3 TRANSPORTATION ENVIRONMENT AND CONSEQUENCES

3.1 Summary

The intent of this chapter is to inform the public about the potential transportation effects of the West Seattle and Ballard Link Extensions (WSBLE) Project alternatives, to provide for a comparison of alternatives and to identify potential mitigation strategies or approaches where potential project impacts are identified. This transportation analysis identifies and evaluates the project alternatives' potential short-term (construction) and long-term (operation) impacts for the following transportation elements:

- Regional system and travel, including vehicle miles of travel, vehicle hours of travel, vehicle hours of delay, and mode share
- Transit services, including regional and local services, project and station ridership and transit quality and performance levels of service (L.O.S.)
- The arterial and local street system, including property access, local traffic circulation and intersection L.O.S.
- Parking, including the loss of parking due to project facilities and potential hide-and-ride parking impacts near stations
- Non-motorized facilities (bicycle and pedestrian) around stations and on major bicycle or pedestrian trails affected by the alternative or alternatives
- Safety (all modes)
- Navigation
- Freight (truck, rail, and water)

Potential indirect impacts are also discussed in this chapter.

Table 3-1 summarizes key transportation findings discussed later in this chapter. The Transportation Technical Report included as Appendix N.1 to the WSBLE Project Draft Environmental Impact Statement provides further information supporting the results and conclusions described in this chapter.

Table 3-1. Transportation Key Findings

Transportation Element	Key Findings
Regional System and Travel	• The WSBLE Project would reduce average weekday vehicle miles of travel by approximately 117,000 and vehicle hours of travel by 8,900 by year 2042. • Construction of the Ballard Link Extension would impact existing light rail service between the SODO and International District/Chinatown stations for 6 to 7 weeks. • The number of persons traveling through the study area is expected to increase with the WSBLE. A greater percentage of these persons would use transit compared to the No Build Alternative.

Transportation Element	Key Findings
Transit	• In total, the West Seattle Link Extension would carry between 25,000 and 27,000 daily riders by 2042, and the Ballard Link Extension would carry between 132,000 and 173,000. • The addition of the West Seattle and Ballard Link extensions to the regional transit system would result in about 20,000 net new daily transit trips by 2042. • Transit service quality, including daily hours of operation, frequency, reliability, and passenger load, would improve with the WSBLE. • The WSBLE travel time from the West Seattle and Ballard stations to downtown would be approximately 50 to 70 percent faster in the p.m. peak, respectively, than existing bus travel between these areas. • The SODO Busway would be permanently closed for some SODO alternatives and temporarily closed during construction for all SODO alternatives. This closure would impact more buses during the construction period, incurring additional travel time. The Ryerson Bus Base also would be permanently closed under some alternatives. • During WSBLE construction, some local and arterial streets would be partially or fully closed in all segments, decreasing bus speeds and reliability and impacting Seattle Streetcar service for durations of short periods (nights and weekends) up to multi-year closures.
Arterials and Local Streets Operations	• In general, the presence of WSBLE stations would increase activity on the streets around them. The predominant WSBLE station mode of access is walking/biking and riders transferring between other transit services. The number of automobiles accessing stations would be limited as there are no park-and-rides with the WSBLE Project. • WSBLE Build Alternatives that are elevated within the roadway would have some property access and circulation impacts; however, these are expected to be for short roadway segments as the alignments are all in exclusive guideway and mainly outside of roadway operations. • In the West Seattle Link Extension, no intersections in the SODO and Duwamish segments would be operationally affected by the West Seattle Link Extension based on the projects' L.O.S. threshold. The Delridge and West Seattle Junction segments each would have up to three intersections operationally affected by the project alternatives. • In the Ballard Link Extension, each segment other than the Downtown Segment would have no more than two intersections affected by the project. The Downtown Segment would have up to 16 affected intersections, mainly due to the additional pedestrian and bicycle activity on downtown streets surrounding the station areas. • During WSBLE construction, some local and arterial streets would be partially or fully closed in all segments, increasing traffic congestion on adjacent streets for durations of short periods (nights and weekends) up to multi-year closures.
Parking	• There is the potential for hide-and-ride parking where there is unrestricted parking near the proposed WSBLE stations, but the long-term impact is expected to be minimal as the City of Seattle and Sound Transit would implement parking management within the station areas. • In the West Seattle Link Extension, the Build Alternatives would permanently remove between 55 and 300 on-street parking stalls and would temporarily remove between 155 and 490 additional on-street parking stalls during construction. • In the Ballard Link Extension, the Build Alternatives would permanently remove between 80 and 280 on-street parking stalls and would temporarily remove between 385 and 1,150 additional on-street parking stalls during construction.

Transportation Element	Key Findings
Non-motorized Facilities	• The WSBLE stations are located in neighborhoods with generally well-connected pedestrian and bicycle networks, though there are some gaps as well as existing facilities not meeting Americans with Disabilities Act or the City's Seattle Streets Illustrated standards. • In the West Seattle Link Extension, the SODO Station and Alaska Junction Station would have the highest pedestrian and bicycle activity—about 700 riders during the p.m. peak hour. • In the Ballard Link Extension, the Chinatown-International District, Westlake, and Denny stations would have the highest pedestrian and bicycle activity, ranging from 3,400 to 12,500 riders per station during the p.m. peak hour under the Preferred Alternative. Other stations would have less non-motorized activity. • The pedestrian L.O.S. would generally be acceptable for all alternatives and station options, with most crosswalks and sidewalks operating at L.O.S. E or better. Pedestrian L.O.S. of F is expected in some locations in the Chinatown-International District and Downtown segments; detailed mitigation measures for specific facilities such as widened walkways or pedestrian signals will be determined in subsequent project phases. • Construction would result in closed or modified non-motorized facilities for various durations throughout the project. Some street connections would be permanently closed, requiring pedestrians and cyclists to use alternate routes.
Safety	• The WSBLE Project would shift up to 20,000 daily trips from auto or other non-transit modes to transit, resulting in fewer roadway conflicts. • Stations would be designed to accommodate the forecasted level of activity, and access would be at signalized, controlled locations and/or would be grade-separated. • During construction, overall crashes in the project corridor would be similar between the build and no build conditions, however the location of those crashes could change as traffic shifts to alternate routes.
Navigation	• West Seattle Link Extension bridges over the East and West Duwamish waterways would have the same or greater clearance as the West Seattle Bridge. All vessels that currently travel under the bridge in the West Waterway would continue to do so. Alternative DUW-2 would cross over a navigation channel in the East Waterway approximately 150 feet north of an existing barrier to navigation and would reduce the horizontal clearance and the area available for navigation and maneuvering. Option DUW-1b would permanently displace moorage on the Duwamish Waterway, and all alternatives would temporarily displace moorage during construction. All alternatives would result in short-term closure of the East and West waterways and require intermittent closures of part of the navigation channel during construction. All alternatives would temporarily reduce portions of the planned vertical clearance over both waterways during construction. • All bridge alternatives for the Ballard Link Extension would meet or exceed the governing limitations on the Ship Canal navigation channel. However, with the exception of the double-leaf bascule bridge for Alternative IBB-3, they would become the first vertical restriction on the navigation channel upstream of Shilshole Bay, and vessels with vertical clearance requirements over 136 feet would not be able to pass under these alternatives. Guideway columns in Salmon Bay for Alternative IBB-3 would introduce new constraints on access between the navigation channel and Fishermen's Terminal, and would also reduce moorage in Salmon Bay and Fishermen's Terminal. Preferred Alternative IBB-1a and Option IBB-1b would reduce moorage in Salmon Bay. Construction of all bridges would require short-term closure of the navigation channel and also closure of the area outside the navigation channel. In addition, all bridges except the double-leaf bascule moveable bridge for Alternative IBB-3 would temporarily reduce portions of the planned vertical clearance over the waterway during construction.

Transportation Element	Key Findings
Freight Mobility and Access	• The WSBLE Build Alternatives would have minimal long-term impacts to freight as the alternatives would retain clearance envelopes for truck streets, over-legal roads, and railroad tracks; access to freight properties would be maintained. • During WSBLE construction, freight routes would be impacted with partial or full roadway closures. Alternate routes would be available but would require some out-of-direction travel for trucks. • For locations where commercial load zones would be eliminated, Sound Transit would coordinate with the City of Seattle to locate alternative commercial load zones, where feasible.

3.2 Introduction and Methodology and Assumptions

Section 3.3 describes the existing (2019) conditions, future long-term (operation) conditions, and construction impacts for the project on regional system and travel, as well as their potential mitigation. Sections 3.4 through 3.10 describe the affected environment and operation impacts under existing and future year 2042 long-term conditions for the West Seattle Link Extension for each of the remaining seven transportation elements listed in Section 3.1; the future long-term condition compares the No Build Alternative and the Build Alternatives. Sections 3.12 through 3.18 do the same for the Ballard Link Extension. Sections 3.11 (West Seattle Link Extension) and 3.19 (Ballard Link Extension) present the short-term (construction) impacts of the two Link extensions, respectively, on the transportation system for each of the non-regional transportation elements.

The 2042 future condition for the transportation analysis represents Sound Transit's long-range plans, when the Sound Transit 3 program, including the WSBLE Project, would be complete. The delivery of the Sound Transit 3 program is a key future assumption within the WSBLE Draft Environmental Impact Statement. The Sound Transit Board in summer 2021 adopted a Sound Transit 3 realignment plan that modifies the delivery of the projects within the Sound Transit 3 program. As part of the adopted realignment target and affordable schedules, the West Seattle and Ballard Link extensions would still be constructed by the WSBLE Draft Environmental Impact Statement future horizon years 2032 and 2042. In addition, most of the other projects in the Sound Transit 3 program would be constructed by the WSBLE Draft Environmental Impact Statement 2042 horizon year with the exception of the Link light rail line from south Kirkland to Issaquah (under the affordable schedule) and non-Link light rail projects outside of Seattle. Therefore, the adopted Sound Transit 3 realignment schedule would not have any noticeable effect to the WSBLE Draft Environmental Impact Statement analysis.

Some transportation elements also analyze 2032 for the West Seattle Link Extension interim terminus condition and for the construction period analysis. Potential mitigation for short-term (construction) and long-term (operation) project impacts on the regional roadway system is discussed in Section 3.3.3. Mitigation for operation impacts on each of the seven remaining transportation elements is discussed in those individual sections; mitigation for construction impacts are discussed within the respective construction sections for each extension in Section 3.11.6 for the West Seattle Link Extension and Section 3.19.7 for the Ballard Link Extension.

The study area for this transportation analysis generally extends 0.5 mile from the project alternatives (including stations). Some transportation elements require a modified study area, and in those cases, the modified study area is defined in the applicable section. Figure 3-1 and Figure 3-2 show the general transportation study area for the West Seattle Link Extension and Ballard Link Extension projects, respectively.

The methodology and assumptions used to analyze the transportation impacts of the projects have been compiled in the *West Seattle Ballard Link Extensions Technical Analysis Methodology*, which is provided in Attachment N.1A of Appendix N.1, Transportation Technical Report. That report presents the following information:

- Agency guidelines and regulations regarding the transportation analysis
- Transportation analysis methodology, including relevant definitions, data collection, regional traffic analysis, intersection impact analysis, and safety assessments
- Methods for traffic forecasting and transit ridership estimates
- Methods for assessing project impacts related to light rail stations, parking, non-motorized facilities and modes, property access and circulation, freight, transit, navigation, and construction
- Specific roadways, intersections, and transit facilities analyzed

The transportation impacts of the project were analyzed from three different perspectives: regional, corridor, and local operations. The regional and corridor assessments studied larger areas of the study area, while local operations studied individual locations or streets of the project.

Impacts from the West Seattle Link and Ballard Link Extensions minimum operable segment (M.O.S.) or the Ballard Link Extension-only M.O.S. are only mentioned for a transportation element if the M.O.S. would have additional impacts when compared with the fully built alternatives. The following elements would be affected:

- Transit
- Arterial and local street operations
- Non-motorized facilities

The M.O.S. would not have additional impacts to any other transportation elements discussed in this chapter.

In addition to the relevant regulations, plans, and policies considered in all environmental analyses, the transportation analysis was guided by laws and regulations relevant to transportation and informed by the policy direction established in the numerous plans and policy documents adopted within the project corridor. These documents are listed in Appendix N.1.

3.3 Regional Context and Travel

This section describes the existing and anticipated future conditions of the regional roadway system through the West Seattle Link Extension and Ballard Link Extension study areas. Because the measures in this section are generally oriented to a regional scale, the analysis is applicable to both the West Seattle and Ballard Link extensions and a single set of results is presented for the combined transportation system.

3.3.1 Affected Environment and Operation Impacts

The City of Seattle has designated portions of the West Seattle Junction and Ballard neighborhoods as hub urban villages, and Puget Sound Regional Council has designated Downtown Seattle and South Lake Union as regional growth centers, meaning that these areas would continue to add housing and jobs over the next 20 years as a matter of policy. The project corridor also includes the Puget Sound Regional Council- and City-designated Duwamish and Ballard Interbay Northend Manufacturing/Industrial Centers. See Section 4.2.2 and Section 4.3.2, Land Use for West Seattle and Ballard, respectively, for further discussion of land uses and maps of these centers.

The regional facilities within the West Seattle Link Extension study area include the West Seattle Bridge, State Route 99, and Interstates 5 and 90. Major arterials include Fauntleroy Way Southwest, 35th Avenue Southwest, Delridge Way Southwest, 1st Avenue South, 4th Avenue South, 6th Avenue South, Airport Way, South Lander Street, South Holgate Street, South Dearborn Street, and South Jackson Street. The Seattle Department of Transportation closed the West Seattle High-Rise Bridge in March 2020 due to structural issues. In November 2020, the Seattle Department of Transportation announced its intention to repair the current bridge and reopen it, and also to study a long-term replacement bridge. The closure to repair the existing bridge is expected to last until mid-2022. The transportation analysis assumes that the West Seattle Bridge would either be repaired or replaced prior to construction of the West Seattle Link Extension.

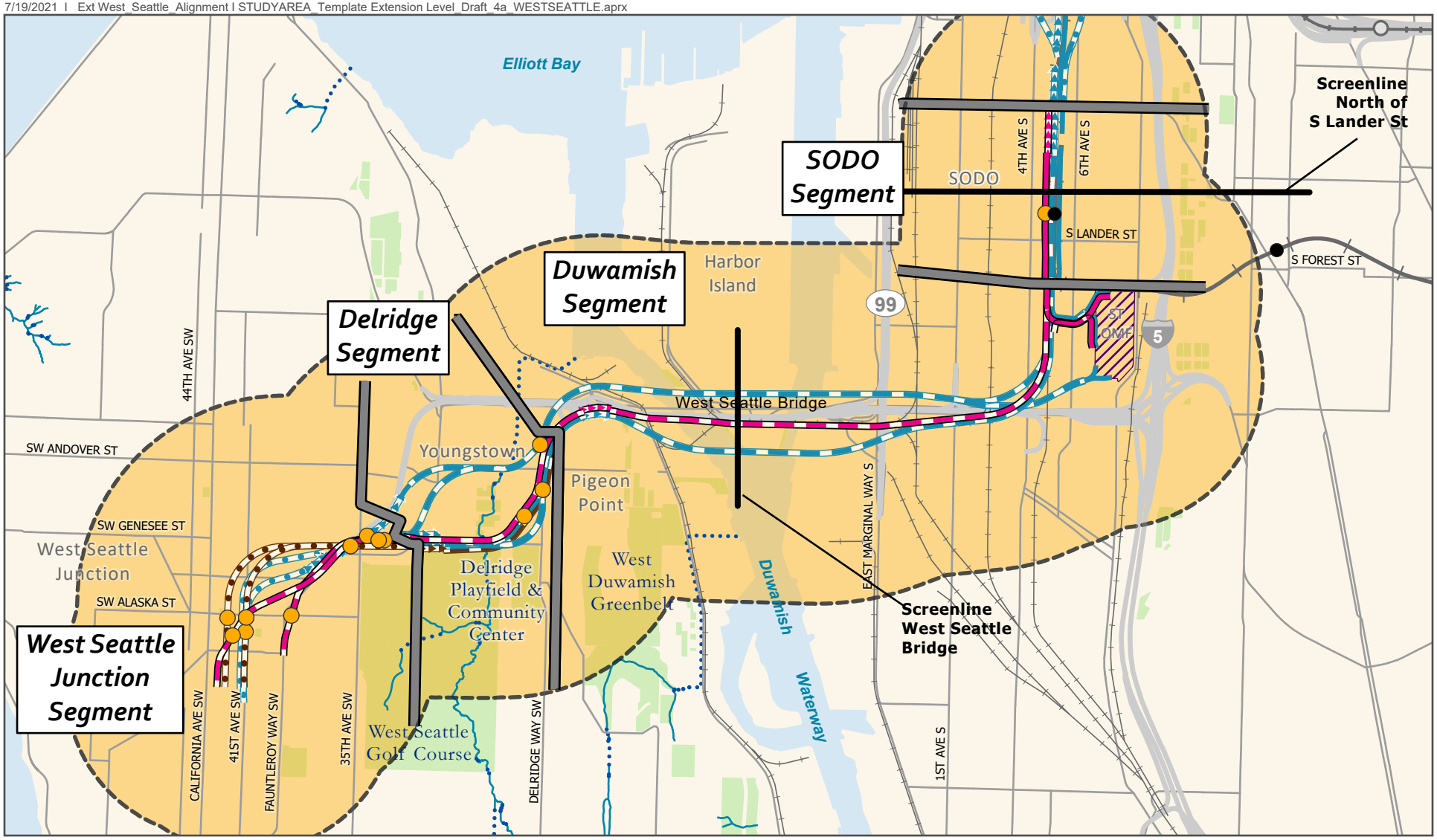
The main regional facilities in the Ballard Link Extension study area include Interstates 5 and 90, State Route 99, and the Ballard Bridge. Major arterials include 4th Avenue, 5th Avenue, 6th Avenue, Westlake Avenue and Westlake Avenue North, Denny Way, Harrison Street, Mercer Street/West Mercer Street/West Mercer Place, Elliott Avenue West, 15th Avenue West, 15th Avenue Northwest, Northwest Market Street, and Leary Avenue Northwest/Northwest Leary Way.

Today, over 88 million vehicle miles traveled and 3.1 million vehicle hours traveled occur daily within the central Puget Sound region (King, Kitsap, Pierce, and Snohomish counties). Approximately 815,000 of those vehicle hours traveled represent delay due to congestion.

Approximately 17 million total daily trips occur in the Puget Sound region, with single-occupancy vehicles and freight making up about half of the travel in the region. High-occupancy vehicles with two or more people are used for a little more than a third of the travel in the region, with walking and bicycling used for approximately 12 percent and transit use at around 3 percent. Within the project corridor, the transit mode share is between 3 and 5 percent except in Downtown Seattle, where the transit share is almost 15 percent.

Screenlines are imaginary boundaries drawn crossing major roadways within the study area. Data at these screenlines provide a snapshot of traffic operations (such as volumes and travel mode share) along each corridor, based on the travel demand estimated from Puget Sound Regional Council and Sound Transit regional models. Five screenline locations were developed for the WSBLE Project: West Seattle Bridge, north of South Lander Street, south of South Main Street, north of Denny Way, and the Ballard Bridge (Figure 3-1 and Figure 3-2).

Vehicle volume-to-capacity ratio is a performance measure used to assess travel conditions on the regional facilities in the study area.



Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

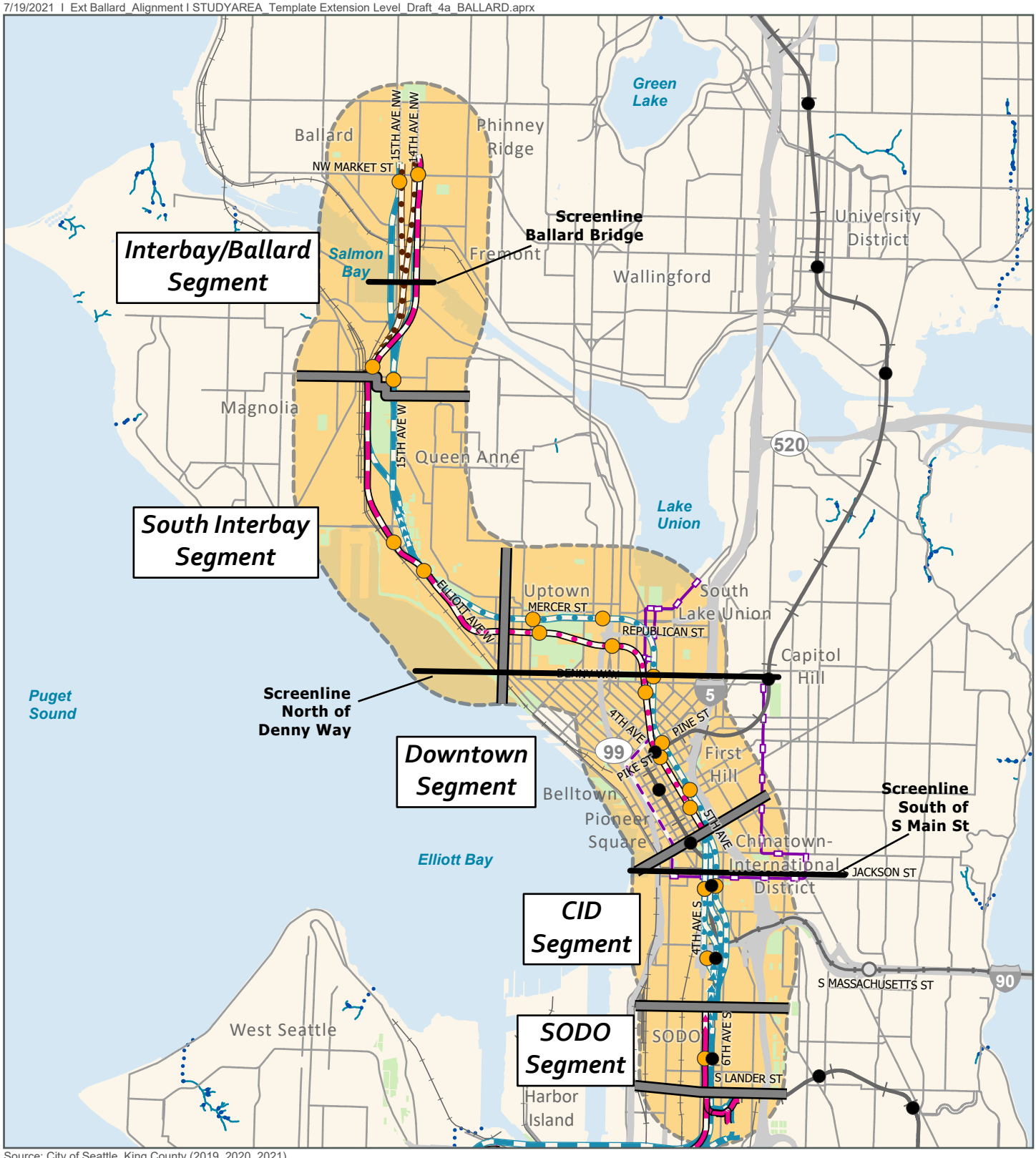
- Segment Line
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Railroad
- Stream
- Piped Stream
- Park
- Screenlines
- Study Area

FIGURE 3-1
West Seattle Link Extension Study Area
West Seattle Link Extension

West Seattle and Ballard Link Extensions

0 0.5 1 Mile

N



Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

- Segment Line
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- Stream
- Piped Stream
- Park
- Screenlines
- Study Area

0 0.5 1 Mile

N

FIGURE 3-2
Ballard Link Extension Study Area
Ballard Link Extension

West Seattle and Ballard Link Extensions

A ratio of greater than 0.9 suggests the roadway is approaching capacity, and a ratio of greater than 1.0 indicates demand is exceeding the capacity and the road cannot effectively accommodate all traffic, leading to substantial congestion restricting the movement of people and goods. During the p.m. peak hour (which varies by location but is generally between 4 and 6 p.m.), all five regional screenlines are over capacity in the peak travel direction, with volume-to-capacity ratios greater than 1.0. Transit mode share is relatively high in the p.m. peak hour with mode share between 12 to 24 percent across the screenlines. Single-occupancy vehicle travel accounts for over 50 percent of all trips across all screenlines.

3.3.1.1 No Build Alternative

The No Build Alternative describes anticipated future land use and transportation conditions if the West Seattle and Ballard Link extensions were not built. Between now and 2042, Puget Sound Regional Council's travel demand forecast model forecasts between 0 and 10 percent growth in p.m. peak hour vehicle trips across the screenlines. Total p.m. peak hour person trips are forecasted to increase between 7 and 24 percent. A number of planned and funded regional transportation improvements would be assumed to be completed during the same timeframe; for a list of assumed future projects, see Appendix N.1, Transportation Technical Report.

While the West Seattle and Ballard light rail extensions would not be implemented under the No Build Alternative, most of the Sound Transit 3 plan is assumed to be completed by 2042, including light rail extensions north to Everett, south to Tacoma, and east to Redmond. The Link service through the existing Downtown Seattle Transit Tunnel is assumed to be extended north to Everett, south to Tacoma, and east to Redmond. Transit routing is assumed to generally conform to King County's 2025 METRO CONNECTS service network, with an average of 1 percent annual growth in service hours per year.

The 2032 No Build Alternative has similar characteristics, with the exception that the light rail extension to Everett would not yet be built and future land use and transit service hour growth is proportionately reduced to reflect the earlier time period.

3.3.1.2 Build Alternatives

This section discusses regional transportation conditions in 2042. Information regarding the 2032 interim terminus condition for the West Seattle Link Extension is provided in Appendix N.1. Because changes in regional (i.e., vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay) and corridor-level measures at the screenlines would be similar between project alternatives, the analysis results for the Build Alternatives represents all project alternatives as compared to the No Build Alternative.

The definition of the Build Alternative in this section includes the operations of both the West Seattle and Ballard Link extensions, as described in Chapter 2, Alternatives Considered.

3.3.1.2.1 Vehicle Miles Traveled and Vehicle Hours Traveled

Table 3-2 presents the average weekday vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay for the No Build Alternative and Build Alternatives in 2042 in the Sound Transit service area that includes King, Pierce, and Snohomish counties. When the West Seattle Link and Ballard Link extensions are both in service, these measures are forecasted to decrease compared to the No Build Alternative, as vehicle trips shift from automobile modes to transit.

Table 3-2. Average Weekday Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay in 2042

Alternative	Vehicle Miles Traveled	Vehicle Hours Traveled	Vehicle Hours of Delay
No Build Alternative	96,632,500	3,409,700	959,900
Build Alternative	96,515,500	3,400,800	954,300
Change	-117,000	-8,900	-5,600
Percent Change	-0.1%	-0.3%	-0.6%

Source: Puget Sound Regional Council and Sound Transit regional models (2042 No Build and Build).

3.3.1.2.2 Screenline Performance

The WSBLE Project would increase transit ridership and slightly decrease traffic volumes and congestion across all screenlines. Modest vehicle volume decreases (0 to 3 percent) during the p.m. peak hour are expected in both the peak and reverse peak directions with the project, but most roads across the screenlines would operate at or near capacity (i.e., volume-to-capacity ratio equal to or greater than 0.90), with or without the project. However, the number of persons traveling across the screenlines via transit during the p.m. peak hour is expected to increase. Shifts to transit with the Build Alternative would cause a slight decrease in single-occupancy-vehicle and high-occupancy-vehicle travel. The daily transit mode share across the Ballard Bridge screenline would increase from about 15 percent under the No Build Alternative to almost 30 percent with the project. The other screenlines have transit percentages between 15 and 30 percent under the No Build Alternative and would each increase between 1 and 3 percentage points with the project.

3.3.2 Construction Impacts

Regional transportation (roadway and transit) facilities and travel would not be noticeably impacted during the West Seattle Link Extension construction period.

Construction of the Ballard Link Extension would have limited short-term impacts to vehicle travel on regional facilities. In the Chinatown-International District Segment, the 4th Avenue South closure with Alternative CID-1a* and Option CID-1b* would prohibit vehicles exiting Interstate 90 westbound from traveling north along 4th Avenue. This could result in additional traffic on adjacent Interstate 5 and Interstate 90 ramps, as well as on local streets. In the Downtown Segment, while construction activities for Preferred Alternative DT-1 and Alternative DT-2 would require temporary closure of some ramps to or from Interstate 5 or city streets serving the ramps, temporary detour routes would be created to maintain access between downtown and Interstate 5, minimizing impacts to the regional facilities. Station and tunnel vent shaft construction would require nighttime lane closures on the Interstate 5 mainline near Madison Street. The lane closure would likely not affect Interstate 5 mainline operations because the work would occur at night. Otherwise, no direct impacts to regional transportation facilities are expected with any of the Ballard Link Extension Build Alternatives during the construction period.

The Arterials and Local Streets Operations section under each segment in Sections 3.11 and 3.19 provides information on short-term construction impacts on arterials and local streets that are at or near Interstate 5, Interstate 90, and State Route 99 ramp terminal intersections. Construction of the Ballard Link Extension would have short-term impacts to the regional transit

system. In the SODO Segment, connecting the Ballard Link Extension to the existing Link system would result in closure of the existing light rail service between the SODO and International District/Chinatown stations for 6 to 7 weeks. This occurs in all of the Ballard Link Extension SODO alternatives when connecting to Alternative CID-1a*. The Alternative CID-1a* south tunnel portal would be between Edgar Martinez Drive South and South Royal Brougham Way. The Stadium Station on the existing light rail line would be removed and rebuilt to accommodate the tunnel portal for the Ballard Link Extension and realignment of the existing light rail line. The Stadium Station would be closed for up to 2 years as it is rebuilt and to construct the temporary and final track connections.

During this period, light rail service would continue from the SODO Station and stations to the south and from the International District/Chinatown Station and stations to the north and the east, but Sound Transit would not operate light rail service between these two stations. Based on future forecasts, this impact to Sound Transit's light rail system could directly affect up to 80,000 daily riders traveling between Downtown Seattle and the southern portion of the region, including Tacoma and Seattle-Tacoma International (SeaTac) Airport. Light rail service to the north and east through Downtown Seattle could also be reduced up to 50 percent. Sound Transit would further evaluate potential measures to reduce the disruption during final design.

When connecting to the other Chinatown-International District Segment alternatives, the multi-week closure of the light rail system would not be needed but there would be intermittent periods of single-track operation and potentially some closures during nights and weekends. Additional information on connecting to the Chinatown-International District Segment alternatives is provided in Appendix N.1, Transportation Technical Report.

3.3.3 Mitigation

There would be no long-term or construction impacts to regional transportation (roadway and transit) facilities as a result of the West Seattle Link Extension; therefore, no mitigation would be needed during light rail operations or construction periods.

The analysis also did not identify any long-term operational impacts during operations that would occur to regional roadway facilities as a result of the Ballard Link Extension, therefore, no mitigation to the regional facilities would be needed during light rail operations.

During construction of the Ballard Link Extension, potential mitigation to the regional transit system is needed with Alternative CID-1a* due to construction of the light rail connections to all of the SODO alternatives. Sound Transit would work with King County Metro Transit (Metro) and the City of Seattle, in coordination with the Federal Transit Administration (FTA), to develop strategies (such as increasing bus service [e.g., implementing a bus bridge] between the SODO and International District/Chinatown stations) and transportation demand management options to minimize the impact to transit riders during the 6- to 7-week period when light rail service would not be available between these stations.

3.4 West Seattle Link Extension Affected Environment and Impacts during Operation – Transit

This section discusses transit service and facilities; regional and local bus transit; project, segment, and station-level ridership; transit L.O.S. measures; and bus and light rail travel time for the No Build Alternative and Build Alternatives for the West Seattle Link Extension. Section 3.2 in Appendix N.1 provides additional discussion and data regarding the transit elements described in this section.

3.4.1 Affected Environment

3.4.1.1 Transit Service and Facilities

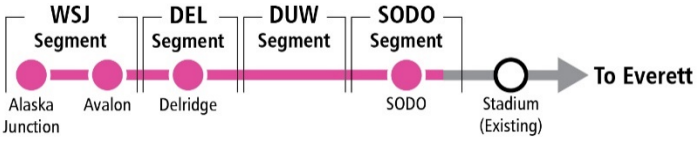
Existing transit service in the West Seattle Link Extension study area is provided by Metro buses. Approximately 100 bus routes operate within the West Seattle Link Extension study area. The study area is also served by the King County Water Taxi, among other service providers.

Within the study area, all-day service between Downtown Seattle and West Seattle is provided by the RapidRide C Line and Route 120 (the future RapidRide H Line, opening in 2022), which are both among Metro's highest ridership routes at approximately 12,000 and 8,500 trips per weekday, respectively. The RapidRide C Line runs between South Lake Union and West Seattle, through Downtown Seattle, SODO, and Alaska Junction. Route 120 provides frequent service between Downtown Seattle and Burien through Delridge. Within the SODO Segment, bus routes provide frequent service south to locations including Renton, Tukwila, Kent, and Federal Way, and Link light rail provides service every 6 minutes (peak) and 10 minutes (off-peak) north to the University of Washington Station and south to SeaTac Airport and Angle Lake Station. In 2019, there were an average of 72,000 weekday boardings on Link light rail.

Transit facilities in the study area include the SODO Busway, which runs between South Spokane Street and the Downtown Seattle Transit Tunnel and includes dedicated right-of-way for rail and buses, while the nearby BNSF Railway tracks adjacent to the SODO Busway provide service to freight and commuter trains. In West Seattle, Southwest Alaska Street includes sections of eastbound and westbound bus-only lanes, and bus-only lanes are present on the West Seattle Bridge. New bus-only lanes are also planned to open in 2022 on Delridge Way Southwest for the RapidRide H Line. There are two park-and-rides within the study area: Southwest Spokane Street under the West Seattle Bridge near Delridge Way Southwest and the Airport & Spokane park-and-ride under the Spokane Street viaduct.

3.4.1.2 Transit Travel Time

There are numerous bus routes within the study area, but the RapidRide C route between West Seattle and downtown provides a comparison to a trip taken on light rail with the project (although the RapidRide C Line does not serve the Delridge, SODO, or Stadium station areas). Between Downtown Seattle (Westlake Station) and West Seattle (Fauntleroy Way Southwest



and Southwest Alaska Street), this trip on the RapidRide C Line takes an average of 22 minutes in the peak direction during the peak period, which is approximately 40 percent longer than during the off-peak period. Travel times can be substantially longer during times of heavily congested roadway conditions.

3.4.1.3 Transit Levels of Service

The performance of existing transit service in the study area was evaluated using L.O.S. measures for frequency, span of service, reliability, and passenger load. L.O.S. A conditions for these measures reflect frequent, reliable service that occurs throughout the majority of the day, with capacity to seat all passengers, while L.O.S. F reflects unreliable, infrequent service that does not occur for most of the day, with standing passenger conditions. These measures were adapted from the 2013 Transportation Research Board *Transit Capacity and Quality of Service Manual*, 3rd edition, and more information on their definition and how they were applied can be found in Appendix N.1.

Routes were analyzed at two screenline locations along the proposed alignment: the West Seattle Bridge and north of South Lander Street in SODO (Figure 3-1).

3.4.1.3.1 Frequency

The RapidRide C Line, which has a similar service area as the proposed West Seattle Link Extension in the existing condition, operates with peak headways of 6 minutes, or L.O.S. A. Frequency L.O.S. and ridership are correlated among routes serving the study area, with high-ridership routes having shorter headways and lower-ridership routes having longer headways; for example, the RapidRide C Line and Routes 21 and 120, all high-ridership routes that parallel sections of the West Seattle Link Extension, operate at L.O.S. A, while lower-ridership express routes like Routes 56/57 and 118/119 operate between L.O.S. C and F. About three-quarters of bus riders at both screenlines are served by routes operating at L.O.S. A or B.

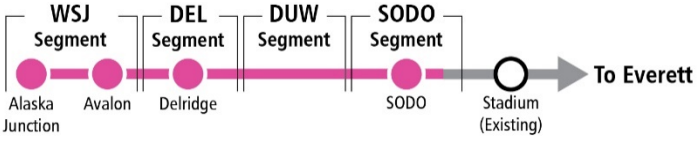
When the peak period headways of all routes crossing the two West Seattle Link Extension screenlines are averaged, the result is 31 minutes (L.O.S. D) for the Duwamish Crossing screenline and 27 minutes (L.O.S. C) for the north of South Lander Street screenline, owing to the fact that the less frequent express routes make up a large proportion of the total number routes at these locations. However, as noted, most riders are served by a few high-ridership core routes.

3.4.1.3.2 Span

The average weekday span of service for buses crossing the West Seattle Bridge and north of South Lander Street screenlines is 17 and 15 hours respectively, or L.O.S. B.

3.4.1.3.3 Reliability

Peak period reliability for bus routes in the study area is generally poor in the a.m. and p.m. peak hours (L.O.S. D through F) in both the inbound (heading towards Downtown Seattle) and outbound (leaving Downtown Seattle) directions because of congested general purpose lanes for the majority of their routes. Most routes fail to meet Metro's evaluation threshold of 80 percent on-time trips ("on-time" is defined as a departure up to 1.5 minutes early and up to 5.5 minutes late). The RapidRide C Line, which generally follows the proposed project alignment,



operates at L.O.S. E. In comparison, existing light rail service has high reliability (L.O.S. A) with little variation, as it operates in exclusive right-of-way.

3.4.1.3.4 Passenger Load

Most transit routes in the study area operate at passenger load L.O.S. A or B; however, many of the more frequent, high-ridership routes are more crowded. In particular, the RapidRide C Line operates at L.O.S. D, indicating standing-room-only conditions during peak periods.

3.4.2 Environmental Impacts of the No Build Alternative

The West Seattle Link Extension transit system was assessed for 2042 under both the No Build Alternative and Build Alternatives. These effects are measured in terms of transit service and facilities; regional, project, and segment/station ridership forecasts; transit travel time; and transit L.O.S. Temporary (short-term) impacts during construction were also assessed and are presented in Section 3.11.

The No Build Alternative assumes that all the projects in the Sound Transit 3 plan would have been implemented (including light rail extensions north to Everett, east to Redmond, and south to Tacoma) with the exception of the West Seattle Link Extension and Ballard Link Extension projects. In this condition, the service line currently running between the University of Washington and Angle Lake stations is assumed for modeling purposes to operate as one continuous line between Everett and Tacoma.

Bus service assumptions for both the No Build Alternative and Build Alternatives were developed by Metro and Sound Transit as part of the project's Transit Service Integration technical memorandum (see Attachment N.1C in Appendix N.1, Transportation Technical Report). The Transit Service Integration memorandum was based on METRO CONNECTS (Metro 2016), which provides a long-range plan for bus service in King County, integrating with future Sound Transit light rail and bus rapid transit services. The Transit Service Integration memorandum considers the bus routing networks as well as the frequency of service consistent with the planned growth in service hours in METRO CONNECTS. Under the No Build Alternative, the bus network in the West Seattle Extension study area is similar to existing conditions, although some frequencies are assumed to be higher due to the overall growth in bus service hours planned in METRO CONNECTS.

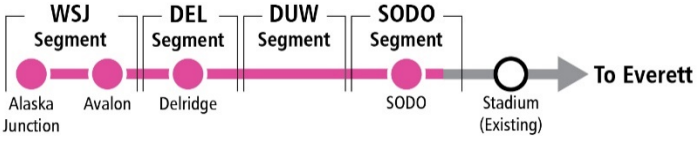
For land use and trip growth assumptions, see Chapter 2, Regional Context and Travel, of Appendix N.1.

3.4.3 Environmental Impacts of the Build Alternatives

3.4.3.1 Transit Service and Facilities

3.4.3.1.1 Impacts Common to All Alternatives and Segments

The 2042 Build Alternatives assume substantial changes to bus service in the West Seattle Link Extension project corridor, to integrate with the new light rail line. Most RapidRide, frequent, and express routes from Burien, White Center, High Point, and other areas south of Alaska Junction would end at Alaska Junction or continue to Alki Beach via Alaska Junction. For example, RapidRide C Line service would likely be restructured so its service hours could be repurposed to serve the light rail stations. Similarly, bus services in the Delridge Segment, such as the RapidRide H Line, would serve the station. In all alternatives, local routes would connect to all



three West Seattle stations. As part of the M.O.S., where the Delridge Station is the terminus station, bus services from the west (Alaska Junction area) and south would be rerouted to serve the Delridge Station. The M.O.S. would incorporate additional active bays (where passengers get on and off buses) and layover areas (where buses stop at the end of the route before beginning a new trips) to accommodate the increased level of bus transfer activity at Delridge Station compared to the full-length alternatives.

In addition, with the removing, rerouting, or truncating some lines of bus service and truncation of routes at the Build Alternatives stations, bus service hours would be redeployed to optimize connections and frequencies to the light rail stations, consistent with Metro's service guidelines. A discussion of Build Alternative transit networks can be found in Appendix N.1, Transportation Technical Report.

Some bus stops and layover areas would be added or relocated to serve the proposed stations, potentially including waiting areas for riders transferring to buses. Most of the bus stop relocation would be focused at the new light rail stations, which would intercept most of the bus routes that travel across the West Seattle Bridge under the No Build Alternative. Bus stops and paratransit spaces would generally be adjacent to the light rail stations to provide safe and efficient transfer access. See the conceptual station drawings in Appendix J for proposed bus stops and, if applicable, layover areas at the stations.

3.4.3.1.2 SODO Segment

For Preferred Alternative SODO-1a and Option SODO-1b, the SODO Busway would be permanently closed to buses to accommodate the light rail guideway. Under this condition, bus routes (between 30 to 50 buses in each peak hour) would use adjacent streets (i.e., 4th Avenue South or 6th Avenue South). Closure of the busway would also eliminate all existing layover areas and increase bus travel times to the bases, as described in Appendix N.1. For Alternative SODO-2, the busway would remain open to buses.

Removal of the SODO Busway for Preferred Alternative SODO-1a and Option SODO-1b could affect formula funding[1] for transit providers that use that facility. Sound Transit will continue to coordinate with the City and Metro to determine how the alternative bus routing on 4th Avenue South would accommodate the reduced number of buses expected to travel along this corridor in the future, either through use of general purpose lanes or transit treatments to minimize effects to transit travel times and formula funding.

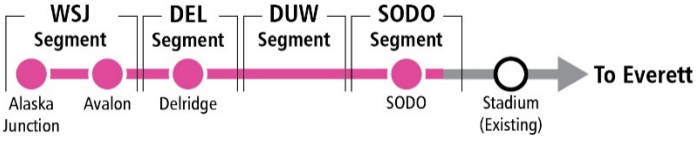
3.4.3.1.3 Delridge Segment

Bus routes would be rerouted to serve the Delridge Station as described in Appendix N.1, Transportation Technical Report.

3.4.3.2 Transit Travel Time

In the 2042 no build condition, riders using bus service that runs along the surface streets between Downtown Seattle (Westlake Station) and West Seattle (Fauntleroy Way Southwest and Southwest Alaska Street) would have longer travel times, as congestion is anticipated to worsen. This in-vehicle travel time could be up to 30 minutes on average during the peak periods in the peak direction, whereas with the West Seattle Link Extension project, the light rail

[1] FTA formula funding includes a number of FTA programs and grants that fund public transit and that are distributed to urbanized areas according to a pre-specified formula.



train would travel between Downtown Seattle and West Seattle in about 16 minutes, which is close to a 50 percent travel time savings. 2032 conditions would be similar, with the addition of a transfer at the SODO Station (with an average wait time of 2.5 minutes).Beyond the in-vehicle rail travel times, a rider's trip time would vary depending on the station platform's vertical distance from the street level. Some of the higher elevated stations (i.e., Preferred Alternative DEL-1a or Option DEL-1b) or deeper tunnel stations (i.e., Preferred Alternative WSJ-3a* or Preferred Option WSJ-3b*) would take approximately an additional 1 minute to 90 seconds for a rider to walk within the station between the train platform and the ground-level entrance, relative to access times for the other alternatives in those segments. Use of the elevator can reduce or eliminate this extra walk time. Otherwise, access times are similar among alternatives within each segment.

3.4.3.3 Ridership

3.4.3.3.1 Impacts Common to All Alternatives

This section describes the forecasted average daily light rail ridership for the West Seattle Link Extension in 2042 for the project as a whole and at the segment and station levels.

Systemwide Ridership

New Transit Trips

The Federal Transit Administration defines new transit trips as the total number of trips shifted to transit from another mode (e.g., single occupancy vehicle, carpool, walk, or bike) as a result of the project when compared to a No Build alternative.

Transit ridership was forecasted for the Sound Transit service area in King, Pierce, and Snohomish counties. Table 3-3 presents the total number of forecasted trips on all transit services under the No Build Alternative and Build Alternatives within the study area on the regional transit system (defined here as the Sound Transit service area) for 2042. Ridership in 2032 under the interim terminus condition is relatively consistent among alternatives; more information on 2032 ridership can be found in Appendix N.1. 2032 conditions would be similar, with the addition of a transfer at the SODO Station (with an average wait time of 2.5 minutes).

Table 3-3. 2042 Transit Ridership (Daily Trips) for the Sound Transit Service Area

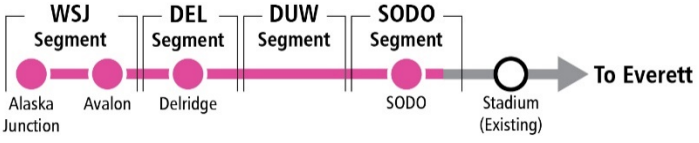
Measure	2042 Ridership - No Build Alternative	2042 Ridership - Build Alternatives
Total Daily Transit Trips	746,000	766,000
Net New Daily Transit Trips with WSBLE	not applicable	20,000

Source: Sound Transit Incremental Ridership Model.

West Seattle Link Extension Project Ridership

The previous section describes total ridership in the Sound Transit service area and the number of new daily transit trips that would be generated in the region as a result of the West Seattle and Ballard Link extensions. In 2042, total daily trips on the project would range between 25,000 and 27,000 for all Build Alternatives, depending on the alternative as well as the underlying land use, economic, and bus service level assumptions used to develop the forecast.

Under the M.O.S., the West Seattle Link Extension ridership would decrease to 22,000 daily riders compared to the full-length ridership of up to 27,000, as the project would terminate at the Delridge Station and not serve the West Seattle Junction Segment.



3.4.3.3.2 SODO Segment

This segment currently has an existing SODO light rail station. In 2042, light rail boardings in the SODO Segment are expected to increase to over 14,000 daily riders due to the West Seattle Link Extension, which adds a second station to the SODO area (Table 3-4). The SODO Station is the first stop where Tacoma riders could transfer to reach the Stadium Station and the first stop where West Seattle riders could transfer to reach points south on the light rail system (see Chapter 2). The Build Alternative is expected to have quadruple the riders of the No Build Alternative in this segment. In 2042, the number of boardings at the SODO Station is expected to be relatively consistent between all SODO Segment alternatives.

Table 3-4. 2042 SODO Segment Station Ridership (Daily Boardings), West Seattle Link Extension

Station	Ridership- No Build Alternative	Ridership- Build Alternatives
SODO (proposed)	Not Applicable	7,400
SODO (existing)	3,600	7,200
Segment Total	**3,600**	**14,600**

3.4.3.3.3 Duwamish Segment

There would be no stations in the Duwamish Segment.

3.4.3.3.4 Delridge Segment

In 2042, the number of boardings at the Delridge Station is expected to be relatively consistent between all Delridge Segment alternatives, ranging between 5,600 for the Andover Street station alternatives (Alternative DEL-5 and Alternative DEL-6*) and 5,800 per day for the remaining alternatives. Forecasted ridership is slightly lower for the Andover Street station alternatives due to lower land use density within the station walksheds.

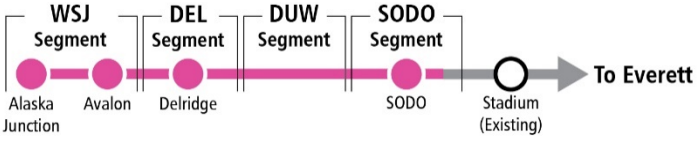
Under the M.O.S., the Delridge Station would have close to twice as many riders (11,100 daily riders in year 2042) compared to the full-length alternative, primarily due to the additional bus service connections to this M.O.S. terminus station.

3.4.3.3.5 West Seattle Junction Segment

In 2042, the number of boardings at the Avalon and Alaska Junction stations is expected to be relatively consistent between the segment alternatives (Table 3-5). Of the two, the Alaska Junction Station is forecasted to have the most activity because of its role as a bus-to-rail transfer hub and the denser land use around the station. Forecasted ridership at that station varies slightly between alternatives due to land use density differences around the respective station locations.

Table 3-5. 2042 West Seattle Junction Segment Station Ridership (Daily Boardings)

Station	Ridership- Build Alternatives
Avalon	1,200
Alaska Junction	6,400 to 6,500
Segment Total	**7,600 to 7,700**



3.4.3.4 Station Mode of Access

Based on the station ridership information presented in the previous section as well as rider survey data, the project's Transit Service Integration technical memorandum (Attachment N.1C of Appendix N.1), and station and surrounding land use characteristics, Sound Transit calculates mode of access information for each station area. The station mode of access was developed for three different types of trips:

- Passenger drop-off and pick-up (including transportation network companies)
- Riders transferring between other transit services, such as buses
- Walk and bicycle trips (non-motorized trips)

This mode of access information was then used to assess the traffic operations, parking, and non-motorized conditions around each station in Sections 3.5.3, 3.6.3, and 3.7.3, respectively.

Table 3-6 presents the 2042 p.m. peak hour trip forecasts of trip activity at proposed and existing stations in the study area by mode for the full-length build and M.O.S. The 2032 results are provided in Appendix N.1. In 2042, the existing and proposed SODO Station would have the greatest ridership, but most of the trips would be rail-to-rail transfers within their station areas.

At the Alaska Junction Station, trips are roughly evenly split between riders transferring between rail and bus and riders walking or biking. At the Delridge Station, most users would be transferring between bus and rail. The Avalon Station would have the lowest trip activity.

With the M.O.S., an interim terminus at the Delridge Station is assumed and the peak hour trips (most notably pick-up, drop-off, and transit transfers) at the station would increase compared to the full-length build condition. Most of the increased vehicle trips are assumed to access the station from the west, because the Avalon and Alaska Junction stations would not be in service under this condition. Table 3-6 includes the Delridge Station trip generation in the M.O.S.

3.4.3.5 Transit Levels of Service

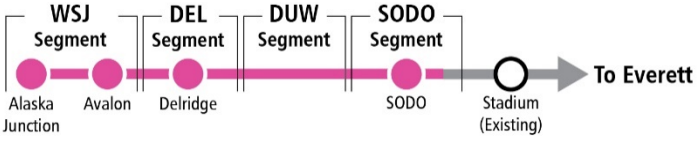
All of the transit L.O.S. measures (frequency, span, reliability and passenger load) apply to all of the West Seattle Link Extension Build Alternatives.

3.4.3.5.1 Frequency

In 2042, the West Seattle Link Extension would provide direct, high-frequency light rail service from West Seattle to Downtown Seattle, with service running at 6-minute headways during the peak periods. This is equivalent to forecasted peak bus service frequency for the RapidRide C Line under the No Build Alternative. With the project in place, all riders crossing the West Seattle Bridge screenline would experience frequency L.O.S. of A or B, and, on average, the frequency of bus routes crossing the West Seattle Bridge would improve by about 20 percent to 12 minutes. All riders at the north of South Lander Street screenline would experience L.O.S. A or B with the project, and average route frequency would improve by about 30 percent to 11 minutes.

3.4.3.5.2 Span

Under the 2032 and 2042 No Build Alternative, the bus routes crossing the West Seattle Bridge and north of South Lander Street screenlines would have an average span of service between



16 to 17 hours per day, or L.O.S. B. With the project, the West Seattle Link Extension would operate for 20 hours per day, or L.O.S. A.

Table 3-6. 2042 P.M. Peak Hour Station Trip Generation by Mode (Boardings and Alightings) – West Seattle Link Extension

Segment	Station	Alternative	Walk and Bike Trips	Drop-off and Pick-up Trips [a]	Transit Transfers	Total Station Trips [b]
SODO	SODO – Build and (No Build) [c]	All Alternatives	700 (600)	50 (50)	2,900 (250)	3,700 (900)
Delridge	Delridge	Preferred Dakota Street Station (DEL-1a), Dakota Street Station, North Alignment Option (DEL-1b), Preferred Dakota Street Station (Lower Height (DEL-2a)*, Dakota Street Station Lower Height North Alignment Option (DEL-2b)*, Delridge Way Station (DEL-3), Delridge Way Station Lower Height (DEL-4)*	150	50	1,300	1,500
		Andover Street Station (DEL-5), Andover Street Station Lower Height (DEL-6)*	100	50	1,300	1,400
		M.O.S.	150	100	2,400	2,600
West Seattle Junction	Avalon	All Alternatives	150	50	100	250
	Alaska Junction	All Alternatives	700	100	700	1,500

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

[a] Includes transportation network companies (e.g., Uber and Lyft).

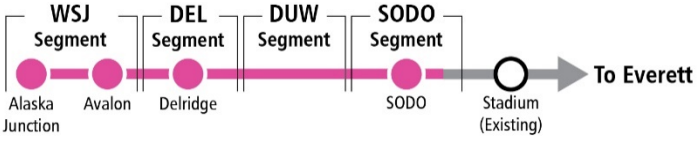
[b] Due to rounding, some totals may not exactly match the sum of the values in their rows.

[c] Values in parentheses indicate forecasted ridership for the existing station only under the 2042 no build condition. Values without parentheses represent the build condition and include both the proposed and existing stations.

3.4.3.5.3 Reliability

The reliability of bus service in the study area would be poor in the 2032 and 2042 No Build Alternative, with most routes operating at L.O.S. E and F due to traffic congestion in the corridor (see Section 3.5.3.3). Bus transit speed and reliability improvements are being planned along portions of some roadways in the project corridor, but bus reliability is not expected to improve substantially beyond existing conditions under the No Build Alternative as it would continue to mainly operate within general traffic.

The West Seattle Link Extension would improve average transit reliability in the study area as light rail would operate in an exclusive right-of-way separated from vehicle traffic, with no at-grade conflicts with other travel modes. Its reliability is expected to be similar to the existing light rail service of L.O.S. A.



3.4.3.5.4 Passenger Load

Under the 2042 No Build Alternative, bus and light rail ridership would operate with high passenger loads in areas of the project corridor (Table 3-7). In the p.m. peak hour, bus service passenger loads would be at L.O.S. D in the peak direction (outbound) across the West Seattle Bridge, indicating high demand for transit. Conditions under the 2032 no build condition are similar to those under the 2042 no build condition (see Appendix N.1).

Table 3-7. Passenger Load – 2042 P.M. Peak Period – West Seattle Link Extension

Screenline Location	Direction [a]	No Build Alternative Bus L.O.S.	No Build Alternative Light Rail L.O.S.	Build Alternatives Bus L.O.S.	Build Alternatives Light Rail L.O.S. West Seattle Link Extension
West Seattle Bridge	Inbound	A	Not applicable	A	A
West Seattle Bridge	Outbound	D	Not applicable	B	A
North of South Lander Street	Inbound	A	A	A	A
North of South Lander Street	Outbound	B	E	B	A

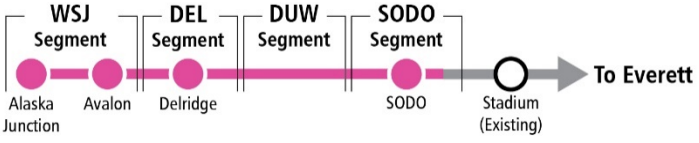
[a] Inbound direction is towards Downtown Seattle, outbound direction is heading away from Downtown Seattle. The p.m. peak hour travel direction is westbound for the West Seattle Bridge screenline and southbound for the South Lander Street screenline.

Under the 2032 interim terminus condition, light rail passengers would experience passenger load of L.O.S. A between West Seattle and SODO (West Seattle Bridge screenline), and bus riders would experience L.O.S. between A and C depending on the location and direction.

Under the Build Alternatives, passenger loads would improve for bus riders as some bus riders would switch to ride light rail. Loads on the West Seattle Link Extension, which becomes the West Seattle-to-Everett service line, would be L.O.S. A in both inbound and outbound directions.

3.4.4 Mitigation for Operation Impacts

Sound Transit would continue to coordinate with transit service providers as the project advances to maintain efficient transit operations, including refinements to the transit service planning documented in Section 3.2.2.2 of Appendix N.1, Transportation Technical Report. Impacts to specific transit facilities were identified, including permanent closures of layover spaces, comfort stations, key transit pathways, and the SODO Busway. These impacts would be addressed through ongoing coordination between Sound Transit, the City of Seattle, Metro, and FTA to identify capital, routing, and access management strategies that would be implemented before transit service operations would be affected. Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project.



3.5 West Seattle Link Extension Affected Environment and Impacts during Operation – Arterial and Local Street Operations

This section presents existing operations of the arterials and local roadways in the study area and their intersection L.O.S., future No Build Alternative and Build Alternatives traffic forecasts, and peak hour intersection L.O.S. compared to project-specific L.O.S. thresholds and potential effects on local access to adjacent properties and traffic circulation with the Build Alternatives.

3.5.1 Affected Environment

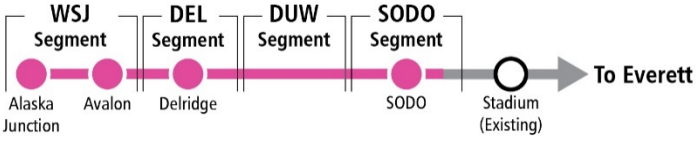
3.5.1.1 Property Access and Circulation

In the SODO Segment, the roadway system consists of a grid network of arterials that serves industrial land uses, with vehicles traveling predominately north and south. Important routes in this segment are 1st Avenue South and 4th Avenue South, which provide connections between Downtown Seattle and State Route 99, the West Seattle Bridge, and Interstate 90. East-west circulation is limited to a few major east-west arterials including South Spokane Street, South Holgate Street, and South Lander Street. There are at-grade BNSF mainline track and light rail track crossings at these locations, which can cause delays. The South Lander Street overpass was recently constructed between 1st Avenue and 4th Avenue to reduce the rail conflict on the BNSF mainline track.

The east-west connections across the Duwamish Waterway include Southwest Spokane Street (also known as the “lower bridge”), which connects SODO to West Seattle, Harbor Island, and the Terminal 5 Port of Seattle facilities, and the West Seattle Bridge, which connects SODO to West Seattle through Fauntleroy Way Southwest. On Harbor Island, access roads cross active freight tracks at multiple at-grade locations.

Delridge Way Southwest, a north-south arterial, is one of the main access roads to the West Seattle Bridge in the Delridge Segment. Southwest Genesee Street is the main east-west street in the Delridge Segment. Southwest Andover Street is another east-west road that provides access to the Nucor Steel property. Other east-west travel is limited due to the terrain and park properties.

In the West Seattle Junction Segment, the street network is a combination of arterials and local streets that serve the mixed residential and commercial land uses. The major arterials are Fauntleroy Way Southwest, a north-south arterial that provides access to the West Seattle Bridge and links most neighborhoods in West Seattle; California Avenue Southwest, which connects Alaska Junction and Admiral Junction; and 35th Avenue Southwest, which connects the West Seattle Bridge to communities to the south. These arterials are also major transit corridors. Southwest Alaska Street is the main east-west arterial, connecting West Seattle neighborhoods to Alaska Junction and Fauntleroy Way Southwest.



3.5.1.2 Intersection Operations

Intersections surrounding potential station areas were evaluated during peak hours to better understand existing traffic operations. All studied intersections were evaluated with the peak 1-hour traffic count for each intersection during the a.m. and p.m. peak hours (between 6 and 8 a.m. and 4 and 6 p.m.). While the p.m. peak hour generally represents the most congested period of the day, some locations may have worse a.m. operations as a result of local land uses and traffic patterns. Intersection operations are described in terms of L.O.S., ranging from A to F, where L.O.S. A represents little to no congestion with under-used lane capacity and free-flow travel speeds, while L.O.S. E represents conditions that are at capacity and L.O.S. F represents poor operating conditions where demand exceeds the intersection's capacity, with vehicle queuing and frequent stop-and-go travel. Detailed L.O.S. results for West Seattle are provided in Section 4.2 of Appendix N.1.

In the SODO and Duwamish segments, all study intersections operate at L.O.S. D or better during both the a.m. and p.m. peak periods, although higher vehicle delays can be experienced from nearby port and terminal operations near the East Marginal Way and South Spokane Street intersection.

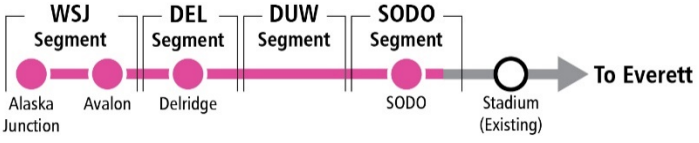
In the Delridge Segment, traffic congestion is concentrated on the arterials that provide connections to the West Seattle Bridge. East of Delridge Way Southwest, there are more residential land uses with lower traffic volumes. During the p.m. peak hour, the peak direction of travel is southbound on Delridge Way Southwest, while during the a.m. period, the peak direction of travel is northbound where vehicle queues can extend multiple blocks to access the West Seattle Bridge. Two intersections operate at L.O.S. E or F in either a.m. or p.m. peak hours.

In the West Seattle Junction Segment, Fauntleroy Way Southwest, California Avenue Southwest, and Southwest Alaska Street experience high traffic volumes. Five intersections operate at L.O.S. E or F in either the a.m. or p.m. peak hours.

3.5.2 Environmental Impacts of the No Build Alternative

As part of the No Build Alternative, other transportation projects in the study area assumed to be completed in the Duwamish Segment include the Southwest Spokane Street/West Marginal Way/Terminal 5 intersection modification as part of the Port of Seattle Terminal 5 redevelopment project. In the Delridge Segment, the rechannelization of Delridge Way Southwest for the RapidRide H Line is assumed. The completion of the Fauntleroy Way Southwest Boulevard project is assumed in the West Seattle Junction Segment. For a complete list of the background transportation projects under the No Build Alternative, see Attachment N.1A of Appendix N.1, Transportation Technical Report.

Traffic volumes for the No Build Alternative were forecasted for the 2042 a.m. and p.m. peak hours using Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Peak hour traffic volumes forecasted in the West Seattle Link Extension study area are predicted to have an average annual traffic volume growth rate of up to approximately 0.4 percent during the a.m. and p.m. peak hours. Because of this traffic growth, intersection operations are expected to worsen in the future under the no build condition compared to the existing conditions. By 2042, seven intersections in the a.m. peak hour and nine intersections in the p.m. peak hour are expected to operate at L.O.S. E or F in the No Build Alternative.



3.5.3 Environmental Impacts of the Build Alternatives

3.5.3.1 Property Access and Circulation

This section describes the main roadway modifications and traffic circulation changes proposed under each Build Alternative by segment. For example, roadway modifications may be needed to accommodate columns associated with an elevated guideway within the roadway or modifications to the street network surrounding stations. In these situations, left-turn access to properties may be restricted, with guideway columns proposed in the roadway median. To maintain property access, vehicles would either be able to recirculate using the surrounding street grid system, or U-turn movements, where feasible, would be provided at adjacent intersections. The Draft Environmental Impact Statement drawings in Appendix J show additional detail about each alternative.

3.5.3.1.1 SODO Segment

Preferred Alternative SODO-1a and Option SODO-1b would build a new South Lander Street vehicle overpass above the light rail tracks between 4th Avenue South and 6th Avenue South. The overpass could affect access to the United States Postal Service Carrier Annex and Distribution Center/Terminal Post Office garage; alternative access to this garage is provided on 4th Avenue South. The South Lander Street overcrossing would eliminate an existing at-grade conflict with the existing light rail line, which interrupts the east-west traffic flow. Option SODO-1b includes a pedestrian crossing on the new overpass to accommodate bus transfers at the SODO Station. See Section 3.5.3.3 for effects to traffic operations and Section 3.4.3 for more information on transit service. Both alternatives provide access to the SODO Station at South Stacy Street/4th Avenue South intersection as shown in the Draft Environmental Impact Statement drawings in Appendix J.

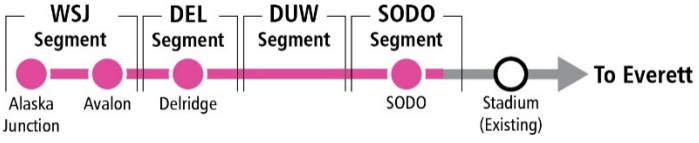
3.5.3.1.2 Duwamish Segment

The Build Alternatives in this segment would not change the existing roadway channelization. All traffic movements would remain along public roadways and at private property access points. There could be some traffic circulation and property access changes after construction related to properties that have been fully or partially acquired during construction. However, access to Terminal 18 would be the same as current conditions, and there would be no changes in access to the redeveloped Terminal 5 or to properties along West Marginal Way Southwest from the Duwamish River Bridge to Terminal 5, also known as the Quiet Zone project area.

3.5.3.1.3 Delridge Segment

Preferred Alternative DEL-1a would construct a median to support the columns under the elevated light rail guideway on Southwest Genesee Street west of 26th Avenue Southwest. Option DEL-1b would construct a median to support the columns under the elevated light rail guideway along Southwest Genesee Street west of the Longfellow Creek crossing. Left-turn access in these sections could be restricted, but the street grid network would allow traffic to recirculate, such as using Southwest Nevada Street, for access to the affected properties.

Preferred Alternative DEL-2a* would close 25th Avenue Southwest below the station to through traffic. The street grid network would allow traffic to recirculate, such as using 26th Avenue Southwest or Delridge Way Southwest, maintaining access to the affected properties.



Option DEL-2b* would close 30th Avenue Southwest north of Southwest Genesee Street, and would also close 25th Avenue Southwest as described for Preferred Alternative DEL-2a*. The street grid network would allow traffic to recirculate, such as using Southwest Nevada Street or 26th Avenue Southwest, maintaining access to the affected properties. Alternative DEL-3 and Alternative DEL-4* are not expected to affect traffic circulation or access.

Alternative DEL-5 would construct a new traffic signal at the intersection of Delridge Way Southwest and 23rd Avenue Southwest to facilitate pedestrian crossings between the station and bus stops on the east side of Delridge Way Southwest. Guideway columns would be located within the median or adjacent to Southwest Avalon Way between Southwest Yancy Street and Southwest Genesee Street, which could restrict some left-turn access to properties. The street grid network would allow traffic to recirculate, and vehicles could potentially travel on 30th Avenue Southwest or 32nd Avenue Southwest, maintaining access to the affected properties.

Alternative DEL-6* would construct a new median on Southwest Andover Street to place guideway columns for short portions of Southwest Andover Street, which would restrict some left-turn access. The street grid network would allow traffic to recirculate, such as using Southwest Nevada Street or Southwest Dakota Street, maintaining access to the affected properties. A new traffic signal is proposed at the intersection of Delridge Way Southwest and 23rd Avenue Southwest to accommodate pedestrians crossing Delridge Way Southwest between the station and bus stops on the east side of the street.

3.5.3.1.4 West Seattle Junction Segment

There are no substantial proposed roadway modifications with Preferred Alternative WSJ-1. Preferred Alternative WSJ-2 would construct a median on Fauntleroy Way north of Southwest Alaska Street, slightly reducing the length for the inside southbound through lane.

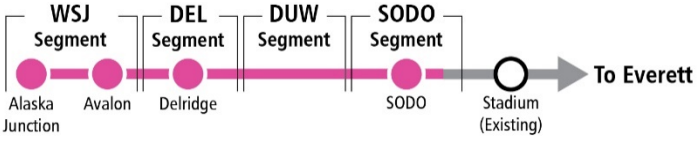
Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, and Alternative WSJ-5* would modify the northbound approach at the Avalon Way Southwest/Southwest Genesee Street intersection to allow vehicles to turn left and access to the drop-off and pick-up locations on Southwest Genesee Street near the station.

Alternative WSJ-5* may close Southwest Genesee Street approaching 35th Avenue Southwest. Station access would occur on Southwest Genesee Street with a new road connection between the station and Southwest Avalon Way, east of 35th Avenue Southwest.

Alternative WSJ-4* would close 38th Avenue Southwest north of Southwest Oregon Street and 37th Avenue Southwest north of Fauntleroy Way Southwest, with turnaround areas added to the street ends. The existing street grid network in this area would allow vehicles to use other streets, such as 39th Avenue Southwest, to reach their destination.

3.5.3.2 Travel Demand Forecasts

For the Build Alternatives, station characteristics and information from the Sound Transit Incremental Ridership Model (Sound Transit 2019) were used to calculate the anticipated vehicular trip generation for each station area. To estimate traffic volumes for the Build Alternatives, the increase in vehicle and non-motorized trips generated at each station were added to the No Build Alternative traffic forecast. The station mode of access information for the Build Alternatives is described in Section 3.4.3.4. This process is conservative, because it does not reduce the no build traffic volumes to account for people changing from driving in the No



Build Alternative to using transit with the project. The traffic forecasts for the No Build Alternative are previously described in this section.

Passenger drop-off and pick-up and bus trips are vehicle trips that are assigned to the surrounding streets. Bus service modifications are described in Section 3.4.3.1, as well as in the Transit Service Integration technical memorandum (Attachment N.1C of Appendix N.1). Station walk and bicycle trips were assigned based on the location of the station facilities, such as transit stops, pick-up and drop-off spaces, and entrances, and were incorporated in the traffic analysis. These trips were also included in the pedestrian L.O.S. assessment in Section 3.7.3. None of the stations include park-and-ride lots.

3.5.3.3 Arterial and Local Street Operations

Intersection p.m. peak hour L.O.S. results for 2042 are presented on Figure 3-3 through Figure 3-5 for the No Build Alternative and West Seattle Link Extension Build Alternatives. Detailed 2032 and 2042 L.O.S. results are provided in Appendix N.1. In the absence of an adopted City of Seattle intersection L.O.S. threshold, intersections that operate at L.O.S. E and L.O.S. F are identified as failing. With the Build Alternatives, affected intersections are defined as locations expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project, or if the intersection already operates at L.O.S. E or F in the No Build Alternative, to have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative).

3.5.3.3.1 Impacts Common to All Alternatives

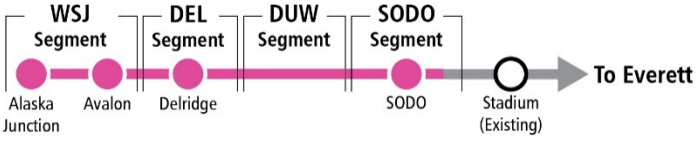
Most affected intersections under the Build Alternatives are a result of increased vehicle trips for pick-up/drop-off and pedestrian and bicycle activity that increase delays near proposed stations. Project-affected intersections are described in this section, with a more detailed discussion, including a.m. peak hour analysis results, in Section 4.2 of Appendix N.1.

3.5.3.3.2 SODO Segment

Under the 2040 no build condition, the SODO Station is expected to generate fewer than 10 additional vehicle trips in either the a.m. or p.m. peak hours (most of the transit trips at the SODO Station are transit transfers from other routes or walk-access). All Build Alternatives would have similar L.O.S. results as the No Build Alternative.

Preferred Alternative SODO-1a and Option SODO-1b would permanently close the SODO Busway, with 30 to 50 total buses in the peak hour using parallel streets such as 4th Avenue South and 6th Avenue South. However, intersection L.O.S. results would not change compared to the No Build Alternative. See Section 3.4.3.1.2 for more information on the SODO Busway closure.

The new Lander Street overpass between 4th Avenue South and 6th Avenue South in both alternatives would provide similar capacity to the No Build Alternative, resulting in similar L.O.S. conditions. The potential midblock crossing on the Lander Street overpass for Option SODO-1b may result in additional vehicle delay when riders transfer between the bus stops and the station. Figure 3-3 shows the 2042 p.m. peak hour L.O.S. results for the SODO Segment alternatives (these results also apply to the Ballard Link Extension 2042 Build condition in SODO).



3.5.3.3.3 Duwamish Segment

Under the No Build Alternative, the West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street intersection is expected to operate at L.O.S. E in the p.m. period; all the other intersections operate at L.O.S. D or better. Because there are no stations in the Duwamish Segment, intersections in this segment are predominantly influenced by trips going to or from the SODO and Delridge stations. However, none of the alternatives result in a substantial change in delay or L.O.S. All the other intersections would operate at L.O.S. D or better.

3.5.3.3.4 Delridge Segment

Under the No Build Alternative, four intersections in the Delridge Segment area operate at L.O.S. E or F in either or both of the a.m. or p.m. peak hours. Figure 3-4 shows the 2042 p.m. peak hour L.O.S. results for the Delridge Segment alternatives.

All Build Alternatives impact the Southwest Dakota Street/Delridge Way Southwest intersection in both peak hours due to additional vehicle trips associated with the proposed station. Alternative DEL-5 and Alternative DEL-6* propose a new traffic signal at Delridge Way Southwest/23rd Avenue Southwest to facilitate pedestrian crossings between bus stops and the station. This intersection would operate at L.O.S. F in both peak hours by delaying vehicles on Delridge Way Southwest.

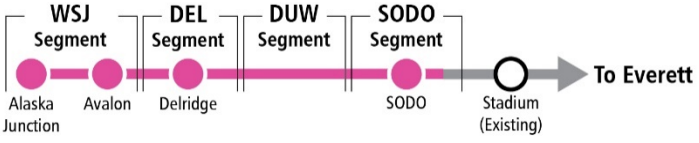
In the year 2042 M.O.S., each of the Delridge stations would have higher station activity, such as more pick-up and drop-off vehicle trips and increased bus service, than under the full-length project. Therefore, additional intersections are affected under the M.O.S. All Build Alternatives would affect the stop-controlled Southwest Dakota Street/Delridge Way Southwest intersection, creating a worse L.O.S. F condition. However, this intersection is also impacted under the full-build conditions with these alternatives. Under the M.O.S., Alternative DEL-3 and Alternative DEL-4* would also affect the Southwest Genesee Street/Delridge Way Southwest intersection in the a.m. period and would operate at a worse L.O.S. E. Under the M.O.S., Alternative DEL-5 and Alternative DEL-6* would also affect the Delridge Way Southwest/Southwest Andover Street intersection and the Delridge Way Southwest/23rd Avenue Southwest intersection in both peak hours and would operate at a worse L.O.S. F. See Section 4.2.2.2 of Appendix N.1 for further information on the intersection L.O.S. results for the M.O.S.

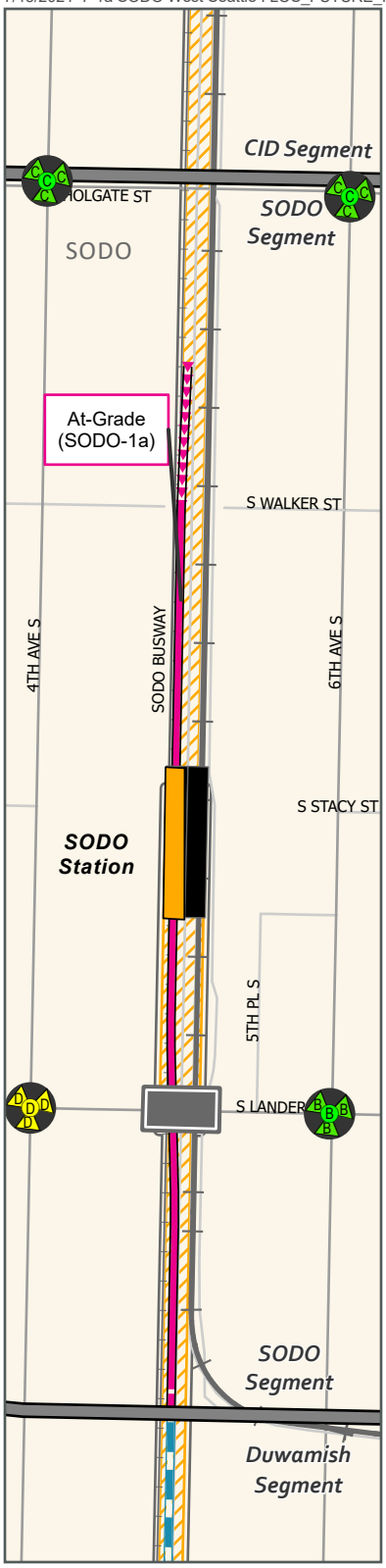
3.5.3.3.5 West Seattle Junction Segment

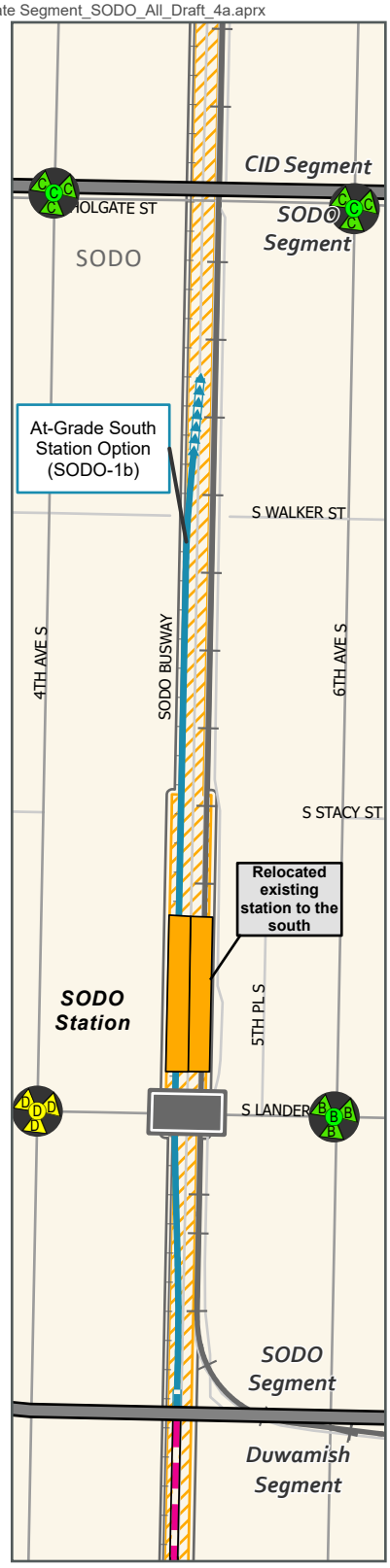
Under the 2042 No Build Alternative, six intersections in the West Seattle Junction Segment area operate at L.O.S. E or F in the a.m. and p.m. peak hours. Intersections affected by the Build Alternatives are shown in Table 3-8. Figure 3-5 shows the 2042 p.m. peak hour L.O.S. results for the West Seattle Junction Segment alternatives.

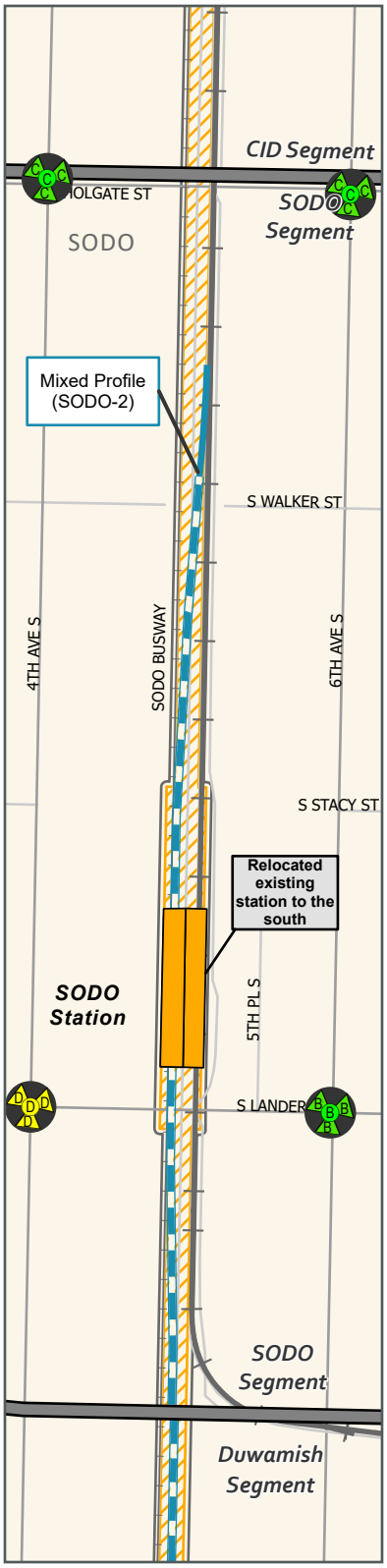
With all Build Alternatives, no intersections would be affected near the Avalon Station compared to the No Build Alternative, as this station would have relatively few vehicle trips.

In the Alaska Junction Station area, Preferred Alternative WSJ-1 would degrade the intersection L.O.S. at the 41st Avenue Southwest/Southwest Edmunds Street (side-street stop-controlled) intersection in the p.m. peak hour and at the Southwest Alaska Street/California Avenue Southwest intersection in the a.m. peak hour.









Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

- Segment Line
- Existing Link Light Rail
- Railroad
- SODO Busway
- Proposed Overpass

LOS Key for Alternatives

- SODO-1a
- SODO-2
- SODO-1b
- No Build

Level of Service (LOS)

A-C D E-F

FIGURE 3-3

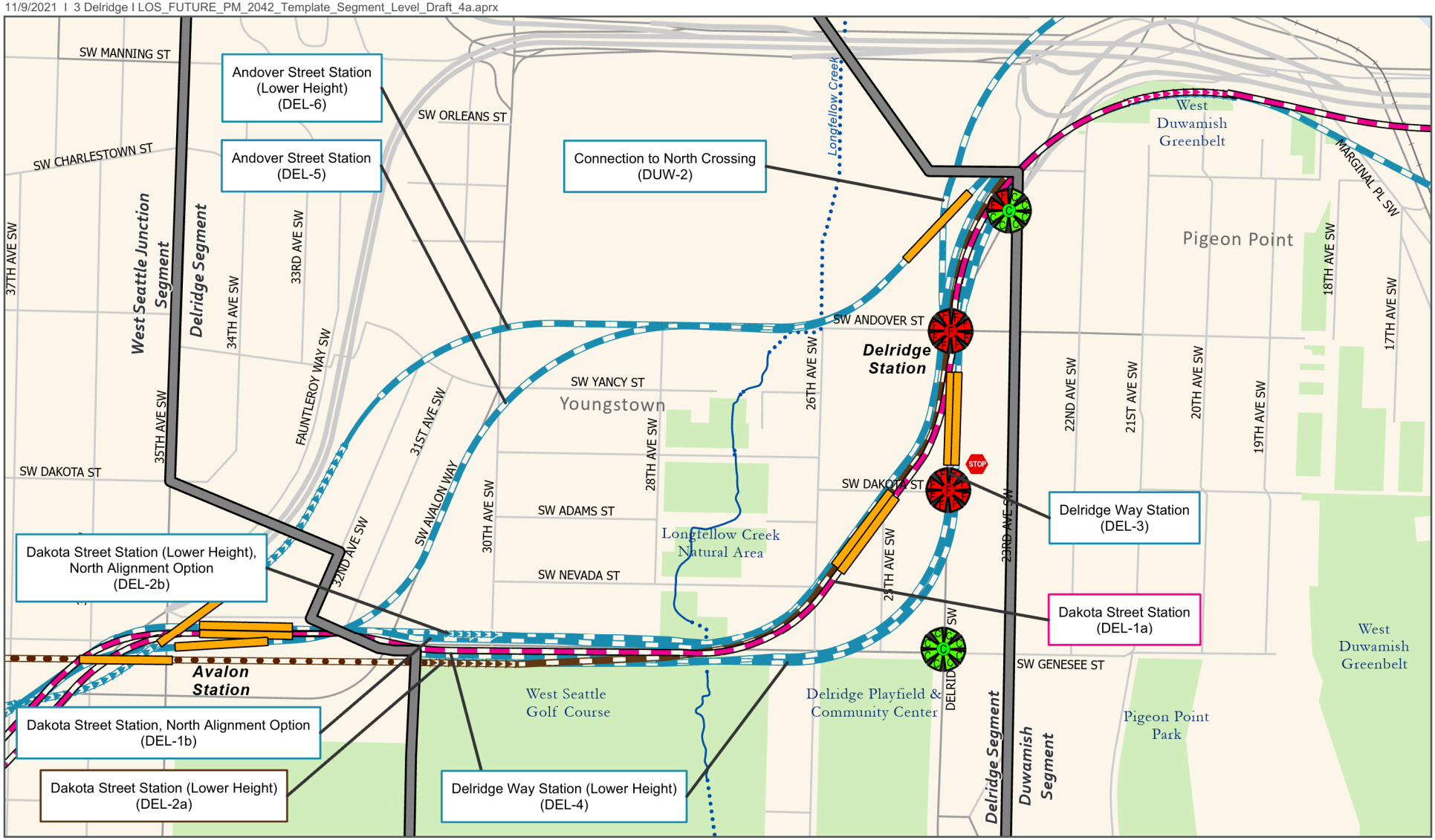
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)

West Seattle Link Extension - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet

N



Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New

- Segment Line
- Railroad
- Stream
- Piped Stream
- Park

LOS Key for Alternatives

Del-1a | Del-1b | Del-2a | Del-2b | Del-3 | Del-4 | Del-5 | Del-6

No Build

Level of Service (LOS)
- A-C
- D
- E-F

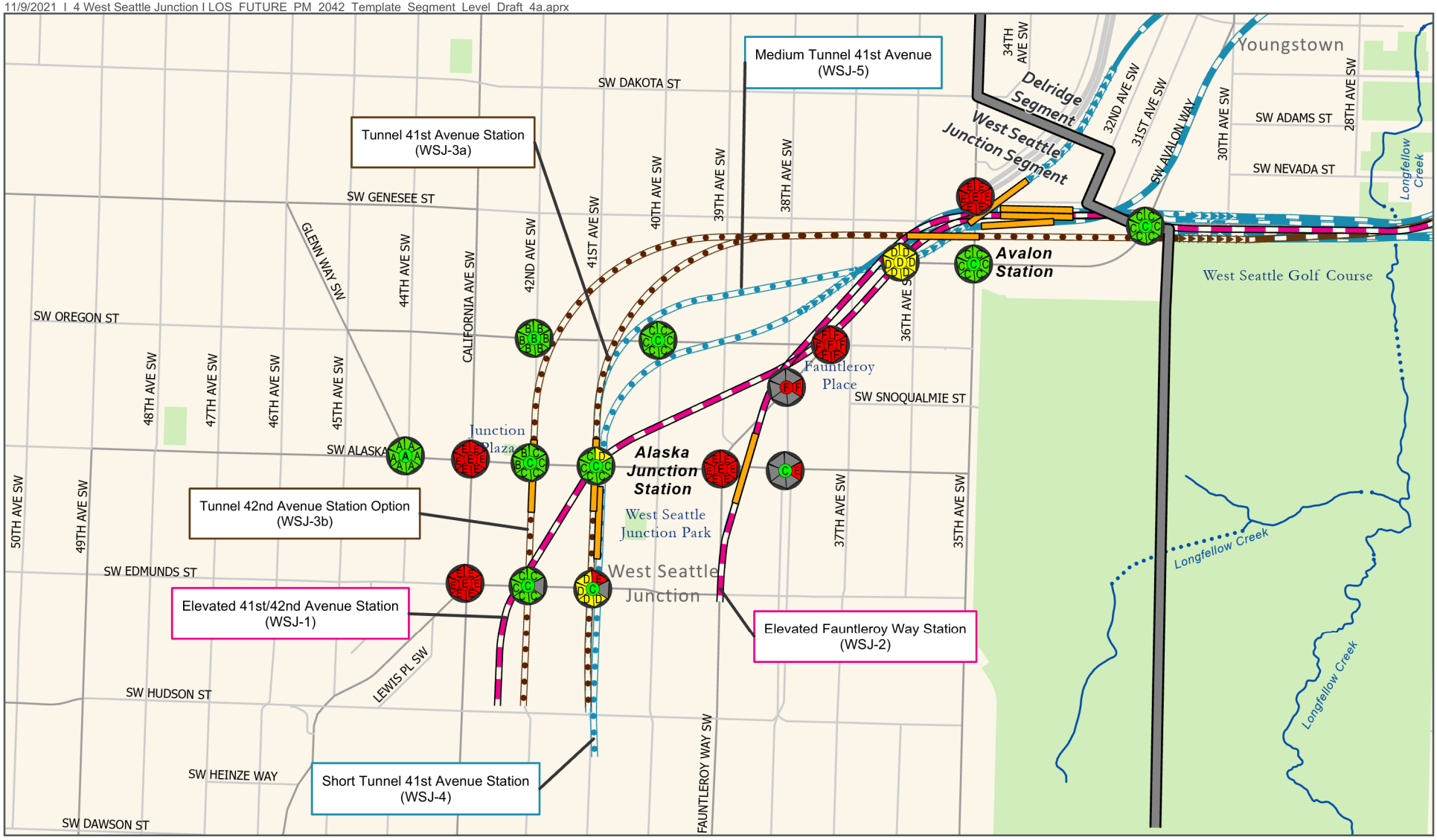
Stop-Controlled Intersection

FIGURE 3-4
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Delridge Segment

West Seattle and Ballard Link Extensions

0 400 800 Feet

N



Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New

- Segment Line
- Stream
- Piped Stream
- Park

LOS Key for Alternatives
- WSJ-1
- WSJ-2
- WSJ-3a
- WSJ-3b
- WSJ-4
- WSJ-5
- No Build

Level of Service (LOS)
- A-C
- D
- E-F

0 500 1,000 Feet

N

FIGURE 3-5
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - West Seattle Junction Segment
West Seattle and Ballard Link Extensions

Under Preferred Alternative WSJ-2, the delays at the Fauntleroy Way Southwest/Southwest Alaska Street and Fauntleroy Way Southwest/38th Avenue Southwest intersections would get worse in both peak hours, and the L.O.S. result would degrade the Southwest Alaska Street/38th Avenue Southwest intersection in the p.m. peak hour compared to the No Build Alternative.

Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would result in noticeably increased delays at the Southwest Alaska Street/California Avenue Southwest intersection in the p.m. peak hour, although the difference would not change the L.O.S. grade. In the a.m. peak hour, delay would increase and L.O.S. results would be degraded compared to the No Build Alternative.

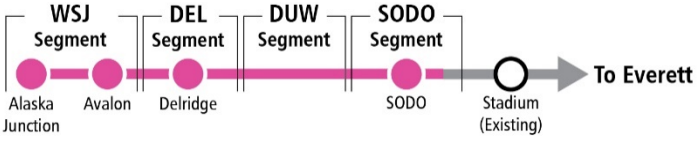
Alternative WSJ-4* and Alternative WSJ-5* have similar L.O.S. results compared to the No Build Alternative.

Table 3-8. West Seattle Junction Segment Potentially Impacted Intersections by Peak Hour in 2042 – West Seattle Link Extension

Intersection	Preferred Elevated 41st/42nd Avenue Station Alternative (WSJ-1)	Preferred Elevated Fauntleroy Way Station Alternative (WSJ-2)	Preferred Tunnel 41st Avenue Station Alternative (WSJ-3a)*	Preferred Tunnel 42nd Avenue Station Option (WSJ-3b)*	Short Tunnel 41st Avenue Station Alternative (WSJ-4)*	Medium Tunnel 41st Avenue Station Alternative (WSJ-5)*
41st Avenue Southwest/Southwest Edmunds Street	p.m.	None	None	None	None	None
California Avenue Southwest/Southwest Alaska Street	a.m.	None	a.m., p.m.	a.m., p.m.	None	None
Fauntleroy Way Southwest/38th Avenue Southwest	None	a.m., p.m.	None	None	None	None
Fauntleroy Way Southwest/Southwest Alaska Street	None	a.m., p.m.	None	None	None	None
Southwest Alaska Street/38th Avenue Southwest	None	p.m.	None	None	None	None

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: An impacted intersection in the Build Alternative is expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, have noticeably worse vehicle delays in the Build Alternative.



3.5.4 Mitigation for Operation Impacts

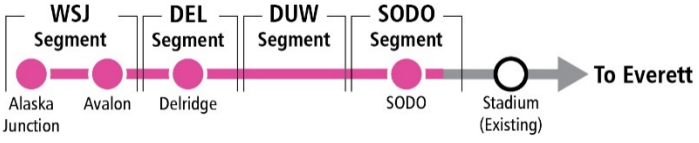
Mitigation could be required at intersections where the intersection L.O.S. would not meet agreed-to project-specific L.O.S. thresholds when compared to the No Build Alternative. Intersections that would be considered for potential mitigation measures would vary depending on the alternative in each segment and are noted in Table 3-9.

Table 3-9. Potentially Impacted Intersections to be Considered for Mitigation – West Seattle Link Extension

Segment	Intersection	Alternative	Cause(s)
Delridge Segment	23rd Avenue Southwest/Delridge Way Southwest	Alternative DEL-5 and Alternative DEL-6* Alternative DEL-5 (M.O.S.) and Alternative DEL-6* (M.O.S.)	New pedestrian signal
	Delridge Way Southwest /Southwest Andover Street	Alternative DEL-5 (M.O.S.) and Alternative DEL-6* (M.O.S.)	Increased pick-up/drop-off activity
	Southwest Dakota Street/Delridge Way Southwest	All Full Build Alternatives Preferred Alternative DEL-2a* (M.O.S.), Option DEL-2b* (M.O.S.), Alternative DEL-3 (M.O.S.) and Alternative DEL-4* (M.O.S.)	Increased pick-up/drop-off activity
	Southwest Genesee Street/Delridge Way Southwest	Alternative DEL-3 (M.O.S.) and Alternative DEL-4* (M.O.S.)	Increased pick-up/drop-off activity
West Seattle Junction Segment	41st Avenue Southwest /Southwest Edmunds Street and California Avenue Southwest/Southwest Alaska Street	Preferred Alternative WSJ-1	Increased pick-up/drop-off activity
	Fauntleroy Way Southwest/Southwest Alaska Street, Southwest Alaska Street/38th Avenue Southwest, and Fauntleroy Way Southwest/38th Avenue Southwest	Preferred Alternative WSJ-2	Increased pick-up/drop-off activity
	Southwest Alaska Street/California Avenue Southwest	Preferred Alternative WSJ-3a* or Preferred Option WSJ-3b*	Increased pick-up/drop-off activity

Sound Transit would continue to work with the City of Seattle and FTA as the West Seattle Link Extension project design progresses to minimize project-related intersection delays. Where additional project-related delays are unavoidable, Sound Transit would work with the City of Seattle to review potential mitigation at intersections identified in Table 3-9 with the intent of either meeting agreed-upon L.O.S. thresholds during the a.m. and p.m. peak hours or attaining a similar vehicle delay as under the No Build Alternative.

The intersection mitigation treatments would likely vary depending on the intersection location and cause of the increased vehicular delay. At intersections or movements where the delay is



the result of vehicular operations such as pick-up/drop-off activity or additional transit buses, mitigation measures could include corridor signal optimization, upgraded signal technologies, implementation of corridor intelligent transportation system strategies, traffic movement and turn restrictions, or added intersection capacity, where feasible. For intersections or movements where increased delay is due primarily to increased non-motorized activity associated with the station, mitigation could be focused instead on strategies such as signal optimization for pedestrians, intersection crossing enhancements, pedestrian and/or bicycle facility modifications, reducing conflicts between vehicles and non-motorized users, or wayfinding, with the goal of improving safety and providing more efficient movement of pedestrians and cyclists.

Final mitigation would be determined and agreed upon by Sound Transit and the City of Seattle, in coordination with FTA, and may include Sound Transit contributing a proportionate share of costs to improve intersections based on the project's proportionate ratio of trips at the intersection or another equitable method.

3.6 West Seattle Link Extension Affected Environment and Impacts during Operation – Parking

This section describes existing on- and off-street parking conditions along the WSBLE corridor and around stations. It describes future changes in parking supply with the No Build Alternative and Build Alternatives and also documents the parking supply and occupancy along streets in each station's vicinity that have unrestricted parking that could be affected by light rail riders who park and ride light rail (also known as hide-and-ride). Section 3.11 discusses, by segment, temporary construction impacts such as loss of on- and off-street parking and construction worker parking. Appendix N.1, Transportation Technical Report, provides additional detail.

The study area for on-street parking is generally one block on either side of the light rail alignment and within a 0.25-mile walking distance of Build Alternative stations where there is unrestricted parking that could accommodate hide-and-ride use.

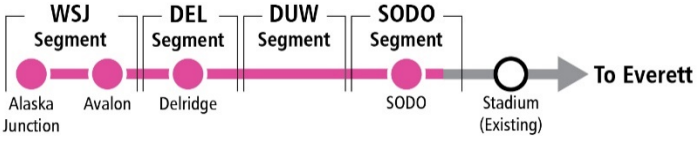
3.6.1 Affected Environment

Table 3-10 summarizes the on-street parking within the study area for each of the West Seattle Link Extension segment alternatives. Parking supply and occupancy counts were performed midday (from 9 a.m. to 3 p.m.) on weekdays between September 2019 and early December 2019.

There are a few publicly owned parking lots near potential stations that serve parks and community centers. Information on these off-street parking facilities is provided in Appendix N.1.

Table 3-10. On-Street Parking in Station Vicinity – West Seattle Link Extension

Segment	Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied
SODO	Preferred At-Grade (SODO-1a)	180	61	241	64%
	At-Grade South Station Option (SODO-1b)	256	63	319	63%

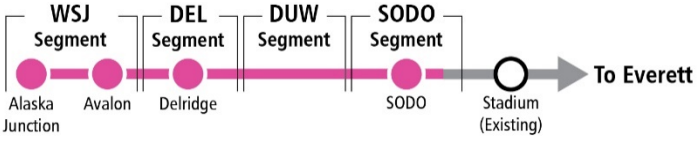


Segment	Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied
	Mixed Profile (SODO-2)	256	63	319	63%
Duwamish	Preferred South Crossing (DUW-1a) [b]	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	South Crossing South Edge Crossing Alignment Option (DUW-1b) [b]	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	North Crossing (DUW-2) [b]	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Delridge	Preferred Dakota Street Station (DEL-1a)	421	1	422	59%
	Dakota Street Station North Alignment Option (DEL-1b)	421	1	422	59%
	Preferred Dakota Street Station Lower Height (DEL-2a)*	421	1	422	59%
	Dakota Street Station Lower Height North Alignment Option (DEL-2b)*	421	1	422	59%
	Delridge Way Station (DEL-3)	392	1	393	57%
	Delridge Way Station Lower Height (DEL-4)*	392	1	393	57%
	Andover Street Station (DEL-5)	388	1	389	50%
	Andover Street Station Lower Height (DEL-6)*	388	1	389	50%
West Seattle Junction	Preferred Elevated 41st/42nd Avenue Station (WSJ-1)	633, Avalon 242, Alaska Junction	74, Avalon 699, Alaska Junction	707, Avalon 941, Alaska Junction	54%, Avalon 66%, Alaska Junction
	Preferred Elevated Fauntleroy Way Station (WSJ-2)	633, Avalon 476, Alaska Junction	74, Avalon 476, Alaska Junction	707, Avalon 952, Alaska Junction	54%, Avalon 71%, Alaska Junction
	Preferred Tunnel 41st Avenue Station (WSJ-3a)*	595, Avalon 264, Alaska Junction	238, Avalon 714, Alaska Junction	833, Avalon 978, Alaska Junction	58%, Avalon 68%, Alaska Junction
	Preferred Tunnel 42nd Avenue Station* Option (WSJ-3b)*	595, Avalon 132, Alaska Junction	238, Avalon 809, Alaska Junction	833, Avalon 941, Alaska Junction	58%, Avalon 65%, Alaska Junction
	Short Tunnel 41st Avenue Station (WSJ-4)*	633, Avalon 264, Alaska Junction	74, Avalon 714, Alaska Junction	707, Avalon 978, Alaska Junction	54%, Avalon 68%, Alaska Junction
	Medium Tunnel 41st Avenue Station (WSJ-5)*	595, Avalon 264, Alaska Junction	238, Avalon 714, Alaska Junction	833, Avalon 978, Alaska Junction	58%, Avalon 68%, Alaska Junction

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

[a] Restricted spaces are signed to limit parking duration or type of vehicle.

[b] Parking was not inventoried In in the Duwamish Segment because there are no stations in this segment and none of the alternatives have long-term effects to on-street and public off-street parking.



3.6.2 Environmental Impacts of the No Build Alternative

The parking conditions in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.6.3 Environmental Impacts of the Build Alternatives

All of the proposed station locations along the West Seattle Link Extension corridor are currently surrounded by areas of unrestricted parking that could be used by light rail riders who park all day to commute elsewhere. This hide-and-ride parking could adversely affect local businesses and residents who rely on that parking for other purposes. Consistent with all existing light rail stations in Seattle, Sound Transit expects that the City of Seattle would manage parking within the vicinity of new stations by placing restrictions (including time limits or permit restrictions) where they do not already exist. Owners of parking lots available for public parking near the stations might also choose to change pricing or parking permit structures to discourage use of the lot as a long-term park-and-ride.

Sound Transit would not create new parking at any of its stations to accommodate light rail commuters. Trip generation and traffic analysis performed for the project assumes no long-term parking by commuters and that curb-use management in the vicinity of new light rail stations would discourage such parking. Therefore, long-term parking impacts surrounding the stations could occur if existing unrestricted parking accommodates hide-and-ride parking or if there is permanent removal of parking spaces by the project.

Sound Transit identified potential long-term parking impacts where parking spaces would be permanently removed for project use at the new station locations and along the alignments. These are described further in the following sections.

3.6.3.1 Potential for Hide-and-Ride near Stations

There is unrestricted parking in the vicinity of each station in the West Seattle Link Extension that could be affected by hide-and-ride parking. The existing parking supply within 0.25 mile of each station, including unrestricted spaces, is summarized in Table 3-10.

3.6.3.2 Permanent Removal of Parking

Table 3-11 summarizes the on-street parking that would be removed with each of the West Seattle Link Extension alternatives, including both parking that would be permanently removed at the stations or along the alignment and additional parking that would be temporarily removed during construction. The table also notes off-street parking impacts. Temporary parking impacts during construction are discussed by segment in Section 3.11. Appendix N.1 provides details on where parking would be removed for each alternative.

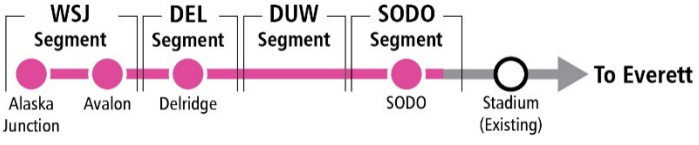


Table 3-11. Displaced On-Street Parking – West Seattle Link Extension

Segment	Alternative	On-Street Parking Permanently Removed (spaces)	Additional On-Street Parking Temporarily Removed during Construction (spaces)
SODO	Preferred At-Grade (SODO-1a)	75 to 100	0
	At-Grade South Station Option (SODO-1b)	30 to 45	15 to 20
	Mixed Profile (SODO-2)	15 to 25	15 to 20
Duwamish	Preferred South Crossing (DUW-1a)	0	40 to 55
	South Edge Crossing Alignment Option (DUW-1b)	0	40 to 55
	North Crossing (DUW-2)	5 to 15	95 to 120
Delridge	Preferred Dakota Street Station (DEL-1a)	35 to 50	60 to 80
	Dakota Street Station North Alignment Option (DEL-1b)	35 to 50	120 to 150
	Preferred Dakota Street Station Lower Height (DEL-2a)*	60 to 80	30 to 40
	Dakota Street Station Lower Height North Alignment Option (DEL-2b)*	75 to 95	30 to 40
	Delridge Way Station (DEL-3)	35 to 50	80 to 100
	Delridge Way Station Lower Height (DEL-4)*	35 to 50	70 to 90
	Andover Street Station (DEL-5)	5 to 10	160 to 200
	Andover Street Station Lower Height (DEL-6)*	15 to 25	75 to 100
West Seattle Junction	Preferred Elevated 41st/42nd Avenue Station (WSJ-1)	30 to 45 [a]	105 to 130
	Preferred Elevated Fauntleroy Way Station (WSJ-2)	45 to 60	75 to 95
	Preferred Tunnel 41st Avenue Station (WSJ-3a)*	45 to 65	190 to 240
	Preferred Tunnel 42nd Avenue Station Option (WSJ-3b)*	40 to 50 [b]	85 to 110
	Short Tunnel 41st Avenue Station (WSJ-4)*	105 to 135	95 to 125
	Medium Tunnel 41st Avenue Station (WSJ-5)*	70 to 90	200 to 250

Source: Heffron Transportation 2020.

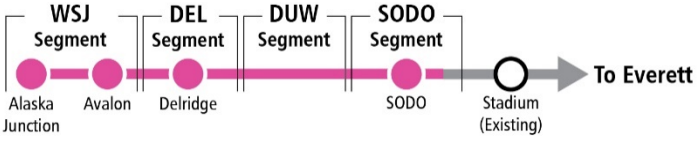
* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

[a] 210 off-street public parking spaces would also be removed with Preferred Alternative WSJ-1.

[b] 219 off-street public parking spaces would also be removed with Preferred Option WSJ-3b*.

3.6.4 Mitigation for Operation Impacts

All of the West Seattle Link Extension segments have areas of unrestricted parking that could be affected by light rail riders parking near the station. To mitigate this potential impact, Sound Transit would work with the City of Seattle to consider appropriate on-street parking measures within a 0.25-mile radius of each station to discourage hide-and-ride activity. Strategies could



include paid parking meters, time-limit signs, passenger drop-off/pick-up zones, truck and load/unload zones, and restricted parking zones. In addition, Sound Transit would coordinate with the City of Seattle to relocate affected Americans with Disabilities Act parking spaces.

3.7 West Seattle Link Extension Affected Environment and Impacts during Operation – Non-motorized Facilities

This section describes the existing and planned pedestrian and bicycle facilities that could be affected by the project. Pedestrian L.O.S. at sidewalks, crosswalks, and intersection corners within one block of each station entrance were evaluated for the p.m. peak hour. Walksheds and bikesheds were used to show the areas around each station that are accessible to pedestrians and bicyclists; the walksheds and bikesheds are graphically shown and described in more detail in Appendix N.1, Transportation Technical Report.

Walksheds and Bikesheds

Walksheds and bikesheds are defined as the distance a person can walk or bicycle in 10 minutes around each station, which translates to roughly a 0.5-mile walk distance and a 1.5-mile bicycle distance. The bikeshed methodology assumes an average speed consistent with traditional bicycles; riders using electric-assist bicycles could travel longer distances.

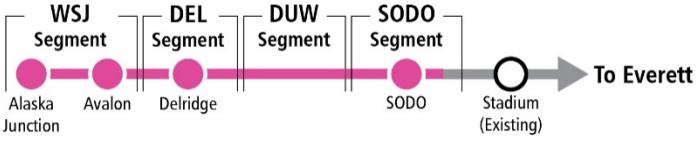
3.7.1 Affected Environment

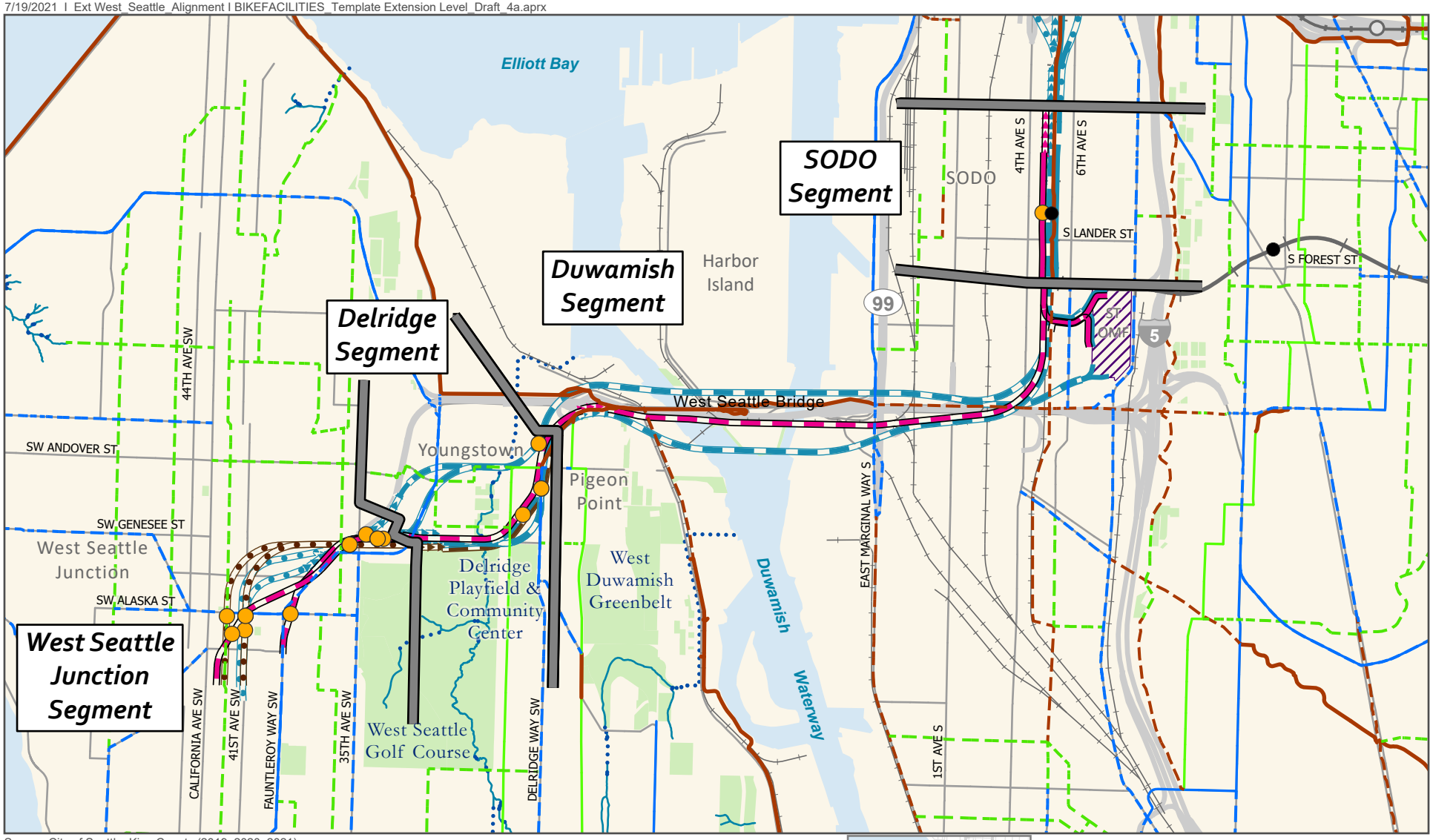
The SODO and Duwamish segments generally have sidewalks on both sides of the major roadways, but there are gaps in coverage. Many streets have impediments to walking. Impediments can include parked cars partially or fully blocking the sidewalk, lack of a curb separating the sidewalk from the roadway, long block lengths and barriers such as railroad tracks and fencing that limit connectivity and increase walking distances, and the prevalence of heavy trucks. In the West Seattle Junction and Delridge segments, station areas have a predominantly residential and neighborhood commercial character and there are generally sidewalks on both sides of the street near the stations, with a few short gaps in coverage and some intersections missing curb ramps.

Most of the study area lacks designated facilities for cyclists, as shown on Figure 3-6. Bicycle facilities near stations include bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails.

3.7.2 Environmental Impacts of the No Build Alternative

Under the No Build Alternative, projects included in Seattle's Bicycle Master Plan (City of Seattle 2014a) and Pedestrian Master Plan (City of Seattle 2017b) are assumed to be built. The Bicycle Master Plan calls for protected bicycle lanes on East Marginal Way South, Airport Way, Delridge Way Southwest, 35th Avenue Southwest, Fauntleroy Way Southwest, and Southwest Alaska Street and multi-use trails on South Spokane Street and between the SODO Trail and South Spokane Street, among others, as well as a network of greenways as shown in Figure 3-6. The RapidRide H Line would also be constructed and includes non-motorized improvements such as protected bike lanes, neighborhood greenway improvements, and pedestrian crossing improvements. Figure 3-6 shows existing and planned no build condition bike facilities and does not include project improvements. Appendix N.1 provides the complete list of projects included in the No Build Alternative.





Source: City of Seattle, King County (2019, 2020, 2021).

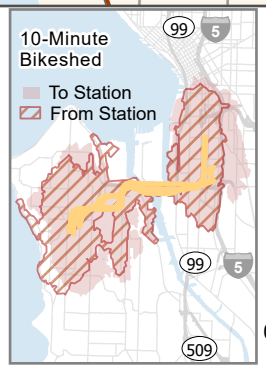
Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

- Segment Line
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Railroad
- Stream
- Piped Stream
- Park

Bike Facilities
- Bike Lane (In-Street Separation)
- Multi-Use Trail
- Neighborhood Greenway
- Bike Lane (In-Street Separation) - Planned
- Multi-Use Trail - Planned
- Neighborhood Greenway - Planned



0 0.5 1 Mile

N

FIGURE 3-6
Existing Bike and Planned Bike Facilities
West Seattle Link Extension
West Seattle and Ballard Link Extensions

3.7.3 Environmental Impacts of the Build Alternatives

Sound Transit would include pedestrian and bicycle improvements at stations to accommodate the projected increase in pedestrian and bicycle travel with the West Seattle Link Extension. The following sections discuss specific improvements affecting pedestrian circulation, such as new connections or signals, by segment. Sound Transit would work with the City of Seattle to determine the most appropriate pedestrian and bicycle improvements to support station access. New facilities would meet Americans with Disabilities Act requirements as well as local and federal design standards, as appropriate.

Station Pedestrian and Bicycle Access Opportunities

Additional pedestrian and bicycle improvements not included as part of the WSBLE project could be identified for potential station access enhancement by others. These improvements could be identified through the station planning efforts, included in existing local plans by partner agencies, or potentially funded in partnership with Sound Transit. FTA considers pedestrian and bicycle improvements within ½ mile and 3 miles of station areas, respectively, for grant funding, which could be sought by partner agencies or in conjunction with Sound Transit. In addition, Sound Transit could consider funding access improvements beyond the station footprint as part of the Non-motorized Access Allowance included in the Sound Transit 3 Plan.

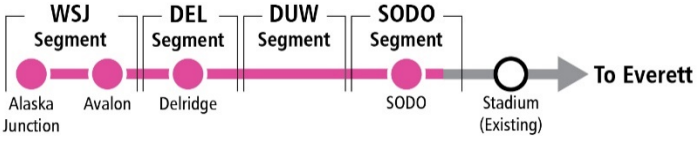
3.7.3.1 Impacts Common to All Alternatives

Based on the available information at the time this Environmental Impact Statement was being prepared, no projects listed in Seattle's Bicycle Master Plan are expected to be impacted by the Build Alternatives. None of the Build Alternatives would result in long-term impacts to sidewalks, school walk routes, or projects in the Pedestrian Master Plan because any affected pedestrian facility (i.e., proposed guideway columns encroaching on existing sidewalks) would be rebuilt to meet applicable design standards including Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020] and the Seattle Land Use Code and Light Rail Facility Construction and Construction Impacts sections of the Seattle Municipal Code) or to a standard agreed to by Sound Transit and the City of Seattle. If it is determined that a facility could not be rebuilt in the original location, Sound Transit would coordinate with the City of Seattle to identify an alternate route. No long-term impacts to bicycle parking are expected under any of the Build Alternatives. Sound Transit will continue to coordinate with the City to ensure bike parking facilities are adequately distributed, sized, and configured to meet present and future bike parking demand at the stations. Therefore, no long-term impacts to bicycle parking are expected under any of the Build Alternatives.

All sidewalks, crosswalks, and corners within one block of the station entrances have sufficient capacity, in terms of pedestrian L.O.S., to serve projected demand unless noted in the following segment-specific discussions. Sound Transit will coordinate with the City of Seattle on specific sidewalk width requirements through the final design process.

3.7.3.2 SODO Segment

Preferred Alternative SODO-1a and Option SODO-1b would include connections along the South Stacy Street corridor, with Preferred Alternative SODO-1a connecting between 4th Avenue South and 6th Avenue South and Option SODO-1b connecting to 4th Avenue South only. These would occur through a combination of new roadway construction and the concourse across the light rail station, improving upon the existing non-motorized access to the SODO



Station. Both of the at-grade alternatives would also include a new Lander Street overpass between 4th Avenue South and 6th Avenue South, which would separate pedestrians and bicyclists from the current at-grade rail crossing.

Under all alternatives, cyclists could continue to access the station via the SODO Trail, which could be accessed by planned protected bicycle lanes on South Royal Brougham Way and Airport Way South (with connections at South Holgate Street and South Forest Street), and a planned trail on South Spokane Street.

While overall boardings and alightings at the SODO Station would increase, most of those would be light rail to light rail transfers. Approximately 300 non-rail transferring riders would board at the SODO Station during the p.m. peak hour for all alternatives.

3.7.3.3 Duwamish Segment

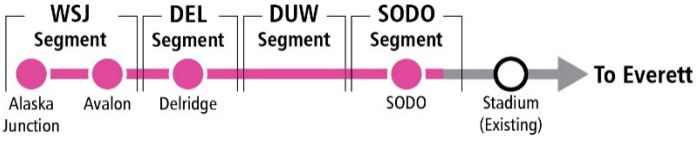
Because the Duwamish Segment does not include any stations, no walksheds, bikesheds, or pedestrian L.O.S. are associated with this segment. Columns associated with the elevated guideway for the North Crossing Alternative DUW-2 would encroach on the Alki Trail just west of the Chelan Avenue Southwest/West Marginal Way Southwest/Southwest Spokane Street intersection. The trail would be permanently shifted to maintain connectivity between the trail and the crosswalk at that intersection. Columns associated with the elevated guideway tracks connecting the alternatives to the Operations and Maintenance Facility Central could encroach on sidewalks on 6th Avenue South north of South Hanford Street, but Sound Transit would rebuild the affected facilities to the extent possible.

3.7.3.4 Delridge Segment

The walksheds around each station location in the Delridge Segment are generally comparable in size, mainly consisting of residential and commercial uses; Alternative DEL-5 and Alternative DEL-6* also include industrial uses. All the alternatives' station areas feature steep slopes, environmental features, and major infrastructure that affect pedestrian and bicycle access, particularly to the east and west. Access is hindered by Longfellow Creek and large, fenced-off park areas, including the West Seattle Golf Course and Pigeon Point Park. In addition, the Delridge Way on- and off-ramps are challenging to navigate. Under Alternative DEL-5 and Alternative DEL-6*, the new pedestrian signal at Delridge Way and 23rd Avenue Southwest (just south of the West Seattle Bridge) would allow pedestrians to transfer between the bus bays and the station entrance.

Under all alternatives, cyclists could access the Delridge Station area via existing and planned neighborhood greenways on 21st Avenue Southwest, 26th Avenue Southwest, and Southwest Andover Street/Southwest Yancy Street; multi-use trails on Delridge Way Southwest north of 23rd Avenue Southwest; the West Seattle Bridge Trail on the Spokane Street Bridge; the Alki Trail; the Duwamish River Trail; and protected bicycle lanes on Delridge Way Southwest and Southwest Avalon Way.

All alternatives would have elevated guideway through the Delridge Segment, with columns that could encroach on existing sidewalks. Sound Transit would rebuild the affected sidewalks to the extent possible. Option DEL-2b* would permanently close 30th Avenue Southwest north of Southwest Genesee Street, potentially eliminating pedestrian and bicycle access at that location.



All alternatives would have approximately 1,500 riders during the p.m. peak hour at the Delridge Station, with most riders transferring from buses.

Under the M.O.S., the Delridge Station would have more boardings and alightings than with the full-build project. Overall boardings and alightings at the Delridge Station would be approximately 2,600 riders during the p.m. peak hour, with over 90 percent of riders accessing the light rail station by bus from Alaska Junction, White Center, Burien, and communities to the south. The remaining riders would access the station by walking or biking. All pedestrian facilities except the following two sidewalks would have sufficient capacity to serve the demand of the M.O.S.:

- The sidewalk on the west side of Delridge Way Southwest north of Andover Street is expected to operate at L.O.S. F with Alternative DEL-5 and Alternative DEL-6*.
- The south side of Southwest Dakota Street is expected to operate at L.O.S. F. between 25th Avenue Southwest and Delridge Way Southwest with Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, and Option DEL-2b*.

In both locations, the L.O.S. F condition is due to the high number of riders transferring between the transit stops on Delridge Way Southwest and the station entrances.

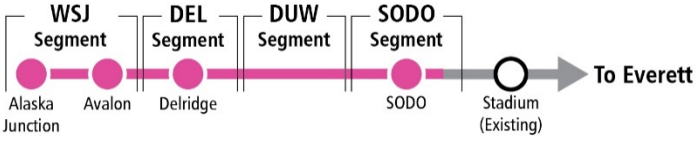
3.7.3.5 West Seattle Junction Segment

The alternatives' walksheds are generally comparable in size to one another for both the Avalon Station and Alaska Junction Station, though they cover different areas depending on station location. Because of the proximity between the Alaska Junction and Avalon stations, some areas would fall within the walksheds of both stations.

Under all alternatives, cyclists could access the Alaska Junction and Avalon stations via planned neighborhood greenways on Southwest Andover Street, 36th Avenue Southwest, 42nd Avenue Southwest, 45th Avenue Southwest, and 48th Avenue Southwest; planned bicycle lanes on Glenn Way Southwest, Erskine Way Southwest, Southwest Genesee Street, and Southwest Charlestown Street; and planned protected bicycle lanes on Fauntleroy Way Southwest, 35th Avenue Southwest, Southwest Avalon Way, Southwest Admiral Way, and Southwest Alaska Street (however, topography is a limiting factor for bicycle access).

Under Alternative WSJ-4*, 37th Avenue Southwest north of Fauntleroy Way and 38th Avenue Southwest north of Southwest Oregon Street would be permanently closed at the guideway, potentially eliminating non-motorized access. Pedestrians and bicycles could reroute to the adjacent parallel roadways, which have relatively short block spacing such that out-of-direction travel would be minimal. Under Alternative WSJ-5*, Southwest Genesee Street would be permanently closed east of 35th Avenue Southwest. Although the station would still be accessible by cyclists and pedestrians, those passing through the station area may have to cross 35th Avenue Southwest and Southwest Fauntleroy Way at Southwest Avalon Way.

The West Seattle Junction Segment would have approximately 1,800 riders during the p.m. peak hour, with most occurring at the Alaska Junction Station. Most riders would arrive on foot or transfer from local buses.



3.7.4 Mitigation for Operation Impacts

The West Seattle Link Extension is not expected to permanently impact existing designated bicycle facilities or routes. If impacts are identified as the project advances, Sound Transit would work with the City of Seattle to rebuild the affected facilities or develop alternate facilities or routes that achieve, to the extent feasible, a similar level of protection and comfort afforded by the facility being impacted. These replacements would be funded by Sound Transit, and may include, for example, protected or standard bicycle lanes, trails, and neighborhood greenway treatments, along with associated design elements such as pavement markings and bike signals, where needed.

Under the full-build condition, no pedestrian facilities would have a L.O.S. impact with the West Seattle Link Extension but under the West Seattle and Ballard Link Extensions M.O.S., all alternatives except Alternative DEL-3 and Alternative DEL-4* would have pedestrian facilities that operate at L.O.S. F at the following locations:

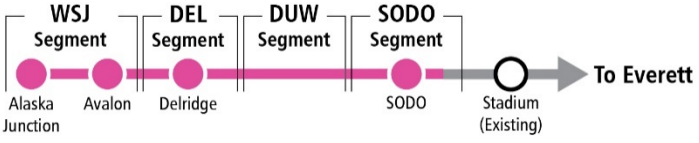
- Sidewalk on the west side of Delridge Way Southwest north of Andover Street for Alternative DEL-5 and Alternative DEL-6*
- South side of Southwest Dakota Street between 25th Avenue Southwest and Delridge Way Southwest for Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, and Option DEL-2b*

Sound Transit would work with the City of Seattle on potential strategies to improve the pedestrian experience if the M.O.S. is constructed. Sound Transit would fund improvements to mitigate these impacts. These may include widened sidewalks or new walkways to accommodate the additional demand, as well as associated treatments that may be required for safe operations such as crosswalks, curb bulbs, and pedestrian signals. Final mitigation would be determined and agreed upon by Sound Transit and the City of Seattle and may include Sound Transit contributing a proportionate share of costs to improve facilities based on the project's proportionate ratio of trips at the affected location or another equitable method.

The West Seattle Link Extension may also have direct physical impacts to existing sidewalks and trails due to placement of guideway columns in the Duwamish and Delridge segments, and several streets in the Delridge and West Seattle Junction segments would be permanently closed potentially eliminating pedestrian and bicycle access at those locations. As the project design is refined and potential column locations are identified with greater precision, additional pedestrian and bicycle visibility issues may emerge. These visibility issues could be mitigated with measures such as protected vehicle turns or restricting vehicle movements.

Sound Transit would rebuild affected non-motorized facilities to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020] and the Seattle Land Use Code and Light Rail Facility Construction and Construction Impacts sections of the Seattle Municipal Code) or to a standard agreed to by Sound Transit and the City of Seattle.

As the project design advances, if it is determined that a facility could not be rebuilt to applicable design standards and an alternate design cannot be agreed upon in the original location, Sound Transit would work with the City of Seattle to develop mitigation, such as an alternate route.



3.8 West Seattle Link Extension Affected Environment and Impacts during Operation – Safety

This section summarizes the existing study area safety and collision data for arterials and local streets within approximately one block (330 feet) of the project alignment. This section describes the potential future vehicle and non-motorized safety impacts (increases or decreases in collisions) for the Build Alternatives compared to the No Build Alternative.

The City of Seattle's safety initiative, Vision Zero, aims to eliminate all traffic deaths by 2030. This section considers the high crash corridors included in the Vison Zero corridor prioritization that are within the West Seattle Link and Ballard Link extension study areas. Vision Zero high crash corridors represent the top 100 arterial corridor segments where collisions occur most frequently, while also accounting for roadway characteristics and traffic volumes.

3.8.1 Affected Environment

Several roadways along the West Seattle Link Extension corridor are identified as high crash corridors in Seattle Department of Transportation's *2017 Vision Zero Progress Report* (City of Seattle 2017c).

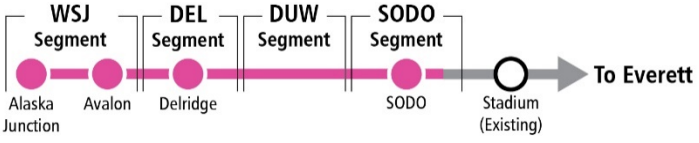
For the 2017 to 2018 period, 35th Avenue Southwest was identified as a priority location, with some improvements, such as reduced speed limits, having already been implemented. In addition, Delridge Way Southwest, Southwest Avalon Way, Fauntleroy Way Southwest, 4th Avenue South, 6th Avenue South, and California Avenue Southwest are corridors in the West Seattle Link Extension area identified as high crash corridors within the Vision Zero corridor prioritization. There are currently no planned, committed safety improvement projects at these locations. However, the 35th/Avalon Paving Project recently made improvements along Southwest Avalon Way, including adding protected bike lanes and spot parking removal, which are likely to reduce collisions and/or severity.

The roadway segments and intersections adjacent to the project alternatives that historically experience the highest crash frequencies are summarized in Appendix N.1, Transportation Technical Report.

3.8.2 Environmental Impacts of the No Build Alternative

The transportation safety performance with the No Build Alternative is expected to be similar or better than the existing conditions as the City of Seattle completes transportation (including Vision Zero) projects within the corridor, along with modest background traffic volume growth expected by year 2042.

Transportation projects in the study area assumed to be completed include the RapidRide H Line project and the Fauntleroy Way Southwest Boulevard project, as well as planned bike and greenway projects. The City of Seattle routinely prepares Vision Zero progress reports to assess previous projects and identify prioritized locations for future projects. Therefore, it is expected that beyond the specific projects identified above, the City of Seattle would implement additional projects in the future to improve the safety of the transportation system in the study area prior to the project being built.



3.8.3 Environmental Impacts of the Build Alternatives

3.8.3.1 Impacts Common to All Alternatives

While most of the West Seattle Link Extension alignment would be adjacent to or along City of Seattle-designated high crash corridors, the safety of the transportation system is expected to be minimally affected by the project or improve because of the following:

- Light rail alternatives that would all be grade-separated and operate in exclusive rights-of-way, with no new direct conflicts with vehicles, pedestrians, or bicyclists
- Light rail design that adheres to both light rail and roadway standards to minimize impacts on transportation safety
- People shifting to ride transit where they would otherwise use other travel modes
- Reduction in modal conflicts on the transportation system (such as rail-to-rail transfer activity within the station)
- Station access improvements (such as proposed signaled crossings)

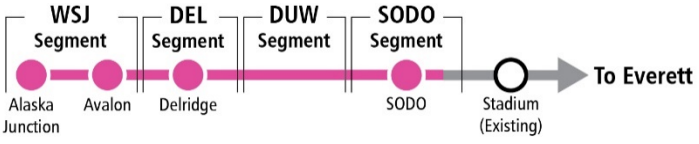
Overall, the WSBLE would shift some trips from driving or taking another non-transit mode to using transit, resulting in a potential reduction of approximately 117,000 vehicle miles traveled per day in the region. A mode shift where people use transit and travel less by car would have an inherent safety benefit because fewer collisions would be expected.

All of the stations are expected to experience only small increases in daily vehicle traffic around the station under typical conditions, suggesting that the impact to vehicle safety would be negligible around stations. The light rail design would adhere to both light rail and roadway standards to minimize impacts on transportation safety. Although pedestrian and bicyclist activity is expected to increase (between 400 to 2,500 daily pedestrian and bicyclists) around each station, the increase in conflicts is relatively small compared to the number of existing conflicts experienced in these dense and often already congested pedestrian and bicyclist areas. While this increase in activity would create the potential for more conflicts near stations, Sound Transit is proposing pedestrian and bicycle improvements adjacent to the stations to ensure access is at signalized or controlled locations and, in some instances, grade-separated crossings. Beyond the station improvements, increased non-motorized activity can also improve driver expectations (i.e., drivers expecting pedestrians and bicyclists to be present) and reduce collision severity because of reduced speeds. All stations would be designed to include appropriate non-motorized facilities to accommodate this expected level of activity and would be coordinated with the City of Seattle.

3.8.3.2 SODO Segment

The proposed South Lander Street overcrossing would separate the proposed and existing light rail tracks from traffic along South Lander Street with Preferred Alternative SODO-1a and Option SODO-1b, avoiding future conflicts at that intersection and removing the rail conflicts with crossing vehicles, pedestrians, and bicyclists that currently exist. This would improve safety for all modes in this area.

With Alternative SODO-2, the elevated guideway for the West Seattle Link Extension would be grade-separated from the roadway. No portion of the guideway would be within the roadway



and it would not impact vehicle safety. This alternative would be elevated over South Lander Street and would not create any additional at-grade rail crossings. However, the existing at-grade rail signalized crossing at South Lander Street would continue to occur.

3.8.3.3 Duwamish Segment

None of the alternatives would affect vehicular or non-motorized safety in the Duwamish Segment, as the guideway would be elevated, grade-separated, and outside of the roadway for the entirety of the segment. The project would ensure adequate lateral clearance from the guideway columns to any travel lanes.

3.8.3.4 Delridge Segment

The guideway would be outside of or adjacent to the roadway in this segment except for a couple of locations where the elevated guideway switches from one side of the roadway to the other side. This would include a guideway column in the median of Southwest Genesee Street for Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, and Option DEL-2b*. The project would ensure adequate lateral clearance to any travel lanes, including to and from the Nucor Steel property, to minimize any impact.

With Alternative DEL-5 and Alternative DEL-6*, a new pedestrian signal would be added on Delridge Way Southwest at 23rd Avenue Southwest to provide a protected crossing for riders transferring between light rail and bus. This would improve pedestrian access and safety but also have the potential to increase rear-end collisions.

3.8.3.5 West Seattle Junction Segment

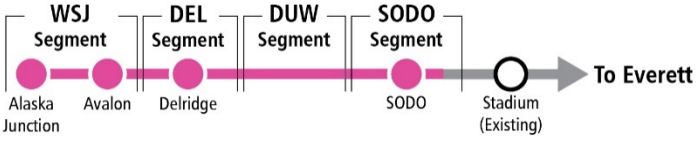
The Avalon and West Seattle Junction stations are expected to experience small increases in daily vehicle traffic around the stations with an expected negligible impact to vehicle safety.

Portions of the Preferred Alternative WSJ-1 elevated guideway would travel along Fauntleroy Way Southwest and would cross other roadways in several locations. The placement of the guideway columns would adhere to roadway standards and be outside of the vehicle travel lanes, resulting in little to no impact on safety in this segment.

There would be an increase in pedestrian and bicycle volumes around the Alaska Junction Station with all of the alternatives. This is likely to increase the already dense pedestrian activity in the West Seattle Junction area and the potential for conflicts around the station area. The Alaska Junction Station with Preferred Alternative WSJ-1 is not located along the arterial streets in this area, which would concentrate the station pedestrian and bicycle activity away from the higher vehicle volumes on Southwest Alaska Street and California Avenue Southwest.

Preferred Alternative WSJ-2 is located closer to the major arterials (Fauntleroy Way Southwest and Southwest Alaska Street) and may have greater potential for conflicts between modes.

All other alternatives (i.e., Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5*) would have similar transportation safety conditions to Preferred Alternative WSJ-1 near the station. However, these tunnel alternatives would not have any columns or other physical roadway impacts.



3.8.4 Mitigation for Operation Impacts

The West Seattle Link Extension project includes roadway, transit, and pedestrian and bicyclist improvements and associated potential mitigation around the stations, including some grade-separated facilities to reduce conflicts, increase visibility between modes, and reduce congestion for the impacted modes. For the West Seattle Link Extension, these project elements and potential mitigation are described in the sections for transit (Sections 3.4.4 and 3.11.6.1), arterials and local streets (Sections 3.5.4 and 3.11.6.2), and non-motorized facilities (Sections 3.7.4 and 3.11.6.4). Beyond these improvements, the project would operate in exclusive right-of-way, separated from other modes of travel, and would be built to applicable design standards, such as those that determine the placement of guideway columns; therefore, no further mitigation specific to safety-related impacts is proposed.

3.9 West Seattle Link Extension Affected Environment and Impacts during Operation – Navigation

This section discusses how the WSBLE Project would affect navigation on navigable waterways in the West Seattle Link Extension.

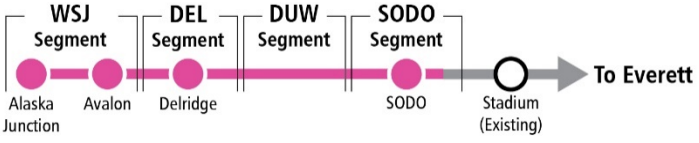
Navigable Waterways

The term navigable waterways generally refers to waterbodies that are subject to tidal influence, waterways with a history of substantial commercial navigation, waterways that presently have commercial navigation, or waterways susceptible to commercial development.

The United States Coast Guard has primary permitting authority related to navigation. The Coast Guard approves the locations and clearances of bridges through the issuance of bridge permits under the authority of Section 9 of the Rivers and Harbors Act, the General Bridge Act of 1946, and other statutes. A bridge permit is required for new construction, reconstruction, or modification of a bridge or causeway over navigable waters of the United States. The Coast Guard issues bridge permits after confirming that the other federal approvals described below have been issued.

The United States Army Corps of Engineers also has regulatory authority under Section 10 and Section 14 of the Rivers and Harbors Act of 1899. Section 10, codified in 33 United States Code Section 403, allows the Army Corps of Engineers to require a permit for any construction, not just bridges, that would affect navigable waters. Section 14, codified in 33 United States Code Section 408 and referred to herein as Section 408, requires the Army Corps of Engineers to review and approve proposed modifications to federally authorized Public Works projects to ensure that such proposed activities would not be injurious to the public interest or impair the usefulness of a federally authorized project. Federally authorized Public Works can include navigation Projects to improve the nation's waterways. Together, both agencies provide safe, reliable, and efficient waterborne transportation systems (e.g., channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.

In addition to this Draft Environmental Impact Statement, Sound Transit prepared a navigation impact report for the Duwamish Waterway to support the United States Coast Guard bridge permitting process.



3.9.1 Affected Environment

The study area for navigation analysis includes navigable waterways within 3 miles of the bridges across the Duwamish Waterway (also known as the Duwamish River) associated with the West Seattle Link Extension Build Alternatives. The Duwamish Waterway is the only navigable waterway that would be crossed by the West Seattle Link Extension. The industrialized portion of the Duwamish Waterway extends about 6 miles upstream from Elliott Bay and encompasses three segments: the West and East waterways on either side of Harbor Island and the Lower Duwamish Waterway upstream/south of Harbor Island. The waterways are shown on Figure 3-7.

3.9.1.1 Waterway Users

Because the Duwamish Waterway has a primarily industrial and commercial shoreline, tugboats, barges, and cargo boats make up a large portion of the vessels that use it. Recreational pleasure boat traffic on the Duwamish Waterway occurs year-round, but typically peaks in the summer months. Most recreational traffic occurs as vessels make their way to and from their berths on the Duwamish Waterway.

The Muckleshoot Indian Tribe is signatory to both the Treaty of Point Elliott and the Treaty of Medicine Creek. The Muckleshoot Indian Tribe has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes the Duwamish Waterway. The Suquamish Tribe of the Port Madison Reservation (Suquamish Tribe) is signatory to the Treaty of Point Elliott and has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes the Duwamish Waterway. Tribal fishing boats operate on the waterway, and the Tribal fishermen place fishing gear in traditional fishing locations. Tribal treaty-protected fishing peaks in mid- to late summer through late fall during annually established salmon and steelhead fishing seasons. The Muckleshoot Indian Tribe Fisheries Division enforcement vessels dock in the study area at Harbor Island Marina.

The Army Corps of Engineers uses vessels such as a workboat with a crane or a standard clamshell dredge to maintain navigation channels by clearing debris and dredging. Barges may also be used to remove dredged material from the waterway, and other Army Corps of Engineers vessels are used for hydrographic surveys to map the navigation channels.

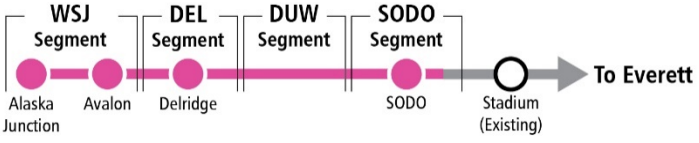
The Seattle Police Harbor Patrol is located on the north shore of Lake Union. While the headquarters and boat docks are outside the study area, the Seattle Police Harbor Patrol operates on waterways within the study area, including Elliott Bay and the Duwamish Waterway. They provide marine law enforcement, rescue, fire response, and assistance.

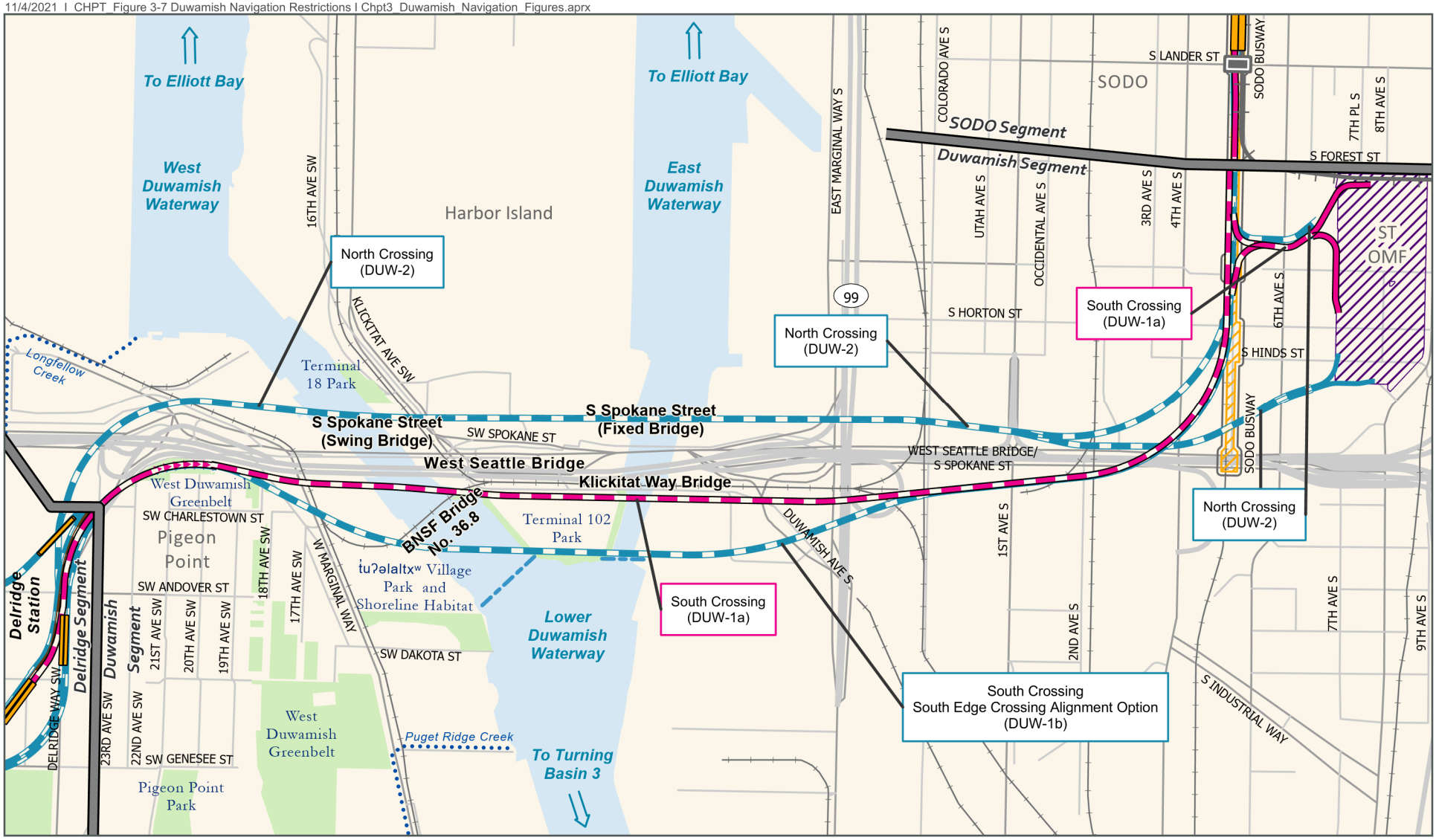
3.9.1.2 Existing Vertical Clearances, Horizontal Clearances, and Hazards

Navigation Channel

A navigation channel is a deeper channel cut into a river bed to enable larger vessels to pass through to a port.

The Duwamish Waterway includes two navigation channels maintained by the Army Corps of Engineers: one consists of the West Waterway and the Lower Duwamish Waterway and the other consists of the East Waterway between Elliott Bay and the Spokane Street (fixed) Bridge. Because these navigation channels are maintained by the Army Corps of Engineers, they are considered federal navigation projects subject to Section 408 requirements. Areas outside of the navigation channels are also used by vessels to access local facilities and maneuver, hold, or avoid other vessels.





Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New

- Segment Line
- Existing Link Light Rail
- Railroad
- SODO Busway
- Proposed Overpass
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Piped Stream
- Park
- Duwamish Waterway Break

FIGURE 3-7
Key Restrictions to Navigation, Duwamish Waterway
West Seattle Link Extension - Duwamish Segment
West Seattle and Ballard Link Extensions

0 800 1,600 Feet
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When traveling from Elliott Bay, vessels can enter either the East or West waterways. In the East Waterway, vessels are unable to pass the Spokane Street (fixed) Bridge, as it is a considered an obstruction to navigation (National Oceanic and Atmospheric Administration 2019), with a vertical clearance of 5 feet. In the West Waterway, vessels are restricted by the 140-foot-vertical and 150-foot-horizontal clearances of the West Seattle Bridge.

The Duwamish Waterway is tidally influenced. Some vessels must wait for certain tides to travel under the West Seattle Bridge, either sailing on a lower tide to meet the vertical clearance or sailing on a higher tide to have enough draft within the navigation channel. Other existing hazards to navigation include shoaling (sediment accumulation that creates shallow areas) at the edge of the navigation channels, submerged obstructions, and minimal room outside of the navigation channels to maneuver, hold, or avoid other vessels.

Climate change projections suggest that sea level rise is very likely to affect the water level of the Duwamish Waterway. Under a high emissions scenario (Representative Concentration Pathway 8.5), there is a 17 percent probability that sea level rise will exceed 3 feet and a 1 percent probability that it will exceed 5 feet by the year 2100 (Miller et al. 2018). An increase in water levels would correspondingly result in a reduction of vertical clearances under all bridges, which may limit the vessels that can travel through this area.

There are existing structures on the Duwamish Waterway that create horizontal or vertical restrictions to navigation. Key existing restrictions to navigation are listed in Table 3-12. Additional restrictions on the Duwamish Waterway are provided in Appendix N.1, Transportation Technical Report.

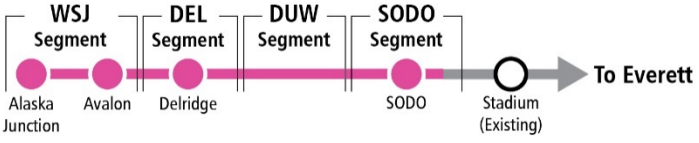
Guide Clearances

Guide Clearances are defined as the navigational clearances established by the United States Coast Guard for a particular navigable water of the United States that will ordinarily receive favorable consideration under the bridge permitting process as providing for the reasonable needs of navigation.

The United States Coast Guard has established guide clearances for the West Waterway of a vertical clearance of 140 feet for fixed bridges and a horizontal clearance of 250 feet for all types of bridges, but has not established guide clearances for the East Waterway.

Table 3-12. Key Existing Restrictions to Navigation on the Duwamish Waterway

Structure	Approximate Rivermile	Type/Use	Vertical Clearance Closed/Open (feet) [a]	Horizontal Clearance Closed/Open (feet) [b]	Channel Depth (feet)	Waterway Width (feet) [c]
West Waterway: West Seattle Bridge	1.36	Fixed/road	140	150	42	450
West Waterway: Spokane Street (swing) Bridge	1.33	Moveable (swing)/road	44/unrestricted	250	42	450
West Waterway: BNSF Railway Bridge (Bridge No. 36.8)	1.45	Moveable (single-leaf bascule)/rail	7/unrestricted	150	43	400
East Waterway: Spokane Street (fixed) Bridge	1.31	Fixed/road	5	90	Unknown	390
East Waterway: Klickitat Way Bridge [d]	1.38	Fixed/road and rail	7	48	11	390



Sources: National Oceanic and Atmospheric Administration 2019, United States Army Corps of Engineers 2020a, 2020b, and 2020c.

[a] Vertical clearance in feet above mean high water; refers to the lowest clearance of the cable or bridge.

[b] Horizontal clearance refers to the width between bridge fenders or bridge protection on either side of a bridge opening.

[c] Width based on approximate measurements using Google Earth imagery.

[d] The Klickitat Way Bridge across the East Waterway includes two structures for the railroad tracks and one for the two-lane roadway. However, this report considers the structures to be one bridge because they are intricately connected by metal grating and have the same vertical and horizontal clearances.

3.9.2 Environmental Impacts of the No Build Alternative

Under the No Build Alternative, light rail would not be extended to West Seattle and the potential impacts on navigation identified for the Build Alternatives would be avoided. Navigation on the Duwamish Waterway would continue as it does today.

3.9.3 Environmental Impacts of the Build Alternatives

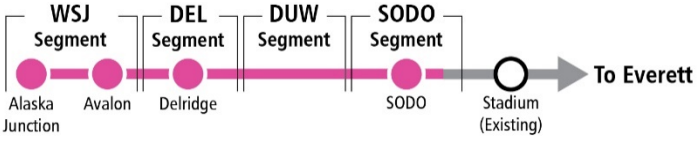
3.9.3.1 Impacts Common to All Alternatives

Sound Transit evaluated impacts to navigation on the Duwamish Waterway. This includes the Army Corps of Engineers-maintained navigation channels and areas outside of the navigation channels that vessels use to access local docks. Impacts to moorage are also identified. Displacement of water-dependent businesses and related economic impacts and mitigation are described in Chapter 4.

All alternatives would cross the East and West waterways near existing restrictions. For the West Waterway, all alternatives would meet or exceed the existing United States Coast Guard guide clearances of 140-foot vertical clearance and 250-foot horizontal clearance. All vessels that currently travel under the West Seattle Bridge and through the area could continue to do so.

Outside of the Army Corps of Engineer-maintained navigation channels, the alternatives would create a new vertical clearance immediately under the guideway of approximately 115 to 140 feet, depending on the alternative. The projected 3- to 5-foot increase in the Duwamish Waterway water levels would correspondingly reduce vertical clearances under the existing structures and the proposed alternatives.

Sound Transit is evaluating the feasibility of several high-level fixed bridge types to cross the Duwamish Waterway, as described in Chapter 2. Some bridge types could require guideway columns in the water. All columns would be outside of the Army Corps of Engineers-maintained navigation channel in the West Waterway, but could still affect vessel movements. In the West Waterway, a new light rail bridge would be a fourth bridge in a relatively short stretch of water. A bridge type with in-water guideway columns would require vessels to set up to travel through the bridges earlier and to hold their course longer in a relatively narrow channel. Along the West Waterway, the areas available for holding or maneuvering outside of the navigation channel are already relatively narrow. An additional in-water guideway column and pier protection would further constrain these areas. Increased interaction with Puget Sound Vessel Traffic Services may be needed during times with heavier vessel traffic (typically Wednesdays and Fridays and



daily around 7 a.m. and 5 p.m.). Vessel congestion could potentially extend north into the West Waterway and south into the open area upstream of the Harbor Island Marina.

Bridge types with guideway columns and associated pier protection in the water could affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas. Bridge types with guideway columns and associated pier protection in the water could also affect Suquamish Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas.

3.9.3.2 Preferred South Crossing Alternative (DUW-1a)

Preferred Alternative DUW-1a would cross over a portion of the East Waterway that does not include an Army Corps of Engineers-maintained navigation channel and is in close proximity (about 40 feet) to the Spokane Street (fixed) Bridge, which is a considered an existing barrier to navigation.

The portion of the East Waterway where Preferred Alternative DUW-1a would cross is primarily used by vessels to access the Harbor Island Marina commercial dock. The horizontal clearance under the guideway would not change, and the vertical clearance under the guideway would be approximately 115 feet. This is not anticipated to affect the vessels that use the dock because they are primarily tugs and work boats that require less than 115 feet of vertical clearance.

3.9.3.3 South Crossing South Edge Crossing Alignment Option (DUW-1b)

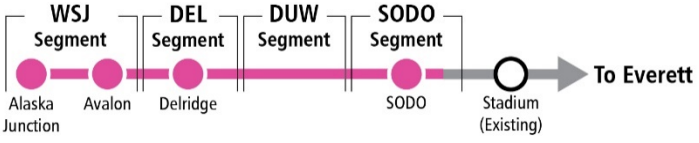
Option DUW-1b would have similar impacts to the East Waterway as Preferred Alternative DUW-1a. However, the vertical clearance under the guideway would be slightly higher, at approximately 125 feet.

Option DUW-1b would reduce moorage in the Duwamish Waterway by removing recreational marinas and docks. The amount of recreational moorage that would be removed from the Duwamish Waterway represents about 20 percent of what is currently available. Due to the percentage of moorage being displaced, many recreational boaters are unlikely to find replacement moorage nearby on the Duwamish Waterway or in Elliott Bay.

3.9.3.4 North Crossing Alternative (DUW-2)

Alternative DUW-2 is over an Army Corps of Engineers-maintained navigation channel (a Public Work subject to Section 408 review and approval process) that spans the entire width of the East Waterway. The vertical clearance under the guideway would be about 100 feet over the navigation channel. The horizontal clearance under the guideway would be about 315 feet wide, approximately 75 feet less than the current horizontal clearance. Alternative DUW-2 would be approximately 150 feet north of the Spokane Street (fixed) Bridge, which is a considered a barrier to navigation. Sound Transit would coordinate with the Army Corps of Engineers regarding the East Waterway federal navigation Projects as part of the permission process pursuant to Section 408.

This area is primarily used by vessels to access maritime businesses and includes a dock. Vessels that currently use this area typically require about 75 feet of vertical clearance; therefore, the vertical clearance of DUW-2 is not anticipated to effect current uses. However, the



change in horizontal clearance could affect vessel movements by reducing the area available for navigation and maneuvering in this section of the waterway.

3.9.4 Mitigation for Operation Impacts

During final design and the bridge permitting process, Sound Transit would determine mitigation actions in coordination with the Muckleshoot Indian Tribe, the Suquamish Tribe, and the United States Coast Guard. This would include identifying specific aids to navigation, such as signage and lighting.

3.10 West Seattle Link Extension Affected Environment and Impacts during Operation – Freight Mobility and Access

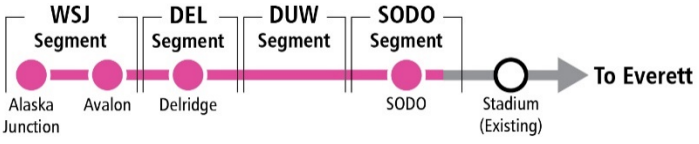
This section describes the freight transportation system within 0.5 mile of the light rail alternatives, including the facilities and operations for truck and rail and how the Build Alternatives could affect this system during project operation. Section 9, Freight Mobility and Access, in Appendix N.1 provides additional details regarding the elements described in this section. The marine freight network and permanent long-term operation impacts are described in Section 3.9, West Seattle Link Extension Affected Environment and Impacts during Operation – Navigation, and temporary construction impacts are described in Section 3.11.1.6. The assessment of freight mobility and access in this section addresses direct impacts from the project.

The City of Seattle's designated truck network (City of Seattle 2016) identifies many streets and arterials based on their function for freight. The City also has two regulatory networks related to heavy and over-dimensioned freight: the Heavy Haul Network, which allows heavy freight to use some streets in the vicinity of the Port's container terminals, and the Over-Legal Network (City of Seattle 2016), which accommodates loads up to 20 feet high and 20 feet wide. The City has also identified access routes to major Port of Seattle cargo terminals as Seaport Highway Connectors and Seaport Intermodal Connectors.

3.10.1 Affected Environment

Streets that are part of the designated truck network are most concentrated in the SODO and Duwamish segments, which are within the Duwamish Manufacturing/Industrial Center. The Port of Seattle's Terminal 5 and Terminal 18 are located in the Duwamish Segment and are served by truck and rail. These two strategic container terminals are operated by the Northwest Seaport Alliance as part of the Puget Sound Gateway.

On-street truck-only load zones, commercial vehicle load zones, and general load zones serve local business deliveries. Truck-only load zones are the most restrictive and allow only vehicles that are licensed as trucks. Commercial vehicle load zones allow a broader range of vehicles but still require specific licensing or commercial permits. They are most commonly located in Seattle's business districts. Some areas also have general load zones that allow any type of vehicle. Load zones are located in all of the segments within the West Seattle Link Extension study area. Long-term and overnight truck parking is allowed in Seattle Industrial Zones (Seattle



Municipal Code 11.72.070), which include areas in the SODO, Duwamish, and Delridge segments. There is also an overnight truck parking lot at Terminal 25 that is discussed in Section 3.11.3.3, Parking.

Seattle is served by two Class I railroads: BNSF Railway and Union Pacific Railroad. The BNSF Railway mainline passes through the Duwamish and SODO segments and continues north. The Union Pacific mainline is located south of South Spokane Street. Both railroads have major intermodal transfer hubs in the Duwamish Segment. There are local rail spurs throughout the Duwamish Segment, including lead tracks located just south of South Spokane Street that serve industries and on-dock rail yards on Harbor Island and in West Seattle and spur tracks along the SODO Busway that serve local businesses.

3.10.2 Environmental Impacts of the No Build Alternative

The truck and rail system in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.10.3 Environmental Impacts of the Build Alternatives

3.10.3.1 Impacts Common to All Alternatives

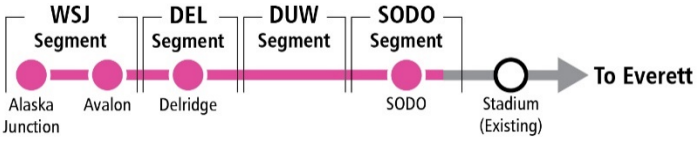
All of the Build Alternatives would be designed to retain clearance envelopes for truck streets, including those designated for over-legal loads. They would also retain horizontal and vertical clearance requirements for railroad tracks. None of the alternatives would permanently remove truck-only load zones, commercial vehicle load zones, or general load zones because they would be relocated as necessary.

3.10.3.2 SODO Segment

Preferred Alternative SODO-1a and Option SODO-1b would build a new vehicle overpass over the existing and future light rail tracks at South Lander Street, which is a Major Truck Street. The vehicle overpass would be designed to accommodate trucks and would eliminate truck delays caused by the existing light rail crossing. The overpass for Preferred Alternative SODO-1a could affect access for the adjacent United States Postal Service Carrier Annex/Terminal Post Office garage that serves trucks. Alternative access for this garage is provided on 4th Avenue South. Alternative SODO-2 would not have an overpass at South Lander Street, and the new light rail track would be elevated above South Lander Street. However, the existing Link light rail track would remain at-grade, and trucks would continue to experience short-duration delays when light rail trains cross South Lander Street.

Preferred Alternative SODO-1a would permanently eliminate about 14 load zone spaces along 5th Place South, South Bayview Street, and South Lander Street to accommodate the new station and vehicle overpass. Option SODO-2 would eliminate three load zones. The other alternatives would not affect commercial load zones.

Spur tracks along the SODO Busway north of Forest Street would be removed for all alternatives but would remain south of Forest Street. No other impacts to the rail network are expected.



3.10.3.3 Duwamish Segment

None of the Duwamish Segment alternatives would have structures within the public street system or Port of Seattle terminals that would affect traffic or truck operations, including over-legal trucks. All alternatives would cross several major rail facilities but would have no long-term effects on rail operations. The alternatives would retain the existing local rail spurs located along both sides of the alignment south of South Forest Street. No commercial load zones in this segment would be eliminated with any alternative.

3.10.3.4 Delridge Segment

None of the Delridge Segment alternatives would affect the truck or rail system. No commercial load zones would be affected.

3.10.3.5 West Seattle Junction Segment

None of the West Seattle Junction Segment alternatives would affect the truck or rail system. No commercial load zones would be affected.

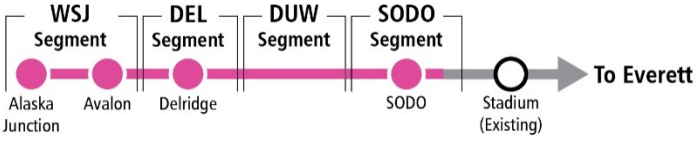
3.10.4 Mitigation for Operation Impacts

None of the West Seattle Link Extension alternatives would have long-term freight impacts that require mitigation during light rail operations.

As part of the parking mitigation, Sound Transit would coordinate with the City of Seattle to manage curb use in the station vicinities. This would include locating commercial vehicle and truck-only load zones to service business needs.

3.11 West Seattle Link Extension Construction Impacts

This section describes the transportation short-term (construction) impacts for the West Seattle Link Extension. This section is organized into impacts on the project as a whole and on its individual segments, with a discussion of each transportation element within each segment. See Sections 3.4 through 3.10 for information on the long-term transportation impacts of the Build Alternatives. An overview of the methodology and assumptions used to analyze the short-term construction transportation impacts of the project is included in Section 3.2, Introduction and Methodology and Assumptions, and described in further detail in Attachment N.1A of Appendix N.1, Transportation Technical Report. Except where noted, the sequencing of construction activities was not assessed for the Draft Environmental Impact Statement, and some of the impacts described in this section may occur simultaneously. More detailed construction planning including sequencing will be provided in later project phases once the design is advanced. See Tables 3-13 through 3-15 for key roadway construction closures by segment. Attachment N.1E, Construction-Related Roadway Modifications, in Appendix N.1 provides a list of key roadway construction closures, including extents and durations.



3.11.1 Impacts Common to All Alternatives

3.11.1.1 Arterial and Local Street Operations

For arterial and local street operations, the construction impacts describe the truck traffic and haul routes associated with the project's construction, property access impacts, roadway closures and, where appropriate, traffic modeling of certain construction impacts.

3.11.1.1.1 Haul Routes and Construction Traffic

To construct the West Seattle Link Extension, Sound Transit would primarily use the City of Seattle's Major Truck Streets (see Sections 9.2.1 and 9.3.1 in Appendix N.1 for the City's Major Truck Streets) and the Washington State Department of Transportation's (WSDOT's) Interstate and State Route facilities, including Interstates 5 and 90 and State Routes 99, 509, 519, 599, and 520. These routes would be used for construction vehicle access to and from the alignments. Some oversize construction vehicles may need to use designated alternative routes.

Certain construction areas are not served by these state and city major truck routes, so additional streets would be required to access construction areas. These streets would be limited to arterials or larger whenever possible but would sometimes need to include local streets to access construction areas not on the arterial street system. West Seattle Link Extension construction areas where local streets would be necessary for access include the vicinity of Pigeon Point, at elevated and tunnel stations, and at the tunnel portals in Delridge and West Seattle Junction.

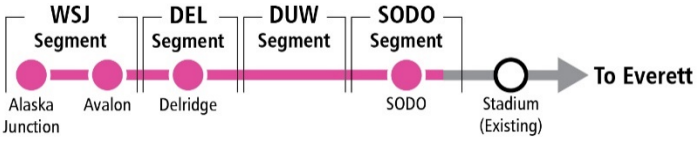
Consistent with City of Seattle regulations, construction and construction traffic management plans (including haul routes) would be prepared in consultation with the City of Seattle during final design and construction.

Over the duration of the construction period, the major construction activities would be associated with the station construction, tunneling, and constructing the elevated guideway or bridges. These activities would require between 10 and 35 trucks per hour; with bridge construction and tunnel excavation generating the highest truck activity (20 to 35 trucks) within that range.

3.11.1.1.2 Property Access, Roadway Impacts, and Detour Routes

Construction for each alternative would require road and lane closures that could also affect transit, freight, and non-motorized travel, as addressed later in this section. In general, detour routes would be along arterials, where feasible, to discourage traffic on local and collector streets through neighborhoods. Detour routes would be determined during the final design phase and in coordination with the City of Seattle and contractor. Project-related roadway closures could increase traffic congestion on detour routes or other roadways where volumes are increased as a result of the closures.

This section identifies major roadway and lane closures, generally defined as a full or partial closure of roadways for at least 1 year that would affect vehicle, people, and property access on these roadways. Some shorter-term (less than 1 year) closures are also described, as appropriate, to explain the breadth of the construction activities within a segment. See Attachment N.1E in Appendix N.1 for a more complete list of the roadway construction closures



expected for each alternative. Additional road or lane closures may be needed for utility relocation, which will be determined during final design in coordination with the utility owner.

For extended (over 1 year on key arterial streets) closures, an assessment of the traffic impacts was performed. Traffic diverting to adjacent roadways is likely with many of these closures. In these situations, the assessment identifies streets where there could be additional congestion as a result of the construction activities. Further information on this is provided in Attachment N.1E in Appendix N.1.

If property access is restricted, temporary alternate access, if feasible, to these properties would be provided. If alternative access is not available, then the specific construction activity would be reviewed to determine whether it could occur during nonbusiness hours.

3.11.1.2 Transit

Construction activities for the West Seattle Link Extension could affect transit in the following ways:

- Impacts to transit infrastructure and facilities, as well as their access
- Transit service and route impacts due to roadway closures

3.11.1.2.1 Transit Infrastructure and Facilities Impacts

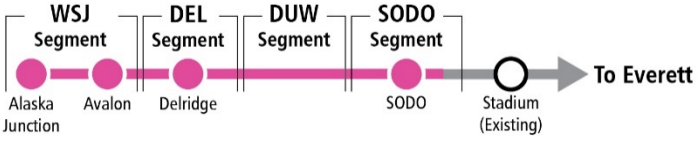
Road, lane, and sidewalk closures would require bus stop and layover relocations, bus service detours, or both during construction. Sidewalk and bicycle lane closures would also affect pedestrians and cyclists accessing transit. Specific transit facilities that are expected to be affected by construction for at least 1 year are described in the segment-specific sections that follow.

3.11.1.2.2 Roadway Closures

During construction, current bus routes would be affected at some locations along the corridor. Bus reliability could potentially degrade along streets with project construction activities due to lane closures and other construction-related activity. For areas with construction within the roadway right of-way, streets may operate with fewer lanes or be completely closed, affecting roadway operations including bus service along those streets.

In locations where roadways experience full closure, bus routes may need to use alternate pathways and temporary bus facilities may need to be installed. Depending on the condition of the alternate pathways, pavement damage could occur as a result of the longer-term transit reroutes. In general, project alternatives constructed outside the roadway right-of-way would have minimal impacts on bus routes, although some pedestrian and bicycle access to transit routes may be temporarily affected.

Detailed descriptions of the roadway closures affecting transit during construction are provided in each of the Arterial and Local Street Operations sections of Section 3.11. See Attachment N.1E in Appendix N.1 for a more detailed list of the roadway construction closures expected for each alternative.



3.11.1.3 Parking

Potential temporary parking impacts during construction are described in the following sections for each segment. The temporary parking impacts are in addition to parking that is permanently removed as described in Section 3.6.3 or lost through property acquisition. Table 3-11 in Section 3.6.3.2 presents the potential parking temporarily removed during construction of the guideway and stations. Short-term removal of parking during night or weekend construction could be needed beyond those areas, depending on the construction activities. The known temporary parking removals are described further in the segment sections. With these temporary impacts, parking would be restored after construction is complete. Appendix N.1 details where parking would be removed for each alternative.

Because the West Seattle Link Extension segments are in urban areas where parking may be limited or require payment, Sound Transit expects that construction employee vehicles would be limited only to the number that could park within the construction staging area. Although construction workers could also park on local streets and arterials where parking is unrestricted, construction worker parking near designated construction staging areas could affect the nearby parking supply during heavy construction periods.

3.11.1.4 Non-motorized Facilities

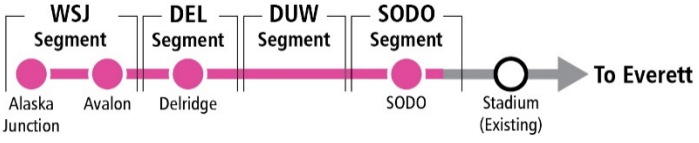
During light rail construction, construction activity within and along roadways (such as elevated guideway construction) would impact non-motorized travel modes. As part of these roadway closures, the construction activities could close sidewalks or reduce the sidewalk width within the construction areas, though Americans with Disabilities Act-compliant access would be maintained or detours provided. In some locations, crosswalks may be closed for construction, although they would remain open to the extent feasible. In accordance with Seattle Department of Transportation Director's Rule 10-2015, sidewalks and pedestrian paths would be kept open to the maximum extent possible; adjacent lane closures would be considered to create pathways around construction areas.

Although sidewalks or pedestrian paths that students use to reach schools may be affected during construction, no designated school crossings are expected to be affected. The project may result in Americans with Disabilities Act-accessible curb ramps temporarily being removed to accommodate the project construction. There could also be bicycle facility closures and reduced bicycle lane widths within or adjacent to construction areas. Some roadways may have full closures such that the roadway connection is eliminated; in those cases, pedestrians and bicycles would be rerouted to the next adjacent street, where feasible, to minimize out-of-direction travel.

The conditions described above could affect areas throughout the project corridor for a range of durations. Trails, bicycle lanes, greenways, signed bicycle routes, and non-street pedestrian throughways and stairways expected to be affected by construction or full roadway closures causing substantial barriers or out-of-direction travel for at least 1 year are described in the segment-specific Non-motorized Facilities sections of Section 3.11.2 through Section 3.11.5.

3.11.1.5 Safety

The potential roadway closures and traffic diversions during construction may increase traffic volumes and the potential for conflicts and collisions on adjacent streets and alternate routes.



However, the overall number of collisions in the area is not expected to substantially change as the total traffic volumes in the area would be similar.

In locations where there would be no physical change to the roadway (i.e., volume changes only), the types of collisions would likely remain similar to existing conditions. Currently, the majority of collisions in the study area are property damage only. Signing and advanced communication of any changes to travel patterns and detours would minimize the potential safety impacts and would be addressed in the Maintenance of Traffic Plan. The Maintenance of Traffic Plan will be developed based on the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* (2009) and Seattle Department of Transportation's *Traffic Control Manual* (2012).

Access modifications (such as right-in, right-out) and left-turn restrictions at intersections, such as along Delridge Way Southwest and Fauntleroy Way Southwest, would occur in the West Seattle Link Extension construction areas. This would reduce some vehicle conflicts along these roadways.

Some sidewalks, crosswalks, and bicycle facilities may be closed temporarily during construction. Detours would be provided where feasible and appropriately designed and marked to encourage compliance. This could temporarily modify trips to these other routes. Some closures may divert bicyclists away from dedicated facilities to shared facilities, and Sound Transit would coordinate with the City of Seattle to identify appropriate alternate facilities.

3.11.1.6 Navigation

Navigation is only applicable to the Duwamish Segment because there are no navigable waterways in the SODO, Delridge, and West Seattle Junction segments. See Section 3.11.3.6 for details.

3.11.1.7 Freight Mobility and Access

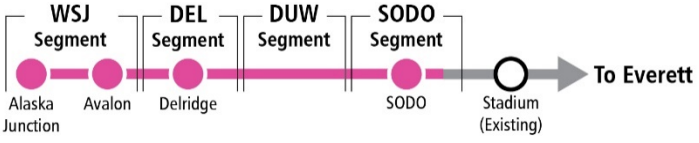
Construction activities for all Build Alternatives are expected to eliminate on-street load zones used by trucks and for business deliveries within the construction areas, particularly near stations. For many of those locations, adjacent businesses would also be acquired, which could limit the demand for the affected load zone.

3.11.2 SODO Segment

3.11.2.1 Arterial and Local Street Operations

As summarized in Table 3-13, Preferred Alternative SODO-1a and Option SODO-1b would close South Lander Street for construction of a new overpass of the existing and proposed light rail tracks. Closing South Lander Street would require detouring a substantial number of peak hour vehicle trips to other routes such as South Holgate Street and South Spokane Street, along with portions of 4th Avenue South, 6th Avenue South, and Airport Way South. Based on the predicted future volumes, the resulting traffic diversions could be adequately accommodated within the adjacent street system.

The SODO Busway closure during construction of Alternative SODO-2 would likely displace 60 to 80 buses total in the peak hour to either 4th Avenue South or 6th Avenue South, but would



not substantially affect general traffic conditions along these streets as these volumes are small relative to the peak hour general purpose traffic volumes. The permanent closure of the SODO Busway with Preferred Alternative SODO-1a and Option SODO-1b would occur at the beginning of construction and would have similar impacts during construction to those described under Alternative SODO-2. The permanent impacts of the SODO Busway closure are described in Section 3.5.3.3.2. Further information on the transit changes associated with the SODO Busway closure during construction is provided in Section 3.11.2.2.

Table 3-13. Key Construction Roadway Closures – SODO Segment, West Seattle Link Extension

Affected Street	Extents [a]	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
SODO Busway [c]	South Massachusetts Street to South Spokane Street	Permanently closed	Permanently closed	Full closure, 5 years
South Lander Street	4th Avenue South to 6th Avenue South	Full closure, 2 years [b]	Full closure, 3 years [b]	Full closure, nights/weekends

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.
[b] Includes short-term partial closures of intersections with 4th Avenue South and 6th Avenue South.
[c] While the full length of the SODO Busway includes portions of the Chinatown-International District and Duwamish segments, the SODO Busway closure is described only in the SODO Segment.

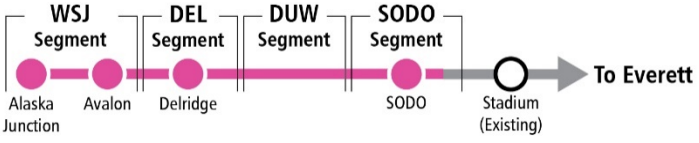
3.11.2.2 Transit

See Table 3-13 for details on key construction-related facility closures in the SODO Segment. Under Preferred Alternative SODO-1a and Option SODO-1b, the closure of South Lander Street between 4th Avenue South and 6th Avenue South would affect bus routes along South Lander Street. The SODO Busway would also be permanently closed to buses with these alternatives, with the closure occurring at the beginning of construction. Under Alternative SODO-2, South Lander Street would remain open, while the SODO Busway would be closed for the duration of construction.

Impacts on transit with the SODO Busway closed during construction would affect 60 to 80 peak hour Metro buses, including both revenue and non-revenue trips. The buses would likely shift to either 4th Avenue South or 6th Avenue South and would create additional travel time for buses in this segment. Section 3.4.3.1.2 describes the permanent effect of this closure on bus service.

3.11.2.3 Parking

Preferred Alternative SODO-1a would not temporarily remove additional on-street parking during construction. Option SODO-1b and Alternative SODO-2 could temporarily remove 15 to 20 on-street parking spaces during construction.



3.11.2.4 Non-motorized Facilities

For each alternative, the SODO Trail would be closed for the duration of construction between South Royal Brougham Way and South Forest Street. During that closure, pedestrians and bicycles would be detoured to 6th Avenue South or 4th Avenue South, with east-west access maintained at adjacent street crossings.

3.11.2.5 Safety

See Table 3-13 for details on key construction-related facility closures in the SODO Segment. With Preferred Alternative SODO-1a and Option SODO-1b, the South Lander Street closure would redistribute traffic to adjacent streets, increasing volumes on some roadways and decreasing volume on other roadways. This would likely have a mixed impact on traffic safety as collisions are related to traffic volumes. While specific streets may see a change in safety benefits or impacts (i.e., increase or decrease), it is likely that there would be negligible overall traffic safety impacts within the segment as the total volume in the area is not expected to substantially change.

However, the SODO Trail would be temporarily closed (see Section 3.11.2.4), requiring pedestrians and bicyclists to likely detour to 4th Avenue South or 6th Avenue South instead of to a multi-use facility, which would increase the potential for conflicts with vehicles.

3.11.2.6 Freight Mobility and Access

See Table 3-13 for details on key construction-related facility closures in the SODO Segment. Preferred Alternative SODO-1a and Option SODO-1b would require the temporary closure of South Lander Street during the construction of the new South Lander Street overpass. South Holgate Street would remain open and would likely be the primary diversion route for trucks. Alternative SODO-2 would not require long-term closure of South Lander Street.

Preferred Alternative SODO-1a does not affect additional load zones beyond the permanent removals. Option SODO-1b and SODO-2 would affect seven load zones during construction, which include four general load zones and three truck-only load zones on 5th Place South.

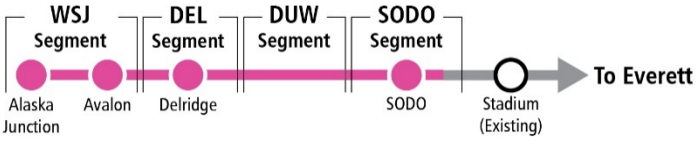
3.11.3 Duwamish Segment

3.11.3.1 Arterial and Local Street Operations

Road closures in the Duwamish Segment would include short-term (i.e., 9-month-or-less, including nights and weekends), partial, and full roadway closures for the guideway crossings over several city streets and State Route 99; see Attachment N.1E, Construction-Related Roadway Modifications, in Appendix N.1 for a complete list. Crossing over the West Seattle Bridge would also require night and weekend partial closures for each alternative.

3.11.3.2 Transit

Preferred Alternative DUW-1a and Option DUW-1b would have short-term partial closures of Delridge Way Southwest in the vicinity of the West Seattle Bridge ramps, which could affect Routes 50 and 125 and the RapidRide H Line.



3.11.3.3 Parking

Preferred Alternative DUW-1a and Option DUW-1b could temporarily remove 40 to 55 on-street parking spaces during construction. Alternative DUW-2 could temporarily remove 95 to 120 on-street parking spaces. Alternative DUW-2 would also temporarily affect the Terminal 25 truck parking lot, which can accommodate 142 truck tractors.

3.11.3.4 Non-motorized Facilities

Preferred Alternative DUW-1a and Option DUW-1b would require a detour of the Delridge Connector Trail to the West Seattle Bridge Trail during construction. Rather than running along the east side of Delridge Way Southwest, the trail could be rerouted along the 23rd Avenue Southwest pathway (starting at roughly Southwest Charlestown Street), connecting to the trail on the north side of the West Seattle Bridge. The staircase through the West Duwamish Greenbelt between Southwest Charlestown Street and Southwest Marginal Place would be closed during construction.

Under the North Crossing Alternative (Alternative DUW-2), construction of the guideway would close the portion of the Alki Trail just west of the Chelan Avenue Southwest/West Marginal Way Southwest/Southwest Spokane Street intersection. Although the current access to the crosswalk would be unavailable, travelers may use existing crosswalks farther to the west to connect to the West Seattle Bridge Trail and the Duwamish Trail.

3.11.3.5 Safety

The Duwamish Segment does not have any substantial construction closures associated with any of the Build Alternatives that would affect transportation safety in this segment.

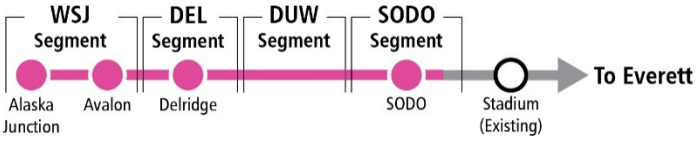
3.11.3.6 Navigation

3.11.3.6.1 Impacts Common to All Bridge Alternatives

Temporary work trestles may be installed in the West and East waterways to support the operation of heavy equipment. Temporary work trestles would be placed outside of the navigation channel. Barges would be required for material supply and would be moored outside of the navigation channels when possible. However, given the size of the barges, they are likely to encroach on the navigation channels, which are Section 408 resources.

All alternatives would result in the short-term closure of the East and West waterways for approximately 4 hours twice a week during bridge construction. The waterways would be closed because larger vessels and those constrained to the deep-draft channel may not have adequate horizontal clearance or water depth to pass the construction barges. West Waterway navigation channel closures would occur during installation of the bridge protection system, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks. In addition, all alternatives would result in two 12-hour closures of the East and West waterways to complete the center of each overwater bridge span. Sound Transit would coordinate with the Army Corps of Engineers regarding potential impacts to the Duwamish Waterway and East Waterway federal navigation projects as part of the permission process pursuant to Section 408 of the Rivers and Harbors Act.

Seattle Police Harbor Patrol response times to the Duwamish Waterway could be affected by temporary closures of the navigation channel and by increased waterway congestion during



construction. Sound Transit would coordinate with the Seattle Police Harbor Patrol prior to and throughout construction at key milestones or phases where navigation conditions could change.

The placement of temporary cofferdams, work trestles, and work barges may affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas for the duration of construction when Tribal treaty-protected fishing is occurring. These construction activities may also affect Suquamish Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas for the duration of construction when Tribal treaty-protected fishing is occurring. Construction activities may also change vessel traffic patterns, which could interfere with upstream and downstream Tribal treaty-protected fishing rights and access.

3.11.3.6.2 Preferred South Crossing Alternative (DUW-1a)

East Waterway

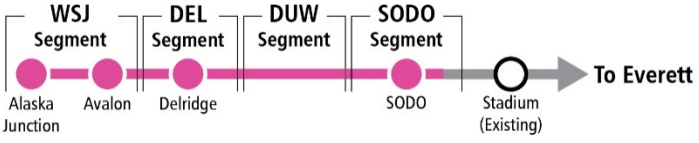
The northern gangway from Harbor Island to the Harbor Island Marina commercial dock on the East Waterway would be temporarily closed during construction. However, mariners could use the existing southern access point. In addition, the northern 125 feet of the dock would be closed during construction. Closure of the northern portion of the dock would reduce commercial moorage and may temporarily displace some commercial vessels. If the Muckleshoot Indian Tribe Fisheries Division vessels moor at the commercial dock, these vessels may also be temporarily displaced. Temporarily displaced commercial and Tribal fishing vessels are unlikely to find replacement moorage on the Duwamish Waterway. Sound Transit would coordinate with the Port of Seattle to minimize disruptions to land and water access from the closure of the northern gangway and northern portion of the Harbor Island Marina commercial dock and use would be restored following construction. Sound Transit would coordinate with the Port of Seattle to ensure access is maintained throughout construction to the Harbor Island Marina.

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet from approximately 115 feet to approximately 100 feet for about 3 months. Because vessels that use this area typically require less than 100 feet of vertical clearance, the vertical clearance is not anticipated to prevent current uses.

West Waterway

The gangway from Harbor Island to the Jim Clark Marina on the West Waterway would be temporarily relocated. Sound Transit would coordinate with the Port of Seattle and tenants to provide alternate access to the marina from the western edge of the Port-owned Harbor Marina Corporate Center parking lot. Sound Transit would coordinate with the Port of Seattle to ensure access is maintained throughout construction to the Jim Clark Marina.

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet from approximately 140 feet to approximately 125 feet for about 2 months. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway, such as shipping terminals and facilities for marine construction and building boats.



3.11.3.6.3 South Crossing South Edge Crossing Alignment Option (DUW-1b)

East Waterway

The southern gangway from Harbor Island to the Harbor Island Marina commercial dock on the East Waterway would be closed intermittently during construction, but mariners could use the existing northern access point. In addition, the southern 300 feet of the dock would be restricted during overhead bridge construction, which would temporarily displace commercial vessels. Temporarily displaced commercial vessels are unlikely to find replacement moorage on the Duwamish Waterway. Sound Transit would coordinate with the Port of Seattle to minimize disruptions to land and water access from the intermittent closures of the southern gangway and southern portion of the Harbor Island Marina commercial dock. Use of the southern access point and southern portion of the dock would be restored following construction.

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 125 feet to approximately 110 feet) for about 3 months. Because vessels that use this area typically require less than 100 feet of vertical clearance, the vertical clearance of the bridge during construction is not anticipated to prevent current uses.

West Waterway

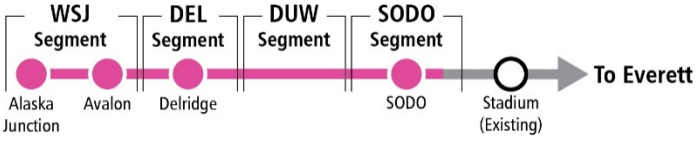
The Harbor Island Marina recreational docks would be closed for approximately 3 to 4 years during construction, which would temporarily remove about 18 percent of recreational moorage and 100 percent of linear dockage for recreational boats on the Duwamish Waterway. If the Muckleshoot Indian Tribe Fisheries Division patrol boats moor at a recreational dock, these vessels may also be temporarily displaced. Temporarily displaced recreational and Tribal fishing vessels are unlikely to find replacement moorage nearby. Sound Transit would coordinate with Port of Seattle to retain the Harbor Island Marina recreational docks and associated marina infrastructure so that marina operations could resume after construction.

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 140 feet to approximately 125 feet) for about 5 months. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway such as shipping terminals and facilities for marine construction and building boats.

3.11.3.6.4 North Crossing Alternative (DUW-2)

East Waterway

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 100 feet to approximately 85 feet) for about 6 months. Because vessels that use this area typically require about 75 feet of vertical clearance or less, the vertical clearance of the bridge during construction is not anticipated to prevent current uses. East Waterway navigation channel closures would also occur during installation of the bridge protection system for all bridge types, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks.



West Waterway

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the vertical clearance over the waterway by up to 15 feet (from approximately 140 feet to approximately 125 feet) for about 1 month. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Duwamish Waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities on the Lower Duwamish Waterway, such as shipping terminals and facilities for marine construction and building boats.

3.11.3.7 Freight Mobility and Access

All alternatives would require partial closures of key streets in the truck network (e.g., Spokane Street, State Route 99, and East Marginal Way) on nights and weekends when the guideway is built over those streets (see Attachment N.1E, Construction-Related Roadway Modifications, in Appendix N.1). Construction of the guideway and guideway columns could also temporarily affect the local business rail spurs on each side of the SODO Busway.

Preferred Alternative DUW-1a and Option DUW-1b could require temporary closures of the BNSF Railway tracks east of East Marginal Way South due to ground improvements associated with a guideway column. Preferred Alternative DUW-1a would also have a guideway column adjacent to the Duwamish rail bridge, which could be affected by construction barges, cranes, and other heavy equipment crossing or in proximity to BNSF Railway tracks.

Alternative DUW-2 would have a guideway column requiring lane closures on Chelan Avenue Southwest west of the West Marginal Way Southwest/Southwest Spokane Street intersection. During construction, increased traffic congestion is expected at this intersection, with short-term lane closures on Chelan Avenue Southwest; however, one lane in each direction would be maintained. This alternative also has a column in the Terminal 18 employee parking lot just west of the Terminal 18 truck gate queue area, but would not affect truck operations at the terminal. Construction access to the column and construction of the guideway could encroach into the gate area but is not expected to affect queue capacity or circulation within the terminal.

Temporary removal of parking during construction could affect trucks, which are allowed to legally park long-term and overnight on streets in designated industrial areas. All of the alternatives would affect two general load zones on 6th Avenue South.

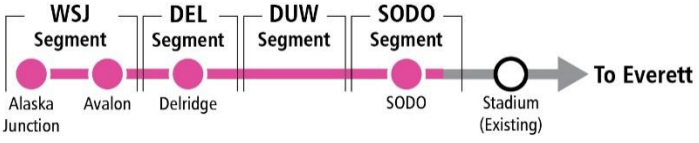
3.11.4 Delridge Segment

3.11.4.1 Arterial and Local Street Operations

Table 3-14 summarizes the major construction closures in the Delridge Segment.

Preferred Alternative DEL-1a would cross over Delridge Way Southwest as an elevated guideway. Portions of Delridge Way Southwest would likely have short-term closures for the construction of this guideway. The construction of the Delridge Station would require a long-term closure of 25th Avenue Southwest and short-term closures on 26th Avenue Southwest and Southwest Dakota Street.

The construction of the guideway along Southwest Genesee Street would require the closure of that street. While the volumes on Southwest Genesee Street are moderate, this street is one of



the few east-west routes through the Delridge neighborhood. Traffic would likely be diverted to other arterial and local streets within the Youngstown neighborhood.

Preferred Alternative DEL-2a* would construct the guideway over both Delridge Way Southwest and Southwest Genesee Street, likely requiring their closure on nights and weekends.

Option DEL-1b and Option DEL-2b* would have impacts similar to Preferred Alternative DEL-1a along Delridge Way Southwest and in the vicinity of the Delridge Station. Option DEL-1b would close Southwest Genesee Street, with impacts similar to Preferred Alternative DEL-1a, while Southwest Genesee Street could remain open except for short-term closures with Option DEL-2b*.

Alternative DEL-3 would require the closure of one to three lanes on Delridge Way Southwest. These lane closures would likely divert substantial amounts to 35th Avenue Southwest, Southwest Avalon Way, the West Seattle Bridge, and 26th Avenue Southwest. This alternative would also require closure of Southwest Genesee Street, with impacts similar to those identified for Preferred Alternative DEL-1a. Construction of the Delridge Station would close Southwest Dakota Street adjacent to the station.

Alternative DEL-4* would have impacts similar to Alternative DEL-3 along Southwest Delridge Way. Southwest Genesee could remain open except for short-term closures.

Alternative DEL-5 construction would require a closure of Southwest Andover Street and Southwest Avalon Way, likely during overlapping periods. This would result in a substantial diversion of vehicle trips to Delridge Way Southwest, Southwest Genesee Street, and West Seattle Bridge/Fauntleroy Way Southwest. With these closures, Southwest Yancy Street and Delridge Way Southwest would also be fully closed during nights and weekends, although access to the Nucor Steel property would be maintained.

Alternative DEL-6* would also require the closure of Southwest Andover Street, although closures on Avalon Way Southwest and Southwest Yancy Streets would be limited to nights and weekends. Delridge Way Southwest would also be partially closed for short periods. The traffic volumes on Southwest Andover Street would likely be diverted to Delridge Way Southwest, Southwest Genesee Street, and Southwest Avalon Way along these streets. Access to the Nucor Steel property would be maintained.

3.11.4.2 Transit

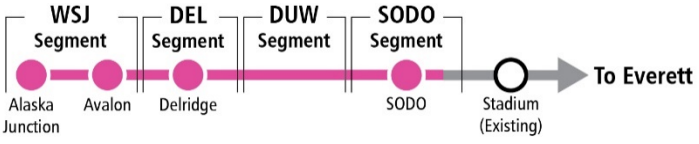
See Table 3-14 for details on key construction-related facility closures in the Delridge Segment. With Preferred Alternative DEL-1a, Option DEL-1b, and Alternative DEL-3, Metro Route 50 on Southwest Genesee Street would be rerouted for the duration of construction.

The Delridge Way Station alternatives (Alternative DEL-3 and Alternative DEL-4*) would have the longest construction effects on Delridge Way Southwest, which could affect 16 to 20 peak hour bus trips, including Metro Routes 50 and 125 and the RapidRide H Line.

Under Alternative DEL-5, a closure of Avalon Way Southwest would require the temporary rerouting of multiple Metro routes, affecting 40 to 60 peak hour bus trips.

3.11.4.3 Parking

Preferred Alternative DEL-1a could temporarily remove up to 80 on-street parking spaces during construction, and Option DEL-1b could remove up to 150 on-street parking spaces. Preferred



Alternative DEL-2a* and Option DEL-2b* could temporarily remove up to 40 on-street parking spaces during construction.

Alternative DEL-3 could temporarily remove up to 100 on-street parking spaces during construction, and Alternative DEL-4* could remove up to 90 spaces. Alternative DEL-5 could remove up to about 200 on-street parking spaces during construction, and Alternative DEL-6* could remove up to 100 spaces. None of these alternatives are expected to affect public off-street parking during construction.

3.11.4.4 Non-motorized Facilities

See Table 3-14 for details on key construction-related facility closures in the Delridge Segment. Under Preferred Alternative DEL-1a, Option DEL-1b, and Alternative DEL-3, the closure of Southwest Genesee Street would temporarily preclude its use by pedestrians and cyclists as well as motorized vehicles. The irregular street grid in that area would require some out-of-direction travel. Traffic diversion from Southwest Genesee Street would likely also cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway.

No specific non-motorized effects are expected under Preferred Alternative DEL-2a* or Option DEL-2b*.

Under Alternative DEL-3 and Alternative DEL-4*, the partial closure of Delridge Way Southwest would affect the sidewalk and bicycle lane on one side of the street.

Under Alternative DEL-5 and Alternative DEL-6*, construction activities would interrupt pedestrian and bicycle access along Southwest Andover Street, which is a signed bike route. Pedestrians and bicycles could use Southwest Genesee Street as an alternative. Alternative DEL-5 would also close Southwest Avalon Way, including the protected bike lanes along that street. Pedestrians and bicycles could use 32nd Avenue Southwest as an alternate route. Traffic diversion from Southwest Andover Street and Southwest Avalon Way could also cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway.

3.11.4.5 Safety

See Table 3-14 for details on key construction-related facility closures in the Delridge Segment. All of the Delridge Segment alternatives are expected to have long-term street closures on one or more arterials. The partial Delridge Way Southwest closure with Preferred Alternative DEL-1a, Preferred Alternative DEL-2a*, Option DEL-1b, Option DEL-2b*, and Alternative DEL-3 and Alternative DEL-4* is likely to increase traffic volumes on adjacent streets and potentially increase collisions on these streets.

Similarly, the closure of Southwest Genesee Street with Preferred Alternative DEL-1a, Option DEL-1b, and Alternative DEL-3 and the closures on Southwest Avalon Way and Southwest Andover Street with Alternative DEL-5 and Alternative DEL-6* would likely lead to increased volumes on adjacent streets and increase the potential for collisions on those streets as well. However, the overall number of collisions within the Delridge Segment is still expected to be similar to the no build condition.

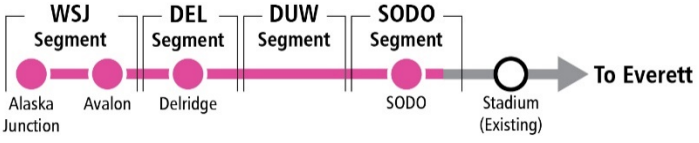
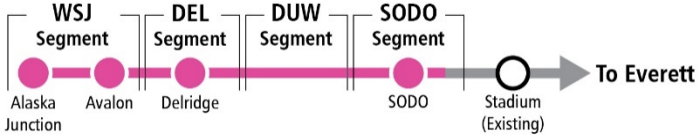


Table 3-14. Key Construction Roadway Closures – Delridge Segment

Affected Street	Extents [a]	Preferred Dakota Street Station Alternative (DEL-1a)	Dakota Street Station, North Alignment Option (DEL-1b)	Preferred Dakota Street Station (Lower Height) Alternative (DEL-2a)*	Dakota Street Station (Lower Height), North Alignment Option (DEL-2b)*	Delridge Way Station Alternative (DEL-3)	Delridge Way Station (Lower Height) Alternative (DEL-4)*	Andover Street Station Alternative (DEL-5)	Andover Street Station (Lower Height) Alternative (DEL-6)*
25th Avenue Southwest	Southwest Dakota Street to Southwest Genesee Street	Full closure, 4 years	Full closure, 4 years	Permanently closed	Permanently closed	Full closure, nights/ weekends	Full closure, nights/ weekends	Not applicable	Not applicable
Delridge Way Southwest	23rd Avenue Southwest to Southwest Dakota Street	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 9 months Full closures, nights/ weekends	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 3 years Full closure, nights/ weekends (extends south of Southwest Dakota Street)	Partial closure, 3 years Full closure, nights/ weekends (extends south of Southwest Dakota Street)	Not applicable	Not applicable
Southwest Andover Street	26th Avenue Southwest to 28th Avenue Southwest	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Full closure, 2 years	Full closure, 2 years
Southwest Avalon Way	Southwest Yancy Street to Southwest Genesee Street	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Full closure, 1 year	Full closure, nights/weekends

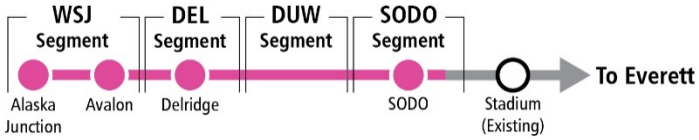


Affected Street	Extents [a]	Preferred Dakota Street Station Alternative (DEL-1a)	Dakota Street Station, North Alignment Option (DEL-1b)	Preferred Dakota Street Station (Lower Height) Alternative (DEL-2a)*	Dakota Street Station (Lower Height), North Alignment Option (DEL-2b)*	Delridge Way Station Alternative (DEL-3)	Delridge Way Station (Lower Height) Alternative (DEL-4)*	Andover Street Station Alternative (DEL-5)	Andover Street Station (Lower Height) Alternative (DEL-6)*
Southwest Dakota Street	25th Avenue Southwest to Delridge Way Southwest	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, nights/ weekends	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable
Southwest Genesee Street	26th Avenue Southwest to Southwest Avalon Way	Full closure, 2 years	Full closure, 2 years	Full closure, nights/ weekends (only extends from 26th Avenue Southwest to 28th Avenue Southwest)	Partial closure, 9 months Full closure, nights/ weekends	Full closure, 2 years	Partial closure, 9 months Full closure, nights/ weekends (only extends from 26th Avenue Southwest to 28th Avenue Southwest)	Not applicable	Not applicable

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.



3.11.4.6 Freight Mobility and Access

See Table 3-14 for details on key construction-related facility closures in the Delridge Segment. Preferred Alternative DEL-1a is not expected to affect any designated truck streets during construction.

Nucor access could be affected by Alternative DEL-3 and Alternative DEL-4*, which would require partial closure of Delridge Way Southwest. Alternative DEL-5 and Alternative DEL-6* would require closure of Southwest Andover Street; however, vehicle and rail access to the Nucor property would be maintained.

Alternative DEL-5 would also require closure of Southwest Avalon Way, which is part of the City of Seattle's designated Over-Legal Network and a Minor Truck Street. This alternative would also affect one general load zone on Southwest Yancy Street.

None of the alignments would affect the rail network in this segment.

3.11.5 West Seattle Junction Segment

3.11.5.1 Arterial and Local Street Operations

Table 3-15 summarizes the major construction roadway closures in the West Seattle Junction Segment.

Under Preferred Alternative WSJ-1, a short section of 36th Avenue Southwest would be fully closed during construction. Traffic could be diverted to 37th Avenue Southwest, the adjacent street, for access to southbound Fauntleroy Way Southwest.

Sections of Fauntleroy Way Southwest would be closed on nights and weekends for guideway construction. Traffic effects would likely be minimal during these low-volume times, although West Seattle Bridge access would be restricted, likely diverting trips to 35th Avenue Southwest to access the bridge. Short sections of Southwest Oregon Street, 39th Avenue Southwest, 40th Avenue Southwest, and 42nd Avenue Southwest would also have short-term closures with minimal effect on traffic.

Construction of Preferred Alternative WSJ-2 would have similar construction effects as Alternative WSJ-1 except at the Alaska Junction Station area. A relatively low traffic volume section of Southwest Alaska Street would be closed, with a majority of the traffic likely to use Fauntleroy Way Southwest, resulting in higher congestion levels between 38th Avenue Southwest and Southwest Avalon Way. This closure of Southwest Alaska Street would affect seven Metro bus routes, including RapidRide C.

Under Preferred Alternative WSJ-3a*, 35th Avenue Southwest would be closed, diverting a high number of vehicles to Fauntleroy Way Southwest, Southwest Alaska Street, and connecting local streets. Traffic would also likely divert through Alaska Junction into the North Admiral neighborhood. For a portion of this time, Fauntleroy Way Southwest would be partially closed, diverting a substantial number of vehicles to surrounding streets such as 35th Avenue Southwest (if open) and Southwest Alaska Street. Simultaneous closures of 35th Avenue Southwest and Fauntleroy Way Southwest would be minimized, where feasible.

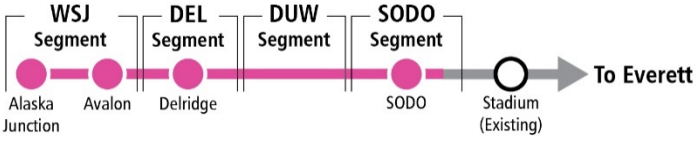
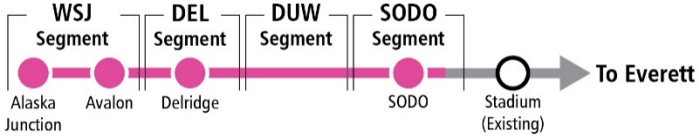


Table 3-15. Key Construction Roadway Closures – West Seattle Junction Segment

Affected Street	Extents [a]	Preferred Elevated 41st/42nd Avenue Alternative (WSJ-1)	Preferred Elevated Fauntleroy Way Alternative (WSJ-2)	Preferred Tunnel 41st Avenue Station Alternative (WSJ-3a)*	Preferred Tunnel 42nd Avenue Station Option (WSJ-3b)*	Short Tunnel 41st Avenue Station Alternative (WSJ-4)*	Medium Tunnel 41st Avenue Station Alternative (WSJ-5)*
35th Avenue Southwest	West Seattle Bridge to Southwest Avalon Way	Full closure, nights/weekends	Full closure, nights/weekends	Full closure, 3 years	Full closure, 3 years	Full closure, nights/ weekends	Full closure, 1 year
36th Avenue Southwest	Southwest Genesee Street to Fauntleroy Way Southwest	Full closure, 1.5 years	Full closure, 3 years	Full closure, 3 years	Full closure, 3 years	Full closure, 9 months	Not applicable
41st Avenue Southwest	North of Southwest Alaska Street to Southwest Hudson Street	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Full closure, 4 years [b]	Full closure, 4 years
42nd Avenue Southwest	North of Southwest Alaska Street to Southwest Hudson Street	Partial closure, 9 months Full closure, nights/weekends (extent limited to block north of Southwest Edmunds Street)	Not applicable	Not applicable	Full closure, 4 years (includes 4-year partial closure of Southwest Hudson Street at 42nd Avenue Southwest)	Not applicable	Not applicable
Fauntleroy Way Southwest	West Seattle Bridge to Southwest Avalon Way	Full closure, nights/weekends (extends from West Seattle Bridge to Southwest Oregon Street)	Full closure, nights/weekends	Partial closure, 1.5 years	Partial closure, 1.5 years	Partial closure, 9 months Full closure, nights/ weekends	Partial closure, 1.5 years
Southwest Alaska Street	38th Avenue Southwest to Fauntleroy Way Southwest	Not applicable	Full closure, 3 years	Not applicable	Not applicable	Not applicable	Not applicable



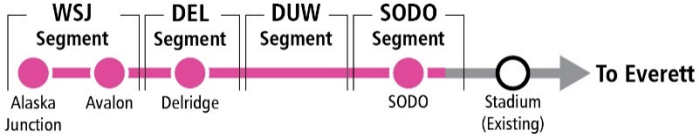
Affected Street	Extents [a]	Preferred Elevated 41st/42nd Avenue Alternative (WSJ-1)	Preferred Elevated Fauntleroy Way Alternative (WSJ-2)	Preferred Tunnel 41st Avenue Station Alternative (WSJ-3a)*	Preferred Tunnel 42nd Avenue Station Option (WSJ-3b)*	Short Tunnel 41st Avenue Station Alternative (WSJ-4)*	Medium Tunnel 41st Avenue Station Alternative (WSJ-5)*
Southwest Edmunds Street	At 41st Avenue Southwest	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Full closure, 4 years	Full closure, 4 years
	At 42nd Avenue Southwest	Full closure, nights/weekends	Not applicable	Not applicable	Full closure, 4 years	Not applicable	Not applicable

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.

[b] The closure extends to south of Southwest Hudson Street; includes 1-year partial closure of Southwest Alaska Street east of 41st Avenue Southwest.



The closures of the non-arterial roadways (36th Avenue Southwest, 41st Avenue Southwest, and Southwest Edmunds Street) would create localized traffic diversions that could be adequately accommodated within the adjacent street system. Fauntleroy Way Southwest would also have a short-term partial closure at the Avalon Station adding to localized peak hour congestion at this location.

The construction effects of Preferred Option WSJ-3b* would be similar those described for Preferred Alternative WSJ-3a*, except that the closures of non-arterial roadways would be along 42nd Avenue Southwest and 36th Avenue Southwest.

Alternative WSJ-4* and Alternative WSJ-5* would have similar construction effects as Preferred Alternative WSJ-3a*. 36th Avenue Southwest would remain open at the Avalon Station under Alternative WSJ-5*.

3.11.5.2 Transit

See Table 3-15 for details on key construction roadway facility closures in the West Seattle Junction Segment.

Construction for Preferred Alternative WSJ-1 would have minimal effects on transit operations.

With Preferred Alternative WSJ-2, part of Southwest Alaska Street would be closed for the duration of construction. This would require rerouting several Metro routes to bypass this closure, affecting 35 to 40 peak hour bus trips.

Under Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b*, a section of 35th Avenue Southwest would be closed, requiring the rerouting of two bus routes and affecting 10 to 12 peak hour bus trips. These alternatives would also close one to three lanes on Fauntleroy Way Southwest. The added congestion from the lane restrictions could affect performance of several bus routes that run 20 to 25 peak hour bus trips.

Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5* would require a short-term partial closure of Southwest Alaska Street at the cut-and-cover station, which could affect the performance of multiple bus routes that include 35 to 40 peak hour bus trips.

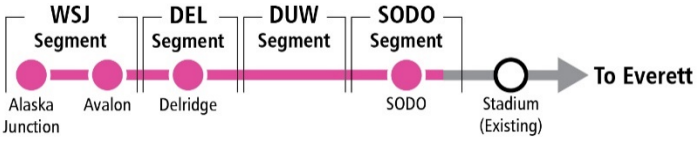
With Alternative WSJ-4*, Fauntleroy Way Southwest would be partially closed near 35th Avenue Southwest, with similar impacts as Preferred Alternative WSJ-3a*.

Alternative WSJ-5* would have similar construction closures as Alternative WSJ-4*; however, 35th Avenue Southwest near Fauntleroy Way Southwest would also be closed for a period. Overall transit impacts are similar to Preferred Alternative WSJ-3a*.

3.11.5.3 Parking

Preferred Alternative WSJ-1 could temporarily remove up to 130 on-street parking spaces during construction. Preferred Alternative WSJ-2 could temporarily remove up to 95 on-street space and Preferred Alternative WSJ-3a* could remove up to 240 parking spaces during construction. Preferred Option WSJ-3b* could remove up to 110 parking spaces during construction.

Alternative WSJ-4* could remove up to 125 spaces during construction. Alternative WSJ-5* could remove up to 250 spaces.



3.11.5.4 Non-motorized Facilities

See Table 3-15 for details on key construction roadway facility closures in the West Seattle Junction Segment. No non-motorized effects beyond the general roadway impacts described in Section 3.11.5.1 are expected under Preferred Alternative WSJ-1.

Under Preferred Alternative WSJ-2, a section of Southwest Alaska Street would be closed, temporarily closing pedestrian and bicycle access along the roadway, which includes a westbound bike lane. Pedestrians would likely not be allowed on Southwest Alaska Street for several months due to the type of construction activities. For the remaining construction period, the sidewalk could be maintained on at least one side of the street. During the periods when pedestrians are not allowed on Southwest Alaska Street, the nearest alternate route would be by 38th Avenue Southwest and Fauntleroy Way Southwest.

Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, and Alternative WSJ-5* would require a closure of 35th Avenue Southwest. Because there are no parallel routes to the east, pedestrians and bicycles could use either 36th Avenue Southwest (under Alternative WSJ-5*) or 37th Avenue Southwest (under Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b*) as an alternate route.

Under Preferred Alternative WSJ-3a*, Alternative WSJ-4*, and Alternative WSJ-5, the staircases along Southwest Hudson Street on either side of 41st Avenue Southwest would be closed during construction. Under Preferred Option WSJ-3b*, Hudson Street would be closed to pedestrians and bicycles at 42nd Avenue Southwest.

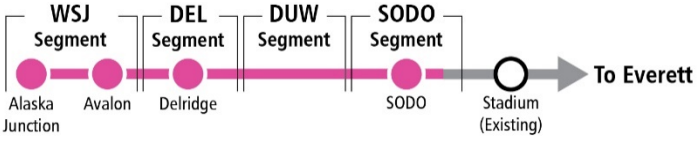
3.11.5.5 Safety

See Table 3-15 for details on key construction roadway facility closures in the West Seattle Junction Segment. The closures on 35th Avenue Southwest with Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, and Alternative WSJ-5*; on Southwest Alaska Street with Preferred Alternative WSJ-2; and the partial closure on Fauntleroy Way Southwest with Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5* would divert vehicles to adjacent arterial streets where feasible. While these arterial streets are better designed to accommodate traffic, they already carry relatively high volumes. The higher diverted traffic volumes could potentially increase collisions on these streets. Potential diversions are described in Section 3.5.3.1.4.

3.11.5.6 Freight Mobility and Access

See Table 3-15 for details on key construction roadway facility closures in the West Seattle Junction Segment. Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5* would require a partial closure of Fauntleroy Way Southwest, which is designated as a Major Truck Street and part of the City's Over-Legal Network south of Southwest Avalon Way. Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2 would not have long-duration closures of Fauntleroy Way Southwest but could have closures on some nights and weekends.

Preferred Alternative WSJ-1 would affect four general load zones and Preferred Alternative WSJ-2 would affect three truck-only load zones and four general load zones on various other streets. Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would affect two general load zones. Alternative WSJ-4* would not remove any load zones, and Alternative WSJ-5* would affect one general load zone.



3.11.6 Mitigation for Construction Impacts

3.11.6.1 Transit

Sound Transit would coordinate with Metro, City of Seattle, and FTA, where appropriate, to identify and agree to bus service and associated infrastructure modifications and transit facility improvements that maintain transit service and access through construction areas. This would include continuing to coordinate on construction-related impacts to Metro's transit operations to determine the potential mitigation required, as many of the alternatives close roadways served by transit and restrict access to transit facilities for varying durations.

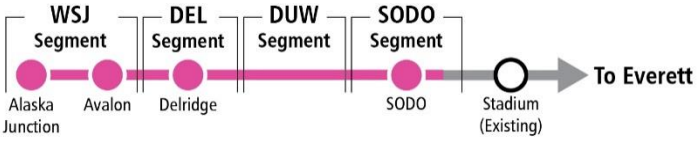
Sound Transit would maintain access to existing bus stops and layovers to the extent feasible and coordinate with Metro and the City of Seattle to minimize impacts and disruptions. Where needed, this coordination would include other transit operators. Where bus stops and layover cannot be maintained in existing locations, Sound Transit would provide temporary facilities to maintain service and access. Information would be communicated to riders in advance of construction at these locations.

Sound Transit would maintain non-motorized access to transit, where feasible, through construction areas, such as providing dedicated walkways or alternative bike facilities around the construction area. Where non-motorized access is not able to be maintained through construction areas, Sound Transit would provide temporary non-motorized facilities to maintain access to transit. Sound Transit would also notify the public of any closures. Refer to Section 3.11.6.2 for more information on measures to minimize impacts related to road closures and detours that would also reduce bus service disruptions.

Construction-related transit service impacts, such as the SODO Busway closure (whether permanent or temporary) under all SODO alternatives, as well as construction impacts to facilities such as trolley infrastructure and layovers, would be coordinated with Metro, the City of Seattle, and other relevant service providers to identify bus detour routes and minimize impacts and disruptions to bus facilities and service performance and hours during project construction. This would include identifying associated improvements needed to implement these service and facility modifications, such as speed and reliability treatments (e.g., new transit lanes, transit signal priority, and similar). Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project. Sound Transit would also coordinate with the City of Seattle to determine the pavement condition before and after extended transit reroutes to identify if pavement improvements are necessary on transit detour routes not designed to accommodate transit vehicles.

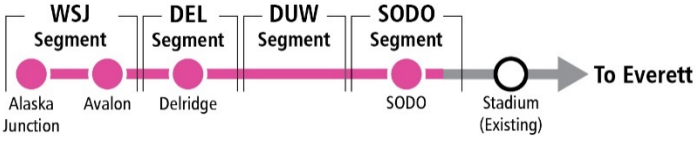
3.11.6.2 Arterial and Local Street Operations

Sound Transit would develop a Construction Access and Traffic Management Plan for the West Seattle Link Extension project. The plan would be developed as the project advances and include the overarching goals and objectives for the project's construction and the approach to partner agency coordination. It would include applicable mitigation commitments to be built by Sound Transit, finalized as part of the environmental documentation, as well as additional detail reflecting continued design for the project after the Final Environmental Impact Statement. Components likely to be addressed in detail include maintaining business access; minimizing construction disruption during large events; providing alternate routes for freight, general traffic, and non-motorized access; parking management; and maintaining transit operations (bus, streetcar, and light rail).



Potential construction mitigation measures would be consistent with the applicable City requirements. Sound Transit would prepare traffic control plans during subsequent design phases to coordinate on how all modes of transportation would be maintained and address pedestrian and bicycle access and safety. Mitigation measures would follow the *Manual on Uniform Traffic Control Devices for Streets and Highways* (Federal Highway Administration 2009) and the City of Seattle *Traffic Control Manual* (City of Seattle 2012) for maintenance of traffic plans. Potential measures to minimize construction traffic impacts could include the following practices:

- Install advance warning signs and highly-visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies, such as supporting employer incentives or programs to use transit.
- Clearly sign and provide detour routes when streets are fully or partially closed. The contractor would be required to keep nearby parallel facilities open to facilitate access and mobility.
- For extended closures requiring substantial traffic detours, Sound Transit would coordinate with the City of Seattle to consider temporary physical treatments such as roadway rechannelization, traffic signals, and transit priority treatments.
- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Communicate public information through tools such as print, radio, posted signs, websites, and email to provide information regarding street closures, hours of construction, business access, and parking impacts.
- Coordinate access closures with affected businesses and residents. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during nonbusiness hours, or if the parking and users of this access (e.g., deliveries) could be accommodated at an alternative location.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Provide regular updates to schools, emergency service providers, local agencies, solid waste utilities, and postal services, and assist school officials in providing advance and ongoing notice to students and parents concerning construction activity near schools.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays, where practical. In addition, closures of parallel arterials or access points would be coordinated with the goal of avoiding simultaneous closures.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from open trenches.
- To minimize potential freight impacts, coordinate with affected businesses throughout the construction period to notify them of lane and access closures and maintain business access as much as possible.



- For construction activities that might impact state facilities, such as Interstate 5 and State Route 99, provide construction information to WSDOT for use in the state's freight notification system. Sound Transit would provide information in the format required by WSDOT.
- Coordinate with the City of Seattle and other relevant agencies to disseminate construction closure information to the public.

3.11.6.3 Parking

Through the permit process, Sound Transit would coordinate with the City of Seattle on measures to address temporary curbside management and project parking impacts during construction, in conjunction with the other infrastructure and development projects in the study area. This would include temporarily relocating affected Americans with Disabilities Act stalls or commercial load zones that would continue to serve adjacent land uses. Increased bus service (e.g., bus bridges) implemented as mitigation for interruption to transit service during construction could affect parking supply and would be coordinated with the City of Seattle and other relevant parties.

Sound Transit would work with owners and operators of garages where parking could be removed or where ingress or egress could be blocked during construction.

Sound Transit would work with the contractor and the City of Seattle to minimize construction worker parking.

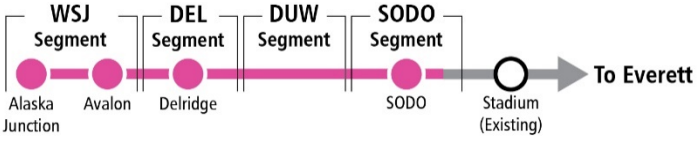
For Alternative DUW-2, Sound Transit would work with the Port of Seattle to temporarily relocate or reconfigure the Terminal 25 truck parking lot.

3.11.6.4 Non-motorized Facilities

When non-motorized facilities such as sidewalks and bicycle lanes must be temporarily closed for construction, Sound Transit would provide clearly marked detours within construction areas, such as dedicated walkways and alternate bicycle routes that may include treatments such as pedestrian and bicycle signals, signal optimization including leading pedestrian intervals, crosswalks, curb bulbs, rectangular rapid flashing beacons, pavement markings, and temporary signals. Where possible, temporary facilities would be designed to applicable design standards such as Seattle Streets Illustrated (City of Seattle 2020) or as agreed to by the City of Seattle; at minimum, they would comply with Americans with Disabilities Act requirements.

When maintaining the facility would not be feasible, Sound Transit would work with the City of Seattle to develop and implement a construction management plan to provide alternate facilities for non-motorized travel that, to the extent feasible, offer a similar level of protection and comfort to the temporarily closed facility. For example, Sound Transit would work to identify a location for a protected bicycle facility through SODO as an alternate route for the temporarily closed SODO Trail. These replacements would be located and designed in coordination with the City of Seattle and funded by Sound Transit.

Pedestrian and bicycle facilities removed or damaged by construction would be replaced, to the extent possible, by permanent facilities that meet applicable design standards or as agreed to by the City of Seattle when project construction is complete.



3.11.6.5 Safety

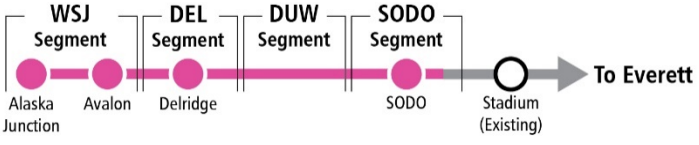
During construction, Sound Transit would develop a Maintenance of Traffic Plan to adhere to federal and local agency guidelines as described in Section 3.11.1.5, as well as to the measures described in Section 3.11.6.2. The Maintenance of Traffic Plan would be created to minimize safety concerns on the transportation system during construction, including non-motorized diversions. Therefore, no additional safety-related mitigation measures for the construction period are anticipated to be necessary.

3.11.6.6 Navigation

The FTA, in coordination with Sound Transit, will continue government-to-government consultation with the Muckleshoot Indian Tribe and the Suquamish Tribe to avoid or minimize impacts to Tribal treaty-protected fishing rights and access to Usual and Accustomed Areas during construction.

Sound Transit would develop a construction navigation management plan in consultation with the United States Coast Guard, Army Corps of Engineers, and Port of Seattle to mitigate impacts to navigation during construction. Measures in the plan could include the following:

- Create a marine safety zone (to be approved by the United States Coast Guard and Army Corps of Engineers) to help motorized and non-motorized waterway users pass through the Harbor Island Reach and East Waterway construction zones.
- Provide a safe and easily recognizable path for non-motorized waterway users through the marine safety zone.
- Set up the marine safety zone so all construction features or potential obstacles can be seen during inclement weather.
- Coordinate with maritime stakeholders and emergency service providers and conduct construction outreach prior to and throughout construction at key milestones or phases where navigation conditions could change.
- Schedule navigation channel restrictions during a time of day or a day of the week with less vessel traffic.
- Coordinate all maritime operations with the United States Coast Guard, Army Corps of Engineers, Puget Sound Vessel Traffic Services, and local mariners and advertise all changes to maritime operations in the Local Notice to Mariners publication.
- Establish effective communications with the public via measures such as meetings, construction updates, alerts, and schedules.
- Provide a 24-hour construction telephone hotline for community members to report issues to Sound Transit community engagement staff, who would work with the construction team to resolve issues and respond to the community member.
- Provide a community ombudsman consistent with Sound Transit policy. In the event that complaints arise about construction impacts that could not be resolved by community outreach staff or the relevant department director, the ombudsman policy provides a process for addressing those complaints in an impartial, fair, and timely manner that ensures effective stewardship of public resources and minimizes construction impacts.



3.11.6.7 Freight Mobility and Access

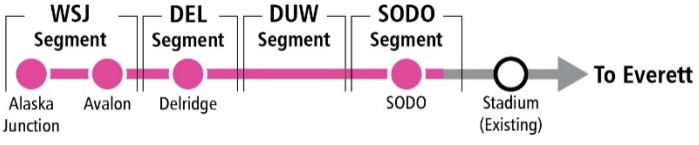
Prior to construction activities that fully close a Major or Minor Truck Street, Sound Transit would work with the City of Seattle to identify detour routes suitable for trucks.

Sound Transit would coordinate with the BNSF Railway and Union Pacific Railroad prior to construction over rail tracks or ground improvements for guideway columns close to the rail tracks. For Preferred Alternative DUW-1a, which would have construction near the BNSF Railway Duwamish Waterway rail bridge, use of barges, cranes, and other heavy equipment crossing or in proximity to BNSF Railway tracks would, to the extent feasible, adhere to schedule and minimum clearance requirements as agreed to by Sound Transit and BNSF Railway.

For construction of Alternative DUW-2, Sound Transit would work with the Port of Seattle and Northwest Seaport Alliance to identify construction management measures to maintain adequate port access and operations along its primary drayage routes between the marine and rail terminals. Measures could include ensuring adequate terminal driveway widths and restricting some construction activities to times of day when the terminals have low or no gate activity.

For locations where truck-only load zones, commercial load zones, or general load zones would be eliminated but businesses that rely on them remain, Sound Transit would coordinate with the City of Seattle to relocate these commercial load zones.

During construction, the closure of Southwest Avalon Way (for Alternative DEL-5) and partial closure of Fauntleroy Way Southwest (for Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, or Alternative WSJ-5*), both of which are part of the City of Seattle's Over-Legal Network, would be coordinated with the City of Seattle to identify construction management measures to maintain an envelope to accommodate oversized trucks during construction or to identify suitable alternative routes that would be defined prior to freight movements as part of the City's over-legal permit process.



3.12 Ballard Link Extension Affected Environment and Impacts during Operation – Transit

This section discusses transit service and facilities; regional and local bus transit; project, segment, and station-level ridership; transit L.O.S. measures; and bus and light rail travel time for the No Build Alternative and Build Alternatives for the Ballard Link Extension. Section 3.3 in Appendix N.1 provides additional discussion and data regarding the transit elements described in this section.

3.12.1 Affected Environment

3.12.1.1 Transit Service and Facilities

Existing transit service in the Ballard Link Extension study area is provided by Metro buses, Community Transit, Sound Transit regional express buses, and Sound Transit Link light rail. Approximately 120 routes operate within the study area. The study area is also served by the Seattle Center Monorail, Seattle Streetcar, and Washington State Ferries, among other transit service providers.

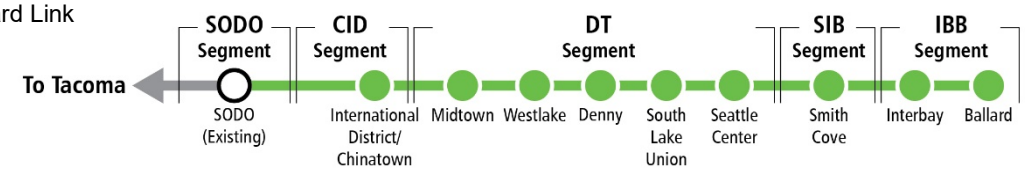
Within the study area, all-day transit service between Ballard and Downtown Seattle is provided by the RapidRide D Line, which runs from Crown Hill through Ballard, Interbay, and Uptown through Downtown Seattle, terminating in Pioneer Square. Other frequent routes that serve portions of the corridor include Route 40, which runs between Ballard and downtown via Westlake Avenue North and Fremont; Route 70, which provides connections north to the University District from South Lake Union; and RapidRide E, which runs north from Pioneer Square in Downtown Seattle to Shoreline via Aurora Avenue North (also known as State Route 99). Link light rail also operates service in this corridor through the Downtown Seattle Transit Tunnel, with stops from the Westlake to SODO stations providing frequent service north to the University of Washington Station and south to SeaTac Airport and Angle Lake Station.

Peak-only bus services connect many of the areas along the project corridor to Downtown Seattle via portions of the corridor, including Magnolia, Sunset Hill, and Blue Ridge.

Transit facilities in the study area include the Downtown Seattle Transit Tunnel, which carries Link light rail vehicles through downtown. This tunnel transitions to the SODO Busway at the southern edge of downtown, which continues at-grade for 1.5 miles to South Spokane Street. 3rd Avenue is a bus-only facility from 6 a.m. to 7 p.m. between Stewart Street and Yesler Way/4th Avenue. In addition to 3rd Avenue, there are several business access and transit lanes and bus queue jumps within downtown. Business access and transit lanes, queue jumps, and transit signal priority are present on sections of 15th Avenue West and 15th Avenue Northwest and Elliott Avenue West and provide bus priority in the peak directions during peak periods.

3.12.1.2 Transit Travel Time

The portion of the existing RapidRide D Line route between Downtown Seattle (Westlake Station) and Ballard (Northwest Market Street and 15th Avenue Northwest) provides a comparison to a trip taken on light rail with the project. This trip takes an average of 31 minutes in the peak direction during the peak period, which is approximately 40 percent longer than travel times in the off-peak period. Travel times can be substantially longer during times of heavily congested roadway conditions.



3.12.1.3 Transit Levels of Service

The performance of existing transit service in the study area was evaluated using L.O.S. measures for frequency, span of service, reliability, and passenger load. L.O.S. A conditions for these measures reflect frequent, reliable service that occurs throughout the majority of the day, with capacity to seat all passengers, while L.O.S. F reflects unreliable, infrequent service that does not occur for most of the day, with standing passenger conditions. These measures were adapted from the 2013 Transportation Research Board *Transit Capacity and Quality of Service Manual*, 3rd edition, and more information on their definition and how they were applied can be found in Appendix N.1.

Routes were analyzed at three screenline locations along the proposed alignment: south of South Main Street, north of Denny Way, and the Ballard Bridge (Figure 3-2).

3.12.1.3.1 Frequency

The RapidRide D Line generally follows the path of the proposed project between Ballard and Downtown Seattle and operates with peak headways of 8 minutes (L.O.S. A). Frequency L.O.S. and ridership are correlated among routes serving the study area, with high-ridership routes having shorter headways and lower-ridership routes having longer headways; for example, the RapidRide E and D lines and Route 40 (all high-ridership routes) operate at L.O.S. A while lower-ridership express routes like Routes 18/19 and 29 operate between L.O.S. C and D. About two-thirds of bus riders at all screenlines are served by routes operating at L.O.S. A or B.

When the peak period headways of all bus routes crossing the three Ballard Link Extension screenlines are averaged, the results range from 17 to 23 minutes (L.O.S. C) during the peak period. This averaged L.O.S. is lower than what most people experience due to the presence of a number of lower-frequency express routes serving the corridor.

3.12.1.3.2 Span

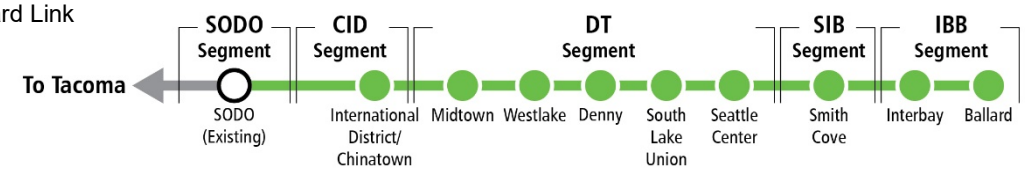
The average weekday span of service for buses crossing the south of South Main Street, north of Denny Way and Ballard Bridge screenlines range between 11 hours (L.O.S. D) to 17 hours (L.O.S. B).

3.12.1.3.3 Reliability

Peak period reliability for bus routes in the study area is generally poor in the a.m. and p.m. peak hours (L.O.S. D through F) in both the inbound and outbound directions because of congested general purpose lanes for the majority of their routes. The RapidRide D Line, sections of which parallel the course of the proposed project, operates at L.O.S. D to E. Most routes fail to meet Metro's evaluation threshold of 80 percent on-time trips ("on-time" is defined as a departure of up to 1.5 minutes early and up to 5.5 minutes late). Existing light rail service in the Downtown Seattle Transit Tunnel has high reliability (L.O.S. A) with little variation in travel times, as it operates in exclusive right-of-way.

3.12.1.3.4 Passenger Load

Most transit routes in the study area operate at passenger load L.O.S. A, B, or C; however, many of the more frequent, high-ridership routes are more crowded. In particular, the RapidRide D and E lines operate at L.O.S. D at some screenlines, indicating standing-room-only conditions during peak periods.



3.12.2 Environmental Impacts of the No Build Alternative

The Ballard Link Extension transit system was assessed for 2042 under both the No Build Alternative and Build Alternatives. These effects are measured in terms of transit service and facilities; regional, project, and segment/station ridership forecasts; transit travel time; and transit L.O.S. Temporary (short-term) impacts during construction were also assessed and are presented in Section 3.19.

The No Build Alternative assumes that all the projects in the Sound Transit 3 plan would have been implemented (including light rail extensions north to Everett, east to Redmond, and south to Tacoma) with the exception of the West Seattle Link Extension and Ballard Link Extension projects. In this condition, the service line currently running between the University of Washington and Angle Lake stations is assumed for modeling purposes to operate as one continuous line between Everett and Tacoma.

Bus service assumptions for both the No Build Alternative and Build Alternatives were developed by Metro and Sound Transit as part of the project's Transit Service Integration technical memorandum (see Attachment N.1C in Appendix N.1, Transportation Technical Report). The Transit Service Integration memorandum was based on METRO CONNECTS (Metro 2016), which provides a long-range plan for bus service in King County, integrating with future Sound Transit light rail and bus rapid transit services. The Transit Service Integration memorandum considers the bus routing networks as well as the frequency of service consistent with the planned growth in service hours in METRO CONNECTS. Under the No Build Alternative, the bus network in the Ballard Link Extension study area is similar to existing conditions, although some new routes and improvements to existing routes are assuming the RapidRide G and J lines would be in service and transit improvements related to the Seattle Arena Renovation Project, such as transit-only lanes along 1st Avenue North and Queen Anne Avenue North, would be built.

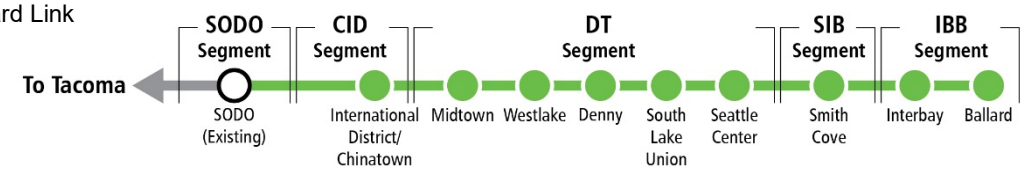
For land use and trip growth assumptions, see Chapter 2, Regional Context and Travel, of Appendix N.1.

3.12.3 Environmental Impacts of the Build Alternatives

3.12.3.1 Transit Service and Facilities

3.12.3.1.1 Impacts Common to All Alternatives

The 2042 Build Alternatives assume substantial changes to bus service in the Ballard Link Extension project corridor, to integrate with the new light rail line. In general, bus service would be rerouted to serve the proposed light rail line by removing duplicate service along the corridor and instead prioritize bringing bus riders to the stations, consistent with Metro's service guidelines. For example, the RapidRide D Line is proposed to be restructured to serve the light rail stations instead of continuing into Downtown Seattle, so its service hours could be repurposed to serve the light rail stations. Some bus stops and layover areas would be added or relocated to serve the proposed stations, potentially including waiting areas for riders transferring to buses. Bus stops and paratransit spaces would generally be adjacent to the light rail stations to provide safe and efficient transfer access. See the conceptual station drawings in Appendix J for proposed bus stops and, if applicable, layover areas at the stations.



In addition, all alternatives would include construction of a new light rail tunnel through Downtown Seattle, which would become part of the Ballard-to-Tacoma line. The existing tunnel would accommodate the West Seattle-to-Everett line and the Redmond-to-Mariner line. The construction of this second tunnel is necessary to complete the regional light rail system, as it would provide the required capacity to operate three service lines at their planned 5- to 6-minute headways and relieve overcrowding at existing stations. Passengers transferring between lines would do so at the SODO, International District/Chinatown, and Westlake stations.

With the M.O.S., the bus network in the Ballard Link Extension area would be a hybrid between existing service and what is planned for the Build Alternatives. The terminus station in the M.O.S. would be Smith Cove and would accommodate many bus routes from Magnolia, Queen Anne, and parts of North Seattle. In the M.O.S., RapidRide service between Ballard and Downtown Seattle would continue. A discussion of Build Alternative transit networks can be found in Appendix N.1.

3.12.3.1.2 SODO Segment

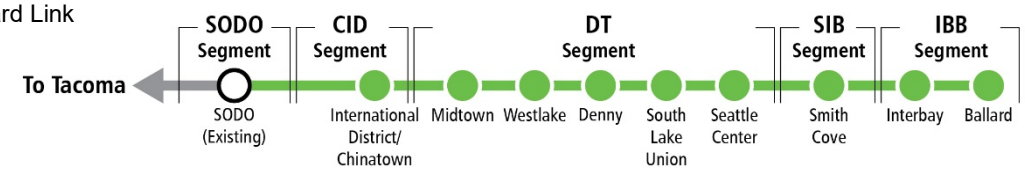
For Preferred Alternative SODO-1a and Option SODO-1b, the SODO Busway would be permanently closed to buses to accommodate the light rail guideway.

If the SODO Busway were to permanently close, bus routes (up to 30 to 50 buses in each peak hour) coming from the south would use adjacent streets (i.e., 4th Avenue South or 6th Avenue South). Closure of the busway would also eliminate all existing layover areas and increase bus travel times to the bases, as described in Appendix N.1. For Alternative SODO-2, the busway would remain open to buses.

Removal of the SODO Busway could affect formula funding for transit providers that use that facility. Sound Transit will continue to coordinate with the City and Metro to determine how alternative bus routing on 4th Avenue South would accommodate the reduced number of buses expected in the future, either through use of general purpose lanes or transit treatments to minimize effects to transit travel times and formula funding.

3.12.3.1.3 Chinatown-International District Segment

Alternative CID-1a* and Option CID-1b* would permanently close the SODO Busway between South Massachusetts Street and South Spokane Street. Alternative CID-1a* would also shift the portion of the SODO Busway between South Royal Brougham Way and South Holgate Street west onto the Ryerson Bus Base property, with modified accesses to the bus base from South Royal Brougham Way and from 4th Avenue South near South Massachusetts Street. This would include potential reconfiguration of the internal bus yard, which would need to be coordinated with Metro. Option CID-1b* would also result in the permanent closure of the Ryerson Bus Base. Section 3.12.3.1.2 discusses the SODO Busway closure impacts. Alternative CID-1a* and Option CID-1b* would remove an existing northbound travel lane on 4th Avenue South from south of Seattle Boulevard South to just south of South Jackson Street. For analysis purposes, the removed lane was assumed to be the existing bus lane because fewer buses are anticipated to be using this bus lane due to the planned transit restructuring in METRO CONNECTS (Metro 2016) and service restructuring described in the WSBLE Transit Service Integration technical memorandum (Attachment N.1C of Appendix N.1, Transportation Technical Report). Other lane configurations could be considered as design proceeds.



3.12.3.2 Transit Travel Time

In the 2042 no build condition, riders using bus service that runs along the surface streets between the Westlake Station in Downtown Seattle and Northwest Market Street, where the Ballard Station would be, would have longer travel times, as congestion is anticipated to worsen. This in-vehicle travel time could be up to 40 minutes on average during the peak periods in the peak direction, whereas with the Ballard Link Extension project, the light rail train would travel between the Westlake Station and the Ballard Station in about 11 minutes, which is close to a 70 percent travel time savings.

Travel times would increase for light rail riders traveling between Link stations to the south and the Stadium Station, as the Stadium Station would not be a stop on the Ballard-to-Tacoma line under both the full build and M.O.S. Instead, these riders (estimated at approximately 500 during the 3-hour peak period) would need to transfer to the West Seattle-to-Everett line to reach the Stadium Station--mostly likely at either the International District/Chinatown or SODO stations--or get off at one of those stations and walk to their destination. A transfer at the SODO Station provides the most direct trip to the Stadium Station for this population of riders, and results in between 2 and 5 additional minutes of travel time when compared to the no build condition, an increase of 6 percent to 12 percent for trips originating from Link stations to the south. This effect is somewhat offset by shorter train headways and improved access to other destinations throughout the region with the project.

Beyond the in-vehicle rail travel times, a rider's trip time would vary depending on the station platform's vertical distance from the street level. Some of the deeper tunnel stations (i.e., Option CID-1b* and Option CID-2b) would take approximately 1 minute to 90 seconds longer for a rider to walk within the station between the train platform and the ground-level entrance, compared to access times for the other alternatives in those segments. Use of the elevator can reduce or eliminate this extra walk time. Otherwise, access times are similar among alternatives within each segment.

3.12.3.3 Ridership

This section describes the forecasted average daily light rail ridership for the Ballard Link Extension in 2042 for the project as a whole and at the segment and station levels.

3.12.3.3.1 Impacts Common to All Alternatives

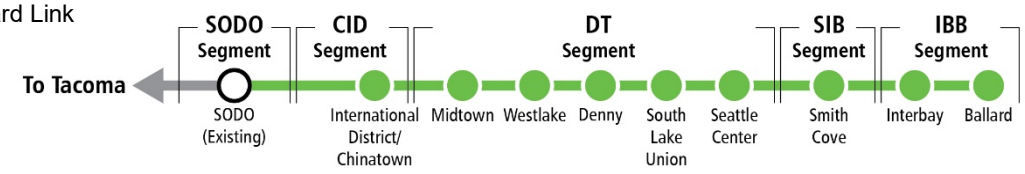
Systemwide Ridership

Transit ridership was forecasted for the Sound Transit service area in King, Pierce, and Snohomish counties. Table 3-16 presents the total number of forecasted trips on all transit services under the No Build Alternative and Build Alternatives within the study area on the regional transit system (defined here as the Sound Transit service area) for 2042.

Table 3-16. 2042 Transit Ridership (Daily Trips) for the Sound Transit Service Area

Measure	2042 Ridership - No Build Alternative	2042 Ridership - Build Alternatives
Total Daily Transit Trips	746,000	766,000
Net New Daily Transit Trips with WSBLE	not applicable	20,000

Source: Sound Transit Incremental Ridership Model.



Ballard Link Extension Project Ridership

The previous section describes total ridership in the Sound Transit service area and the number of new daily transit trips that would be generated in the region as a result of the West Seattle and Ballard Link extensions. In 2042, total daily trips on the project would range between 132,000 and 173,000 for all Build Alternatives, depending on the alternative as well as the underlying land use, economic, and bus service level assumptions used to develop the forecast.

Under the M.O.S., the Ballard Link Extension ridership would decrease to between 132,000 and 140,000 daily riders, as the project would terminate at the Smith Cove Station and not serve the Interbay/Ballard Segment.

The ridership forecasts presented in this section do not directly forecast transit ridership during special events at venues such as T-Mobile Park, Lumen Field, Washington State Convention Center, Climate Pledge Arena, and the grounds of Seattle Center. While it is expected that additional ridership would be experienced on the light rail system during days with events at these facilities, it is not included in the forecasts. These events are intermittent and occur during various times of the day, with the highest surge often occurring outside of peak travel times. These events would occur without the light rail expansion, and the WSBLE Project would provide additional high capacity transit service to support this demand and facilitate access by efficiently moving attendees and staff to and from these areas. Further information on these events and the surrounding station area conditions is provided in Section 3.15.3.

3.12.3.3.2 SODO Segment

No new stations are proposed in the SODO Segment as part of the Ballard Link Extension. To connect to the Stadium Station, riders on the Ballard-to-Tacoma line could transfer to the West Seattle-to-Everett line at the Westlake, International District/Chinatown, or SODO stations, or walk from the International District/Chinatown Station.

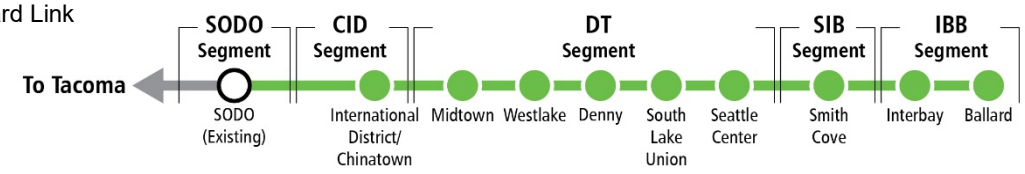
3.12.3.3.3 Chinatown-International District Segment

The new International District/Chinatown Station would be built next to the existing station. For a depiction of connections between these stations, see Appendix J, Conceptual Design Drawings. For the Chinatown-International District Segment, the project would increase ridership by about 50 percent compared to the No Build Alternative, largely due to rail-to-rail transfers between the two International District/Chinatown Station platforms (Table 3-17). A range of values is presented for the Build Alternatives because of the possibility that some rail-to-rail transfers could occur at the International District/Chinatown Station or other transfer points in the light rail system.

Table 3-17. 2042 Chinatown-International District Segment Station Ridership (Daily Boardings)

Station	Ridership- No Build Alternative	Ridership- Build Alternatives [a]
International District/Chinatown (new station)	Not applicable	9,000 to 11,000
International District/Chinatown (existing station)	23,500	21,000 to 23,000
Segment Total	**23,500**	**30,000 to 34,000**

[a] Includes Alternative CID-1a*, Option CID-1b*, Alternative CID-2a, and Option CID-2b.



3.12.3.3.4 Downtown Segment

The Downtown Segment includes five new stations in the Downtown, South Lake Union, and Uptown neighborhoods. Preferred Alternative DT-1 is expected to have slightly higher ridership than Alternative DT-2. Ridership in this segment is about 60 percent higher with either of the two Build Alternatives compared to the No Build Alternative, some of which is due to increased transit transfers (see station mode of access information in Section 3.12.3.4).

The daily ridership at the Westlake Station with either Build Alternative would be over 70,000, as riders on the Ballard Link Extension would be able to transfer to other Link lines at Westlake Station (riders could also transfer at the International District/Chinatown and SODO stations in the Chinatown-International District and SODO segments, respectively).

Alternative DT-2 would have fewer riders at the South Lake Union Station because there are fewer proposed bus connections at this station location. Some of these transfers would instead occur at the new Westlake Station. Different accessibility to land uses also contributes to the slightly lower overall ridership for Alternative DT-2, particularly at the Midtown and Denny stations. Table 3-18 shows the ridership for the Downtown Segment stations.

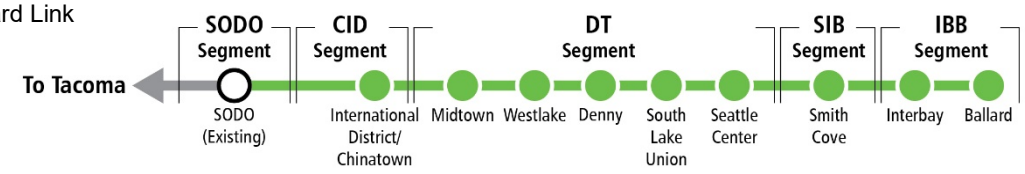
Table 3-18. 2042 Downtown Segment Station Ridership (Daily Boardings)

Station	Ridership- No Build Alternative	Ridership- Preferred 5th Avenue/Harrison Alternative (DT-1)	Ridership- 6th Avenue/Mercer Alternative (DT-2)
Pioneer Square Station (existing)	14,800	12,500	12,900
Midtown Station	Not Applicable	15,500	13,900
University Street Station (existing)	32,600	24,700	24,700
Westlake Station (existing)	53,000	45,200	45,500
Westlake Station (proposed)	Not Applicable	28,700	32,100
Denny Station	Not Applicable	15,300	12,000
South Lake Union Station	Not Applicable	10,500	6,100
Seattle Center	Not Applicable	11,300	11,500
Segment Total	**100,400**	**163,700**	**158,700**

3.12.3.3.5 South Interbay Segment

The proposed Smith Cove Station is expected to have the same number of daily boardings in the 2042 build condition (2,600) for all alternatives. Under the M.O.S., the Smith Cove Station would have a substantial increase in riders (8,200) compared to the full-length alternative. This increase in ridership is mainly a result of the additional bus service connections, creating more transit transfer activity at this M.O.S. terminus station.

The conceptual station design and environmental analysis conducted in Section 3.13, Ballard Link Extension Affected Environment and Impacts during Operation – Arterial and Local Street Operations, and Section 3.15, Ballard Link Extension Affected Environment and Impacts during Operation – Non-motorized Facilities, accounts for cruise ship activities at Terminal 91 to ensure the station area infrastructure supports this activity. The ridership forecasts are conservatively prepared to not incorporate potential riders accessing the nearby cruise ship terminal.



3.12.3.3.6 Interbay/Ballard Segment

The Interbay/Ballard Segment would have two stations, Interbay and Ballard, with the Ballard Station having the higher ridership due to its location within close proximity to dense housing and jobs as well as being the terminus station with planned bus connections. All of the segment alternatives would have similar ridership due to similar station locations, as shown in Table 3-19.

Table 3-19. 2042 Interbay/Ballard Segment Station Ridership (Daily Boardings)

Station	Ridership- Build Alternatives
Interbay Station	4,200
Ballard Station	13,100
Segment Total	**17,300**

3.12.3.4 Station Mode of Access

Based on the station ridership information presented in the previous section, as well as rider survey data, the project's Transit Service Integration technical memorandum (Attachment N.1C of Appendix N.1), and station and surrounding land use characteristics, Sound Transit calculated mode of access information for each station area. The station mode of access was developed for three different types of trips:

- Passenger drop-off and pick-up (including transportation network companies).
- Riders transferring between other transit services, such as buses.
- Walk and bicycle trips (non-motorized trips).

This mode of access information was then used to assess the traffic operation, parking, and non-motorized conditions around each station in Sections 3.13.3, 3.14.3, and 3.15.3, respectively.

Table 3-20 presents the 2042 p.m. peak forecasts of trip activity at proposed and existing stations in the study area by mode for the full-length build and M.O.S.

The station with the greatest number of new trips expected is Westlake (among the existing and proposed stations), where ridership would increase by about 40 percent over the No Build Alternative. However, most of these trips would be rail-to-rail transfers and would not affect the surrounding transportation system. Some existing downtown stations would experience less activity as riders shift to other stations, taking advantage of the expanded light rail system.

With the Ballard Link Extension-only M.O.S., an interim terminus at the Smith Cove Station is assumed and the peak hour trips (most notably pick-up, drop-off, and transit transfers) at the station would increase compared to the full-length build condition. Most of the increased vehicle trips are assumed to access the station from the north, because the Interbay and Ballard stations would not be in service under this condition. Table 3-20 includes trip generation for the Smith Cove Station trip in the M.O.S.

3.12.3.5 Transit Levels of Service

All of the transit L.O.S. measures (frequency, span, reliability, and passenger load) apply to all of the Ballard Link Extension Build Alternatives.

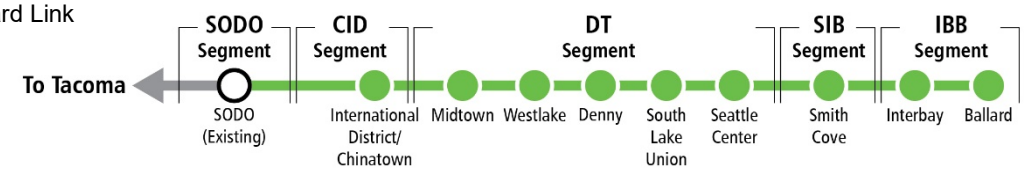
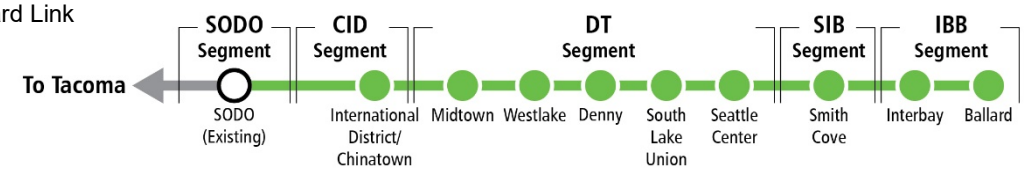


Table 3-20. 2042 P.M. Peak Hour Station Trip Generation by Mode (Boardings and Alightings) – Ballard Link Extension

Segment	Station	Alternative	Walk and Bike Trips	Drop-off and Pick-up Trips [a]	Transit Transfers	Total Station Trips [b]
Chinatown-International District	Stadium (existing) – Build and (No Build) [c]	All Alternatives	700 (600)	50 (50)	0 (10)	700 (700)
	International District/ Chinatown (existing and proposed) – Build and (No Build) [c]	4th Avenue Shallow (CID-1a)*	3,900 (3,000)	200 (150)	4,000 (3,100)	8,100 (6,300)
		4th Avenue Deep Station Option (CID-1b)*	3,900 (3,000)	200 (150)	4,000 (3,100)	8,100 (6,300)
		5th Avenue Shallow (CID-2a)	3,800 (3,000)	200 (150)	5,300 (3,100)	9,300 (6,300)
		5th Avenue Deep Station Option (CID-2b)	3,800 (3,000)	200 (150)	5,300 (3,100)	9,300 (6,300)
Downtown	Pioneer Square (existing) – Build and (No Build) [c]	Preferred 5th Avenue/Harrison Street (DT-1)	2,800 (3,300)	150 (150)	100 (150)	3,000 (3,600)
		6th Avenue/Mercer Street (DT-2)	2,900 (3,300)	150 (150)	100 (150)	3,200 (3,600)
	Midtown	Preferred 5th Avenue/Harrison Street (DT-1)	3,500	150	250	3,800
		6th Avenue/Mercer Street (DT-2)	3,100	150	200	3,400
	University Street (existing) – Build and (No Build) [c]	All Alternatives	5,800 (6,600)	250 (300)	250 (1,200)	6,300 (8,100)
	Westlake (existing and proposed) – Build and (No Build) [c]	Preferred 5th Avenue/Harrison Street (DT-1)	12,500 (12,100)	600 (600)	6,000 (1,400)	19,000 (14,000)
		6th Avenue/Mercer Street (DT-2)	13,700 (12,100)	600 (600)	5,800 (1,400)	20,100 (14,000)
	Denny	Preferred 5th Avenue/Harrison Street (DT-1)	3,400	150	600	4,100
		6th Avenue/Mercer Street (DT-2)	2,500	150	600	3,300
	South Lake Union	Preferred 5th Avenue/Harrison Street (DT-1)	2,000	100	1,000	3,100
		6th Avenue/Mercer Street (DT-2)	1,200	50	500	1,800
	Seattle Center	All Alternatives	2,500	100	350	3,000



Segment	Station	Alternative	Walk and Bike Trips	Drop-off and Pick-up Trips [a]	Transit Transfers	Total Station Trips [b]
South Interbay	Smith Cove	Preferred Galer Street/Central Interbay (SIB-1)	500	50	150	700
		Prospect Street Station/15th Avenue (SIB-2)	450	50	200	700
		Prospect Street Station/Central Interbay (SIB-3)	450	50	200	700
		M.O.S.	500	100	1,700	2,300
Interbay/ Ballard	Interbay	All Alternatives	200	50	800	1,100
	Ballard	All Alternatives	1,400	200	1,800	3,400

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: These ridership estimates represent typical weekday conditions. For a discussion of demand surges associated with special events, see Section 3.15.3.

[a] Includes transportation network companies (e.g., Uber and Lyft).

[b] Due to rounding, some totals may not exactly match the sum of the values in their rows.

[c] Build values represent the total forecasted ridership in the build condition; this includes both the proposed and existing stations.

3.12.3.5.1 Frequency

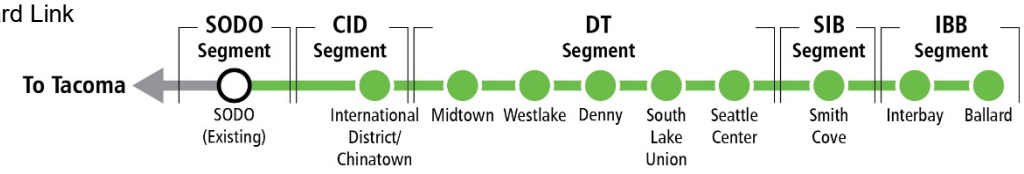
In 2042, the Ballard Link Extension would provide direct, high-frequency light rail service from Ballard to Downtown Seattle and beyond, with service running at 5-minute headways during the peak periods. With the project and associated bus network restructures in place, all riders crossing the Ballard Bridge screenline and over 99 percent of riders at all three screenlines would experience frequency L.O.S. of A or B, with headways improved from about 15 minutes to between 8 and 11 minutes depending on screenline. On average, the build condition represents an approximately 50 percent improvement in route frequency over the no build condition.

3.12.3.5.2 Span

Under the 2042 No Build Alternative, the bus routes crossing the three screenlines would have an average span of service between 18 to 19 hours per day with the No Build Alternative, or L.O.S. B to A. With the project, the Ballard Link Extension would operate for 20 hours per day, or L.O.S. A.

3.12.3.5.3 Reliability

The reliability of bus service in the study area would remain poor in 2042 under the No Build Alternative. Most routes along the corridor operate at L.O.S. E and F currently, and this is generally expected to remain the same or degrade as congestion worsens in the future (see Section 3.13.3). Bus transit speed and reliability improvements are being planned along portions of some roadways in the project corridor, but bus service reliability is not expected to improve substantially beyond existing conditions under the No Build Alternative as it would continue to mainly operate within general traffic.



The Ballard Link Extension would improve average transit reliability in the study area as it would operate in an exclusive right-of-way separated from vehicle traffic with no at-grade conflicts with other travel modes. Its reliability is expected to be similar to the existing light rail service of L.O.S. A.

Under Alternative IBB-3, the moveable bridge across Salmon Bay would be required to open for certain marine vessels to pass through. During the 2013 to 2017 timeframe, the Ballard Bridge opened an average of 210 times per month in the winter (December to February) and an average of 455 times in the summer months (June to August). The Alternative IBB-3 moveable bridge would have a 70-foot vertical clearance at the center, so would open less frequently than the existing Ballard Bridge, which has an approximately 46-foot vertical clearance. This would interrupt light rail service and result in light rail passenger service delays, both for the bridge opening period and a recovery period to restore schedules throughout the light rail line. Peak hour delays would rarely occur because of bridge lift restrictions for most vessels navigating through Salmon Bay. However, the largest vessels—those of greater than 1,000 tons and tow boats hauling that much or more—are exempt from the regulations that restrict bridge openings and could disrupt service at any time.

3.12.3.5.4 Passenger Load

Under the 2042 No Build Alternative, bus and light rail ridership would operate with high passenger loads in areas of the project corridor (Table 3-21). In the p.m. peak hour, bus service passenger loads would be at L.O.S. D in the peak direction (outbound) across the Ballard Bridge, indicating high demand for transit. Passenger loads on the light rail system would be over capacity at the South Main Street screenline in the peak direction (outbound).

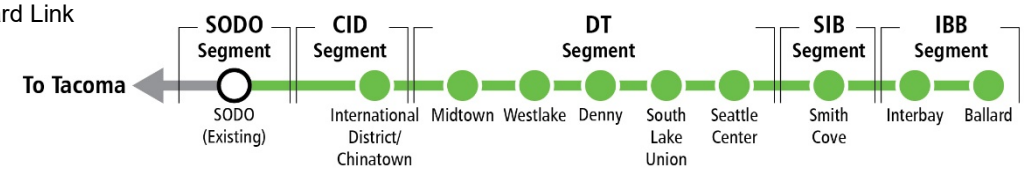
With the Ballard Link Extension, the passenger load L.O.S. on the light rail system at the north of Denny Way and Ballard Bridge screenlines are expected to be L.O.S. A. At the South Main Street screenline, passenger load L.O.S. would be E on the Ballard Link Extension in the peak (outbound) direction, which would be an improvement for riders traveling between Downtown Seattle and points to the south when compared to the No Build Alternative. Bus passenger load L.O.S. are expected to improve with the project as riders shift from bus to using light rail.

Table 3-21. Passenger Load – 2042 P.M. Peak Hour – Ballard Link Extension

Screenline Location	Direction [a]	No Build Alternative Bus L.O.S.	No Build Alternative Light Rail L.O.S. Everett to Tacoma Line	Build Alternatives Bus L.O.S.	Build Alternatives Light Rail L.O.S. Ballard Link Extension
South of South Main Street	Inbound	A	A	A	A
South of South Main Street	Outbound	A	F	C	E
North of Denny Way	Inbound	A	Not applicable	A	A
North of Denny Way	Outbound	C	Not applicable	A	A
Ballard Bridge	Inbound	A	Not applicable	A	A
Ballard Bridge	Outbound	D	Not applicable	A	A

Note: The source of these forecasts is the Sound Transit ridership model, which generates a single set of peak values; the a.m. passenger loads are assumed to be similar to the p.m. results shown here.

[a] Inbound toward Downtown Seattle, outbound away from Downtown Seattle. The p.m. peak hour travel direction is westbound for the West Seattle Bridge screenline and southbound for the South Lander Street screenline.



3.12.4 Mitigation for Operation Impacts

Sound Transit would continue to coordinate with transit service providers as the project advances to maintain efficient transit operations, including refinements to the transit service planning documented in Section 3.2.2.2 of Appendix N.1, Transportation Technical Report. Impacts to specific transit facilities were identified for all alternatives and design options, including the permanent closure of the Ryerson Bus Base under Option CID-1b* and permanent closures of layover spaces, comfort stations, key transit pathways, and the SODO Busway, and access to Metro's Ryerson and Atlantic/Central bus bases. These impacts would be addressed through ongoing coordination between Sound Transit, the City of Seattle, Metro, and FTA to identify capital, routing, alternative base locations and capacity, and access management strategies that would be implemented before transit service operations would be affected. Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project.

3.13 Ballard Link Extension Affected Environment and Impacts during Operation – Arterial and Local Street Operations

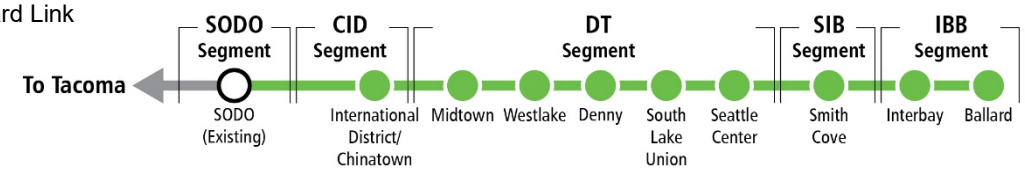
This section presents existing operations of the arterials and local roadways in the study area and their intersection L.O.S., future No Build Alternative and Build Alternatives traffic forecasts, and peak hour intersection L.O.S. compared to project-specific L.O.S. thresholds and potential effects on local access to adjacent properties and traffic circulation with the Build Alternatives.

3.13.1 Affected Environment

3.13.1.1 Property Access and Circulation

In the SODO Segment, the roadway system consists of a grid network of arterials that serves industrial land uses, with vehicles traveling predominately north and south. Important routes in this segment are 1st Avenue South and 4th Avenue South, which provide connections between Downtown Seattle and State Route 99, the West Seattle Bridge, and Interstate 90. East-west circulation is limited to a few major east-west arterials including South Spokane Street, South Holgate Street, and South Lander Street. There are at-grade BNSF mainline track and light rail track crossings at these locations, which can cause delays. The South Lander Street overpass was recently constructed between 1st Avenue and 4th Avenue to reduce the rail conflict on the BNSF mainline track.

In the Chinatown-International District Segment, several north-south arterials provide important routes to Downtown Seattle. 1st Avenue South and 4th Avenue South connect downtown with State Route 99, South Royal Brougham Way (State Route 519), the West Seattle Bridge, and Interstate 90. Seattle Boulevard South/South Airport Way connects downtown with Georgetown neighborhood to the south. The roadway network in this area provides access to Union Station, King Street Station, Lumen Field, T-Mobile Park, WaMu Theater, and other businesses in the Chinatown-International District and Pioneer Square neighborhoods. South Jackson Street is a major east-west connection between the Waterfront and Pioneer Square neighborhoods and residential neighborhoods to the east. The First Hill Streetcar also operates on South Jackson



Street. South Dearborn Street provides access to 4th Avenue South, Interstate 5, and Rainier Avenue South.

The Downtown Segment is served by a large network of arterials in a grid pattern. Main north-south roadways include 1st Avenue North, 2nd Avenue, 4th Avenue, 5th Avenue, 5th Avenue North, 6th Avenue South, 7th Avenue North, 8th Avenue, 9th Avenue, 9th Avenue North, Dexter Avenue North, Queen Anne Avenue North, Taylor Avenue North, and Westlake Avenue. Main east-west roadways include Columbia Street, Denny Way, Harrison Street, Madison Street, Marion Street, Mercer Street, Olive Way, Pike Street, Pine Street, Republican Street, Roy Street, West Roy Street, Seneca Street, and Spring Street.

In the South Interbay Segment, Elliott Avenue West and 15th Avenue West connect Downtown Seattle with the Magnolia and Ballard neighborhoods to the west and north, respectively. West Mercer Street/West Mercer Place provides a connection between Uptown and Elliott Avenue West. The Magnolia Bridge provides access from Downtown Seattle to the Magnolia neighborhood and the West Galer Street Flyover provides access between 15th Avenue West and properties west of the BNSF Railway tracks, including the Port of Seattle Terminal 91, Expedia Group campus, Louis Dreyfus grain terminal, and Centennial Park.

The Interbay/Ballard Segment is also served by 15th Avenue West/15th Avenue Northwest, which connects Downtown Seattle and Ballard. The West Emerson Street/West Nickerson Street corridor connects Magnolia, 15th Avenue West, North Queen Anne, and Seattle Pacific University. West Dravus Street connects Magnolia, Queen Anne, and Interbay with 15th Avenue West. Northwest Market Street connects Ballard and Wallingford with State Route 99, Interstate 5, and the University District. Leary Way Northwest connects Ballard and Fremont.

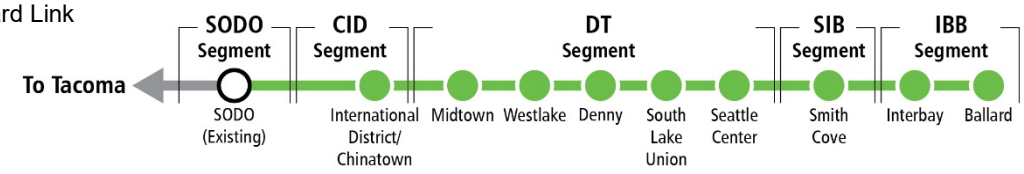
3.13.1.2 Intersection Operations

Intersections surrounding potential station areas were evaluated during peak hours to better understand existing traffic operations. All studied intersections were evaluated with the peak 1-hour traffic count for each intersection during the a.m. and p.m. peak hours (between 6 and 8 a.m. and 4 and 6 p.m.). While the p.m. peak hour generally represents the most congested period of the day, some locations may have worse a.m. operations as a result of local land uses and traffic patterns. Intersection operations are described in terms of L.O.S., ranging from A to F, where L.O.S. A represents little to no congestion with under-used lane capacity and free-flow travel speeds, while L.O.S. E represents conditions that are at capacity and L.O.S. F represents poor operating conditions where demand exceeds the intersection's capacity with vehicle queuing and frequent stop-and-go travel. Detailed L.O.S. results are provided in Section 4.2 of Appendix N.1.

In the SODO Segment, all study intersections operate at L.O.S. D or better during both the a.m. and p.m. peak periods.

In the Chinatown-International District Segment, four signalized intersections in the project study area currently operate at L.O.S. E or F in the a.m. and p.m. peak hours.

Many of the intersections in the Downtown Segment operate at L.O.S. E or F in the a.m. and p.m. peak hours. High levels of traffic volumes and closely spaced intersections, as well as large pedestrian and bicycle activity, contribute to the congestion on many of the one-way streets in the downtown area. Four of the studied intersections operate at L.O.S. E or worse during the p.m. peak hour and seven operate at L.O.S. E or worse during the a.m. peak hour.



For the South Interbay Segment, Elliott Avenue West experiences high traffic volumes during both peak hours. Two of the studied intersections operate at L.O.S. E or F during one or both of the a.m. or p.m. peak hours.

In the Interbay/Ballard Segment, 15th Avenue West/15th Avenue Northwest is a major north-south arterial. Three of the studied intersections operate at L.O.S. E or F during one or both of the a.m. or p.m. peak hours.

3.13.2 Environmental Impacts of the No Build Alternative

As part of the No Build Alternative, other transportation projects assumed to be completed in the Downtown Segment include the City Center Connector Streetcar project and transit improvements related to the Seattle Arena Renovation Project, such as transit-only lanes along 1st Avenue North and Queen Anne Avenue North. In the South Interbay Segment, the No Build Alternative includes the signalization of the Alaskan Way West/West Galer Street Flyover intersection. For a complete list of the background transportation projects under the No Build Alternative, see Attachment N.1A of Appendix N.1, Transportation Technical Report.

Traffic volumes for the No Build Alternative were forecasted for the 2042 a.m. and p.m. peak hours using Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Peak hour traffic volumes forecasted in the Ballard Link Extension study area are expected to grow by an average of 0.8 percent per year between 2019 and 2042. Because of this traffic growth, many intersections are expected to worsen in the future under the no build condition compared to the existing conditions. By 2042, 21 intersections in the a.m. peak hour and 17 intersections in the p.m. peak hour are expected to operate at L.O.S. E or F conditions (Figure 3-8 through Figure 3-12).

3.13.3 Environmental Impacts of the Build Alternatives

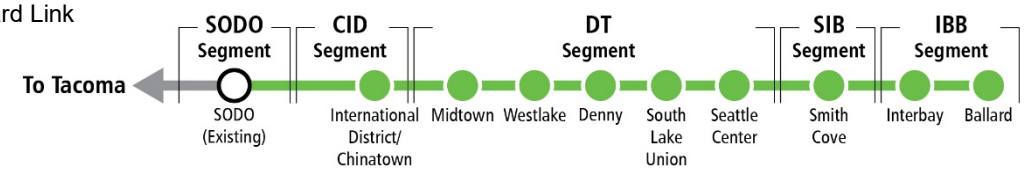
3.13.3.1 Property Access and Circulation

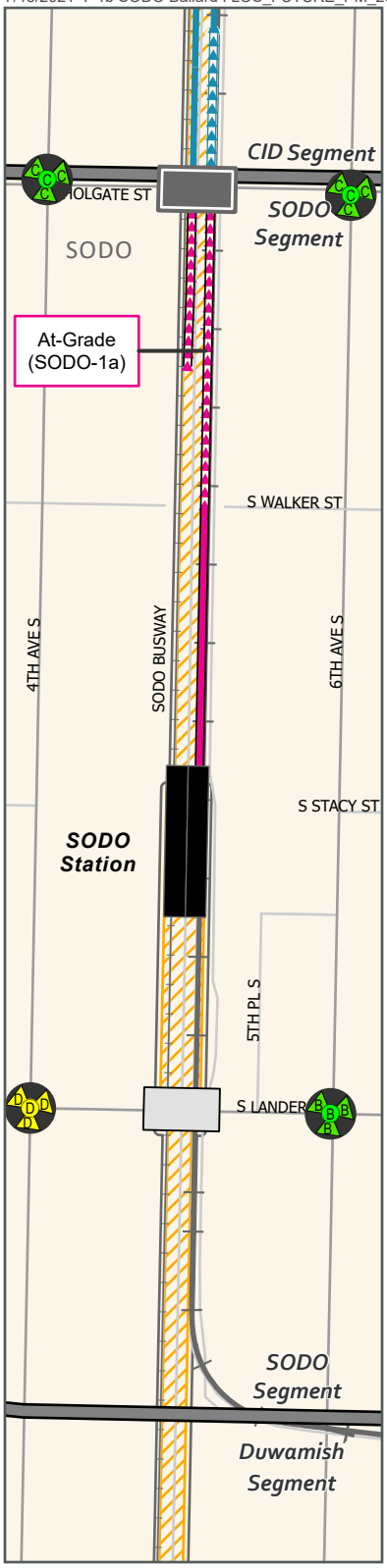
This section describes the main roadway modifications and traffic circulation changes proposed under each Build Alternative by segment. For example, roadway modifications may be needed to accommodate columns associated with an elevated guideway within the roadway or modifications to the street network surrounding stations. In these situations, left-turn access to properties may be restricted, with guideway columns proposed in the roadway median. To maintain property access, vehicles would either be able to recirculate using the surrounding street grid system or, where feasible, U-turn movements would be provided at adjacent intersections. The conceptual design drawings in Appendix J show additional detail about each alternative.

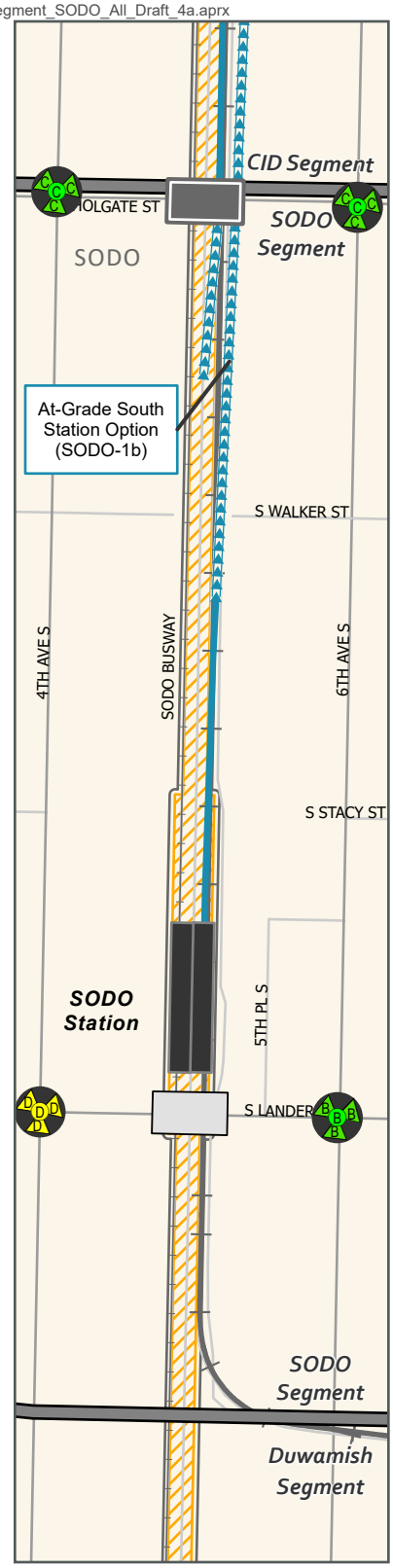
3.13.3.1.1 SODO Segment

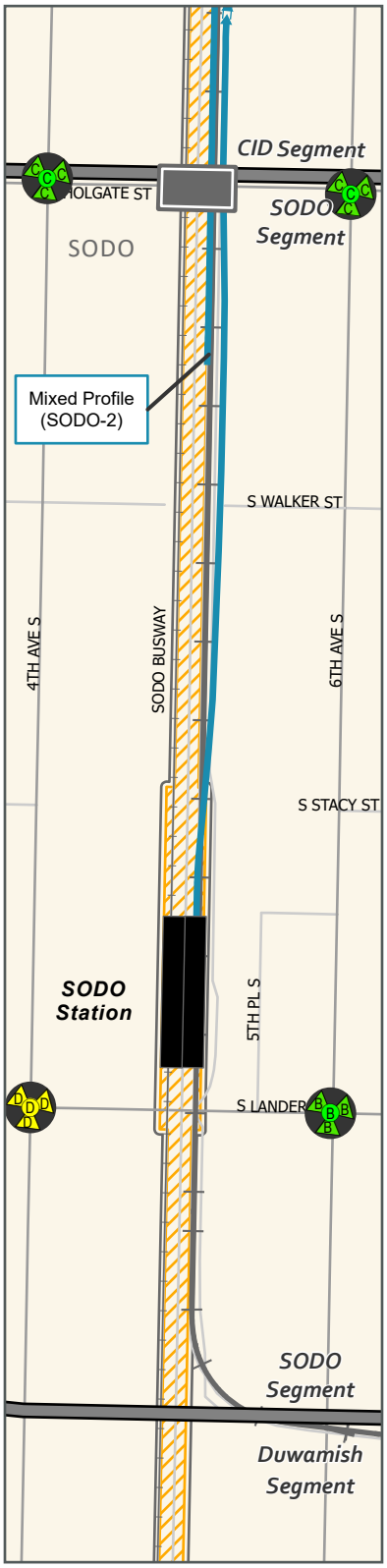
All SODO alternatives would construct an elevated South Holgate Street overpass between 4th Avenue South and 6th Avenue South for the Ballard Link Extension. This would eliminate an existing at-grade conflict with the existing light rail line that interrupts east-west traffic flow in the area. Property access on this section of South Holgate Street would be maintained with new driveways potentially on 4th Avenue South or 6th Avenue South.

Both Preferred Alternative SODO-1a and Option SODO-1b would close the SODO Busway. The SODO Busway would be relocated west and remain open with Alternative SODO-2. This is further described in Section 3.12.3.1.2.









Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- Existing

- Segment Line
- Existing Link Light Rail
- Railroad
- SODO Busway
- Existing Overpass
- Proposed Overpass

LOS Key for Alternatives

- SODO-1a
- SODO-2
- SODO-1b
- No Build

Level of Service (LOS)

A-C D E-F

FIGURE 3-8
2042 P.M. Peak Hour Intersection Level of Service(L.O.S.)
Ballard Link Extension - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet

N

Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

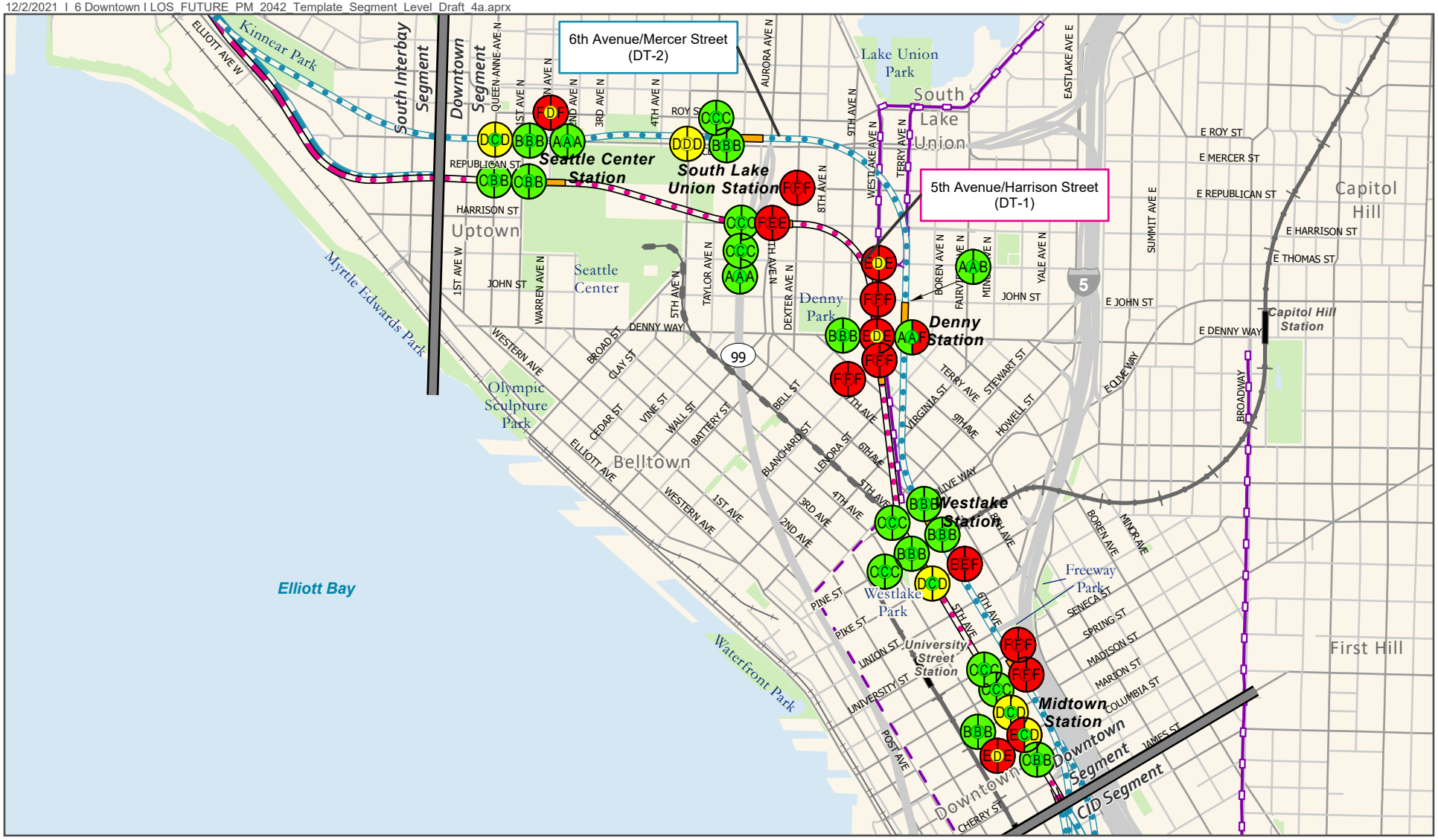
- Segment Line
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- SODO Busway
- Proposed Overpass
- Park

LOS Key for Alternatives
- CID-1a
- CID-2a
- CID-1b
- CID-2b
- No Build

Level of Service (LOS)
- A-C
- D
- E-F

FIGURE 3-9
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Chinatown-International District Segment
West Seattle and Ballard Link Extensions

0 700 1,400 Feet N



Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New
- Existing

- Segment Line
- Existing Link Light Rail
- Monorail
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- Park

LOS Key for Alternatives

DT-1 | DT-2 | No Build

Level of Service (LOS)
- A-C
- D
- E-F

FIGURE 3-10

2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)

Ballard Link Extension - Downtown Segment

West Seattle and Ballard Link Extensions

0 1,000 2,000 Feet

N

Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New

- Segment Line
- Railroad
- Park

LOS Key for Alternatives
- SIB-1
- SIB-3
- SIB-2
- No Build

Level of Service (LOS)
- A-C
- D
- E-F

0 800 1,600 Feet

N

FIGURE 3-11
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- Tunnel
- At-Grade
- Retained Cut

Station
- New

- Segment Line
- Railroad
- Stream
- Park

LOS Key for Alternatives

IBB-1a, IBB-2b, IBB-1b, IBB-3, IBB2a, No Build

Level of Service (LOS)
A-C D E-F

FIGURE 3-12

2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)

Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet

N

3.13.3.1.2 Chinatown-International District Segment

Alternative CID-1a* would close the SODO Busway between South Royal Brougham Way and South Holgate Street, with Ryerson Bus Base access shifted west on South Royal Brougham Way and a potential modified access from 4th Avenue South near South Massachusetts Street. Option CID-1b* would permanently close the Ryerson Bus Base and the entire SODO Busway to South Spokane Street. See Section 3.5.3.3.2 for more information on the general traffic effects of the SODO Busway closure.

Alternative CID-1a* and Option CID-1b* would eliminate the existing southbound left-turn lane to the Union Station parking garage near the South Weller Street Bridge and the existing northbound bus lane on 4th Avenue South from south of Seattle Boulevard South to South Jackson Street. For analysis purposes, it was assumed that the northbound bus lane would be repurposed, because the number of buses using this section of 4th Avenue South would be substantially reduced by the time Ballard Link Extension light rail service begins. Other options could be explored in coordination with the City of Seattle and Metro as design progresses. No changes are proposed to the general purpose traffic circulation under Alternative CID-2a and Option CID-2b.

3.13.3.1.3 Downtown Segment

Preferred Alternative DT-1 would close a short segment of 9th Avenue between Westlake Avenue and Denny Way to provide an entrance plaza for the Denny Station. This closure would result in the removal of on-street parking and loading areas.

No roadway changes or access or circulation modifications are proposed for Alternative DT-2.

3.13.3.1.4 South Interbay Segment

Preferred Alternative SIB-1 would construct medians to support the columns under the elevated light rail guideway along Elliott Avenue West south of the Smith Cove Station. Left-turn access from Elliott Avenue West to approximately ten properties would be restricted.

Alternative SIB-2 would construct medians to support guideway columns on Elliott Avenue West and 15th Avenue West south of West Barrett Street. This would remove left-turn access to two properties on Elliott Avenue West and to all midblock properties on 15th Avenue West between West Newton Street and West Barrett Street.

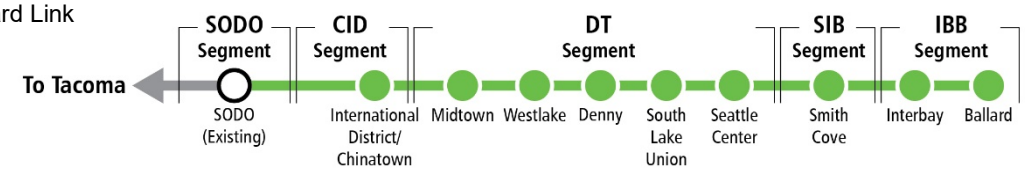
No roadway changes or access or circulation modifications are proposed with Alternative SIB-3.

3.13.3.1.5 Interbay/Ballard Segment

With both Preferred Alternative IBB-1a and Option IBB-1b, the northbound travel lane of 14th Avenue Northwest would be shifted west to accommodate the proposed light rail guideway along the east side of the roadway, eliminating the existing median between Northwest 50th Street and Northwest 59th Street.

Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would require access modifications near Interbay Station. The 17th Avenue West roadway would be realigned to parallel the light rail alignment and then cross via a proposed bridge to access the station and the remaining properties on Thorndyke Avenue West. 16th Avenue West would be truncated just south of the realigned 17th Avenue West. Access to remaining properties in this area would be maintained.

For Alternative IBB-3, medians would be constructed to support the light rail guideway along 15th Avenue Northwest between Northwest 56th Street and Northwest 57th Street. This would



restrict left-turn access to properties between Northwest 56th Street and Northwest 57th Street, but the street grid network would allow traffic to recirculate for access to the affected properties. Existing traffic movements at the 15th Avenue Northwest and Northwest Market Street intersection would remain.

3.13.3.2 Travel Demand Forecast

For the Build Alternatives, station characteristics and information from the Sound Transit Incremental Ridership Model (Sound Transit 2019) were used to calculate the anticipated vehicular trip generation for each station area. To estimate traffic volumes for the Build Alternatives, the increase in vehicle and non-motorized trips generated at each station were added to the No Build Alternative traffic forecast. The station mode of access information for the Build Alternatives is described in Section 3.12.3.4. This process is conservative, because it does not reduce the no build traffic volumes to account for people changing from driving in the No Build Alternative to using transit with the project. The traffic forecasts for the No Build Alternative are previously described in this section.

Passenger drop-off and pick-up and bus trips are vehicle trips that are assigned to the surrounding streets. Bus service modifications are described in Section 3.12.3, as well as in the Transit Service Integration technical memorandum (Attachment N.1C of Appendix N.1, Transportation Technical Report). Station walk and bicycle trips were assigned based on the location of the station facilities, such as transit stops, pick-up and drop-off spaces, and entrances, and were incorporated in the traffic analysis. These trips were also included in the pedestrian L.O.S. assessment in Section 3.15.3. None of the stations include park-and-ride lots.

3.13.3.3 Arterial and Local Street Operations

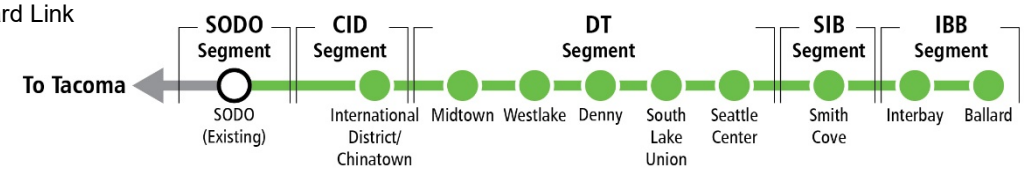
Intersection p.m. peak hour L.O.S. results are presented on Figure 3-8 through Figure 3-12 for 2042 for the No Build Alternative and Ballard Link Extension alternatives. In the absence of an adopted City of Seattle intersection L.O.S. threshold, intersections that operate at L.O.S. E or L.O.S. F are identified as failing. With the Build Alternatives, an affected intersection is defined as a location expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, to have noticeably worse vehicle delays in the Build Alternative (10 percent or more worse delay than the No Build Alternative).

3.13.3.3.1 Impacts Common to All Alternatives

Most affected intersections under the Build Alternatives are a result of increased vehicle trips for pick-up and drop-off and pedestrian and bicycle activity that increase delays near stations. Ballard Link Extension project-affected intersections are described in the following sections, with more detailed discussion, including a.m. peak hour analysis results, in Section 4.3 of Appendix N.1.

3.13.3.3.2 SODO Segment

Because the West Seattle Link Extension is assumed to be operating in the Ballard Link Extension's 2042 build condition, the intersection operations and L.O.S. in the SODO Segment with the Ballard Link Extension would be the same as for the West Seattle Link Extension as the SODO Station would be constructed as part of the West Seattle Link Extension. Therefore, all Build Alternatives would have similar L.O.S. results as the No Build Alternative. Figure 3-8 shows the 2042 p.m. peak hour L.O.S. results for the SODO Segment alternatives.



Preferred Alternative SODO-1a and Option SODO-1b would permanently close the SODO Busway with bus routes using parallel streets. However, the intersection L.O.S. during the peak hours would not change compared to the No Build Alternative. See Section 3.12.3.1.2 for more information on the SODO Busway closure.

The proposed South Holgate Street overpass between 4th Avenue South and 6th Avenue South with all the SODO alternatives would eliminate the existing at-grade rail crossing and associated vehicle delays and vehicle queuing along South Holgate Street that occurs during these train crossings.

3.13.3.3.3 Chinatown-International District Segment

Under the 2042 No Build Alternative, three intersections operate at L.O.S. E or F during the a.m. and p.m. peak hours. Figure 3-9 shows the 2042 p.m. L.O.S. results for the Chinatown-International District Segment alternatives.

Alternative CID-1a* and Option CID-1b* would affect the 4th Avenue South/Seattle Boulevard South intersection in the a.m. peak hour because of the rechannelization of 4th Avenue South associated with the removal of the northbound bus lane. All Build Alternatives would affect the 5th Avenue South midblock crossing (south of South Weller Street) with the higher pedestrian and bicycle activity around the station.

3.13.3.3.4 Downtown Segment

Under the 2042 No Build Alternative, many of the intersections in the Downtown Segment would operate at L.O.S. E or F in the a.m. and p.m. peak hours. Eight of the study intersections would operate at L.O.S. E or F in the p.m. peak hour and twelve would operate at L.O.S. E or F in the a.m. peak hour.

Intersections expected to be worse than the 2042 No Build Alternative and to operate at L.O.S. E or F in either peak hour are shown in Table 3-22. Figure 3-10 displays the 2042 p.m. peak hour L.O.S. results for both alternatives compared to the No Build Alternative. Increased intersection delay at affected intersections is mainly due to the pick-up/drop-off activity and pedestrian and bicyclists accessing the stations.

3.13.3.3.5 South Interbay Segment

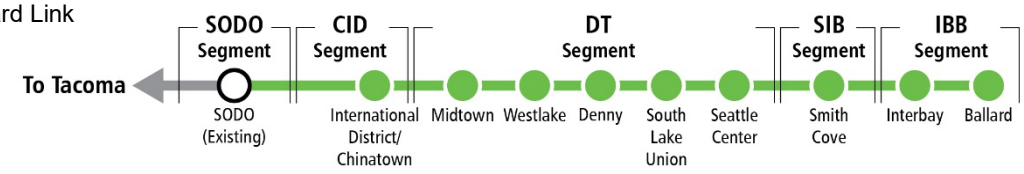
Under the 2042 No Build Alternative, four signalized intersections in the South Interbay Segment operate at L.O.S. E or worse in the a.m. and p.m. peak hours.

The Elliott Avenue West/West Galer Street Flyover intersection would get worse and operate at L.O.S. F during the p.m. peak hour under Preferred Alternative SIB-1, as the station access is located at this location.

With Alternative SIB-2 and Alternative SIB-3, traffic conditions would be similar to Preferred Alternative SIB-1 except at the Elliott Avenue West/West Galer Street Flyover intersection, which would operate better in the p.m. peak hour (L.O.S. E) than with Preferred Alternative SIB-1 but would experience more delay than under the No Build Alternative.

Figure 3-11 shows the 2042 p.m. peak hour L.O.S. results for the South Interbay Segment alternatives.

Under the M.O.S., in addition to the impacts at the Elliott Avenue West/West Galer Street Flyover intersection under the full-length condition, the Elliott Avenue West/West Prospect Street intersection would be affected under Alternative SIB-3 in the a.m. peak hour.



For all alternatives except Alternative SIB-3 under the M.O.S., increased intersection delay at the affected intersections is mainly due to the pick-up/drop-off activity and pedestrian and bicyclists accessing the stations. For Alternative SIB-3 under the M.O.S., the added intersection delay is due primarily to increased pick-up/drop-off activity.

See Appendix N.1 for further information on the intersection L.O.S. results for the M.O.S.

Table 3-22. Downtown Segment Potentially Impacted Intersections by Peak Hour in 2042 – Ballard Link Extension

Intersection	Preferred 5th Avenue/Harrison Street Alternative (DT-1)	6th Avenue/Mercer Street Alternative (DT-2)
4th Avenue/Marion Street	a.m., p.m.	p.m.
5th Avenue/Columbia Street	a.m.	None
5th Avenue/Marion Street	a.m., p.m.	a.m.
5th Avenue/Pike Street	a.m.	a.m.
5th Avenue/Seneca Street	None	a.m.
6th Avenue/Pike Street	a.m., p.m.	a.m., p.m.
6th Avenue/Seneca Street	None	a.m., p.m.
6th Avenue/Spring Street	None	a.m., p.m.
8th Avenue/Blanchard Street	None	p.m.
Aurora Avenue North/Harrison Street	p.m.	None
Dexter Avenue North/Republican Street	a.m., p.m.	a.m., p.m.
Queen Anne Avenue North/West Mercer Street	a.m.	a.m.
Queen Anne Avenue North/West Republican Street	a.m.	None
Terry Avenue North/Denny Way	None	a.m., p.m.
Warren Avenue North/Roy Street	p.m.	a.m., p.m.
Westlake Avenue North/Blanchard Street	a.m., p.m.	a.m., p.m.
Westlake Avenue North/Denny Way	a.m., p.m.	a.m., p.m.
Westlake Avenue North/John Street	a.m., p.m.	a.m., p.m.
Westlake Avenue North/Thomas Street	p.m.	p.m.

Note: An impacted intersection in the Build Alternative is expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, have noticeably worse vehicle delays in the Build Alternative.

3.13.3.3.6 Interbay/Ballard Segment

Under the 2042 No Build Alternative, three intersections along 15th Avenue Northwest operate at L.O.S. E or F during the a.m. and p.m. peak hours. Intersections expected to be worse than the 2042 No Build Alternative and to operate at L.O.S. E or F in either peak hour are shown in Table 3-23. Figure 3-12 shows the 2042 p.m. peak hour L.O.S. results for the Interbay/Ballard Segment.

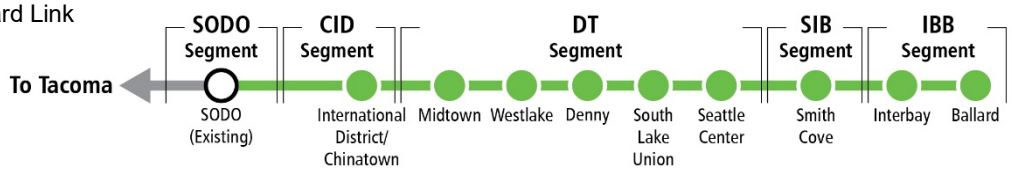


Table 3-23. Interbay/Ballard Segment Potentially Impacted Intersections by Peak Hour – Ballard Link Extension

Intersection	Preferred Elevated 14th Avenue Alternative (IBB-1a) and Elevated 14th Avenue Alternative Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	Preferred Tunnel 14th Avenue Alternative (IBB-2a)*	Preferred Tunnel 15th Avenue Station Option (IBB-2b)* and Elevated 15th Avenue Alternative (IBB-3)	Cause
15th Avenue Northwest/Northwest 54th Street	None	None	a.m.	Increased pick-up/drop-off activity
15th Avenue Northwest/Northwest Market Street	p.m.	p.m.	p.m.	Increased pick-up/drop-off activity and non-motorized station access

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: An impacted intersection in the Build Alternative is expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, have noticeably worse vehicle delays in the Build Alternative.

3.13.4 Mitigation for Operation Impacts

Mitigation could be required at intersections where the intersection L.O.S. would not meet agreed-to project-specific L.O.S. thresholds when compared to the No Build Alternative. Intersections that would be considered for potential mitigation measures would vary depending on the alternative in each segment and are noted in Table 3-24.

Sound Transit would continue to work with the City of Seattle and FTA as the Ballard Link Extension project design progresses to minimize project-related intersection delays. Where additional project-related delays are unavoidable, Sound Transit would work with the City of Seattle and FTA to review potential mitigation at intersections identified in Table 3-24, with the intent of either meeting agreed-upon L.O.S. thresholds during the a.m. and p.m. peak hours or attaining a similar vehicle delay as under the No Build Alternative.

The intersection mitigation treatments would likely vary depending on the intersection location and cause of the increased vehicular delay. At intersections or movements where the delay is the result of vehicular operations such as pick-up/drop-off activity or additional transit buses, mitigation measures could include corridor signal optimization, upgraded signal technologies, implementation of corridor intelligent transportation system strategies, traffic movement and turn restrictions, or added intersection capacity, where feasible. For intersections or movements where increased delay is primarily due to increased non-motorized activity associated with the station, mitigation could be focused instead on strategies such as signal optimization for pedestrians, intersection crossing enhancements, pedestrian and/or bicycle facility modifications, reducing conflicts between vehicles and non-motorized users, or wayfinding, with the goal of improving safety and providing more efficient movement of pedestrians and cyclists.

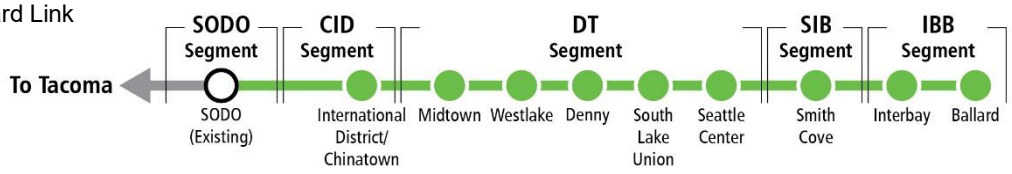


Table 3-24. Potentially Impacted Intersections to be Considered for Mitigation – Ballard Link Extension

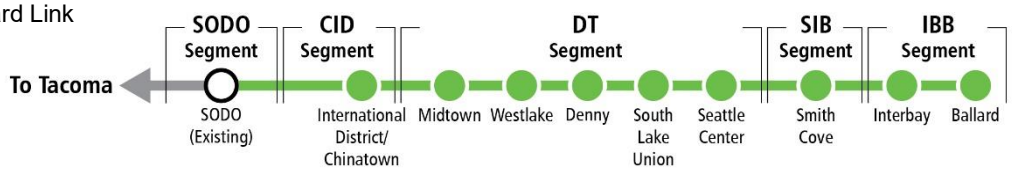
Segment	Intersection	Alternative	Cause
Chinatown-International District Segment	5th Avenue South midblock crossing (south of South Weller Street)	All	Non-motorized station access
	4th Avenue South/Seattle Boulevard Southwest	Alternative CID-1a* and Option CID-1b*	Project-related rechannelizations
Downtown Segment	14 intersections (see Table 3-22)	Preferred Alternative DT-1	Increased pick-up/drop-off activity and non-motorized station access
	16 intersections (see Table 3-22)	Alternative DT-2	Increased pick-up/drop-off activity and non-motorized station access
South Interbay	Elliott Avenue West/West Galer Street Flyover	All	Increased pick-up/drop-off activity and non-motorized station access
	Elliott Avenue West/West Prospect Street	Alternative SIB-3 (M.O.S.)	Increased pick-up/drop-off activity
Interbay/Ballard Segment	15th Avenue Northwest/Northwest Market Street	All	Increased pick-up/drop-off activity and non-motorized station access
	15th Avenue Northwest/Northwest 54th Street	Preferred Option IBB-2b* and Alternative IBB-3	Increased pick-up/drop-off activity

Final mitigation would be determined and agreed upon by Sound Transit and the City of Seattle, in coordination with FTA, and may include Sound Transit contributing a proportionate share of costs to improve intersections based on the project's proportionate ratio of trips at the intersection or another equitable method.

3.14 Ballard Link Extension Affected Environment and Impacts during Operation – Parking

This section describes existing on- and off-street parking conditions along the WSBLE corridor and around stations. It describes future changes in parking supply with the No Build Alternative and Build Alternatives and also documents the parking supply and occupancy along streets in each station's vicinity that have unrestricted parking that could be affected by light rail riders who park and ride light rail (also known as hide-and-ride). Section 3.19 discusses temporary construction impacts such as loss of on- and off-street parking and construction worker parking. Appendix N.1, Transportation Technical Report, provides additional detail.

The study area for on-street parking is generally one block on either side of the light rail alignment and within a 0.25-mile walking distance of Build Alternative stations where there is unrestricted parking that could accommodate hide-and-ride use.



3.14.1 Affected Environment

Table 3-25 summarizes the on-street parking within the study area for each of the Ballard Link Extension segment alternatives. Parking supply and occupancy counts were performed midday (from 9 a.m. to 3 p.m.) on weekdays between September 2019 and early December 2019. Parking occupancy counts were not collected for station areas in the Downtown of Chinatown-International District segments where all parking has either time or type of vehicle restrictions that reduce the potential for hide-and-ride.

3.14.2 Environmental Impacts of the No Build Alternative

The parking conditions in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.14.3 Environmental Impacts of the Build Alternatives

Most of the proposed station locations along the Ballard Link Extension, with the exception of those in the Downtown and Chinatown/International District segments, are currently surrounded by areas of unrestricted parking that could be affected by hide-and-ride parking. This could adversely affect local businesses and residents who rely on that parking for other purposes. Consistent with existing light rail stations in Seattle, it is expected that the City of Seattle would manage parking within the vicinity of new stations by placing restrictions (including time limits or permit restrictions) where they do not already exist. Owners of parking lots available for public parking close to the stations might also choose to change pricing or parking permit structures to discourage use of the lot as a long-term park-and-ride.

There are a few publicly owned parking lots in the Interbay/Ballard Segment that serve the Interbay Athletic Complex and Interbay Golf Center. There are also privately owned lots available for public parking that could be affected by the project in the Chinatown-International District and Downtown segments. Information on these off-street parking facilities is provided in Appendix N.1, Transportation Technical Report.

Sound Transit would not create any new parking at any of its stations to accommodate light rail commuters. Trip generation and traffic analysis performed for the project assume no long-term parking by commuters, and that curb-use management in the vicinity of the stations would discourage such parking. Therefore, long-term parking impacts surrounding the stations could occur if existing unrestricted parking accommodates hide-and-ride parking or if there is permanent removal of parking spaces by the project.

Potential long-term parking impacts were identified at the new stations and along the proposed alignments; these are described in the following sections.

3.14.3.1 Potential for Hide-and-Ride Near Stations

There is unrestricted parking within the vicinity of each station in the Ballard Link Extension that could be affected by hide-and-ride parking except for the alternatives in the Downtown and Chinatown-International District segments, where the existing parking surrounding the station areas is restricted by time limits, vehicle type, or payment requirements, which discourage hide-and-ride parking. The existing parking supply within 0.25 mile of each station, including unrestricted spaces, is summarized in Table 3-25.

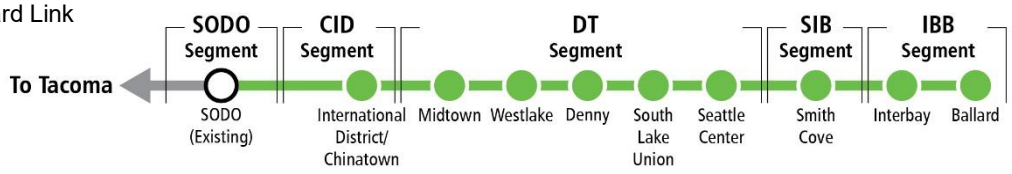


Table 3-25. On-Street Parking in Station Vicinity – Ballard Link Extension

Segment	Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
SODO	Preferred At-Grade (SODO-1a)	180	61	241	64%
	At-Grade South Station Option (SODO-1b)	256	63	319	63%
	Mixed Profile (SODO-2)	256	63	319	63%
Chinatown-International District [b]	All Alternatives [a] (CID-1a*, CID-1b*, CID-2a, CID-2b)	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Downtown [b]	All Alternatives [a] (DT-1, DT-2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable
South Interbay	Preferred Galer Street Station/ Central Interbay (SIB-1)	126	38	164	70%
	Prospect Street Station/15th Avenue (SIB-2)	101	7	108	52%
	Prospect Street Station/Central Interbay (SIB-3)	101	7	108	52%
Interbay/ Ballard	Preferred Elevated 14th Avenue (IBB-1a)	366, Interbay 720, Ballard	67, Interbay 77, Ballard	433, Interbay 797, Ballard	94%, Interbay 85%, Ballard
	Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	375, Interbay 720, Ballard	49, Interbay 77, Ballard	424, Interbay 797, Ballard	72%, Interbay 85%, Ballard
	Preferred Tunnel 14th Avenue (IBB-2a)*	257, Interbay 720, Ballard	66, Interbay 77, Ballard	323, Interbay 797, Ballard	103%, [c] Interbay 85%, Ballard
	Preferred Tunnel 15th Avenue Station Option (IBB-2b)*	257, Interbay 510, Ballard	66, Interbay 205, Ballard	323, Interbay 715, Ballard	103%, [c] Interbay 100%, Ballard
	Elevated 15th Avenue (IBB-3)	375, Interbay 510, Ballard	49, Interbay 205, Ballard	424, Interbay 715, Ballard	72%, Interbay 100%, Ballard

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

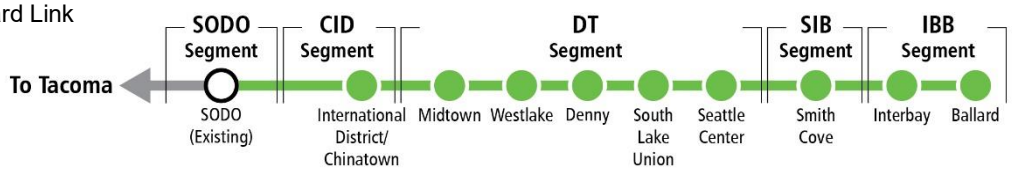
[a] Restricted spaces are signed to limit parking duration or type of vehicle.

[b] On-street parking surrounding the potential stations within this segment is restricted during weekday hours with time limits, payment requirements, or both, therefore there is little to no potential for hide-and-ride. Therefore, parking supply and occupancy studies were not performed.

[c] Parking utilization rates in excess of 100 percent can occur when vehicles encroach into areas where parking is not allowed (e.g., park too close to driveways, intersections, crosswalks, or fire hydrants). Parking supply for each street is estimated using an average vehicle length, and higher utilization percentages can also occur when smaller-than-average vehicles park along the street.

3.14.3.2 Potential for Hide-and-Ride Near Stations

There is unrestricted parking within the vicinity of each station in the Ballard Link Extension that could be affected by hide-and-ride parking except for the alternatives in the Downtown and Chinatown-International District segments, where the existing parking surrounding the station areas is restricted by time limits, vehicle type, or payment requirements, which discourage hide-and-ride parking. The existing parking supply within 0.25 mile of each station, including unrestricted spaces, is summarized in Table 3-25.



3.14.3.3 Permanent Removal of Parking

Table 3-26 summarizes the on-street parking that would be removed with each of the Ballard Link Extension alternatives, including both parking that would be permanently removed at the stations or along the alignments and additional parking that would be temporarily removed during construction. The table also notes off-street parking impacts. Temporary parking impacts during construction are discussed by segment in Section 3.19. Appendix N.1 provides details on where parking would be removed for each alternative.

Table 3-26. Displaced On-Street Parking – Ballard Link Extension

Segment	Alternative	On-Street Parking Permanently Removed (spaces)	Additional Parking Temporarily Removed during Construction (spaces)
SODO	Preferred At-Grade (SODO-1a)	0 to 5	0
	At-Grade South Station Option (SODO-1b)	0 to 5	0
	Mixed Profile (SODO-2)	0 to 5	0
Chinatown-International District	4th Avenue Shallow (CID-1a)*	10 to 20 [a]	0
	4th Avenue Deep Station Option (CID-1b)*	45 to 60 [a]	0
	5th Avenue Shallow (CID-2a)	50 to 65 [b]	155 to 195 [c]
	5th Avenue Deep Station Option (CID-2b)	50 to 65 [b c]	40 to 50
Downtown	Preferred 5th Avenue/Harrison Street (DT-1)	70 to 90 [d]	185 to 235 [e]
	6th Avenue/Mercer Street (DT-2)	45 to 60 [f]	130 to 165 [g]
South Interbay	Preferred Galer Street Station/Central Interbay (SIB-1)	15 to 25	200 to 250
	Prospect Street Station/15th Avenue (SIB-2)	0	215 to 265
	Prospect Street Station/ Central Interbay (SIB-3)	0 to 5	45 to 60
Interbay/Ballard	Preferred Elevated 14th Avenue (IBB-1a)	75 to 95	380 to 470
	Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	0 to 5	290 to 360
	Preferred Tunnel 14th Avenue (IBB-2a)*	75 to 100	255 to 315
	Preferred Tunnel 15th Avenue Station Option (IBB-2b)*	35 to 50	160 to 200
	Elevated 15th Avenue (IBB-3)	0 to 5	75 to 100

Source: Heffron Transportation 2020.

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

[a] Alternative CID-1a* and Option CID-1b* would also remove about 200 off-street public parking spaces.

[b] Alternative CID-2a and Option CID-2b would also remove 80 off-street public parking spaces.

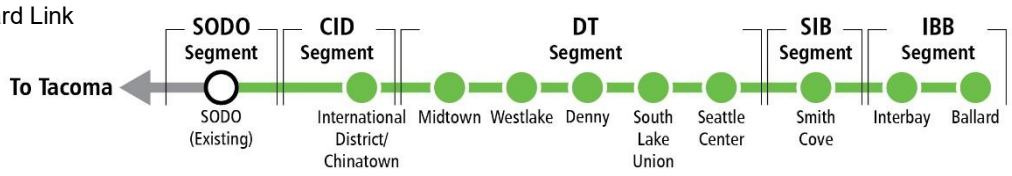
[c] The diagonal station configuration for Alternative CID-2a would remove fewer on-street parking stalls during construction.

[d] Preferred Alternative DT-1 would also permanently remove 218 off-street public parking spaces.

[e] Preferred Alternative DT-1 would remove 283 parking spaces during construction; it would also temporarily affect egress from a private garage that has 678 parking spaces.

[f] Alternative DT-2 would also remove 183 off-street public parking spaces.

[g] Alternative DT-2 would also remove 283 off-street public parking spaces during construction.



3.14.4 Mitigation for Operation Impacts

The South Interbay and Interbay/Ballard segments of the Ballard Link Extension have areas of unrestricted parking that could be affected by light rail riders parking near the station. To mitigate this potential impact, Sound Transit would work with the City of Seattle to consider appropriate on-street parking measures within a 0.25-mile radius of each station to discourage hide-and-ride activity. Strategies could include paid parking meters, time-limit signs, passenger drop-off/pick-up zones, truck and load/unload zones, and restricted parking zones. In addition, Sound Transit would coordinate with the City of Seattle to relocate affected Americans with Disabilities Act parking spaces.

3.15 Ballard Link Extension Affected Environment and Impacts during Operation – Non-motorized Facilities

This section describes the existing and planned pedestrian and bicycle facilities that could be affected by the project. Pedestrian L.O.S. at sidewalks, crosswalks, and intersection corners within one block of each station entrance were evaluated for the p.m. peak hour. Walksheds and bikesheds were used to show the areas around each station that are accessible to pedestrians and bicyclists; the walkshed and bikesheds are graphically shown and described in more detail in Appendix N.1, Transportation Technical Report.

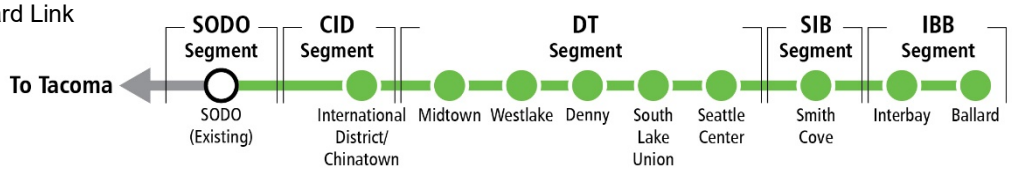
Walksheds and Bikesheds

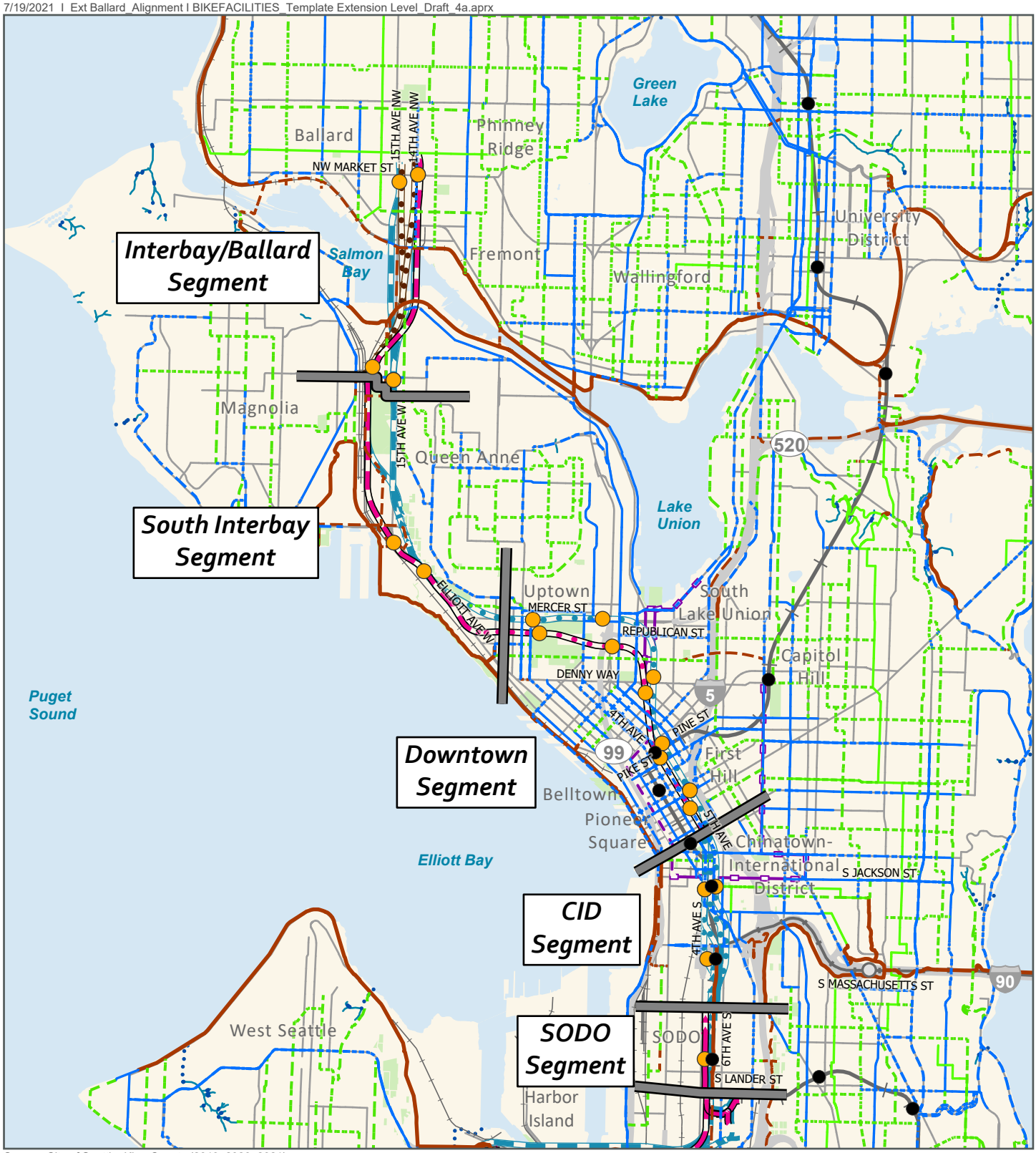
Walksheds and bikesheds are defined as the distance a person can walk or bicycle in 10 minutes around each station, which translates to roughly a 0.5-mile walk distance and a 1.5-mile bicycle distance. The bikeshed methodology assumes an average speed consistent with traditional bicycles; riders using electric-assist bicycles could travel longer distances.

3.15.1 Affected Environment

In urban station areas closer to Downtown Seattle (such as the Chinatown-International District and Downtown segments of the project), sidewalks, curb ramps, and marked crosswalks are prevalent, with minimal gaps. In more industrial station areas south and north of Downtown Seattle (i.e., Stadium Station, Smith Cove Station, and Interbay Station), there are generally sidewalks on both sides of the roadway near the stations, but there are gaps in coverage and some locations lacking curb ramps. Sidewalks are prevalent near the Ballard Station though some locations lack curb ramps, and marked crosswalks exist at most key intersections on arterial and collector streets but are not typically found on residential streets.

The Chinatown-International District and Downtown segments have protected bicycle lanes and bicycle lanes without separation. Although the Burke-Gilman Trail (except the missing portion in Ballard) and Ship Canal Trail provide east-west access from Fremont, Wallingford, Magnolia, and North Queen Anne to Ballard and Interbay, and the Elliott Bay Trail provides north-south access along the extension connecting riders to South Interbay, much of the South Interbay and Interbay/Ballard segment study areas generally lack dedicated bicycle facilities, as shown on Figure 3-13. Residential roadways in the Interbay/Ballard Segment have a combination of bicycle lanes without separation, neighborhood greenways, and multi-use trails, as well as many low-volume residential streets that are relatively comfortable for users of all ages and abilities despite having no dedicated facilities.





Source: City of Seattle, King County (2019, 2020, 2021).

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

Alternative Profile
- Elevated
- At-Grade
- Tunnel
- Retained Cut

Station
- New
- Existing

- Segment Line
- Existing Link Light Rail
- East Link Light Rail (Under Construction)
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- Stream
- Piped Stream
- Park

Bike Facilities
- Bike Lane (In-Street Separation)
- Multi-Use Trail
- Neighborhood Greenway
- Bike Lane (In-Street Separation) - Planned
- Multi-Use Trail - Planned
- Neighborhood Greenway - Planned

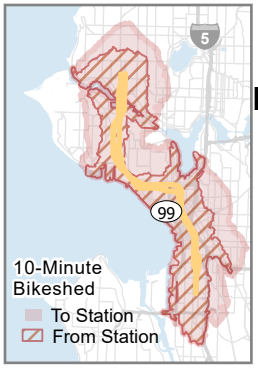


FIGURE 3-13
Existing Bike and Planned Bike Facilities
Ballard Link Extension

West Seattle and Ballard Link Extensions

0 0.5 1 Mile

N

3.15.2 Environmental Impacts of the No Build Alternative

Under the No Build Alternative, projects included in Seattle's Bicycle Master Plan (City of Seattle 2014a), Pedestrian Master Plan (City of Seattle 2017d), and the West Seattle Link Extension are assumed to be built. Improvements related to the Seattle Arena Renovation Project, such as two-way protected bicycle lanes along 1st Avenue North and Queen Anne Avenue North are also assumed to be in place. The Bicycle Master Plan calls for protected bicycle lanes throughout Downtown Seattle, South Lake Union, and Uptown; multi-use trails on the Ballard Bridge and West Galer Street Flyover; and a network of greenways and completion of the Burke-Gilman Trail, among others. Figure 3-13 shows existing and planned no build condition bike facilities and does not include project improvements. Appendix N.1 provides the complete list of projects included in the No Build Alternative.

3.15.3 Environmental Impacts of the Build Alternatives

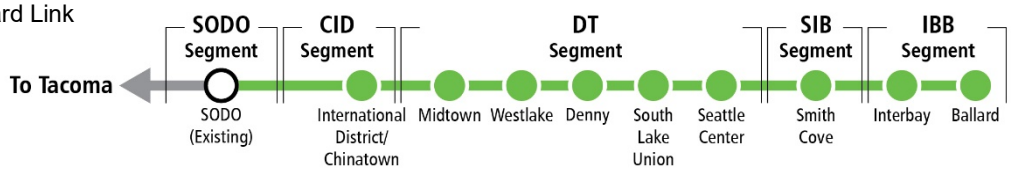
Sound Transit would include pedestrian and bicycle improvements at stations to accommodate the projected increase in pedestrian and bicycle travel with the Ballard Link Extension. The following sections discuss specific improvements affecting pedestrian circulation, such as new connections or signals, by segment. Sound Transit would work with the City of Seattle to determine the most appropriate pedestrian and bicycle improvements to support station access and safety. New facilities would meet Americans with Disabilities Act requirements as well as local and federal design standards for pedestrian and bicycle facilities, as appropriate.

Station Pedestrian and Bicycle Access Opportunities

Additional pedestrian and bicycle improvements not included as part of the WSBLE project could be identified for potential station access enhancement by others. These improvements could be identified through the station planning efforts, included in existing local plans by partner agencies, or potentially funded in partnership with Sound Transit. FTA considers pedestrian and bicycle improvements within 0.5 mile and 3 miles of station areas, respectively, for grant funding, which could be sought by partner agencies or in conjunction with Sound Transit. In addition, Sound Transit could consider funding access improvements beyond the station footprint as part of the Non-motorized Access Allowance included in the Sound Transit 3 Plan.

3.15.3.1 Impacts Common to All Alternatives

Based on the available information at the time this Environmental Impact Statement was being prepared, no projects listed in Seattle's Bicycle Master Plan are expected to be impacted by the Build Alternatives. None of the Build Alternatives would result in long-term impacts to sidewalks, school walk routes, or projects in the Pedestrian Master Plan because any affected pedestrian facility (i.e., proposed guideway columns encroaching on existing sidewalks) would be rebuilt to meet Americans with Disabilities Act requirements and applicable design standards including Seattle Streets Illustrated (City of Seattle 2020), or to a standard agreed to by Sound Transit and the City of Seattle. As the project design advances, if it is determined that a facility could not be rebuilt to applicable design standards (for instance due to physical constraints) and an alternate design cannot be agreed upon in the original location, Sound Transit would work with the City of Seattle to identify an alternate route. No long-term impacts to bicycle parking are expected under any of the Build Alternatives. Sound Transit will continue to coordinate with the City to ensure bike parking facilities are adequately distributed, sized, and configured to meet present and future bike parking demand at the stations. Therefore, no long-term impacts to bicycle parking are expected under any of the Build Alternatives.



All sidewalks, crosswalks, and corners within one block of the station entrances have sufficient capacity, in terms of pedestrian L.O.S., to serve projected demand unless noted in the following segment-specific discussions. Sound Transit will coordinate with the City of Seattle on specific sidewalk width requirements through the final design process.

The Chinatown/International District and Seattle Center stations would serve attendees and staff of large events at and around T-Mobile Park (capacity 48,000), Lumen Field (capacity 72,000), Climate Pledge Arena (capacity 19,000), and the grounds of Seattle Center. The frequency of large events varies, with T-Mobile Park hosting 81 Mariners Major League Baseball games along with other events and Lumen Field hosting 10 Seahawks National Football League home games and 17 Sounders FC professional soccer games, also along with other concerts and events. Climate Pledge Arena and Seattle Center host large events up to several times a week.

For all of these venues, events are currently occurring or would be by the time the West Seattle and Ballard Link extensions are in operation. Before and after these events, there would be surges of demand in pedestrian areas near those stations, and pedestrians could experience congestion depending on the event time and attendance. The WSBLE Project would provide additional high capacity transit service to support this demand and facilitate access by efficiently moving attendees and staff to and from these areas. Sound Transit actively manages operations during special events today and would continue to implement operational management strategies for event surges in the future. Further, event management would be considered throughout station design as the project advances, and Sound Transit would work with the City of Seattle and other stakeholders to incorporate best practices from its current management of event operations and consider design treatments at the stations. Sound Transit would also coordinate with the City of Seattle and others on the Arena Access Management Plan developed by the Climate Pledge Arena operator. The conceptual drawings included in Appendix J illustrate the station entrances and station area conditions for riders.

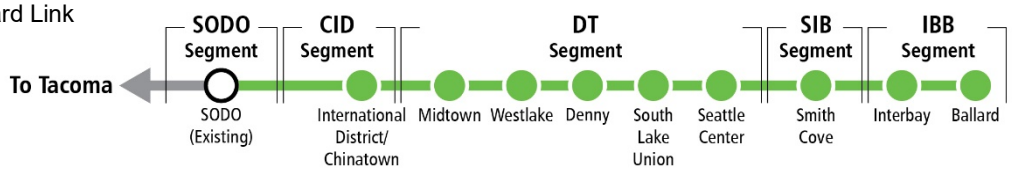
3.15.3.2 SODO Segment

All alternatives would include the proposed South Holgate Street overpass. The overpass would be constructed to allow the SODO Trail to pass beneath it with the necessary clearances, with a surface connection at the South Holgate Street/6th Avenue South intersection.

3.15.3.3 Chinatown-International District Segment

Because all Chinatown-International District station alternatives are within two blocks of each other, there are no substantial differences between the walksheds. Under all alternatives, cyclists could access the stations via a network of existing and planned bicycle lanes, protected bicycle lanes, and neighborhood greenways.

All Build Alternatives would be mostly in tunnels in this segment, minimizing direct effects to the surrounding pedestrian and bicycle facilities. Alternative CID-1a* and Option CID-1b* could affect one project listed in Seattle's Bicycle Master Plan: a protected bicycle lane project on Airport Way South/Seattle Boulevard South/4th Avenue South that would connect South Royal Brougham Way to 2nd Avenue Extension South (2014 Bicycle Master Plan Project 303). Because 4th Avenue South and South Jackson Street (including the 4th Avenue South Viaduct) would be reconstructed to include widened pedestrian facilities, there would likely be limited space to implement the City of Seattle's bicycle project as currently designed without repurposing the street through this area.



Half of the riders at the International District/Chinatown Station would access it using transit, with most of those transferring between light rail and Sounder commuter rail. Most of the remaining riders would be pedestrians and bicyclists. For riders that would be transferring between light rail lines, all of the alternatives provide a pedestrian undercrossing for direction transfers, with Alternative CID-1a* and Option CID-1b* providing a direct transfer to the southbound line of the existing International District/Chinatown Station and Alternative CID-2a and Option CID-2b providing a direct transfer to the northbound line. Other rider transfers would be accommodated by passengers going up to the street level and then down to the appropriate existing station platform.

With both Alternative CID-1a* and Option CID-1b*, two intersections would have pedestrian L.O.S. F conditions, similar to the No Build Alternative. Under Alternative CID-2a and Option CID-2b, one intersection would have a pedestrian L.O.S. F condition not experienced in the No Build Alternative. Further information is presented in Section 6.4.2 of Appendix N.1, Transportation Technical Report.

Both the existing Stadium Station and existing International District/Chinatown Station are currently used by attendees of large events at Lumen Field and Event Center and T-Mobile Park. Riders along the Ballard Link Extension (that would go south to Tacoma) and the East Link line would be able to reach the International District/Chinatown Station directly but would have to either transfer at the SODO Station or walk from the International District/Chinatown Station to reach the Stadium Station. Further information on pedestrian pathways between the event venues and the International District/Chinatown Station are described in Appendix N.1, Transportation Technical Report.

3.15.3.4 Downtown Segment

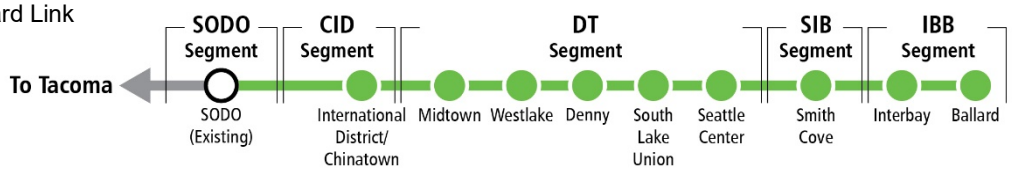
The areas covered by the walksheds around the Midtown, Westlake, and Denny stations are generally similar among alternatives. Preferred Alternative DT-1 is expected to have slightly higher ridership than Alternative DT-2 because of better pedestrian connectivity at the South Lake Union Station and transfer opportunities for bus routes along Harrison Street and the RapidRide E Line.

Under all alternatives, cyclists could access the stations via a well-connected network of existing and planned bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails (such as the Elliott Bay Trail). However, topography is a limiting factor for bicycle access at the Midtown and Seattle Center stations in particular (e.g., steep grades in the Queen Anne neighborhood north of Seattle Center).

All Build Alternatives would be in tunnels in this segment, eliminating direct impacts to existing or planned bicycle and pedestrian facilities.

In the existing dense urban environment, most non-motorized facilities have already been built to accommodate large numbers of pedestrians and bicycles; however, the pedestrian L.O.S. analysis found two additional locations where demand may exceed capacity. At Denny Station, the crosswalk across 9th Avenue on the east side of Westlake Avenue is expected to operate at L.O.S. F under existing conditions, the No Build Alternative, and Preferred Alternative DT-1. At South Lake Union Station, the crosswalk across Taylor Avenue North on the north side of Mercer Street is expected to operate at L.O.S. E with the No Build Alternative and L.O.S. F with Alternative DT-2.

The Seattle Center Station entrances are located near Climate Pledge Arena and other Seattle Center campus venues; Preferred Alternative DT-1 would provide a station entrance with a



direct connection not requiring street crossings, while Alternative DT-2 would require event attendees to cross at least one roadway to reach the station entrances. Further information on pedestrian pathways between the event venues and the Seattle Center Station are described in Appendix N.1. The pedestrian L.O.S. analysis identified that sidewalks, crosswalks, and corners within one block of station entrances would have sufficient capacity to meet the average weekday demand. This ridership estimate and analysis is based on a typical day, rather than a special event surge in demand. See Section 3.15.3.1, Impacts to All Alternatives, for a discussion of event surges.

3.15.3.5 South Interbay Segment

The Smith Cove Station walksheds are generally comparable in size to one another, though they cover different areas.

Cyclists could access the Smith Cove Station via the Elliott Bay Trail for all alternatives. Some cyclists also use the business access and transit lanes along the Elliott Avenue West and 15th Avenue West corridor, which are signed as a bike route. There are several planned neighborhood greenways, bicycle lanes, and protected bicycle lanes that provide east-west connections to the trail, but topography is a limiting factor for bicycle access.

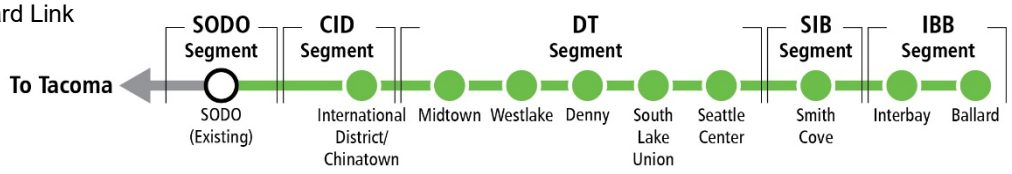
Preferred Alternative SIB-1 and Alternative SIB-3 could potentially impact a trail extension project for the Elliott Bay Trail where the planned trail and planned light rail alignment would both be located between the Interbay Athletic Complex and the railway. For planned projects such as the trail extension, Sound Transit would work with the City of Seattle during the design process to either accommodate the planned trail improvement or realign the new trail to accommodate the light rail alignment. The existing pedestrian bridge along the West Galer Street Flyover would be rebuilt to include a connection to the station mezzanine level for Preferred Alternative SIB-1.

Under Preferred Alternative SIB-1, more than half of the riders at the Smith Cove Station would access the station either by walking or biking. The pedestrian L.O.S. analysis found that sidewalks, crosswalks, and corners within one block of the Smith Cove Station entrances would have sufficient capacity to serve demand. This ridership estimate and analysis is based on a typical day, rather than a special event demand surge. On days when cruise ships are docking at the Smith Cove Cruise Terminal at Pier 91, there could be an increase in station activity as cruise ship staff and passengers use the station to access the cruise terminal. The cruise season runs from April to October with roughly 200 ships in a season. The Smith Cove Cruise Terminal can host up to two ships per day with passenger capacities up to 4,000 per ship.

Under the M.O.S., the Smith Cove Station would have higher ridership than with the full-build project, with most riders accessing the light rail station by bus from Ballard and Magnolia. However, for all alternatives, sidewalks, crossings, and corners within one block of Smith Cove Station entrances would have sufficient capacity to serve the demand from the M.O.S.

3.15.3.6 Interbay/Ballard Segment

All walksheds around the Interbay Station are constrained by topography and the railroad tracks. The Interbay Station under Option IBB-1b and Alternative IBB-3 is located further east into the Queen Anne neighborhood than under the other alternatives (including Preferred Alternative IBB-1a), which cover more of the Magnolia neighborhood. The walksheds immediately around the Ballard Station alternatives are generally unconstrained by hills or gaps in sidewalk coverage and are similar in size. The alternatives with Ballard Station near 15th



Avenue Northwest (Preferred Option IBB-2b* and Alternative IBB-3) would provide closer access to the Ballard core compared to those on 14th Avenue Northwest (Preferred Alternative IBB-1a, Option IBB-1b, and Preferred Alternative IBB-2a*). For Preferred Option IBB-2b* and Alternative IBB-3, riders would not have to cross 15th Avenue Northwest because station entrances would be provided on both sides of 15th Avenue Northwest.

About three-quarters of the boardings within the Interbay/Ballard Segment would take place at the Ballard Station. Most riders in this segment would access the light rail system by transferring between the light rail station and buses that serve local roads in the Interbay and Ballard neighborhoods.

Cyclists could access the Interbay Station via the Magnolia Connector Trail, the Ship Canal Trail, and protected bicycle lanes connecting the Ship Canal Trail to Gilman Avenue West. Under all alternatives, cyclists could access the Ballard Station via a combination of the planned bicycle lanes on 14th Avenue Northwest, the Burke-Gilman Trail, existing and planned neighborhood greenways running on both north-south and east-west streets, and bicycle lanes on 32nd Avenue Northwest, 24th Avenue Northwest, and 8th Avenue Northwest. With the larger bikesheds, beyond the immediate station areas, hills limit bicycle access to both the Ballard and Interbay stations.

Preferred Alternative IBB-1a and Option IBB-1b could affect a planned project in Seattle's 2014 Bicycle Master Plan to place bicycle lanes on 14th Avenue Northwest north of Northwest 46th Street, as well as a neighborhood greenway from Northwest 45th Street to Northwest 46th Street.

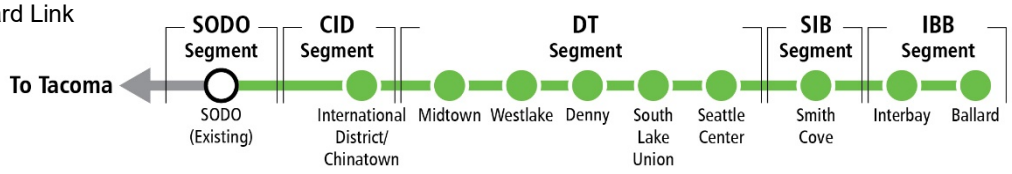
3.15.4 Mitigation for Operation Impacts

The Ballard Link Extension may permanently impact existing or planned designated bicycle facilities or routes. Sound Transit would work with the City of Seattle to rebuild the affected facilities or develop alternate facilities or routes that achieve, to the extent feasible, a similar level of protection and comfort afforded by the facility being impacted. These replacements would be funded by Sound Transit, and may include protected or standard bicycle lanes, trails, and neighborhood greenway treatments, along with associated design elements such as pavement markings and bike signals where needed.

Where the Ballard Link Extension conflicts with Seattle Bicycle Master Plan planned projects, Sound Transit would coordinate with the City of Seattle to determine whether a planned project would be precluded, as well as any mitigation that may be necessary.

Under the full-build condition, some pedestrian facilities would experience an L.O.S. impact with the Ballard Link Extension. The following locations have pedestrian facilities that would experience L.O.S. F conditions and be substantially impacted by the project:

- Sidewalk on the east side of 5th Avenue South between South Jackson Street and South King Street for Alternative CID-2a and Option CID-2b
- Crosswalk across 4th Avenue South at South Weller Street for Alternative CID-1a* and Option CID-1b*
- Southwest corner of 4th Avenue South and South Jackson Street for Alternative CID-1a* and Option CID-1b*
- Crosswalk across 9th Avenue on the east side of Westlake Avenue for Preferred Alternative DT-1



- Crosswalk across Taylor Avenue North on the north side of Mercer Street for Alternative DT-2

Sound Transit would fund improvements to mitigate these impacts, such as widened sidewalks or new walkways to accommodate the additional demand, as well as associated treatments that may be required for safe operations such as crosswalks, curb bulbs, and pedestrian signals. Final mitigation would be determined and agreed upon by Sound Transit and the City and may include Sound Transit contributing a proportionate share of costs to improve facilities based on the project's proportionate ratio of trips at the affected location or another equitable method.

Sound Transit would coordinate with the City of Seattle and develop event management plans for the Seattle Center and International District/Chinatown stations to identify crowd management strategies during potentially heavier transit ridership periods associated with events at the nearby venues or stadiums.

The Ballard Link Extension may also have direct physical impacts to existing sidewalks due to placement of guideway columns in the South Interbay and Interbay/Ballard segments. As the project design is refined and potential column locations are identified with greater precision, additional pedestrian and bicycle visibility issues may emerge. These visibility issues could be mitigated with measures such as protected vehicle turns or restricting vehicle movements.

Sound Transit would rebuild affected non-motorized facilities to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020] and the Seattle Land Use Code and Light Rail Facility Construction and Construction Impacts sections of the Seattle Municipal Code) or to a standard agreed to by Sound Transit and the City of Seattle.

As the project design advances, if it is determined that a facility could not be rebuilt to applicable design standards and an alternate design cannot be agreed upon in the original location, Sound Transit would work with the City of Seattle to develop mitigation, such as an alternate route.

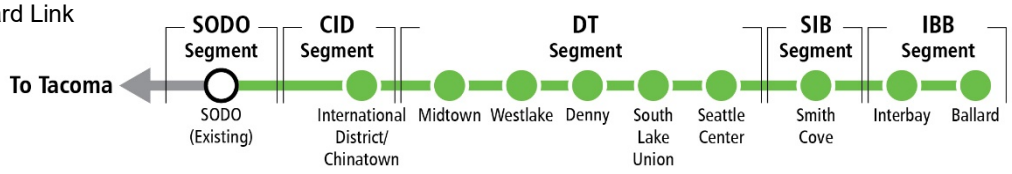
3.16 Ballard Link Extension Affected Environment and Impacts during Operation – Safety

This section summarizes the existing study area safety and collision data for arterials and local streets within approximately one block (330 feet) of the project alignment. It describes the potential future vehicle and non-motorized safety impacts (increases or decreases in collisions) for the Build Alternatives compared to the No Build Alternative.

The City of Seattle's safety initiative, Vision Zero, aims to eliminate all traffic deaths by 2030. Vision Zero high crash corridors represent the top 100 arterial corridor segments where collisions occur most frequently, while also accounting for roadway characteristics and traffic volumes. This section considers the high crash corridors included in the Vison Zero corridor prioritization that are within the West Seattle Link and Ballard Link extension study areas.

3.16.1 Affected Environment

Several roadways along the Ballard Link Extension corridor are identified as high crash corridors in Seattle Department of Transportation's *2017 Vision Zero Progress Report*. As part of the Vision Zero program, Elliott Avenue West was identified as a priority corridor. In addition, 15th Avenue Northwest, Northwest Market Street, Denny Way, Queen Anne Avenue North, and



4th, 5th, and 6th avenues through downtown are all corridors in the Ballard Link Extension area that are identified as high crash corridors within the Vision Zero corridor prioritization.

The roadway segments and intersections adjacent to the project alternatives that historically experience the highest crash frequencies are summarized in Appendix N.1, Transportation Technical Report.

3.16.2 Environmental Impacts of the No Build Alternative

Besides bike and greenway projects, no major transportation infrastructure projects, including Vision Zero projects, are currently planned that would considerably modify the roadways and alter the travel patterns within the study area. The City of Seattle routinely conducts Vision Zero progress reports to assess previous projects and identify prioritized locations for future projects. Therefore, it is expected that the City of Seattle would implement some Vision Zero projects in the future to improve the safety of the transportation system in the Ballard Link Extension study area prior to the project being built.

3.16.3 Environmental Impacts of the Build Alternatives

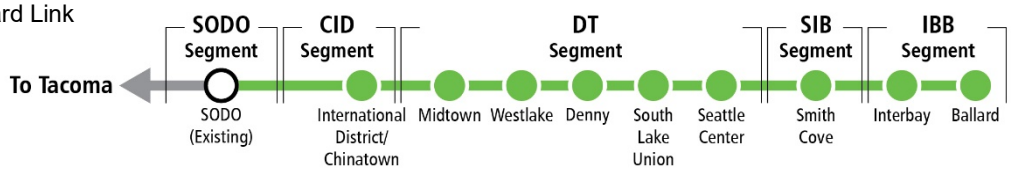
3.16.3.1 Impacts Common to All Alternatives

While most of the Ballard Link Extension alignment would be adjacent to or along City of Seattle-designated high crash corridors, the safety of the transportation system is expected to be minimally affected by the project or improve because of the following:

- Light rail alternatives that would all be grade-separated and operate in exclusive rights-of-way, with no new direct conflicts with vehicles, pedestrians, or bicyclists
- Light rail design that adheres to both light rail and roadway standards to minimize impacts on transportation safety
- People shifting to ride transit where they would otherwise use other travel modes
- Reduction in modal conflicts on the transportation system (such as rail-to-rail transfer activity within the station)
- Station access improvements (such as proposed signaled crossings)

Overall, the WSBLE would potentially shift up to 20,000 people per day from driving or taking another non-transit mode to using transit. This would result in a potential reduction of approximately 117,000 vehicle miles traveled per day in the region. A mode shift where people use transit and travel less by car would have an inherent safety benefit because fewer collisions would be expected.

All of the stations are expected to experience relatively small increases in daily vehicle traffic around the station under typical operations, suggesting that the impact to vehicle safety would be negligible around stations. The light rail design would adhere to both light rail and roadway standards to minimize impacts on transportation safety. Although pedestrian and bicyclist activity is expected to increase (between 1,200 to 13,000 daily pedestrians and bicyclists) around each station, the increase in conflicts is relatively small compared to the number of existing conflicts experienced in these dense and often already congested pedestrian and bicycle areas. While this increase in activity would create the potential for more conflicts near



stations, Sound Transit is proposing pedestrian and bicycle improvements adjacent to the stations to ensure access is at signalized or controlled locations and, in some instances, grade-separated crossings. Beyond the station improvements, increased non-motorized activity can also improve driver expectations (i.e., drivers expecting pedestrians and bicyclists to be present) and reduce collision severity because of reduced speeds. All stations would be designed to include appropriate non-motorized facilities to accommodate this expected level of activity and would be coordinated with the City of Seattle.

3.16.3.2 SODO Segment

The transportation safety in the SODO Segment with the Ballard Link Extension would improve compared to the No Build Alternative as all of the alternatives would include a South Holgate Street overcrossing separating the proposed and existing light rail tracks from traffic along South Holgate Street. This would minimize future conflicts at that intersection and remove the rail conflicts with crossing vehicles, pedestrians, and bicyclists that currently exist, improving safety for all modes in this area.

3.16.3.3 Chinatown-International District Segment

With the Chinatown-International District Segment alternatives, vehicle safety around the Stadium Station is not expected to substantially change.

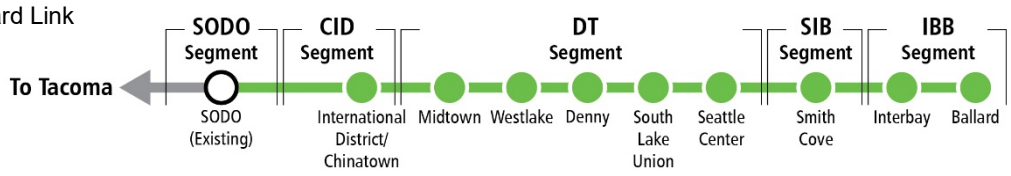
The additional pedestrian and bicyclist activity associated with the International District/Chinatown Station area is expected to increase the potential for conflicts around this already dense pedestrian area, particularly during peak periods and events at the nearby stadiums. However, the station area for all alternatives is surrounded by a plaza with multiple adjacent signalized crossings, and some alternatives include entrances across a road from the station, avoiding an at-grade street crossing. This would allow large concentrations of pedestrians and bicyclists to access the station without the confines of the surrounding street system. Most of the pedestrian activity with the International District/Chinatown Station with any of the alternatives would be underground or within the plaza area, minimizing interaction with vehicles.

3.16.3.4 Downtown Segment

Preferred Alternative DT-1 would serve five stations in the Downtown Segment. At all of these stations, the majority of the riders would access the station by walking or biking. Therefore, there would be a negligible change in vehicle safety in the Downtown Segment as vehicle traffic surrounding the station would be similar to the No Build Alternative.

With respect to pedestrian and bicyclist activity, the existing downtown stations at Pioneer Square and University Street (in the Downtown Seattle Transit Tunnel) are expected to experience a decrease in pedestrian activity as ridership patterns shift in response to the project (see Sections 3.3.2.2 and 6.4.2.2 in Appendix N.1). There would be a collective increase in pedestrian and bicyclist activity within the Downtown Seattle area, but the increase in volume is relatively small compared to the overall volume experienced in the highly dense, pedestrian-oriented downtown area. Therefore, the impacts are expected to be negligible.

The Seattle Center Station would experience large surges in pedestrian volumes during events, typically during off-peak periods. Alternative DT-2 would require pedestrians accessing Climate Pledge Arena and other venues on the Seattle Center campus to cross roadways when traveling to and from the station. Preferred Alternative DT-1, however, would provide one station



entrance that would not require crossing a roadway between the station and the Seattle Center campus. Further information on the pedestrian conditions surrounding station areas before and after events is provided in Section 3.15.3. The project is not expected to affect the number of people going to these events, but it does provide a mode of access (transit) that is safer than driving. Therefore, the safety impacts with respect to events is expected to be negligible or positive.

Transportation safety conditions with Alternative DT-2 are expected to be similar to those with Preferred Alternative DT-1 at most stations.

3.16.3.5 South Interbay Segment

The guideway would predominately be outside of the roadway except for Alternative SIB-2, which is an elevated guideway along 15th Avenue West for about a mile. To provide adequate sight distance and maintain safe vehicle operations, vehicle turns would not be allowed where there are guideway columns within the roadway median. This would create more right-in, right-out accesses and turns at signalized intersections, which would be expected to improve safety in those areas.

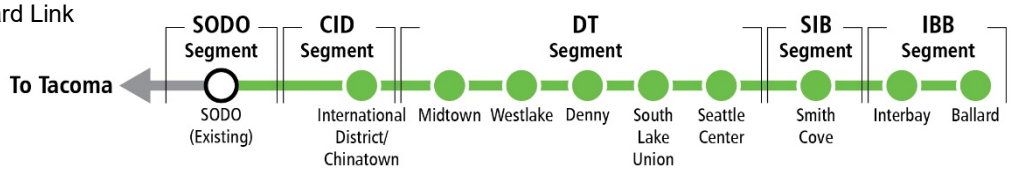
With Preferred Alternative SIB-1 and Alternative SIB-2, the guideway between West Mercer Place and West Republican Street would cross Elliott Avenue West twice, with Preferred Alternative SIB-1 crossing an additional time south of West Galer Street. These alternatives would place guideway columns within the roadway, requiring elimination of some midblock turns and potentially reducing conflicts.

Under all alternatives, signalized crossings of Elliott Avenue West would allow pedestrian and bicyclist access to the Smith Cove Station. Existing grade-separated pedestrian crossings (at the Helix bridge and West Galer Street Flyover) over the rail lines would provide access to the west side of the railroad tracks, including the Smith Cove Cruise Terminal at Pier 91, the Expedia property, and the Elliott Bay Trail.

3.16.3.6 Interbay/Ballard Segment

With Preferred Alternative IBB-1a, Preferred Alternative IBB-2a*, and Preferred Option IBB-2b*, the Interbay Station would have minimal non-motorized safety impacts, with stations located off 15th Avenue West on lower-volume and lower-speed roadways where vehicle interaction with pedestrians and bicyclists would be reduced. The Interbay Station straddling West Dravus Street with Option IBB-1b and Alternative IBB-3 would increase pedestrian activity around the congested West Dravus Street interchange and might increase the potential for conflicts. Station access would occur outside the interchange, minimizing conflicts with the 15th Avenue West on- and off-ramps. Both of these alternatives would be in the existing median on 15th Avenue West at the south end of the segment, then transition out of the median shortly after the Interbay Station at West Bertona Street; however, this is not likely to impact vehicle safety because the guideway would be within the existing median.

North of Salmon Bay, Preferred Alternative IBB-1a and Option IBB-1b would travel for about 0.65 mile along 14th Avenue Northwest. This is unlikely to impact vehicle safety as the guideway along 14th Avenue Northwest would maintain the same number of lanes and vehicle movements at intersections along the corridor. The tunnel alternatives (Preferred Alternative IBB-2a* and Preferred Option IBB-2b*) would avoid vehicular conflict as they are underground. Alternative IBB-3 would travel for about 0.3 mile along 15th Avenue Northwest. The guideway columns for the elevated alternatives would be placed within a median, sidewalks, or both along



15th Avenue Northwest, would maintain the existing roadway configuration, and are unlikely to impact vehicle safety.

The Ballard Station, as the terminus station of the project, is expected to have a larger increase in vehicle trips than the other stations, which would increase the potential for conflicts around the station area for all alternatives. The passenger pick-up and drop-off locations would be separated from transit and non-motorized access locations, which would minimize conflicts but would increase traffic volumes on minor streets.

Pedestrian and bicyclist activity is also expected to noticeably increase at the Ballard Station. Access to the Ballard Station for Preferred Alternative IBB-1a, Preferred Alternative IBB-2a*, and Option IBB-1b would be provided on either side of 14th Avenue Northwest at signalized or controlled crossings. The signalized crossings, particularly on 15th Avenue Northwest or Northwest Market Street, would also be adjusted, as necessary, to account for increases in volumes to ensure pedestrians have sufficient time to cross the street. Preferred Option IBB-2b* and Alternative IBB-3 would have station access on both sides of 15th Avenue Northwest, minimizing conflicts between pedestrians and traffic on this arterial.

3.16.4 Mitigation for Operation Impacts

The Ballard Link Extension project includes roadway, transit and pedestrian and bicyclist improvements and associated potential mitigation around the stations, including some grade-separated facilities to reduce conflicts, increase visibility between modes, and reduce congestion for the impacted modes. These project elements and potential mitigation are described in the sections for transit (Sections 3.12.4 and 3.19.7.1), arterials and local streets (Sections 3.13.4 and 3.19.7.2), and non-motorized facilities (Sections 3.15.4 and 3.19.7.4). Beyond these improvements, the project would operate in exclusive right-of-way, separated from other modes of travel, and would be built to applicable design standards, such as those that determine the placement of guideway columns; therefore, no further mitigation specific to safety-related impacts is proposed.

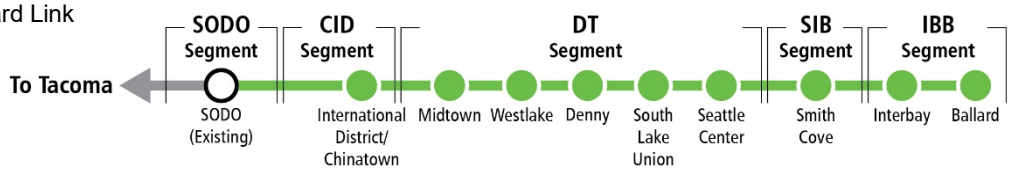
3.17 Ballard Link Extension Affected Environment and Impacts during Operation – Navigation

This section discusses how the WSBLE Project would affect navigation on navigable waterways in the Ballard Link Extension.

Navigable Waterways

The term navigable waterways generally refers to waterbodies that are subject to tidal influence, waterways with a history of substantial commercial navigation, waterways that presently have commercial navigation, or waterways susceptible to commercial development.

The United States Coast Guard has primary permitting authority related to navigation. The Coast Guard approves the locations and clearances of bridges through the issuance of bridge permits under the authority of Section 9 of the Rivers and Harbors Act, the General Bridge Act of 1946, and other statutes. A bridge permit is required for new construction, reconstruction, or modification of a bridge or causeway over navigable waters of the United States. The Coast Guard issues bridge permits after confirming that the other federal approvals described below have been issued.



The United States Army Corps of Engineers also has regulatory authority under Section 10 and Section 14 of the Rivers and Harbors Act of 1899. Section 10, codified in 33 United States Code Section 403, allows the Army Corps of Engineers to require a permit for any construction, not just bridges, that would affect navigable waters. Section 14, codified in 33 United States Code Section 408 and referred to herein as Section 408, requires the Army Corps of Engineers to review and approve proposed modifications to federally authorized Public Works projects to ensure that such proposed activities would not be injurious to the public interest or impair the usefulness of a federally authorized project. Federally authorized Public Works can include navigation Projects to improve the nation's waterways. Together, both agencies provide safe, reliable, and efficient waterborne transportation systems (e.g., channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.

In addition to this Draft Environmental Impact Statement, Sound Transit prepared a navigation impact report for Salmon Bay to support the United States Coast Guard bridge permitting process.

3.17.1 Affected Environment

The study area for navigation analysis includes navigable waterways from Shilshole Bay through Salmon Bay to Lake Washington, as well as all of Lake Washington because any vessel sailing between Puget Sound and Lake Washington must sail through Salmon Bay and the Lake Washington Ship Canal (Ship Canal).

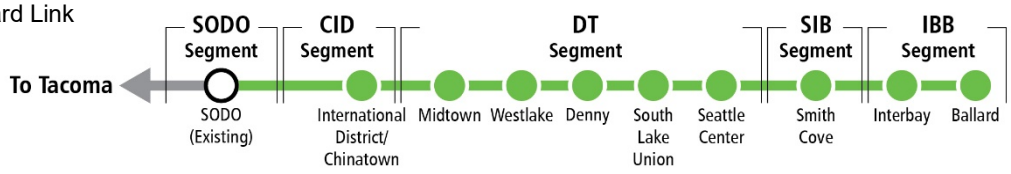
The west end of the Ship Canal originates in a narrow tidal inlet of Shilshole Bay. The Ship Canal extends about 8 rivermiles from Shilshole Bay to Lake Washington. Created in the early 1900s when the Army Corps of Engineers dredged two cuts to link Salmon Bay, Lake Union, and Lake Washington, the Ship Canal provides access via a maintained navigation channel between Puget Sound and these three large freshwater inland harbors.

Approximately 1.3 rivermiles east of Shilshole Bay and Puget Sound, the Hiram M. Chittenden Locks (also known as the Ballard Locks) control the hydrology of the Ship Canal from the western narrows of Salmon Bay. Salmon Bay includes the freshwater channel and harbor that extend upstream of the Ballard Locks and past the Ballard Bridge to the Fremont Cut. From Salmon Bay, the Ship Canal continues east/upstream along the Fremont Cut into Lake Union. Portage Bay is east of Lake Union, followed by the Montlake Cut, southern Union Bay, and the end of the Ship Canal at Lake Washington.

Along the Ship Canal, land use primarily reflects the industrial maritime and fishing industries, especially along Salmon Bay and the downstream portion of the Fremont Cut. A focal point of Salmon Bay is Fishermen's Terminal, which houses the North Pacific fishing fleet and can provide moorage for up to 400 commercial fishing vessels and work boats (Port of Seattle 2017). East of the Fremont Bridge, the waterways are mostly lined with marinas and maritime industrial clusters interspersed with residential areas such as groups of floating homes. Land use along Lake Washington and Mercer Island is primarily residential. Hundreds of private docks as well as municipal and private marinas and parks line the shoreline.

3.17.1.1 Waterway Users

Vessels using the Ship Canal represent a variety of waterway users because of the mix of industrial, commercial, and residential shorelines and because the Ship Canal is the only route available for vessels traveling between Lake Washington and Puget Sound. Recreational



vessels are the predominant vessel types in the Ship Canal and Lake Washington (City of Seattle 2013, 2014, 2015, 2016, and 2017).

The Muckleshoot Indian Tribe, signatory to the Treaty of Point Elliott and the Treaty of Medicine Creek, has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes Salmon Bay in the immediate project area. Tribal fishing boats operate on the waterway, and the Tribal fishermen place fishing gear in traditional fishing locations. The Suquamish Tribe is signatory to the Treaty of Point Elliott and has treaty-protected fishing rights and Usual and Accustomed Areas in the Puget Sound region, which includes the use of Salmon Bay in order to access the Tribe's Usual and Accustomed Areas. Tribal treaty-protected fishing peaks seasonally mid-summer through late fall during the annually established salmon and steelhead fishing seasons. Tribal fishermen also launch vessels from the 14th Avenue Northwest Boat Ramp.

The Army Corps of Engineers uses vessels such as a workboat with a crane or a standard clamshell dredge to maintain navigation channels by clearing debris and dredging. Barges may also be used to remove dredged material from the waterway, and other Army Corps of Engineers vessels are used for hydrographic surveys to map the navigation channels.

The Seattle Police Harbor Patrol is located on the north shore of Lake Union. While the headquarters and boat docks are outside of Salmon Bay, the Seattle Police Harbor Patrol operates along the Ship Canal (including Salmon Bay), across Lake Washington, and on waterways outside of the study area such as Elliott Bay and the Duwamish Waterway. They provide marine law enforcement, rescue, fire response, and assistance.

3.17.1.2 Existing Vertical Clearances, Horizontal Clearances, and Hazards

Navigation Channel

A navigation channel is a deeper channel cut into a river bed to enable larger vessels to pass through to a port.

The study area includes two navigation channels maintained by the Army Corps of Engineers: one consists of the Ship Canal between Shilshole Bay and Lake Washington, and the other consists of a channel in northern Lake Washington near Kenmore. Because these navigation channels are maintained by the Army Corps of Engineers, they are considered federal navigation projects subject to Section 408 requirements. The alternatives cross the Ship Canal.

There are existing structures that create horizontal or vertical restrictions to the Ship Canal navigation channel and areas outside of the channel. Key restrictions to navigation are listed in Table 3-27. Additional restrictions on the Ship Canal and Lake Washington are provided in Appendix N.1, Transportation Technical Report.

A primary hazard along the waterway is the mix of vessel traffic that can occur on the Ship Canal, especially during the summer. Conflicts can arise between recreational and commercial vessels as they navigate past the bridges and through some of the narrower sections of the Ship Canal. Other existing hazards to navigation include shoaling at the edge of the navigation channel, submerged obstructions, and limited room outside of the navigation channel to maneuver, hold, or avoid other vessels.

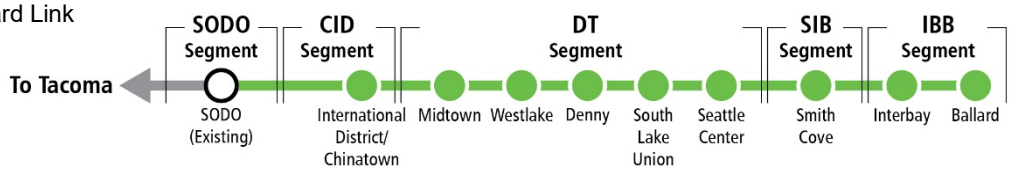


Table 3-27. Key Existing Restrictions to Navigation Near Salmon Bay

Structure	Approximate Rivermile [a]	Type/Use	Vertical Clearance Closed/Open [b] (feet)	Horizontal Clearance Closed/Open (feet) [c]	Channel Depth (feet)	Waterway Width [a] (feet)
Ballard Locks [d]	1.3	Locks	Not applicable	80 (large lock) and 30 (small lock)	29 (large lock) and 16 (small lock)	400
Ballard Bridge	2.4	Moveable (double-leaf bascule)/road	29 (46 at center)/Unrestricted	150	30	1,800
Overhead Cable	3.2	Cable/power	160	Unrestricted	32	330
Overhead Cable	3.6	Cable/power	160	Unrestricted	34	280
Fremont Bridge	3.9	Moveable (double-leaf bascule)/road	14 (31 at center)/ Unrestricted	150/120	36	290
U.S. Highway 99/ Aurora Bridge	4.0	Fixed/road	73 (136 at center)	525 (150 channel)	30	770

Sources: United States Army Corps of Engineers 2018, National Oceanic and Atmospheric Administration 2020.
[a] Approximate measurement of geographic information system data in Google Earth.
[b] Vertical clearances obtained from National Oceanic and Atmospheric Administration nautical charts are referenced to the mean water level of the lakes, which is 21 feet above mean lower low water in Puget Sound (North American Datum of 1983). Vertical clearance refers to the lowest clearance of the cable or bridge.
[c] Horizontal clearance refers to the width between bridge fenders or bridge protection on either side of a bridge opening.
[d] The Ballard Locks, which were constructed by and are operated and maintained by the Army Corps of Engineers, are considered a federally authorized civil works project subject to Section 408 requirements.

3.17.2 Environmental Impacts of the No Build Alternative

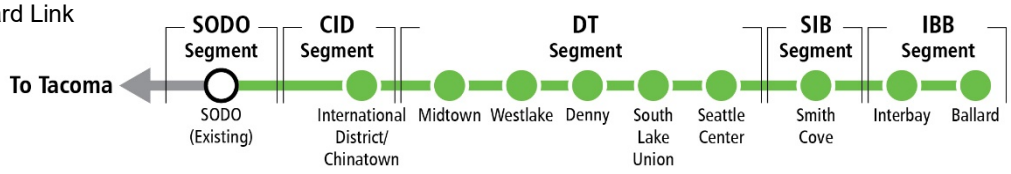
Under the No Build Alternative, light rail would not be extended to Ballard and the potential impacts on navigation identified for the Build Alternatives would be avoided. Navigation would continue as it does today.

3.17.3 Environmental Impacts of the Build Alternatives

Sound Transit evaluated the following three alternatives that would have bridge crossings of Salmon Bay in the Interbay/Ballard Segment: Preferred Alternative IBB-1a, Option IBB-1b, and Alternative IBB-3. The tunnel alternatives for the Interbay/Ballard Segment (Preferred Alternative IBB-2a* and Preferred Option IBB-2b*) would cross beneath Salmon Bay and would avoid impacts to navigation; therefore, they are not discussed further in this section.

3.17.3.1 Impacts Common to All Alternatives

Sound Transit evaluated impacts to navigation on Salmon Bay. This includes the Army Corps of Engineers-maintained Ship Canal navigation channel and areas outside of the navigation channel that vessels use to hold and maneuver and also access local docks. None of the alternatives would impact the Lake Washington navigation channel or the Ballard Locks, so they



are not discussed further. Displacement of water-dependent businesses and related economic impacts and mitigation are described in Section 4.3.3, Economics.

As described in Chapter 2, Alternatives Considered, Sound Transit is evaluating the feasibility of several high-level, fixed bridge types for Preferred Alternative IBB-1a and Option IBB-1b and two moveable bridge types (vertical-lift and double-leaf bascule) for Alternative IBB-3. All of the fixed bridge types would require at least one guideway column in the water, and all of the moveable bridge types would require multiple guideway columns in the water.

All of the bridge alternatives would meet or exceed the governing limitations on the Ship Canal by meeting the 136-foot vertical clearance of the Aurora Bridge and by exceeding the 80-foot horizontal clearance of the Ballard Locks. However, with the exception of the double-leaf bascule bridge type for Alternative IBB-3, all alternatives would be the first vertical restriction on the Ship Canal east of Shilshole Bay, approximately 0.8 rivermile west of the 160-foot overhead power cable and 1.6 river miles west of the 136-foot Aurora Bridge.

Vessels with vertical clearance requirements over 136 feet would not be able to pass under these alternatives. However, only a small percentage of vessels (less than 0.01 percent of the recreational fleet) that required more than 136 feet of vertical clearance have entered Salmon Bay via the Ballard Locks over the past several years.

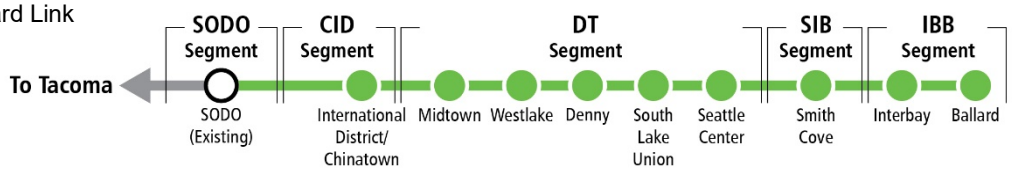
None of the alternatives would permanently affect the width or depth of the Army Corps of Engineers-maintained Ship Canal navigation channel. However, because of the proximity to the existing Ballard Bridge, all alternatives would be a second bridge in a relatively short stretch of water, requiring vessels to set up to travel through the bridges earlier and to hold their course longer in a relatively narrow channel.

While Salmon Bay has areas available for holding or maneuvering outside of the navigation channel, the areas are relatively narrow considering the volume and mix of vessel traffic typically seen on the waterway. Additional in-water guideway columns and pier protection systems would further constrain these areas. This could cause congestion upstream and downstream to increase during times of heavier vessel traffic (typically summer weekends and holidays, and on weekdays around 9 a.m. and 6 p.m. after the mandated bridge closures during peak vehicle traffic hours on roads crossing the Ship Canal).

All bridge alternatives would have guideway columns and associated pier protection systems in the water that could affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Tribe's Usual and Accustomed Areas in Salmon Bay. All bridge alternatives could also affect treaty-protected access to the Suquamish Tribe's Usual and Accustomed Areas.

3.17.3.2 Preferred Elevated 14th Avenue Alternative (IBB-1a) and Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)

Preferred Alternative IBB-1a and Option IBB-1b would be east of the Ballard Bridge. Outside of the navigation channel, this area is used by vessels to access maritime businesses and includes associated docks. The vertical clearance under the bridge would be about 140 feet south of the navigation channel and about 130 feet north of the navigation channel. Vessels that require more vertical clearance would not be able to sail underneath these portions of the guideway.



These alternatives would reduce moorage in Salmon Bay through the displacement of docks and seawall. Less than 1 percent of recreational moorage slips and approximately 23 percent of recreational linear dockage in Salmon Bay would be removed. Replacement moorage for displaced recreational boaters could potentially be found nearby on Shilshole Bay, elsewhere on Salmon Bay, or east of Salmon Bay on the Ship Canal. They would also relocate the 14th Avenue Northwest Boat Ramp prior to construction to maintain public maritime access to the Ship Canal in this area.

3.17.3.3 Elevated 15th Avenue Alternative (IBB-3)

Alternative IBB-3 would be west of the Ballard Bridge. The navigation channel in this area is close to the Old Pioneer Dock (current Ballard Mill Marina) north of Salmon Bay and the area is constrained by moored barges and other vessels that can encroach on the navigation channel. While this alternative would not reduce the width of the navigation channel, guideway columns would further limit an already constrained area. This would shift more vessels toward Fishermen's Terminal and especially toward vessels moored at its northwest dock.

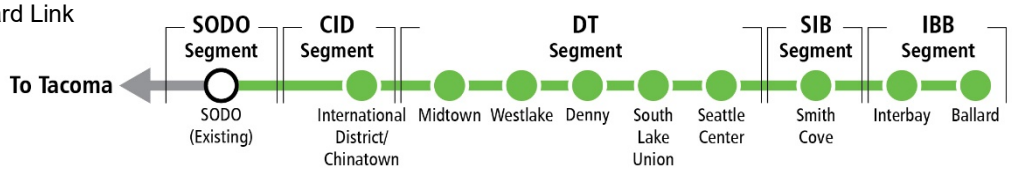
Outside of the navigation channel, the area near this alternative is used by vessels to access Fishermen's Terminal. Vertical clearance under the bridge south of the navigation channel would decrease from approximately 80 feet adjacent to the moveable bridge span to approximately 55 feet at the southern bank of the Ship Canal. Because of shoaling near the navigation channel, this would limit reliable access to the southern bank of Salmon Bay directly under the bridge to vessels that require less than about 70 feet of vertical clearance. Vertical clearance under the bridge north of the navigation channel would be approximately 80 feet. However, the area immediately under the guideway would be difficult to access due to the pier protection system and the additional guideway column north of the moveable span.

Guideway columns for this alternative would introduce new constraints on outbound and inbound access between the navigation channel and Fishermen's Terminal. Fishermen's Terminal Docks 1 and 2 would only be accessible from the west. Access would also be limited to vessels that require less than about 70 feet of vertical clearance because of the position of the Ballard Bridge fenders and Alternative IBB-3 pier protection system (which would not be wide enough for vessels to sail through), as well as existing shoaling near the navigation channel.

This alternative would also reduce moorage in Salmon Bay and in Fishermen's Terminal by removing recreational and commercial marinas and docks. The amount of moorage that would be removed from Salmon Bay (outside Fishermen's Terminal) represents a small percentage (about 4 percent of recreational moorage and about 3 percent of recreational linear dockage) of what is available currently in Salmon Bay. The amount of moorage that would be removed from Fishermen's Terminal represents about 13 percent of the berths and 7 percent of the linear dockage currently available in Fishermen's Terminal. In addition, this alternative would remove the only bilge/pump-out facility in Fishermen's Terminal.

3.17.4 Mitigation for Operation Impacts

During final design and the bridge permitting process, Sound Transit would determine mitigation actions in coordination with the Muckleshoot Indian Tribe, the Suquamish Tribe, and the United States Coast Guard. This would include identifying specific aids to navigation, such as signage and lighting.



3.18 Ballard Link Extension Affected Environment and Impacts during Operation – Freight Mobility and Access

This section describes the freight transportation system within 0.5 mile of the light rail alternatives, including the facilities and operations for truck and rail and how the Build Alternatives could affect this system during project operation. Section 9, Freight Mobility and Access, in Appendix N.1 provides additional details regarding the elements described in this section. The marine freight network and permanent long-term operation impacts are described in Section 3.17, Ballard Link Extension Affected Environment and Impacts during Operation – Navigation, and temporary construction impacts are described in Sections 3.19.1.6 and Section 3.19.7.6. The assessment of freight mobility and access in this section address direct impacts from the project.

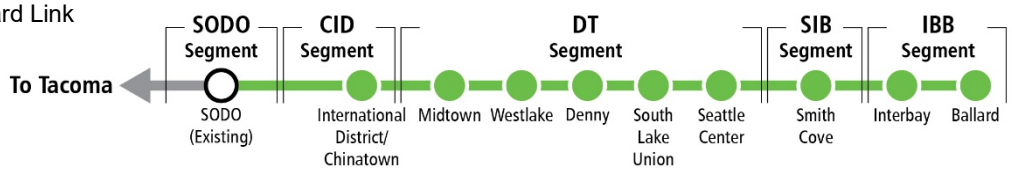
The City of Seattle's designated truck network (City of Seattle 2016) identifies many streets and arterials based on their function for freight. The City also has two regulatory networks related to heavy and over-dimensioned freight: the Heavy Haul Network, which allows heavy freight to use some streets in the vicinity of the Port's container terminals, and the Over-Legal Network (City of Seattle 2016), which accommodates loads up to 20 feet high and 20 feet wide. The City has also identified access routes to major Port of Seattle cargo terminals as Seaport Highway Connectors and Seaport Intermodal Connectors.

3.18.1 Affected Environment

Streets that are part of the designated truck network are concentrated in the South Interbay and Interbay/Ballard segments, which are a part of the Ballard Interbay Northend Manufacturing/Industrial Center. This area includes industrial lands on both sides of the Ship Canal as well as the Seattle Armory, Port of Seattle Terminal 86 and Terminal 91, and Fishermen's Terminal. It also includes the BNSF Balmer Yard and industrial properties along the 15th Avenue West/Elliott Avenue West corridor. In addition to general industrial uses, the area is one of the largest hubs supporting maritime industries in the Pacific Northwest and Alaska. Truck and rail networks are also concentrated in the SODO Segment, which is within the Duwamish Manufacturing/Industrial Center.

On-street truck-only load zones, commercial vehicle load zones, and general load zones serve local business deliveries. Truck-only load zones are the most restrictive and allow only vehicles that are licensed as trucks. Commercial vehicle load zones allow a broader range of vehicles but still require specific licensing or commercial permits. They are most commonly located in Seattle's business districts. Some areas also have general load zones that allow any type of vehicle. Load zones are located in all of the segments within the Ballard Link Extension study area. Long-term and overnight truck parking is allowed in Seattle Industrial Zones (Seattle Municipal Code 11.72.070), which include areas in the SODO, South Interbay, and Interbay/Ballard segments.

The BNSF mainline is located west of the 15th Avenue/Elliott Avenue West corridor, connecting to the BNSF Balmer Yard north of the Magnolia Bridge. The Balmer Yard is a general sorting and classification yard for railcars. No transfer of cargo to other modes occurs at this yard. Local rail spurs connect warehouse sidings at Terminal 91 and the Grain Terminal at Pier 86, and to



the Coastal Transportation team track. The Ballard Terminal Railroad operates a short-line railroad that serves local businesses north of the Ship Canal.

3.18.2 Environmental Impacts of the No Build Alternative

The truck and rail system in the study area for the No Build Alternative would not substantially change from the existing conditions.

3.18.3 Environmental Impacts of the Build Alternatives

3.18.3.1 Impacts Common to All Alternatives

All of the Build Alternatives would be designed to retain clearance envelopes for truck streets, including those designated for over-legal loads. They would also retain horizontal and vertical clearance requirements for railroad tracks. None of the alternatives would permanently remove truck-only load zones, commercial vehicle load zones, or general load zones because they would be relocated as necessary.

3.18.3.2 SODO Segment

All three alternatives would build a vehicle overpass at South Holgate Street, which is a Major Truck Street and part of the Heavy Haul Network, to accommodate trucks and therefore improve truck mobility by eliminating truck delays caused by the existing light rail crossing.

3.18.3.3 Chinatown-International District Segment

All alternatives through the Chinatown-International District Segment would be below street grade either in the vicinity of South Massachusetts Street or further north between Edgar Martinez Drive South and South Royal Brougham Way. None are expected to affect the truck or rail system.

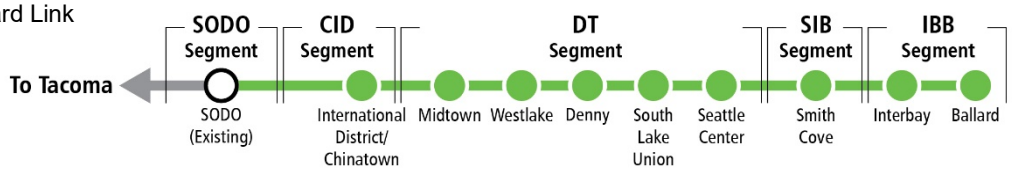
3.18.3.4 Downtown Segment

All alternatives through the Downtown Segment would be in tunnels. None are expected to affect the truck or rail freight systems.

3.18.3.5 South Interbay Segment

Preferred Alternative SIB-1 would have medians with columns to support the elevated guideway in some areas of the existing center-turn lane along Elliott Avenue West south of the Smith Cove Station. Alternative SIB-2 would similarly have a median with columns to support the elevated light rail guideway along Elliott Avenue West and 15th Avenue West south of West Barrett Street. These medians would restrict left-turn access to some businesses, and vehicles would make U-turns at breaks in the medians or at signalized intersections. Large trucks could also use the West Dravus Street interchange as a turnaround route or use alternative corridors such as Westlake Avenue North and West Nickerson Street to reach businesses where left-turn access is restricted. Alternative SIB-3 would not affect freight.

None of the alternatives in this segment would affect railroad facilities.



3.18.3.6 Interbay/Ballard Segment

Preferred Alternative IBB-1a and Option IBB-1b would have columns under the elevated guideway on each side of Salmon Bay. The guideway columns on the south side of Salmon Bay could affect circulation and operations for businesses along this edge of the bay.

Preferred Alternative IBB-1a and Option IBB-1b would locate the guideway along 14th Avenue Northwest and change the configuration at some intersections while maintaining one lane in each direction. Although 14th Avenue Northwest is not a designated truck street, it does provide local access for businesses located in the Ballard Interbay Northend Manufacturing/Industrial Center.

Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would not affect the truck or rail networks.

Alternative IBB-3 would construct medians for guideway columns along 15th Avenue Northwest between Northwest 56th Street and Northwest 57th Street. This would restrict left-turn access to properties between Northwest 56th Street and Northwest 57th Street, but the street grid network would allow traffic to recirculate for access to the affected properties. Guideway columns on the south side of Salmon Bay could affect access and circulation within Fishermen's Terminal.

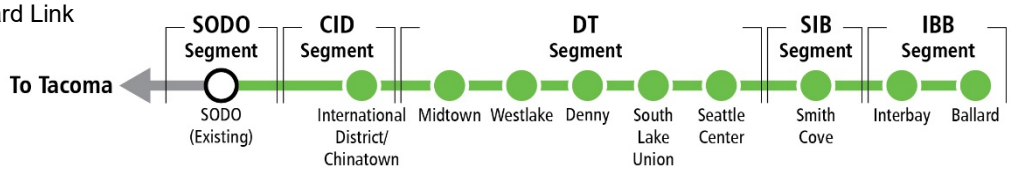
3.18.4 Mitigation for Operation Impacts

None of the Ballard Link Extension alternatives would have long-term freight impacts that require mitigation during light rail operations.

As part of the parking mitigation, Sound Transit would coordinate with the City of Seattle to manage curb use in the station vicinities. This would include locating commercial vehicle and truck-only load zones to service business needs.

3.19 Ballard Link Extension Construction Impacts

This section describes the transportation temporary (construction) impacts for the Ballard Link Extension. This section is organized into impacts on the project as a whole and on its individual segments, with a discussion of each transportation element within each segment. See Sections 3.12 through 3.18 for information on the long-term transportation impacts of the Build Alternatives. An overview of the methodology and assumptions used to analyze the short-term construction transportation impacts of the project is included in Section 3.2, Introduction and Methodology and Assumptions, and described in further detail in Attachment N.1A of Appendix N.1, Transportation Technical Report. Except where noted, the sequencing of construction activities was not assessed for the Draft Environmental Impact Statement, and some of the impacts described in this section may occur simultaneously. More detailed construction planning including sequencing will be provided in later project phases once the design is advanced further. See Tables 3-28 through 3-32 for key roadway construction closures by segment. Attachment N.1E, Construction-Related Roadway Modifications, in Appendix N.1 provides a list of key roadway construction closures, including extents and durations.



3.19.1 Impacts Common to All Alternatives

3.19.1.1 Arterial and Local Streets Operations

For arterial and local street operations, the construction impacts describe the truck traffic and haul routes associated with the project's construction, property access impacts, roadway closures and, where appropriate, traffic modeling of certain construction impacts.

3.19.1.1.1 Haul Routes and Construction Traffic

To construct the Ballard Link Extension, Sound Transit would primarily use the City of Seattle's Major Truck Streets (see Sections 9.2.1 and 9.3.1 in Appendix N.1 for the City's Major Truck Streets) and WSDOT's Interstate and State Route facilities, including Interstates 5 and 90 and State Routes 99, 509, 519, 599, and 520. These routes would be used for construction vehicle access to and from the alignments. Some oversize construction vehicles may need to use designated alternative routes.

Certain construction areas are not served by these state and city major truck routes, so additional streets would be required to access construction areas. These streets would be limited to arterials or larger whenever possible but would sometimes need to include local streets to access construction areas not on the arterial street system.

Consistent with City of Seattle regulations, construction and construction traffic management plans (including haul routes) would be prepared in consultation with the City of Seattle during final design and construction.

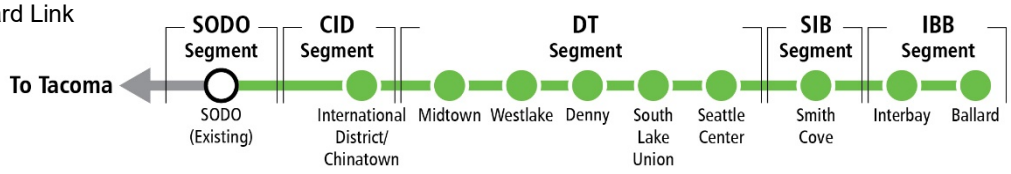
Over the duration of the construction period, the major construction activities would be associated with the station construction, tunneling, and constructing the elevated guideway or bridges. These activities would require between 10 and 35 trucks per hour; with bridge construction and tunnel excavation generating the highest truck activity (20 to 35 trucks) within that range.

3.19.1.1.2 Property Access, Roadway Impacts, and Detour Routes

Construction for each alternative would require road and lane closures that could also affect transit, freight, and non-motorized travel, as addressed later in this section. In general, detour routes would be along arterials, where feasible, to discourage traffic on local and collector streets through neighborhoods. Detour routes would be determined during the final design phase and in coordination with the City of Seattle and contractor. Project-related roadway closures could increase traffic congestion on detour routes or other roadways where volumes are increased as a result of the closures.

This section identifies major roadway and lane closures, generally defined as a full or partial closure of roadways for at least 1 year that would affect vehicle, people, and property access on these roadways. Some shorter-term (less than 1 year) closures are also described, as appropriate, to explain the breadth of the construction activities within a segment. See Attachment N.1E in Appendix N.1 for a more complete list of the roadway construction closures expected for each alternative. Additional road or lane closures may be needed for utility relocation, which would be determined during final design in coordination with the utility owner.

For long-term (over 1 year on key arterial streets) closures, an assessment of the traffic impacts was performed. Traffic diverting to adjacent roadways is likely with many of these closures. In these situations, the assessment identifies streets where there could be additional congestion



as a result of the construction activities. Further information on this is provided in Attachment N.1E in Appendix N.1.

If property access is restricted, temporary alternate access to these properties would be provided, if feasible. If alternative access is not available, then the specific construction activity would be reviewed to determine whether it could occur during nonbusiness hours.

3.19.1.2 Transit

Construction activities for the Ballard Link Extension could affect transit in the following ways:

- Impacts to transit infrastructure and facilities, as well as their access
- Transit and streetcar service and route impacts due to roadway closures

3.19.1.2.1 Transit Infrastructure and Facilities Impacts

Road, lane, and sidewalk closures would require temporary bus stop and layover relocations, bus service detours, or both during construction. Sidewalk and bicycle lane closures would also affect pedestrians and cyclists accessing transit. Specific transit facilities that are expected to be affected by construction for at least 1 year are described in the segment-specific sections that follow.

During the construction period, the SODO Busway would be closed, and access to the Metro Ryerson and Atlantic/Central bus bases would be affected. Section 3.19.2 provides additional discussion on the SODO Busway closure.

The City of Seattle streetcar system would be potentially impacted by construction activities in both the Chinatown-International District and Downtown segments. By the time construction of the Ballard Link Extension begins, it is assumed that the Center City Connector project would be complete, connecting the existing South Lake Union and First Hill lines. As the project progresses, Sound Transit would work with the City of Seattle to minimize streetcar impacts and, where needed, develop an operational plan to minimize impacts to streetcar service and riders. Further information on this is provided in Sections 3.19.3 and 3.19.4.

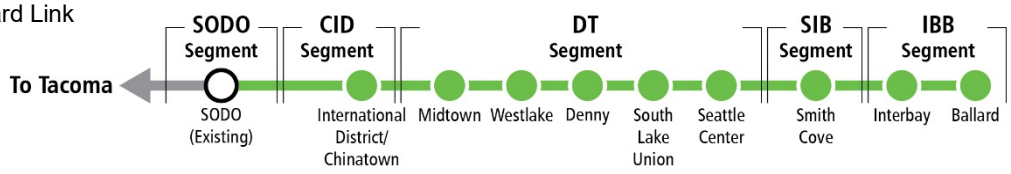
Similar to the streetcar system, the Metro trolley bus system would be potentially impacted by construction activities. Impacts to trolley bus routes or modifications to the overhead catenary system could potentially occur in the Chinatown-International District, Downtown, and Interbay/Ballard segments. As the project advances, Sound Transit would work with Metro and the City of Seattle to minimize trolley bus impacts and develop a capital plan (including trolley bus wire relocation) and operational plan for construction impacts that are not avoidable.

In the SODO Segment, the Alternative CID-1a* connections to all of the SODO Segment alternatives would affect the existing light rail service between the SODO and International District/Chinatown stations. These impacts are described in Section 3.3.2.

3.19.1.2.2 Roadway Closures

During construction, current bus routes would be affected at some locations along the corridor. Bus reliability could potentially degrade along streets with project construction activities due to lane closures and other construction-related activity. For areas with construction within the roadway right of-way, streets may operate with fewer lanes or be completely closed, affecting roadway operations including bus service along those streets.

In locations where roadways experience full closure, bus routes may need to use alternate pathways and temporary bus facilities may need to be installed. Depending on the condition of



the alternate pathways, pavement damage could occur as a result of the longer-term transit reroutes. In general, project alternatives constructed outside the roadway right-of-way would have minimal impacts on bus routes, although some pedestrian and bicycle access to transit routes may be temporarily affected.

Detailed descriptions of the roadway closures affecting transit during construction are provided in each of the segment-specific Arterial and Local Street Operations sections of Section 3.19. See Attachment N.1E in Appendix N.1 for a more complete list of the roadway construction closures expected for each alternative.

3.19.1.3 Parking

Potential temporary parking impacts during construction are described in the following sections for each segment. The temporary parking impacts are in addition to parking that is permanently removed as described in Section 3.14.3.2 or lost through property acquisition. Table 3-26 in Section 3.14.3.2 presents the potential parking temporarily removed during construction of the guideway and stations. Short-term removal of parking during night or weekend construction could be needed beyond those areas, depending on the construction activities. The known temporary parking removals are described further in the segment sections. With these temporary impacts, parking would be restored after construction is complete. Appendix N.1 details where parking would be removed for each alternative.

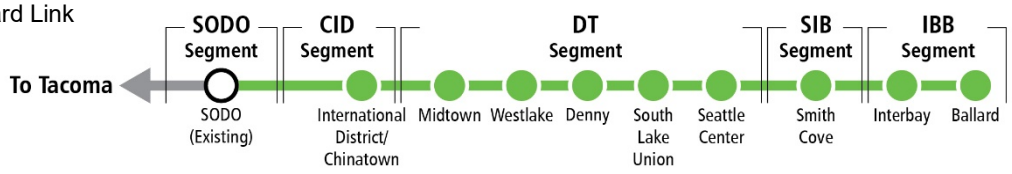
Because the Ballard Link Extension segments are in urban areas where parking may be limited or require payment, Sound Transit expects that construction employee vehicles would be limited only to the number that could park within the construction staging area. Although construction workers could also park on local streets and arterials where parking is unrestricted, construction worker parking near designated construction staging areas could affect the nearby parking supply during heavy construction periods.

3.19.1.4 Non-motorized Facilities

During light rail construction, construction activity within and along roadways (such as elevated guideway construction) would impact non-motorized travel modes. As part of these roadway closures, the construction activities could close sidewalks or reduce the sidewalk width within the construction areas, though Americans with Disabilities Act-compliant access would be maintained or detours provided. In some locations, crosswalks may be closed for construction, although they would remain open to the extent feasible. In accordance with Seattle Department of Transportation Director's Rule 10-2015, sidewalks and pedestrian paths would be kept open to the maximum extent possible; adjacent lane closures would be considered to create pathways around construction areas.

Although sidewalks or pedestrian paths that students use to reach schools may be affected during construction, no designated school crossings are expected to be affected. The project may result in Americans with Disabilities Act-accessible curb ramps temporarily being removed to accommodate the project construction. There could also be bicycle facility closures and reduced bicycle lane widths within or adjacent to construction areas. Some roadways may have full closures such that the roadway connection is eliminated; in those cases, pedestrians and bicycles would be rerouted to the next adjacent street, where feasible, to minimize out-of-direction travel.

The conditions described above could affect areas throughout the project corridor for a range of durations. Trails, bicycle lanes, greenways, signed bicycle routes, and non-street pedestrian



throughways and stairways expected to be affected by construction or full roadway closures causing substantial barriers or out-of-direction travel for at least 1 year are described in the segment-specific Non-motorized Facilities sections of Section 3.19.2 through Section 3.19.6.

3.19.1.5 Safety

The potential roadway closures and traffic diversions during construction may increase traffic volumes and the potential for conflicts and collisions on adjacent streets and alternate routes. However, the overall number of collisions in the area is not expected to substantially change as the total traffic volumes in the area would be similar.

In locations where there would be no physical change to the roadway (i.e., volume changes only), the types of collisions would likely remain similar to existing conditions. Currently, the majority of collisions in the study area are property damage only. Signing and advanced communication of any changes to travel patterns and detours would minimize the potential safety impacts and would be addressed in the Maintenance of Traffic Plan. The Maintenance of Traffic Plan will be developed based on the Federal Highway Administration's Manual on Uniform Traffic Control Devices (2009) and Seattle Department of Transportation's Traffic Control Manual (2012).

Access modifications (such as right-in, right-out) and left-turn restrictions at intersections, such as along 15th Avenue Northwest, would occur in the Ballard Link Extension construction areas. This would reduce some vehicle conflicts along these roadways.

Some sidewalks, crosswalks, and bicycle facilities may be closed temporarily during construction. Detours would be provided where feasible and appropriately designed and marked to encourage compliance. This could temporarily modify trips to these other routes. Some closures may divert bicyclists away from dedicated facilities to shared facilities, and Sound Transit would coordinate with the City of Seattle to identify appropriate alternate facilities.

3.19.1.6 Navigation

Navigation is only applicable to the Interbay/Ballard Segment because there are no navigable waterways in the SODO, Chinatown-International District, Downtown, and South Interbay segments. See Section 3.19.6.6 for details.

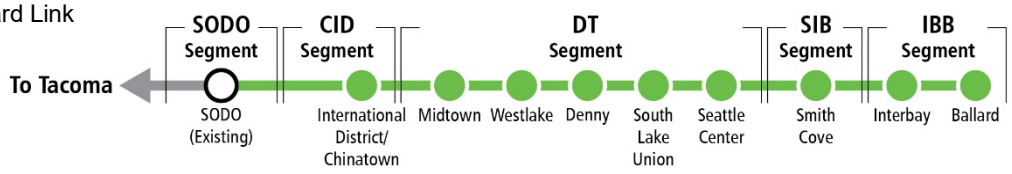
3.19.1.7 Freight Mobility and Access

Construction activities for all Build Alternatives are expected to eliminate some on-street load zones for trucks and business deliveries within the construction areas, particularly near stations. For many of those locations, adjacent businesses would also be acquired, which could limit the demand for the affected load zone. For most alternatives, one to two load zones would be removed during construction. Alternatives with a higher number of load zones removed are described in the following segment-specific discussion.

3.19.2 SODO Segment

3.19.2.1 Arterial and Local Street Operations

As summarized in Table 3-28, all of the three SODO Segment alternatives would construct a new South Holgate overpass over the SODO Busway, including the existing and proposed light rail tracks between 4th Avenue South and 6th Avenue South. South Lander Street would be open during construction of the South Holgate overpass.



Closing South Holgate Street would divert east-west vehicle trips to other streets affecting traffic conditions along South Lander Street, Edgar Martinez Drive South, and South Royal Brougham Way, along with portions of 6th Avenue South and Airport Way South.

With Alternative SODO-2, a section of the SODO Busway would be closed for the duration of construction. Construction of both the West Seattle and Ballard Link SODO-2 alternatives would result in the SODO Busway being closed for 10 years. Metro buses during the peak hour would be relocated onto 4th Avenue South and/or 6th Avenue South, which would not substantially affect the general traffic conditions on these roadways. The traffic impacts during construction with the permanent SODO Busway closure under Preferred Alternative SODO-1a and Option SODO-1b would be similar to what is described for Alternative SODO-2. See Section 3.19.2.2 for further information on the transit service with the closure of the SODO Busway.

Table 3-28. Key Construction Roadway Closures – SODO Segment, Ballard Link Extension

Affected Street	Extents [a]	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
SODO Busway [d]	South Massachusetts Street to South Spokane Street	Permanently closed	Permanently closed	Full closure, 7 years [e]
South Holgate Street	4th Avenue South to 6th Avenue South	Full closure, 2 to 3 years [b,c]	Full closure, 2 to 3 years [b,c]	Full closure, 3 years [c]

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.

[b] 2 years (if connecting to Alternative CID-2a or Option CID-2b), 3 years (if connecting to Alternative CID-1a* or Option CID-1b*).

[c] Includes short-term partial or full closures of intersections with 4th Avenue South and 6th Avenue South.

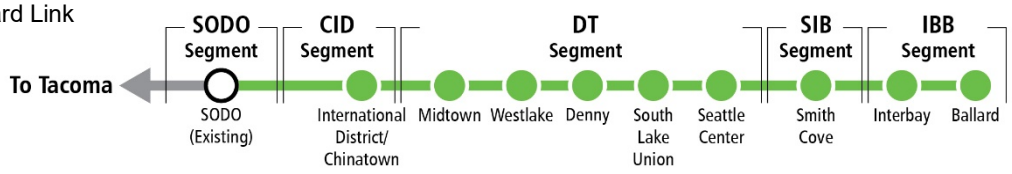
[d] While the full length of the SODO Busway includes portions of the Chinatown-International District and Duwamish segments, the SODO Busway closure is described under the SODO Segment.

[e] Approximately 2 years of the SODO Busway closure would coincide with the 5-year busway closure for the West Seattle Link Extension. The total busway closure would be 10 years for the duration of the West Seattle and Ballard projects.

3.19.2.2 Transit

See Table 3-28 for details on key construction-related facility closures in the SODO Segment. Alternative SODO-2 would close the SODO Busway between South Massachusetts Street and South Spokane Street during the duration of the West Seattle Link and Ballard Link extension construction periods (10 years in total with the combination of both extensions). The SODO Busway closure would affect 60 to 80 peak hour Metro buses during the construction period, including both revenue and non-revenue trips. These buses would shift to either 4th Avenue South or 6th Avenue South, which would likely create additional travel time for buses in this segment. The transit impacts during construction with the permanent SODO Busway closure under Preferred Alternative SODO-1a and Option SODO-1b would be similar to what is described for Alternative SODO-2.

See Section 3.3.2 for a discussion of the temporary closure of the light rail system with the construction of any of the SODO alternatives connecting to Alternative CID-1a*.



3.19.2.3 Parking

All of the alternatives are expected to have only minor temporary parking impacts during construction.

3.19.2.4 Non-motorized Facilities

See Table 3-28 for details on key construction-related facility closures in the SODO Segment. With the closure of South Holgate Street for all of the SODO alternatives, the nearest east-west non-motorized routes across the SODO Busway would be South Lander Street and South Royal Brougham Way, which are both approximately 0.5 mile away.

The SODO Trail would also be closed for the construction duration between South Royal Brougham Way and South Forest Street. During this closure, pedestrians and bicycles would likely be detoured to either 6th Avenue South or 4th Avenue South, with east-west access maintained at adjacent street crossings such as South Lander Street.

3.19.2.5 Safety

See Table 3-28 for details on key construction-related facility closures in the SODO Segment. For all SODO Segment alternatives, the South Holgate Street closure would redistribute traffic to adjacent streets, increasing volumes on some streets and decreasing volumes on others. This would likely have a mixed impact on safety, as collisions are correlated with traffic volumes. While individual streets may see a change in safety benefits or impacts (i.e., decrease or increase in collisions), it is likely that there would be negligible overall safety impact within the segment as the total volumes in the area are not expected to change.

The closure of the SODO Trail would likely require pedestrians and bicyclists be detoured to 4th Avenue South or 6th Avenue South, which would increase the potential for conflicts with vehicles.

3.19.2.6 Freight Mobility and Access

See Table 3-28 for details on key construction-related facility closures in the SODO Segment. While South Holgate Street is closed for construction, South Lander Street would be open and could serve as an alternate route for most trucks. However, heavy-haul trucks that use South Holgate Street may be affected because there are no other designated Heavy Haul Network streets in the vicinity to serve those types of vehicles.

3.19.3 Chinatown-International District Segment

3.19.3.1 Arterial and Local Street Operations

As summarized in Table 3-29, the primary effects from construction in the Chinatown-International District Segment would occur with the alternatives on 4th Avenue South (Alternative CID-1a* and Option CID-1b*). 4th Avenue South carries approximately 30,000 vehicles per day as a primary north-south arterial connecting SODO to Downtown Seattle. Closure of all or portions of 4th Avenue South would result in substantial diversion of traffic and additional congestion throughout the arterial and local streets within the Chinatown-International District and potentially the surrounding transportation system outside this segment.

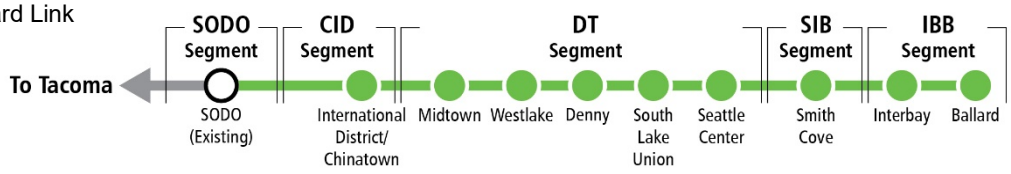


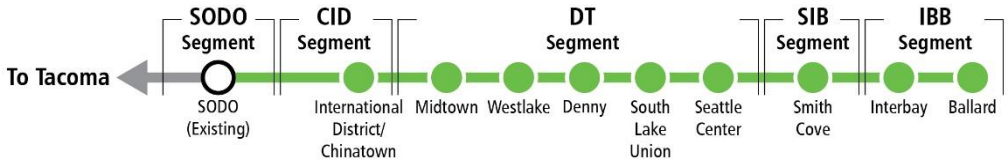
Table 3-29. Key Construction Roadway Closures – Chinatown-International District Segment

Affected Street	Extents [a]	4th Avenue Shallow Alternative (CID-1a)*	4th Avenue Deep Station Option (CID-1b)*	5th Avenue Shallow Alternative (CID-2a)	5th Avenue Deep Station Alternative (CID-2b)
2nd Avenue Extension	South Jackson Street to 4th Avenue South	Full closure, 2 years	Full closure, 6.5 years	Not applicable	Not applicable
4th Avenue South	South Jackson Street to Seattle Boulevard South	Partial closure, 6 years (extends from South Jackson Street to I-90 off-ramp)	Full closure, 6.5 years Partial closure, 2 years	Not applicable	Not applicable
4th Avenue South	South Main Street to north side of South Jackson Street	Full closure, 4 years	Not applicable	Not applicable	Not applicable
4th Avenue South/South Jackson Street	Intersection	Full closure, 2 years	Full closure, 2 years	Not applicable	Not applicable
5th Avenue South	South Jackson Street to South Weller Street	Not applicable	Not applicable	Partial closure, 2.5 years Full closure, 9 months (includes 6-month partial closure of intersection at South Jackson Street)	Partial closure, 1 year
6th Avenue South	In the vicinity of South Royal Brougham Way	Not applicable	Not applicable	Partial closure, 1 year	Partial closure, 6 months
Ryerson Bus Base Access from SODO Busway	North of South Massachusetts Street	Full closure, 4 years	Permanently closed	Not applicable	Not applicable
Seattle Boulevard South	4th Avenue South to 5th Avenue South	Full closure, 2 years	Not applicable	Not applicable	Not applicable
South Jackson Street	2nd Avenue Extension to 5th Avenue South	Full closure, 2 years	Full closure, 2 years	Partial closure, 6 months for intersection at 5th Avenue South	Not applicable
South Main Street	3rd Avenue South to 4th Avenue South (includes 4th Avenue South intersection)	Full closure, 4 years	Not applicable	Not applicable	Not applicable

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.



Alternative CID-1a* would have multiple partial and full closures of 4th Avenue South and connecting streets for multiple years. Traffic would be diverted to parallel north-south streets such as 1st Avenue South, 6th Avenue South, and Maynard Avenue South. Notably, the closure of South Jackson Street would also divert traffic to the east-west parallel streets such as South Main Street and South Washington Street. Yesler Way South would also experience increased congestion approaching downtown from the east.

Option CID-1b* would have similar construction traffic effects as Alternative CID-1a*, with the most notable difference that Option CID-1b* would fully close 4th Avenue South between South Jackson Street and Seattle Boulevard South for multiple years. During the period of full closure of 4th Avenue South, over 2,000 p.m. peak hour vehicles would be diverted to other streets. Traffic diversions and increased congestion would likely occur within the study area on 1st Avenue South and local streets within the Chinatown-International District Segment including 6th Avenue South, and Maynard Avenue South.

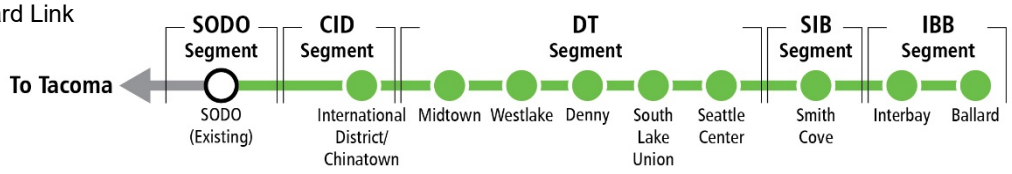
The alternatives on 5th Avenue South (Alternative CID-2a and Option CID-2b) would have short- and longer-term closures of 5th Avenue South between South Jackson Street and around South Weller Street. The effects of these closures would be more localized within the Chinatown-International District than the 4th Avenue South closures, but they would likely increase congestion along parallel routes such as 4th Avenue South, 6th Avenue South, and Maynard Avenue South, as well as along South Jackson Street.

Alternative CID-2a would have longer-term closures of 5th Avenue South, along with a short-term closure of the intersection of 5th Avenue South/South Jackson Street. This closure would affect traffic flows. The diagonal station configuration would require a partial closure of 5th Avenue South for approximately 1 year and would not have construction traffic impacts to South Jackson Street.

Option CID-2b would have similar traffic diversion effects during construction as Alternative CID-2a, although the durations would be shorter. The 5th Avenue South/South Jackson Street intersection would also not be directly affected during construction.

3.19.3.2 Transit

See Table 3-29 for details on key construction-related roadway and facility closures in the Chinatown-International District Segment. Under Alternative CID-1a*, the partial closure of 4th Avenue South would affect multiple bus routes, potentially impacting between 150 and 200 peak hour bus trips. Concurrent with the partial closure of 4th Avenue South, construction of Alternative CID-1a* would also close Seattle Boulevard South, affecting buses connecting to the Atlantic/Central Bus Base (also between 130 and 180 peak hour bus trips). The closures of 4th Avenue South and South Jackson Street, including the 4th Avenue South /South Jackson Street intersection, would directly affect approximately 20 bus routes and the Seattle Streetcar system, affecting between 220 and 300 bus or streetcar trips in the peak hour. The streetcar would not be able to operate through the 4th Avenue South and South Jackson Street intersection. Other segments (i.e., Capitol Hill/First Hill and Downtown/South Lake Union) of the streetcar system would still be operable, but not as a connected system as it is assumed the Seattle's Center City Connector project is built prior to this project's construction. Therefore, the frequency and headway of the streetcar system could be impacted depending on how the fleet is managed and access is provided to the maintenance facilities. Closures along 4th Avenue South would also affect trolley bus routes.



Under Option CID-1b*, the closure of 4th Avenue South would also affect multiple transit routes, similar to Alternative CID-1a*. The closure of South Jackson Street and the South Jackson Street/4th Avenue South intersection would also affect multiple regular and trolley buses and the Seattle Streetcar system with similar impacts to those described for Alternative CID-1a*.

Under Alternative CID-2a, the 5th Avenue South closures would affect non-revenue service for the RapidRide D and E lines and for trolley buses accessing the Atlantic Bus Base, affecting 40 to 60 peak hour bus trips. The partial closure of the 5th Avenue South/South Jackson Street intersection would also affect trolley bus service and interrupt streetcar service, affecting 60 to 80 peak hour bus and streetcar trips. Trolley buses could potentially be rerouted through the Chinatown-International District on 7th Avenue South or 8th Avenue South. Partial closures of 6th Avenue South both north and south of South Royal Brougham Way would affect numerous bus routes that layover in the vicinity of the Atlantic/Central Bus Base.

The diagonal station configuration for Alternative CID-2a would not require relocation of the trolley bus pathway on 5th Avenue South or interrupt streetcar service on South Jackson Street. This station configuration would also likely avoid lane closures and transit effects along 6th Avenue South south of South Royal Brougham Way, which is a key pathway to the Atlantic/Central Bus Base, as well as layover areas.

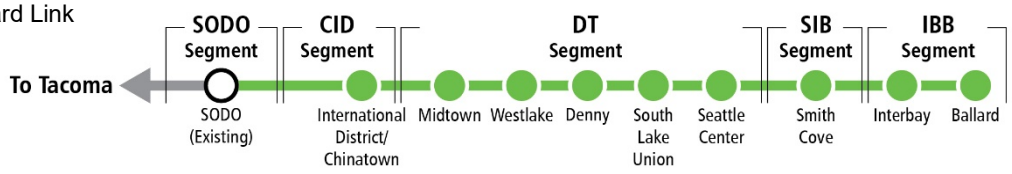
Under Option CID-2b, there would be no construction effects to the intersection of South Jackson Street and 5th Avenue South. The streetcar on South Jackson Street and trolley buses on 5th Avenue South would be able to continue operations during construction.

Alternative CID-2a and Option CID-2b would build a tunnel portal in the vicinity of South Massachusetts Street beneath 6th Avenue South. The tunnel portal construction would partially close portions of 6th Avenue South, which provides layover and base access for employees and non-revenue vehicles, and would also temporarily affect portions of the Atlantic/Central Bus Base. Tunneling under South Royal Brougham Way could also temporarily close portions of that street, which would impact access to both the Ryerson and Atlantic/Central bus bases. While not a publicly owned transit operator, this closure would also impact Greyhound bus operations.

Construction of Alternative CID-1a* would require the temporary closure during construction of the bus access to Ryerson Bus Base along a portion of the SODO Busway between South Massachusetts Street and South Royal Brougham Way. During this time, a new point of access into the Ryerson Bus Base, along with possible reorientation of the internal bus yard, would be coordinated with Metro. The effects of routing bus trips out of the SODO Busway would be similar to those described in Section 3.19.2, SODO Segment. Alternative CID-2a and Option CID-2b would allow the SODO Busway to remain open from South Massachusetts Street to South Royal Brougham Way, although the remainder of the busway would be closed throughout the construction period.

3.19.3.3 Parking

Alternative CID-1a* and Option CID-1b* are not expected to impact parking during construction. Alternative CID-2a could temporarily remove 155 to 195 on-street parking spaces on 6th Avenue South, South Weller Street, 5th Avenue South, and South King Street, and could eliminate additional parking along 8th Avenue South with the relocation of the trolley bus system. Option CID-2b could temporarily remove 40 to 50 on-street parking spaces on 6th Avenue South and South Weller Street during construction. These parking impacts would not occur with the diagonal station configuration for Alternative CID-2a, but 10 to 20 on-street parking spaces on 5th Avenue South and South King Street would be temporarily removed.



3.19.3.4 Non-motorized Facilities

See Table 3-29 for details on key construction-related roadway closures in the Chinatown-International District Segment. Under all alternatives, the SODO Trail, a portion of which is located in the Chinatown-International District Segment, would be affected by construction. For information on this closure, see Section 3.19.2.4, Non-motorized Facilities, for the SODO Segment.

Under Alternative CID-1a* and Option CID-1b*, the full and partial closures of 4th Avenue South and connecting streets such as South Jackson Street and South Main Street would affect pedestrian and bicycle movements along and across the 4th Avenue South corridor. These would affect the existing and planned bicycle facilities on 4th Avenue South and the existing cycle track on South Main Street. Because connectivity to the west is limited, most users would likely divert to 5th Avenue South. Access to the Weller Street Bridge would likely be closed, although a temporary pedestrian crossing of the construction area may be possible. Pedestrians would need to use South Jackson Street to cross 4th Avenue South during that time except when the South Jackson Street and 4th Avenue South intersection would be fully closed, during which pedestrians may need divert to South Main Street.

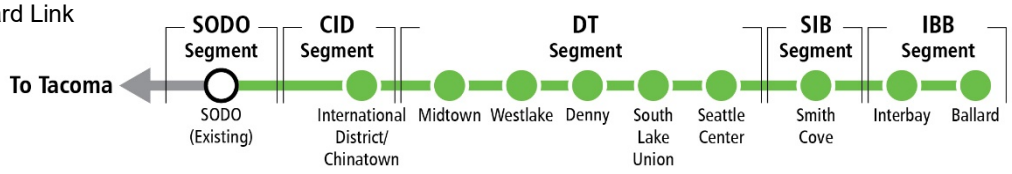
Under Alternative CID-2a, the partial and full closures of 5th Avenue South could affect the existing bike lane along 5th Avenue South. Option CID-2b would have fewer closures of 5th Avenue South, potentially reducing the effects on bicycle travel compared to Alternative CID-2a. Under Alternative CID-2a, the partial closure of South Jackson Street at 5th Avenue South would limit pedestrian and bicycle access along that roadway, which is a signed City of Seattle bike route; bicyclists could divert to South Main Street. The closure of South King Street and South Weller Street would also affect pedestrian movements to and from the existing light rail station. The diagonal station configuration for Alternative CID-2a would reduce the duration of the 5th Avenue South partial closure and would allow South Jackson Street to remain open for pedestrians. The partial closure of 6th Avenue South in the station vicinity could affect pedestrian movements.

3.19.3.5 Safety

See Table 3-29 for details on key construction-related roadway closures in the Chinatown-International District Segment. Alternative CID-1a* and Option CID-1b* would require multiple-year staged closures along 4th Avenue South, which would divert volumes to adjacent streets and potentially increase collisions along those streets.

Alternative CID-2a would have multiple stages of full and partial closures of 5th Avenue South, which would likely increase volumes on adjacent streets and potentially increase collisions. The volumes diverted would be less than the 4th Avenue South alternatives (Alternative CID-1a* and Option CID-1b*) and would likely have a smaller impact on safety. 6th Avenue South on either side of South Royal Brougham Way would have reduced lanes during construction, but the diversions are expected to be minimal and have a negligible effect on safety. Implementing the diagonal station configuration would remove roadway closures on South Jackson Street, while requiring only short-term minor disruptions to traffic along of 5th Avenue South that would have negligible effects on safety. Option CID-2b would have fewer and shorter roadway closures on 5th Avenue South than Alternative CID-2a, which would reduce the safety impact.

With all of the Chinatown-International District Segment alternatives' roadway closures, vehicles would be diverted to adjacent arterial streets where feasible, which are better designed to accommodate higher volumes and may not impact safety as much as when traffic is diverted to residential streets.



3.19.3.6 Freight Mobility and Access

See Table 3-29 for details on key construction-related roadway closures in the Chinatown-International District Segment. The partial and full closures of 4th Avenue South with Alternative CID-1a* and Option CID-1b* would affect a Major Truck Street. Alternative CID-1a* would also fully close Seattle Boulevard South, which is a Major Truck Street and part of the City of Seattle's Over-Legal Network. During these closures, traffic is expected to be rerouted to other streets, such as 1st Avenue South and 6th Avenue South.

Alternative CID-1a* would rebuild the bridges over the BNSF Railway mainline tracks at South Main Street and South Jackson Street. Option CID-1b* would retrofit the South Jackson Street bridge over the tracks, which could affect rail operations during certain construction activities.

Alternative CID-2a and Option CID-2b could partially close 6th Avenue South near Royal Brougham Way, which is a Major Truck Street. The diagonal station configuration of Alternative CID-2a is not expected to affect truck streets.

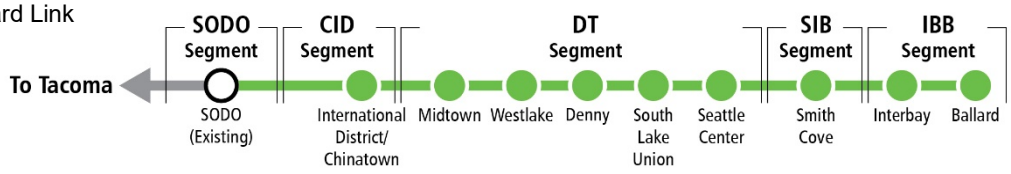
3.19.4 Downtown Segment

3.19.4.1 Arterial and Local Street Operations

Table 3-30 summarizes the major construction closures for the Downtown Segment.

Table 3-30. Key Construction Roadway Closures – Downtown Segment

Affected Street	Extents [a]	Preferred 5th Avenue/Harrison Street Alternative (DT-1) [b]	6th Avenue/Mercer Street Alternative (DT-2)
4th Avenue	Columbia Street to James Street	Partial closure, 6 years	Not applicable
4th Avenue	Marion Street to Madison Street	Partial closure, 6 years	Not applicable
4th Avenue	Pine Street to Olive Way	Full closure, 2 years	Not applicable
4th Avenue/Madison Street	Intersection	Partial closure, 4 years	Not applicable
5th Avenue	Madison Street to Columbia Street	Full closure, up to 1.5 years (includes 9-month full closure of intersections at Madison, Marion, and Columbia streets and a portion of the Interstate 5 high-occupancy-vehicle express lanes reversible ramp)	Not applicable
5th Avenue	Union Street to Pike Street	Partial closure, 6 years	Not applicable
6th Avenue	University Street to Madison Street (includes intersections at Seneca, Spring and Marion streets)	Not applicable	Partial closure, 1 year
6th Avenue	Olive Way to Stewart Street	Not applicable	Full closure, 6 years
7th Avenue	Westlake Avenue to Lenora Street	Partial closure, 4 years	Not applicable
8th Avenue	Westlake Avenue to Blanchard Street	Partial closure, 4 years	Not applicable



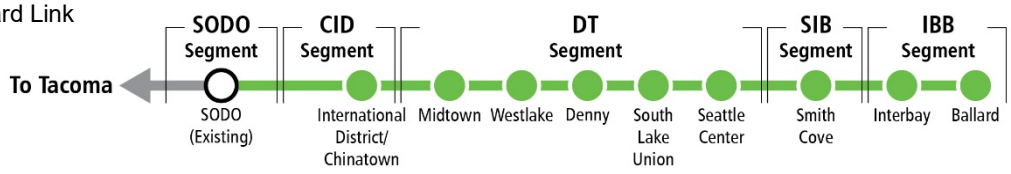
Affected Street	Extents [a]	Preferred 5th Avenue/Harrison Street Alternative (DT-1) [b]	6th Avenue/Mercer Street Alternative (DT-2)
Blanchard Street	8th Avenue to 9th Avenue/ Westlake Avenue	Partial closure, 5 years	Not applicable
Cherry Street	3rd Avenue to 5th Avenue	Full closure, 1 year	Not applicable
Harrison Street	6th Avenue North to Dexter Avenue North	Full closure, 4 years	Not applicable
Harrison Street	Dexter Avenue North to 8th Avenue North (includes intersection at Dexter Avenue North)	Partial closure, 1.5 years	Not applicable
Harrison Street/7th Avenue	Intersection	Partial closure, 1.5 years	Not applicable
Interstate 5 Southbound Off-ramp to James Street	Near Madison Street	Not applicable	Partial closure, 6 years
Madison Street	4th Avenue to 5th Avenue	Full closure, 1 to 3 years (may by partial closure depending on connection option)	Not applicable
Mercer Street/West Mercer Street	Warren Avenue North to 1st Avenue West	Not applicable	Partial closure, 3.5 years
Pike Street	4th Avenue to 5th Avenue	Partial closure, 6 years	Not applicable
Pine Street	4th Avenue to 5th Avenue	Full closure, 6 years	Not applicable
Pine Street	5th Avenue to 6th Avenue	Not applicable	Full closure, 4 years
Republican Street	Queen Anne Avenue North to Warren Avenue North	Full closure, 5 years (includes 15-month full closure of intersection at 1st Avenue North)	Not applicable
Taylor Avenue North	Mercer Street to Roy Street	Not applicable	Full closure, 4 years
Terry Avenue North	Denny Way to Thomas Street (includes intersections at John and Thomas streets)	Not applicable	Full closure, 4 years
Westlake Avenue	7th Avenue to Denny Way [c]	Full closure, 4 years (includes 9-month partial closure of intersections at 8th Avenue and 9th Avenue/Blanchard Street) [c]	Not applicable

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.

[b] Range of closure duration reflects differences in construction method, alternative, and connection options.

[c] If an alternative construction approach is used to maintain streetcar operations (see Section 3.19.4.2), Westlake Avenue would instead be closed between Stewart Street and Thomas Street for 6 years. The intersections of 8th Avenue/Lenora Street/Westlake Avenue and 9th Avenue/Blanchard Street/Westlake Avenue would be closed for 7 years.



With the light rail construction through the Downtown Segment being entirely underground, the construction-related traffic impacts in this segment occur at or near the stations. In general, street closures would be needed for cut-and-cover station construction or station entrance construction. These closures would increase congestion on nearby streets due to traffic diversions. Sidewalk closures would be needed at several locations near the stations, which could result in vehicle lane reductions to maintain pedestrian access. Depending on the construction method for the tunnel as well as stations, the length and type of construction closures required would vary. The following sections describe the notable longer-term closures surrounding each of the new stations.

3.19.4.1.1 Midtown Station

The location and duration of closures related to the Midtown Station vary depending on which alternative they connect to in the Chinatown-International District Segment.

If Preferred Alternative DT-1 connects to Alternative CID-2a, one lane on 4th Avenue and one lane on Madison Street would be closed near the station entrance for multiple years. Closure of Madison Street between 4th Avenue and 5th Avenue might be required.

If Preferred Alternative DT-1 connects to Alternative CID-1a*, Option CID-1b*, or Option CID-2b, Sound Transit anticipates partial or full closures of sections of 5th Avenue, Columbia Street at 5th Avenue (affecting one general purpose lane and the sidewalk), 4th Avenue (affecting one lane), Madison Street, and the Interstate 5 high-occupancy-vehicle express lane ramps on 5th Avenue at Columbia Street and Cherry Street.

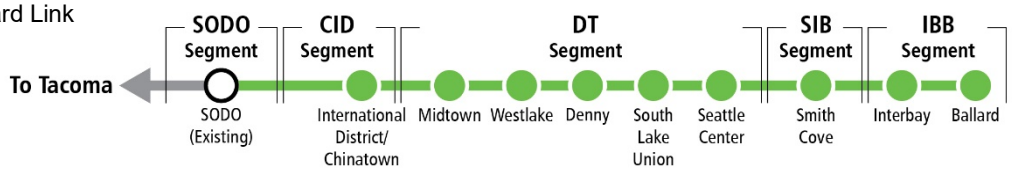
With the 5th Avenue, Columbia Street, and Madison Street roadway closures, westbound traffic across Interstate 5 would likely divert to Seneca Street and James Street, and southbound traffic would likely divert from 5th Avenue to 2nd Avenue. Northbound trips that would have used the Interstate 5 high-occupancy-vehicle express lanes ramp would likely use 4th Avenue, 6th Avenue, and University Street to reach other Interstate 5 northbound on-ramps, creating additional congestion on the local streets near those on-ramp locations. Furthermore, any short-term closure of Interstate 5 or State Route 99 ramps would create additional traffic circulation on local streets.

Construction of the Midtown Station under Alternative DT-2 would require a partial closure of 6th Avenue. Station construction would also require a lane closure on the Interstate 5 off- ramp to James Street, as well as nighttime lane closures on the Interstate 5 mainline near Madison Street. The nighttime lane closures would likely not affect Interstate 5 mainline operations. All lane closures on state facilities would be coordinated with WSDOT to minimize impacts.

3.19.4.1.2 Westlake Station

Construction of the Westlake Station under Preferred Alternative DT-1 would require closures of sections of 4th Avenue and Pine Street. For the 4th Avenue closure, traffic would likely detour to 1st Avenue via Union Street and Pine Street, and to 6th Avenue via Pike Street. The closure of Pine Street would likely divert to traffic to Stewart Street, Union Street, 5th Avenue, and 6th Avenue.

Alternative DT-2 would require a closure of a section of Pine Street, with traffic likely diverting to Stewart Street, Union Street, 7th Avenue, and 8th Avenue. For the 6th Avenue closure, northbound traffic would likely divert to 4th Avenue and 8th Avenue.



3.19.4.1.3 Denny Station

Construction of the Denny Station under Preferred Alternative DT-1 would require a closure of Westlake Avenue. Traffic would likely detour to Dexter Avenue and Fairview Avenue. Other affected streets would include 8th Avenue and 7th Avenue, which would experience periods of partial closure. Traffic diversions would span multiple streets and would likely not have a substantial impact to one single street, but would create additional circulation within the congested street grid on streets such as Dexter Avenue, Fairview Avenue, and 6th Avenue.

Alternative DT-2 would require a closure of Terry Avenue North, including the intersections on Thomas Street and John Street. Traffic would likely divert to Westlake Avenue North or Boren Avenue North. The Thomas Street intersection closure would impact South Lake Union Streetcar service, as described in Section 3.19.4.2.

3.19.4.1.4 South Lake Union Station

Under Preferred Alternative DT-1, sections of Harrison Street would be closed, diverting some east-west traffic to Mercer Street and John Street. Access to and from Aurora Avenue North via 7th Avenue North would remain open.

Alternative DT-2 would require a closure of Taylor Avenue North, and 6th Avenue North would also be closed north of Mercer Street. Traffic would likely divert to 5th Avenue North.

3.19.4.1.5 Seattle Center Station

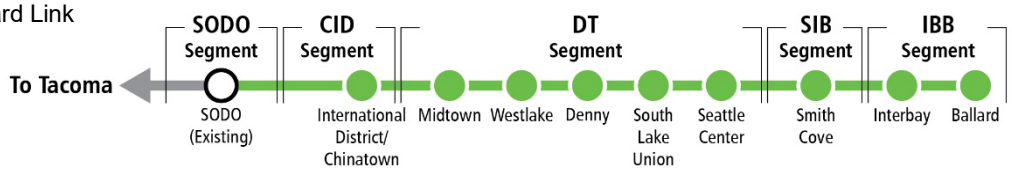
The construction of the Seattle Center Station under Preferred Alternative DT-1 would require closures of sections of West Republican Street. East-west traffic would likely divert to nearby parallel streets, such as Mercer or Harrison streets, and north-south traffic would divert to parallel streets such as 1st Avenue West or 2nd Avenue West.

Construction of the Seattle Center Station under Alternative DT-2 would require a partial closure of Mercer Street. Diverted traffic would likely use Denny Way.

3.19.4.2 Transit

See Table 3-30 for details on key construction-related facility closures in the Downtown Segment. Under Preferred Alternative DT-1, multiple transit routes, including the Seattle Streetcar system, would be affected by the roadway closures on Harrison Street, Pine Street, Westlake Avenue, and Madison Street. With the full closure of Westlake Avenue near Denny Way, the streetcar would not be able to travel through this segment. The streetcar may be able to continue to operate in South Lake Union and Downtown/First Hill, although not as a connected system, as it is assumed the Center City Connector project is built prior to this project's construction. This closure would prevent access for the Downtown/First Hill segment to the maintenance facility in South Lake Union. Therefore, the frequency and headway of the streetcar system could be impacted depending on how the fleet is managed and access is provided to the maintenance facilities. The greatest construction-related transit effects would be around the Harrison Street/7th Avenue North intersection (which impacts up to 50 peak hour peak hour bus trips on the RapidRide E Line, among others), on Westlake Avenue between Denny Way and 7th Avenue (which impacts up to 40 peak hour trips on the streetcar system, RapidRide C, and Route 40, a future RapidRide route), and on Pine Street between 4th Avenue and 5th Avenue.

However, alternative construction approaches are being considered for this location, which could substantially reduce the impact to streetcar service through the Westlake Avenue/Denny



Way portion of the route. This could maintain access to the South Lake Union maintenance facility as well as provide single-track operation through the construction area on Westlake Avenue, with full operations resuming while station construction continues (see Section 3.3.2.2 of Appendix N.1, Transportation Technical Report, for more information). Note that these alternative construction approaches would reduce streetcar impacts but there would be no change in bus construction impacts, as bus routes would still need to divert away from the Denny Way/Westlake Avenue intersection area during construction.

In addition to the full closures noted in Table 3-30, construction activities at the intersection of 1st Avenue North and West Republican Street could affect trolley bus operations, necessitating short-term, off-wire bus service or temporarily shifting the overhead trolley wire system to maintain operations. Trolley bus routes operating on Pine Street and Madison Street could be affected by street closures and if overhead wires are temporarily de-energized.

Under Alternative DT-2, extended closures of Pine Street, Taylor Avenue North, and Terry Avenue North would affect several transit routes and up to 10 to 30 peak hour bus trips at each of these locations. The streetcar would not be able to travel northbound through the Terry Avenue North closure at Thomas Street, which could impact the frequency and headway of the streetcar system.

In addition to these full roadway closures, the partial closure of Mercer Street under Alternative DT-2 could affect the performance of bus routes operating in the corridor. This could also affect impact trolley bus operations, necessitating short-term, off-wire bus service or temporarily shifting the overhead trolley wire system to maintain operations. The Mercer Street closure would have the largest effect to bus operations with 60 to 70 peak hour bus trips being impacted, including the RapidRide D Line.

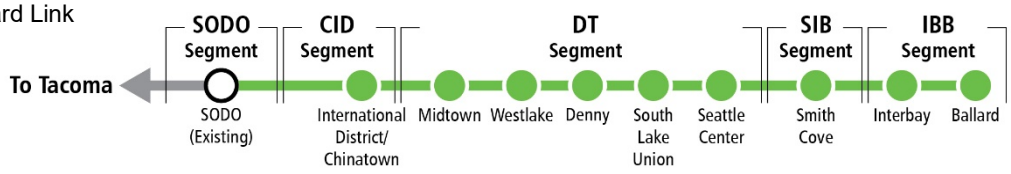
3.19.4.3 Parking

Preferred Alternative DT-1 could temporarily remove up to 235 on-street parking spaces during construction. Alternative DT-2 could remove up to 165 on-street spaces. Both alternatives would use the 283-space surface parking lot under Interstate 5 for construction staging. Preferred Alternative DT-1 could also block egress from the Columbia Tower Garage for up to 9 months during construction on Cherry Street. This garage, with about 680 parking spaces, has a separate access point on Columbia Street, which may be able to be reconfigured to accommodate ingress and egress with flagger control.

3.19.4.4 Non-motorized Facilities

See Table 3-30 for details on key construction-related facility closures in the Downtown Segment. For construction of the Midtown and Westlake stations under Preferred Alternative DT-1, sections of Pine Street, 7th Avenue, and 4th Avenue would be fully or partially closed for construction; the dense street grid in the Downtown Segment could provide multiple alternate routes for non-motorized users. For construction of the Seattle Center Station under Preferred Alternative DT-1, the closure of Republican Street/August Wilson Way would affect the neighborhood greenway and pathway into Seattle Center.

Under Alternative DT-2, the Pine Street closure would potentially affect the existing bike lane on that street. The Thomas Street closure would potentially affect the neighborhood greenway improvements along Thomas Street slated for construction in 2022 in the Bicycle Master Plan Implementation Plan (City of Seattle 2017b). The closure of Taylor Avenue North could affect the existing northbound bike lane on that street.



3.19.4.5 Safety

See Table 3-30 for details on key construction-related facility closures in the Downtown Segment. Most of the full and partial roadway closures in the Downtown Segment would be for one to two blocks, but they would be in areas where traffic volumes are high and some would extend for multiple years. The traffic volumes diverted to the surrounding streets would vary, with some closures likely creating noticeable congestion on parallel streets and potentially increasing collisions on those streets while potentially decreasing collisions on streets with closures.

With Preferred Alternative DT-1, the long-term closure on Pine Street could affect non-motorized safety. This closure would remove the midblock crossing and sidewalks surrounding this area, which would divert pedestrians to other crossings and sidewalks and might introduce more interactions with vehicles. Westbound bicyclists would also be diverted to other streets, which could increase exposure to vehicles for a few blocks.

3.19.4.6 Freight Mobility and Access

See Table 3-30 for details on key construction-related facility closures in the Downtown Segment. Preferred Alternative DT-1 is not expected to affect major truck streets in the Downtown Segment. Although not designated as a truck street, Harrison Street on each side of 7th Avenue North would be closed during construction but access with Aurora Avenue North would remain open. This street connects to Aurora Avenue North, which is a Major Truck Street and an important highway in WSDOT's Freight and Goods Transportation System Network (WSDOT 2019). Alternative routes to Harrison Street could include John Street, Denny Way, or both. Alternative DT-1 could require temporary removal and relocation of up to 21 load zones, including 11 general load zones and 10 commercial load zones. The most concentrated effects would be on Columbia Street between 5th Avenue and 6th Avenue and on Republican Street between 1st Avenue North and Warren Avenue North.

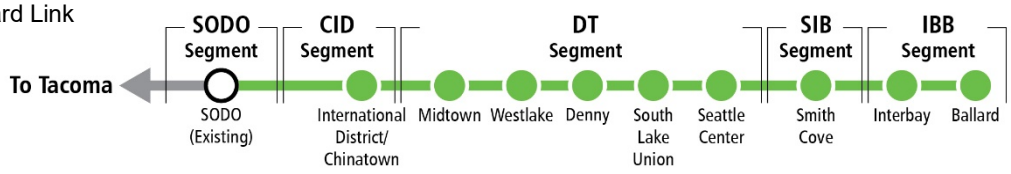
Construction of Alternative DT-2 would require a partial closure of Mercer Street/West Mercer Street. There are limited east-west arterials in this area, and traffic would likely divert to Denny Way, which is currently subject to restrictions that prohibit large trucks (over 30 feet long, over 8 feet wide, or over 32,000 pounds) between Western Avenue and Olive Way during the morning and afternoon commuter peak periods. Alternative DT-2 could affect up to 12 general load zones, 13 commercial load zones, and four truck-only load zones. The most concentrated effect would be on Terry Avenue North between Thomas Street and Lenora Street, on Warren Avenue North between Mercer Street and Roy Street, and on 6th Avenue between Pike Street and Pine Street.

3.19.5 South Interbay Segment

3.19.5.1 Arterial and Local Street Operations

Table 3-31 summarizes the major construction closures for the South Interbay Segment.

The primary construction closure for Preferred Alternative SIB-1 would be the partial closure of Elliott Avenue West. This would occur in two locations: where the elevated guideway would cross Elliott Avenue West near West Mercer Street and again near the West Galer Street Flyover. These closures would increase congestion on Elliott Avenue West. While most trips



would remain on Elliott Avenue West, it is likely some trips would divert to Gilman Drive West and West Olympic Place or to West Nickerson Street.

Table 3-31. Key Construction Roadway Closures – South Interbay Segment

Affected Street	Extents [a]	Preferred Galer Street Station/Central Interbay Alternative (SIB-1)	Prospect Street Station/15th Avenue Alternative (SIB-2)	Prospect Street Station/Central Interbay Alternative (SIB-3)
15th Avenue West	West Barrett Street to West Howe Street	Not applicable	Partial closure, 1 year	Partial closure, 9 months (limited to vicinity of West Armory Way intersection)
Elliott Avenue West	West Republican Street to West Galer Street	Partial closure, 1.5 years	Partial closure, 9 months (limited to south of West Mercer Place)	Partial closure, nights/weekends
West Republican Street	3rd Avenue West to 5th Avenue West (includes intersections at 3rd Avenue West and 4th Avenue West)	Full closure, 5 years	Full closure, 5 years	Not applicable

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

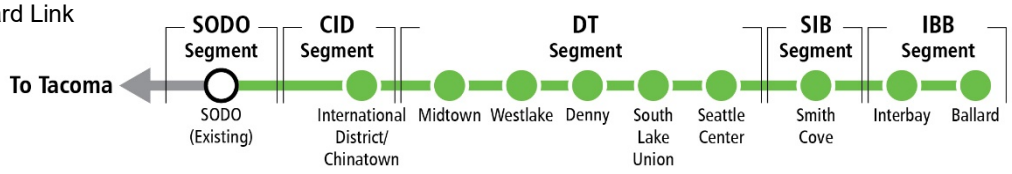
[a] Extents listed do not include intersections unless specifically stated.

Similar to Preferred Alternative SIB-1, Alternative SIB-2 would include the partial closure of Elliott Avenue West, increasing congestion on Elliott Avenue West. This alternative would also require a partial closure of 15th Avenue West. While most traffic would remain on 15th Avenue West, congestion would likely increase and some trips—especially those originating or ending in the Magnolia or Queen Anne neighborhoods—may divert to other local roads, such as Queen Anne Avenue North, 11th Avenue West, West Dravus Street, and 28th Avenue West.

Alternative SIB-3 would require short-term lane shifts or closures on nights and weekends where the guideway would be constructed along Elliott Avenue West near West Prospect Street and where the elevated guideway would cross 15th Avenue West near West Armory Way.

3.19.5.2 Transit

See Table 3-31 for details on key construction-related facility closures in the South Interbay Segment. Under Preferred Alternative SIB-1 and Alternative SIB-2, the partial closures of Elliott Avenue West would likely affect the service and performance for multiple bus routes including the RapidRide D Line, impacting 50 to 60 peak hour bus trips. Transit performance would also be affected by the partial closure of 15th Avenue West for Alternative SIB-2 and Alternative SIB-3, affecting a similar number of peak hour bus trips.



3.19.5.3 Parking

Preferred Alternative SIB-1 could temporarily remove up to 250 on-street parking spaces, and Alternative SIB-2 could remove up to 265 on-street spaces during construction. Alternative SIB-3 is expected to remove up to 60 on-street spaces. None of the South Interbay Segment alternatives would affect off-street parking spaces during construction.

3.19.5.4 Non-motorized Facilities

See Table 3-31 for details on key construction-related facility closures in the South Interbay Segment. Under Preferred Alternative SIB-1, the stairway to the West Galer Street Flyover may be closed on nights and weekends. Pedestrians could use the nearby Helix bridge as an alternate access route across the railroad tracks. Under Alternative SIB-2 and Alternative SIB-3, the partial closure of 15th Avenue West could affect the adjacent sidewalks and business access and transit lanes, which are used by some bicyclists.

3.19.5.5 Safety

See Table 3-31 for details on key construction-related facility closures in the South Interbay Segment. Preferred Alternative SIB-1 would require night and weekend partial closures of the West Galer Street Flyover, which is not likely to impact safety. However, non-motorized facilities on the flyover would likely have longer closures, which may require pedestrians and bicyclists to use the Helix bridge to the south to cross the railroad tracks. This would still provide pedestrians and bicyclists with a facility separate from vehicles to cross the railroad tracks, but may require additional travel and exposure along Alaskan Way West or Elliott Avenue West to reach the bridge.

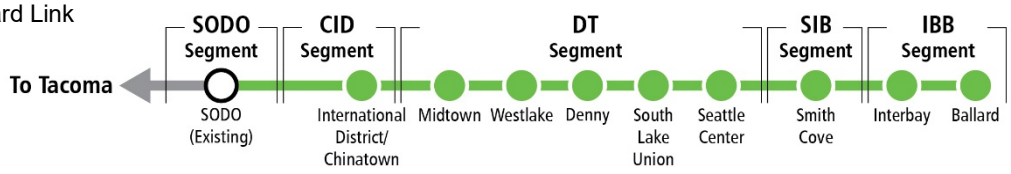
Preferred Alternative SIB-1 and Alternative SIB-2 would partially close portions of Elliott Avenue West, which could increase the potential for collisions during construction due to increased congestion. Limited traffic diversion to other streets is expected.

Alternative SIB-2 would also temporarily reduce the number of lanes on 15th Avenue West. This would create additional traffic congestion and could increase the potential for collisions during construction. This closure could divert traffic to parallel routes, which could increase collisions on those streets. Alternative SIB-3 would also have a short-term partial closure of 15th Avenue West.

3.19.5.6 Freight Mobility and Access

See Table 3-31 for details on key construction-related facility closures in the South Interbay Segment. Preferred Alternative SIB-1 and Alternative SIB-2 would require partial closures of Elliott Avenue West. Alternative SIB-2 and Alternative SIB-3 would require partial closure of 15th Avenue West. Each of these streets is a Major Truck Street. Preferred Alternative SIB-1 would require short-term closures on nights and weekends of the West Galer Street Flyover, which provides access to Terminal 91.

Preferred Alternative SIB-1 could require temporary removal of up to nine general load zones and one truck-only zone. The highest concentration of these impacts would be near the tunnel portal on West Republican Street west of 2nd Avenue West. Alternative SIB-2 could eliminate 15 load zones, which includes 12 general load zones and 3 truck-only load zones. Similar to Preferred Alternative SIB-1, the highest concentration of these impacts would be near the tunnel portal on West Republican Street. Four general load zones plus one truck-only load zone would



also be eliminated on 15th Avenue West between West Boston Street and West Wheeler Street. Alternative SIB-3 would affect a total of three general and one truck-only load zone on several streets.

3.19.6 Interbay/Ballard Segment

3.19.6.1 Arterial and Local Street Operations

Table 3-32 summarizes the major construction closures for the Interbay/Ballard Segment.

Construction of the guideway for Preferred Alternative IBB-1a, Preferred Alternative IBB-2a*, and Preferred Option IBB-2b* would require closure of Thorndyke Avenue West. Traffic volumes on Thorndyke Avenue West are relatively low, and traffic impacts are expected to be minimal.

Preferred Alternative IBB-1a and Option IBB-1b would require closure of 14th Avenue Northwest, as well as closure of some cross streets. These are low traffic volume streets, and the grid street system in this area would provide circulation and access on adjacent streets. 14th Avenue West at West Emerson Street would also be closed, with minimal impact to traffic.

Option IBB-1b and Alternative IBB-3 would require intermittent short-term closures of the West Dravus Street on- and off-ramps to 15th Avenue Northwest for multiple years. West Dravus Street would remain open for east-west travel except for short-duration night or weekend closures. During these closures, traffic would likely divert to the West Emerson Street interchange. Option IBB-1b would also require the partial closure of 15th Avenue West near West Dravus Street, although traffic diversions would likely be minimal.

The primary traffic impacts of Preferred Alternative IBB-2a* are related to closure of 14th Avenue Northwest in Ballard. Diverted traffic would likely travel through the congested Northwest Market Street and 15th Avenue Northwest intersection. The Ballard Station construction for Preferred Alternative IBB-2a* would also require the closure of Northwest 54th Street and Northwest 56th Street at 14th Avenue Northwest. However, closure of these relatively low traffic volume streets is not anticipated to substantially change traffic conditions on other streets.

Construction of the Ballard Station for Preferred Option IBB-2b* would include closure of Northwest 52nd Street and Northwest 54th Street east of 15th Avenue Northwest. These streets have low traffic volumes, and limited diversion of traffic to nearby streets is expected.

Construction of the Ballard Station for Alternative IBB-3 would require closure of Northwest 54th Street east of 15th Avenue Northwest. During this period, the northbound curb lane of 15th Avenue Northwest would likely be closed, which would affect traffic flow along 15th Avenue Northwest. A closure of the West Dravus Street/15th Avenue West on- and off- ramps would also be required.

3.19.6.2 Transit

See Table 3-32 for details on key construction-related facility closures in the Interbay/Ballard Segment. All of the Interbay/Ballard Segment alternatives could require short-term deactivation of the trolley wire along Northwest Market Street, which would affect transit routes that travel along this street. All of the alternatives would also have varying affects to multiple transit routes along 15th Avenue West, affecting 40 to 45 peak hour bus trips on the corridor, including the RapidRide D Line, although Preferred Alternative IBB-1a would only impact transit on nights and weekends.

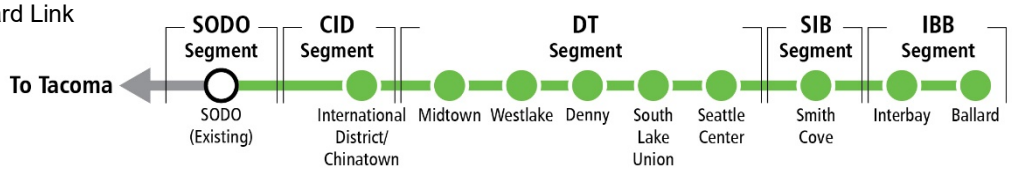
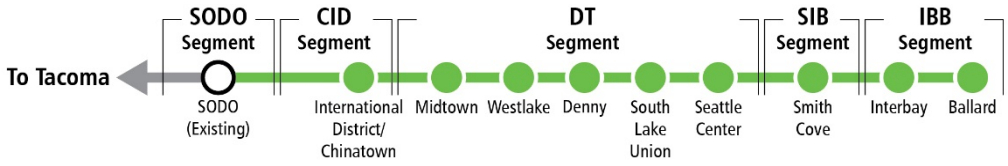


Table 3-32. Key Construction Roadway Closures – Interbay/Ballard Segment

Affected Street	Extents [a]	Preferred Elevated 14th Avenue Alternative (IBB-1a)	Elevated 14th Avenue Alternative Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	Preferred Tunnel 14th Avenue Alternative (IBB-2a)*	Preferred Tunnel 15th Avenue Station Option (IBB-2b)*	Elevated 15th Avenue Alternative (IBB-3)
14th Avenue Northwest	Northwest 45th Street to Northwest 51st Street (includes intersections with Northwest 46th Street, Northwest Ballard Way, Northwest 49th Street, and Northwest 50th Street)	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable	Not applicable
14th Avenue Northwest	Northwest 52nd Street to Northwest 58th Street	Full closure, nights/weekends	Full closure, nights/weekends	Full closure, 3 years	Not applicable	Not applicable
14th Avenue West	At West Emerson Street	Full closure, 1.5 years	Partial closure, 6 months	Not applicable	Not applicable	Not applicable
15th Avenue West	West Dravus Street interchange to West Emerson Street interchange	Full closure, nights/weekends (in the vicinity of West Emerson Street interchange)	Partial closure, 6 months Full closure, nights/weekends (in the vicinity of West Dravus Street interchange)	Partial closure, 6 months (in the vicinity of West Emerson Street interchange)	Partial closure, 6 months (in the vicinity of West Emerson Street interchange)	Partial closure, 6 months Full closure, nights/weekends (in the vicinity of West Dravus Street interchange)
16th Avenue West	West Bertona Street to Thorndyke Avenue West	Full closure, 3 years	Not applicable	Full closure, 3 years	Full closure, 3 years	Not applicable



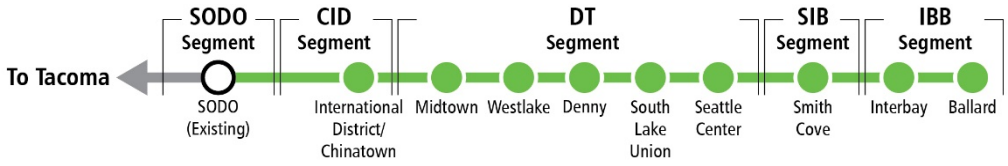
Affected Street	Extents [a]	Preferred Elevated 14th Avenue Alternative (IBB-1a)	Elevated 14th Avenue Alternative Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	Preferred Tunnel 14th Avenue Alternative (IBB-2a)*	Preferred Tunnel 15th Avenue Station Option (IBB-2b)*	Elevated 15th Avenue Alternative (IBB-3)
17th Avenue West/Thorndyke Avenue West	West Dravus Street to 16th Avenue West	Full closure, 3 years (includes intersection at West Bertona Street)	Not applicable	Full closure, 3 years (includes intersection at West Bertona Street)	Full closure, 3 years (includes intersection at West Bertona Street)	Not applicable
Northwest 52nd Street	East of 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Full closure, 4 years	Full closure, nights/weekends
Northwest 54th Street	At 14th Avenue Northwest	Full closure, 3 years	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable
Northwest 54th Street	East of 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Full closure, 4 years	Full closure, 3 years
Northwest 56th Street	At 14th Avenue Northwest	Not applicable	Not applicable	Full closure, 3 years	Not applicable	Not applicable
Northwest Market Street	At 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Partial closure, 3 years	Full closure, nights/weekends
West Dravus Street/15th Avenue West On- and Off-ramps	Intersections	Not applicable	Full closure, 3 years [b]	Not applicable	Not applicable	Full closure, 3 years [b]
West Emerson Street	13th Avenue West to 14th Avenue West	Full closure, 1.5 years	Full closure, 1 year	Not applicable	Not applicable	Not applicable

* As described in the introduction to Chapter 2, Alternatives Considered, at the time the Sound Transit Board identified alternatives for study in the Draft Environmental Impact Statement, some alternatives were anticipated to require third-party funding based on early cost estimates. The asterisk identifies these alternatives and the alternatives that would only connect to these alternatives in adjacent segments.

Note: The physical limits of street closures as well as durations are approximate and subject to change based on final design and construction planning. Roadways listed typically include designated arterials with closures of 1 year or longer for at least one alternative. For the complete list, see Attachment N.1E, Construction-Related Roadway Modifications.

[a] Extents listed do not include intersections unless specifically stated.

[b] Closure would be intermittent over 3 years, in 1-month increments.



Under Option IBB-1b and Alternative IBB-3, the West Dravus Street and 15th Avenue West on- and off-ramps would be periodically closed, affecting multiple transit routes including the RapidRide D Line. 16 to 20 peak hour bus trips would be affected by these closures.

3.19.6.3 Parking

Preferred Alternative IBB-1a could temporarily remove up to 470 on-street parking spaces during construction. Option IBB-1b could remove up to 360 on-street parking spaces. Preferred Alternative IBB-2a* could remove up to 315 on-street spaces. Preferred Option IBB-2b* could remove up to 200 on-street spaces. Alternative IBB-3 would have the least on-street parking impacts during construction, with up to 100 spaces removed. None of the alternatives would affect off-street parking spaces during construction.

3.19.6.4 Non-motorized Facilities

See Table 3-32 for details on key construction-related facility closures in the Interbay/Ballard Segment. Under Preferred Alternative IBB-1a and Option IBB-1b, construction closures along 14th Avenue Northwest and the connecting streets would limit pedestrian and bicycle access at those locations (potentially including the existing bike lanes on Northwest 45th Street and the future Burke-Gilman Trail Missing Link on Northwest 46th Street). The Ship Canal Trail would need to be closed multiple times for short durations. Where feasible, closures would be staged to minimize concurrent closures and associated out-of-direction travel.

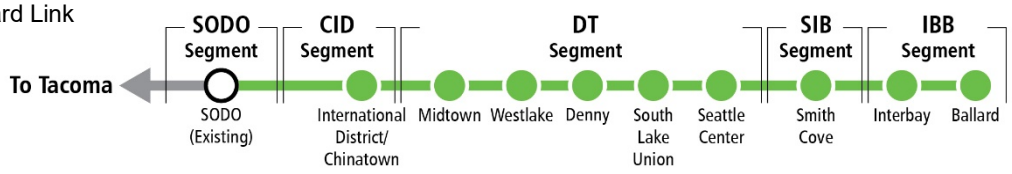
No specific non-motorized effects are expected under Preferred Alternative IBB-2a* or Preferred Option IBB-2b*. Under Alternative IBB-3, the portion of sidewalk on the Emerson Street interchange east of 15th Avenue West would be closed on nights and weekends; however, pedestrians could still use the sidewalk to cross 15th Avenue West by using the stairways at either end. The Ship Canal Trail would also need to be closed multiple times for short durations. Pedestrians and bicyclists would be rerouted to the next adjacent street to minimize out-of-direction travel. Construction may also temporarily close the future Burke-Gilman Trail Missing Link on Northwest 46th Street.

3.19.6.5 Safety

See Table 3-32 for details on key construction-related facility closures in the Interbay/Ballard Segment. The full closure of 14th Avenue Northwest with Preferred Alternative IBB-1a, Option IBB-1b, and Preferred Alternative IBB-2a* would divert traffic to adjacent streets and potentially increase collisions on those streets; however, there are multiple alternate streets that could help to distribute traffic and minimize these impacts.

Option IBB-1b, Preferred Alternative IBB-2a*, Preferred Option IBB-2b*, and Alternative IBB-3 would partially close portions of 15th Avenue West, which would create additional traffic congestion along this roadway and may increase the potential for collisions during construction. Traffic that diverts to the parallel streets could increase collisions on those streets.

The 15th Avenue West on- and off-ramps at West Dravus Street would also have periodic closures with Option IBB-1b and Alternative IBB-3. Traffic would likely divert to the Emerson Street interchange, where collisions could increase due to the increased volume at that location.



3.19.6.6 Navigation

This section discusses potential construction impacts from the alternatives with bridges across Salmon Bay. The tunnel alternatives would avoid impacts to navigation and are not discussed further in this section.

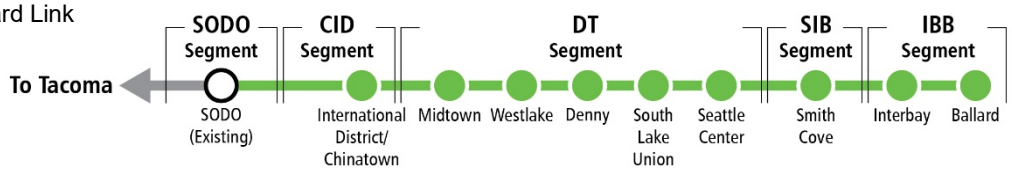
3.19.6.6.1 Impacts Common to All Bridge Alternatives

Barges for material supply and supporting cranes would be required for construction of in-water foundations and constructing bridge spans. The barges would be placed on each side of the waterway. Barges would be moored outside of the navigation channel. Barges would move across the waterway as bridge spans are completed and would need to occasionally cross the navigation channel. These barge crossings could be coordinated with the Coast Guard to minimize and avoid delays to vessel traffic. Barges may also temporarily reduce some of the maneuvering area for other vessels outside the navigation channel as they cross the waterway toward the navigation channel. The barge support needed to complete each bridge would require short-term closures of the navigation channel, which is a Public Work subject to the Section 408 review and approval process. These short-term closures are discussed in greater detail in the sections below. Sound Transit would coordinate with the Army Corps of Engineers regarding navigation channel closures and potential impacts to the Ship Canal federal navigation project as part of the permission process pursuant to Section 408. Temporary work trestles would be installed in Salmon Bay to support construction material delivery and operation of heavy equipment. For all bridge alternatives, the work trestles would be outside of and are not anticipated to affect the navigation channel. However, all bridge alternatives would require longer-term closures of areas outside the navigation channel for the duration of bridge construction because of the work trestles. The trestles would block east/west vessel movements outside of the navigation channel such that the navigation channel would be the only path for vessels through the construction area. As a result, vessels sailing to nearby businesses could experience temporary delays and interruptions to access. Current vessel access would be restored following construction.

The placement of temporary cofferdams, work trestles, and work barges may affect Muckleshoot Indian Tribe treaty-protected fishing rights and access to the Usual and Accustomed Areas of the Muckleshoot Indian Tribe for the duration of construction when Tribal treaty-protected fishing is occurring. They may also affect Suquamish Tribe treaty-protected access to the Tribe's Usual and Accustomed Areas for the duration of construction when Tribal treaty-protected fishing is occurring. Construction activities could also change vessel traffic patterns, which could interfere with upstream and downstream Tribal treaty-protected fishing and access. This could also affect response times for the Seattle Police Department's Harbor Patrol Unit to Salmon Bay, Elliott Bay, and the Duwamish Waterway.

3.19.6.6.2 Preferred Elevated 14th Avenue Alternative (IBB-1a) and Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the planned vertical clearance over the waterway from approximately 136 feet to approximately 121 feet for about 5 months. During the use of scaffolding and netting under the bridge, vessels requiring more than about 121 feet of vertical clearance would not be able to pass under portions of the bridge. These temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities in Lake Union. In addition, the use of



barges during construction of the center span of the bridge would require the navigation channel to be closed to all vessel traffic for either approximately two 12-hour closures or one 48-hour closure.

Navigation channel closures would also occur during installation of the bridge protection system for all bridge types, when part of the navigation channel would be closed intermittently for up to approximately 4 weeks.

3.19.6.6.3 Elevated 15th Avenue Alternative (IBB-3)

Construction of the vertical-lift moveable bridge would require approximately one 24-hour closure of the navigation channel. During the 24-hour closure, portions of the trestle south of the navigation channel could be removed to allow some vessels to pass through the construction area. There would also be a 48-hour period where the vertical clearance would be temporarily reduced to about 65 feet because netting would be used beneath the bridge, and vessels requiring more than approximately 65 feet of vertical clearance would not be able to pass under the bridge.

Construction of the double-leaf bascule moveable bridge would require approximately two 48-hour closures of the navigation channel.

Navigation channel closures would also occur during installation of the bridge protection system for both the vertical-lift and double-leaf bascule bridge types, when each half of the navigation channel would be closed intermittently for up to approximately 4 weeks.

3.19.6.7 Freight Mobility and Access

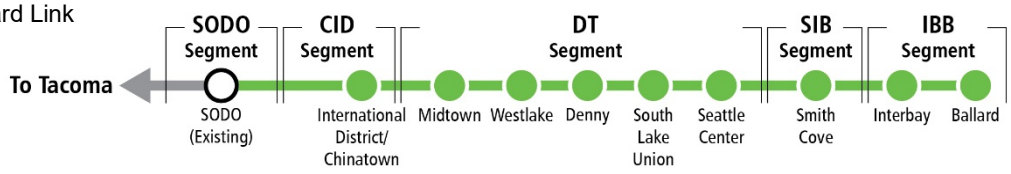
See Table 3-32 for details on key construction-related facility closures in the Interbay/Ballard Segment. The full closure of portions of 14th Avenue Northwest and a number of cross streets for Preferred Alternative IBB-1a, Option IBB-1b, and Preferred Alternative IBB-2a* would not directly affect truck streets. However, access to businesses in the vicinity could be affected. Preferred Option IBB-2b* would require a partial closure of the Northwest Market Street/15th Avenue Northwest intersection; both streets are truck streets.

Preferred Alternative IBB-1a, Option IBB-1b, and Alternative IBB-3 would construct large structures on each side of Salmon Bay. Construction of the guideway column on the south side could affect circulation and operations for local businesses.

Construction of Preferred Alternative IBB-1a and Option IBB-1b would occur in the vicinity of the BNSF Railway lead tracks adjacent to the Ship Canal Trail as well as the Ballard Terminal Railroad. Rail operations could be sporadically affected during the construction period. Construction of Alternative IBB-3 would also cross over the BNSF Railway lead tracks and the Ballard Terminal Railroad.

All alternatives would require partial or full closures of 15th Avenue West and would affect a Major Truck Street. Option IBB-1b and Alternative IBB-3 would also require rolling closures of the West Dravus Street on- and off-ramps to 15th Avenue West. Sound Transit expects additional congestion along 15th Avenue West, which could delay truck movements or incur out-of-direction travel with the West Dravus Street ramps closures. Alternative IBB-3 would also require a full closure of the Northwest Market Street/15th Avenue Northwest intersection on nights and weekends; both streets are truck streets.

Preferred Alternative IBB-1a would affect three general and one truck-only load zone, spread among several streets. Preferred Alternative IBB-2a* would affect four general load zones near



the Interbay Station. Preferred Option IBB-2b* would affect 10 general load zones, of which three are located on Northwest 53rd Street west of 15th Avenue Northwest. Alternative IBB-1b would affect three general load zones and three truck-only load zones along several streets. Alternative IBB-3 would affect 11 load zones, which includes eight general load zones and three truck-only load zones, along several streets. Of these, five are located on Northwest Leary Way between 15th Avenue Northwest and 17th Avenue Northwest.

3.19.7 Mitigation for Construction Impacts

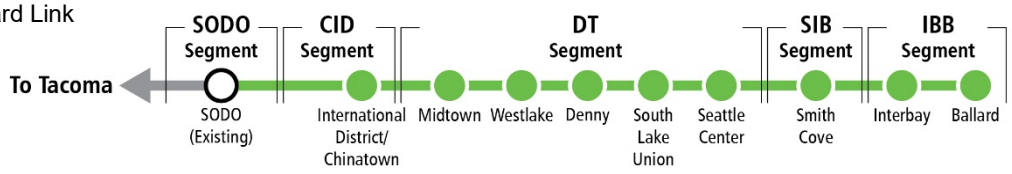
3.19.7.1 Transit

Sound Transit would coordinate with Metro, City of Seattle, and FTA, where appropriate, to identify and agree to bus service and associated infrastructure modifications and transit facility improvements that maintain transit service and access through construction areas. This would include continuing to coordinate on construction-related impacts to Metro's transit operations to determine the potential mitigation required, as many of the alternatives close roadways served by transit and access to transit facilities for varying durations.

Sound Transit would maintain access to existing bus stops and layovers to the extent feasible and coordinate with Metro and the City of Seattle to minimize impacts and disruptions. Where needed, this coordination would include other transit operators. Where bus stops and layover cannot be maintained in existing locations, Sound Transit would provide temporary facilities to maintain service and access. Information would be communicated to riders in advance of construction at these locations.

Sound Transit would maintain non-motorized access to transit, where feasible, through construction areas, such as providing dedicated walkways or alternative bike facilities around the construction area. Where non-motorized access is not able to be maintained through construction areas, Sound Transit would provide temporary non-motorized facilities to maintain non-motorized access to transit. Sound Transit would also notify the public of any closures. Refer to Section 3.13.4 for further information on measures to minimize impacts related to road closures and detours that would also reduce disruption to bus service.

Construction-related transit service impacts, such as bus reroutes associated with the 4th Avenue South closures under Alternative CID-1a* and Option CID-1b* and the SODO Busway closure under all SODO alternatives, as well as temporary impacts to facilities such as trolley infrastructure and layovers, would be coordinated with Metro, the City of Seattle, and other relevant service providers to identify bus detour routes and minimize impacts and disruptions to bus facilities and service performance and hours during project construction. Sound Transit would implement agreed-upon improvements that mitigate impacts directly associated with the project. This would include identifying associated improvements needed to provide these service and facility modifications, such as speed and reliability treatments (e.g., transit lanes, transit signal priority, and similar), new trolley wire infrastructure along detour pathways, revised base and employee garage access, and new or interim bus stop, layover, and comfort station infrastructure near impacted facilities. Sound Transit would also coordinate with the City of Seattle to determine the pavement condition before and after extended transit reroutes to identify if pavement improvements are necessary on transit detour routes not designed to accommodate transit vehicles. For any identified temporary impacts to the RapidRide G Line (Madison bus rapid transit), Sound Transit would coordinate with the City of Seattle, FTA, and Metro to identify and implement capital improvements during construction to maintain RapidRide G Line service.



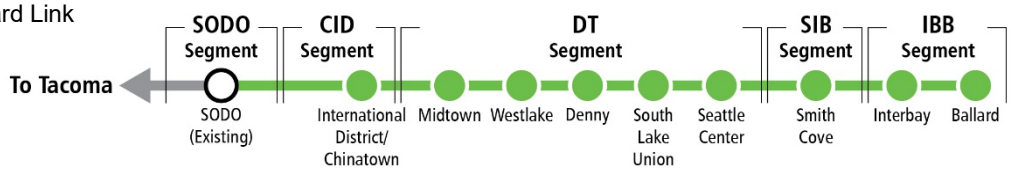
The Seattle Streetcar is expected to be impacted to varying degrees under all Downtown and Chinatown-International District segment alternatives, with the exception of the Alternative CID-2a diagonal station configuration and Option CID-2b. If any of the Downtown and Chinatown-International District segment alternatives (besides Alternative CID-2a with the diagonal station configuration and Option CID-2b) are advanced, Sound Transit would coordinate with the City of Seattle, FTA, and Metro to develop a Seattle Streetcar WSBLE Construction Operations Plan to evaluate operational scenarios and capital investments to minimize these impacts. This could include strategies for how streetcar riders could transfer to other transit services near the closures, refining construction staging to minimize streetcar disruptions, or using bus bridges or alternative bus routes to replace lost streetcar services. Implementation of temporary bus bridges would require identification of curb space for staging and operations and would be coordinated with the City of Seattle and other relevant parties. Sound Transit would implement capital improvements, such as a crossover track or temporary passenger stations along the streetcar alignment to maintain streetcar service during construction, where feasible.

3.19.7.2 Arterial and Local Street Operations

Sound Transit would develop a Construction Access and Traffic Management Plan for the Ballard Link Extension project. The plan would be developed as the project advances and include the overarching goals and objectives for the project's construction and the approach to partner agency coordination. It would include applicable mitigation commitments to be built by Sound Transit, which would be finalized and approved as part of the environmental process, as well as additional detail reflecting ongoing project design. Components likely to be addressed in detail include maintaining business access; minimizing construction disruption during large events; providing alternate routes for freight, general traffic, and non-motorized access; parking management; and maintaining transit operations (i.e., bus, streetcar, and light rail). Sound Transit would also develop a Construction Access and Traffic Management Plan specific to Seattle Center that addresses these same components.

Potential construction mitigation measures would be consistent with the applicable City requirements. Sound Transit would prepare traffic control plans during subsequent design phases to coordinate on how all modes of transportation would be maintained and address pedestrian and bicycle access and safety. Mitigation measures would follow the *Manual on Uniform Traffic Control Devices for Streets and Highways* (Federal Highway Administration 2009) and the City of Seattle *Traffic Control Manual* (City of Seattle 2012) for maintenance of traffic plans. Potential measures to minimize construction traffic impacts could include the following practices:

- Install advance warning signs and highly-visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies, such as supporting employer incentives or programs to use transit.
- Clearly sign and provide detour routes when streets are fully or partially closed. The contractor would be required to keep nearby parallel facilities open to facilitate access and mobility.
- For extended closures requiring substantial traffic detours, Sound Transit would coordinate with the City of Seattle to consider temporary physical treatments such as roadway rechannelization, traffic signals, and transit priority treatments.

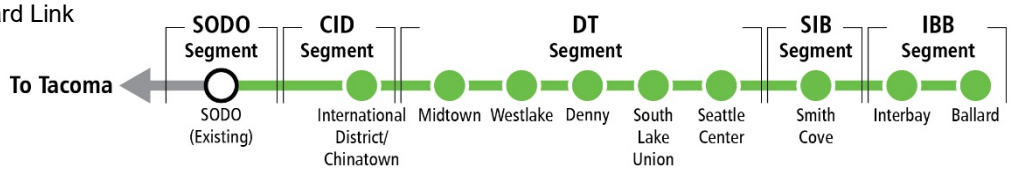


- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours. Use special lighting for work zones and travel lanes, where required.
- Communicate public information through tools such as print, radio, posted signs, websites, and email to provide information regarding street closures, hours of construction, business access, and parking impacts.
- Coordinate access closures with affected businesses and residents. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during nonbusiness hours, or if the parking and users of this access (e.g., deliveries) could be accommodated at an alternative location.
- Post advance notice signs prior to construction in areas where construction activities would affect access to surrounding businesses.
- Provide regular updates to schools, emergency service providers, local agencies, solid waste utilities, and postal services, and assist school officials in providing advance and ongoing notice to students and parents concerning construction activity near schools.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays, where practical. In addition, coordinate closures of parallel arterials or access points to avoid simultaneous closures.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from open trenches.
- To minimize potential freight impacts, coordinate with affected businesses throughout the construction period to notify them of lane and access closures and maintain business access as much as possible.
- For construction activities that might impact state facilities such as Interstate 5 and State Route 99, provide construction information to WSDOT for use in the state's freight notification system. Sound Transit would provide information in the format required by WSDOT.
- Coordinate with the City of Seattle and other relevant agencies to disseminate construction closure information to the public.

3.19.7.3 Parking

Through the permit process, Sound Transit would coordinate with the City of Seattle on measures to address temporary curbside management and project parking impacts during construction, in conjunction with the other infrastructure and development projects in the study area. This would include temporarily relocating affected Americans with Disabilities Act stalls or commercial load zones that would continue to serve adjacent land uses. It would also include curb-use management strategies that support operations during Seattle Center events such as bus loading and staging. Increased bus service (e.g., bus bridges) implemented as mitigation for interruption to transit service during construction could affect parking supply and would be coordinated with the City of Seattle and other relevant parties.

Sound Transit would work with owners and operators of garages where parking could be removed or where ingress or egress could be blocked during construction.



Sound Transit would work with the contractor and the City of Seattle to minimize construction worker parking.

3.19.7.4 Non-motorized Facilities

When non-motorized facilities such as sidewalks and bicycle lanes must be temporarily closed for construction, Sound Transit would provide clearly marked detours within construction areas, such as dedicated walkways and alternate bicycle routes that could include treatments such as pedestrian and bicycle signals, signal optimization including leading pedestrian intervals, crosswalks, curb bulbs, rectangular rapid flashing beacons, pavement markings, and temporary signals. Where possible, temporary facilities would be designed to applicable design standards such as Seattle Streets Illustrated (City of Seattle 2020) or as agreed to by the City of Seattle; at minimum they would comply with Americans with Disabilities Act requirements.

When maintaining the facility would not be feasible, Sound Transit would work with the City of Seattle to develop and implement a construction management plan to provide alternate facilities for non-motorized travel that, to the extent feasible, offer a similar level of protection and comfort to the temporarily closed facility. For example, Sound Transit would work to identify a location for a protected bicycle facility through SODO as an alternate route for the temporarily closed SODO Trail. These replacements would be located and designed in coordination with the City of Seattle and funded by Sound Transit.

Sound Transit would also work with the City of Seattle and Seattle Center to develop an access management plan that would identify operational strategies and improvements to maintain operations and access to the Seattle Center and its support facilities during WSBLE construction.

Pedestrian and bicycle facilities removed or damaged by construction would be replaced, to the extent possible, by permanent facilities that meet applicable design standards or as agreed to by the City of Seattle when project construction is complete.

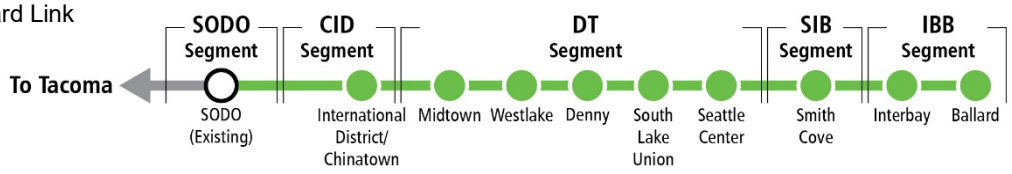
3.19.7.5 Safety

During construction, Sound Transit would develop a Maintenance of Traffic Plan to adhere to federal and local agency guidelines as described in Section 3.19.1.5, as well as to the measures described in Section 3.19.7.2. The Maintenance of Traffic Plan would be created to minimize safety concerns on the transportation system during construction. The mitigation proposed in Sections 3.19.7.1 for transit and Section 3.19.7.4 for non-motorized facilities would also be implemented to maximize safety. Therefore, no additional safety-related mitigation measures for the construction period are anticipated to be necessary.

3.19.7.6 Navigation

The FTA, in coordination with Sound Transit, will continue government-to-government consultation with the Muckleshoot Indian Tribe and Suquamish Tribe to avoid or minimize impacts to Tribal treaty-protected fishing rights and access to the Tribes' Usual and Accustomed Areas during construction.

Sound Transit would develop a construction navigation management plan in consultation with the Coast Guard, Army Corps of Engineers, and Port of Seattle to mitigate impacts to navigation during construction. Measures in the plan could include the following:



- Create a marine safety zone (to be approved by the United States Coast Guard and Army Corps of Engineers) to help motorized and non-motorized waterway users pass through the Salmon Bay construction zone.
- Provide a safe and easily recognizable path for non-motorized waterway users through the marine safety zone.
- Set up the marine safety zone so all construction features or potential obstacles can be seen during inclement weather.
- Coordinate with maritime stakeholders and emergency service providers and conduct construction outreach prior to and throughout construction at key milestones or phases where navigation conditions could change.
- Schedule navigation channel restrictions during a time of day or a day of the week with less vessel traffic.
- Coordinate all maritime operations with the United States Coast Guard, Army Corps of Engineers, Puget Sound Vessel Traffic Services, and local mariners and advertise all changes to maritime operations in the Local Notice to Mariners publication.
- Establish effective communications with the public via measures such as meetings, construction updates, alerts, and schedules.
- Provide a 24-hour construction telephone hotline for community members to report issues to Sound Transit community engagement staff, who work with the construction team to resolve issues and respond to the community member.
- Coordinate with the Ballard bridgetender to ensure lines of sight are maintained and to address other impacts construction may have on the bridgetender or Ballard Bridge operations.
- Provide a community ombudsman consistent with Sound Transit policy. In the event that complaints arise about construction impacts that could not be resolved by community outreach staff or the relevant department director, the ombudsman policy provides a process for addressing those complaints in an impartial, fair, and timely manner that ensures effective stewardship of public resources and minimizes construction impacts.

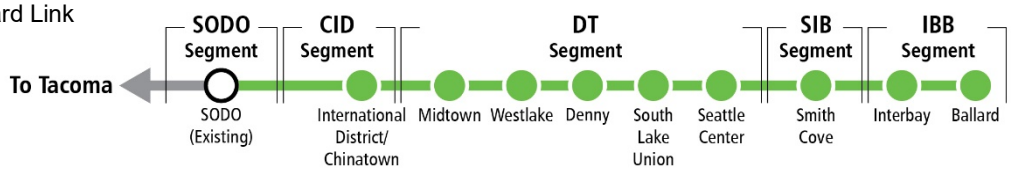
3.19.7.7 Freight Mobility and Access

Prior to construction activities that fully close a Major or Minor Truck Street, Sound Transit would work with the City of Seattle to identify detour routes suitable for trucks.

During construction, the clearance envelope for over-legal trucks on Elliott Avenue West/15th Avenue West corridor could be affected with some construction activities for all alternatives. Sound Transit would coordinate with the City of Seattle to identify construction management measures to maintain an envelope to accommodate oversized trucks during construction or to identify suitable alternative routes that would be defined prior to freight movements as part of the City's over-legal permit process.

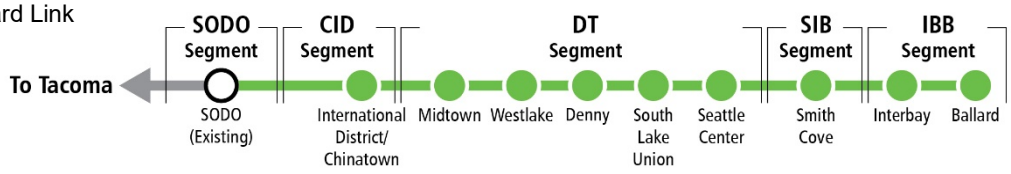
South Holgate Street, which is part of the Heavy Haul Network, would be closed for all alternatives during construction of the overpass. An alternative route for heavy trucks would be identified prior to this closure.

For construction activities that would close the West Galer Street Flyover on nights and weekends (i.e., Preferred Alternative SIB-1), Sound Transit would work with the Port of Seattle to identify construction management measures to maintain access to Terminal 91.



For locations where truck-only load zones, commercial load zones, or general load zones would be eliminated but the businesses that rely on them remain, Sound Transit would coordinate with the City of Seattle to relocate commercial load zones.

Sound Transit would coordinate with the BNSF Railway and the Ballard Terminal Railroad prior to construction over rail tracks or ground improvements for guideway columns close to the rail tracks. Construction near the tracks would be planned to comply with the schedule and minimum clearance requirements to be agreed with BNSF Railway.



3.20 Indirect Impacts

This section presents the project's indirect and secondary transportation impacts beyond those described in previous sections for both the West Seattle and Ballard Link extensions. Indirect impacts have not been identified for regional travel, safety, navigation, and freight. See Section 4.2.3, Economics, for discussion of indirect effects to maritime businesses.

3.20.1 Transit Service and Operations

Beyond the future conceptual bus service plan assumed for each Build Alternative, other changes in transit service within the WSBLE corridor that are not yet planned or anticipated in response to the WSBLE could also result in shifts in ridership. For instance, Metro could redeploy or reinvest in bus service that would be replaced by light rail service above what has been assumed in the WSBLE Draft Environmental Impact Statement.

Light rail service could facilitate a concentration of residential and commercial land uses, known as transit-oriented development, surrounding the stations. The population and employment projections used in Sound Transit's ridership forecasting model were Puget Sound Regional Council's 2014 Land Use Targets data. These plans forecast a substantial amount of population and employment growth in and around the WSBLE study area by 2042.

Because the Sound Transit and Puget Sound Regional Council models already include adopted land use changes, the overall WSBLE ridership is not expected to substantially change as a result of concentrated development (transit-oriented) around future light rail stations. However, the mode of access to and from stations may shift to a greater percentage of non-motorized access and lower percentage of automobile access as the population and employment densities increase within station walksheds and bikesheds.

Any development beyond Puget Sound Regional Council's adopted population and employment land use forecasts would require further regional and local planning and policy decisions and could result in additional increases in overall ridership in the WSBLE corridor.

3.20.2 Arterial and Local Street Operations, Parking, and Non-motorized Facilities

Increased automobile and parking demand as well as non-motorized trips to and from the station areas could result from potential additional increases in the density of land use development around the light rail stations beyond what is already adopted by the City of Seattle and/or Puget Sound Regional Council. The increase in traffic, parking, and non-motorized activity could cause additional impacts on the arterials and local streets. Mode shifts from automobile to transit, bicycle, and pedestrian could also result from increased development along the WSBLE corridor. For example, depending on how development is planned and permitted, there could be additional bicycle and pedestrian activity near the station areas.

3.20.3 Mitigation for Indirect Impacts

No mitigation for indirect impacts is anticipated. The potential direct impacts identified in the previous sections are consistent with City of Seattle and regional comprehensive planning, which promotes higher density, mixed-use development around transit services. Additional development around WSBLE stations would encourage the use of non-single-occupancy

vehicle modes (e.g. transit, walking, and bicycling), which could reduce traffic volumes and air pollution, improve access and mobility, and create health benefits.

Some bus riders could be affected if there are additional changes to the bus system beyond the previously identified bus integration plans to support new connections with the light rail system. Overall, the project provides a substantial increase in transit service to the area in the form of direct rail service, with the potential to reinvest duplicative bus service hours to other areas in the city and/or county.

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