixed-use project and parking. Improved connections near the stadiums could benefit revitalization in surrounding areas. However, the stadium area has experienced increasing development over the previous several years.

## **9 What are indirect effects, and does the project have any?**

An indirect effect is a reasonably foreseeable effect that may be caused by a project but would occur in the future or outside of the project area. The S. Holgate Street to S. King Street Viaduct Replacement Project would result in very few, if any, indirect effects, and most of these possible effects would be positive rather than negative. This project's indirect effects are limited because it's a replacement project, rather than a new roadway or highway expansion project. The project would replace failing infrastructure critical to the city and

state. Once built, the project would remove a significant risk to the stability of Seattle's transportation infrastructure and the state's highway system.

This project would maintain and not increase existing roadway capacity. The replaced roadway would continue to provide the infrastructure required to connect and support many well-established land uses. These land uses include the industrial development associated with the Port of Seattle and the SODO district, area railroads, Safeco and Qwest Fields, the Qwest Field Event Center, and the densely developed Seattle neighborhoods that SR 99 connects. The project would improve access to the surrounding commercial and industrial businesses, benefiting adjacent land uses.

While this project's roadway and safety improvements may be a benefit to existing or future revitalization efforts in nearby areas, it's important to note that large-scale redevelopment as a result of this project is not likely, because the project represents only one of many ongoing improvements underway in Seattle.

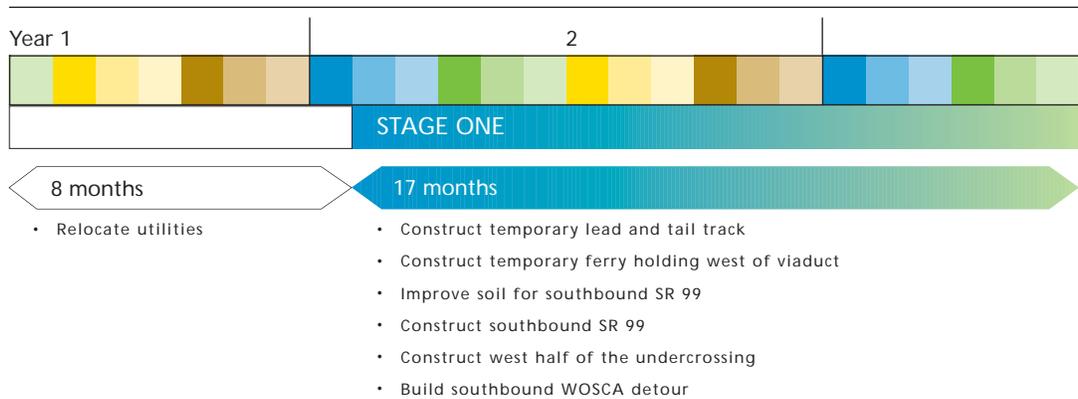
Other potential indirect benefits of this project include those associated with properties adjacent to areas where soils would be strengthened and stabilized. These properties may indirectly benefit from a reduced risk of lateral spreading in the case of an earthquake. Similarly, properties close to those where hazardous materials would be removed as part of project construction may also indirectly benefit from the cleanup effort because it would eliminate the potential for contaminants to migrate.

View of the project area



Views of the viaduct at S. Massachusetts Street, S. Atlantic Street, and S. Royal Brougham Way from First Avenue S.

*Exhibit 4-1*  
**Construction Activities**



# CHAPTER 4 - CONSTRUCTION EFFECTS & MITIGATION

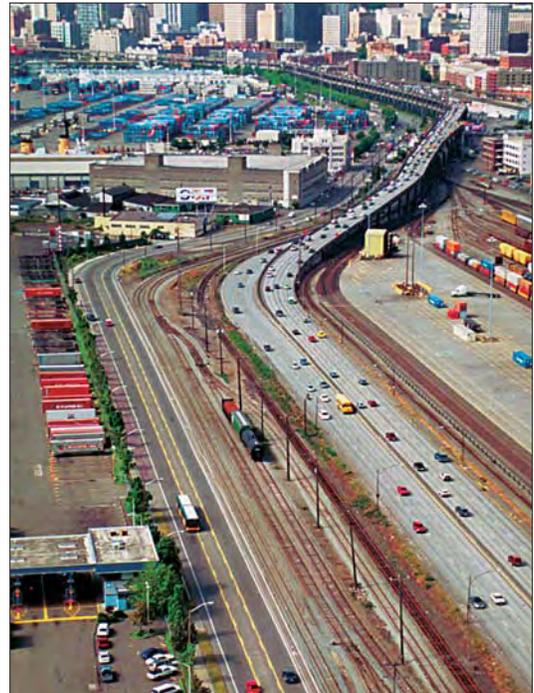
## What's in Chapter 4?

Chapter 4 explains how the project would be built and how traffic would be affected during construction. It also identifies other construction effects (such as noise) and describes proposed mitigation measures. Only elements of the environment that would be affected are discussed. Energy, fisheries, wildlife, and habitat resources are not affected by the project and are therefore not discussed in this chapter.

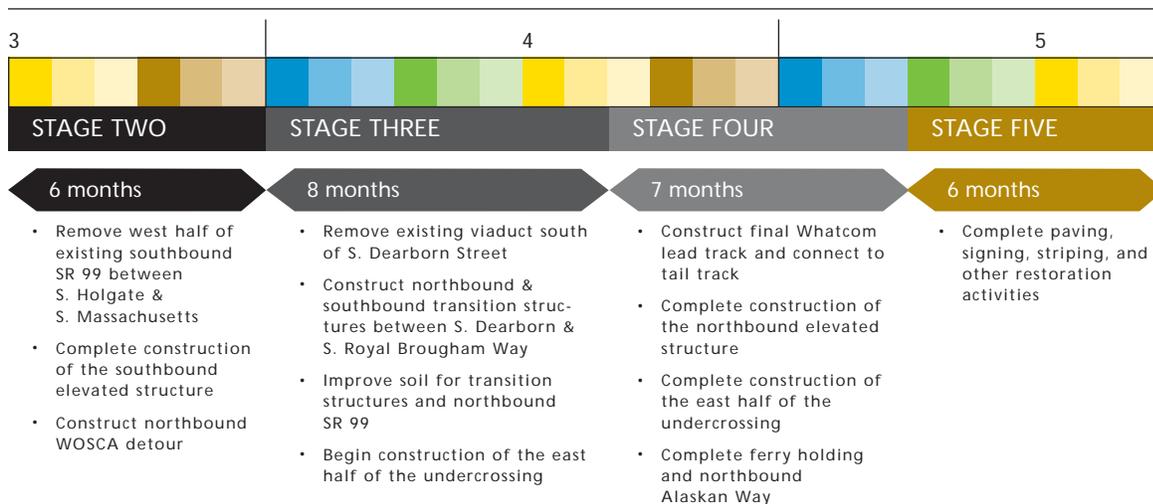
### 1 How would construction activities be sequenced?

The construction activities chart in Exhibit 4-1 shows how construction activities could be sequenced for the project. We expect construction to take about 4 years and 4 months beginning in mid-2009. The first 8 months of construction would consist of utility relocations. After the early utility relocations, construction activities have been organized into five stages that include distinct traffic restrictions or detours, which are described in Question 3 of this chapter. Construction activities are expected to affect traffic on SR 99 for about 2 years and 3 months.

Construction would typically take place 5 days per week, 10 hours per day, but may occur up to 24 hours per day,



View of the Whatcom Railyard next to SR 99



### Construction Staging & Work Zones

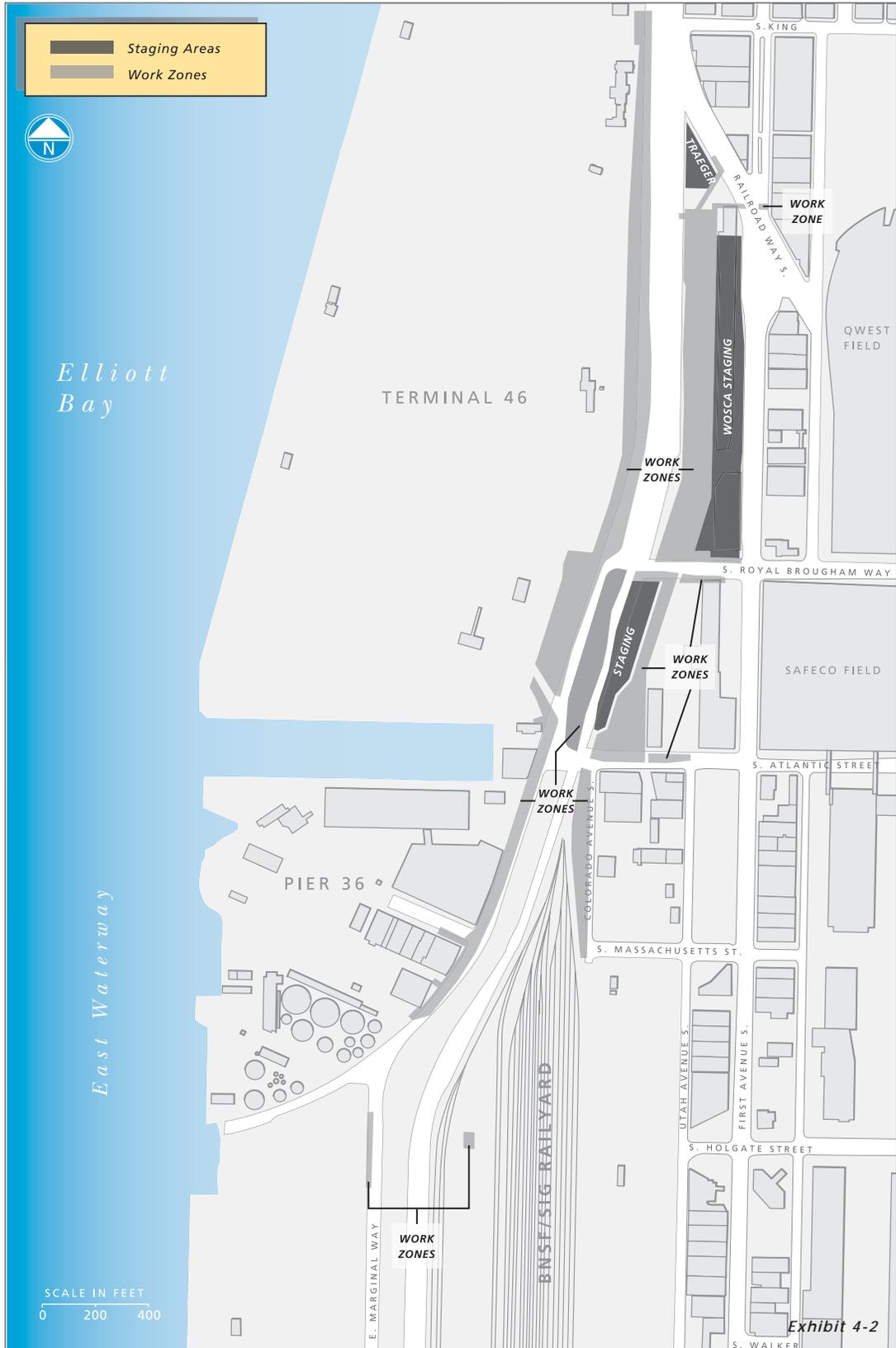


Exhibit 4-2

7 days per week at times. Construction over and above the typical 50-hour work week would only occur when needed to keep the project on schedule. Some night or weekend work may also be required for roadway crossings, tail track relocation, or other critical construction phases.

Construction would occur simultaneously at several locations throughout the project area, and the intensity of construction at each location would vary. Construction activities would progress throughout the project area so that a specific location would not experience intense activities outside their front door for the entire construction duration. Construction is likely to pass by properties located in the construction zone more than once. The duration of each construction activity would vary greatly, ranging from a few days to several months depending on the type of activity. Proposed construction methods and sequencing may change as the project design progresses.

## **2 How would the project be built?**

Construction activities would be staged within the existing right-of-way for SR 99 and affected local streets, where possible. Exhibit 4-2 shows proposed construction staging areas and work zones. Staging areas are where construction equipment, supply lay-down areas, parking, and other miscellaneous resources are located. Work zones are those areas where the construction is occurring. Work zones change as construction moves through different locations in the project area.

Construction crews would need a wide variety of equipment such as trucks, cranes, backhoes, excavators, loaders, forklifts, jackhammers, compactors, pumps, grading and paving equipment, compressors, generators, and welding equipment. Construction crews may also require additional equipment such as pile drivers, dewatering pumps and tanks, and conveyor belts. Materials and equipment would be stored within the project area and existing right-of-way outside of the shoreline area.

Once utilities are relocated, construction of the bridge structure, street-level facilities, and retained cuts that would compose the new SR 99 roadway and ramps would require the following construction activities:

- Demolishing and removing the existing viaduct and support structures
- Soil improvements
- Building bridge foundations

- Retained cut-and-fill construction
- At-grade roadway construction

### Removing the Viaduct and Other Structures

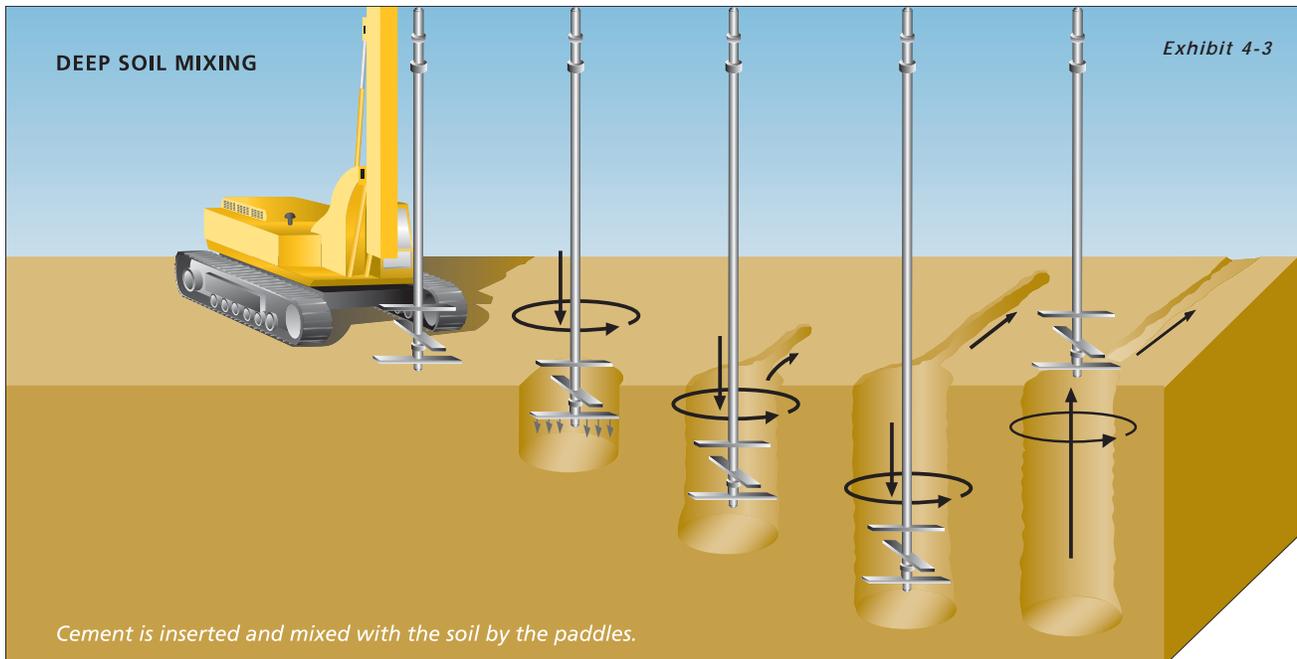
The viaduct and associated structures south of the intersection of Railroad Way S. and Alaskan Way S. would be demolished and removed. Demolishing and removing these structures is expected to take about 3 months during Stage 3. In total, approximately 40,000 cubic yards of reinforced concrete would be removed. These materials would primarily be hauled away by truck.

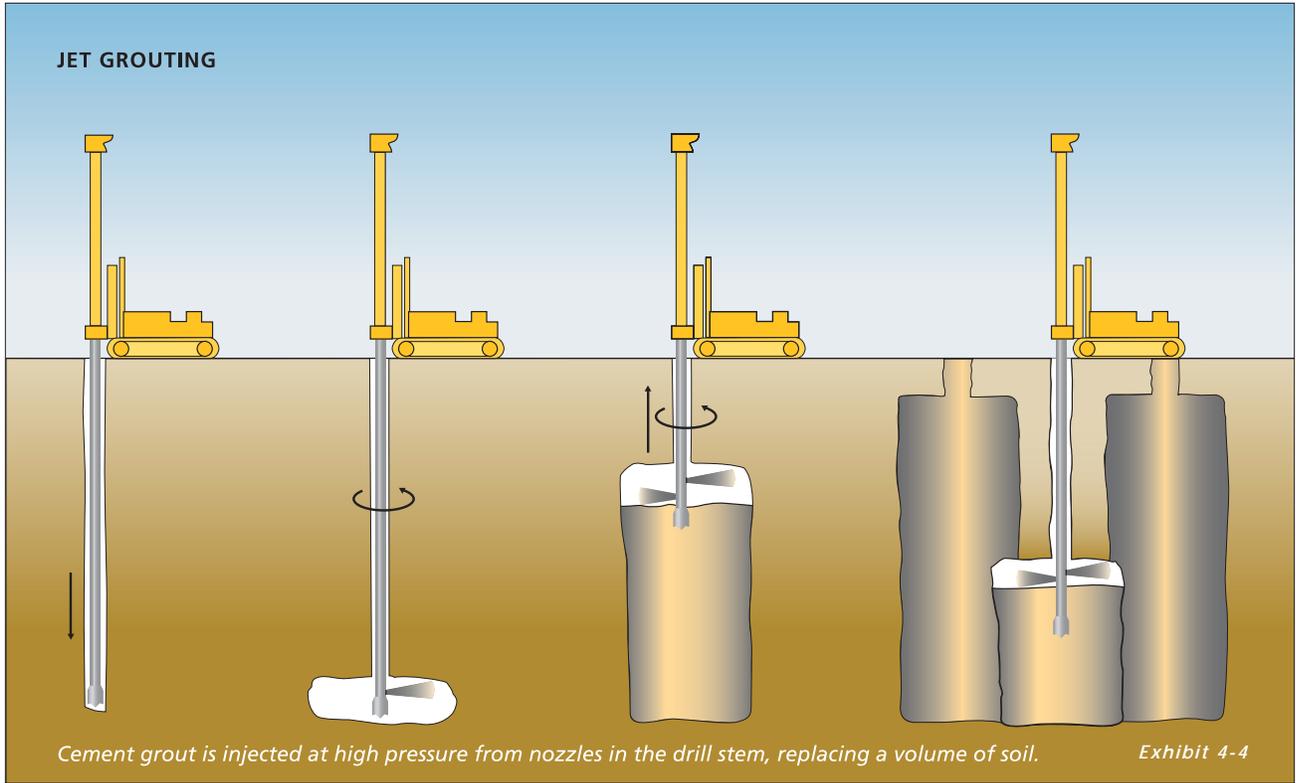
### Soil Improvements

Soil improvements would be required throughout the footprint of the proposed alignment to strengthen soils to offset the risk of soil liquefaction and lateral spreading in the event of an earthquake. Soils can be strengthened many different ways, and a combination of soil improvement techniques would be used. Though a variety of soil improvement techniques may be used, for this project soil improvement methods would likely include deep soil mixing, jet grouting, and stone columns.

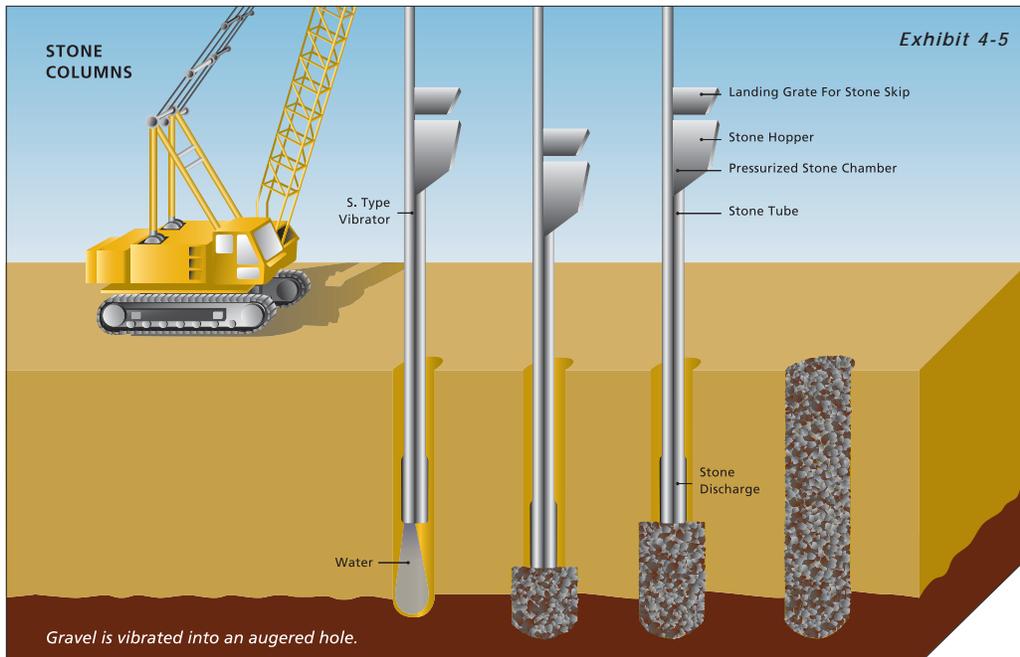
Deep soil mixing involves strengthening soil by mixing it with cement grout injected under pressure. As the soil is mixed, it creates columns of strengthened soil, as shown in Exhibit 4-3.

### Soil Improvement Methods





Jet grouting is similar to deep soil mixing, but can be done using smaller equipment, as shown in Exhibit 4-4. Stone columns are created by backfilling drilled holes with gravel and vibrating it into place to strengthen soil, as shown in Exhibit 4-5.



Deep soil mixing would most likely be used throughout the footprint of the proposed alignment. Jet grouting would be used in place of deep soil mixing where existing utilities preclude access for deep soil mixing equipment. Stone columns may be used beneath proposed fill areas and in the vicinity of bridge abutments and piers.

Deep soil mixing and jet grouting would produce spoils. The volume of spoils created would range from 30 to 50 percent of treated ground volume for deep soil mixing and from 50 to 100 percent of treated ground volume for jet grouting. Stone columns would produce minimal spoils.

### **Building Bridge Foundations**

Foundations for proposed elevated structures would be built using drilled concrete shafts or cast-in-place concrete piles. The foundations would support steel-reinforced concrete columns and bents.

Cast-in-place concrete piles would be used for the portion of the structure carrying SR 99 over S. Atlantic Street. The area for the pile cap would be excavated and shored up as needed. Next, piles would be driven into the ground in the area of the excavation to an average depth of 150 feet. If hammering methods are used, pile driving activities would be disruptive, increasing noise in areas where this activity occurs. However, methods such as pushing or vibrating piles into the ground would be much less disruptive and not as loud. Piles could be constructed in various sizes using several different materials. At this time, it is expected that 2-foot-diameter piles constructed of steel casings filled with reinforced concrete would be used.

Once a cluster of several piles is driven, the pile cap would be finished to connect the cluster of piles together to form a new foundation. The pile cap would be constructed by placing concrete forms in the excavated area, installing rebar (reinforcing bars of steel), and placing concrete within the concrete form. A typical pile cap is expected to be approximately 30 feet by 50 feet with a depth of 5 to 7 feet. Approximately 600 cubic yards of soil would be excavated for each pile cap.

The remainder of the bridge structures would be supported by drilled concrete shafts. Drilled shafts in the south section would range from 8 to 12 feet in diameter and would extend between 60 and 125 feet into the soil. In general, drilled shafts would be built by drilling soil out to the desired circumference

#### **What are spoils?**

Spoils are composed of soil, rock, and other materials that come to the surface when soil is mixed with cement grout.

#### **What is a bent?**

A bent is a structural support consisting of two columns (like the columns on the east and west sides of the existing viaduct) with an interconnecting beam.

and depth, installing rebar, and filling the hole with concrete. The stability of the excavated hole could be maintained either by keeping the hole continuously filled with a sealing mixture or by advancing a steel casing while drilling. Each drilled shaft would require the excavation of approximately 100 to 500 cubic yards of soil.

Temporary bridges proposed during construction to connect the existing First Avenue S. ramps to the WOSCA detour would be built on drilled concrete shafts or micropiles. These pile types would not produce heavy ground vibrations and would protect the existing utilities from damage.

### **Retained Fill Construction**

Proposed retained fills are expected to be retained by constructing structural earth walls. Structural earth walls are built by placing and compacting progressive lifts of soil. Retaining straps made from plastic or steel are placed with the lifts. The successive layers of soil and retaining straps create a block of soil that acts as a solid wall. The wall's exterior face is typically wrapped with a metal or plastic mesh to retain the reinforced soils; a system of reinforced concrete face panels may also be connected to the retaining straps. The concrete face panels also help to retain the soils and could be cast with architectural finishes.

### **Retained Cut Construction**

Roadway sections constructed in retained cuts (such as the U-shaped undercrossing) would be built using a combination of soil improvements, excavation, concrete bottom slabs, secant piles, and interior concrete.

The area would be excavated, once soil improvement activities are completed. Excavation depth is expected to vary between 0 and 40 feet. Excavation in retained cuts would be supported using an internally braced excavation support wall. The support wall would be constructed of secant piles. Secant pile walls are constructed of overlapping drilled concrete piles. First, two shafts would be drilled apart from each other, rebar would be installed, and the hole would be filled with concrete to form the pile. Then another shaft would be placed and filled between the first two. This process would be used to form a continuous wall of interlocking piles.

A concrete bottom slab up to 15 feet thick would be placed at the base of the retained cut. This would provide support for the roadway and would provide a water barrier to allow the

interior of the cut to be dewatered. Water in the cut would then be pumped out, and the remaining roadway construction and finishes would be built in dry conditions.

**At-Grade Roadway Construction**

At-grade roadway sections include portions of SR 99 and Alaskan Way S. The at-grade roadways would be built by removing existing roadways, clearing and grading the area, laying the aggregate roadway foundation, and placing an asphalt or concrete roadway surface. In addition, portions of Colorado Avenue S. and S. Atlantic Street west of Utah Avenue S. would be reconstructed and paved. Sidewalks, landscaping, and lighting would also be constructed on the surface streets.

**3 How would SR 99 traffic be restricted and detoured during construction?**

During construction, WSDOT would make it a priority to maintain traffic capacity on SR 99 as much as practical, minimize effects to First Avenue S., and maintain access to and from area businesses and the stadiums. These priorities would be accomplished by:

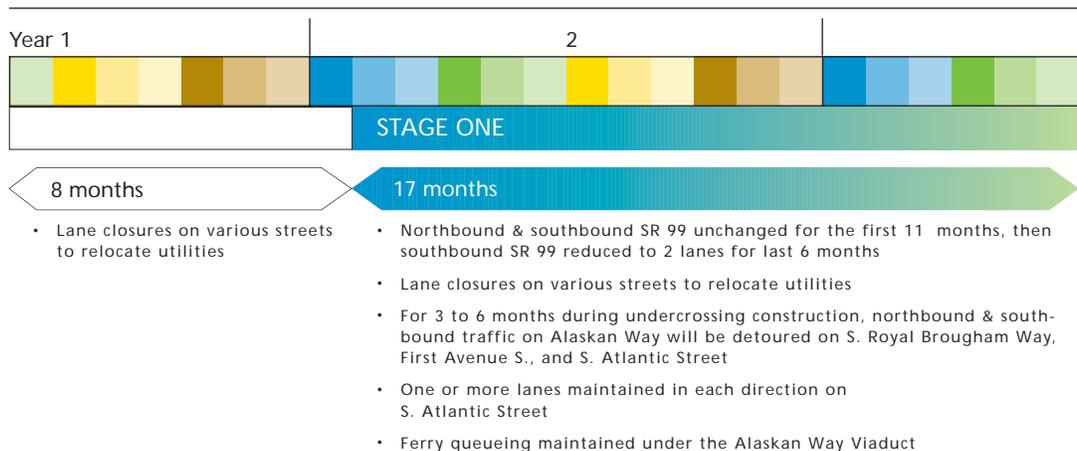
- Maintaining a minimum of two lanes of SR 99 traffic in each direction during peak traffic hours or providing a comparable detour.
- Allowing full closures of SR 99 only during nights and weekends.

**Appendix F Transportation Discipline Report**

*Appendix F* contains supporting traffic information that explains how the construction traffic analysis was conducted and documents the conclusions contained within the text of this EA.

Exhibit 4-6

**Construction Roadway Closures, Restrictions, and Detours**



- Maintaining access to and from the North SIG Railyard and the Port of Seattle’s Terminal 46 at all times.
- Keeping the railroad tracks and the Whatcom Railyard in service, except for short periodic closures of 8 hours or less to facilitate construction activities. Any closures would be coordinated with BNSF and Union Pacific Railroad.

The project is expected to take approximately 4 years and 4 months to build starting in mid-2009. We have divided the total construction period into five stages that have distinct traffic restrictions or detours, as shown on the timeline in Exhibit 4-6.

Exhibit 4-7 shows how long key routes would be affected by roadway restrictions during construction.

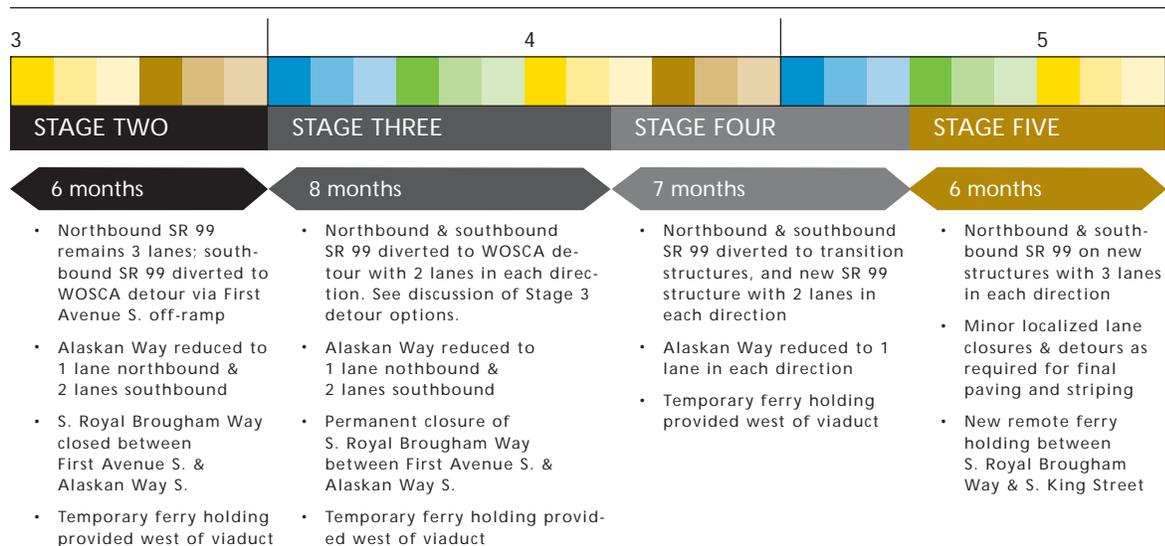
Exhibit 4-7

**Duration of Roadway Restrictions on Key Routes**

Affected Roadway	Duration of Roadway Restrictions
SR 99	2 years – 3 months <i>beginning in early 2011</i>
Alaskan Way S.	2 years – 9 months <i>beginning midyear in 2010</i>
S. Royal Brougham Way	Traffic detoured on S. Royal Brougham Way for 6 months at the end of the first 17 months of construction (Stage 1); S. Royal Brougham Way would be closed permanently where it crosses underneath the existing viaduct after Stage 1, midyear in 2011.

Exhibits 4-8 through 4-12 summarize the traffic restrictions and detours for each stage.

Prior to Stage 1 there would be 8 months of utility relocation work. Water, communication, and electrical lines would be





moved during this time so that they are not in the path of the major construction activities. There would be lane closures and restrictions during this 8-month period at various locations on the surface streets. These locations would change as the utilities are relocated.

### **Stage 1**

The first construction stage would last about 17 months. Traffic on SR 99 would be unchanged for the first 11 months of Stage 1. During the last 6 months, southbound traffic would be reduced to two lanes from just north of Railroad Way S. to S. Holgate Street.

During Stage 1, local streets in the area would be periodically closed for utility relocations. On Alaskan Way S., northbound and southbound lanes would remain open until construction of the undercrossing begins. Construction of the west half of the undercrossing is expected to take about 6 months. During that time, traffic on Alaskan Way S. would be detoured to S. Royal Brougham Way, First Avenue S., and S. Atlantic Street. On S. Atlantic Street, at least one lane of traffic in each direction would remain open throughout Stage 1.

In addition, relocation of rail lines in the Whatcom Railyard would require an 8-hour rail closure and a weekend closure of S. Atlantic Street. During this brief closure, both motorized and nonmotorized traffic would be detoured to S. Royal Brougham Way.

### **Stage 2**

Stage 2 would last about 6 months. During this stage, the three northbound lanes of SR 99 would remain unchanged. All southbound traffic would be diverted to the WOSCA site, east of SR 99, via the First Avenue S. off-ramp along Railroad Way S.

Traffic on Alaskan Way S. would be reduced to one northbound lane and two southbound lanes. A connection to E. Marginal Way S. would be maintained. S. Royal Brougham Way would be permanently closed between First Avenue S. and Alaskan Way S. Temporary remote ferry holding would be located to the west of the viaduct south of S. King Street and would be accessed via S. Atlantic Street.

### **Stage 3**

Stage 3 would last approximately 8 months. During Stage 3, when the existing viaduct is demolished, both northbound

#### **What is the WOSCA Detour?**

A temporary at-grade connection would be built between SR 99, S. Royal Brougham Way, and the WOSCA property. Traffic would travel on a temporary roadway across the WOSCA property. During Stage 2, southbound SR 99 traffic would be diverted off of the existing viaduct between S. Royal Brougham Way and Railroad Way S. During Stage 3, both northbound and southbound SR 99 traffic would use the WOSCA detour in this section, as shown in Exhibit 4-10. At the north end of the detour, traffic would connect to SR 99 via temporary ramps that link up to the existing First Avenue S. ramp.

## Stage 2 Construction





### Stage 4 Construction



### Stage 5 Construction



and southbound SR 99 traffic would use the WOSCA detour between S. Royal Brougham Way and Railroad Way S.

South of S. Royal Brougham Way, both southbound and northbound SR 99 traffic would use the new southbound SR 99 structure. Two traffic lanes would be provided in each direction on SR 99.

Traffic on Alaskan Way S. would be reduced to one northbound lane and two southbound lanes with a connection to E. Marginal Way S. maintained by decking over the undercrossing. The temporary remote ferry holding would continue to be located west of the viaduct.

#### **Stage 4**

Stage 4 would last for approximately 7 months. Northbound and southbound SR 99 traffic would continue to be on the new southbound SR 99 structure, with two lanes in each direction, south of S. Royal Brougham Way. Just north of S. Royal Brougham Way, traffic would be at-grade on SR 99 and connect to the new transition structures that join this project to the existing viaduct near S. King Street.

During Stage 4, Alaskan Way S. would be reduced to one northbound lane and two southbound lanes with a connection maintained to E. Marginal Way S. The temporary remote ferry holding would continue to be located west of the viaduct.

#### **Stage 5**

Stage 5 would last about 6 months. Northbound and southbound SR 99 traffic would travel on new structures from S. Holgate Street to Railroad Way S. with three lanes in each direction.

Local streets would be open for general purpose, ferry, and nonmotorized traffic. However, some minor localized lane or street closures and detours would be needed for final paving and striping. The new remote ferry holding area would also be open between S. Royal Brougham Way and S. King Street along the east side of SR 99. Vehicles would access the new holding area from either S. Atlantic Street or S. Royal Brougham Way.

#### **How would access to SR 99 be affected during construction?**

Access between SR 99 and the stadium area would be maintained throughout the construction period. Today, the First

Avenue S. ramps provide an exit for vehicles traveling southbound on SR 99 and an entrance for vehicles heading to northbound SR 99. These access points would remain open during the beginning and end of construction (Stages 1 and 5), but would be relocated during Stages 2 through 4.

During Stages 2 through 4, the southbound First Avenue S. off-ramp would be closed. Traffic would be relocated to a temporary off-ramp to Alaskan Way S. located just north of S. Royal Brougham Way. The First Avenue S. on-ramp to SR 99 would remain open during Stage 2. Traffic would use a temporary on-ramp from S. Royal Brougham Way west of First Avenue S. during Stages 3 and 4 to access northbound SR 99. The temporary ramp would provide similar access as the current on-ramp.

### **How would access to local streets be maintained during construction?**

Construction activities would disrupt traffic on several streets within the project area, including S. Royal Brougham Way, S. Atlantic Street, Colorado Avenue S., Alaskan Way S., and E. Marginal Way S. Local access to businesses within the project area would be maintained throughout the construction period.

S. Royal Brougham Way would be closed between Alaskan Way S. and First Avenue S. beginning in Stage 2 and would remain closed after construction is complete. A portion of the roadway west of First Avenue S. would remain open to provide access to adjacent businesses and the temporary entrance ramp to northbound SR 99. Drivers that currently use S. Royal Brougham Way to travel east-west between Alaskan Way S. and the stadium area, SR 519, or First Avenue S. would instead use S. King Street to the north or S. Atlantic Street, located one block to the south.

Since S. Royal Brougham Way would be closed, maintaining access on S. Atlantic Street is critical. Throughout the construction period, a minimum of four lanes would be provided on S. Atlantic Street east of Colorado Avenue S., and a minimum of two lanes would be provided on S. Atlantic Street west of Colorado Avenue S. to Alaskan Way S.

To accommodate construction activities, Alaskan Way S. would be relocated east of its current alignment, and connections between S. Atlantic Street and E. Marginal Way S. would be modified. Temporary connections would be provided as

necessary to maintain these routes throughout the construction period.

The temporary southbound off-ramp from SR 99 would allow southbound traffic to access Alaskan Way S. and eastbound traffic to access S. Atlantic Street. A minimum of two southbound and eastbound lanes would be maintained on these streets to accommodate these trips.

During construction, one lane would be open in each direction on Colorado Avenue S. Construction of improvements to

### SR 99 Existing Bus Routes

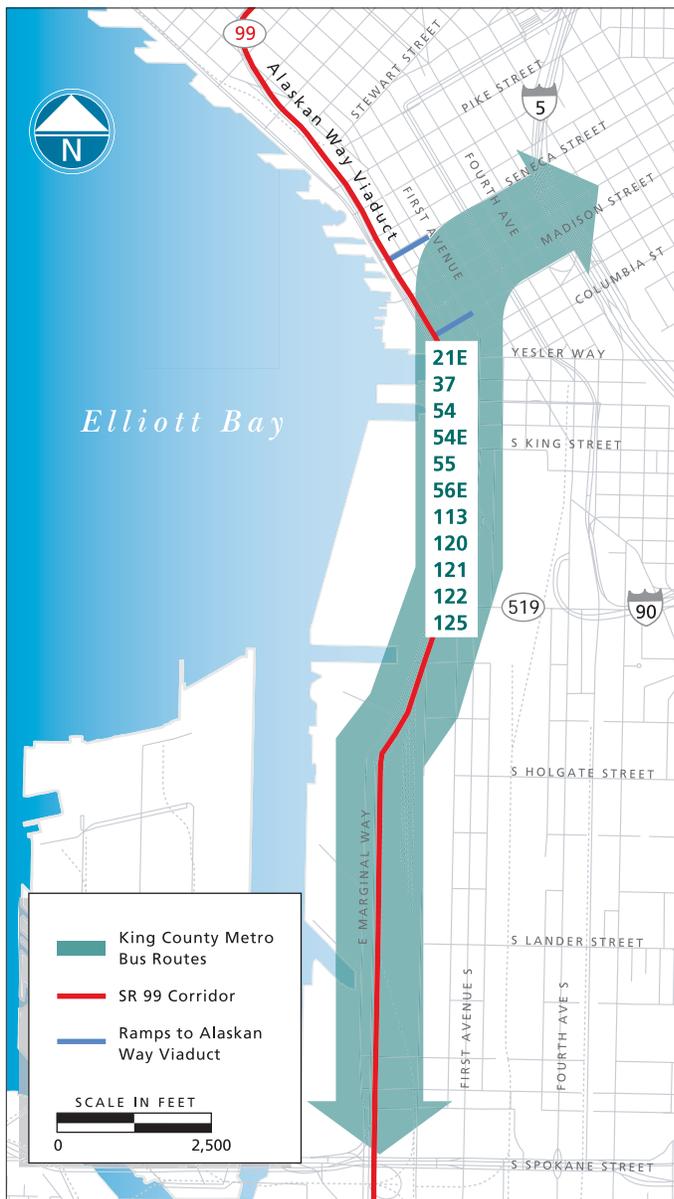


Exhibit 4-13

Colorado Avenue S. may increase delays along this street. Improvements include building two southbound and one northbound truck-only lanes on the west side of the street, and one general purpose lane in each direction on the east side of the street.

### **How would transit be affected during construction?**

During construction, King County Metro Transit bus services using SR 99 would be affected by lane reductions on SR 99 through the construction zone. Transit would be affected in the same way as general purpose traffic. The affected bus routes are shown in Exhibit 4-13. With lane reductions on SR 99 through the construction zone, buses are expected to take longer to reach their destinations if no alternative routes or mitigation measures are provided.

Although SR 99 would remain open, King County Metro Transit may decide to make some routing changes for SR 99 bus routes to help reduce effects to transit riders. Potential mitigation measures on SR 99 and alternate transit paths are being identified in coordination with Seattle Department of Transportation and King County Metro Transit staff. Mitigation measures and alternative paths are being considered for SR 99, First Avenue S., Fourth Avenue S., and the E-3 Busway and include possible transit priority treatments. These options, described below, are in the process of being refined.

### **SR 99**

Three potential transit enhancements are being considered for SR 99 during the construction period. These include:

1. Adding a directional queue bypass lane for both northbound and southbound SR 99. In the northbound direction, the queue bypass lane could extend from the Spokane Street Viaduct to the approximate start of the construction zone at S. Holgate Street using one of the three available lanes. The southbound transit queue bypass lane could begin at the Columbia Street on-ramp and end near the First Avenue S. off-ramp using one of the available three lanes. The southbound transit queue bypass lane may only be feasible if the Columbia Street on-ramp were designated as transit and high-occupancy vehicle (HOV) only during peak periods, as discussed below. Variations on the transit queue bypass strategy will be assessed as the project progresses.
2. Converting the Seneca and Columbia Street ramps to transit/HOV only during peak periods. This conversion would also allow transit to better accommodate trips into and out of downtown during the peak periods when

#### **What is a queue bypass lane?**

A queue bypass lane for transit would provide a dedicated lane and often traffic signal priority, allowing transit to “jump ahead” of other traffic on the roadway.

SR 99 is most heavily used, and would retain more capacity for through trips on SR 99 through downtown.

Converting the Seneca and Columbia Street ramps would displace a relatively high amount of traffic onto the downtown street grid, particularly those trips from West Seattle. Converting these ramps from general purpose to transit and HOV only would require a policy decision from WSDOT, as well as coordination with and agreement from the City of Seattle, King County, and FHWA.

3. Adding a transit-only off-ramp to First Avenue S. near S. Royal Brougham Way. This northbound off-ramp could allow transit to bypass some of the congestion resulting from the detour through the WOSCA property that could back up onto SR 99 at the First Avenue S. ramp. A southbound transit-only on-ramp from Alaskan Way S. is also being considered.

#### ***First Avenue S.***

Two transit enhancements are being considered on First Avenue S. during the construction period.

1. Transit-only lanes on First Avenue S. could be provided. Transit priority could be provided through parking restrictions in the existing parking lane. This could be replaced by or combined with a two-way, center turn lane between S. Spokane Street and S. Atlantic Street to provide northbound and southbound transit lanes. The transit lanes could either be adjacent to the curb or run down the center of the roadway. Regardless of the transit lane placement (curb or center), transit would have to use the general purpose lanes through the most congested segment on First Avenue S. (between S. Holgate Street and S. Royal Brougham Way) and would continue north to S. Washington Street or S. Main Street. The structural stability and ability of the areaways on First Avenue S. to withstand continual transit usage would need to be assessed.
2. The eastbound Spokane Street Viaduct exit ramp to First Avenue S. could be converted from general purpose to transit and HOV only. This designation change could provide transit with a designated path to the transit lanes on First Avenue S. and therefore would support a higher level of reliability and improved speed. Converting the ramp from general purpose to transit and HOV only would require a policy decision from the Seattle Department of Transportation and agreement from WSDOT and King County. This concept assumes that the added eastbound lane on the Spokane Street Viaduct to the Fourth Avenue Loop Ramp from the City's Spokane Street Viaduct Widening Project would be designated as general purpose to facilitate auto traffic's use of the Fourth Avenue Loop Ramp.

***Fourth Avenue S.***

Potential transit enhancements on Fourth Avenue S. were considered but not found to be practical. Fourth Avenue S. is a one-way northbound road north of S. Jackson Street. It experiences considerable congestion between S. Royal Brougham Way and S. Jackson Street, which is largely unavoidable, and it also lacks corresponding southbound access to the Spokane Street Viaduct.

***E-3 Busway***

Potential transit enhancements on the E-3 Busway were considered but found to be a less viable option because there is insufficient capacity for additional buses in the tunnel, which will have joint operations with light rail. In addition, the existing E-3 Busway ends at S. Royal Brougham Way, prior to entering the Downtown Seattle Transit Tunnel and prior to the bottleneck north of S. Royal Brougham Way. As with Fourth Avenue S., there is no corresponding southbound access to the Spokane Street Viaduct.

**How would pedestrians and bicycles be affected during construction?**

During Stage 1, pedestrians and bicyclists would use the existing combined path south of S. Atlantic Street. Between S. Atlantic Street and S. Royal Brougham Way, the path would cross under the existing viaduct and run along a temporary path east of the viaduct. North of S. Royal Brougham Way, the sidewalk on the west side of Alaskan Way S. would be closed and pedestrians and bicyclists would be routed along the existing combined pedestrian/bicycle path on the east side of the street. Signs would be posted to help direct pedestrians and bicycles through the construction zone.

During the last 6 months of Stage 1 when construction for the west half of the undercrossing begins, bicyclists using the bike lane on Alaskan Way S. could be detoured as will vehicular traffic. Traffic on Alaskan Way S. would be detoured to S. Atlantic Street, S. Royal Brougham Way, and First Avenue S. Bicyclists would have the option of sharing the roadway with vehicles on the detour routes or using the existing combined pedestrian/bicycle path on the east side of Alaskan Way S.

During Stages 2 through 4, a combined pedestrian/bicycle path would be provided on the west side of Alaskan Way S., close to the location of the existing sidewalk. The existing path located on the east side of Alaskan Way S. would be closed

south of S. King Street. A pedestrian/bicycle connection to S. Atlantic Street would be provided. As in Stage 1, bicyclists would need to use the combined pedestrian/bicycle path or share the roadway with vehicles.

During Stage 5, localized lane closures would be required for final paving and striping. Bicyclists and pedestrians may be detoured to other routes for brief periods before the final facilities are open for use.

### **How would ferry traffic be affected during construction?**

Although the Seattle Ferry Terminal is located north of the project area, many drivers heading to or from the ferry terminal would need to pass through the construction zone. Currently, vehicles traveling to the terminal sometimes overflow under the existing viaduct north of S. Royal Brougham Way when the terminal is full during busy times. There would be no changes to ferry holding during Stage 1. During Stages 2 through 5, a temporary remote ferry holding area would be located west of Alaskan Way S. and south of S. King Street.

With S. Royal Brougham Way permanently closed after Stage 1 of the construction period, most vehicles would use S. Atlantic Street and Alaskan Way S. to access the Seattle Ferry Terminal and the temporary remote holding area.

Vehicles exiting the Seattle Ferry Terminal would also be rerouted during the construction period. With S. Royal Brougham Way closed, traffic exiting the ferry terminal and traveling southbound on Alaskan Way S. would instead use S. King Street, S. Atlantic Street, and First Avenue S. when traveling through the project area. The tail track would be relocated to the west of Alaskan Way S. to prevent train blockages from affecting vehicles traveling southbound on Alaskan Way S. and eastbound on S. Atlantic Street.

### **How would freight access and connections be affected during construction?**

S. Atlantic Street, SR 519, First Avenue S., and E. Marginal Way S. are key freight routes that serve several important freight handling sites in the project area. Freight trucks would be able to continue to use these routes during the construction period. Although maintaining these routes is a priority, there would be instances when freight traffic would be affected by construction activities. Alaskan Way S. and E. Marginal Way S. are significant routes for over-legal (oversized) vehicles

transporting freight in the area. A route for over-legal vehicles will be maintained throughout construction.

Throughout the construction period, S. Atlantic Street would remain open between Alaskan Way S. and First Avenue S. Similar to today, this route would be blocked by train activity during train switching operations. During these periods, trucks could use S. Horton Street or S. Hanford Street to make trips between Terminal 46, S. Atlantic Street, SR 519, the North SIG Railyard, and other points east. During Stage 1, traffic on S. Atlantic Street would be reduced from four to two lanes between Alaskan Way S. and Colorado Avenue S.

S. Royal Brougham Way would be permanently closed between Alaskan Way S. and First Avenue S. after Stage 1. Trucks that currently use this segment of roadway would instead travel one block to the south to use S. Atlantic Street to access freight-related sites on Alaskan Way S. and E. Marginal Way S.

#### **How would rail operations be affected during construction?**

Rail in the project area can remain open and in operation for most of the construction period. There would be instances when rail operations would be affected due to temporary track relocations during Stage 1 and construction of the final track configuration during Stages 3 and 4. The tail track would be permanently relocated west of the new SR 99 roadway.

The Whatcom Railyard's lead track would also be temporarily relocated during construction to connect to the relocated tail track. In addition, the easternmost Union Pacific track in the Whatcom Railyard would be out of service for approximately 3 years during construction of the southbound bridge between S. Walker and S. Atlantic Streets. This track would be available when construction is completed.

Maintenance of rail operations is a priority, and the project will strive to expedite track construction and minimize effects to rail operations.

#### **How would traffic safety be maintained during construction?**

The traffic safety hazards associated with work zones are greater than on normal roadways. New and unfamiliar traffic patterns, signage, and cones/barricades in temporary work

zones can be confusing and unexpected for drivers. A traffic management plan will be coordinated with the City of Seattle, Seattle Police Department, Seattle Fire Department, Port of Seattle, King County Metro Transit, Safeco Field, Qwest Field, and Qwest Field Event Center to identify detours and traffic management strategies. This plan would address traffic safety and control throughout the work zone. Work zone management strategies may include using Intelligent Transportation Systems (ITS), traveler information, real-time work zone monitoring, traffic incident management, and enforcement components.

During much of the construction period, the bicycle lane on Alaskan Way S. south of S. Royal Brougham Way would be removed. Bicycles would use the shared pedestrian/bicycle path, although some may opt to share the roadway with vehicles. This would increase the potential for vehicle-bicycle conflicts. The combined pedestrian/bicycle path is unlikely to be highly used by pedestrians through the construction area, so bicycle-pedestrian conflicts are not expected to be frequent.

#### **4 How would construction affect traffic and congestion on SR 99 and other city streets?**

##### **How would construction affect traffic and congestion on SR 99?**

Vehicles would experience the most traffic disruption on SR 99 during Stage 3, when traffic on mainline SR 99 is detoured onto the WOSCA property. A traffic analysis was completed using these worst-case assumptions, and for the majority of the construction period, traffic conditions would be better and overall congestion would be less than the conditions described below.

##### ***Travel Patterns and Traffic Volumes***

For a period of about 2 years and 3 months beginning late in Stage 1 and continuing through Stage 4, traffic congestion and travel times on SR 99 are expected to increase due to lane restrictions and detours. Because of this, some SR 99 users are expected to make other travel choices. These changes may include switching to other routes, changing travel modes (such as using transit), making fewer trips, or choosing other destinations.

Exhibit 4-14 shows how AM and PM peak hour traffic volumes may change on SR 99 during Stage 3. When compared to esti-

##### **What is ITS?**

Intelligent Transportation Systems (ITS) use advanced electronic and computer technology to automate highway and vehicle systems that improve safety and efficiency on roadways.

mated year 2010 baseline volumes, traffic volumes on SR 99 are expected to decrease by 30 to 35 percent.

*Exhibit 4-14*

**Peak Hour SR 99 Traffic Volumes**

	<i>AM PEAK HOUR</i>			<i>PM PEAK HOUR</i>		
	<b>2010 Baseline Volumes</b>	<b>Stage 3 Volumes</b>	<b>% Decrease</b>	<b>2010 Baseline Volumes</b>	<b>Stage 3 Volumes</b>	<b>% Decrease</b>
<b>SOUTHBOUND</b>						
SR 99 <i>north of the stadium area</i>	3,900	2,730	30%	5,400	3,510	35%
Off SR 99 <i>to the stadium area</i>	1,480	1,040	30%	850	560	35%
SR 99 <i>south of the stadium area</i>	2,420	1,690	30%	4,550	3,000	35%
<b>NORTHBOUND</b>						
SR 99 <i>south of the stadium area</i>	4,540	2,950	35%	3,620	2,560	30%
On to SR 99 <i>from the stadium area</i>	800	520	35%	1,260	820	35%
SR 99 <i>north of the stadium area</i>	5,330	3,470	35%	4,880	3,360	31%

Exhibit 4-15 (following page) shows how peak hour traffic volumes during the construction period would compare to normal traffic levels throughout the day on the SR 99 mainline. As shown in Exhibit 4-15, hourly traffic volumes during the construction period are expected to be lower than the traffic volumes that would normally occur for several hours during both the AM and PM peak travel periods. Midday traffic volumes on a normal day are usually lower than traffic volumes during the peak periods. During Stage 3, however, traffic volumes during the midday hours could mirror those experienced during the peak hours. This is because congested conditions and changes in travel times during the construction period could result in more trips being made midday than normal.

***Travel Speeds and Queues***

Congested conditions are expected on the SR 99 mainline throughout the construction period, though the most congested conditions are expected during Stage 3. As shown in Exhibit 4-16, travel speeds are generally expected to decrease as vehicles approach the WOSCA detour. Through the WOSCA detour, vehicles would travel at approximately 8 to 20 miles per hour (mph) and then accelerate to free-flow speeds after the detour. Currently, speeds on this section of SR 99 are approximately 30 to 40 mph for southbound traffic and 20 to 40 mph for northbound traffic during the peak hour.

**Why are projected traffic volumes for 2010 used to assess traffic conditions during construction?**

Project construction is expected to begin in the fall of 2009. Therefore, projected traffic volumes in 2010 would be more reflective of actual traffic conditions at the time of construction.

Exhibit 4-15

### SR 99 Peak Hour Traffic Volumes

During Construction Stage 3

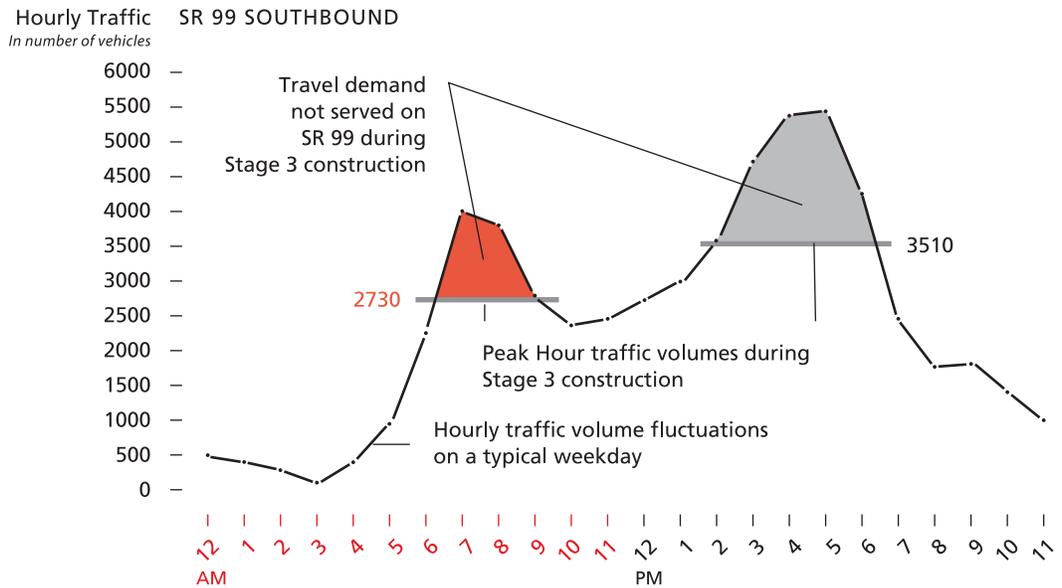
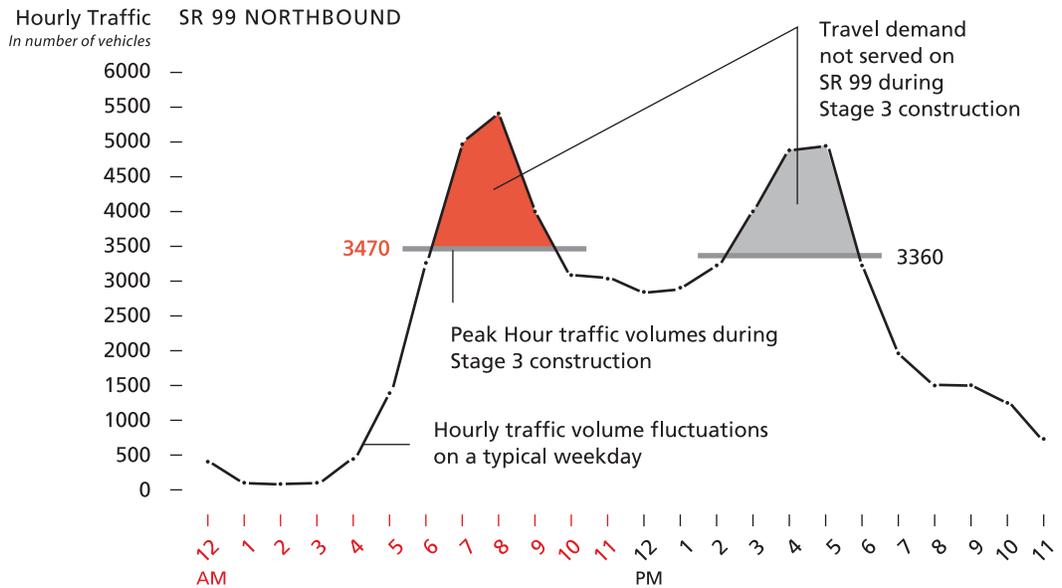


Exhibit 4-16

**SR 99 Peak Hour Travel Speeds during Construction Stage 3**  
in miles per hour (mph)

SOUTHBOUND	AM Peak Hour	PM Peak Hour
North of WOSCA Detour	28	27
Through WOSCA Detour	12 to 20	8 to 20
South of WOSCA Detour	Free-flow	Free-flow
NORTHBOUND		
South of WOSCA Detour	40	40+
Through WOSCA Detour	12 to 20	10 to 20
North of WOSCA Detour	Free-flow	Free-flow

Because of traffic congestion on the detour, vehicles traveling southbound on the SR 99 mainline could experience traffic queues extending back to the vicinity of the Elliott Avenue on-ramp during the AM peak hour and towards the Battery Street Tunnel during the PM peak hour. Northbound, vehicles on the SR 99 mainline could experience traffic queues extending south toward S. Spokane Street during the AM peak hour. During the PM peak hour, congested conditions and northbound traffic queues are expected to remain in the vicinity of the detour.

**How would construction affect traffic and congestion on city streets?**

Trucks traveling to and from the staging areas and work zones are expected to use established truck routes, including First and Fourth Avenues S., S. Atlantic Street, E. Marginal Way S., S. Michigan Street, SR 519, and I-5. Material hauled along these routes would include new construction materials as well as demolished structure materials, excavated soil, and spoils created by soil improvements.

Before and after special events at the stadiums and event center, traffic normally becomes congested on First Avenue S., S. Royal Brougham Way, S. Atlantic Street, and other nearby streets. These conditions would likely be worse during construction, depending on construction stage and time of the event.

Traffic disruption caused by construction would also affect traffic conditions on nearby local streets. Some drivers would choose to divert to alternate routes. In particular, First and Fourth Avenues S. offer direct, alternate routes to SR 99 in the project area.

Exhibit 4-17 shows the intersections that would be congested during Stage 3 of the construction period. Traffic conditions

**Congested Intersections**

CONSTRUCTION STAGE 3  
PM Peak

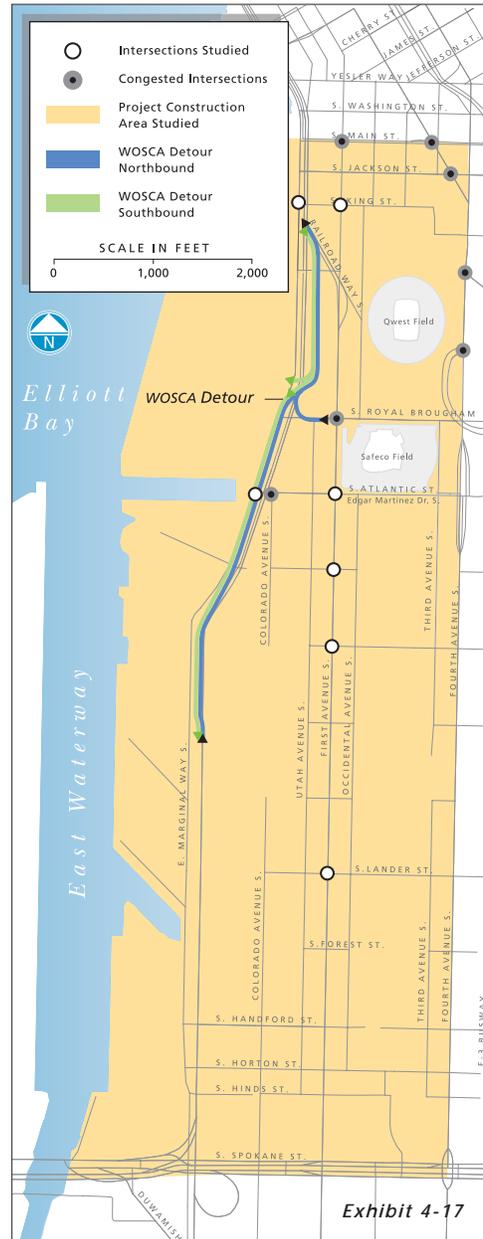


Exhibit 4-17

**What are congested intersections?**

For the traffic analysis conducted for this project, congested intersections are intersections that cause drivers considerable delay. A driver might wait one minute or more to get through a traffic signal at a congested intersection.

during the 8 months of Stage 3 construction represent the most congested conditions expected during the five construction stages.

### ***First Avenue S.***

Expected traffic volumes along First Avenue S. during Stage 3 of the construction period are shown in Exhibit 4-18. Construction effects to traffic volumes would peak during Stage 3 when all SR 99 traffic is routed to the WOSCA detour.

*Exhibit 4-18*

#### **PM Peak Hour Traffic Volumes on First Avenue S.**

	<b>2010 Baseline Volumes</b>	<b>Stage 3 Option 2 Volumes</b>	<b>% Change</b>
<b>SOUTHBOUND</b>			
North of First Avenue S. ramps	540	800	48%
Between First Avenue S. ramps & the stadium area	1,650	980	-40%
South of the stadium area	1,210	1,180	-2%
<b>NORTHBOUND</b>			
South of the stadium area	1,470	1,330	-10%
Between First Avenue S. ramps & the stadium area	1,800	830	-54%
North of First Avenue S. ramps	470	780	67%

Two primary factors would affect traffic volumes on First Avenue S. during Stage 3: the temporary relocation of the First Avenue S. ramps and lane closures on SR 99.

The southbound First Avenue S. off-ramp would be relocated to Alaskan Way S. just north of S. Royal Brougham Way, and the northbound First Avenue S. on-ramp would be relocated to S. Royal Brougham Way on the west side of First Avenue S. The temporary ramps would provide similar access to SR 99 as the current ramps. Traffic volumes would decrease on First Avenue S. between S. Royal Brougham Way and Railroad Way S. because of the ramp relocations and the lane closures on SR 99. The traffic volumes north of the current First Avenue S. ramp location would increase due to the additional traffic displaced from SR 99.

South of the stadium area (near S. Atlantic Street), peak hour traffic volumes are expected to decrease by 2 to 10 percent. While some diverted traffic is expected on First Avenue S., this traffic increase is more than offset by traffic reductions associated with temporarily relocating the First Avenue S. ramps.

First Avenue S. has adequate capacity to accommodate the construction traffic volumes forecasted for the construction

period. The projected traffic volumes could be accommodated under congested conditions, even with only one lane of travel provided in each direction north of S. Royal Brougham Way. However, there is a possibility First Avenue S. may attract more traffic than indicated by the forecasting model, given the high levels of congestion forecasted for SR 99 and Fourth Avenue S. during the construction period. Should First Avenue S. attract more traffic than indicated by the forecasting models, parking restrictions would be needed along First Avenue S. in Pioneer Square during both the AM and PM peak periods, to create an additional travel lane north of S. King Street. These parking spaces are currently restricted for the AM peak period.

#### ***Fourth Avenue S.***

During Stage 3, traffic would also divert from the SR 99 mainline to Fourth Avenue S., as shown in Exhibit 4-19. Traffic volume increases on Fourth Avenue S. would not be offset by the changes associated with the SR 99 First Avenue S. ramps to the same degree as on First Avenue S.

#### *Exhibit 4-19*

#### **PM Peak Hour Traffic Volumes on Fourth Avenue S.**

	2010 Baseline Volumes	Stage 3 Volumes	% Change
<b>SOUTHBOUND</b>			
North of Airport Way S.	1,160	1,950	68%
North of I-90	1,520	2,100	39%
Between I-90 ramps & S. Royal Brougham Way	2,320	2,780	20%
South of S. Atlantic Street	1,190	1,860	56%
<b>NORTHBOUND</b>			
South of S. Atlantic Street	1,130	1,600	42%
Between I-90 ramps & S. Royal Brougham Way	640	900	41%
North of I-90	930	1,320	42%
North of Airport Way S.	1,390	1,900	37%

North of Airport Way S., PM peak hour traffic volumes on Fourth Avenue S. are expected to increase by 37 to 68 percent during Stage 3 of the construction period because vehicles displaced by the SR 99 closure would likely use this parallel route between the downtown business district and the stadium area. During the AM peak hour, northbound traffic is expected to be more constrained on this segment of Fourth Avenue S. than during the PM peak hour.

Between the I-90 ramps and S. Royal Brougham Way, traffic volumes are typically heavier in the southbound direction as

vehicles travel from the I-90 off-ramp to SR 519. During Stage 3, traffic volumes in this segment of Fourth Avenue S. are expected to increase by 20 to 41 percent during the PM peak hour. South of S. Atlantic Street, PM peak hour traffic volumes are projected to increase by 42 to 56 percent during Stage 3.

Even without these traffic volume changes, southbound traffic on Fourth Avenue S. north of S. Royal Brougham Way is already heavily congested during the PM peak hour. As shown in Exhibit 4-17, a number of intersections on Fourth Avenue S., including the intersection at Airport Way S. and intersections associated with the I-90 off-ramp, are expected to operate poorly during Stage 3 of the construction period. These results show that Fourth Avenue S. would not be able to effectively move a substantial amount of additional traffic in the peak commute direction. Despite operational problems on Fourth Avenue S., eastbound traffic on S. Atlantic Street would still flow quite well.

#### ***Alaskan Way S and S. Atlantic Street***

S. Royal Brougham Way between Alaskan Way S. and First Avenue S. would be closed during the majority of the construction period. During this time, traffic exiting SR 99 in the stadium area would likely be redirected to Alaskan Way S. With these traffic routing changes during construction, a minimum of two travel lanes need to be provided for southbound traffic on Alaskan Way S.

During Stage 3, the intersection of Alaskan Way S. and Colorado Avenue S. at S. Atlantic Street, which operates in tandem with the adjacent E. Marginal Way S./Terminal 46/S. Atlantic Street intersection, would be reconfigured. This intersection would operate poorly during the AM and PM peak hours, with congestion forming along southbound Alaskan Way S., northbound E. Marginal Way S., and Colorado Avenue S.

### **5 What would we do to keep people and traffic moving during construction?**

We plan to develop and deliver enhancements and improvements to help keep traffic moving during the construction of this project and other projects proposed as part of the Alaskan Way Viaduct and Seawall Replacement Program. These enhancements and improvements are independent projects that benefit all pending improvements under the Alaskan Way Viaduct and Seawall Replacement Program. As such, they are not part of the S. Holgate Street to S. King Street Viaduct

Replacement Project and will each be evaluated separately. Up to \$125 million has been set aside for funding these enhancements and improvements. The projects and strategies include additional transit service hours and capital equipment (i.e., buses), transit speed and reliability improvements, traveler information systems, improving arterial and street traffic operations, and supporting transportation demand management efforts and other projects.

The project team has begun work on identifying candidate projects and programs that could be eligible for funding. Projects planned for implementation are discussed below. In addition, WSDOT, the City of Seattle, and King County are considering establishing an oversight committee called the Downtown Transportation Operations Committee. This committee would be tasked with monitoring and coordinating construction activities in the greater downtown Seattle area. This committee would lead the coordination efforts to ensure that transportation operations for all modes (general purpose traffic, transit, and freight) are as effective as possible during downtown construction activities. This committee would provide for real-time communications and information linkages to better manage the multimodal transportation system.

We will also prepare a traffic management plan in coordination with City of Seattle, Seattle Police Department, Seattle Fire Department, Port of Seattle, King County Metro Transit, Safeco Field, Qwest Field, and Qwest Field Event Center. The plan will identify ways to minimize construction effects to traffic. Procedures in the plan would include:

- Agency coordination.
- Flexible and responsive management of traffic before, during, and after stadium events.
- Strategies for redirecting traffic.
- Notification of detours, lane closures, nighttime construction, or other relevant information.

### **Proposed Projects to Keep Traffic Moving During Construction**

The projects listed in Exhibit 4-20 (following page) have been identified to help keep traffic moving during construction.

### **Transit Priority Routes and Strategies**

As noted earlier, a number of potential transit enhancements are being considered for SR 99 and First Avenue S. during the

## Exhibit 4-20

## Proposed Projects to Keep Traffic Moving during Construction

PROJECT NAME	TRAVEL MARKET	GOALS
SR 519 Intermodal Access Project Phase 2	<ul style="list-style-type: none"> <li>Freight to/from the Port of Seattle</li> <li>SODO</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway &amp; street system reliability</li> <li>Improve freight connections</li> </ul>
Spokane Street Viaduct Widening Project	<ul style="list-style-type: none"> <li>West Seattle</li> <li>SODO</li> <li>Duwamish</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway &amp; street system reliability</li> <li>Improve freight connections</li> <li>Help redistribute traffic to/from West Seattle</li> </ul>
Elliott Avenue W. to 15 <sup>TH</sup> Avenue W. Corridor Improvements	<ul style="list-style-type: none"> <li>Ballard</li> <li>Magnolia/Interbay</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway &amp; street system reliability</li> <li>Provide information to travelers</li> <li>Improve ITS infrastructure to support transit signal priority &amp; provide real-time transit information</li> </ul>
West Seattle Corridor Improvements	<ul style="list-style-type: none"> <li>West Seattle</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway &amp; street system reliability</li> <li>Provide information to travelers</li> <li>Improve ITS infrastructure to support transit signal priority &amp; provide real-time transit information</li> </ul>
SODO/Integrated Corridor Management Improvements	<ul style="list-style-type: none"> <li>SODO</li> <li>Georgetown</li> <li>I-5</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway &amp; street system reliability</li> <li>Provide information to travelers</li> <li>Improve ITS infrastructure to support transit signal priority &amp; provide real-time transit information</li> </ul>
I-5 Travel Time Signs	<ul style="list-style-type: none"> <li>Regional through trips on I-5</li> </ul>	<ul style="list-style-type: none"> <li>Provide information to travelers</li> </ul>
Secure use of new buses & transit service hours	<ul style="list-style-type: none"> <li>West Seattle</li> <li>Burien</li> <li>White Center</li> <li>Ballard</li> <li>Aurora</li> <li>I-5 Corridor</li> </ul>	<ul style="list-style-type: none"> <li>Increase transit capacity</li> <li>Increase transit frequency</li> <li>Increase transit system reliability</li> </ul>
Bus Travel Time Monitoring System	<ul style="list-style-type: none"> <li>Transit System</li> </ul>	<ul style="list-style-type: none"> <li>Improve transit system reliability</li> </ul>
I-5 Active Traffic Management	<ul style="list-style-type: none"> <li>Regional through trips on I-5</li> </ul>	<ul style="list-style-type: none"> <li>Improve highway system reliability</li> <li>Reduce the number of roadway incidents</li> <li>Reduce the severity of roadway incidents</li> </ul>
Ballard and SODO Arterial Travel Time System	<ul style="list-style-type: none"> <li>Ballard</li> <li>Magnolia/Interbay</li> <li>SODO</li> </ul>	<ul style="list-style-type: none"> <li>Improve street system reliability</li> <li>Provide information to travelers</li> </ul>
Denny Way Corridor Improvements	<ul style="list-style-type: none"> <li>Ballard</li> <li>Queen Anne</li> <li>South Lake Union</li> </ul>	<ul style="list-style-type: none"> <li>Improve street system reliability</li> <li>Provide information to travelers</li> </ul>
South End Transportation Demand Management	<ul style="list-style-type: none"> <li>West Seattle</li> <li>South Seattle</li> <li>Burien</li> <li>Tukwila</li> </ul>	<ul style="list-style-type: none"> <li>Encourage shifts in travel modes for single-occupant vehicles</li> <li>Provide information to travelers</li> </ul>
Downtown Transportation Demand Management	<ul style="list-style-type: none"> <li>Downtown Seattle</li> </ul>	<ul style="list-style-type: none"> <li>Provide travel information for visitors</li> <li>Encourage shifts in travel modes for single-occupant vehicles</li> <li>Improve parking management</li> </ul>
In Construction Adaptation Project	<ul style="list-style-type: none"> <li>All</li> </ul>	<ul style="list-style-type: none"> <li>Modify the system as needed to adapt to ongoing construction activities</li> </ul>

construction period. Some of the considerations would require a policy decision or agreement from the City of Seattle, WSDOT, and King County. The projects include:

- Implementing a directional queue bypass lane for both northbound and southbound SR 99 ramps.
- Converting the Seneca and Columbia Street ramps to transit and HOV only during peak periods.
- Implementing a transit-only northbound off-ramp to First Avenue S. near S. Royal Brougham Way.
- Implementing transit-only lanes on First Avenue S.
- Converting the Spokane Street Viaduct eastbound ramp to First Avenue S. from general purpose to transit and HOV only.

### Managing Event Traffic

Safeco Field, Qwest Field, and Qwest Field Event Center host many sporting and other events, which generate high volumes of traffic. Typical attendance at these facilities is shown in Exhibit 4-21. The home game schedules for the Mariners and Seahawks during the construction period are expected to be similar to their existing schedules. Forty-eight of the 81 Mariners home games in 2008 are scheduled on weekday evenings, which can affect the evening peak hours of travel. All of the Seahawks regular season home games in 2008 are scheduled on Sundays and do not affect the weekday commute periods; however, there is a possibility that a game could occur on a different day, such as a weekday night.

*Exhibit 4-21*

#### Typical Event Attendance in the Stadium Area

Event	Average Number of Attendees (Approximate)
Safeco Field – Mariners game	37,000
Qwest Field – Seahawks game	58,000
Event Center – large trade show	20,000 - 65,000
Event Center – small trade show	5,000 - 20,000

Source: SR 519 Intermodal Access Project Phase 2, WSDOT and FHWA 2008

During construction, events that overlap with peak commuting hours are likely to create very congested traffic conditions. Traffic flow during events is managed by the Seattle Police Department. The traffic control officers adapt to specific conditions and use their professional judgment regarding how traffic restrictions are applied under specific circumstances. Pedestrian traffic before and after events at the stadiums is

also heavy and controlled at intersections by the Seattle Police Department.

### **Other Potential Projects**

Construction traffic mitigation projects will continue to be developed, with the goal of having critical projects in place by the time major construction effects to SR 99 traffic occur. We will coordinate with other agencies and projects as applicable. In addition, more localized mitigation measures will be developed as project construction details are refined. Some localized mitigation measures during construction might include:

- Temporarily widening Alaskan Way S. from S. Atlantic Street to S. King Street to accommodate two southbound lanes and one northbound lane of traffic during Stages 2 through 4, including ferry traffic.
- Providing temporary traffic signals.
- Providing flaggers at certain intersections to facilitate freight movements and other traffic as necessary.

### **6 How would noise be affected during construction?**

Construction would typically take place 5 days per week, 10 hours per day. However, construction may occur up to 24 hours per day, 7 days per week at times during the construction period. Some night or weekend work may be required for roadway crossings, tail track relocation, or other critical construction activities. Nighttime work would be completed in compliance with the City of Seattle Noise Ordinance. Any noise variances would need to be obtained prior to any nighttime construction.

Construction noise would be bothersome to nearby residents and businesses. The loudest construction activity would be the demolition of the existing viaduct. The most common noise source near construction work zones would be from engines. Earth-moving equipment, material-handling equipment, and stationary equipment are all engine-powered. Stationary equipment (e.g., pumps, generators, and compressors) operates at sound levels that are fairly constant over time. Because trucks would be present during most phases and would not be confined to the project site, noise from trucks could affect more receptors. Other noise sources would include impact equipment and tools such as pile drivers.

Construction noise could last for several weeks in any one area. Construction noise would be intermittent, occurring at

different times and locations during the construction. Construction noise levels would depend on the type, amount, and location of construction activities. The maximum noise levels of construction equipment would be similar to the typical maximum construction equipment noise levels presented in Exhibit 4-22.

**Exhibit 4-22  
Typical Sound Levels**

Transportation Sources Other Sources	Description
Jet Takeoff (200 feet) Car horn (3 feet)	120 dBA <i>Maximum vocal effort</i>
Pile Driver (50 feet)	110 dBA
Shout (1/2 foot)	100 dBA <i>Very annoying</i>
Heavy truck (50 feet) Jackhammer (50 feet) Home shop tools (3 feet)	90 dBA <i>Loss of hearing with prolonged exposure</i>
Train on a structure (50 feet) Backhoe (50 feet)	80 dBA <i>Annoying</i>
City Bus (50 feet) Vacuum cleaner (3 feet) Bulldozer (50 feet)	80 dBA
Train (50 feet) Blender (3 feet)	70 dBA
City bus at stop (50 feet) Freeway traffic (50 feet) Lawn mower (50 feet) Large office	70 dBA <i>Intrusive</i>
Train in Station (50 feet) Washing machine (3 feet)	60 dBA
Television (10 feet) Talking (10 feet)	60 dBA
Light Traffic (50 feet) Talking (10 feet)	50 dBA <i>Quiet</i>
Light traffic (100 feet) Refrigerator (3 feet)	50 dBA
Library	40 dBA
Soft whisper (15 feet)	30 dBA <i>Very quiet</i>

Source: FTA 1995, EPA 1971, EPA 1974

As shown in Exhibit 4-22, maximum noise levels from construction equipment would range from 69 to 106 dBA  $L_{max}$  at 50 feet. Construction noise at locations farther away would decrease at a rate of 6 to 8 dBA per doubling of distance from the source. The number of occurrences of the maximum noise peaks would increase during construction, particularly during pile-driving activities. Because various pieces of equipment would be turned off, idling, or operating at less than full power at any given time, and because construction machinery is typically used to complete short-term tasks at any given location, average  $L_{eq}$  daytime noise levels would be 10 to 20 dBA less than the typical maximum construction equipment noise levels. Construction noise levels may not exceed a maximum  $L_{eq}$  (7.5 minutes) of 99 dBA at 50 feet or the nearest property line (whichever is farther) within the city of Seattle (SMC 25.08.425).

**What is a dBA?**

Sound levels are expressed on a logarithmic scale in units called decibels (dB). A-weighted decibels (dBA) are the commonly used frequency that measures sound at levels that people can hear.

To the human ear, a 1- to 3-dBA change is hard to distinguish, but a 5-dBA change in noise levels is readily noticeable. A 10-dBA decrease would sound like the noise level has been cut in half.

**What are  $L_{max}$  and  $L_{eq}$ ?**

The maximum sound level ( $L_{max}$ ) is the loudest short-duration sound level that occurs during a single event.  $L_{max}$  is related to effects such as speech interference and sleep disruption.

The  $L_{eq}$  is a measure of the average sound energy during a specified period of time.

### What types of mitigation measures would be used to minimize these effects?

To reduce construction noise at nearby receptors, mitigation measures would be incorporated where feasible into construction plans, specifications, and variance requirements. Mitigation could include the following measures:

- Crush and recycle concrete off-site, away from noise-sensitive uses, to decrease construction noise effects.
- Construct temporary noise barriers or curtains around stationary equipment and long-term work areas that must be located close to residences. This would decrease noise levels at nearby sensitive receptors and could reduce equipment noise by 5 to 10 dBA.
- Designate specific construction activities as high-impact noise-generating activities and assign noise limits that cannot be exceeded during specific time periods.
- Limit the noisiest construction activities to between 7 a.m. and 10 p.m. on weekdays and holidays, and between 9 a.m. and 10 p.m. on weekends to reduce construction noise levels during sensitive nighttime hours.
- Restrict impact construction activities, such as pile driving.
- Equip construction engines with adequate mufflers, intake silencers, and engine enclosures; this could reduce their noise by 5 to 10 dBA<sup>1</sup>.
- Use the quietest equipment available; this could reduce noise by 5 to 10 dBA.
- Require broadband backup alarms approved by the Occupational Safety and Health Administration (OSHA); this could reduce disturbances to nearby residents from backup alarms during quieter periods.
- Turn off construction equipment during prolonged periods of non-use; this could eliminate noise from idling construction equipment during those periods.
- Require all equipment to be maintained and equipment operators to be trained; this could reduce noise levels and increase operational efficiency. Out-of-specification mufflers can increase equipment noise by 10 to 20 dBA.

Additional noise mitigation measures are described in Appendix B. Other mitigation measures could also be specified in a noise variance. WSDOT would coordinate with nearby businesses and residents to notify them if there are circumstances that require nighttime construction activities to occur nearby.

#### Appendix G Technical Memoranda

*Appendix G* contains technical memoranda that support conclusions discussed in this EA:

- *Alternative Description and Construction*
- *Archaeological Resources*
- *Economics*
- *Environmental Justice*
- *Geology and Soils*
- *Hazardous Materials*
- *Historic Resources*
- *Land Use and Shorelines*
- *Noise and Vibration*
- *Parks and Recreation*
- *Public Involvement*
- *Public Services and Utilities*
- *Relocations*
- *Social Resources*
- *Visual Quality*
- *Water Resources*

<sup>1</sup>EPA 1971

## 7 Would vibration affect the project area during construction?

Vibration and settlement caused by construction could damage existing structures and utilities. Construction activities that would result in the highest levels of ground vibration are the demolition of the existing viaduct structure and impact pile driving. During viaduct demolition, buildings closer than 100 feet could potentially exceed the vibration damage risk criterion for extremely fragile buildings. The majority of buildings along the proposed alignment for this project are not considered to be fragile. Two historic buildings are located near the viaduct, the Bemis Building and the Triangle Hotel. The Bemis Building is about 65 feet away from the viaduct, and the hotel is approximately 160 feet away from the viaduct and about 40 feet from the First Avenue S. ramp columns, which will remain in place. For newer buildings, the risk for vibration damage would not be exceeded when construction activities are more than 25 feet away. For pile driving, buildings closer than 400 feet would exceed the damage risk criterion for extremely fragile buildings, while at 50 feet they would not exceed the criterion for newer buildings.

Settlement could occur where soils are excavated. If any existing pile foundations are to be removed, vibration techniques should be avoided in areas where adjacent structures or utilities are present. Soil improvement methods could also cause vibration and potentially damage utilities. We will coordinate with Seattle Public Utilities and affected utility providers to identify nearby utilities that should be avoided. Effects could be mitigated by monitoring activities and altering construction methods if needed.

### What types of mitigation measures would be used to minimize these effects?

To reduce construction vibration effects, mitigation measures would be incorporated into construction plans and specifications. Several potential measures and construction methods can be used to reduce vibration from impact pile driving, when appropriate for specific site conditions, such as:

- Jetting.
- Pre-drilling.
- Cast-in-place or auger piles.
- Pile cushioning.

### What are the construction vibration criteria?

The potential for cosmetic or structural damage due to construction activities is assessed on the basis of effect criteria developed by the Acoustical Society of America (2001), the International Organization for Standardization (ISO 1989), and the Federal Transit Administration (FTA 2006).

The highest levels of vibration would be during the demolition activities. The expected peak particle velocity of ground vibration levels at 25 feet from the demolition activities ranges from 0.24 to 0.42 inch/second. This would exceed the damage risk criterion of 0.12 inch/second for older extremely fragile buildings but would not exceed the project's damage risk criterion for newer buildings of 0.50 inch/second.

### Appendix B. Potential Mitigation Measures

*Appendix B* lists potential mitigation measures being considered for this project.

- Alternative non-impact drivers.
- Use of vibratory pile drivers instead of impact drivers.

Vibration from other construction activities can be reduced by either restricting their operation to predetermined distances from historic structures (such as the Triangle Hotel) or other sensitive receivers, or using alternative equipment or construction methods. An example would be the use of saws or rotary rock cutting heads to cut bridge decks or concrete slabs instead of using a hoe ram. Vibration mitigation measures are described further in Appendix B.

WSDOT could implement vibration monitoring at the nearest historic structure or sensitive receiver to the construction activities. The monitoring data would be compared to the project's vibration criteria to ensure that ground vibration levels do not exceed the damage risk criteria for historic and non-historic buildings, and to determine if mitigation measures are needed.

## **8 How would air quality be affected during construction?**

Dust from demolition, excavation, and truck-hauling activities and emissions from heavy-duty construction equipment could affect air quality in the immediate vicinity of construction activities. Air pollutant emissions that result from construction activities were qualitatively assessed for the project. Equipment emissions could come from:

- Gas and diesel-fueled construction equipment, such as bulldozers, backhoes, and cranes.
- Diesel- and gas-fueled generators.
- Other project-generated vehicles (such as service trucks and pickups).

Fugitive PM<sub>10</sub> emissions from construction activities could be noticeable, if uncontrolled. These emissions would be temporary and limited to the immediate area surrounding the construction site.

## **What types of mitigation measures would be used to minimize these effects?**

During construction, specific avoidance and minimization measures will help reduce pollutant emissions. These measures could include spraying exposed soil with water, covering truck loads and materials as needed, washing truck wheels before leaving the site, removing particulate matter from

### **Appendix E Air Quality Discipline Report**

*Appendix E* Appendix E contains information that supports conclusions discussed in this EA about air quality during construction.

### **What are Fugitive PM<sub>10</sub> emissions?**

Fugitive PM<sub>10</sub> emissions are associated with demolition, land clearing, ground excavation, grading, cut-and-fill operations, and structure erection. PM<sub>10</sub> emissions would vary from day to day, depending on the level of activity, specific operations, and weather conditions.

roads, routing and scheduling construction trucks to reduce delays, staging materials and construction areas in a way that reduces standing wait time for equipment, ensuring that equipment is well-maintained, and implementing other temporary mitigation measures as needed and considered appropriate. Reducing delays and ensuring that equipment operates at efficient levels will reduce fuel consumption and emissions, which contribute to climate change. Due to space constraints at the work site and the benefit of additional emission reductions, we recommend that ridesharing and other commute trip reduction efforts be promoted for employees working on the project. Air quality mitigation measures are described further in Appendix B.

## **9 How would economic conditions in surrounding areas be affected?**

### **Benefits**

Increased employment and economic stimulus to the local economy from construction activities would be the primary economic benefit from the project. About 1,600 new jobs would be directly associated with the project as a result of new money entering the Puget Sound regional economy. The amount of new earnings (wages) entering the Puget Sound regional economy would be about \$59 million.

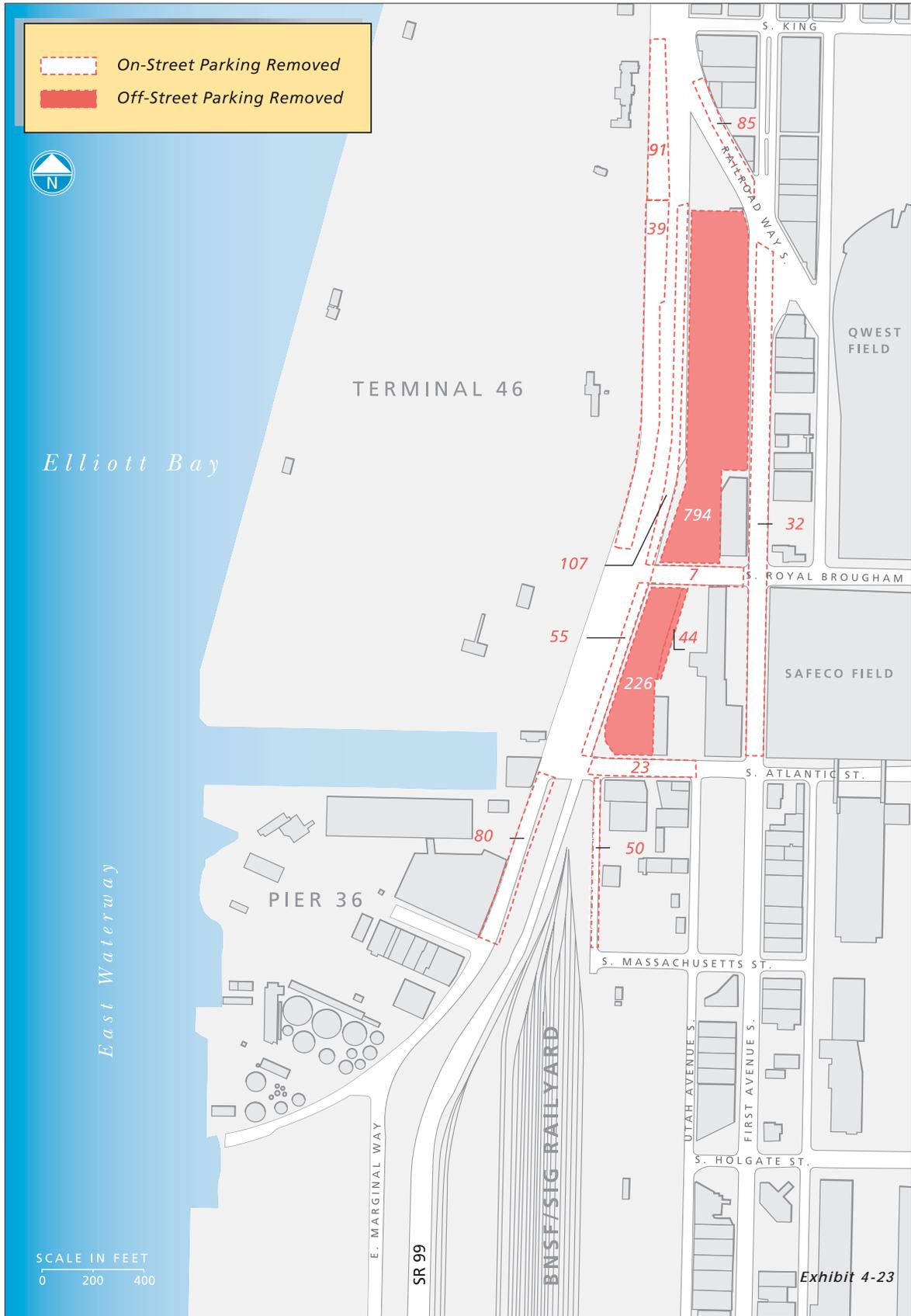
The project would generate \$15 million in sales tax revenue through the purchase of goods and materials related to construction.

### **Businesses and Employees**

The project requires a construction period of about 4 years and 4 months that would disrupt normal business activities in the project area. Approximately 308 businesses (including multi-family residential buildings) were identified within one block of SR 99 that could be disrupted by construction activities. These temporary effects include the following:

- Increased activity from construction workers, heavy construction equipment, and materials.
- Temporary road closures, traffic diversions, and alterations to property access.
- Noise and vibrations from construction equipment and vehicles.
- Decreased business visibility and times when customer access to businesses may be more challenging due to reduced parking and traffic restrictions.

### Locations of Parking Removed during Construction



Up to 19 active commercial and industrial buildings are within 50 feet of the proposed SR 99 alignment and would not be acquired. Some businesses in these buildings may suffer little or no adverse effects, while others may experience a noticeable temporary decline in sales, increase in costs, or decrease in efficiency.

***What types of mitigation measures would be used to minimize effects to businesses and employees?***

Construction activities would likely interfere with access to businesses and properties adjacent to the project on each side of the right-of-way. A primary goal of construction planning is to maintain adequate access to all businesses so they can continue to operate. WSDOT would coordinate with affected businesses to minimize the amount of disruption from construction activities and provide signage to identify that businesses are open during construction. Mitigation measures during construction would include having a communications plan and providing advance notice to property owners in the project area regarding construction activities, utility disruptions, and detours.

**Parking**

Approximately 1,633 parking spaces would be removed during the first stage of construction, which is expected to last 17 months. Exhibit 4-23 shows the locations of parking removed in the project area. As shown in Exhibit 4-24, some spaces would become available again in Stages 2 through 5. Approximately 1,267 of the parking spaces removed during construction would be removed permanently.

*Exhibit 4-24*

**Parking Removed during Construction**

	Spaces Removed During Stage 1	Spaces Removed During Stages 2 - 4	Spaces Removed During Stage 5	Spaces Removed Permanently
<b>On-Street</b> short-term parking spaces	146	146	29	29
<b>On-Street</b> long-term parking spaces	423	423	423	418
<b>Off-Street</b> parking spaces	1,064	1,020	1,020	820
<b>Total</b>	<b>1,633</b>	<b>1,589</b>	<b>1,472</b>	<b>1,267</b>

Removing 146 on-street short-term parking spaces would result in an annual revenue loss of approximately \$365,000 for the City of Seattle. The City would also lose revenue associated with the license fees and user tax for affected off-street parking lots. During normal business hours, the existing on-

street short-term parking is underutilized, and many spaces are typically available within two blocks of the removed spaces.

Free on-street long-term parking is available within several blocks of the project. The spaces closer to the railyards are more highly utilized than spaces farther south. People who normally park in the long-term free spaces that are being removed could choose to park farther away, pay for parking, or change their mode of travel.

Approximately 1,064 off-street parking spaces would be removed. However, many other parking lots are available in the project area. About 37 percent of the off-street parking spaces in the stadium area are utilized on an average non-event weekday, according to the Puget Sound Regional Council<sup>2</sup>.

<sup>2</sup> PSRC 2006

Construction would affect on-street parking on First Avenue S. north of S. Atlantic Street during Stages 1 through 4. However, these spaces already tend to be restricted before, during, or after events at either stadium or the event center. During events such as Seahawks or Mariners games, parking is highly utilized, and private lots charge a premium for event parking. During construction, it could become more difficult to find parking during an event. As they are today, event-goers would be encouraged to use bus and rail service and to car-pool to the stadiums.

Surrounding businesses could be affected by reduced parking if their customers and employees have to pay or park farther away. However, south of S. Atlantic Street, there is free parking with 1- and 2-hour limits along First Avenue S. In addition, several blocks of free parking with no time limits are currently located near the project south of S. Massachusetts Street on Utah Avenue S. and Occidental Avenue S. Pay parking lots are also available near the businesses.

For the duration of project construction, the average workforce would be about 350 construction workers. Considering overlapping work schedules, parking demand could average 250 vehicles per day, Monday through Friday. Construction workers who are not able to park within the construction zone would likely seek available long-term parking at pay lots. The use of any on-street parking spaces by construction workers would have to be coordinated and approved by the City. This could make it more difficult for the customers of local businesses to find parking. There is the potential to inconvenience some customers and employees.

***What types of mitigation measures would be used to minimize these effects?***

Because parking lots are generally underutilized south of downtown Seattle, parking spaces are not anticipated to be difficult to find during non-event days. People who normally park in the long-term free spaces that are being removed could choose to park farther away, such as in the unrestricted spaces south of S. Atlantic Street, pay for parking, or change their mode of travel. Therefore, no mitigation is needed. No mitigation is planned for parking during special events.

Public street right-of-way will not be set aside as construction worker parking unless approved by the City of Seattle.

**10 Would any properties be needed specifically for construction?**

Six of the seven properties where permanent property acquisitions or utility easements would be required (as described in Chapter 3, Question 4 and Exhibit 3-11) also require a small amount of additional property for temporary construction easements. Approximately 0.36 acre over and above the permanently affected properties would be needed for temporary construction easements. The affected properties include Terminal 46, Pier 36, a Port of Seattle property south of S. Massachusetts Street, Pyramid Alehouse, the Fortune Warehouse, and vacant BNSF land. Only the easement on Terminal 46 would be used for the duration of construction. The other easements would be needed for approximately 1 to 4 months for sidewalk or sewer line construction.

***What types of mitigation measures would be used to minimize these effects?***

WSDOT staff would work with affected property owners to assess their needs and minimize the amount of disruption that could result from temporary construction easements. Mitigation measures during construction activities would include providing advance notice to property owners in the project area regarding construction activities, utility disruptions, and detours. Local access to adjacent residences and businesses would be maintained during construction.

**11 How would historic resources be affected during construction?**

Possible effects to historic resources from construction activities are similar to potential effects to other buildings in the project area. However, since historic resources have elements

that could be damaged irreparably, there is a greater need for protective measures during construction. The possible effects include increased vibration, increased traffic congestion, loss of parking, increased noise and dust, and loss of business if people avoid the area during construction. Construction effects would vary during the construction period. Direct effects would be more intense when construction is adjacent to an area and less intense when the activity moves elsewhere.

During some parts of the demolition and construction period, the southwest portion of Pioneer Square would be affected by increased traffic congestion, loss of parking, and changes to business access. Traffic barriers and detours may make it harder for people to get to the area, and businesses and residents closest to the project may experience construction noise and dust. These effects may inconvenience people, but they would be of limited duration and are not expected to have a substantial effect. The discussion of how to mitigate or minimize the effects of traffic congestion (Questions 4 and 5), noise (Question 6), dust (Question 8), loss of parking (Question 9), and changes to business access (Question 9) are described previously in this chapter.

Before viaduct demolition begins, adjacent historic buildings will be evaluated to determine their vulnerability to potential damage from vibration. If necessary, modified demolition and construction methods will be used. Refer to Question 7 of this chapter for further detail on potential effects due to increased vibration.

One building, the Bemis Building, would experience an indirect adverse effect from construction activities. Tenants would experience noise and dust during construction, with interruptions or modifications to building access at times during the construction period. Construction would prevent use of their primary loading dock at times. Because this would potentially affect the economic viability of the building, it is considered an adverse effect. This effect would be mitigated by improvements to an alternative loading dock facing the south parking lot, which would allow business operations to continue. Construction would also reduce on-street short-term parking near the Bemis Building.

**What types of mitigation measures would be used to minimize these effects?**

Since the project is not anticipated to have a substantial effect on the Pioneer Square Historic District, general business miti-



gation measures are not needed. The only historic resource that may be substantially affected during construction is the Bemis Building, so mitigation is focused on these effects.

In addition to mitigation measures previously described related to minimizing effects from noise and air quality, specific mitigation for effects to the Bemis Building would include the following measures:

- Communicate regularly with affected residents and businesses in the Bemis Building about construction issues.
- Maintain adequate access to the property, including the loading dock, so that businesses can continue to operate.

Mitigation measures for historic resources will be described in a Memorandum of Agreement among WSDOT, FHWA, the Washington State Department of Archaeology and Historic Preservation (DAHP), the Advisory Council on Historic Preservation (ACHP), affected tribes, and the City of Seattle. The draft Memorandum of Agreement is included in Appendix H.

## **12 Would construction affect archaeological resources?**

Soil excavation and soil improvement activities may affect unknown, important pre-contact and historic-era archaeological deposits potentially located on the former tideflats of Elliott Bay and in historic-era fill layers.

There is a low to moderate probability that evidence of fish weirs, such as wood stakes, basketry, matting, or rock alignments, could be located in the project area. Shell and/or rock concentrations from shellfish gathering and processing could be present on old beaches and tideflats, from seasonal camps, villages, or processing localities. Archaeological materials could include food refuse, rock features, stone tools, bone tools, and debris from tool manufacturing, dating from as early as 2,000 years ago to about A.D. 1900.

There is a moderate to high probability that construction could affect historic-era archaeological resources associated with industrial, commercial, and residential development of the Elliott Bay tideflats in the 1890s through early twentieth-century development.

Archaeological study of the project area in two phases in the summer of 2007 and early 2008 included the sampling of 49 boreholes between S. Atlantic Street and S. King Street. Archaeologists chose the borehole locations based on extensive historical research conducted in 2006 in preparation for

the sampling program. Materials recovered from the 2007 and 2008 samples included sparse historic-era artifacts and thick deposits of industrial debris such as lumber and coal. Most of the boreholes also contained some shell, but this was determined to be natural in origin rather than part of an archaeological site. The borehole data will allow archaeologists to define areas for further investigation and monitoring during construction.

Construction activities have the potential to encounter historic material related to transportation, primarily railroad tracks, trestles, and support facilities; infrastructure in the form of a fire station, pipes, hydrants, and other early utilities; and commerce as represented by retail establishments, warehouses, offices, and freight facilities. Historic industrial remains may also be discovered, including those from manufacturing establishments, lumber mills, foundry, metal fabricators, and machine works. Evidence could also be found of residential use from shanties on floats and other small dwellings and cabins in limited areas dating back to 1904 and after.

Sites discovered during construction will be considered eligible for the National Register of Historic Places under Section 106 unless research and documentation prove otherwise. Any discoveries would need to be documented and addressed through scientific data recovery or other suitable measures determined in consultation with SHPO and the affected tribes.

### **What types of mitigation measures would be used to minimize these effects?**

Because the project could have an adverse effect on significant, eligible sites, mitigation measures will be described in a Memorandum of Agreement among WSDOT, FHWA, DAHP, ACHP, affected tribes, and the City of Seattle. The draft Memorandum of Agreement, developed in compliance with Section 106 of the National Historic Preservation Act of 1966, is included in Appendix H. Mitigation measures would consider subsurface conditions and the likelihood of encountering archaeological material during excavation or construction activities. Mitigation may also include a combination of archaeological investigation and monitoring of subsurface excavations and/or borings conducted for geotechnical studies prior to construction.

We will use the information gathered from pre-construction studies as we work with the tribes and SHPO to develop a

#### **Appendix B. Potential Mitigation Measures**

*Appendix B* lists potential mitigation measures being considered for this project.

monitoring and treatment plan for properly addressing any effects to significant, eligible archaeological sites.

### **13 What other elements of the environment were studied, and what were the results?**

The following elements of the environment either do not have extensive effects that require special mitigation measures during construction or have required measures that are standard for a roadway project such as this. These elements of the environment include views, park and recreational facilities, neighborhoods, low-income and minority populations (environmental justice), police and fire services, water resources, and soil and contaminated materials.

#### **How would views be affected during construction?**

During construction, views in the project area would be cluttered with heavy equipment, drill rigs, scaffolding, fencing, dust, noise barriers or curtains, and storage of construction materials. Distant views of water and mountains might be somewhat cluttered by construction activities throughout the construction period. These temporary effects do not require mitigation.

#### **Would any park or recreational facilities be affected?**

The Jack Perry Memorial Viewpoint, Waterfront Bicycle/Pedestrian Facility, and the Mountains to Sound Greenway Trail would be affected during construction. Construction effects could include noise, blocked and cluttered views, dust, traffic delays, and congestion. Construction would make it more difficult for people to reach parks and recreation facilities and to travel within the project area once they arrive.

Access to Jack Perry Memorial Viewpoint would be limited due to lane restrictions on E. Marginal Way S. and Alaskan Way S. The viewpoint is not expected to be affected by noise and dust from construction activities, and views of Elliott Bay and the Duwamish East Waterway would not be obstructed.

During construction, the Waterfront Bicycle/Pedestrian Facility along Alaskan Way S. would be removed. Until the new pathway is complete, bicyclists and pedestrians would use alternate routes such as First Avenue S., as described in Question 3 of this chapter. People using the proposed route for the Mountains to Sound Greenway Trail along S. Atlantic Street west of First Avenue S. would also be required to use an alternate route during construction. The experience of bicy-

clists and pedestrians on the alternative routes would likely be less scenic and perhaps less conducive to recreational walking and bicycling than the existing pathways.

For some people, construction would be interesting to watch as they traveled through the project area. For others, increased traffic congestion, noise, vibration, and dust would make the project area a less desirable destination. Construction would make it harder for people to get to the project area because of traffic detours and the removal of parking. The construction site may seem like a barrier to some people, even when temporary sidewalks or other routes are available. These temporary effects do not require mitigation beyond providing temporary sidewalks and detour routes, and other measures described in Appendix B.

### **How would neighborhoods be affected?**

For people working or living right next to the worksite, construction would sometimes be inconvenient and at other times would be quite disruptive. Construction noise, lights, and traffic changes could affect people within one to two blocks of the construction zone or a staging area. The noise (Question 6) and visual (Question 13) effects of construction are discussed elsewhere in this chapter.

For some people, the construction sites may seem like a barrier, even when temporary sidewalks or other routes are available. Because they are perceived as barriers, construction sites would temporarily increase separation between parts of each neighborhood.

Many temporary road closures, lane restrictions, and detours would be needed, generally for a number of months. The closures and detours may be inconvenient and disruptive to adjacent businesses and residents. WSDOT will work with local residents and businesses to minimize disruption to the extent practicable. These temporary effects to neighborhoods do not require mitigation beyond the efforts described for traffic (Question 5) and noise (Question 6) in this chapter, and in Appendix B.

### **Would low-income or minority populations be affected?**

Construction effects to disadvantaged populations would be similar to those discussed for the general community. These effects include increased traffic congestion, reduced mobility, a potential for increased response times for emergency services, and increased noise. Temporary traffic congestion during

construction would affect low-income, homeless, elderly, or disabled people and the organizations that strive to serve them. These people are heavily dependent on transit, whose service would be affected by detours, lane restrictions, and resulting traffic congestion. As part of the project mitigation strategy, funding will be provided to enhance transit operations during construction, as described in Question 5 of this chapter. Traffic congestion would also make deliveries to service providers more difficult. Construction activities may bring additional effects to portions of the homeless population. Traffic detours, barricades, and other temporary construction measures can present hurdles for all of these disadvantaged populations.

Although construction effects to disadvantaged populations are probable, outreach efforts will help to avoid, minimize, or mitigate these effects. As part of the effort to forecast possible construction effects to these populations, individual meetings with social service providers and public outreach meetings where people can find out about the project, express their opinions, and give input about the project have been held.

We will continue working to find ways to avoid or reduce construction-related effects on these populations through careful planning and design and by providing fair and thorough solutions to construction-related problems when they do occur. We recognize the potential dangers of homeless persons seeking shelter within construction areas and will work with construction personnel to provide and maintain a safe worksite. These efforts are described further in Appendix B and will ensure that the project will not have a high or disproportionate effect on low-income or minority populations. No other mitigation is required for these temporary effects.

### **Would police and fire services be affected?**

Police and fire services would be affected by traffic delays and detours caused by construction activities. Construction could require additional police support services to direct and control traffic and pedestrian movements and could result in increased response times to certain destinations. Law enforcement services outside of the project area may be affected due to changes in traffic patterns on local roads. During construction, fire hydrants may need to be relocated, which could temporarily affect water supplies used for fire suppression. Fire watches, or stationing fire trucks in the vicinity, could be required if the water supply and power must be turned off.

We will continue coordinating with City of Seattle and Port of Seattle police and fire departments to ensure that general emergency management services are not compromised. Early notice about detours or lane restrictions will be provided to emergency and non-emergency public service providers to help mitigate any potential effects to response time. These standard mitigation measures are described in detail in Appendix B. No substantial effects on police or fire services or other mitigation measures are expected.

### **How would water resources be affected?**

Construction activities, such as grading, dewatering, and soil improvements, could result in temporary effects to water quality. BMPs would be used to minimize or prevent temporary effects. BMPs are required mitigation measures that are standard for a roadway project.

Any construction-related water quality effects would likely be caused by erosion of disturbed or graded soil areas or soil stockpiles in construction staging areas and work zones. These areas could result in silt and sediment being transported to Elliott Bay, the Duwamish River's east waterway, or Puget Sound in stormwater runoff. BMPs would prevent or minimize runoff from transporting sediment from disturbed soil areas or soil stockpiles, which can affect water quality in nearby areas by increasing turbidity and sometimes affecting other water quality parameters.

Stormwater runoff from construction staging areas may also carry other contaminants, such as fuel or oil from construction equipment. BMPs would be in place to prevent or minimize runoff from carrying contaminants from construction equipment to Elliott Bay, the Duwamish River's east waterway, or Puget Sound. BMPs could include covering stock piles, silt fences, catch basin inserts, and settling and contaminant testing of dewatering water and sediment prior to discharge from the construction site.

Dewatering would likely be necessary during construction of the undercrossing and in some locations where utilities would be relocated. Groundwater sampling in the project area indicated that the level of metals, volatile organic compounds, and oil-range petroleum hydrocarbons do not exceed the King County Wastewater Treatment Division Discharge Limits<sup>3,4</sup>. Because there would be no surface water discharge from construction dewatering, and treatment BMPs would be provided as needed prior to dewatering water being discharged to the

#### **What is a BMP?**

A Best Management Practice (BMP) is an action or structure that reduces or prevents pollution from entering the stormwater or treats stormwater to reduce possible degradation of water quality.

<sup>3</sup>Shannon Wilson Inc. 2007

<sup>4</sup>Parametrix 2007

combined sewer system or reinjected into the groundwater, no water quality effects are expected from dewatering.

Soil improvements would likely consist of a combination of stone columns (vibro-replacement), jet grouting, and deep soil mixing, which are intended to improve soil stability. Jet grouting produces a waste slurry that has high pH, which could affect the quality of stormwater leaving the site and the receiving water if not properly managed. Any dewatered slurry would be treated using BMPs as needed prior to discharge to the stormwater system or receiving water or disposed of in an approved off-site facility. Additional standard mitigation measures are described in Appendix B.

### **How would soil and contaminated material be affected during construction?**

The project would partially acquire property on three parcels and require temporary or permanent easements on four additional parcels. These parcels contain 32 potentially contaminated sites, a majority of which are associated with the terminals, which have long and varied historical uses. In addition, five parcels with three potentially contaminated sites have already been purchased by WSDOT for the project.

The project has the potential to generate approximately 222,000 cubic yards of excavated soil, materials, and spoils. This amount of material would bury a football field just over 100 feet deep. Approximately 204,000 cubic yards of the material is potentially contaminated. Contaminated soil and material would require special handling and would be treated and disposed of according to State regulations. Spoils from activities such as jet grouting and deep soil mixing would be contained by constructing berms or other barriers around the construction area to prevent the spread of any contamination. Soil that does not pose an unacceptable threat to human health and the environment and meets the Washington State Department of Ecology's Model Toxics Control Act (MTCA) requirements may be used as fill in other areas of the project.

Standard mitigation measures include BMPs that would be implemented to reduce or prevent soil erosion and sediment from being transported outside the work area by the wind, surface water, or construction vehicles so that any contamination does not spread. A temporary erosion and sediment control plan would be prepared in accordance with WSDOT's *Highway Runoff Manual*. A Health and Safety Plan would be prepared that describes monitoring requirements and the use



of personal protective equipment for workers that come in contact with contaminated materials. Additional standard mitigation measures are described in Appendix B.

#### **14 What indirect or cumulative effects are expected from construction, and what mitigation is proposed?**

One building, the Bemis Building, would experience an indirect adverse effect from construction activities. Tenants would experience noise and dust during construction, with interruptions or modifications to building access at times during the construction period. Construction would prevent use of their primary loading dock at times. Because this would potentially affect the economic viability of the building, it is considered an adverse effect. This effect would be mitigated by improvements to an alternative loading dock facing the south parking lot, which would allow business operations to continue. Construction would also reduce on-street short-term parking near the Bemis Building.

Cumulative effects could occur during construction because several projects in nearby areas are expected to be under construction at the same time as the S. Holgate Street to S. King Street Viaduct Replacement Project, as shown in Exhibit 4-25. Potential cumulative effects from these overlapping projects and proposed mitigation for these effects are discussed below.

#### **Cumulative Traffic Effects**

Traffic congestion is expected to increase in the project area, including SODO and the Duwamish industrial area, due to roadway restrictions on SR 99 and other local streets during construction. Specifically, we expect SR 99 and adjacent streets such as Alaskan Way S., S. Royal Brougham Way, and First Avenue S. to be affected for the durations indicated in Exhibit 4-26. The total construction period is expected to last about 4 years and 4 months, beginning in mid-2009 and continuing through fall 2013.

##### *Exhibit 4-26*

#### **Duration of Roadway Restrictions on Key Routes**

<b>Affected Roadway</b>	<b>Duration of Roadway Restrictions</b>
SR 99	2 years – 3 months <i>beginning in early 2011</i>
Alaskan Way S.	2 years – 9 months <i>beginning midyear in 2010</i>
S. Royal Brougham Way	Traffic detoured on S. Royal Brougham Way for 6 months at the end of the first 17 months of construction (Stage 1); S. Royal Brougham Way would be closed permanently where it crosses underneath the existing viaduct after Stage 1, midyear in 2011.

#### **Cumulative Construction Effects**

Supporting information about cumulative effects is provided in **Section 7.2** of *Appendix F*, the *Transportation Discipline Report*, and *Appendix G*, *Technical Memoranda*.

Congestion may intensify in the area if other nearby planned projects require lane closures as well. This could cause problems for all drivers, including transit, freight, and emergency service providers. Some commercial activity within the project area would also be affected by the accumulation of direct construction effects, such as traffic restrictions, traffic congestion, and noise. Much of the roadway work in the downtown and SODO areas would likely be completed with partial lane closures and/or evening and weekend construction to help minimize effects to the overall transportation system.

We know the projects shown in Exhibit 4-25 are scheduled to have some overlap with construction for the S. Holgate Street to S. King Street Viaduct Replacement Project. WSDOT and the City of Seattle have been monitoring these projects' construction schedules and coordinating to avoid major construction conflicts and minimize effects to traffic to the extent practicable. Information about the planned timelines for these projects is provided below:

- **SR 519 Intermodal Access Project, Phase 2** – Construction is planned to begin in fall of 2008 and be completed by 2011.
- **S. Spokane Street Viaduct Phase 1** – Construction for widening the Spokane Street Viaduct is expected to begin in June 2009 and be completed in June 2011.
- **S. Spokane Street Viaduct Phase 3, Fourth Avenue S. Loop Ramp** – Construction of this ramp is scheduled to begin in October 2008 and be completed in September 2010.
- **Port of Seattle Terminal 46** – The Port of Seattle projects an increased volume of container processing over the next 7 years.
- **Port of Seattle Terminal 91 Cruise Ship Terminal Construction Project** – The Port is moving the cruise ship terminal from Terminal 30 and constructing a new cruise ship facility at Terminal 91 during 2008 and 2009.
- **Port of Seattle Terminal 30 Container Terminal** – This project will convert Terminal 30's current use as a cruise terminal back to its original use for container operations.
- **I-5 Pavement Repair** – This project is expected to begin in 2009 and includes repairing pavement and replacing 58 roadway panels from Boeing Access Road up to the King/Snohomish County line. Work will be done during evening and weekend closures of I-5.
- **E. Marginal Way Overpass** – Construction for this project is expected between 2007 and 2010. The Port of

Seattle will construct a grade-separated crossing of the BNSF rail lines (used by both BNSF and Union Pacific) and an improved intersection between E. Marginal Way and S.W. Spokane Street (to Harbor Island and West Seattle).

- **Bridging the Gap Projects** – 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 on Airport Way S. north of S. Massachusetts Street and on S. Dearborn Street east of Fifth Avenue S.
- **Commercial Development** – This office and retail development, located on the south side of S. Atlantic Street and the west side of First Avenue S., is expected to be constructed between 2010 and 2012.
- **S. Massachusetts Street to Railroad Way S. Electrical Line Relocation Project** – This electrical line relocation project will relocate electrical lines currently located on the existing SR 99 structure. Relocation of these lines is expected to take place from August 2008 through December 2009.
- **SR 99 Battery Street Tunnel Fire and Safety Improvements** – Construction for this project is expected to begin in June 2009 and continue through February 2011. This project will require evening and weekend closures of SR 99 through the Battery Street Tunnel.
- **S. Lander Street Overcrossing** – The construction schedule for this project is currently unknown, since the project is not fully funded. It's possible that it may overlap with a portion of the S. Holgate Street to S. King Street Viaduct Replacement Project.
- **U.S. Coast Guard Integrated Support Command** – The U.S. Coast Guard is proposing changes to its facility located on Alaskan Way S. The schedule for this work is unknown.

Additionally, construction of the central waterfront portion of the Alaskan Way Viaduct and Seawall Replacement Program may begin as early as 2012.

At this time, we do not know specific details about lane restrictions, detours, and local street closures that may be required for the projects listed above. As design and construction planning move forward for the S. Holgate Street to S. King Street Viaduct Replacement Project, WSDOT and other agencies will continue to work together to minimize possible cumulative

effects and coordinate construction schedules. For example, as shown in Exhibit 4-25, the City of Seattle plans to repave several streets in the SODO/Duwamish industrial area over the next few years as part of the Bridging the Gap Projects.

WSDOT and the City have been working together to make sure that projects in the vicinity of the S. Holgate Street to S. King Street Viaduct Replacement Project are completed before or after major lane restrictions are in place on SR 99.

To aid in this coordination effort, WSDOT, the City of Seattle, and King County are considering establishing an oversight committee called the Downtown Transportation Operations Committee. This committee would be tasked with monitoring and coordinating construction activities in the greater downtown Seattle area. This committee would lead coordination efforts to ensure that transportation operations for all modes (general purpose traffic, transit, and freight) are as effective as possible during downtown construction activities. This committee would provide real-time communications and information linkages to better manage the multimodal transportation system.

In addition to ongoing coordination between agencies, WSDOT has committed up to \$125 million for various enhancements and improvements designed to keep transit and traffic moving. Many of these investments will be made in the SODO/Duwamish area during construction. These enhancements and improvements are discussed in Question 5 of this chapter and would help to alleviate traffic congestion that may be caused by constructing projects near one another.

FHWA, WSDOT, the City of Seattle, and King County continue to work collaboratively with the community to find a solution for the SR 99 corridor through the central waterfront. It is uncertain what will replace the existing viaduct in the central waterfront at this time. If a decision is made for the central waterfront after construction has been started on the S. Holgate Street to S. King Street Viaduct Replacement Project, this project could be altered north of S. Royal Brougham Way.

### **Other Cumulative Effects**

In addition to the potential cumulative traffic effects discussed above, possible cumulative construction effects may:

- Increase construction noise and temporary air quality effects, such as those related to dust and emissions from construction equipment.

- Cause problems for utility providers. Most of the proposed projects require utilities to be relocated. Funding, having enough skilled workers, and ensuring minimal utilities disruptions could be a challenge or cause delays in construction.
- Cause additional erosion and sediment transport to the Duwamish River or Elliott Bay.

**Mitigation**

Mitigation measures discussed for this project throughout this chapter would help to mitigate this project's effects to noise, air quality, utilities, and water quality. We will continue to work with the agencies leading other proposed projects in the surrounding area to help avoid and minimize potential cumulative effects.



## DRAFT SECTION 4(f) EVALUATION

### 1 What is Section 4(f)?

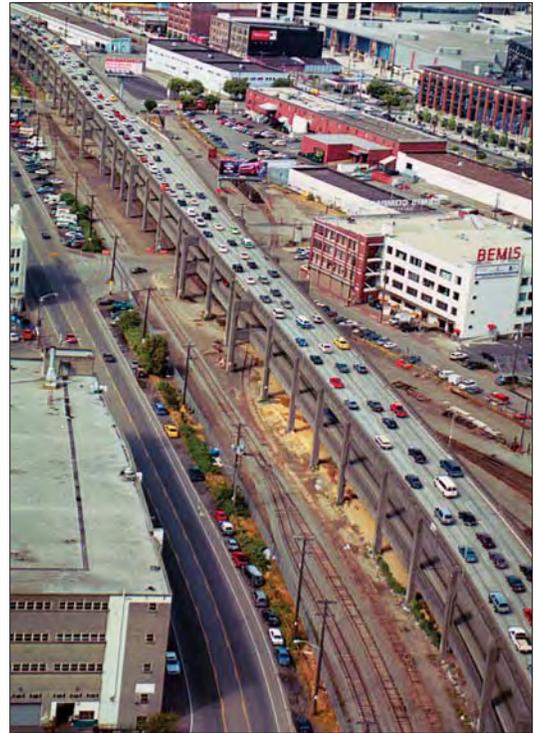
Section 4(f) refers to a section of the Department of Transportation Act of 1966 that established the policy “*that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.*” (These requirements are codified in federal law at 49 U.S.C. 303.)

Section 4(f) requires that transportation projects with federal involvement avoid use of:

- Park and recreation land (specifically publicly owned land of a significant public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance), or
- Historic resources (specifically a historic site of national, state, or local significance) on or eligible for the National Register of Historic Places.

In discussing Section 4(f), the term “use” may mean either a direct use or constructive use. A direct use occurs when land is permanently incorporated into a transportation facility or when there is a temporary occupancy of land that is adverse to a Section 4(f) resource. Temporary occupancy of a resource is not considered adverse under the Section 4(f) statute if all of the following conditions are satisfied:

1. The duration must be temporary (i.e., shorter than the period of construction).
2. The scope of work must be minor, with only minimal changes to the protected resource.
3. There are no anticipated permanent adverse physical effects, or interference with the activities or purposes of the resource on either a temporary or permanent basis.
4. The resource being used must be fully restored to a condition which is at least as good as that which existed prior to the proposed project.



*The Alaskan Way Viaduct near S. Atlantic Street*

5. There must be documented agreement of the appropriate officials having jurisdiction over the resource regarding the above conditions.

Constructive use occurs when a project's proximity effects are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired.

To make use of such resources, the Federal Highway Administration (FHWA) must determine that:

- There is no feasible and prudent avoidance alternative to using that resource; and
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

## **2 How is it determined that there are no alternatives to using a Section 4(f) resource?**

To demonstrate that there is no feasible and prudent avoidance alternative to the use of Section 4(f) resources, an evaluation must address:

- Location alternatives, and
- Design shifts that avoid the Section 4(f) resource.

## **3 What alternatives were considered?**

This evaluation considers the Build Alternative because it more effectively meets the purpose and need for the project than other alternatives considered during project development. Alternatives that would retain or repair the viaduct are not considered because the ability of the viaduct to withstand earthquakes needs to be improved. The viaduct is vulnerable to earthquakes because of its age, design, and location. The viaduct's existing foundations are embedded in liquefiable soil, and the structure is deteriorating. These factors make the structure vulnerable to earthquakes and necessitate its replacement. An effort to seismically retrofit and repair the viaduct would not be reasonable as a long-term solution because it would cost 80 to 90 percent of the cost of a new structure without meeting modern design standards.

### **Roadways**

The Build Alternative would replace the existing viaduct between S. Holgate Street and S. King Street with a safer facility that meets current seismic and roadway design standards.

These improvements would replace approximately 40 percent of the existing viaduct structure located between S. Holgate Street and the Battery Street Tunnel.

Near S. Holgate Street, SR 99 would transition from an at-grade roadway to a side-by-side aerial roadway crossing over S. Atlantic Street and the BNSF tail track. SR 99 would return to grade for a short distance north of S. Royal Brougham Way. SR 99 would then transition to a stacked, aerial structure to match the existing viaduct at about S. King Street. As part of the design, S. Royal Brougham Way would be closed between First Avenue S. and Alaskan Way S. A new northbound off-ramp and southbound on-ramp would be provided just south of S. King Street. The existing northbound on-ramp and southbound off-ramp at First Avenue S. would be maintained.

New roadways and connections would be provided near S. Atlantic Street. These connections include:

- Providing a new grade-separated access for freight and general purpose traffic traveling between the Seattle International Gateway (SIG) Railyard, SR 519, and the Port of Seattle. This access would be provided by a new U-shaped undercrossing below SR 99 on the north side of S. Atlantic Street. This new connection would improve vehicle access by providing a route for east-west traffic when railroad cars on the tail track block the at-grade roadway.
- Improving Colorado Avenue S. to enhance access to the new North SIG Railyard. These improvements would include providing two dedicated truck-only lanes southbound and one dedicated truck-only lane northbound on the west half of Colorado Avenue S., and one general purpose traffic lane in each direction on the east half of Colorado Avenue S.
- Providing northbound and southbound frontage roads that would provide access between Alaskan Way S. and E. Marginal Way S. In addition, the northbound frontage road would provide access from S. Atlantic Street to the new remote holding area for Seattle Ferry Terminal traffic and to Alaskan Way S.
- Reconfiguring the intersections where S. Atlantic Street meets Alaskan Way S., the new U-shaped undercrossing, Colorado Avenue S., the new frontage roads, and Utah Avenue S.

#### **What is the tail track?**

The tail track is a single railroad track that connects the BNSF Seattle International Gateway (SIG) Railyard on the east side of SR 99 to the Whatcom Railyard located west of SR 99. The tail track is used to assemble and sort railroad cars for both railyards.

## Rail

The tail track would be relocated west of the new SR 99 roadway and would extend north from the railyard to the vicinity of S. King Street. This would help to maintain connections between the Whatcom Railyard on the west side of SR 99 and the SIG Railyard on the east side of SR 99.

## Ferry Holding

A new remote holding area for Seattle Ferry Terminal traffic would be added between S. Royal Brougham Way and S. King Street along the east side of SR 99. The remote holding area would be accessed via the northbound frontage road.

## Bicycle and Pedestrian Facilities

Existing bicycle and pedestrian access would be maintained or improved as part of this project.

## 4 What is the project's purpose and need?

The purpose of this project is to replace the SR 99 mainline with a seismically sound structure between approximately S. Holgate Street and S. King Street. In this area, the new SR 99 facility would maintain or improve access to, from, and across SR 99 for general purpose vehicles, transit, and freight. This portion of SR 99 (also known as the Alaskan Way Viaduct) is deteriorating and vulnerable to earthquakes.

The project is not only needed to address seismic vulnerability, but also roadway design deficiencies and to support transportation functions in the area. The viaduct has narrow lanes and lacks or has narrow shoulders that do not meet current roadway design standards. This affects roadway safety, operations, and capacity. The transportation system in this area plays a crucial role in the movement of goods and services. Specific areas where access needs to be improved to support key transportation functions in this area include:

- Transit access into downtown. Transit access to downtown is currently provided at Columbia and Seneca Streets, which are located in the middle of downtown. Transit access could be improved if access to and from SR 99 were provided south of downtown.
- East-west access across SR 99 between the Port and Duwamish industrial facilities, railyards, and the stadiums. This access is currently provided via at-grade connections at S. Atlantic Street and S. Royal Brougham Way and is often blocked by trains.

### What is remote ferry holding?

Remote ferry holding is an area where vehicles would wait to enter the Seattle Ferry Terminal when the dock is full. Typically, remote ferry holding is needed during the peak summer season and on holidays.

## **5 Who did we coordinate with to determine what resources would be affected?**

Section 4(f) requires consultation with the Department of the Interior and, as appropriate, the involved offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use resources protected by Section 4(f).

Coordination for this Section 4(f) evaluation included meetings, field visits, and drafting preliminary memoranda outlining Section 4(f) issues with representatives of the City of Seattle and the Department of Archaeology and Historic Preservation (DAHP).

## **6 What archaeological resources affected by the project are protected by the provisions of Section 4(f)?**

Construction activities for the new SR 99 structure could potentially affect archaeological resources through excavation, pile-driving, and soil improvement. Any archaeological site encountered during construction that is historically significant would be subject to Section 4(f) provisions, unless it is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

### **What avoidance measures have been identified?**

There are no avoidance or design alternatives that would eliminate the need for excavation and other activities that could potentially affect archaeological resources.

### **What planning to minimize harm has been incorporated into the project?**

Harm to significant archaeological sites discovered during construction would be minimized through scientific data recovery or other suitable measures determined in consultation with the State Historic Preservation Officer (SHPO), affected Indian tribes, and other concerned parties. To minimize potential damage, construction would be conducted under the auspices of a discovery plan that would include a provision for inadvertent discovery of cultural material or human remains. Subsurface coring is underway at excavation and foundation locations to better establish the potential for encountering archaeological resources.

## 7 What historic resources affected by the project are protected by the provisions of Section 4(f)?

The only historic resource determined to be protected under the provisions of Section 4(f) and subject to use by the proposed project is the existing Alaskan Way Viaduct, which would be demolished within the project area.

The viaduct is protected under Section 4(f) because it was determined eligible for inclusion in the National Register. Authorized under the National Historic Preservation Act of 1966, and administered by the National Park Service, the National Register is part of a program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archaeological resources.

### What resources would be used by the proposed action?

The viaduct has been determined eligible for listing in the National Register under Criterion A (see sidebar) for its association with bridge and tunnel building in Washington in the 1950s and under Criterion C for its type, period, materials, and methods of construction. It is the only multi-span concrete double-level bridge in the state. It is also significant for its role in the development of the regional transportation system and of Seattle's waterfront. It would be demolished within the project area to construct the new SR 99 structure.

### What avoidance measures have been identified?

There are no avoidance or design alternatives that would avoid replacement or complete reconstruction of the existing viaduct given its inherent structural limitations and high risk of failure during a seismic event.

### What planning to minimize harm has been incorporated into the project?

To comply with the National Historic Preservation Act, a Memorandum of Agreement for effects to historic and archaeological resources will be completed in coordination with WSDOT, FHWA, DAHP, Advisory Council on Historic Preservation (ACHP), affected tribes, and the City of Seattle. To mitigate for removal of the viaduct, prior to issuance of the Finding of No Significant Impact (FONSI), documentation will be completed on the viaduct structure in accordance with Level 2 Historic American Engineering Record (HAER) standards. Photographs have already been taken for the HAER documentation.

### What determines National Register eligibility?

To be eligible for inclusion in the National Register, a resource must meet one or more of the following criteria:

- **Criterion A** – the resource is associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B** – the resource is associated with the lives of persons significant in our past.
- **Criterion C** – the resource embodies 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 may lack individual distinction.
- **Criterion D** – the resource has yielded, or may be likely to yield, information important in prehistory or history.

## **8 What park, recreation, and historic resources are not discussed in this evaluation?**

Park, recreation, and historic resources not discussed in this evaluation are either:

1. Not protected by Section 4(f), or
2. Are subject to effects that would not substantially impair the activities, features, or attributes that qualified the resource for protection under Section 4(f).

*Appendix D Part B* addresses in detail the resources that were evaluated but were not subject to use or substantial impairment, such as the Pioneer Square-Skid Road National Historic District and the Bemis Building. *Appendix D Part C* includes historic inventory forms for buildings evaluated as part of the project.

In many cases, although these resources are adjacent to the construction site, the new SR 99 structure would maintain access to the resource and would not result in noise or other effects that would substantially impair the public's ability to access and enjoy the resource.

.

## ACRONYMS

**A**

ACHP Advisory Council on Historic Preservation

**B**

BMP Best Management Practice

**C**

CO Carbon monoxide

**D**

DAHP Department of Archaeology and Historic Preservation

dBA A-weighted decibels

**E**

EA Environmental Assessment

EIS Environmental Impact Statement

EPA U. S. Environmental Protection Agency

**F**

FHWA Federal Highway Administration

FONSI Finding of No Significant Impact

**H**

HAER Historic American Engineering Record

HOV high-occupancy vehicle

**I**

I-5 Interstate 5

ITS Intelligent Transportation Systems

**M**

mph miles per hour

MSAT mobile source air toxics

**N**

NAAQS National Ambient Air Quality Standards

NEPA National Environmental Policy Act

**P**

PM<sub>10</sub> particulate matter less than 10 micrometers in size

PM<sub>2.5</sub> particulate matter less than 2.5 micrometers in size

**S**

SHPO State Historic Preservation Officer

SIG Seattle International Gateway

SR State Route

**T**

TSS total suspended solids

**W**

WOSCA Washington-Oregon Shippers Cooperative Association

WSDOT Washington State Department of Transportation

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## LIST OF APPENDICES

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Included on CD only

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Appendix F. Transportation Discipline Report

Appendix G. Technical Memoranda

- Alternative Description and Construction
- Archaeological Resources
- Economics
- Environmental Justice
- Geology and Soils
- Hazardous Materials
- Historic Resources
- Land Use and Shorelines
- Noise and Vibration
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Appendix H. Draft Memorandum of Agreement