

Rebuild Alternative

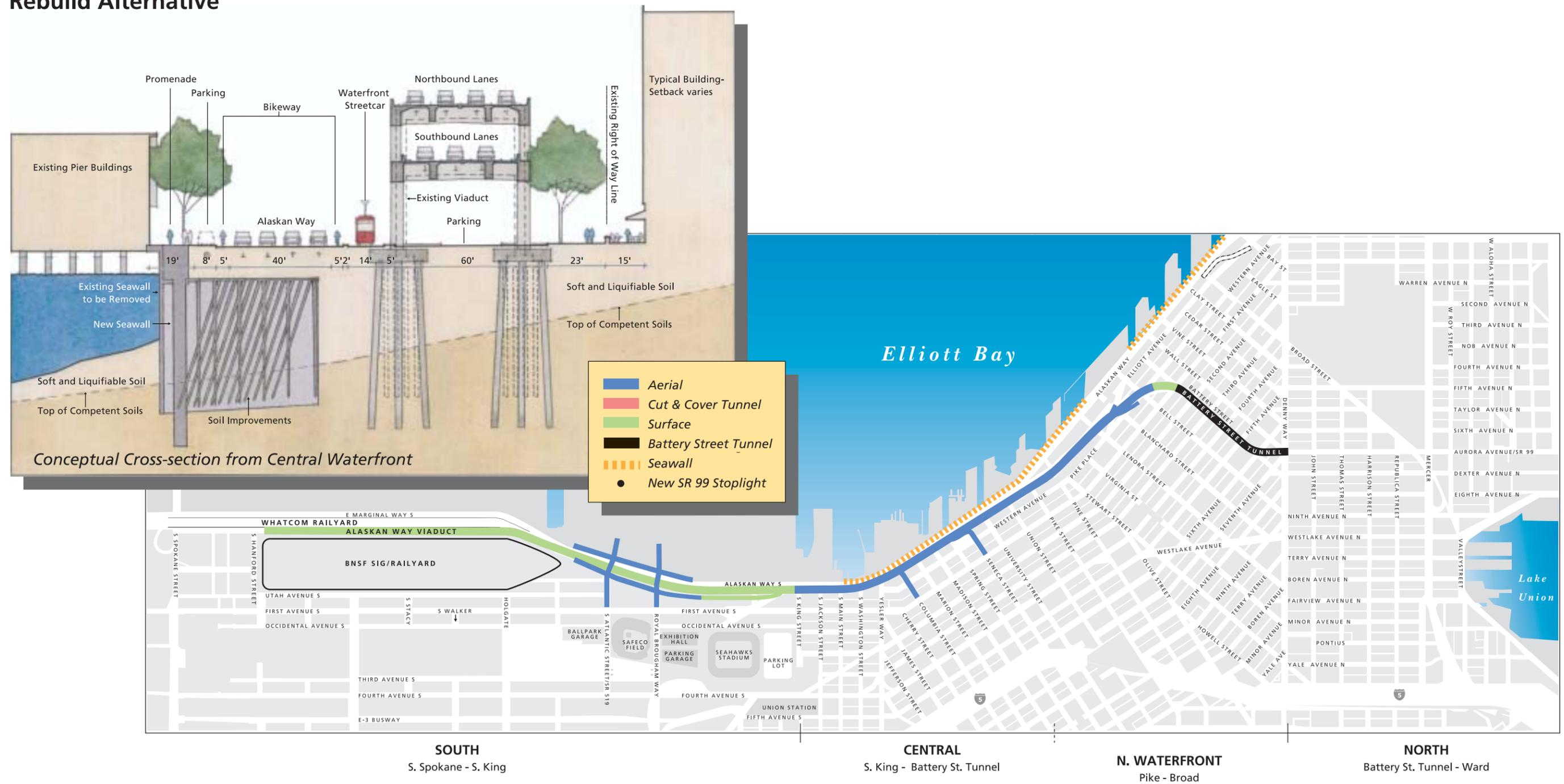


Exhibit 5-1

CHAPTER 5 - REBUILD ALTERNATIVE

1 What is the Rebuild Alternative?

How would it replace SR 99 and the viaduct?

The Rebuild Alternative would rebuild and retrofit SR 99 with the following elements shown in Exhibit 5-1:

- **South** - Replace the existing viaduct (SR 99) with an at-grade roadway. Replace the First Avenue S. ramps with a new, elevated interchange connecting SR 99 with SR 519 at S. Atlantic Street and S. Royal Brougham Way. Provide a new northbound ramp to S. King Street.
- **Central** - Rebuild and retrofit the viaduct in its existing location. Retrofit ramps at Seneca, Columbia, Elliott, and Western. Maintain existing Battery Street ramps for only emergency vehicle use.
- **North Waterfront** - Rebuild the Alaskan Way surface street with four lanes (two lanes in each direction) after the seawall is rebuilt.
- **North** - No work is proposed in the north section of the project area.

How would it replace the seawall?

For the Rebuild Alternative, the seawall would be replaced with drilled shafts and improved soils from S. Washington Street up to Bay Street as shown in Exhibit 5-1.¹ The liquefiable soils behind the seawall and under the relieving platform would be improved by strengthening them with cement grout. Similarly, a small section of existing sheet pile wall from near S. King Street to S. Washington Street would be removed and replaced with improved soils and drilled shafts. In some areas along the seawall, drilled shafts may not be needed and the soils would only be improved.

2 How would the Rebuild Alternative be built?

The construction steps described below are preliminary and they may change based on additional project design.

Construction of this alternative would begin by relocating utilities. Next, the seawall would be replaced. Once the seawall was replaced, the viaduct and its ramps would be rebuilt or retrofitted from S. King Street² up to the Battery Street Tunnel. Then the at-grade roadway in the south section of the project area would be built. The viaduct would be torn down from S. Holgate Street to just north of S. King Street and the new ramps at S. Atlantic Street and S. Royal Brougham Way would be constructed. Finally, utilities would be moved to their final locations, the Alaskan Way surface street would be reconstructed, and traffic would be routed to its permanent locations. Additional information about construction is provided in Chapter 10.

3 How would the Rebuild Alternative change access?

How would it change vehicle access in the south?

Currently in the south end, SR 99 has a southbound off-ramp and a northbound on-ramp connecting at First Avenue S. near Railroad Way S. The Rebuild Alternative would replace the First Avenue S. ramps with an elevated interchange over SR 99. The interchange would connect SR 99 to SR 519 at S. Atlantic Street and S. Royal Brougham Way. The interchange would improve access in the south end by adding ramps that would provide connections to the stadiums and SR 519, which connects to I-90. The SR 519 interchange will also separate vehicles and rail opera-

tions. Currently these operations are not separated, and there are times when trains block roadway connections at S. Atlantic Street.

In addition, a northbound off-ramp would be built to S. King Street. The S. King Street off-ramp would provide drivers access into downtown. Traffic movements provided by the new ramps would include:

- Northbound off from SR 99 to S. Atlantic Street and S. Royal Brougham Way.
- Northbound on to SR 99 from S. Royal Brougham Way.
- Northbound off from SR 99 to the Alaskan Way surface street near S. King Street.
- Southbound on from E. Marginal Way near S. Holgate Street to SR 99.
- Southbound off from SR 99 to S. Atlantic Street and S. Royal Brougham Way.

How would it change railroad access?

This alternative would shift existing rail yards and move the tail track in the south end. The new at-grade SR 99 roadway would be built west of the existing viaduct where the Whatcom Rail Yard is currently located. As a result, the Whatcom Rail Yard would be removed and the Burlington Northern Santa Fe (BNSF) Seattle International Gateway (SIG) Rail Yard, located to the west of SR 99, would be expanded and reconfigured to include the relocated Whatcom Rail Yard tracks.

In addition, the tail track would be moved from the west side of SR 99 to the east side of SR 99. The tail track would extend from the reconfigured BNSF SIG Rail Yard to just south of Railroad Way S.

Appendix B contains additional information describing the Rebuild Alternative.

Rebuild vs Retrofit

How is rebuilding the viaduct different from retrofitting it?

Rebuilding the viaduct means that most of the existing viaduct components would be replaced. Retrofitting the viaduct means the existing structural members (such as columns and foundation supports) would be strengthened. Under the Rebuild Alternative, about 20% of the existing viaduct would be retrofitted.

How can soils be improved or strengthened?

Soil can be strengthened by mixing it with cement grout. Construction methods that may be used to strengthen soil for this project are described in more detail in Chapter 10.

Appendix W contains preliminary engineering drawings of this alternative.

Appendix C contains additional details about transportation.

¹No seawall work is required for any of the alternatives between Blanchard and Battery Streets adjacent to the Bell Harbor International Conference Center.

²From S. King Street up to Yesler Way, a new aerial structure would be built to connect the at-grade SR 99 with the rebuilt SR 99.

How would it change vehicle access for ferries?

People driving to the ferry get there via the Alaskan Way surface street, often by taking a left at Yesler Way. When Colman Dock is full, drivers wait for the ferry under the viaduct south of Railroad Way S. Drivers leaving Colman Dock use Marion Street or Alaskan Way.

The Rebuild Alternative would change where drivers would wait for the ferry when Colman Dock is full. It would also change the way drivers get to Colman Dock, and it would add a new way for drivers to exit Colman Dock

With this alternative, the viaduct would be removed and replaced with an at-grade roadway south of Yesler Way. Therefore, the existing ferry holding area under the viaduct would need to be relocated. Ferry holding could be provided east of SR 99 near S. Royal Brougham Way or west of SR 99 on part of Terminal 46, just south of S. King Street. With either of these ferry holding locations, traffic flow would be improved for both Alaskan Way surface street traffic and ferry traffic by building a separate roadway connecting the holding area to Colman Dock. Improved traffic flow at Colman Dock could also make ferry loading and unloading operations more efficient.

The separate ferry access roadway would be built on a new over-water pier between S. Washington Street and Yesler Way. Drivers would get to Colman Dock using S. King Street and the new ferry access roadway. Drivers leaving Colman Dock would be able to exit where they do now at Marion Street or Alaskan Way, or they could exit using the roadway to S. King Street.

The new ferry access roadway and over-water pier is needed for some additional reasons. The new pier would provide space to relocate the historic Washington Street Boat Landing, and it could provide new shoreline access to pedestrians and bicyclists. During construction, the roadway and pier are needed to maintain ferry access and egress. They could also accommodate construction staging activities.

How would it change how drivers get into and out of downtown?

With the Rebuild Alternative, there would be some minor changes for drivers traveling into and out of downtown. On the south end, a new interchange at S. Atlantic Street and S. Royal Brougham Way and a new northbound off-ramp at S. King Street would offer drivers a new way into or out of the Pioneer Square area. The ramps at Columbia, Seneca, Elliott, and Western would remain in their current locations, so drivers would not notice much of a change compared with what is there today. The Battery Street ramps would be closed to general traffic, but they would remain open for emergency vehicles.

How would it change the Alaskan Way surface street for vehicles?

The Alaskan Way surface street would be rebuilt in the same location with the same number of lanes. In most areas, a four-lane roadway would be built with two lanes in each direction as shown in Exhibit 5-2. In some locations, left-hand turn pockets could be provided. Parking both on Alaskan Way and under the viaduct would continue to be provided in the central waterfront area.

How would the Battery Street Tunnel change?

The Rebuild Alternative does not propose to make any changes to the Battery Street Tunnel.

How would it change vehicle access in the north?

No changes are proposed north of the Battery Street Tunnel, so access in this area would not change.

How would it change bicycle access?

The Rebuild Alternative would change bicycle access by modifying the location of the Waterfront Trail. The existing Waterfront Trail begins at S. Royal Brougham Way and runs along the east side of E. Marginal Way/ Alaskan Way to Bell Street. It is separated from the Alaskan Way surface street, and shared by bicyclists and pedestrians. The separated, shared path would be extended south from S. Royal

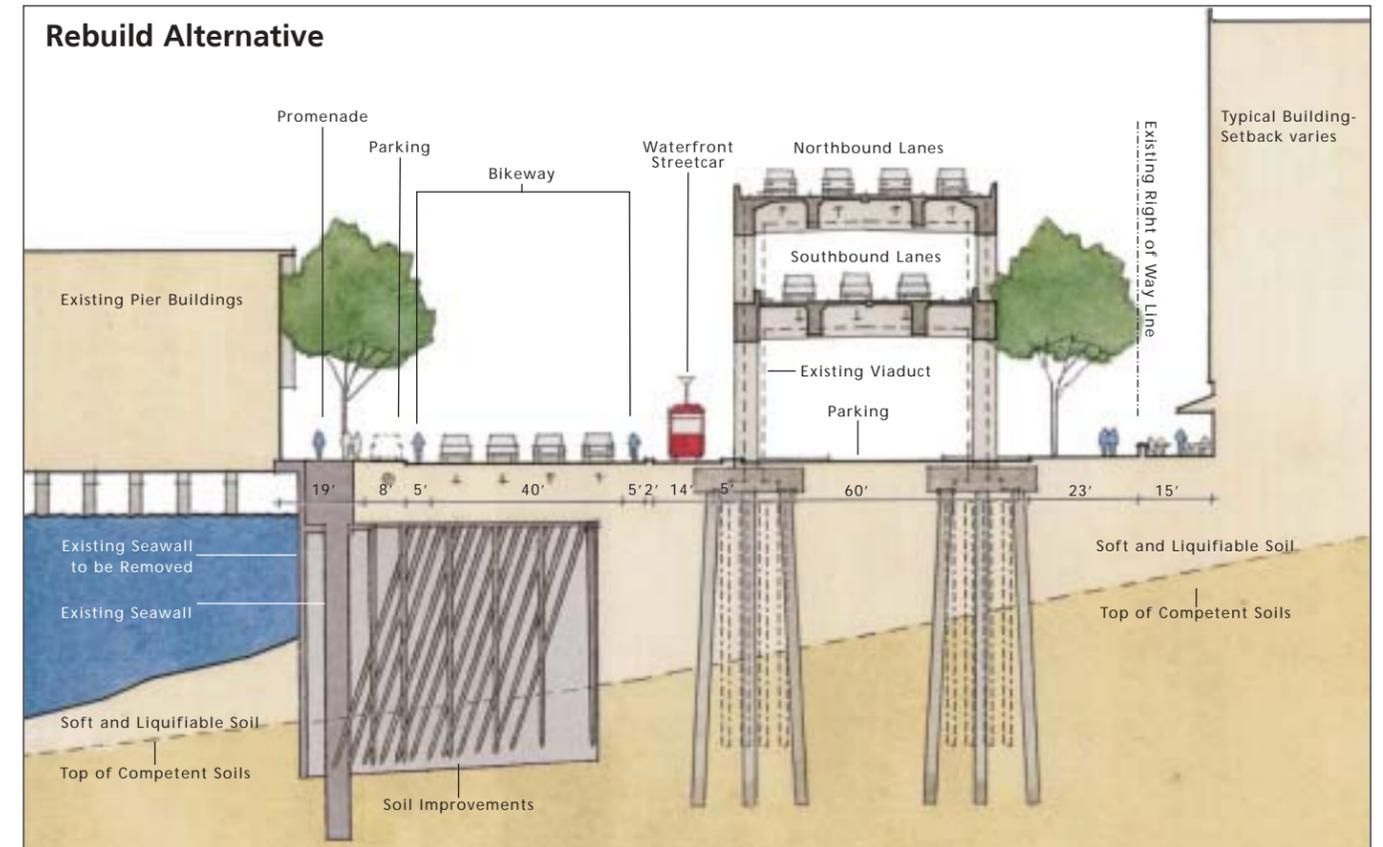


Exhibit 5-2

Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side. Between Yesler Way and Pine Street, the Waterfront Trail would be replaced with striped bicycle lanes along each side of the Alaskan Way surface street. North of Pine Street, cyclists would be routed to the Waterfront Trail, which would be located in its present location on the east side of Alaskan Way.

How would it change pedestrian access?

As with bicycle access, the Rebuild Alternative would change pedestrian access by modifying the location of the Waterfront Trail in a few places. The separated, shared path would be extended south from S. Royal Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side

What is the tail track?

The tail track is a single railroad track that connects the Burlington Northern Santa Fe (BNSF) Seattle International Gateway (SIG) Rail Yard on the east side of SR 99 to the Whatcom Rail Yard located west of SR 99.

The tail track is used to assemble and sort railcars for both the Whatcom and BNSF SIG Rail Yards.

of E. Marginal Way/Alaskan Way to the west side. From Yesler Way to Pine Street, the Waterfront Trail could be replaced with sidewalks along the Alaskan Way surface street. At Yesler Way, sidewalks on the west side of Alaskan Way would broaden and merge with the existing waterfront promenade, which would continue to Pine Street. North of Pine Street, cyclists would be routed to the Waterfront Trail, which would be located in its present location on the east side of Alaskan Way.

In the SR 519 area, pedestrian access would be maintained by continuing the sidewalks on Alaskan Way and associated local streets on the SR 519 interchange. Connections across SR 99 would be provided by sidewalks on S. Royal Brougham Way and S. Atlantic Street, which would cross over the SR 99 mainline.

All of the alternatives would add a new over-water pier connecting Pier 48 near the end of S. Washington Street with the Colman Dock Ferry Terminal. The pier would accommodate pedestrians on its waterside edge. In addition, for all alternatives, a pedestrian bridge may be added over the Alaskan Way surface street connecting the Colman Dock Ferry Terminal near Madison Street. The existing pedestrian bridge for people traveling to and from the Ferry Terminal at Marion Street would be rebuilt near its existing location

4 How would the Rebuild Alternative affect travel times and traffic flow?

How would daily traffic patterns and volumes on SR 99 change with the Rebuild Alternative?

In the central section of the corridor where traffic volumes are the highest, daily traffic is expected to peak downtown at 133,000 vehicles per day for the Rebuild Alternative compared with 126,000 vehicles per day for the existing facility in 2030. Travel patterns and volumes on SR 99 would not change much compared with the year 2030 existing facility if the Rebuild Alternative were constructed.

Rebuild Alternative Travel Times

During the PM Peak

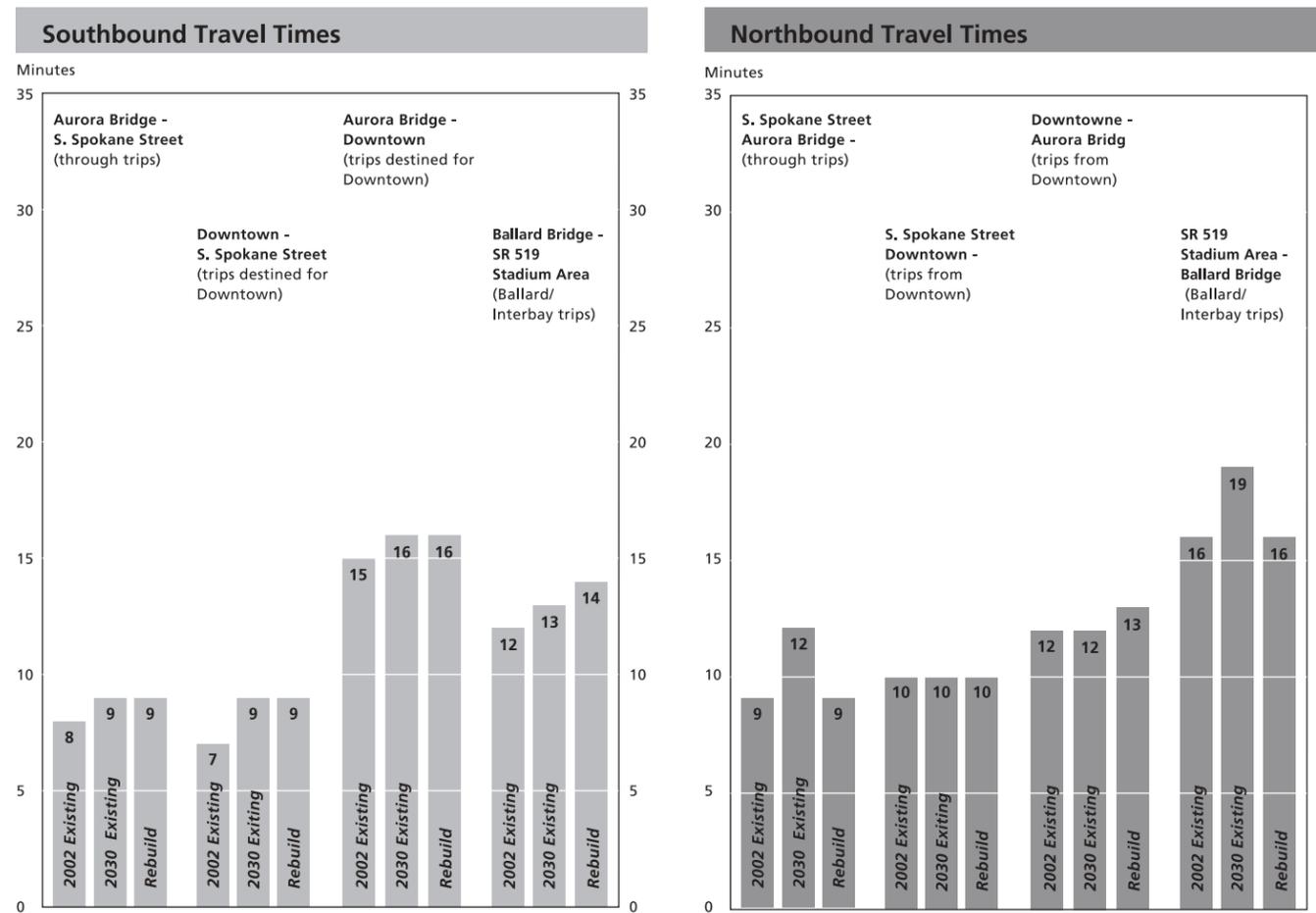


Exhibit 5-4

With the Rebuild Alternative, the number of hours that the SR 99 mainline would be congested is expected to be the same as the year 2030 existing facility as shown in Exhibit 5-3.

Exhibit 5-3

Daily Hours of Congested Operations on the SR 99 Mainline

	2002 Existing	2030 Existing Facility	Rebuild
Southbound	<1	3	3
Northbound	<1	4	4

In the south end of the project area, mainline SR 99 traffic volumes and ramp volumes are expected to in-

crease due to improved access between SR 99 and SR 519 (S. Atlantic Street and S. Royal Brougham Way). This traffic increase is not expected to affect operations on SR 99 in the south because there would be adequate roadway capacity to accommodate the trips.

In the south end of the project area, mainline SR 99 traffic volumes and ramp volumes are expected to increase due to improved access between SR 99 and SR 519 (S. Atlantic Street and S. Royal Brougham Way). This traffic increase is not expected to affect operations on SR 99 in the south because there would be adequate roadway capacity to accommodate the trips.

What is the "year 2030 existing facility" and why is it evaluated?

The year 2030 existing facility shows how much traffic is projected to use the existing SR 99 facility in the year 2030. It takes into account future population growth and other funded transportation projects such as Monorail and Link light rail. It assumes that the viaduct would remain in the year 2030 in its existing condition. We know it is unlikely that the viaduct will last until 2030. However, the information provides a baseline that can be compared with traffic conditions for the proposed alternatives.

How are congested operations on SR 99 defined?

The number of hours SR 99 would be congested was estimated by determining how long the busiest sections of SR 99 would be expected to have regular traffic slow downs or stop and go traffic.

What is the PM Peak Hour and why is traffic data analyzed for the PM Peak?

The PM Peak Hour is the time period when traffic is heaviest during the late afternoon commute. For SR 99, the PM Peak Hour occurs from 4:00 to 5:00 p.m. For this project, PM Peak data was evaluated because overall traffic conditions in and around the project area are the most congested during that time of day.

In the central section, similar traffic volumes are expected on the SR 99 mainline and at ramps at Columbia, Seneca, Elliott, and Western. The Battery Street northbound on-ramp and southbound off-ramp would be closed to general traffic. As a result, the number of drivers that would use the northbound Denny Way on-ramp is expected to increase during the late afternoon commute. Consequently, the volume of traffic headed northbound in the Battery Street Tunnel would slightly decrease.

How would travel times and traffic speeds change on SR 99 with the Rebuild Alternative?

If the Rebuild Alternative were built, travel times would be comparable or slightly improved compared to what is expected for the existing facility in 2030. Exhibit 5-4 shows southbound and northbound travel times for four common trips on SR 99 during the late afternoon commute. The Rebuild Alternative would slightly reduce northbound travel times for trips traveling through downtown between S. Spokane Street and the Aurora Bridge and SR 519 and the Ballard Bridge. These travel times would improve because the northbound on-ramp at Battery Street would be closed, which would improve safety and traffic flow. Travel times in the southbound direction would be comparable to those for the 2030 existing facility.

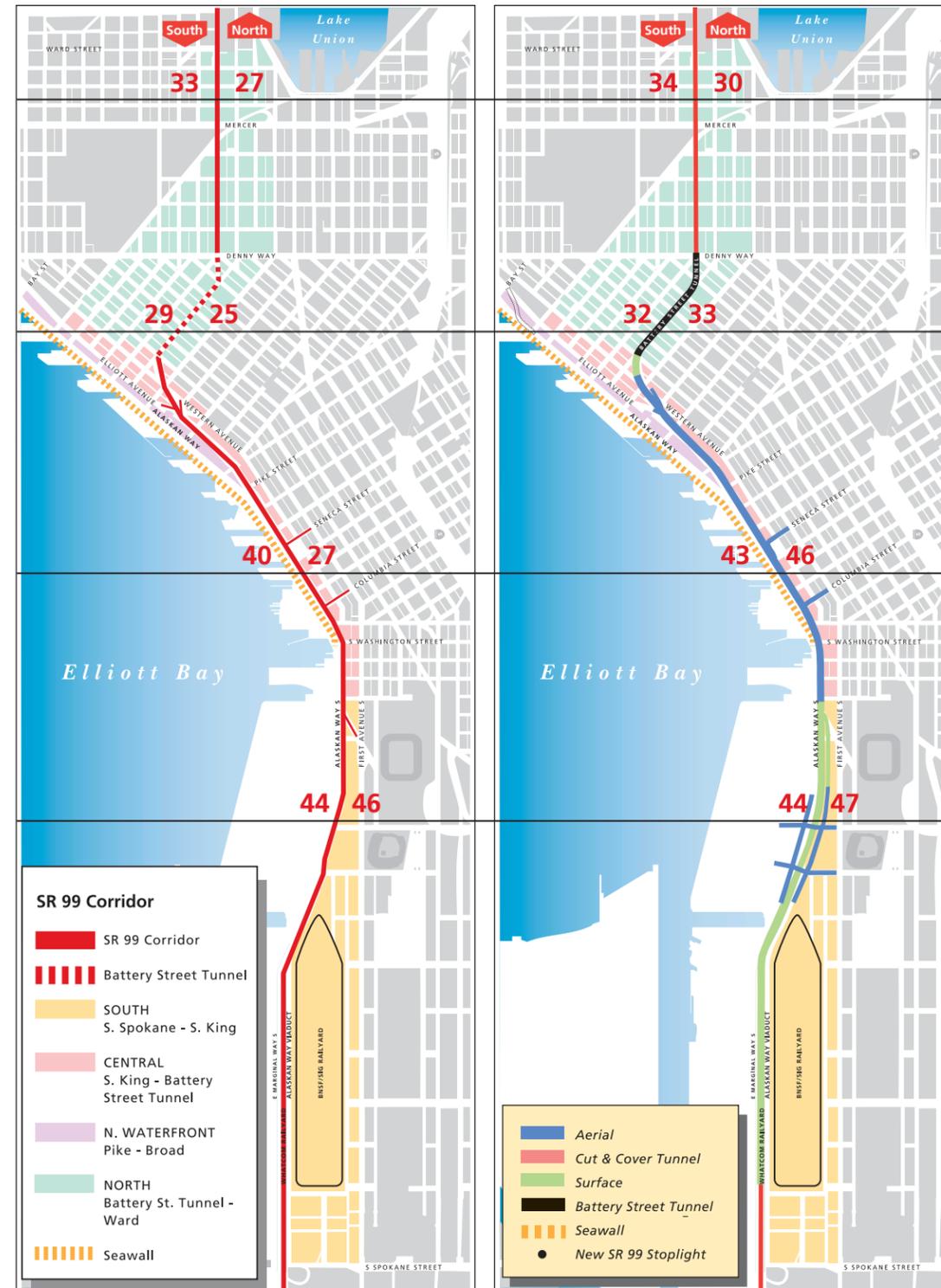
Average traffic speeds for the Rebuild Alternative would improve through downtown, the Battery Street Tunnel, and the north end compared with year 2030 conditions, as shown in Exhibit 5-5. Average traffic speeds would increase the most for northbound traffic traveling between downtown and the Battery Street Tunnel. In this area, traffic speeds are expected to increase from 27 miles per hour for the 2030 existing facility to 46 miles per hour for the Rebuild Alternative. Increased traffic speeds would occur because the Battery Street ramps would be closed, which would improve traffic operations. Also, the rebuilt viaduct would be slightly wider than the existing facility, which would make it easier for people to drive.

Average Traffic Speeds

During the PM Peak

2030 Existing Facility

Rebuild



Southbound SR 99 Speeds

During the PM Peak Hour
Shown as miles per hour

SR 99 Section	2002 Existing	2030 Existing	Rebuild
South Lake Union Area	39	33	34
Battery Street Tunnel	34	29	32
Downtown	41	40	43
Stadium Area	44	44	44

Northbound SR 99 Speeds

During the PM Peak Hour
Shown as miles per hour

SR 99 Section	2002 Existing	2030 Existing	Rebuild
South Lake Union Area	33	27	30
Battery Street Tunnel	33	25	33
Downtown	39	27	46
Stadium Area	46	46	47

What are congested and highly congested intersections?

Congested intersections are intersections that cause drivers considerable delay. A driver might wait between one and two minutes to get through a traffic signal at a congested intersection. At a highly congested intersection, a driver might wait two minutes or more to get through the traffic signal.

Exhibit 5-5

How would local streets and intersections operate?

Traffic on local streets and delay at intersections would not substantially change if the Rebuild Alternative were built, as shown in Exhibit 5-6.

In the south, intersections at First Avenue S. and S. Royal Brougham Way and First Avenue S. and S. Atlantic Street would slightly improve from highly congested conditions to congested conditions. Conditions at these intersections would improve because fewer drivers would need to turn to connect with SR 519. Also, the new interchange would distribute traffic between two streets, compared with the existing facility, which distributes traffic at only one street (First Avenue S.).

In the downtown area, congestion on local streets would be similar between the Rebuild Alternative and the year 2030 existing facility, with one notable exception. With the Rebuild Alternative, the intersection of Alaskan Way and Yesler Way is expected to improve substantially from an estimated 124 seconds of delay to 10 seconds of delay during the PM Peak. This improvement would occur because ferry access to Colman Dock would be moved from Yesler Way to S. King Street. The tradeoff is that an intersection would be added at Alaskan Way and S. King Street. This intersection would have about 57 seconds of delay during the PM Peak.

North of the Battery Street Tunnel, conditions would be the same between the Rebuild Alternative and the year 2030 existing facility because no changes are proposed.

How would traffic volumes change on the Alaskan Way surface street?

Traffic volumes on the Alaskan Way surface street are not expected to change much compared with the 2030 existing facility. Daily traffic volumes are expected to be about 10,000 vehicles per day, which is about 1,000 cars less than what is predicted with the existing facility in 2030. With the Rebuild Alternative, traffic operations along Alaskan Way are expected to improve because ferry traffic would be separated

from Alaskan Way traffic on a new parallel ferry access road. The primary ferry access location from Alaskan Way would be moved from Yesler Way to S. King Street.

Would traffic on other parallel city streets change?

For the most part, the Rebuild Alternative would not change traffic volumes on other city streets. In the south end of the project area, fewer drivers are expected to use parallel city streets due to improved connections to SR 519 at S. Atlantic Street and S. Royal Brougham Way. The reduction in vehicles on city streets may slightly improve traffic flow along these routes. North of the Battery Street Tunnel, traffic on city streets would slightly increase near Denny Way because the Battery Street ramps would be closed.

Would Rebuild Alternative affect traffic volumes on I-5?

The Rebuild Alternative is not expected to affect traffic volumes on I-5.

5 How would the Rebuild Alternative change conditions for freight and transit?

How would the Rebuild Alternative change conditions for freight?

Freight access, travel times, and travel speeds would improve compared with the existing facility in 2030. A new interchange would be built at S. Atlantic Street and S. Royal Brougham Way, which would improve access between SR 99 and SR 519. This interchange would improve freight connections between the Duwamish industrial area, Harbor Island, SR 519, and I-90.

In addition, travel times would be slightly improved compared to the existing facility in 2030. As discussed in previous questions, travel speeds would also be improved, particularly in the northbound direction during the PM Peak hour. For example, in the northbound direction, travel times between SR 519 and the Ballard Bridge would be reduced from 19 minutes to 16 minutes. Improved travel times and speeds benefit all vehicles, including freight. Travel

Rebuild Alternative Congested Intersections
During the PM Peak

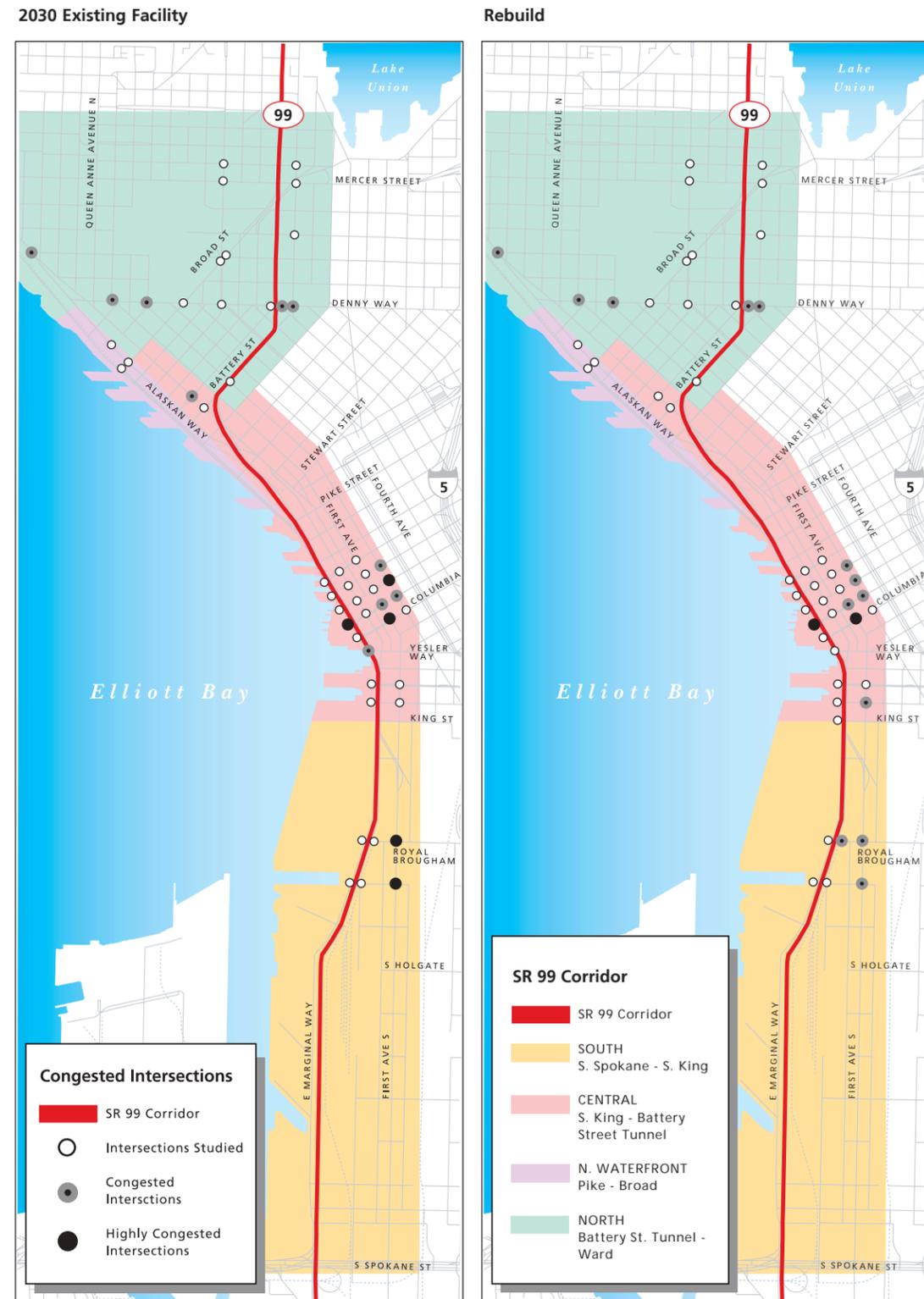


Exhibit 5-6

times and speeds are expected to improve because ramp connections would be changed and the roadway would be wider than the existing facility, which would make it easier for people to drive.

Finally, due to the viaduct's deteriorating condition, speeds for large vehicles over 10,000 pounds are currently restricted to 40 miles per hour (10 miles below the speed limit for other vehicles). Large vehicles also must use only the right lanes of the viaduct. These restrictions would be removed once the viaduct and seawall are replaced, which would benefit both freight and transit.

How would the Rebuild Alternative change transit conditions?

Conditions for transit would be similar to conditions for the existing facility. Buses could continue to reach downtown from Columbia and Seneca Streets and Denny Way as they do now. Using these established routes, travel times and speeds would be similar or slightly improved compared to the 2030 existing facility. For example, the southbound trip from downtown to S. Spokane Street would take 9 minutes for both the Rebuild Alternative and the year 2030 existing facility, though travel speeds in the area are expected to increase slightly. This trip represents the route that buses travel during the late afternoon commute between downtown and West Seattle.

Conditions for bus transit would also improve because speed and lane restrictions currently in effect for large vehicles (including buses) would be removed once the viaduct was rebuilt. Also, the SR 99 roadway would be wider than the existing facility, which would make it easier for bus operators to drive. Finally, bus transit providers could decide to change their routes by entering downtown via the new S. Atlantic Street/S. Royal Brougham Way ramps. This would increase transit times to the downtown area, but would allow buses to access the entire Fourth Avenue corridor, thereby expanding services to growing employment centers in the International District and Pioneer Square area. Please note, if buses were routed to the SR 519 ramps, transit would be subject to

traffic congestion in the stadium area during events unless alternate routes were developed.

The lead agencies are committed to improving other transportation options in the corridor as part of this project, particularly as part of construction. A Flexible Transportation Package has been developed that includes several different programs and tools to respond to varying needs in the corridor. Most of the tools are designed to decrease reliance on single-occupancy vehicles and increase other modes of transportation during construction of the project, though some investments would provide long-term benefits once the project was completed. The range of programs that could be implemented to provide long-term benefits includes implementing parking strategies to decrease long-term parking in the area and installing traffic management and transit priority systems. A more defined Flexible Transportation Package will be presented in the Final EIS as part of the preferred alternative.

6 How would the Rebuild Alternative improve roadway safety?

The Rebuild Alternative would improve roadway safety over existing conditions. The existing, deteriorating facility would be replaced, reducing seismic risks and other risks associated with the aging structure. Also, the replaced roadway would be easier for people to drive because it would be wider than the existing facility. In the south end, SR 99 would be removed and replaced with a new at-grade roadway from S. Holgate Street up to near S. King Street. The new at-grade roadway would be built with wider lanes and shoulders than the existing facility, which would improve driving conditions for all vehicles. Also, the ramps at First Avenue S. would be removed and replaced with ramps with wider shoulders in the S. Atlantic Street/S. Royal Brougham Way area. In addition, the rebuilt section of the viaduct from Yesler Way up to near Pike Street would be rebuilt with slightly wider lanes and shoulders, further improving roadway conditions. The ramps to Columbia, Seneca, Elliott, and Western would be retrofitted, therefore widths or lengths would not change. The Battery Street ramps

would be closed to general traffic, which is expected to reduce accidents at these ramp locations.

7 How would the Rebuild Alternative affect parking?

Currently there are 2,038 parking spaces located in the project area. As shown in Exhibit 5-7, a total of about 270 parking spaces would be removed with the Rebuild Alternative.

Exhibit 5-7
Parking Changes for the Rebuild Alternative

	Short-Term ¹	Long Term ²	Off-Street ³	Total
<i>Existing Parking Spaces</i>	814	276	900	2,038
<i>South End</i>	-13	-241	-57	-311
<i>Pioneer Square</i>	+5	-15	+2	-8
<i>Central Waterfront</i>	+42	0	+1	+43
<i>North Waterfront</i>	+2	0	+4	+6
<i>Net Change</i>	+36	-256	-50	-270
<i>Parking Spaces with the Rebuild Alternative</i>	850	20	850	1,768

¹ Short-term metered parking spaces
² Free, long-term parking spaces
³ Pay parking and tenant only parking

The majority of parking spaces that would be removed are free, long-term spaces located in the south section of the project area. This project does not currently propose to replace these long-term parking spaces because there is enough long-term parking available in the project area. People currently parking for free would need to pay to park, or they would need to use transit. According to the Puget Sound Regional Council's 2002 parking inventory study, 46.6 percent of parking spaces in the south end are utilized. There are more than five parking facilities in this area providing more than 6,000 parking spaces. Using the estimated parking utilization rate in this area, approximately 2,800 spaces are available in this area on a normal business day.

The Rebuild Alternative would increase the number of short-term parking spaces provided in the project area. Most of these new spaces would be located in the central waterfront area.

Chapter 10 and Appendix B contain additional details about tools proposed for the Flexible Transportation Package.

8 If the Rebuild Alternative were built, what would it look like?

The rebuilt viaduct would have almost the same dimensions and alignment as the existing viaduct, so the look and feel of the corridor would be similar to existing conditions. However, columns would be farther apart and more slender. The elevated part of SR 99 between S. Holgate Street and S. King Street would become a surface roadway, possibly creating a few new east-west views that are currently blocked by the viaduct. To cross over SR 99, elevated ramps would be built at S. Atlantic Street and S. Royal Brougham Way, and the roadway in this area would be widened. Views in the south end would still be dominated by industrial and waterfront buildings, and especially by Seahawks Stadium and Safeco Field. Westward views in parts of Pioneer Square, the commercial core, and Belltown that are adjacent to the viaduct's east side would continue to be dominated by the viaduct, as would eastward views from the central waterfront. For the most part, the general character of the corridor, both on the ground and from the new elevated roadway structure, would stay the same.

9 How would noise or vibration levels change?

Noise from the Rebuild Alternative would change by plus or minus 2 dBA from existing traffic noise levels. A change of 2 dBA is not usually noticeable to the human ear. These small changes would be caused by slightly modified traffic patterns resulting from new on- and off-ramp locations.

The noise abatement criterion is 67 dBA for noise-sensitive outdoor uses at locations such as parks, hotels, and residences. Existing traffic noise approaches or exceeds the FHWA traffic noise abatement criteria at 43 of the 48 sites modeled. In general, the traffic noise is currently loud, typical of a downtown urban environment, and would not change substantially under the Rebuild Alternative.

Traffic noise levels with the Rebuild Alternative would approach or exceed the traffic noise abatement criteria at the same 43 sites as existing conditions. These sites include approximately 4,490 resi-

dential units, 1,290 hotel rooms, and 120 shelter beds. Nine of the sites are parks or public open spaces, two are educational or childcare sites, and ten sites are commercial or other less noise-sensitive uses. Six sites that are severely affected by noise for the year 2030 existing facility would continue to be severely affected under the Rebuild Alternative. Modeled noise levels at specific locations may be found in Exhibits 5-1 and 5-2 of Appendix F.

Noise from other sources, such as aircraft, restaurants and other businesses, the bustle of sidewalks, construction, mechanical systems in buildings, alarms, and sirens, also contributes to the total noise environment.

The following mitigation measures were evaluated for their potential to reduce noise impacts from the Rebuild Alternative: traffic management measures, acquiring land as buffer zones or for construction of noise barriers or berms, realigning the roadway, and installing noise insulation for public use or nonprofit institutional structures. The only measure that was found potentially feasible and reasonable was the use of sound-absorbing materials to reduce reflected noise from the viaduct structure.

Long-term vibration impacts from the Rebuild Alternative would be similar to existing levels, because the rebuilt viaduct structure would be in a similar location and configuration. Vibration would continue to be transferred from the structure to the ground via the columns.

10 How would the Rebuild Alternative change character and land use in the project area?

The Rebuild Alternative would rebuild the viaduct with an updated elevated structure that would have almost the same dimensions and route as the existing structure. The new elevated structure would continue to affect existing land uses in much the same way as the existing viaduct, with traffic noise, view blockage, and shadow. The Rebuild Alternative would not create opportunities for new types of development in the project corridor, like new businesses, redevelopment of existing properties, and public open space. Some



Rebuild Alternative Simulation
at Union Street

Exhibit 5-8

land along the corridor would be converted to roadway, most of it in the industrial area on the south end. Approximately 270 long-term parking spaces would be removed in the corridor. Overall, this alternative would not substantially change land uses in the corridor.

11 How would the Rebuild Alternative affect parks, recreation, and open space?

Because the Rebuild Alternative would have a similar route and dimensions as the existing viaduct, effects to parks, recreation, and open space in the project corridor would remain about the same as they are now. A new over-water pier would be built near the end of S. Washington Street connecting to Colman Dock. The pier would remove Alaska Square, a small

Appendices D and E contains additional information about views.

Appendix F contains additional noise and vibration information.

Land Use

The Land Use and Shorelines Technical Memorandum found in Appendix G discusses this topic more extensively and looks at the alternatives with an eye toward their consistency with current local land use plans and policies.

public access and shoreline viewing area. Alaska Square is currently closed because the bulkhead supporting it is failing. Alaska Square could be replaced with sidewalks and shoreline viewing near its current location. The new over-water pier would also require relocating the Washington Street Boat Landing about 125 feet west of its current location.

The Rebuild Alternative would modify the Waterfront Trail, which is separated from the Alaskan Way surface street and shared by bicyclists and pedestrians. The separated, shared path would be extended south from S. Royal Brougham Way to just south of S. Atlantic Street. From S. Atlantic Street to Yesler Way, the Waterfront Trail would be moved from the east side of E. Marginal Way/Alaskan Way to the west side. Between Yesler Way and Pine Street, the trail would change from being a separated, shared bicycle and pedestrian pathway. Bicyclists would ride in striped lanes along the Alaskan Way surface street, and pedestrians could walk on sidewalks on the east side of Alaskan Way or the waterfront promenade located on the west side of Alaskan Way. From Pine Street north, the Waterfront Trail would not be affected.

12 How would the Rebuild Alternative affect neighborhoods and the people who live there?

Because the Rebuild Alternative is quite similar to the existing viaduct, it would make few day-to-day changes to neighborhoods along the corridor. The biggest changes would be in the Duwamish neighborhood. Here, construction of a new interchange would provide better access to SR 519, which could benefit local businesses. Population and employment along the rest of the corridor would change very little, if at all as a result of the project.

13 Would the Rebuild Alternative affect community and social services?

The Rebuild Alternative would have little effect on most community and social services providers in the corridor. The CASA Latina Day Workers' Center (which dispatches jobs for casual day laborers) is located near the south portal of the Battery Street Tun-

nel and would be displaced. In the south, traffic in front of the St. Martin de Porres homeless shelter would increase. This could make driving to and from the shelter during peak travel times more difficult when transporting overnight clients to and from other downtown social service agencies. Other social service providers along the project would not be affected.

14 What residences, businesses, or other properties would need to be acquired?

No residences would be affected. Up to 14 parcels would be permanently acquired for the Rebuild Alternative. If these parcels are fully acquired, the total area obtained would be approximately 1,064,000 square feet (24 acres). Additionally, about 170,000 square feet (3.9 acres) along the eastern edge of Terminal 46 may be acquired for right-of-way needs or ferry holding. Up to eight buildings would be modified or acquired during construction, including five commercial buildings, two industrial buildings, and Fire Station No. 5. At this time, the number of businesses or employees that would need to be relocated is unknown; however, it is estimated that in the eight buildings, up to 334 employees may be affected. Specific information about the number of businesses and employees requiring relocation will be developed for the preferred alternative and described in the Final EIS.

Of the 14 parcels that would potentially be acquired, seven are located in the south section of the project, and seven are located in the central section. Additional parcels or buildings would receive minor modifications, such as changes to driveways, parking, or fences, which would not alter their existing use. The lead agencies will work closely with the affected businesses and properties to minimize the level of disruption.

15 How would the Rebuild Alternative affect historic resources?

The Rebuild Alternative would not change most conditions for historic buildings and neighborhoods in the corridor because it is similar to the existing viaduct. The elevated structure would continue to

block views to and from historic buildings, and in the cases of both Pioneer Square Historic District and Pike Place Market Historic District, views to, from, and within an entire historic neighborhood would continue to be affected. The height, bulk, and industrial design of the elevated structure would still detract from the historical character of buildings and neighborhoods in the corridor, especially those located a block or so from the viaduct. In some cases, access to historic buildings may be changed.

Existing ramps connecting First Avenue S. with SR 99 would be removed, eliminating their effects near the south end of Pioneer Square. However, new ramps connecting SR 99 to S. Royal Brougham Way and S. Atlantic Street (on the south edge of the Pioneer Square neighborhood) would have some of the same effects as the viaduct, and could affect access to a nearby historic building. Retrofitted ramps at Columbia and Seneca Streets would continue to affect nearby historic buildings, but would not change compared with the existing facility. In the south end of the corridor, one building eligible for listing in the National Register of Historic Places may be demolished. The building is located at 801 First Avenue S., and was originally the Washington-Oregon Shippers Cooperative Association (WOSCA) Freight House.

Along the waterfront, the Washington Street Boat Landing pergola would be relocated approximately 125 feet west of its current location to make way for the Colman Dock ferry access road. Piers 54 to 59, with their distinctive working waterfront architecture, are eligible for consideration as a historic district in the National Register of Historic Places.

Because of its age, mid twentieth-century engineering, and role in Seattle's history, the Alaskan Way Viaduct itself is eligible to be listed in the National Register of Historic Places. The seawall is also eligible. The potential historic status of these structures will be considered as part of the planning process but is not expected to prevent their modification or replacement. Replacement of the seawall is not



Historic Washington Street Boat Landing

Appendices H and N contain additional information about parks and recreation.

Appendices I and J contain additional information about neighborhoods.

Will the agencies help relocate properties that need to be purchased for the project?

The lead agencies will provide relocation assistance and compensation to the affected property owners and tenants as mitigation. Compensation will comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation assistance includes determining special needs and providing referrals to comparable properties.

Appendix K contains additional information about properties that would potentially be acquired.

Appendices L and N contain additional information about historic resources.

expected to affect any other historic resource in the corridor.

As part of the planning and design of the Rebuild Alternative, measures would be taken to lessen its effects on historic resources. These measures might include designing structures to blend in with historic buildings and neighborhoods, moving historic buildings instead of tearing them down, and documenting buildings and structures that need to be removed (with photos, surveys, measurements, and notes) to help preserve the memory of Seattle's history for the future.

16 How would the Rebuild Alternative affect public services (such as police and fire)?

Public services would mostly be affected by changes in traffic patterns within the corridor. Because overall traffic would improve under the Rebuild Alternative, public service providers would benefit as well. Project elements that would improve overall operations for traffic include adding ramps that connect SR 99 to S. Atlantic Street and S. Royal Brougham Way, shifting access to the ferry terminal from Yesler Way to S. King Street, and closing the Battery Street ramps to general traffic. The Battery Street ramps would remain open only to emergency vehicles, providing direct access to the Battery Street Tunnel for emergency service providers. This alternative is the only one that does not include the improvements to the Battery Street Tunnel that would make it safer in the event of a fire, accident, or other type of emergency.

17 How would the Rebuild Alternative affect the local and regional economy?

Once the Rebuild Alternative is operational, it would benefit the local and regional economy by making the facility safer, improving freight mobility, and providing a more reliable transportation corridor for goods and services.

The Rebuild Alternative would provide improved connections between SR 99 and the Duwamish area, Harbor Island, and SR 519. The new interchange at SR 519 would also provide grade-separated access

over the tail track, allowing vehicles to travel between the waterfront and SR 519 when freight trains are present. Additionally, the Rebuild Alternative would provide a good connection between the Duwamish industrial area and the Ballard Interbay Northend Manufacturing and Industrial Center (BINMIC). Overall, movement of freight would improve over present day conditions, since lane and speed restrictions for freight traffic would be greatly reduced. These improved connections, increased travel speeds, and decreased travel times would reduce freight operation and shipping costs.

However, the Rebuild Alternative would permanently displace up to eight buildings with approximately 334 employees. If the businesses are not relocated within the city, local sales tax, business and occupation (B&O) tax, and property tax revenue might be lost. If displaced businesses leave Seattle but stay in the region, the new location would continue to collect B&O taxes and support the regional economy.

18 Would the Rebuild Alternative change air quality?

Under the Rebuild Alternative, concentrations of carbon monoxide and particulate matter (PM₁₀) were estimated under peak traffic conditions for study area intersections (Exhibits 6-1, 6-2, and 6-3 in Appendix Q). The future pollutant concentrations were estimated to be below (within) the National Ambient Air Quality Standards (NAAQS).

Daily pollutant emissions from traffic in the study area in 2030 were also estimated. Comparison between existing study area emissions and the various alternatives in 2030 demonstrates the trend towards cleaner operating vehicles for carbon monoxide, oxides of nitrogen, and hydrocarbons in 2030 (Exhibit 6-4 in Appendix Q).

19 How would the Rebuild Alternative affect fish and wildlife species and their habitat?

One way the Rebuild Alternative would affect wildlife habitat is by replacing the old seawall with a new one. The new concrete seawall would be constructed slightly landward of the existing seawall along the

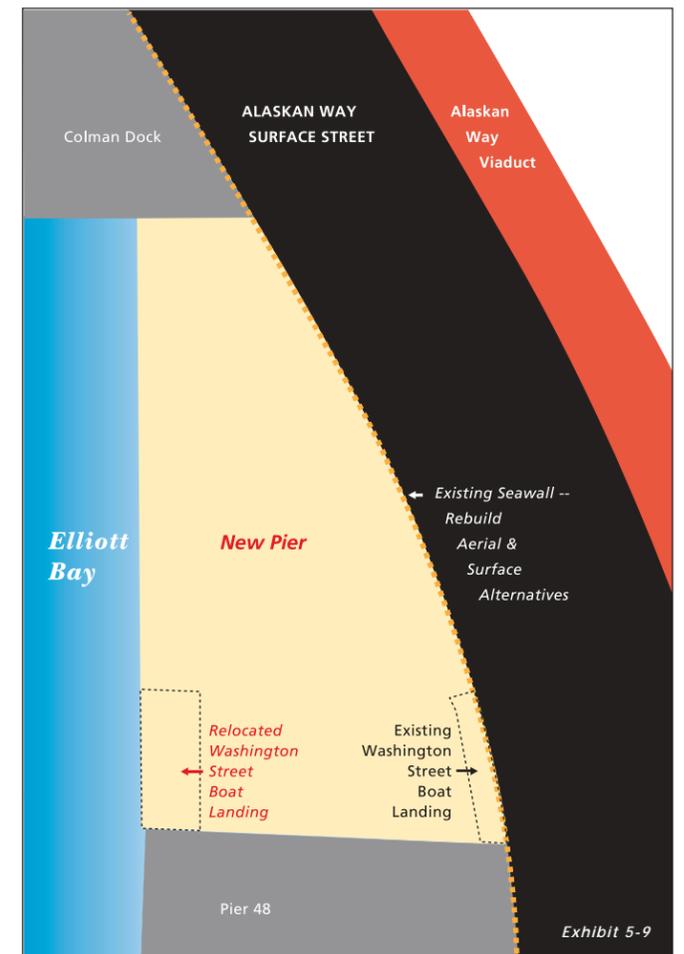
majority of the corridor. In some areas, the existing seawall would be removed, increasing the water volume in the immediate area by an estimated 8,000 cubic yards. Like the old seawall, the basic structure in the aquatic habitat along the new seawall would consist of a vertical concrete wall with rock riprap placed at its base where needed to prevent erosion. Up above at street level, urban habitat—mostly street trees and shrubs—would remain much the same as it currently is. The existing storm water facilities that collect and convey water from the viaduct are old and would be replaced with new facilities using current design standards and technology, improving the quality of water discharged.

The vertical concrete seawall is poor inertial habitat for many species, including ESA listed species such as Chinook salmon and bull trout. The Seattle waterfront is a migration corridor and rearing area for juvenile Chinook and other juvenile anadromous salmonids. Juvenile salmon are commonly present at various protected locations near the water's surface in the vicinity of the seawall during spring migration. Other fish species commonly observed in the shoreline area along the seawall include seaperch, bay pipefish, shiner perch, sculpins, greenling, various flatfishes, and a few lingcod. These fish would experience the same basic habitat as they do today when the new seawall is constructed. The habitat along the seawall is also occupied by a range of marine invertebrates, such as red crab, hairy crab, coon-striped shrimp, octopus, starfish, and anemones.

Between Pier 48 and Colman Dock, a new over-water pier would be built to provide vehicle access to the Colman Dock Ferry Terminal. The new pier would cover approximately 33,000 square feet of intertidal shoreline (areas that are exposed during low tides), including riprap, and shallow subtidal habitat (areas normally covered by water). Under other piers along the waterfront, marine biologists observed that macro algae (a kind of seaweed, important for food and habitat for aquatic animals) have a hard time growing

Appendix O contains additional information about public services.
Appendix P contains additional information about Economics.
Appendix Q contains additional information about air quality.
Appendix R contains additional information about fish and wildlife

Changes to Elliott Bay at S. Washington Street
Rebuild, Aerial and Surface



in shade cast by the piers. The shade would probably keep macro algae and other aquatic vegetation from growing under the new pier.

Project planners and designers would work with resource agencies (like the Corps of Engineers) to address habitat that could be affected by shading from the construction of the pier. These efforts could include protecting an existing intertidal beach with an offshore berm or breakwater and creating new beaches in open areas along the waterfront that would provide much-needed improvements to aquatic habitat along Seattle's urban shoreline. This would give young salmon and bull trout the protective shallow water habitat they need to grow and provide a corridor along the waterfront in which adult salmon and bull trout could migrate on their way to and from the Pacific Ocean. Other possibilities for restoring natural habitat or improving current habitat conditions where possible are also being studied.

20 Would the Rebuild Alternative change water quality?

The amount of impervious surface area would not increase under the Rebuild Alternative. Incorporation of Best Management Practices (BMPs) into the Rebuild Alternative would improve the water quality of runoff discharged from the project area compared with existing conditions. Rain running off the streets and highways collects zinc and copper that degrade water quality and can be harmful to aquatic plants and wildlife. By using BMPs, the Rebuild Alternative would reduce the amount of these potentially harmful materials.

Exhibit 5-10
Summary of Water Quality Benefits for the Rebuild Alternative BMP Approach

Annual Pollutant Load (lbs/yr) ¹	Existing Conditions	Rebuild Alternative	Change (% Reduction) ²
Total Suspended Solids	87,300	45,700	48%
Zinc	132	82	38%
Copper	26	17	35%

¹ Annual pollutant load from project area pollutant-generating impervious surface (PGIS) after treatment with the BMP Approach

² Pollutant reduction is an estimate based on a mass balance model developed for this project

The volume of stormwater being discharged to the Duwamish River, Elliott Bay, and Puget Sound would not change. According to the current design plans, the locations of the outfalls would remain the same. The Rebuild Alternative would not change the volume of stormwater discharged to the combined sewer system; therefore, the West Point Treatment Plant efficiency and combined sewer overflows would not change.

21 How would the Rebuild Alternative change the soil conditions once the project is completed?

To meet earthquake standards, the soil would have to be strengthened to ensure that it would not liquefy in an earthquake. A large part of the Alaskan Way Viaduct project area is located on loose fill, soft sediment, sand, and gravel (described in Chapter 3 Question 2). The Rebuild Alternative's structures must be anchored in soils that are stronger than these loose materials to withstand an earthquake. In the project area, piles or drilled shafts would need to be installed 60 to 150 feet deep to reach the dense glacial soils that would support the facility.

The soils would be strengthened to reduce the seismic hazards and meet the earthquake standards. Soils can be strengthened by using jet grouting or deep soil mixing. The jet grouting and deep soil mixing techniques inject, mix, or replace the existing soil with cement grout to strengthen the soils.

Soils would be strengthened around the new foundations of the viaduct, under some proposed retaining walls, and behind the seawall. The soils would primarily be strengthened in the south section and along the waterfront. The soils between Pine Street and the Battery Street Tunnel have sufficient strength and do not need to be improved. North of the Battery Street Tunnel, there are no changes required for the soil conditions because no improvements are planned for this alternative and the existing soils are adequate.

The extent of soil improvement behind the seawall depends upon the type of seawall and depth to glacial soils. Improvements behind the seawall are likely to use the jet grouting technique. From S. King Street

to S. Washington Street, soil improvements behind the existing sheet pile wall would be made to a depth of about 40 feet and a width of about 35 feet. Along the Pile-Supported Gravity Wall from S. Washington Street to Madison Street, soil improvements would be made to a depth of about 40 feet and width of about 65 feet. The Type A and Type B Seawalls are located between Madison Street and Myrtle Edwards Park. Behind the Type B Seawall, the soil improvements would be around 60 feet in width and 65 feet in depth. The soil improvements behind the Type A Seawall would improve approximately the first 40 feet east of the seawall to a depth of about 55 feet.

22 Would the Rebuild Alternative change groundwater flows?

Once the soil has been injected, mixed, or replaced with cement grout, groundwater would not be able to flow as readily in these areas. However, since the improvements are limited, overall groundwater flow in the watershed would not be substantially affected by the project. Groundwater levels may change slightly, although the changes would probably be less than the natural fluctuations in groundwater levels that already occur.

23 Would the Rebuild Alternative create or remove any contaminated materials or sites?

The Rebuild Alternative would not create any new contaminated materials or sites. This alternative would remove an estimated 795,000 cubic yards of soil or material generated as spoils during construction. Of this amount, approximately 317,000 cubic yards of potentially contaminated soils would be removed and disposed of appropriately, which would benefit the project area. Removing contaminated soil could reduce future groundwater contamination, and it could reduce the potential exposure to workers that may have future excavation projects in the area.

What is a BMP?

A Best Management Practice (BMP) is an action or structure that reduces or prevents pollutants from entering the stormwater and degrading water quality.

The approaches for stormwater management are described in Chapter 2.

Appendix S contains additional information about water quality.

Appendix T contains more information about geology, soils, and groundwater.

Appendix U contains additional information about contaminated materials.

