January 2022

West Seattle and Ballard Link Extensions

Draft Environmental Impact Statement

TRANSPORTATION TECHNICAL REPORT

Appendix N.1

SoundTransit

U.S. Department of Transportation
Federal Transit Administration

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Table of Contents

Figures

Tables

Appendices

Acronyms and Abbreviations

Acronym	Definition
A.D.A.	Americans with Disabilities Act
A.D.T.	average daily traffic
Coast Guard	United States Coast Guard
Corps.	United States Army Corps of Engineers
L.O.S.	level of service
M.O.S.	minimum operable segment
Metro	King County Metro Transit
NOAA	National Oceanic and Atmospheric Administration
Ship Canal	Lake Washington Ship Canal
WSBLE	West Seattle and Ballard Link Extensions
WSDOT	Washington State Department of Transportation

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1 INTRODUCTION

1.1 Overview

Central Puget Sound Regional Transit Authority (Sound Transit) is proposing to expand Link light rail transit service from Downtown Seattle to West Seattle and Ballard (Figure 1-1). The West Seattle and Ballard Link Extensions (WSBLE) Project is an 11.8-mile corridor in the city of Seattle in King County, Washington, the most densely populated county of the Puget Sound region. The West Seattle Link Extension would be about 4.7 miles and include stations at SODO, Delridge, Avalon, and Alaska Junction. The Ballard Link Extension would be about 7.1 miles from Downtown Seattle to Ballard's Northwest Market Street area. It would include a new 3.3-mile light rail-only tunnel from Chinatown-International District to South Lake Union and Seattle Center/Uptown. Stations would serve the following areas: Chinatown-International District, Midtown, Westlake, Denny, South Lake Union, Seattle Center, Smith Cove, Interbay, and Ballard.

The WSBLE Project is part of the Sound Transit 3 Plan of regional transit system investments, funding for which was approved by voters in the region in 2016. The project would provide fast, reliable light rail in Seattle and connect to dense residential and job centers throughout the Puget Sound region, while the new Downtown Seattle light rail tunnel would provide capacity for the entire regional system to operate efficiently. Puget Sound Regional Council (the regional metropolitan planning organization) and the City of Seattle have designated the following regional growth centers, Manufacturing/Industrial Centers, and urban villages in the project corridor:

- **Regional Growth Centers.** The project corridor includes three regional growth centers designated by Puget Sound Regional Council and the City of Seattle: Seattle Downtown, South Lake Union, and Uptown. The First Hill/Capitol Hill growth center is also just east of the project corridor.
- **Manufacturing/Industrial Centers.** The project corridor includes two Manufacturing/Industrial Centers designated by Puget Sound Regional Council: Duwamish and Ballard Interbay Manufacturing/Industrial Centers. The City of Seattle has designated these areas as the Duwamish Manufacturing/Industrial Center and the Ballard Interbay Northend Manufacturing/Industrial Center.
- **Urban Villages.** There are two neighborhoods in the project corridor designated by the City of Seattle as urban villages: West Seattle Junction and Ballard neighborhoods.

These designations indicate that these areas will continue to increase in residential and/or employment density over the next 30 years.

Regional transit service in the project corridor includes regional bus service, light rail, Sounder commuter rail, Washington State Ferries, and Amtrak passenger rail service. Light rail currently operates between the Angle Lake Station in the city of SeaTac and the Northgate Station in Seattle, traveling through the Downtown Seattle Transit Tunnel. Extensions of light rail are under construction north to Lynnwood, east to Bellevue and Redmond, and south to Federal Way, and are anticipated to begin operation in 2024. Planned light rail extensions would continue south to Tacoma Dome, expected to begin service in 2032, and north to Everett, planned to begin service in 2037. The West Seattle Link Extension is scheduled to open in 2032. The Ballard Link Extension is scheduled to begin service in 2037. Depending on funding availability, service from Smith Cove to Ballard Station is scheduled to open in 2037 or 2039.

Figure 1-1. West Seattle and Ballard Link Extensions Project Corridor

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 an 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.

Table 1-1 lists the WSBLE Project Build Alternatives for each extension (West Seattle and Ballard).

1.2 Purpose of Report

This report provides information about the potential transportation effects of the WSBLE Project alternatives to provide for a comparison of alternatives and to identify potential mitigation where potential project impacts are identified. The transportation analysis describes and evaluates the project alternatives' potential short-term (construction) and long-term (operations) impacts as follows:

- Chapter 2: Regional transportation, including vehicle miles of travel, vehicle hours of travel, vehicle hours of delay, and mode share.
- Chapter 3: Transit services, including regional and local services, project and station ridership and transit quality and performance levels of service (L.O.S.).
- Chapter 4: The arterial and local street system, including property access and local traffic circulation and intersection L.O.S.
- Chapter 5: Parking, including the loss of parking due to project facilities and potential hide-and-ride parking impacts near stations.
- Chapter 6: Non-motorized facilities (bicycle and pedestrian) around stations and on major bicycle or pedestrian trails affected by the alternative or alternatives.
- Chapter 7: Safety (all modes).
- Chapter 8: Navigation of navigable waterways.
- Chapter 9: Freight (truck, rail, and water).
- Chapter 10: Indirect impacts on transportation.
- Chapter 11: Cumulative impacts on transportation.

Table 1-1. Summary of West Seattle and Ballard Link Extensions Build Alternatives

Extension	Segment	Alternative	Alternative Abbreviation	Stations (and Station Profile)	Connections
West Seattle	**SODO**	**Preferred At-Grade**	**SODO-1a**	**SODO (At-Grade) or SODO Staggered Station Configuration (At-Grade)**	**All Duwamish Segment alternatives.**
West Seattle	SODO	At-Grade South Station Option	SODO-1b	SODO (At-Grade)	All Duwamish Segment alternatives.
West Seattle	SODO	Mixed Profile	SODO-2	SODO (Elevated)	All Duwamish Segment alternatives.
West Seattle	**Duwamish**	**Preferred South Crossing**	**DUW-1a**	**None**	**All SODO Segment alternatives. All Delridge Segment alternatives.**
West Seattle	Duwamish	South Crossing South Edge Crossing Alignment Option	DUW-1b	None	All SODO Segment alternatives. All Delridge Segment alternatives.
West Seattle	Duwamish	North Crossing	DUW-2	None	All SODO Segment alternatives. All Delridge Segment alternatives.
West Seattle	**Delridge**	**Preferred Dakota Street Station**	**DEL-1a**	**Delridge (Elevated)**	**All Duwamish Segment alternatives. Connects to WSJ-1, WSJ-2, and WSJ-4*.**
West Seattle	Delridge	Dakota Street Station North Alignment Option	DEL-1b	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-1, WSJ-2, and WSJ-4*.
West Seattle	**Delridge**	**Preferred Dakota Street Station Lower Height***	**DEL-2a***	**Delridge (Elevated)**	**All Duwamish Segment alternatives. Connects to WSJ-3a* and WSJ-3b*.**
West Seattle	Delridge	Dakota Street Station Lower Height North Alignment Option*	DEL-2b*	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-3a* and WSJ-3b*.
West Seattle	Delridge	Delridge Way Station	DEL-3	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-1, WSJ-2, and WSJ-4*.

Extension	Segment	Alternative	Alternative Abbreviation	Stations (and Station Profile)	Connections
West Seattle	Delridge	Delridge Way Station Lower Height*	DEL-4*	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-3a* and WSJ-3b*.
West Seattle	Delridge	Andover Street Station	DEL-5	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-1, WSJ-2 and WSJ-4*.
West Seattle	Delridge	Andover Street Station Lower Height*	DEL-6*	Delridge (Elevated)	All Duwamish Segment alternatives. Connects to WSJ-5*.
West Seattle	**West Seattle Junction**	**Preferred Elevated 41st/42nd Avenue Station**	**WSJ-1**	**Avalon (Elevated), West Seattle Junction (Elevated)**	**Connects to DEL-1a, DEL-1b, DEL-3, and DEL-5.**
West Seattle	**West Seattle Junction**	**Preferred Elevated Fauntleroy Way Station**	**WSJ-2**	**Avalon (Elevated), West Seattle Junction (Elevated)**	**Connects to DEL-1a, DEL-1b, DEL-3, and DEL-5.**
West Seattle	**West Seattle Junction**	**Preferred Tunnel 41st Avenue Station***	**WSJ-3a***	**Avalon (Tunnel), West Seattle Junction (Tunnel)**	**Connects to DEL-2a*, DEL-2b*, and DEL-4*.**
West Seattle	**West Seattle Junction**	**Preferred Tunnel 42nd Avenue Station Option***	**WSJ-3b***	**Avalon (Tunnel), West Seattle Junction (Tunnel)**	**Connects to DEL-2a*, DEL-2b* and DEL-4*.**
West Seattle	West Seattle Junction	Short Tunnel 41st Avenue Station*	WSJ-4*	Avalon (Elevated), West Seattle Junction (Tunnel)	Connects to DEL-1a, DEL-1b, DEL-3, and DEL-5.
West Seattle	West Seattle Junction	Medium Tunnel 41st Avenue Station*	WSJ-5*	Avalon (Retained Cut), West Seattle Junction (Tunnel)	Connects to DEL-6*.
Ballard	**SODO**	**Preferred At-Grade**	**SODO-1a**	**Not applicable**	**Connects to CID-1a*, CID-2a, and CID-2b.**
Ballard	SODO	At-Grade South Station Option	SODO-1b	Not applicable	All Chinatown-International District Segment alternatives.
Ballard	SODO	Mixed Profile	SODO-2	Not applicable	Connects to CID-1a* and CID-2a.
Ballard	Chinatown-International District	4th Avenue Shallow* [a]	CID-1a*	Stadium (existing station would be rebuilt) and International District/Chinatown (tunnel)	All SODO Segment alternatives. All Downtown Segment alternatives.
Ballard	Chinatown-International District	4th Avenue Deep Station Option*	CID-1b*	International District/Chinatown (Tunnel)	Connects to SODO-1b. Connects to DT-1.

Extension	Segment	Alternative	Alternative Abbreviation	Stations (and Station Profile)	Connections
Ballard	Chinatown-International District	5th Avenue Shallow	CID-2a	International District/Chinatown (Tunnel) or International District/Chinatown Diagonal Station Configuration (Tunnel)	All SODO Segment alternatives. All Downtown Segment alternatives.
Ballard	Chinatown-International District	5th Avenue Deep Station Option	CID-2b	International District/Chinatown (Tunnel)	Connects to SODO-1a and SODO-1b. Connects to DT-1.
Ballard	**Downtown**	**Preferred 5th Avenue/Harrison Street**	**DT-1**	**Midtown, Westlake, Denny, South Lake Union, and Seattle Center (Tunnel)**	**All Chinatown-International District Segment alternatives. Connects to SIB-1 and SIB-2.**
Ballard	Downtown	6th Avenue/Mercer Street	DT-2	Midtown, Westlake, Denny, South Lake Union, and Seattle Center (Tunnel)	Connects to CID-1a* and CID-2a. Connects to SIB-3.
Ballard	**South Interbay**	**Preferred Galer Street Station/Central Interbay**	**SIB-1**	**Smith Cove (Elevated)**	**Connects to DT-1. Connects to IBB-1a, IBB-2a*, and IBB-2b*.**
Ballard	South Interbay	Prospect Street Station/15th Avenue	SIB-2	Smith Cove (Elevated)	Connects to DT-1. Connects to IBB-3 and IBB-1b.
Ballard	South Interbay	Prospect Street Station/Central Interbay	SIB-3	Smith Cove (Retained cut)	Connects to DT-2. Connects to IBB-1a, IBB-2a*, and IBB-2b*.
Ballard	**Interbay/Ballard**	**Preferred Elevated 14th Avenue**	**IBB-1a**	**Interbay (Elevated), Ballard (Elevated)**	**Connects to SIB-1 and SIB-3.**
Ballard	Interbay/Ballard	Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue)	IBB-1b	Interbay (Elevated), Ballard (Elevated)	Connects to SIB-2.
Ballard	**Interbay/Ballard**	**Preferred Tunnel 14th Avenue***	**IBB-2a***	**Interbay (Retained cut), Ballard (Tunnel)**	**Connects to SIB-1 and SIB-3.**
Ballard	**Interbay/Ballard**	**Preferred Tunnel 15th Avenue Station Option***	**IBB-2b***	**Interbay (Retained cut), Ballard (Tunnel)**	**Connects to SIB-1 and SIB-3.**
Ballard	Interbay/Ballard	Elevated 15th Avenue	IBB-3	Interbay (Elevated), Ballard (Elevated)	Connects to SIB-2.

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] The 4th Avenue Shallow Alternative (CID-1a)* would require the existing Stadium Station to be rebuilt to the west of its current location due to the tunnel portal, although the Ballard Link Extension would not connect to Stadium Station.

The following attachments provide additional information:

- Attachment N.1A, Transportation Technical Analysis Methodology Report.
- Attachment N.1B, Existing and Future Transit Routes and Level of Service.
- Attachment N.1C, Transit Service Integration Technical Memorandum.
- Attachment N.1D, Existing and Future Intersection Levels of Service.
- Attachment N.1E, Construction-Related Roadway Modifications.
- Attachment N.1F, Pedestrian Levels of Service.
- Attachment N.1G. Bicycle Master Plan Project List.
- Attachment N.1H, Historical Collisions by Collision Type.

1.3 Methodology

The methodology and assumptions used to analyze the transportation impacts of the projects are detailed in the *Transportation Technical Analysis Methodology*, which is provided as Attachment N.1A of this 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.

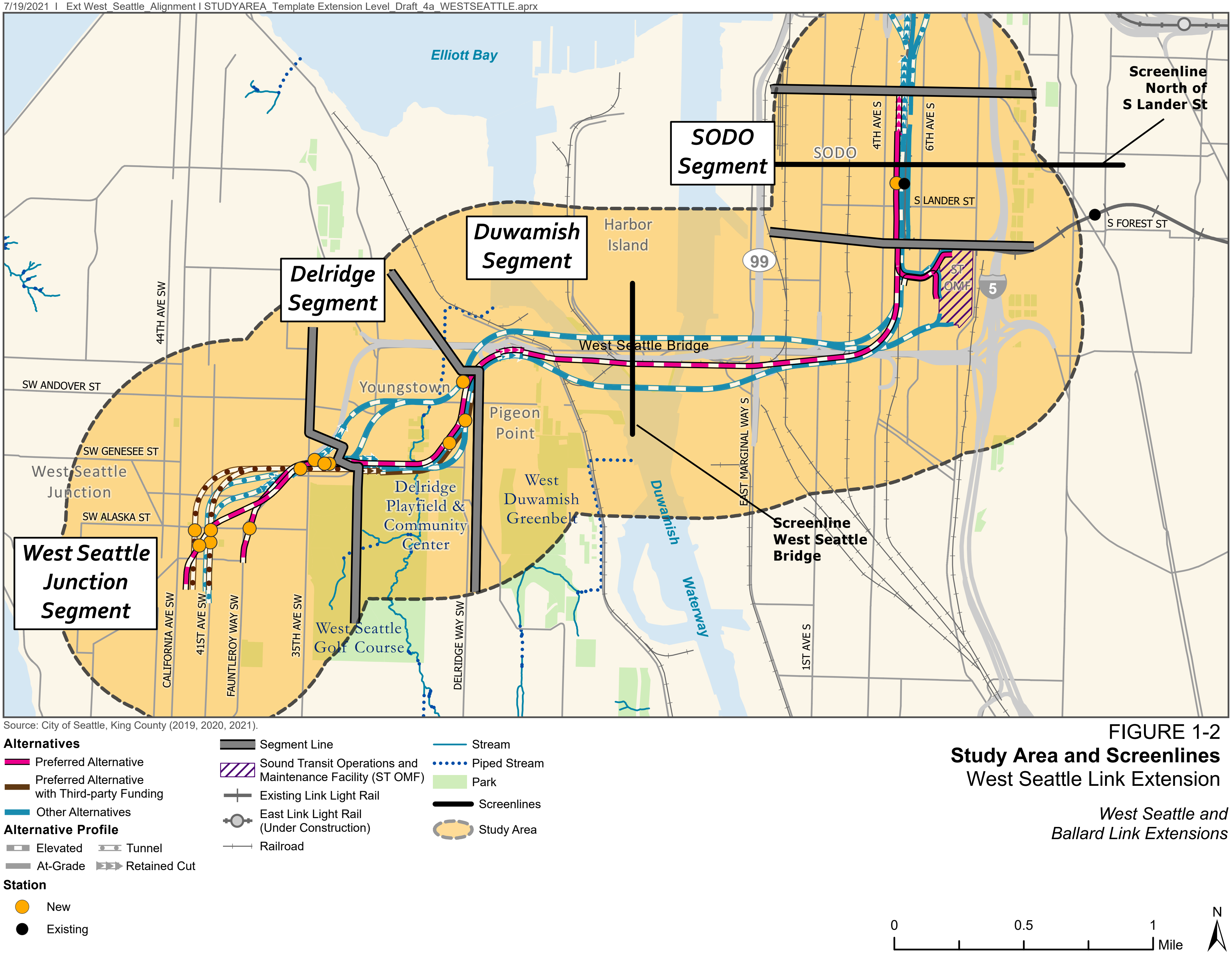
For each of these transportation elements, an affected environment section describes the existing (2019) conditions to provide context. The environmental impacts section describes the future conditions as a comparison between the No Build Alternative and the Build Alternatives for the years 2032 and 2042.

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. Some transportation elements also analyze 2032 for the West Seattle Link Extension interim terminus condition and for construction period analysis. The future analysis considers both long-term (operations) and short-term (construction) impacts. The future long-term analysis considers the fully-built West Seattle and Ballard Link Extension projects as well as minimum operable segments. The Delridge Station would be the West Seattle and Ballard Link Extensions minimum operable segment (M.O.S.) terminal station, and the Smith Cove Station would be the Ballard Link Extension-only M.O.S. terminal station. Potential mitigation to reduce identified potential project impacts is discussed in each section. For more detail on the various conditions and time periods analyzed, see Chapter 2, Regional Context and Travel.

In addition to the relevant regulations, plans, and policies considered in all environmental analyses, the transportation analysis would be guided by laws and regulations relevant to transportation as well as be informed by the policy direction established in the numerous plans and policy documents adopted within the project corridor.

1.4 Study Area

The study area for this transportation analysis is generally the area within 0.5 mile from the project alternatives (including stations), but can be unique to some transportation elements. Study areas that vary by transportation element are described in the section for that transportation element. Figures 1-2 and 1-3 show the general transportation study areas for the West Seattle Link Extension and Ballard Link Extension. The intersection analysis described in Chapter 4, Arterial and Local Street Operations, focuses on a set of study intersections in each project segment; these are presented in Figures 1-4 through 1-11.

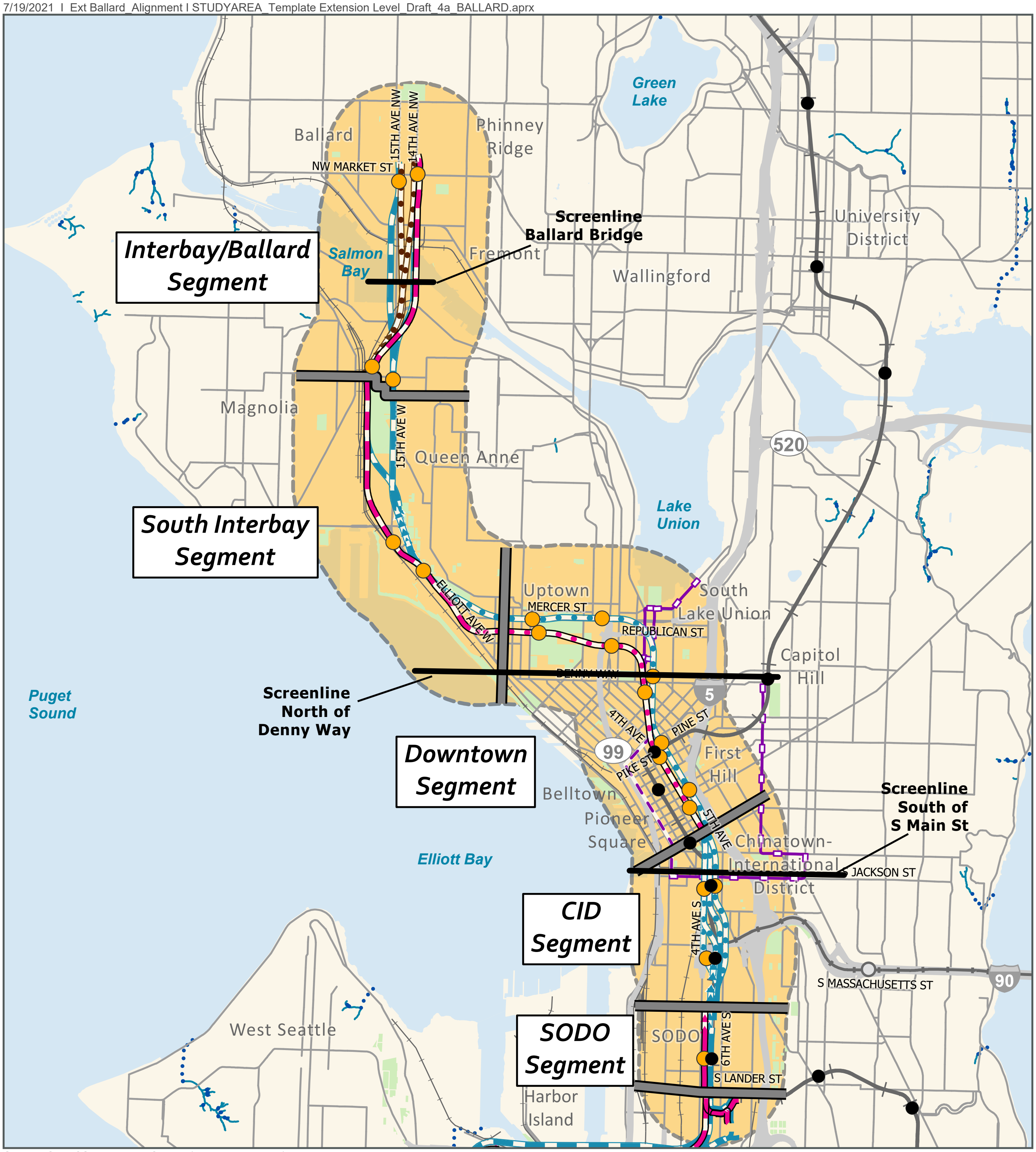


Source: City of Seattle, King County (2019, 2020, 2021).

FIGURE 1-2
Study Area and Screenlines
West Seattle Link Extension

West Seattle and Ballard Link Extensions

7/19/2021 I Ext Ballard_Alignment I STUDYAREA_Template Extension Level_Draft_4a_BALLARD.aprx



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

FIGURE 1-3
Study Area and Screenlines
Ballard Link Extension

West Seattle and Ballard Link Extensions

0 0.5 1 Mile
N

7/16/2021 I 1c SODO combined I STUDYAREA_Template Segment_SODO_All_Draft_4a.aprx

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

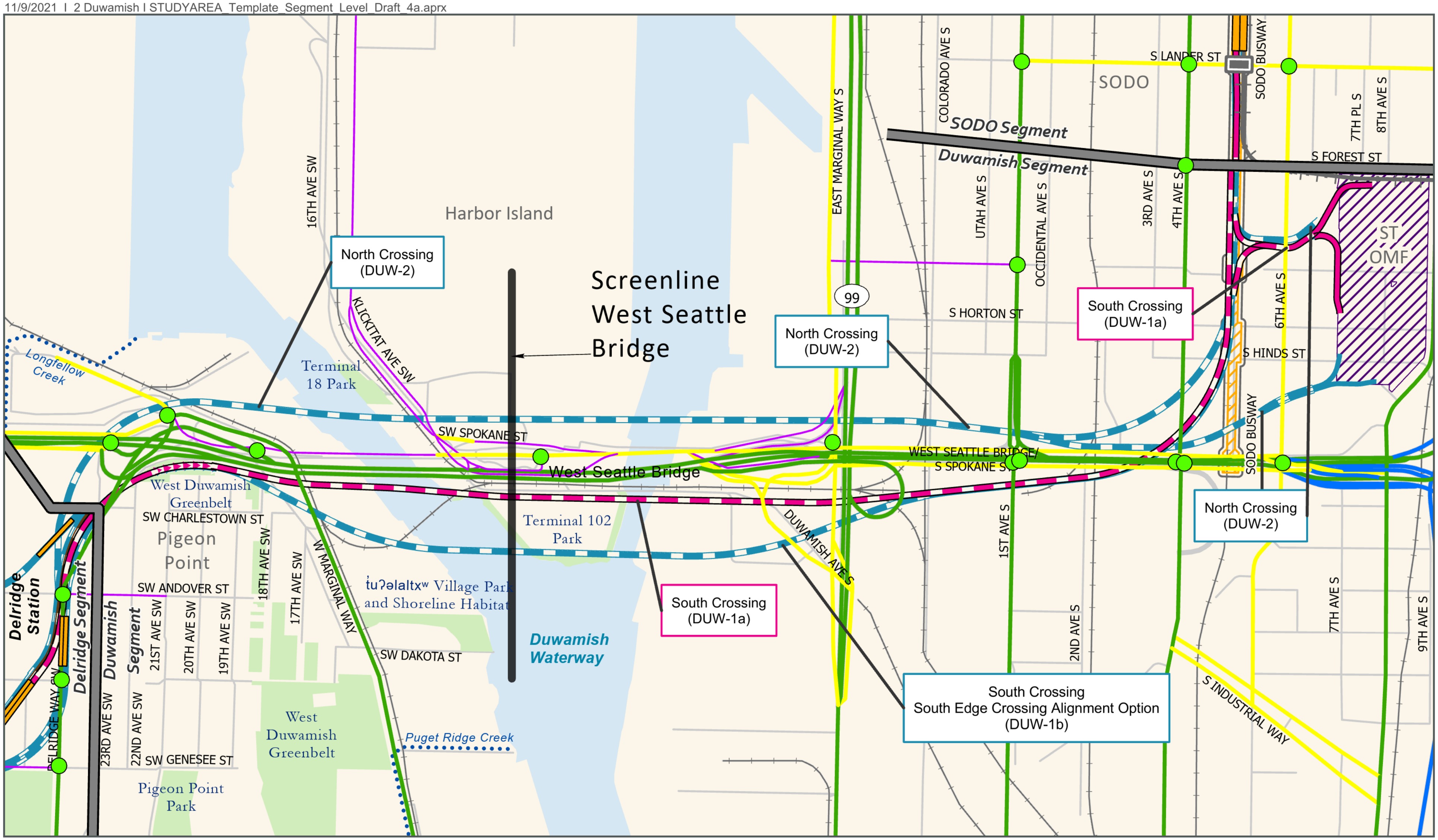
- Study Intersections
- Screenline

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

FIGURE 1-4
Study Area
West Seattle and Ballard Link Extensions - 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
- Existing Link Light Rail
- Railroad
- SODO Busway
- Proposed Overpass
- Sound Transit Operations and Maintenance Facility (ST OMF)
- Piped Stream
- Park

- Study Intersections
- Screenline

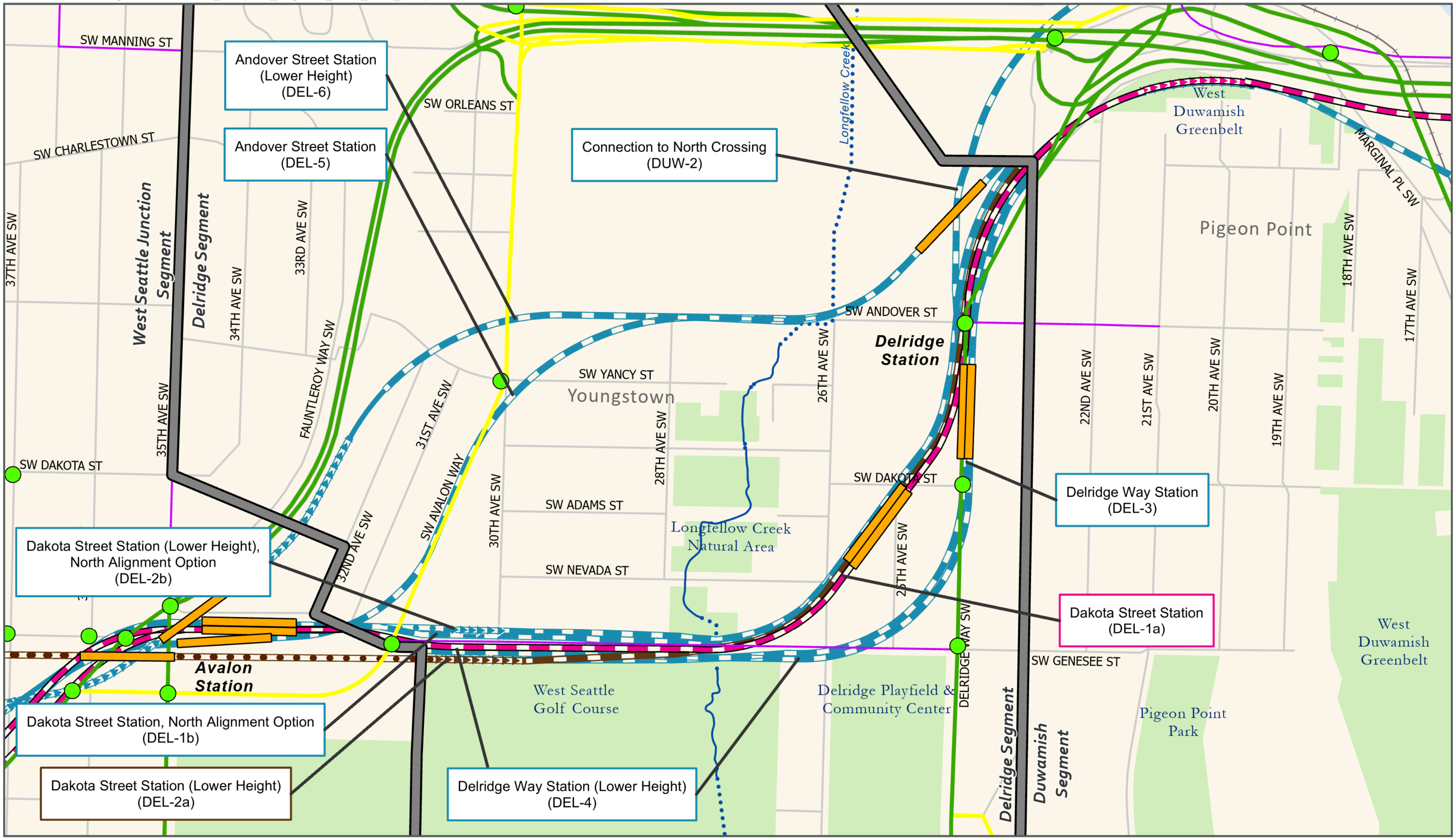
Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 800 1,600 Feet

N

FIGURE 1-5
Study Area
West Seattle Link Extension - Duwamish 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
- Piped Stream
- Park

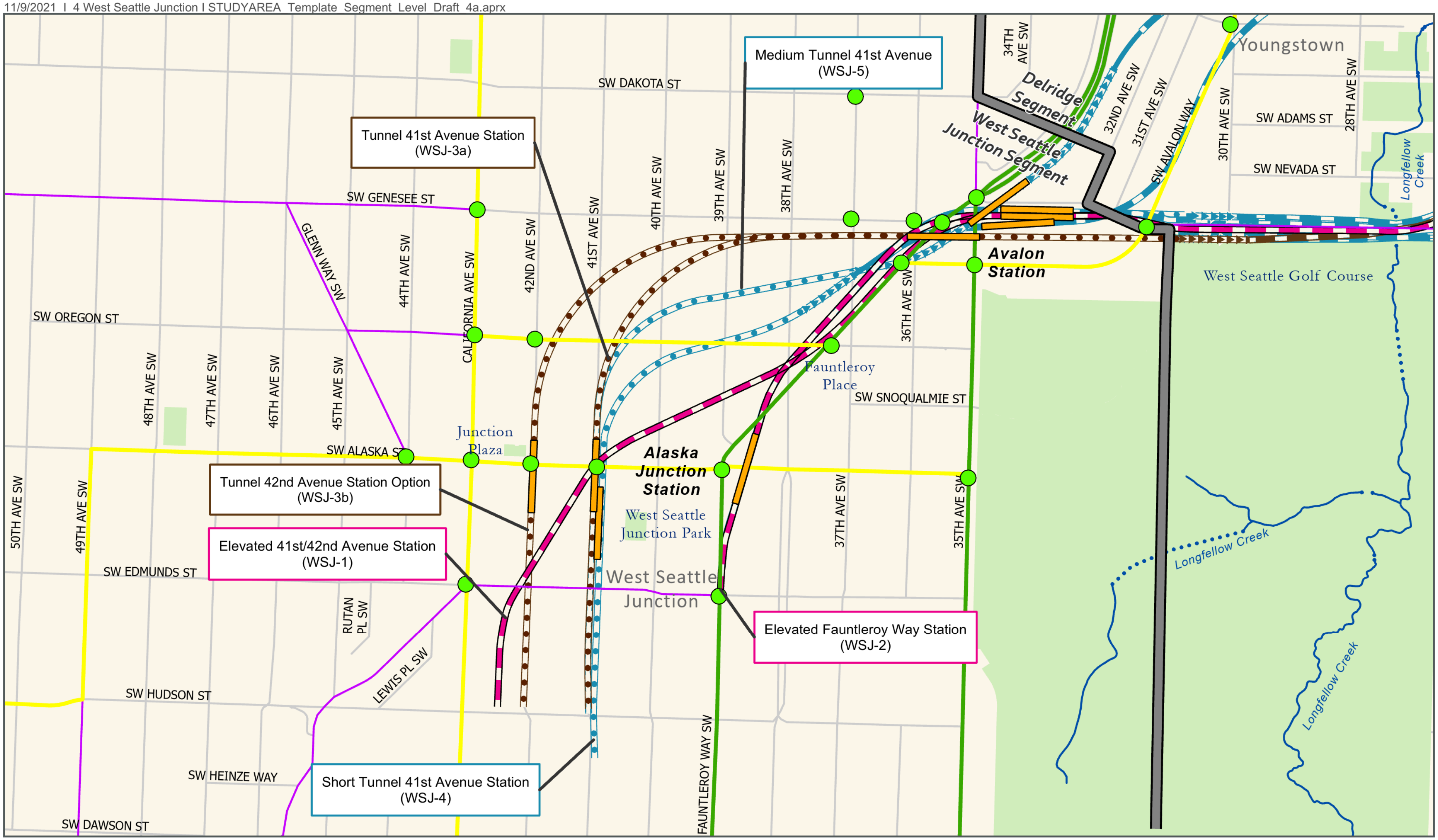
- Study Intersections

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 400 800 Feet
N

FIGURE 1-6
Study Area
West Seattle Link Extension -
Delridge 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
- Stream
- Piped Stream
- Park

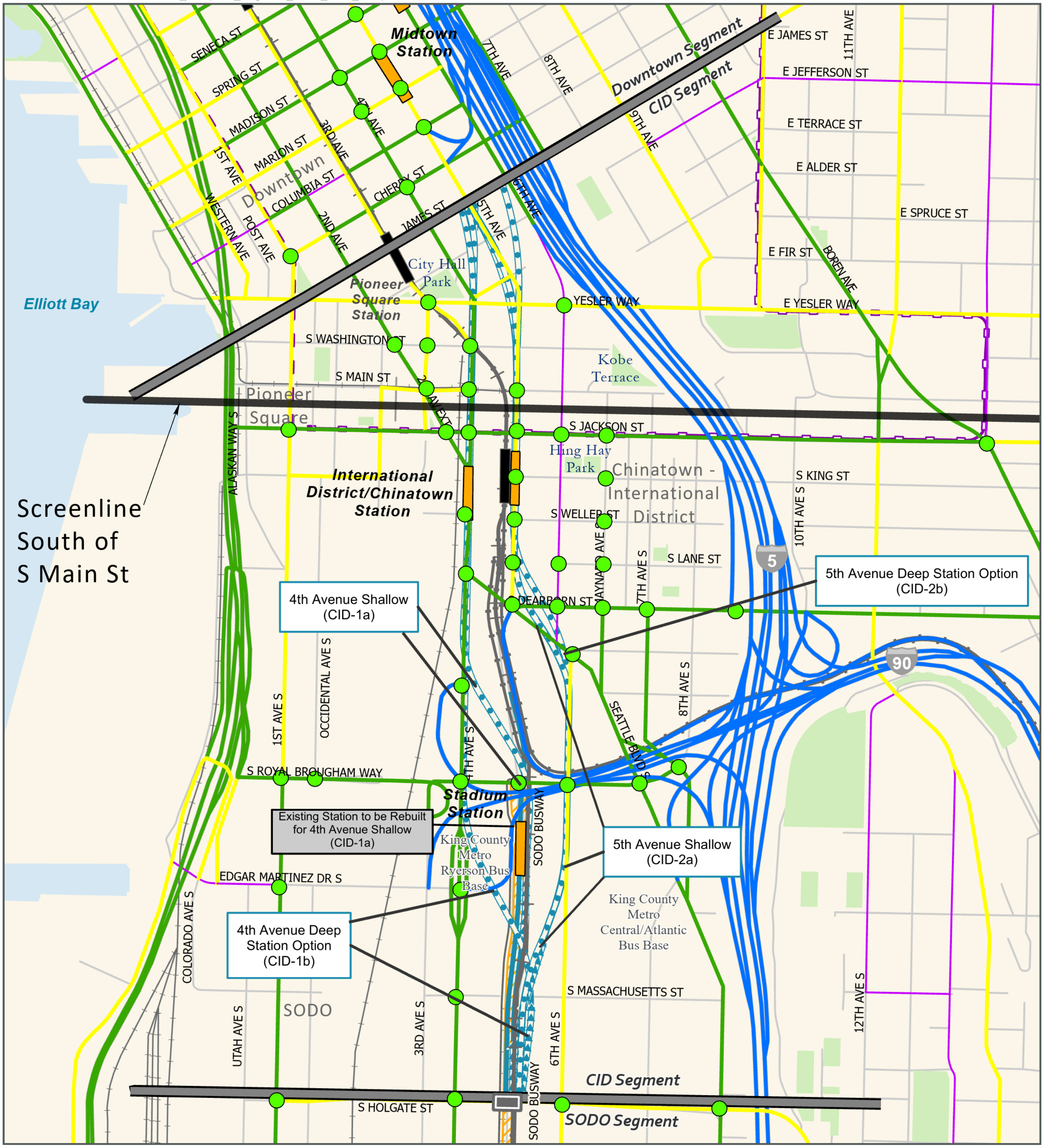
- Study Intersections

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 500 1,000 Feet
N

FIGURE 1-7
Study Area
West Seattle Link Extension - West Seattle Junction 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
- 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

- Study Intersections
- Screenline

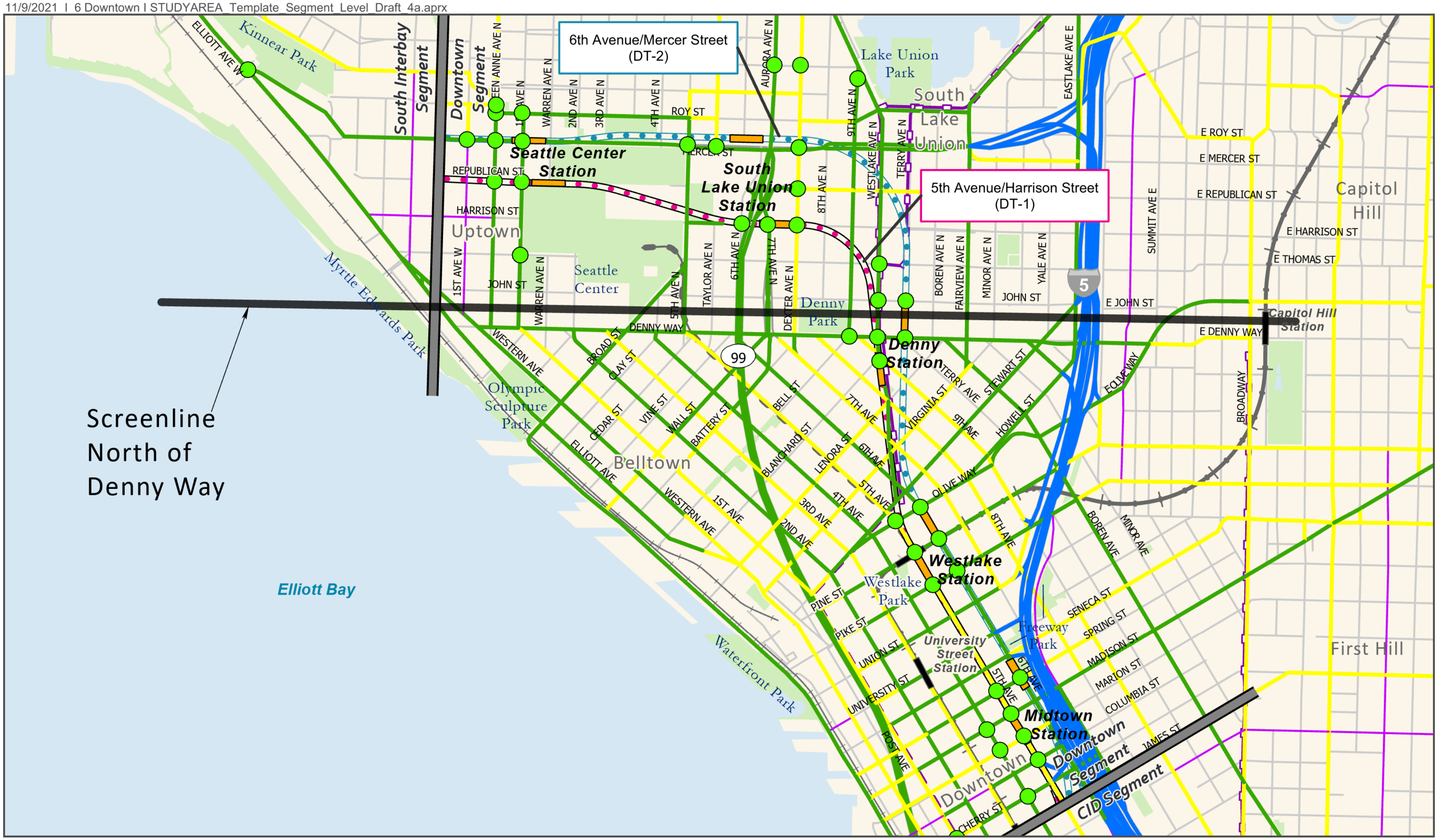
Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

FIGURE 1-8
Study Area
Ballard Link Extension - Chinatown-International District Segment

West Seattle and Ballard Link Extensions

0 700 1,400 Feet
N

11/9/2021 I 6 Downtown I STUDYAREA_Template_Segment_Level_Draft_4a.aprx



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

- Study Intersections
- Screenline

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 1,000 2,000 Feet
N

FIGURE 1-9
Study Area
Ballard Link Extension - Downtown 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
- Park

- Study Intersections

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 800 1,600 Feet

N

FIGURE 1-10
Study Area
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

11/9/2021 I 8 Interbay Ballard I STUDYAREA_Template_Segment_Level_Draft_4a.aprx

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

- Study Intersections
- Screenline

Street Functional Classification
- Interstate
- Principal Arterial/State Highway
- Minor Arterial
- Collector Arterial
- Local Arterial

0 800 1,600 Feet
N

FIGURE 1-11
Study Area
Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

2 REGIONAL CONTEXT AND TRAVEL

2.1 Introduction to Regional Facilities 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, which include major highways and arterials such as Interstates 5 and 90, State Route 99, the West Seattle Bridge, and the Ballard Bridge/15th Avenue Northwest. Because the measures in this section are generally oriented to a regional scale, the analysis for mode share, vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay is applicable for both the West Seattle and Ballard Link extensions and a single set of results is presented for the combined transportation system.

Region-wide performance measures include region-wide vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay today and in the future, with and without the project. Roadway performance is also assessed at select locations (screenlines) within the study area, with estimates of total trips at screenlines by mode, person trips, and a comparison of volumes to roadway capacity (i.e., volume-to-capacity ratio). Temporary (during construction) and permanent impacts on regional facilities and travel are discussed, as well as potential mitigation.

The following key findings were determined for regional context and travel:

- Both the West Seattle and Ballard Link extensions result in reductions in vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay across the region in 2042.
- Within the study areas, transit mode share is forecast to increase with slight shifts from single-occupancy and high-occupancy automobile trips.
- Volume-to-capacity ratios are anticipated to remain relatively unchanged under the Build Alternatives.
- Regional travel patterns are not expected to change substantially under the West Seattle Link Extension's 2032 interim terminus condition.

2.2 West Seattle Link Extension

The West Seattle Link Extension connects to the existing Link light rail system and extends from SODO to the West Seattle neighborhoods of Seattle, with four proposed stations.

2.2.1 Affected Environment

The City of Seattle has designated portions of the West Seattle Junction as a hub urban village, and Puget Sound Regional Council has designated Downtown Seattle as a regional growth center, 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 Manufacturing/Industrial Center.

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. As of March 2020, the West Seattle Bridge is closed to vehicle traffic and the timeline for the City of Seattle to complete their assessment is uncertain, but the City has stated the current closure is expected to continue through at least the end of 2021. The transportation analysis assumes that the West Seattle Bridge will either be repaired or replaced prior to construction of the West Seattle Link Extension.

The West Seattle Link Extension is also served by Sound Transit and King County Metro Transit (Metro).

2.2.1.1 Vehicle Miles Traveled, Vehicle Hours Traveled, and Mode Share

Vehicle miles traveled refers to total number of miles traveled by vehicles in an area over a given period of time. Vehicle hours traveled refers to the total operating hours for all vehicles in an area over a given period of time. These statistics are used to describe the intensity of automobile use in the region and increases in either or both are usually accompanied by increases in congestion and pollution. Vehicle hours of delay is the total number of hours of delay per vehicle relative to free-flow speed that are attributable to roadway congestion.

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). This results in approximately 815,000 hours of delay for passenger cars and heavy trucks.

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. Transit comprises about 3 percent of all the trips in the region. Table 2-1 shows the existing daily mode share trips by person trips for the Puget Sound region.

Table 2-1. Existing Daily Mode Share (by Person) for the Central Puget Sound Region

Mode	Mode Share (Person Trips)
Single-occupancy Vehicles/Freight	49.1%
High-occupancy Vehicles	36.1%
Walk/Bike	12.1%
Transit	2.7%
Total	**100.0%**

Source: Puget Sound Regional Council Regional Model and Sound Transit Ridership Model.

2.2.1.2 Screenline Performance

The following measures were used to assess the existing condition of regional travel on major corridors through the study area:

- Vehicle volume.
- Vehicle volume-to-capacity ratio.
- Person trips.
- Mode share.

Vehicle volume is the total number of vehicles passing through a location in a given length of time. Volume-to-capacity ratio compares the vehicle volume on a roadway to its capacity; a ratio over 1.0 indicates that demand exceeds capacity and that congestion is present as a result. Person trips are the number of discrete trips taken by individual persons regardless of mode.

Mode share is the percentage of trips by a particular mode (i.e., single-occupancy vehicles, high-occupancy vehicles with two or more persons, and transit [bus and rail)]. These statistics were calculated at two representative location along the project corridor: at the West Seattle Bridge and across a screenline north of South Lander Street (see Figure 1-2 in Chapter 1). Table 2-2 and Table 2-3 show the existing p.m. peak hour and daily performance metrics for these two screenlines, respectively. Existing a.m. peak hour performance metrics are not shown because the a.m. peak hour performance metrics would be the inverse of the existing p.m. peak hour metrics.

During the p.m. peak hour, both screenlines are over capacity in the peak travel direction (westbound at the West Seattle Bridge screenline and southbound at the north of South Lander Street screenline), with volume-to-capacity ratios greater than 1.0. Eastbound travel across the West Seattle Bridge also shows a volume-to-capacity ratio greater than 0.9, meaning that vehicles are beginning to experience slowdowns. Transit mode share is relatively high—over 15 percent—in the p.m. peak hour in the peak travel direction.

The daily results include off-peak periods of the day with lower travel demand. Volume-to-capacity ratios are therefore less than 0.7, and transit mode shares are between 8 to 11 percent.

Table 2-2. Existing P.M. Peak Hour Volumes, Volume-to-capacity Ratios, and Mode Shares

Screenline (Direction)	Vehicles	Volume-to-capacity Ratio	Persons	Single-occupancy Vehicle	High-occupancy Vehicle	Transit
West Seattle Bridge (Eastbound)	4,600	0.92	6,600	57%	38%	5%
West Seattle (Bridge Westbound)	5,300	1.04	8,700	50%	29%	21%
Lander Street (Northbound)	15,200	0.77	22,500	62%	35%	3%
Lander Street (Southbound)	21,000	1.08	36,000	51%	32%	17%

Source: Puget Sound Regional Council Regional Model and Sound Transit Ridership Model.

Table 2-3. Existing Weekday Daily Volumes, Volume-to-capacity Ratios, and Mode Share

Screenline (Direction)	Vehicles	Volume-to-capacity Ratio	Persons	Single-occupancy Vehicle	High-occupancy Vehicle	Transit
West Seattle Bridge (Eastbound)	58,400	0.65	85,200	57%	32%	11%
West Seattle Bridge (Westbound)	57,300	0.64	83,400	58%	31%	11%
Lander Street (Northbound)	234,200	0.66	352,200	60%	32%	8%
Lander Street (Southbound)	222,700	0.66	336,700	61%	31%	8%

Source: Puget Sound Regional Council Regional Model and Sound Transit Ridership Model.

2.2.2 Environmental Impacts

2.2.2.1 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 up to 10 percent growth in p.m. peak hour vehicle trips across the screenlines. Total screenline 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, including the following (for further details on these projects and a complete list of assumed future projects, see Attachment N.1A, Transportation Technical Analysis Methodology Report):

- Washington State Department of Transportation (WSDOT) State Route 520 – Interstate 5 to Lake Washington – Rest of the West.
- City of Seattle Central Waterfront Improvement Program.
- Sound Transit Light Rail Extensions to Everett, Tacoma, and Redmond.
- City of Seattle and Metro RapidRide G Line (Madison Street), H Line (Delridge), and J Line (formerly RapidRide Roosevelt), as well as other bus corridor projects within the city.

While the West Seattle and Ballard Light Rail extensions would not be implemented under the No Build Alternative, the Downtown Redmond Link Extension, Lynnwood Link, Everett Link, Federal Way Link, and Tacoma Dome Link Extension are assumed to be completed by 2042 as part of the No Build Alternative. 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 the 2025 METRO CONNECTS service network (Metro 2016), 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.

2.2.2.2 Build Alternatives

Long-term Impacts

This section discusses regional transportation conditions in years 2032 and 2042. 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 represent all project alternatives (collectively referred to as the Build Alternatives) compared to the No Build Alternative.

The definition of the Build Alternatives in year 2032 only includes the interim terminus connection of the West Seattle Link Extension at the SODO Station, while the definition of the Build Alternatives in year 2042 includes operation of a light rail line from West Seattle to Everett and a light rail line from Ballard to Tacoma, as described in Chapter 2 of the Draft Environmental Impact Statement.

Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay

Table 2-4 and Table 2-5 show the average weekday vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay for the Build Alternatives and No Build Alternative in year 2032 for the West Seattle Link Extension interim terminus condition and in year 2042. The project definition under the 2042 Build Alternative includes both the West Seattle and Ballard Link extensions, including the second downtown light rail tunnel.

With the project, daily vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay are forecasted to decrease compared to the No Build Alternative in both year 2032 and 2042 conditions, as people are forecasted to shift from driving to transit. By year 2042, with both the West Seattle and Ballard extensions in place, considerably more trips shift from automobile modes to transit than in year 2032, which assumes a West Seattle Extension interim terminus in SODO.

Table 2-4. 2032 Average Weekday Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay by Mode – West Seattle Link Extension

Alternative	Vehicle Miles Traveled	Vehicle Hours Traveled	Vehicle Hours of Delay
No Build Alternative	92,749,900	3,209,000	867,500
Build Alternatives	92,744,300	3,208,600	867,200
Change (#)	*-5,600*	*-400*	*-300*
Change (%)	*<-0.01%*	*-0.01%*	*-0.03%*

Source: Puget Sound Regional Council Regional Model.

Table 2-5. 2042 Average Weekday Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay by Mode – West Seattle and Ballard Link Extensions

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

Source: Puget Sound Regional Council Regional Model.

Screenline Performance

In general, the project would shift some trips to transit within the project corridor. The screenline analysis reflect that shift by showing slightly reduced vehicle volumes, lower roadway volume-to-capacity ratios, and increased transit mode share.

Year 2032 Condition

Table 2-6 compares the vehicle demand volumes and vehicle volume-to-capacity ratios for the 2032 No Build Alternative and Build Alternatives for the p.m. peak hour and weekday daily time periods. The Build Alternatives shows equivalent or slightly improved performance compared to the No Build Alternative. Travel during the p.m. peak hour in the peak direction is congested in both alternatives, with volume-to-capacity ratios above 1.0.

Table 2-6. 2032 Vehicle Volumes and Volume-to-capacity Ratios – West Seattle Link Extension

Screenline (Direction)	P.M. Peak No Build Vehicles	P.M. Peak No Build Volume-to-capacity Ratio	P.M. Peak Build Vehicles	P.M. Peak Build Volume-to-capacity Ratio	Daily No Build Vehicles	Daily No Build Volume-to-capacity Ratio	Daily Build Vehicles	Daily Build Volume-to-capacity Ratio
West Seattle Bridge (Eastbound)	4,500	0.91	4,500	0.91	57,900	0.65	57,800	0.65
West Seattle Bridge (Westbound)	5,200	1.03	5,200	1.02	56,800	0.64	56,600	0.64
North of South Lander Street (Northbound)	15,200	0.78	15,200	0.78	235,800	0.67	235,800	0.67
North of South Lander Street (Southbound)	20,600	1.08	20,600	1.08	224,500	0.68	224,300	0.68

Source: Puget Sound Regional Council Regional Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Table 2-7 and Table 2-8 compare the total person demand volumes and travel mode shares for the 2032 No Build Alternative and Build Alternatives for the p.m. peak hour and weekday time periods. The Build Alternatives show approximately the same number of people traveling across each screenline and a small increase in the percentage of people using transit across the Duwamish Waterway.

Table 2-7. 2032 P.M. Peak Hour Mode Shares – West Seattle Link Extension

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
West Seattle Bridge (Eastbound)	6,700	55%	38%	7%	6,700	55%	37%	8%
West Seattle Bridge (Westbound)	9,200	46%	29%	25%	9,300	45%	29%	26%
North of South Lander Street (Northbound)	24,700	57%	33%	10%	24,600	57%	33%	10%
North of South Lander Street (Southbound)	42,800	43%	27%	30%	42,700	43%	27%	30%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Table 2-8. 2032 Daily Mode Shares – West Seattle Link Extension

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
West Seattle Bridge (Eastbound)	87,600	55%	32%	13%	87,900	55%	32%	13%
West Seattle Bridge (Westbound)	85,400	56%	31%	13%	85,800	55%	31%	14%
North of South Lander Street (Northbound)	395,900	55%	29%	16%	395,300	55%	29%	16%
North of South Lander Street (Southbound)	381,400	55%	28%	17%	380,600	55%	28%	17%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Year 2042 Condition

Table 2-9 compares the vehicle demand volumes and vehicle volume-to-capacity ratios for the 2042 No Build Alternative and Build Alternatives for the p.m. peak hour and weekday time periods. The Build Alternatives show improved performance compared to the No Build Alternative, with slightly fewer vehicles traveling on the roadways and lower roadway volume-to-capacity ratios. Travel during the p.m. peak hour in the peak direction is congested in both alternatives.

Table 2-9. 2042 Vehicle Volumes and Volume-to-capacity Ratios – West Seattle Link Extension

Screenline (Direction)	P.M. Peak No Build Vehicles	P.M. Peak No Build Volume-to-capacity Ratio	P.M. Peak Build Vehicles	P.M. Peak Build Volume-to-capacity Ratio	Daily No Build Vehicles	Daily No Build Volume-to-capacity Ratio	Daily Build Vehicles	Daily Build Volume-to-capacity Ratio
West Seattle Bridge (Eastbound)	4,500	0.91	4,400	0.90	58,000	0.65	57,600	0.64
West Seattle Bridge (Westbound)	5,200	1.03	5,100	1.01	56,200	0.63	55,500	0.62
North of South Lander Street (Northbound)	15,600	0.81	15,500	0.81	241,800	0.70	240,900	0.70
North of South Lander Street (Southbound)	20,700	1.09	20,400	1.08	229,400	0.70	228,500	0.70

Source: Puget Sound Regional Council Regional Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Table 2-10 and Table 2-11 compare year 2042 total person demand volumes and travel mode shares for the No Build Alternative and Build Alternatives for the p.m. peak hour and weekday time periods. The Build Alternatives show approximately the same number of people traveling across each screenline, with an increase in the percentage of people using transit across both screenlines.

Table 2-10. 2042 P.M. Peak Hour Mode Shares – West Seattle Link Extension

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
West Seattle Bridge (Eastbound)	6,900	53%	39%	8%	6,800	53%	37%	10%
West Seattle Bridge (Westbound)	9,500	44%	29%	27%	9,700	42%	29%	29%
North of South Lander Street (Northbound)	26,100	56%	33%	11%	26,100	56%	32%	12%
North of South Lander Street (Southbound)	46,000	40%	26%	34%	46,100	40%	25%	35%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Table 2-11. 2042 Daily Mode Shares – West Seattle Link Extension

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
West Seattle Bridge (Eastbound)	89,900	53%	32%	15%	90,100	53%	31%	16%
West Seattle Bridge (Westbound)	87,300	54%	31%	15%	87,400	53%	31%	16%
North of South Lander Street (Northbound)	421,900	53%	29%	18%	422,300	53%	29%	18%
North of South Lander Street (Southbound)	406,000	53%	28%	19%	406,100	53%	28%	19%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Note: The p.m. peak travel direction is westbound for the West Seattle Bridge screenline and southbound for the north of South Lander Street screenline.

Construction Impacts

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

2.2.3 Potential Mitigation Measures

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

2.3 Ballard Link Extension

2.3.1 Affected Environment

The City of Seattle has designated the Ballard and Interbay neighborhoods as urban villages, and Puget Sound Regional Council has designated Downtown Seattle, Uptown, 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 Ballard Interbay Northend Manufacturing/Industrial Center.

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

The Ballard Link Extension is also served by various transit services, including Metro, Sound Transit, and Community Transit.

2.3.1.1 Vehicle Miles Traveled, Vehicle Hours Traveled, and Mode Share

Section 2.2.1.1 provides estimates of existing regional vehicle miles traveled, vehicles hours traveled, and mode share measures.

2.3.1.2 Screenline Performance

Regional screenline performance measures for the Ballard Link Extension were calculated at three screenlines along the project corridor: Main Street, Denny Way, and the Ballard Bridge (see Figure 1-3 in Chapter 1). For a description of the performance measures presented in this section, see Section 2.2.1.2.

Table 2-12 and Table 2-13 show the existing p.m. peak hour and daily performance metrics for these three screenlines. During the p.m. peak hour, the south of South Main Street and Ballard Bridge screenlines are over capacity in the peak travel direction, with volume-to-capacity ratios greater than or equal to 1.0. Southbound travel across the Ballard Bridge also shows a volume-to-capacity ratio greater than 0.9, meaning that vehicles are beginning to experience slowdowns. In the peak travel direction, transit mode share is up to 31 percent. Single-occupancy-vehicle travel accounts for between 50 and 60 percent of all trips across the screenlines.

The daily results include off-peak times of the day with lower travel demand. Volume-to-capacity ratios are therefore less than 0.7, and transit mode shares are between 13 and 14 percent.

Table 2-12. Existing Weekday p.m. Peak Hour Volumes, Volume-to-capacity Ratios, and Mode Shares – Ballard Link Extension

Screenline (Direction)	Vehicles	Volume-to-capacity Ratio	Persons	Single-occupancy Vehicle	High-occupancy Vehicle	Transit
South of South Main Street (Northbound)	16,200	0.87	25,400	58%	30%	12%
South of South Main Street (Southbound)	18,100	1.00	33,500	47%	29%	24%
North of Denny Way (Northbound)	21,800	0.63	41,200	49%	20%	31%
North of Denny Way (Southbound)	19,800	0.69	31,600	56%	29%	15%
Ballard Bridge (Northbound)	2,800	1.12	4,800	50%	25%	25%
Ballard Bridge (Southbound)	2,300	0.91	3,300	57%	35%	7%

Source: Puget Sound Regional Council Regional Model and Sound Transit Ridership Model.

Table 2-13. Existing Weekday Daily Volumes, Volume-to-Capacity Ratios, and Mode Shares – Ballard Link Extension

Screenline (Direction)	Vehicles	Volume-to-capacity Ratio	Persons	Single-occupancy Vehicle	High-occupancy Vehicle	Transit
South of South Main Street (Northbound)	233,700	0.68	366,300	59%	28%	13%
South of South Main Street (Southbound)	220,500	0.67	346,600	59%	28%	13%
North of Denny Way (Northbound)	267,400	0.44	415,300	60%	23%	17%
North of Denny Way (Southbound)	261,200	0.46	410,100	60%	24%	16%
Ballard Bridge (Northbound)	27,800	0.62	40,500	58%	29%	13%
Ballard Bridge (Southbound)	24,900	0.56	37,000	57%	29%	14%

Source: Puget Sound Regional Council Regional Model and Sound Transit Ridership Model.

2.3.2 Environmental Impacts

2.3.2.1 No Build Alternative

The discussion of the No Build Alternative in Section 2.2.2.1 for the West Seattle Link Extension is the same as for the Ballard Link Extension.

2.3.2.2 Build Alternatives

Long-term Impacts

This section discusses regional transportation conditions in year 2042. 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 the alternatives, the analysis results for the Build Alternatives represents all project alternatives as compared to the No Build Alternative.

The definition of the Build Alternatives in year 2042 includes operation of a light rail line from West Seattle to Everett and a light rail line from Ballard to Tacoma, as described in Chapter 2 of the Draft Environmental Impact Statement.

Vehicle Miles Traveled, Vehicle Hours Traveled, and Vehicle Hours of Delay

Table 2-5 in Section 2.2.2.2 shows the average weekday vehicles miles traveled, vehicle hours traveled, and vehicle hours of delay for the No Build Alternative and Build Alternatives in year 2042. Changes in regional travel patterns for the Ballard and West Seattle Link extensions were developed with both projects assumed to be completed in 2042.

In the Build Alternatives, daily vehicles miles traveled, vehicle hours traveled, and vehicle hours of delay are forecasted to decrease compared to the No Build Alternative, as people are forecasted to shift from using vehicle modes to riding transit.

Screenline Performance

In general, the project would shift some trips to transit within the project corridor. The screenline analysis reflects that shift by showing slightly reduced vehicle volumes, lower roadway volume-to-capacity ratios, and increased transit mode share. As with other regional measures described in this section, the screenline performance for all project alternatives are similar. Therefore, the Build Alternatives are presented as a single set of values for year 2042 conditions.

Table 2-14 compares the vehicle demand volumes and volume-to-capacity ratios for the 2042 No Build Alternative and Build Alternatives for the weekday p.m. peak hour and daily time periods. The build condition shows similar to slightly improved performance across all screenlines compared to the No Build Alternative.

Table 2-15 and Table 2-16 compare the total person demand volumes and travel mode shares for the 2042 No Build Alternatives and Build Alternatives for the p.m. peak hour and weekday time periods, respectively. The Build Alternatives show slightly more people able to travel across the south of South Main Street and north of Denny Way screenlines, with a larger increase in people crossing the Ballard Bay screenline.

While there is a slight shift to a higher p.m. peak hour transit mode share at the south of South Main Street and north of Denny Way screenlines, the transit mode share across the Ballard Bridge screenline is forecasted to nearly double and increase by almost 20 percent during the p.m. peak hour in the peak travel direction.

Table 2-14. 2042 Vehicle Volumes and Volume-to-Capacity Ratios

Screenline (Direction)	P.M. Peak No Build Vehicles	P.M. Peak No Build Volume-to-Capacity Ratio	P.M. Peak Build Vehicles	P.M. Peak Build Volume-to-Capacity Ratio	Daily No Build Vehicles	Daily No Build Volume-to-Capacity Ratio	Daily Build Vehicles	Daily Build Volume-to-Capacity Ratio
South of South Main Street (Northbound)	16,800	0.92	16,700	0.92	246,100	0.73	245,200	0.73
South of South Main Street (Southbound)	18,400	1.03	18,100	1.02	230,200	0.71	229,000	0.71
North of Denny Way (Northbound)	22,700	0.67	22,200	0.66	286,400	0.46	283,100	0.46
North of Denny Way (Southbound)	20,700	0.73	20,400	0.72	278,200	0.50	275,100	0.50
Ballard Bridge (Northbound)	3,100	1.23	3,000	1.17	29,000	0.65	28,200	0.63
Ballard Bridge (Southbound)	2,500	1.02	2,500	1.01	26,500	0.60	25,900	0.59

Source: Puget Sound Regional Council Regional Model.

Table 2-15. 2042 P.M. Peak Hour Mode Shares

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
South of South Main Street (Northbound)	29,700	52%	29%	19%	30,000	51%	29%	20%
South of South Main Street (Southbound)	43,400	37%	25%	38%	44,100	36%	24%	40%
North of Denny Way (Northbound)	49,100	42%	21%	37%	49,800	41%	20%	39%
North of Denny Way (Southbound)	36,600	51%	28%	21%	37,900	49%	26%	25%
Ballard Bridge (Northbound)	5,400	47%	28%	25%	6,800	36%	21%	43%
Ballard Bridge (Southbound)	3,700	57%	34%	9%	4,100	52%	31%	17%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Table 2-16. 2042 Daily Mode Shares

Screenline (Direction)	No Build Persons	No Build Single-occupancy Vehicle	No Build High-occupancy Vehicle	No Build Transit	Build Persons	Build Single-occupancy Vehicle	Build High-occupancy Vehicle	Build Transit
South of South Main Street (Northbound)	439,100	53%	26%	21%	442,000	52%	26%	22%
South of South Main Street (Southbound)	418,100	51%	27%	22%	421,000	50%	27%	23%
North of Denny Way (Northbound)	486,400	55%	23%	22%	492,400	54%	22%	24%
North of Denny Way (Southbound)	479,400	54%	25%	21%	485,900	53%	24%	23%
Ballard Bridge (Northbound)	44,400	55%	30%	15%	50,600	47%	26%	27%
Ballard Bridge (Southbound)	41,200	55%	29%	16%	47,500	47%	24%	29%

Source: Puget Sound Regional Council Regional Model and Sound Transit Model.

Construction Impacts

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 Interstates 5 and 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.

Section 4.3.2.3 provides further information on construction impacts, including short-term closures of arterials and local streets that are at or near Interstates 5 and 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, the connection of the Ballard Link Extension to the existing Link system would close 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 south tunnel portal for these alternatives 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. To construct the temporary and final track connections, a full closure of the Link light rail tracks would be required at this location.

During this period, light rail service would continue from the SODO Station and stations to the south as well as 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 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 subsequent project design phases.

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.

For additional details regarding construction impacts to transit and transit facilities, see Section 3.3.3.2.

2.3.3 Potential Mitigation Measures

2.3.3.1 Long-term Impacts

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

2.3.3.2 Construction Impacts

During construction, potential mitigation to the regional transit system is identified as required with Alternative CID-1a* due to construction of the light rail connections to all of the SODO alternatives. Sound Transit would work with Metro and the City of Seattle, in coordination with the Federal Transit Administration, 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 TRANSIT

3.1 Introduction to Transit

This chapter describes existing conditions for transit in the study area and regionally, as well as the anticipated future effects of the project on bus and rail operations. Transit service and facilities, travel times, ridership, and transit L.O.S. are evaluated. L.O.S. measures include frequency, hours of service (span), reliability, and passenger load. Temporary construction impacts to transit facilities and operations are also discussed.

3.1.1 Key Findings

Several deficiencies in transit service were identified in the existing condition and No Build Alternative. Current issues related to transit speed, reliability, and overcrowding will degrade in the future and capacity on the transit system will not be sufficient to support regional growth. The Build Alternatives address many of these deficiencies and support growth in regional connectivity. The following sections describe the primary changes or benefits of the WSBLE Build Alternatives.

3.1.1.1 West Seattle Link Extension

- Travel Time and Reliability – Transit travel time is expected to improve by about 50 percent under the 2042 Build Alternative compared to the 2042 No Build Alternative. In addition, the project would be fully grade-separated and would provide reliable, high-speed trips at all times, regardless of congestion or disruptions on the roads.
- Ridership – Because of improved reliability, additional capacity, and increased service levels, approximately 27,000 riders are forecasted to use the West Seattle Link Extension each day by year 2042. Together with the Ballard Link Extension, which would also be in operation by 2042, systemwide transit use would see an increase of 20,000 daily trips when compared to the No Build Alternative.
- Transit Construction – Construction of the guideway, stations, and support infrastructure could disrupt King County Metro Transit (Metro) bus operations and access to transit for several years. Roadway, travel lane, bus stop, layover, and sidewalk and bike facility closures will be coordinated between Sound Transit, Metro, and the City of Seattle to identify alternative bus routes, bus stops, layover areas, and transit access locations. Sound Transit would implement mitigation for direct impacts to Metro operations caused by the construction activities.

3.1.1.2 Ballard Link Extension

- Travel Time and Reliability – Transit travel time is expected to improve by about 70 percent in the p.m. peak under the 2042 Build Alternative compared to the 2042 No Build Alternative. In addition, the project would be fully grade-separated and would provide reliable, high-speed trips at all times, regardless of congestion or disruptions on the roads.
- Ridership – 154,000 riders are forecasted to use the Ballard Link Extension each day by 2042. Together with the West Seattle Link Extension, which would also be in operation by 2042, systemwide transit use would see an increase of 20,000 daily trips when compared to the No Build Alternative.

- Construction of a second Downtown Seattle transit tunnel would provide the additional capacity necessary to support regional light rail operations.
- Transit Construction – Construction of the guideway, stations, and support infrastructure could disrupt Metro bus operations and access to transit for several years. Roadway, travel lane, bus stop, layover, and sidewalk and bike facility closures will be coordinated between Sound Transit, Metro, and the City of Seattle to identify alternative bus routes, bus stops, layover areas, and transit access locations. Sound Transit would implement mitigation for direct impacts to Metro operations caused by the construction activities. Construction could temporarily disrupt existing Link light rail service and the Seattle Streetcar, necessitating bus bridges or other strategies. Access to the Ryerson and Atlantic/Central bus bases could also be affected by construction, necessitating alternative entry and exit routes during construction.

3.1.2 Regional Transit Ridership

This section describes the characteristics of the regional transit system as applicable to both the West Seattle Link and Ballard Link extension projects.

Today, there are over half a million average daily boardings within the Sound Transit service area (Table 3-1), which includes parts of King, Pierce, and Snohomish counties; by 2042, that number is anticipated to grow by over half again. An average of 72,000 people board Link light rail today and that number is expected to grow substantially by 2042 (under the no build condition) as the light rail system is built out to Everett, Tacoma, and Redmond. Future growth in ridership, particularly for light rail, will present capacity challenges, particularly in the segment between the International District and Beacon Hill. Many bus routes in the study area will also experience capacity challenges as ridership increases (see Section 3.2.2.2, Build Alternatives, for the West Seattle Link Extension and Section 3.3.2.2, Build Alternatives, for the Ballard Link Extension).

Table 3-1. Regional Transit System Ridership

Measure	Existing Ridership
Total Daily Transit Trips	467,000
Total Daily Transit Boardings	604,000
Total Daily Systemwide Link Boardings	72,000

Note: Transit ridership modeled using the Sound Transit Incremental Ridership Model.

3.2 West Seattle Link Extension

3.2.1 Affected Environment

3.2.1.1 Transit Service and Facilities

The bulk of existing transit service in the West Seattle Link Extension project corridor is by Metro buses, although Sound Transit regional express bus and Sound Transit Link light rail services run through the SODO industrial area into Downtown Seattle. Approximately 100 routes operate within the West Seattle Link Extension study area; of those, the 21 routes that most directly serve the core of West Seattle were selected to represent the project corridor (Table 3-2), and the following discussion and analysis describes those routes. The project corridor is also served by King County Water Taxi, among other transit service providers.

All-day service between downtown and West Seattle is provided by the RapidRide C Line, Route 21, Route 120 (future RapidRide H Line, which is expected to open in 2022), and Route 125. The RapidRide C Line runs from South Lake Union, through downtown, across the West Seattle Bridge and south through West Seattle by California Avenue Southwest and Fauntleroy Way Southwest, terminating at Westwood Village. Route 120 provides frequent service runs from downtown across the West Seattle Bridge and south through the Delridge neighborhood by Delridge Way Southwest, continuing on to Westwood Village, White Center, and Burien. West Seattle is also served by Route 21, which provides service along 35th Avenue Southeast, connecting downtown to Westwood Village by West Seattle with frequent service (15-minute headways). From SODO, multiple routes along the SODO Busway provide frequent service south to locations like 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 Seattle-Tacoma International Airport and the Angle Lake Station.

Table 3-2. West Seattle Link Extension Existing Key Transit Routes

Route	Service Period	Service Type	Average P.M. Peak Period Headway	Service Area
21	Peak	Frequent	15	Westwood Village to Downtown Seattle
22	All-Day	Local	60	Alaska Junction to Arbor Heights
37	Peak	Express	60	Alaska Junction to Alki to Downtown Seattle
50	All-Day	Local	20	Othello Station to SODO to Alki
55	Peak	Express	22	Admiral District to Alaska Junction to Downtown Seattle
56	Peak	Express	30	Alaska Junction/Alki to Admiral District to Downtown Seattle
57	Peak	Express	48	Alaska Junction/Alki to Admiral District to Downtown Seattle
101	All-Day	Frequent	13	Renton Transit Center to Downtown Seattle
102	Peak	Express	20	Fairwood to Downtown Seattle
116	Peak	Express	34	Fauntleroy Ferry to Downtown Seattle
118	Peak	Express	48	Fauntleroy Ferry to Downtown Seattle
119	Peak	Express	60	Tahlequah Ferry to Vashon Ferry
120	All-Day	Frequent	9	Burien Transit Center to Westwood Village to Downtown Seattle
124	All-Day	Frequent	14	Tukwila International Boulevard Link Station to Downtown Seattle
125	All-Day	Express	20	Westwood Village to South Seattle College to Downtown Seattle
128	All-Day	Local	20	Southcenter to Admiral District
131	All-Day	Local	30	Burien Transit Center to Highland Park to Downtown Seattle
132	All-Day	Local	27	Burien Transit Center to South Park to Downtown Seattle
150	All-Day	Express	17	Kent Station to Southcenter to Downtown Seattle
177	Peak	Express	27	South Federal Way Park-and-ride to Downtown Seattle
178	Peak	Express	30	South Federal Way Park-and-ride to Downtown Seattle

Route	Service Period	Service Type	Average P.M. Peak Period Headway	Service Area
C Line	All-Day	RapidRide	6	Westwood Village to South Lake Union
Link	All-Day	Rail	6	Seattle-Tacoma International Airport to Seattle

Note: METRO CONNECTS defines frequent service as all-day with headways of 15 minutes or less. RapidRide is Metro's bus rapid transit service that has higher frequencies, transit speed improvements, and enhanced stations. Express service includes limited-stop service to major destinations that can be peak-only or all-day. Local service includes all other all-day service.

Peak period-only bus services connect various portions of West Seattle and Vashon Island to downtown.

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 light rail and buses, while 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. 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 and Spokane park-and-ride under the Spokane Street viaduct. Combined, these park-and-ride lots have 80 spaces, although the 2019 utilization data from Metro indicated light use of both lots (less than 15 vehicles parked on a typical weekday).

3.2.1.2 Transit Travel Times

There are numerous bus routes within the project corridor, but the RapidRide C Line follows a similar path for a downtown-to-West Seattle trip that could be taken on light rail with the project in place (although it 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 about 50 percent longer than during the off-peak period (Table 3-3). Due to congestion and other factors that impact reliability on the route (see Section 3.2.1.3), transit travel times can vary substantially from this average.

Table 3-3. Existing Transit Travel Times on RapidRide C Line (P.M. Peak Hour) — West Seattle Link Extension

Trip	Direction	Existing P.M. Peak (minutes)	Existing Unconstrained/ Off-Peak (minutes)	Additional Travel Time due to Congestion (minutes)	Additional Travel Time due to congestion (%)
3rd Avenue and Pike Street (Westlake Station) to Fauntleroy Way Southwest and Southwest Alaska Street	Outbound	22	15	+7	+47%
Fauntleroy Way Southwest and Southwest Alaska Street to 3rd Avenue and Pike Street (Westlake Station) (inbound)	Inbound	19	15	+4	+27%

Source: Metro automated vehicle location data (2019).

3.2.1.3 Transit Levels of Service

The performance of existing transit service along the project corridor was evaluated using L.O.S. measures for frequency, span of service, reliability, and passenger load. These measures were adapted from the *Transit Capacity and Quality of Service Manual*, third edition (Transportation Research Board of the National Academies 2013), and more information about how they were applied can be found in Attachment N.1B, Existing and Future Transit Routes and Level of Service.

Routes were analyzed at two screenline locations along the new alignment: the West Seattle Bridge and north of South Lander Street in SODO (for maps, see Figure 1-5 and Figure 1-4).

Frequency

Frequency L.O.S. is a transit service rating based on how frequently a bus or train stops at a given location (also known as headway). The better (shorter) the transit headway, the less time a rider has to wait between transit arrivals, and therefore the better the frequency L.O.S. Transit routes that have headways of less than 10 minutes are rated L.O.S. A, whereas headways longer than 60 minutes are rated L.O.S. F.

The RapidRide C Line generally follows the path of the project between West Seattle and Downtown Seattle and operates with peak headways of 6 minutes (L.O.S. A). Frequency L.O.S. and ridership are correlated, with high-ridership routes having shorter headways and lower-ridership routes having longer headways; for example, the C Line, Routes 21, and 120, all high-ridership routes that parallel sections of the new alignment, 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.

Table 3-4 shows the existing peak period headways and corresponding frequency L.O.S. for the transit routes that cross both screenlines.

Table 3-4. Existing Bus Service Frequency (P.M. Peak) – West Seattle Link Extension

Screenline Location	Headway (minutes)	Level of Service
West Seattle Bridge	31	D
North of South Lander Street	27	C

Span

Span L.O.S. is a transit service rating based on the number of hours per day a transit service operates. The longer that transit service is provided throughout the day, the more people and types of trips it can serve, and therefore a longer span has a better L.O.S. L.O.S. A reflects service with a span greater than 18 hours, and L.O.S. D or worse indicates service with a span of 11 hours or less. For the complete list of span L.O.S. thresholds, see Attachment N.1B.

Routes are typically categorized as all-day or peak-only. All-day routes have the longest span, running in the weekday a.m. and p.m. peaks, as well as during the midday, evening, and often late-night periods. All-day routes serve the widest variety of trip types and usually also run on weekends. Peak-only routes have shorter spans, because they are structured to accommodate weekday commuter trips and generally lack midday and evening service. They are also less likely to run on the weekends. Table 3-2 notes these service types for the select routes operating in the West Seattle Link Extension study area.

All-day routes crossing the West Seattle Bridge screenline include the RapidRide C Line and Routes 21, 50, 120, 125, and 118/119; these routes run 17 to 24 hours a day, though not necessarily always at high frequencies. The span of peak-only routes ranges between 3 and 8 hours on weekdays. On weekends, most of the all-day routes operate at similar span levels of service as they do on weekdays, with the exception of Route 118/119, which decreases from a weekday span of 17 hours (L.O.S. B) to 9 hours of service on the weekends (L.O.S. D). The peak-only routes do not operate on the weekends.

All-day routes at the north of South Lander Street screenline include Routes 21, 101, 118/119, 120, 124, 125, 131, 132, and 150, the RapidRide C Line, and Link light rail. Eight peak-only routes cross the screenline, with spans between 5 and 8 hours per weekday. As at the West Seattle Bridge screenline, the all-day routes operate with the same or similar spans on the weekend (with the exception of Route 118/119), and peak-only routes do not operate on weekends.

Table 3-5 shows the existing average span of service L.O.S. for the transit routes that cross both screenline locations.

Table 3-5. Existing Bus Span of Service – West Seattle Link Extension

Screenline Location	Average Span of Service (hours)	Level of Service
West Seattle Bridge	17	B
North of South Lander Street	15	B

Reliability

Reliability L.O.S. is a transit service rating based on the consistency of a transit line's arrival time. Reliable service is preferred because it provides travel time certainty, minimizes passenger waiting, and maximizes the efficiency of the system by evenly loading transit vehicles. Reliability is rated on a scale from A to F, with higher letter grades indicating better on-time performance. Ratings of L.O.S. E or F indicate unreliable service, in which even spacing between buses cannot be maintained. This causes excessive wait times and crowded buses, making the service less appealing for users.

Peak period reliability for bus routes[1] in the project corridor is generally poor in the a.m. and p.m. peaks (L.O.S. D through F) in both the inbound and outbound directions. The buses are routed on congested streets for the majority of their routes (Table 3-6). 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 new project alignment, operates at L.O.S. E. In comparison, existing light rail service within the region has a high reliability (L.O.S. A) because it operates in exclusive right-of-way.

Detailed performance analysis by route can be found in Attachment N.1B, Existing and Future Transit Routes and Levels of Service.

[1] Because Link light rail runs entirely in its own right-of-way and has little variation in its reliability, it was omitted to highlight the performance of the bus service in the corridor that would be served by the project.

Table 3-6. Existing Bus Service Reliability (P.M. Peak Period) – West Seattle Link Extension

Screenline Location	Direction	P.M. Peak Period Level of Service	A.M. Peak Period Level of Service
West Seattle Bridge	Inbound (east)	E	D
West Seattle Bridge	Outbound (west)	E	E
North of South Lander Street	Inbound (north)	E	E
North of South Lander Street	Outbound (south)	F	E

Note: P.M. peak period is 3 p.m. to 7 p.m.

Passenger Load

Passenger load L.O.S. measures the physical comfort of passengers on a bus or train during periods of peak demand by comparing the number of passengers with the number of seats, for buses, or square feet of standing area, for light rail vehicles. Passenger load of L.O.S. A indicates ample room and seat availability for passengers and their personal items. A passenger load of L.O.S. D or worse indicates standing room only to overcrowding. In addition to the discomfort it can cause, overcrowding results in longer dwell times at stops because of extended and inefficient boarding and alighting, which worsens travel time and service reliability, or stops being passed by if the bus is completely full. For passenger load L.O.S. thresholds, see Attachment N.1B.

The values in Table 3-7 and Table 3-8 represent an average of total passenger demand and transit vehicle supply across all routes at that location. On average, the bus load factors at the screenline locations are good. 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 conditions during the peak periods. For detailed, route-by-route values, see Attachment N.1B.

Table 3-7. Existing Transit Passenger Load Level of Service (A.M. Peak) – West Seattle Link Extension

Screenline Location	Direction	Bus Average Load Factor	Bus L.O.S.	Link Light Rail Average Standing Passenger Space (square feet per person)	Link Light Rail L.O.S.
West Seattle Bridge	Inbound	0.86	C	Not applicable	Not applicable
West Seattle Bridge	Outbound	0.16	A	Not applicable	Not applicable
North of South Lander Street	Inbound	0.70	B	11	A
North of South Lander Street	Outbound	0.33	A	14	A

Note: A.M. peak period is 5 a.m. to 9 a.m.

Table 3-8. Existing Transit Passenger Load Level of Service (P.M. Peak) – West Seattle Link Extension

Screenline Location	Direction	Bus Average Load Factor	Bus L.O.S.	Link Light Rail Average Standing Passenger Space (square feet per person)	Link Light Rail L.O.S.
West Seattle Bridge	Inbound	0.29	A	Not applicable	Not applicable
West Seattle Bridge	Outbound	0.76	C	Not applicable	Not applicable
North of South Lander Street	Inbound	0.32	A	6.6	C
North of South Lander Street	Outbound	0.68	B	7.5	C

Note: P.M. peak period is 3 p.m. to 7 p.m.

3.2.2 Environmental Impacts

The West Seattle Link Extension transit system was assessed for 2032 and 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 are also assessed.

3.2.2.1 No Build Alternative

The No Build Alternative assumes that neither the West Seattle nor Ballard Link extensions are constructed, but other Sound Transit system expansion projects are operating. In 2032, this would include the following:

- Lynnwood Link Extension.
- Northgate Link Extension.
- East Link Extension.
- Downtown Redmond Link Extension.
- Federal Way Link Extension.
- Tacoma Dome Link Extension.
- Hilltop Tacoma Link Extension.

By 2042, the following projects are assumed to also have been completed:

- Everett Link Extension.
- Tacoma Community College Tacoma Link Extension.

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, provided as Attachment N.1C. The 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. Metro will continue to update the bus network as part of METRO CONNECTS in coordination with agency partners as implementation progresses. The Transit Service Integration technical 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 West Seattle 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 Section 2.2.2.1, No Build Alternative, in Chapter 2, Regional Context and Travel.

3.2.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All Alternatives

All alternatives will increase transit ridership in the project area and region. Bus service will be restructured to integrate with Link, removing or truncating some lines but generally replacing them with reliable, high-frequency rail service. Those bus service hours savings would be redeployed in accordance with Metro's service guidelines. Transit travel times will be reduced along the project corridor when compared to surface bus routes, and transit L.O.S. for frequency, reliability, span of service, and passenger load will be improved or remain similar to conditions under the No Build Alternative.

Transit Service and Facilities

This section describes the transit services and facilities in 2032 and 2042 under the Build Alternatives.

<u>Service</u>

With the 2032 Build Alternative, the West Seattle Link Extension is planned to operate between Alaska Junction and the SODO Station, also serving the Avalon and Delridge stations. This new light rail connection would require a transfer at SODO for passengers traveling between West Seattle and Downtown Seattle. Under the 2032 Build Alternatives, when the initial segment of West Seattle Link light rail is operational, bus service is expected to continue between the West Seattle and Downtown Seattle areas, similar to existing conditions, to avoid multiple transfers for people traveling between West Seattle and Downtown Seattle.

By year 2042, with both West Seattle and Ballard Link light rail service in operation, most RapidRide, frequent, and express routes from Burien, White Center, High Point, and other areas south of the Alaska Junction would end at the Alaska Junction, while local routes would connect to all three West Seattle stations.

Route changes for the 2042 Build Alternatives include but are not limited to the following; additional detail can be found in Attachment N.1C, Transit Service Integration Technical Memorandum:

- METRO CONNECTS Route 1041 (similar to Route 120/RapidRide H Line) would follow the current pathway from Burien to Delridge Station, then continue on to serve the Admiral Junction area. Unlike the no build condition, this route would no longer continue to Downtown Seattle.
- METRO CONNECTS Route 2021 (similar to Route 21 without traveling downtown) would provide a connection between Kent Station and northern West Seattle by Burien and White Center.
- METRO CONNECTS Route 3034 (similar to Routes 50 and 57) would provide east-west connectivity between West Seattle and Mount Baker Station instead of serving Downtown Seattle.

- METRO CONNECTS Route 2003 (similar to the RapidRide C Line) would continue to serve the Fauntleroy Ferry terminal but instead would provide express service to South Lake Union by the State Route 99 tunnel, bypassing Downtown Seattle.

Under the West Seattle and Ballard Link Extensions M.O.S. in year 2042 (see Chapter 2), bus services that would otherwise terminate at the West Seattle Junction Station would be revised to serve the Delridge Station. This includes the following routes:

- METRO CONNECTS Route 1043 (similar to Route 128) would serve the Alaska Junction area, but then continue on to the Delridge Station via 35th Avenue Southwest to Southwest Avalon Way to Southwest Yancy Street.
- METRO CONNECTS Route 2003 (similar to the RapidRide C Line) would serve the Fauntleroy Ferry terminal and provide express service to South Lake Union by the State Route 99 tunnel, bypassing Downtown Seattle. This route would serve the Delridge Station via Southwest Avalon Way to Southwest Yancy Street.
- METRO CONNECTS Route 2021 (similar to Route 21) would no longer serve Admiral Junction via Southwest Hanford Street, as described in METRO CONNECTS, but would access the Delridge Station via 35th Avenue Southwest to Southwest Avalon Way to Southwest Yancy Southwest before continuing on to Downtown Seattle. This extension to Downtown Seattle is a substantial departure from the routing in the full Build Alternatives, but it provides a single-seat ride for West Seattle residents into downtown as an option to transferring to Link at the Delridge Station.
- METRO CONNECTS Route 3400 (similar to Routes 37 and 22) would be extended from Alaska Junction to the Delridge Station via 35th Avenue Southwest to Southwest Avalon Way to Southwest Yancy Street.

To accommodate this change in routing, additional active bay and layover spaces would be needed at the Delridge Station. Refer to Attachment N.1C for more information.

<u>Facilities</u>

With the 2042 Build Alternatives, bus stops and select layover areas would be relocated to serve new or revised transit routes. This includes waiting areas for riders transferring to buses. The facility design is consistent between the 2042 and 2032 build conditions for the full build and interim conditions and M.O.S.

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 are proposed to be generally adjacent to the light rail stations to provide safe and efficient transfer access. Station area layover needs and potential impacts were assessed collaboratively by Sound Transit and Metro and are also summarized in this section. In general, layover space would be allocated near the stations where bus routes terminate, and routing to access the layover spaces would be kept as short as possible and on streets that can accommodate bus movements. For more details, see Attachment N.1C, Transit Service Integration Technical Memorandum, and the conceptual design drawings in Appendix J of the Draft Environmental Impact Statement.

The information included in this section is based on the design of the project up through when the environmental analysis began in 2019. Sound Transit and Metro will continue to coordinate to refine the design of station areas, bus stops, and layover accommodations as the project advances.

Key facilities affected include the following:

- SODO Station – For Preferred Alternative SODO-1a, bus stops would be along both sides of 4th Avenue South for north-south routes and along both sides of South Lander Street just west of 6th Avenue South for east-west routes. For Option SODO-1b, the bus stops would have a similar configuration to Preferred Alternative SODO-1a except that the South Lander Street bus stops would be relocated to be midway between 4th Avenue South and 6th Avenue South. For Alternative SODO-2, north-south buses would stop on 4th Avenue South (with the option to stop along the SODO Busway, if Metro chooses to operate buses along that pathway) and on South Lander Street, just west of the SODO Busway. For all alternatives, an off-street loop would also accommodate bus layover spaces, pick-up/drop-off spots, and paratransit access. For Preferred Alternative SODO-1a and Alternative SODO-2, the loop is east of the station, accessed from 6th Avenue South, although Preferred Alternative SODO-1a also has a cul-de-sac for pick-up and drop-off and pedestrian and bicycle access that accesses 4th Avenue South opposite of South Stacy Street. For Option SODO-1b, the loop is west of the station and accessed from 4th Avenue South.
- Delridge Station – For Preferred Alternative DEL-1a and Option DEL-1b, bus stops would be located immediately adjacent to the station entrances. This would require northbound buses on Delridge Way Southwest to divert to 25th Avenue Southwest to access the station. Preferred Alternative DEL-2a* and Option DEL-2b* would have a similar configuration, but northbound buses would divert to 26th Avenue Southwest and then Southwest Dakota Street to provide a bus stop immediately adjacent to the station. Preferred Alternative DEL-2a* and Option DEL-2b* would also require a new transit or traffic signal at Southwest Dakota Street and Delridge Way Southwest, which would need City of Seattle approval. For Alternative DEL-3 and Alternative DEL-4*, the station would straddle Delridge Way Southwest and there would be bus stops on both sides of Delridge Way Southwest, requiring no route deviation. For Alternative DEL-5 and Alternative DEL-6*, northbound and southbound buses are assumed to deviate to Southwest Andover Street with bus stops on Southwest Andover Street to eliminate the need for riders to cross Delridge Way Southwest. There is no layover assumed near the Delridge Station.
- Avalon Station (all alternatives) – Bus stops would be on Southwest Avalon Way and 35th Avenue Southwest, adjacent to the station. There is no layover identified at the Avalon Station, as no routes terminate at the station. Paratransit would be located immediately adjacent to a station entrance along Southwest Genesee Street for all alternatives. The pick-up/drop-off location is located north and south of the station on Southwest Genesee Street.
- Alaska Junction – For Preferred Alternative WSJ-1, bus stops would be along Southwest Alaska Street between 42nd Avenue Southwest and 41st Avenue Southwest. Layover spaces will be accommodated on-street near the station.

  The bus stop locations for the other alternatives—Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5*—are all similar to Preferred Alternative WSJ-1, being along either side of Southwest Alaska Street. Layover areas will be accommodated on-street near the station. Paratransit is identified along Southwest Alaska Street, adjacent to the bus stops for all Build Alternatives. Pick-up and drop-off is located adjacent to the station on lower-volume north-south streets like 38th Avenue, 40th Avenue, and 41st Avenue Southwest.

In addition to changes around the station areas, the Build Alternatives would modify the SODO Busway in the 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. For Alternative SODO-2, the busway would remain open to buses after construction.

The SODO Busway closure would affect up to four Metro routes. As documented in METRO CONNECTS, Metro eventually plans to phase active routes away from the SODO Busway as the light rail system expands, and routes that currently use this facility are truncated at rail stations outside Downtown Seattle (Metro 2016). However, this closure is likely to impact non-revenue routes coming from the south (30 to 50 buses in the peak hour in 2040), which would use adjacent streets (i.e., 4th Avenue South or 6th Avenue South) to access the Metro Ryerson and Atlantic/Central bus bases. Buses would likely experience increased travel times during the peak hour on 4th Avenue South compared to use of the SODO Busway. These increased travel times are consistent with intersection delay results presented in Chapter 4 of this report. The SODO Busway also has numerous existing layover areas that would be eliminated by a permanent closure.

Removal of the SODO Busway for Alternative SODO-1a and Option SODO-1b 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 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.

<u>Transfer Environment</u>

Transfers in West Seattle would increase for the 2042 Build Alternatives as some bus passengers originating in West Seattle, White Center, and Burien would transfer to light rail, particularly if they are destined for Downtown Seattle or other points along the light rail network. For the 2032 No Build Alternative and Build Alternatives, there would be fewer bus-to-rail transfers as bus routes from points in West Seattle and southward continue to serve Downtown Seattle. However, as noted in the Transit Facilities section, the station designs would be the same for 2042 and 2032 build conditions.

There would be more transfers with the Build Alternatives, and the transfer environment would be enhanced to provide for safe and efficient movement between buses and light rail. For many alternatives, bus stops would be immediately adjacent to light rail station entrances. Where a street crossing is required, it would be at an existing, new, or enhanced crossing.

- SODO Station – The SODO Station would be the first opportunity for West Seattle passengers to transfer to the Tacoma to Ballard Link light rail line. The light rail stations would be built side-by-side, providing a direct transfer environment though transfer movement patterns would be different between the alternatives due to the varying profiles. For all alternatives, bus transfers would require crossing either 4th Avenue South or South Lander Street, although there are existing or planned signalized crossings near each of the bus stop pairs.
- Delridge Station – The Delridge Station is a major transfer point for bus-to-rail transfers, with about 90 percent of all riders transferring between bus and rail at this station, resulting in more than 5,000 projected daily transfer boardings. For all the station alternatives except Alternative DEL-5 and Alternative DEL-6*, bus-to-rail transfers would occur without the need to cross a street. For Alternative DEL-5 and Alternative DEL-6*, passengers to and from northbound Delridge Way Southwest buses would need to cross Southwest Andover Street.
- Avalon Station – The Avalon Station is not expected to be a major transfer point between buses and trains (fewer than 500 daily transfer boardings). Those transfers that do occur generally would require the crossing of either 35th Avenue Southwest or Southwest Avalon

Way for the inbound or outbound trip (there are very few active bus routes on Fauntleroy Way Southwest that would interact with the station).

- Alaska Junction Station – Like the Delridge Station, Alaska Junction is a notable transfer point between buses and rail with more than 3,500 daily transfer boardings. For Preferred Alternative WSJ-2, bus stops would be adjacent to the station on Southwest Alaska Street and Fauntleroy Way Southwest. Most transfers would occur from the stops immediately adjacent to the station along Southwest Alaska Street and would not require crossing any streets. Crossing one to two streets would be required for bus routes along Fauntleroy Way Southwest, but these routes have lower transfer volumes. For Preferred Alternative WSJ-1, the primary bus stops serving the station are on Southwest Alaska Street between Southwest Fauntleroy Way and 38th Avenue Southwest, which would require a crossing of the street for access and egress to westbound buses. For the other station options—Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5*—bus stops and station entrances are located on both sides of Southwest Alaska Street between 41st and 40th Avenue Southwest. This design would not require any street crossings to facilitate transfers.

Transit Travel Time

Table 3-9 presents travel times for a representative trip between the Westlake and Alaska Junction stations with and without the project for all alternatives. Travel times are similar for both directions during the a.m. and p.m. peak periods due to light rail operating within its own right-of-way. In 2042, the project would cut travel times by approximately half when compared to forecasted bus travel times. Year 2032 conditions would be similar, with the addition of a transfer at the SODO Station which would add between 2 and 5 minutes to the trip.

Table 3-9. 2042 Transit Travel Times (P.M. Peak Period) – West Seattle Link Extension

Trip	2042 No Build – Bus (minutes)	2042 Build Alternatives (minutes)	Travel Time Change (minutes)	Travel Time Change (%)
Westlake Station to Alaska Junction Station (outbound)	30	16	-14	-47%
Alaska Junction Station to Westlake Station (inbound)	30	16	-14	-47%

Notes:

Modeling for the 2042 alternatives performed using Sound Transit ridership and operational models.

P.M. peak period is 3 p.m. to 7 p.m.

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 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.

As noted in the Transit Service and Facilities section, the future Route 1041 (or H Line) would be truncated and no longer serve Downtown Seattle under the full build in 2042. This would necessitate a transfer for riders traveling between communities to the south of West Seattle and points along the West Seattle Link Extension that would otherwise be directly served by the H Line under the no build condition. However, the project would provide considerable time savings for these riders despite the new transfer. For example, a ride from Southwest 116th Street and Ambaum Boulevard Southwest to the Westlake Station would take 16 to 18 fewer minutes with the project in place, including the transfer at the Delridge Station, when compared to a trip on the H Line under the no build condition.

Ridership

Ridership forecasts were produced using the Sound Transit Incremental Ridership Model. Forecasts were conducted for the alternatives at the system, project, and segment levels to estimate how ridership would differ between alternatives. In some instances, a single forecasted value is presented for all or a subset of the alternatives, when forecasts for individual alternatives would not notably differ. This is the case for the system and project-level forecasts, and for some of the segment-level forecasts.

For the West Seattle Link Extension M.O.S., 2042 ridership forecasts are provided for the project as a whole and for the Delridge Station, its western terminus. The station forecasts in the other segments were lower under the M.O.S. than under the full build and therefore were not included.

<u>Systemwide Ridership</u>

Transit ridership was forecasted for the Sound Transit service area in King, Pierce, and Snohomish counties with and without the project in 2032 and 2042 using the Sound Transit Incremental Ridership Model. Table 3-10 presents the total number of forecasted trips for these time periods. In this context, a transit trip is a journey by one person from an origin to a destination that includes at least one leg on bus, rail, or another transit mode. A trip may include more than one boarding.

Table 3-10. 2032 and 2042 Transit Ridership for the Sound Transit Service Area (Daily Trips)

Measure	2032 No Build Alternative Ridership	2032 Build Alternatives SODO Interim Terminus Ridership	2042 No Build Alternative Ridership	2042 Build Alternatives Ridership
Total Daily Transit Trips	631,000	632,000	746,000	766,000
Net New Daily Transit Trips with WSBLE	Not applicable	1,000	Not applicable	20,000

Source: Sound Transit Incremental Ridership Model.

<u>West Seattle Link Extension Project Ridership</u>

Upon opening in 2032, the West Seattle Link Extension would temporarily require riders to transfer at the SODO Station to continue north on Link light rail, while bus service would continue to operate direct service between West Seattle and downtown. Under this condition, weekday ridership is projected at 5,400 trips. In 2042, the West Seattle service line would continue through Downtown Seattle and on to the north and the Ballard Link Extension would be in operation. Consequently, ridership would increase to between 25,000 and 27,000 daily trips, depending on the underlying land use, economic, and bus service level assumptions. This increase includes all trips to or from any one of the project stations between and including the new SODO and West Seattle Junction stations.

Under the M.O.S., when the project would terminate at the Delridge Station and not serve the West Seattle Junction Segment, ridership is forecasted to be 22,000 trips.

SODO Segment Ridership

The SODO Segment currently has the existing SODO light rail station, and a second station is proposed to be constructed next to it as part of the West Seattle Link Extension. In 2032, the new SODO Station would be the interim terminus of the new service line operating between SODO and West Seattle. Ridership at the new SODO Station would be about half that of the existing station, and most of these trips would be rail-to-rail transfers (Table 3-11).

Table 3-11. 2032 SODO Segment Station Ridership (Daily Boardings)

Station	Ridership No Build Alternative	Ridership Build Alternatives
SODO (new station)	Not applicable	2,600
SODO (existing station)	3,400	5,400
Segment Total	**3,400**	**8,000**

In 2042, light rail boardings in the SODO Segment are expected to increase to over 14,000 daily riders as a result of the West Seattle Link Extension (Table 3-12). SODO Station is the first stop where Tacoma riders could transfer to reach the Stadium Station, and it is also the first opportunity for West Seattle riders to transfer to the Ballard-to-Tacoma line. Because all the station alternatives are relatively close to each other and have similar transit integration profiles, boardings are forecasted to be similar for all alternatives.

Table 3-12. 2042 SODO Segment Station Ridership (Daily Boardings)

Station	Ridership No Build Alternative	Ridership Build Alternatives [a]
SODO (new station)	Not applicable	7,400
SODO (existing station)	3,600	7,200
Segment Total	**3,600**	**14,600**

[a] Includes Preferred Alternative SODO-1a, Option SODO-1b, and Alternative SODO-2.

Duwamish Segment Ridership

The Duwamish Segment does not include any stations.

Delridge Segment Ridership

For 2032, forecasts for the Delridge Station show limited ridership (600 boardings per day) due to the continuation of direct Metro bus service between West Seattle and Downtown Seattle.

In 2042, light rail service from West Seattle would be extended through downtown and north to Everett, along with connections to the Ballard Extension. The number of boardings inn the Delridge Segment is expected to increase substantially as a result (Table 3-13). Alternative DEL-5 and Alternative DEL-6* may have a slightly smaller ridership due to the difference in land uses within walking distance of the stations.

Under the M.O.S., the Delridge Station would have close to twice as many riders compared to the full build. This increase in ridership is mainly a result of the additional bus service connections, creating more rail-to-bus activity at this M.O.S. terminus station.

Table 3-13. 2042 Delridge Segment Station Ridership (Daily Boardings)

Station	Ridership All Build Alternatives Except Andover Street Station Alternatives (DEL-5 and DEL-6*)	Ridership Andover Street Station Alternatives (DEL-5 and DEL-6*)
Delridge	5,800	5,600
Delridge (M.O.S.)	11,100	10,900

West Seattle Junction Segment Ridership

In 2032, ridership for the West Seattle Junction Segment (Table 3-14) would be focused at the Alaska Junction terminus station, which has a high number of nearby potential riders and several bus routes connecting to the station. Ridership in this segment is expected to be similar between all Build Alternatives.

Table 3-14. 2032 West Seattle Junction Segment Station Ridership (Daily Boardings)

Station	Ridership All Build Alternatives
Avalon	400
Alaska Junction	1,800
Segment Total	**2,200**

Daily boardings are expected to grow substantially between 2032 and 2042 (Table 3-15) as the West Seattle light rail service line is completed. In 2042, the number of boardings at the Avalon and Alaska Junction stations is expected to be relatively consistent between the segment alternatives (see Table 3-15). 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. Forecast ridership at that station varies slightly between alternatives due to land use density differences around the respective station locations.

Table 3-15. 2042 West Seattle Junction Segment Station Ridership (Daily Boardings)

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

Transit Levels of Service

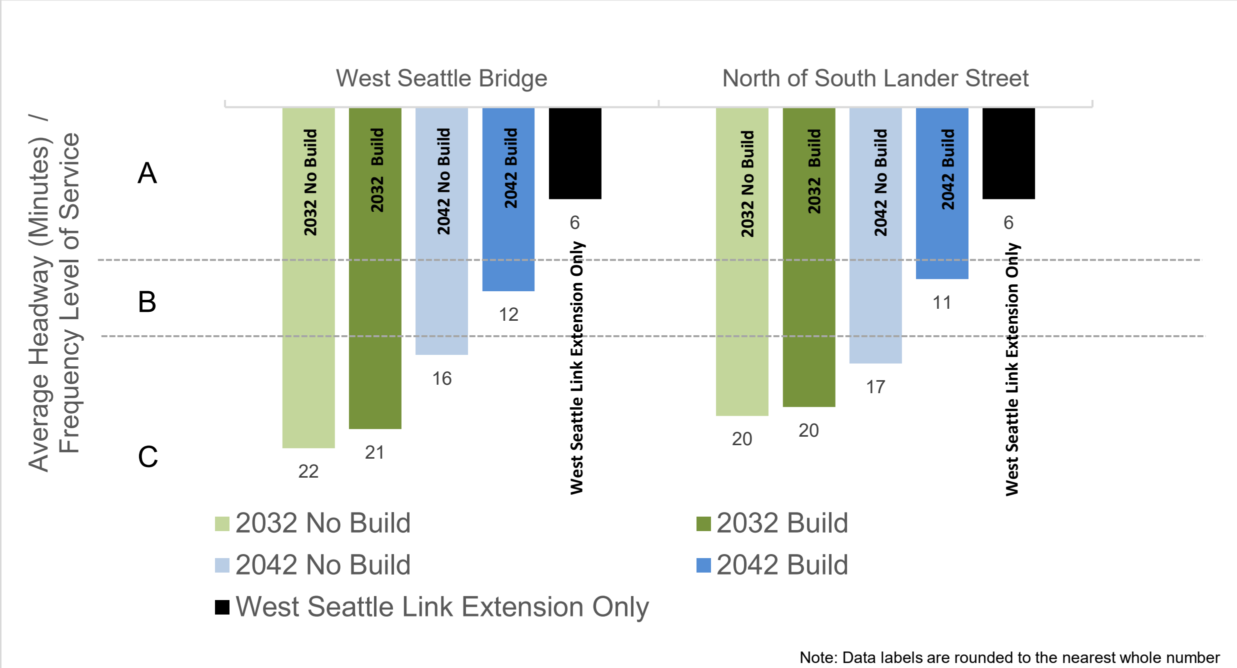
Frequency

Figure 3-1 presents the average frequency of transit routes at analysis screenlines in the study area during the p.m. peak period (3 p.m. to 7 p.m.).

In 2032, when light rail service begins between the Alaska Junction Station and the interim terminus in SODO, average route frequency is expected to remain similar under the No Build

Alternative and Build Alternatives because Metro would continue providing frequent bus service between West Seattle and Downtown Seattle.

Figure 3-1. Average Transit Route Frequency L.O.S. (2042) – West Seattle Link Extension



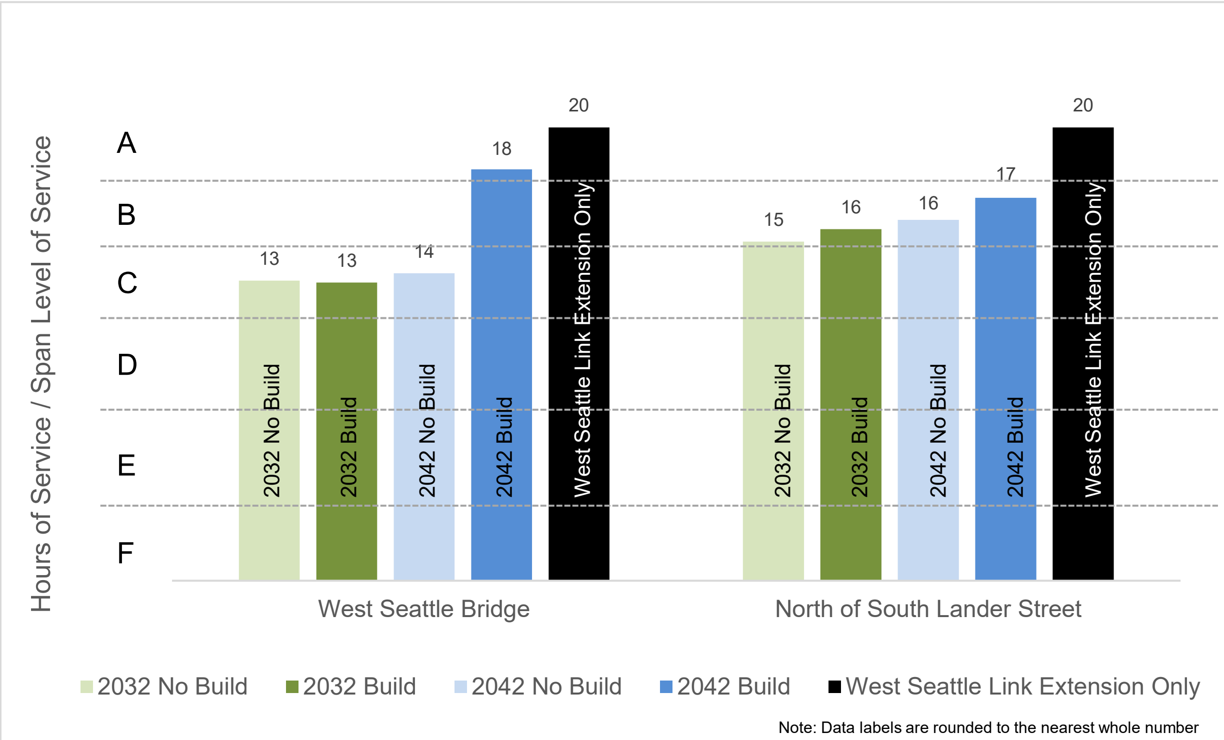
In 2042, the West Seattle Link Extension would provide direct, high-frequency light rail service from West Seattle to Downtown Seattle and beyond, with service running at 6-minute headways during the peak periods. This is equivalent to forecasted peak bus service frequency for the RapidRide C Line under the No Build Alternative. With the project in place, all riders crossing the West Seattle Bridge screenline by rail or bus would experience frequency L.O.S. A or B, and the average frequency of all routes crossing the West Seattle Bridge screenline would improve by about 20 percent (Figure 3-1). All riders at the north of South Lander Street screenline would experience L.O.S. A or B with the project, and the average frequency of all routes crossing the screenline would improve by about 30 percent.

Span

Under the 2032 No Build Alternative, it is assumed that a mix of short-span peak-only routes and all-day routes will operate across the West Seattle Bridge, including the RapidRide C Line, Route 125, and future RapidRide H Line (comparable to the existing Route 120). On average, these routes have a span L.O.S. of B. The Build Alternatives include the same underlying bus routes as the No Build Alternative, so the addition of the project's service line (20 hours of service per day) would have only a modest improvement on the average span (Figure 3-2).

In 2042, the average span L.O.S. would improve from L.O.S. B under the no build condition to L.O.S. A with the project at both the West Seattle Bridge and north of South Lander Street screenlines. This is due to a combination of the project itself and associated bus restructurings.

Figure 3-2. Average Transit Route Span L.O.S. (2042) – West Seattle Link Extension



Reliability

Most bus service in the project corridor would operate at L.O.S. E and F under the 2032 and 2042 No Build Alternatives due to current and expected future traffic congestion in the corridor (see Section 4.2.2). Even though bus transit speed and reliability improvements are being planned along portions of some roadways in the project corridor, the overall transit reliability is not expected to improve substantially beyond existing conditions as buses would continue to mainly operate within general traffic.

The Build Alternatives rail project would operate at reliability L.O.S. A, as the alignments are within exclusive right-of-way separated from vehicle traffic. In the 2032 interim terminus condition, passengers traveling between West Seattle and Downtown Seattle on light rail would be required to transfer at the SODO Station. While there would be a required transfer, the reliability would improve compared to the No Build Alternative because the transfer is between two frequent light rail services in dedicated rights-of-way.

Passenger Load

Under the 2032 interim terminus condition, passengers will experience good passenger load L.O.S. (Table 3-16). Because the line terminates at the SODO Station, which precedes the north of South Lander Street screenline (which is between South Lander Street and South Holgate Street), results are only presented for the West Seattle Bridge screenline. Bus riders would see a moderate improvement in crowding conditions with the project as transit passengers adjust and use the new light rail service in the project corridor.

Table 3-16. 2032 Passenger Load Level of Service (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. Everett to Tacoma Line	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	C	A
North of South Lander Street	Inbound	A	A	A	Not applicable
North of South Lander Street	Outbound	C	E	B	Not applicable

Notes:
Modeled using the Sound Transit Incremental Ridership Model.
P.M. peak period is 3 p.m. to 6:30 p.m.
[a] Inbound toward Downtown Seattle, outbound away from Downtown Seattle.

In 2042, ridership forecasts anticipate p.m. peak standing-room-only conditions for passengers traveling in the peak direction on the West Seattle Link Extension, which in this time period will continue uninterrupted from the Alaska Junction Station to Everett (Table 3-17). However, each passenger would have a comfortable amount of space to stand in, so the passenger load L.O.S. remains high. Similar to year 2032, bus passengers in year 2042 would experience an improvement in in-vehicle conditions as some transit passengers adjust and use the West Seattle Link light rail.

Table 3-17. 2042 Passenger Load Level of Service (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. Everett to Tacoma Line	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

Notes:
Source of forecasts is the Sound Transit Incremental Ridership Model.
P.M. peak period is 3 p.m. to 7 p.m.
[a] Inbound toward Downtown Seattle, outbound away from Downtown Seattle.

Construction Impacts

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.

Transit Infrastructure and Facilities Impacts

Road, lane, and sidewalk closures may require bus stop, layover, and comfort station relocations, bus service detours, or both, during construction. Sound Transit would maintain access to existing bus stops and layovers/comfort stations to the extent feasible and coordinate with Metro and other transit providers to minimize impacts and disruptions (e.g., identifying new bus stops or layovers/comfort stations in a nearby location). Information (e.g., rider alerts) would be posted at transit stops before construction at these locations. Bus detours could also result in pavement damage to streets that were not built to accommodate bus or heavy vehicle traffic.

Sidewalk closures would also affect pedestrians accessing transit. Sound Transit would maintain pedestrian access, where feasible, through construction areas, such as providing dedicated walkways or alternative pathways around the construction area. Sound Transit would also notify the public of any closures as appropriate.

Roadway Closures

<u>Impacts Common to All Alternatives</u>

Detailed descriptions of the roadway closures during construction, including extents and closure durations, are provided in Section 4.2.2.3, Construction Impacts. During construction, there will be temporary impacts to bus pathways, bus travel times, sidewalks and bike lanes that access transit, and layover areas. For areas with construction within the roadway right of-way, streets may operate with fewer lanes or be temporarily closed, affecting roadway operations including bus service along those streets.

Durations of roadway construction closures would vary from nights and weekends to multi-year closures. At locations where roadways experience full closure, bus routes may need to use alternate pathways and temporary bus facilities may need to be installed. Bus routes could also face delays from increased traffic congestion. 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.

Specific transit services and/or facilities that are expected to be affected by construction for at least 1 year are described in the following segment-specific discussions. Key shorter-duration construction impacts to transit services and facilities (lasting at least 6 months) are also highlighted where there are substantial differences between alternatives or where many transit routes/transit trips are affected, but the analysis does not consider every short-duration transit impact from construction. See Attachment N.1E, Construction-Related Roadway Modifications, for a more complete list of the roadway construction closures expected for each alternative and design option.

<u>SODO Segment</u>

Under Preferred Alternative SODO-1a and Option SODO-1b, South Lander Street between 4th Avenue South and 6th Avenue South would be closed for construction, affecting Route 50. The SODO Busway would be permanently closed to bus use with these alternatives. The Long-term Impacts section above describes the permanent effect of this closure on bus service.

Under Alternative SODO-2, South Lander Street would remain open. The SODO Busway would be closed during the duration of the West Seattle Link Extension construction period. Impacts on transit with the SODO Busway temporarily closed during construction would affect 60 to 80 peak hour Metro buses, including both revenue and non-revenue trips (Table 3-18). After this time, the SODO Busway could reopen for bus access. Temporary construction impacts on transit with the SODO Busway closure would be similar to those described in the Long-term Impacts for Preferred Alternative SODO-1a and Option SODO-1b.

Table 3-18. Key Arterial Roadway Closures Affecting Transit Routes - SODO Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]	Non-Revenue Routes Affected [b]
SODO-1a	SODO Busway	South Massachusetts Street	South Spokane Street	Full			permanent			1	4	1	11
SODO-1a	South Lander Street	4th Avenue South	6th Avenue South	Full	2 years					1	0	0	0
SODO-1b	SODO Busway	South Massachusetts Street	South Spokane Street	Full			permanent			1	4	1	11
SODO-1b	South Lander Street	4th Avenue South	6th Avenue South	Full	3 years					1	0	0	0
SODO-2	SODO Busway	South Massachusetts Street	South Spokane Street	Full			5 years			2	4	1	11

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

Most-likely affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

[b] Approximate number of routes based on 2018 routing to bases.

Duwamish Segment

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

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 (Table 3-19).

Alternative DEL-3 and Alternative DEL-4* would have the longest construction effects on Delridge Way Southwest, which could affect Metro Routes 50 and 125 and the RapidRide H Line performance.

Under Alternative DEL-5, a full closure of Avalon Way Southwest would require the rerouting of up to eight Metro routes, including Routes 21 and 55 and the RapidRide C Line.

There would be minimal effects to transit with Alternative DEL-6* because transit does not operate along Andover Street Southwest.

Table 3-19. Key Arterial Roadway Closures Affecting Transit Routes - Delridge Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
DEL-1a	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		9 months				1	0	2
DEL-1a	Southwest Genesee Street	26th Avenue Southwest	Southwest Avalon Way	Full		2 years				0	0	1
DEL-1b	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		9 months				1	0	2
DEL-1b	Southwest Genesee Street	26th Avenue Southwest	Southwest Avalon Way	Full		2 years				0	0	1
DEL-2a*	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		9 months				1	0	2
DEL-2b*	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		9 months				1	0	2
DEL-2b*	Southwest Genesee Street	26th Avenue Southwest	Southwest Avalon Way	Partial		9 months				0	0	1
DEL-3	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		3 years				1	0	2
DEL-3	Southwest Genesee Street	26th Avenue Southwest	Southwest Avalon Way	Full		2 years				0	0	1

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
DEL-4*	Delridge Way Southwest	23rd Avenue Southwest	Southwest Dakota Street	Partial		3 years				1	0	2
DEL-4	Southwest Genesee Street	26th Avenue Southwest	Southwest Avalon Way	Partial		9 months				0	0	1
DEL-5	Southwest Andover Street	26th Avenue Southwest	28th Avenue Southwest	Full	2 years					0	0	0
DEL-5	Southwest Avalon Way	Southwest Yancy Street	Southwest Genesee Street	Full			1 year			1	6	1
DEL-6*	Southwest Andover Street	26th Avenue Southwest	28th Avenue Southwest	Full	2 years					0	0	0

* 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: Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

West Seattle Junction Segment

Construction for Preferred Alternative WSJ-1 would have minimal effects on transit operations (Table 3-20).

With Preferred Alternative WSJ-2, part of Southwest Alaska Street would be closed for the duration of construction. This would require rerouting Routes 37, 50, 55, and 773 and the RapidRide C Line to bypass this closure.

Under Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b*, a section of 35th Avenue Southwest would be closed, requiring the rerouting of Routes 21 and 55. These alternatives would also partially close Fauntleroy Way Southwest. The added congestion from the lane restrictions could affect the performance of Routes 116, 118, and 119.

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 Routes 37, 50, 55, 57, and 773 and the RapidRide C Line (see Attachment N1.E, Construction-Related Roadway Modifications).

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*.

Table 3-20. Key Arterial Roadway Closures Affecting Transit Routes – West Seattle Junction Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
WSJ-2	Southwest Alaska Street	38th Avenue Southwest	Fauntleroy Way	Full			3 years			1	3	3
WSJ-3a*	35th Avenue Southwest	West Seattle Bridge	Southwest Avalon Way	Full		3 years				0	1	1
WSJ-3a*	Fauntleroy Way Southwest	West Seattle Bridge	Southwest Avalon Way	Partial		1.5 years				0	2	3
WSJ-3b*	35th Avenue Southwest	West Seattle Bridge	Southwest Avalon Way	Full		3 years				0	1	1
WSJ-3b*	Fauntleroy Way Southwest	West Seattle Bridge	Southwest Avalon Way	Partial		1.5 years				0	2	3
WSJ-4*	Fauntleroy Way Southwest	West Seattle Bridge	Southwest Avalon Way	Partial		9 months				0	2	3
WSJ-5*	35th Avenue Southwest	West Seattle Bridge	Southwest Avalon Way	Full		1 year				0	1	1
WSJ-5*	Fauntleroy Way Southwest	West Seattle Bridge	Southwest Avalon Way	Partial		1.5 years				0	2	3

* 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.

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure. Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

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

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

3.2.3 Potential Mitigation Measures

3.2.3.1 Long-Term 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 plan as described in the Transit Service and Facilities section of Section 3.2.2.2. 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 the Federal Transit Administration 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.

3.2.3.2 Construction Impacts

Sound Transit would coordinate with Metro, the City of Seattle, and the Federal Transit Administration, 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, 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 implement 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 implement temporary non-motorized facilities to maintain non-motorized access to transit. Sound Transit would also notify the public of any closures. Refer to Section 4.2.3.1 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, or 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.

3.3 Ballard Link Extension

3.3.1 Affected Environment

3.3.1.1 Transit Service and Facilities

Existing transit service for the Ballard Link Extension area is provided by local Metro buses, Sound Transit regional express buses, and Sound Transit Link light rail. The project corridor is also served by the Seattle Center Monorail, Seattle Streetcar, King County Water Taxi, and Washington State Ferries, among other transit service providers. Approximately 120 routes operate within the study area; of those, the 39 routes that most directly serve the Ballard through South Lake Union corridor were selected to represent conditions along and around the project corridor, and the following discussion and analysis describes those routes (Table 3-21).

Table 3-21. Ballard Link Extension Existing Key Transit Routes

Route	Service Period	Service Type	Average P.M. Peak Period Headway (minutes)	Service Area
1	All-Day	Express	16	Kinnear to Downtown Seattle
2	All-Day	Frequent	13	West Queen Anne to Downtown Seattle to Madrona Park
7	All-Day	Frequent	11	Prentice Street/Rainier Beach to Downtown Seattle
13	All-Day	Express	15	Seattle Pacific to Downtown Seattle to Madrona Park
14	All-Day	Express	17	Mount Baker to Downtown Seattle
15	Peak	Express	18	(Peak Hour Express) Blue Ridge to Crown Hill to Downtown Seattle
17	Peak	Express	30	(Peak Hour Express) Sunset Hill to Ballard to Downtown Seattle
18	Peak	Express	27	(Peak Hour Express) North Beach to Ballard to Downtown Seattle
19	Peak	Local	40	West Magnolia to Downtown Seattle
21	All-Day	Express	15	Westwood Village to Downtown Seattle
24	All-Day	Express	22	West Magnolia to Downtown Seattle
26	All-Day	Express	20	(Express) Northgate Transit Center to East Green Lake to Downtown Seattle
29	Peak	Express	20	Ballard to Seattle Pacific University to Queen Anne to Downtown Seattle
33	All-Day	Express	20	Discovery Park to Downtown Seattle
37	Peak	Local	60	Alaska Junction to Alki to Downtown Seattle
40	All-Day	Rapid	6	Northgate Transit Center to Ballard to Fremont to Westlake to Downtown Seattle
55	Peak	Express	22	Admiral District to Alaska Junction to Downtown Seattle
56	Peak	Express	30	Alaska Junction/Alki to Admiral District to Downtown Seattle
57	Peak	Local	48	Alaska Junction/Alki to Admiral District to Downtown Seattle

Route	Service Period	Service Type	Average P.M. Peak Period Headway (minutes)	Service Area
62	All-Day	Frequent	11	Sand Point to Green Lake to Downtown Seattle
70	All-Day	Rapid	9	University District to Eastlake to Downtown Seattle
101	All-Day	Frequent	13	Renton Transit Center to Downtown Seattle
102	Peak	Express	20	Fairwood to Downtown Seattle
116	Peak	Local	34	Fauntleroy Ferry to Downtown Seattle
118	All-Day	Local	48	Fauntleroy Ferry to Downtown Seattle
119	All-Day	Local	60	Tahlequah Ferry to Vashon Ferry
120	All-Day	Rapid	9	Burien Transit Center to Westwood Village to Downtown Seattle
124	All-Day	Frequent	14	Tukwila International Blvd Link Station to Downtown Seattle
125	All-Day	Express	20	Westwood Village to South Seattle College to Downtown Seattle
131	All-Day	Express	30	Burien Transit Center to Highland Park to Downtown Seattle
132	All-Day	Express	27	Burien Transit Center to South Park to Downtown Seattle
150	All-Day	Express	17	Kent Station to Southcenter to Downtown Seattle
177	Peak	Express	27	South Federal Way Park-and-ride to Downtown Seattle
178	Peak	Express	30	South Federal Way Park-and-ride to Downtown Seattle
190	Peak	Local	34	Redondo Heights Park-and-ride to Star Lake to Downtown Seattle
C Line	All-Day	Rapid	6	Westwood Village to South Lake Union
D Line	All-Day	Rapid	8	Crown Hill to Ballard to Seattle Center West to Downtown Seattle
E Line	All-Day	Rapid	6	Aurora Village to Downtown Seattle
Link	All-Day	Rail	6	Angle Lake/Seattle-Tacoma International Airport to University of Washington
Streetcar	All-Day	Rail	10	South Lake Union Line: Westlake to Fairview and Campus Drive First Hill Line: Capitol Hill to Pioneer Square

Note: METRO CONNECTS defines frequent service as all-day with headways of 15 minutes or less. RapidRide is Metro's bus rapid transit service that has higher frequencies, transit speed improvements, and enhanced stations. Express service includes limited-stop service to major destinations that can be peak-only or all-day. Local service includes all other all-day service.

All-day service between Ballard and Downtown Seattle along the new alignment is provided by the RapidRide D Line, which runs from Northwest 100th Street in Crown Hill to Ballard on 15th Avenue Northwest, continuing south on 15th Avenue West and Elliott Avenue West to Uptown, and then through downtown to terminate in Pioneer Square. Other frequent routes serve portions of the corridor, including Route 40, which runs between Ballard and downtown via Westlake Avenue North; Route 70, which provides connections north to the University District from South Lake Union; and the RapidRide E Line, running north from Downtown Seattle to Aurora Avenue North. Link light rail also parallels the new project alignment between the Westlake and SODO stations and provides frequent service north to the University of

Washington Station and south to Seattle-Tacoma International Airport and the Angle Lake Station.

Peak-only bus services connect many of the areas adjacent to or near the new alignment, including Magnolia, Queen Anne, 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.

3.3.1.2 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. Table 3-22 presents average transit travel times on the RapidRide D Line between the Westlake Station and the intersection of Northwest Market Street and 15th Avenue Northwest in Ballard, an existing surface transit route that parallels the alignment of the proposed Ballard Link Extension. Due to congestion and other factors that impact reliability on the route (see Section 3.3.1.3), transit travel times can vary substantially from this average.

Riders on this trip experience additional travel time in peak periods when compared to uncongested conditions.

Table 3-22. Existing Transit Travel Times on RapidRide D Line (P.M. Peak Hour) – Ballard Link Extension

Trip	Direction	Existing P.M. Peak (minutes)	Existing Unconstrained/ Off-Peak (minutes)	Additional Travel Time due to Congestion (minutes)	Additional Travel Time due to Congestion (%)
3rd Avenue and Pike Street (Westlake Station) to Northwest Market Street/15th Avenue Northwest	Outbound	31	22	+9	+41%
Northwest Market Street/15th Avenue Northwest to 3rd Avenue and Pike Street (Westlake Station)	Inbound	30	21	+9	+43%

Source: Metro automated vehicle location data (2019).

3.3.1.3 Transit Levels of Service

The performance of existing transit service along the Ballard Link Extension was evaluated using L.O.S. measures for frequency, span of service, reliability, and passenger load at three screenlines: south of Main Street, north of Denny Way, and at the Ballard Bridge (Figure 1-3). These measures were adapted from the *Transit Capacity and Quality of Service Manual*, third edition (Transportation Research Board of the National Academies 2013), and more information about how they were applied can be found in Attachment N.1B, Existing and Future Transit Routes and Levels of Service.

Frequency

Section 3.2.1.3, Transit Levels of Service, provides a discussion of frequency L.O.S. and how it is calculated.

The RapidRide D Line generally follows the path of the new 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 project corridor, 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 serving the study area, operate at L.O.S. A, while lower-ridership express routes like Routes 18/19 and 29 operate at L.O.S. C or D. About two-thirds of bus riders at both screenlines are served by routes operating at L.O.S. A or B.

When the 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, 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.

Table 3-23 shows the existing peak period headways and corresponding frequency L.O.S. for the transit routes that cross the screenlines.

Table 3-23. Existing Bus Service Frequency (P.M. Peak) – Ballard Link Extension

Screenline Location	Headway (minutes)	Level of Service
South of South Main Street	23	C
North of Denny Way	17	C
Ballard Bridge	21	C

Span

Section 3.2.1.3, Transit Levels of Service, provides a discussion of span L.O.S. and how it is calculated.

The RapidRide D Line is the major route crossing the Ballard Bridge, and provides service 24 hours per day (L.O.S. A), 7 days a week. The span of peak-only routes here ranges between 3 and 8 hours on weekdays, and they do not operate on weekends.

All-day routes at the north of Denny Way screenline include (but are not limited to) Routes 1, 2, 13, 24, 33, 26, 40, 62, and 70 and the RapidRide C, D, and E lines, most of which operate at L.O.S. A on weekdays and weekends. Five weekday, peak-only routes cross here as well.

The screenline south of South Main Street is served by many all-day routes. All have similar spans of service on the weekends except Route 118/119, which operates at L.O.S. B on weekdays and L.O.S. D on weekends. Several peak-only routes cross the south of South Main Street screenline, with roughly equal numbers serving north Seattle, West Seattle, and cities to the south.

Table 3-24 shows the existing average span of service L.O.S. for the transit routes that cross the screenlines.

Table 3-24. Existing Bus Span of Service – Ballard Link Extension

Screenline Location	Average Span of Service (hours)	Level of Service
South of South Main Street	15	B
North of Denny Way	17	B
Ballard Bridge	11	D

Reliability

Section 3.2.1.3, Transit Levels of Service, provides a discussion of reliability L.O.S. and how it is calculated.

Peak period reliability for surface transit routes in the project corridor is generally poor (L.O.S. D through F) in both the inbound and outbound directions due to their routing, which places them in congested general purpose lanes for most of their route (Table 3-25).[1]
Most routes fail to meet Metro's evaluation threshold of 80 percent on-time trips. Detailed performance analysis by route can be found in Attachment N.1B.

Table 3-25. Existing Bus Service Reliability (P.M. and A.M. Peak Periods) – Ballard Link Extension

Screenline Location	Direction	P.M. Peak Period Level of Service	A.M. Peak Period Level of Service
South of South Main Street	Inbound	E	E
South of South Main Street	Outbound	E	E
North of Denny Way	Inbound	E	E
North of Denny Way	Outbound	E	D
Ballard Bridge	Inbound	E	D
Ballard Bridge	Outbound	F	E

Note: Peak period is 3 to 7 p.m.

Passenger Load

Section 3.2.1.3, Transit Levels of Service, provides a discussion of passenger load L.O.S. and how it is calculated.

The values in Table 3-26 and Table 3-27 represent an average of total passenger demand and transit vehicle supply across all routes at that location. Most routes operate at passenger load L.O.S. A or B, but others, particularly 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. For detailed, route-by-route values, see Attachment N.1B.

[1] Link light rail was omitted from the reliability analysis because it runs entirely in its own right-of-way and consistently has very high reliability. This was done to isolate the existing condition of surface transit in the corridor, which is more reflective of conditions along the new project alignment.

Table 3-26. Existing Transit Passenger Load Level of Service (A.M. Peak) – Ballard Link Extension

Screenline Location	Direction	Bus Average Load Factor	Bus L.O.S.	Link Light Rail Average Standing Passenger Space (square feet per person)	Link Light Rail L.O.S.
South of South Main Street	Outbound	0.34	A	8	C
South of South Main Street	Inbound	0.72	B	47	A
North of Denny Way	Outbound	0.43	A	Not applicable	Not applicable
North of Denny Way	Inbound	0.68	B	Not applicable	Not applicable
Ballard Bridge	Outbound	0.46	A	Not applicable	Not applicable
Ballard Bridge	Inbound	0.86	C	Not applicable	Not applicable

Note: A.M. peak period is 5 a.m. to 9 a.m.

Table 3-27. Existing Transit Passenger Load Level of Service (P.M. Peak) – Ballard Link Extension

Screenline Location	Direction	Bus Average Load Factor	Bus L.O.S.	Link Light Rail Average Standing Passenger Space (square feet per person)	Link Light Rail L.O.S.
South of South Main Street	Inbound	0.20	A	5	D
South of South Main Street	Outbound	0.46	A	5	D
North of Denny Way	Inbound	0.49	A	Not applicable	Not applicable
North of Denny Way	Outbound	0.81	C	Not applicable	Not applicable
Ballard Bridge	Inbound	0.48	A	Not applicable	Not applicable
Ballard Bridge	Outbound	0.70	B	Not applicable	Not applicable

Note: P.M. peak period is 3 p.m. to 7 p.m.

3.3.2 Environmental Impacts

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, segment, and station ridership forecasts; transit travel time; and transit L.O.S. Temporary (short-term) impacts during construction are also assessed.

3.3.2.1 No Build Alternative

The 2042 No Build Alternative for the Ballard Link Extension is the same as for the 2042 No Build Alternative for the West Seattle Link Extension (see Section 3.2.2.1). Specific to the Ballard project area, 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. Metro will continue to update the bus network as part of METRO CONNECTS in coordination with agency partners as implementation progresses.

3.3.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All Alternatives

All alternatives would increase transit ridership in the project area and region. Bus service would be restructured to integrate with Link, removing, rerouting, or truncating some lines but generally replacing them with reliable, high-frequency rail service. Those bus service hours savings would be redeployed in accordance with Metro's service guidelines. Transit travel times will be reduced along the project corridor when compared to surface bus routes, and transit L.O.S. for frequency, reliability, span of service, and passenger load will be improved or remain similar to conditions under the No Build Alternative.

Transit Service and Facilities

This section describes the transit services and facilities in 2042.

<u>Service</u>

Under the 2042 Build Alternatives, substantial changes to transit service are planned for bus service in the Ballard Link Extension, to align with the Link extensions. Route changes for the 2042 Build Alternatives include but are not limited to the following; additional detail can be found in Attachment N.1C, Transit Service Integration Technical Memorandum:

- For the International District/Chinatown, Midtown, Westlake, and Denny stations, many of the No Build Alternative bus routes would no longer operate in the build condition, as services would be terminated at Link stations outside of Downtown Seattle.
- At South Lake Union, Preferred Alternative DT-1 has a station at 7th Avenue North and Harrison Street that would intercept a major new transit corridor served by METRO CONNECTS Routes 2516 (which is not similar to a current route), 2614 (which is similar to Route 101), 3025 (similar to Routes 33 and 24), 3028 (similar to Route 2), and 3104 (not similar to a current route) and RapidRide 1061 (similar to Route 8 and the RapidRide D Line). These routes serve many destinations, including Interbay, Magnolia, Capitol Hill, First Hill, Kirkland, and Renton. This station also is a major transfer point for RapidRide 1001, which is similar to the current RapidRide E Line, providing service along Aurora Avenue between Shoreline and Downtown Seattle. Alternative DT-2 is similar but transfers between the Ballard Link Extension and RapidRide 1001 would be less convenient because the Link and RapidRide stations would be more than 1,500 feet apart and would require an approximately 7-minute walk along Dexter Avenue North. Because of this impedance, the ridership forecasts indicate most RapidRide 1001 riders would likely transfer at the Westlake Station, which would add a similar but slightly smaller amount of travel time for people destined to Seattle Center or other points north along the Ballard Link Extension. In general, bus routes are farther from the Alternative DT-2 station entrances than under Preferred Alternative DT-1. The current RapidRide D Line (METRO CONNECTS Route 1010) would be restructured, terminating at the Ballard Link light rail station instead of running to Downtown Seattle; Route 15 would be retired; and METRO CONNECTS Route 1512 (similar to Route 28) would serve the Ballard Station area before routing through Magnolia and connecting to light rail at the Smith Cove Station.

- At Smith Cove, seven bus routes are expected to operate with the 2042 Build Alternatives: METRO CONNECTS Routes 1512, 2516, 2614, 3025, and 3104 and RapidRide 1061 and 1074. These routes provide connections to Magnolia, South Lake Unio and Capitol Hill, with Route 2614 also providing service through the Denny Triangle to Renton. Routes that service this station area in the 2042 No Build Alternative would be similar to current conditions.

Under the M.O.S. with a Smith Cove terminus station, a restructure of routes has been developed by Sound Transit and Metro to ensure strong connections between Ballard, Interbay, and Magnolia to both the Ballard Link Extension and other major destinations in Seattle. However, there is additional redundancy between bus and rail service under the M.O.S. The following routes were substantially modified from the METRO CONNECTS plan to accommodate the M.O.S.:

- METRO CONNECTS Route 1512 (which has elements of Routes 28 and 24 but provides new service to the Broadview neighborhood) would continue to serve the Smith Cove Station, but would terminate in Magnolia to provide a more direct connection between the Greenwood neighborhood and eastern portions of Ballard and the project.
- The RapidRide D Line would continue to run between Ballard and Downtown Seattle to provide a frequent one-seat connection. This route would connect with the Ballard Link Extension at the Smith Cove Station.
- Route 33 (which would replace METRO CONNECTS Route 3025) would be similar to the existing Route 33 but would terminate near the Seattle Center Station. This would provide a connection between Magnolia and the Ballard Link Extension.
- New Route 34 (similar to Route 24) would connect portions of Magnolia, particularly along 28th Avenue West to the Smith Cove Station; this route would terminate near Seattle Center.
- METRO CONNECTS Route 1006 (which is not similar to a current Metro route) would terminate in downtown Ballard rather than serving Sunset Hill via 32nd Avenue Northwest as contemplated in METRO CONNECTS (the connection to Sunset Hill would be made by Route 1010, described below). This route would not connect with the project under the M.O.S.
- METRO CONNECTS Route 1010 (similar to Route 45 and the RapidRide D Line) would terminate near the Ballard Blocks via 15th Avenue Northwest, Northwest 85th Street, and 32nd Avenue Northwest. This route would not connect with the project under the M.O.S.

No additional active bays are needed at the Smith Cove Station to accommodate the restructured service. One additional layover space would be required at the Smith Cove Station.

Facilities

To accommodate the potential bus routing modifications of the project, transit facilities (including layover areas, comfort stations, bus shelters, and waiting areas for riders transferring to buses) would be added or relocated to serve new or revised routes. Bus stops and paratransit spaces would generally be provided adjacent to the light rail stations to provide safe and efficient transfer access. Station area layover needs and potential impacts were assessed collaboratively by Sound Transit and Metro and are summarized in this section. For more details, see Attachment N.1C, Transit Service Integration Technical Memorandum, and the conceptual design drawings in Appendix J of the Draft Environmental Impact Statement. In general, layover space would be allocated near the stations where bus routes terminate.

The information included in this section is based on the project efforts up through when the environmental analysis began in 2019. Further refinements to the station areas, bus stops, and layover accommodations will continue between Sound Transit and Metro as the project advances.

Key facilities affected include the following:

- In addition to changes around the station areas, Preferred Alternative SODO-1a and Option SODO-1b would permanently close the SODO Busway between South Massachusetts Street and South Spokane Street. The Transit Service and Facilities section in Section 3.2.2.2, Build Alternatives, describes the SODO Busway closure and impacts to bus service and facilities.
- For the International District/Chinatown, Midtown, Westlake, and Denny stations, transit facilities for the downtown stations would not be notably different between the No Build Alternative and Build Alternatives, because all of these stations are within the dense grid of downtown bus routes and no major transit rerouting is planned in association with these stations.
- South Lake Union Station (for Preferred Alternative DT-1) would be located beneath Harrison Street, between Dexter Avenue North and just west of 7th Avenue North, along the new Harrison Street transit spine through South Lake Union. This alternative would have bus stops immediately adjacent to the station entrances for most of the buses stopping on Harrison and 7th Avenue North. There would also be bus stops on Dexter Avenue North. For the station location under Mercer Street (for Alternative DT-2), there would also be bus stops on both sides of Dexter Avenue North. There would be no layover planned at the South Lake Union Station.
- The Seattle Center Station has two potential locations, with the station for Preferred Alternative DT-1 being under Republican Street just north of Climate Pledge Arena. Major bus stops are located along Queen Anne Avenue North and 1st Avenue North near Republican Street and on both sides of Mercer Street. The station location for Alternative DT-2 would be under Mercer Street between Queen Anne Avenue North and Warren Avenue North. Bus stops would be in similar locations to Alternative DT-1.
- The Smith Cove Station serves as a major route termination point under the 2042 Build Alternatives with six routes proposed to terminate at the station. For all alternatives, there would be a mix of on- and off-street bus stops. All station configurations would also have 12 off-street bus layover spaces in the vicinity of the station to accommodate the terminating routes.
- The Interbay Station (Preferred Alternative IBB-1a, Preferred Alternative IBB-2a*, and Preferred Option IBB-2b*) would have bus stops on West Dravus Street just west of 17th Avenue Northwest and a stop immediately adjacent to the station on 17th Avenue Northwest for Route 1061. For the station options on 15th Avenue Northwest (Option IBB-1b and Alternative IBB-3), the station would be in the median of 15th Avenue Northwest with bus stops on both sides of 15th Avenue West, north of West Dravus Street. Layover would be near the station for all alternatives for Route 1061.
- The Ballard Station (Preferred Alternative IBB-1a and Option IBB-1b) would be elevated on 14th Avenue Northwest, straddling Northwest Market Street. The bus stops for the east and westbound buses on Northwest Market Street would be immediately adjacent to the station. North and southbound buses on 15th Avenue Northwest would be rerouted to 14th Avenue Northwest and those stops would be located along Northwest Market Street, west of 14th Avenue Northwest. These facilities would also be the same for Preferred Alternative IBB-

2a*, which would have a tunnel station under 14th Avenue Northwest. For the Ballard Station on 15th Avenue Northwest (Preferred Option IBB-2b* and Alternative IBB-3), the westbound bus stops, one of the southbound, and one of the northbound bus stops are not immediately adjacent to the station. Layover for three buses is required near the station but is not integrated within the station. Sound Transit, Metro, and the City of Seattle will coordinate on bus layover near Ballard Station. This layover would be needed for all alternatives.

Alternative CID-1a* and Option CID-1b* would close the SODO Busway between Massachusetts Street and 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 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 3.2.2.2 discusses the SODO Busway closure impacts.[3] 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 the service restructuring described in the WSBLE Transit Service Integration technical memorandum (Attachment N.1C). Other lane configurations could be considered as the project advances.

Preferred Alternative SODO-1a and Alternative SODO-2 work only for the shallow CID station options (Alternative CID-1a* and Alternative CID-2a). Option SODO-1b* works for any of the International District/Chinatown station options (both shallow and deep).

<u>Transfer Environment</u>

The following describes the transfer environment at each of the stations along the Ballard Link Extension.

- The International District/Chinatown Station would be a major transfer point among the light rail lines serving the station (West Seattle-Everett, Redmond-Mariner, and Ballard-Tacoma), and it is also the main transfer point between Sounder commuter rail, the First Hill Streetcar, and bus/rail service that carries people farther north into downtown.
    - Under Alternative CID-1a*, Option CID-1b*, Alternative CID-2a, and Option CID-2b, there would be less bus service (about 40 to 60 percent fewer active and deadhead bus trips compared to existing conditions) along 4th Avenue compared to the No Build Alternative, so more passengers are expected to transfer between the Sounder and Link at this station. For the most part, these transfers are expected to use the at-grade Weller Street crosswalk at 4th Avenue South to access light rail.
    - Under the 5th Avenue Alternatives (Alternative CID-2a and Option CID-2b), transfers between the new station and the existing northbound platform would take place using an underground pedestrian connection. To transfer to the existing southbound platform, passengers would use the existing courtyard level just east of the Union Station and

[3] The Ryerson Bus Base is just southeast of the intersection of 4th Avenue South and South Royal Brougham Way. This Metro bus base accommodated 213 buses in late 2018 and is part of Metro's Operations and Maintenance Facility Central campus. The Central campus includes layover space, maintenance shops, body shop, employee wellness center, employee parking, and parking for non-revenue vehicles.

would not require any at-grade street crossings (similar to how someone could transfer between northbound and southbound Link trains today).

  - Transfers between the two light rail tunnels under the 4th Avenue alternatives (Alternative CID-1a* and Option CID-1b*) would be via an underground connection between the new station to the existing southbound platform. For transfers to the existing northbound platform, passengers would use the existing courtyard level just east of the Union Station and would not require any at-grade street crossings.

- The Midtown Station is not expected to be a major transit transfer point, other than for the RapidRide G Line. The RapidRide G Line stops currently are planned for the far side of 4th Avenue at Spring Street and the near side of 5th Avenue at Madison Avenue. The nearest station entrance for Preferred Alternative DT-1 would be at the corner of 4th Avenue and Madison Street. This access would be relatively easy to reach the eastbound stop at 4th Avenue and Spring Street, but there would be a substantial grade difference to reach the westbound stop at 5th Avenue and Madison Street. Alternative DT-2 would be similar, with level access along 5th Avenue but grade issue for transfers between the station entrance and the eastbound bus stop at 4th Avenue.
- At the Westlake Station, bus-to-rail transfers are similar between Preferred Alternative DT-1 and Alternative DT-2, although there would be a longer underground walk to access the platforms for the DT-2 alternative from 3rd Avenue bus routes. The Westlake Station will be a major rail-rail transfer hub, with most of these transfers occurring within the underground station.
- For the Denny Station, transfers are either adjacent to or within one block of the light rail station, with relatively easy access to major routes along Westlake Avenue (including the streetcar) and Denny Way for both Preferred Alternative DT-1 and Alternative DT-2. However, Alternative DT-2 does have one block of steep grade that people must traverse to and from the station to reach the Westlake transit routes.
- For the South Lake Union Station, Preferred Alternative DT-1 is adjacent to the Harrison Street and 7th Avenue North/Aurora Avenue transit corridors and provides a good transfer environment for all routes. For Alternative DT-2, routes on the Harrison Street transit spine could be accessed using stops along 5th Avenue North, just south of Mercer Street, or along Mercer Street west of 5th Avenue North, but this would require crossing Mercer Street or 5th Avenue North, which have high traffic volumes. The walk to the high-ridership RapidRide 1001 (E Line) would also be long and could make this transfer unlikely at this location.
- At the Seattle Center Station, most of the bus transfer activity would be on the routes traveling along 1st Avenue North and Queen Anne Avenue North. The transfer environment between buses on these streets and the station entrances would be either adjacent to or within one block for Preferred Alternative DT-1. For Alternative DT-2, the transfer to and from Queen Anne Avenue North would require an additional street crossing.
- At the Smith Cove Station, transfers would be similar for all alternatives. In each case, some transferring passengers would need to cross Elliott Avenue West at grade. This is a high-speed and high vehicle volume roadway to cross with a long crossing, but there are signalized crossings near all new bus stops.
- The Interbay Station transit transfer environment would not require the crossing of more than one street to transfer between bus and rail. This is true for all alternatives. Preferred Alternative IBB-1a and Preferred Option IBB-2b* would have a slightly better transit transfer environment, because passengers of Route 1061 would always have a bus stop adjacent to

the station, and passengers transferring to that major route would not need to cross the street.

- The Ballard Station would be a major transfer hub between buses and the Ballard Link Extension. For Preferred Alternative IBB-1a and Preferred Alternative IBB-2a*, bus transfers would occur at stops immediately adjacent to the station and would not require crossing any streets. The exception would be northbound routes on 14th Avenue Northwest, which would require a crossing of 14th Avenue Northeast (the stop would be on westbound Northwest Market Street, west of 14th Avenue Northwest). For the 15th Avenue Northwest station locations (Preferred Option IBB-2b* and Alternative IBB-3), a substantial number of transferring passengers would have to cross Northwest Market Street to access the westbound bus stops along Northwest Market Street.

Transit Travel Time

Table 3-28 presents travel times for a representative trip between the Westlake Station and the new Ballard Station (all alternatives), with and without the project. Travel times are similar for both directions during the a.m. and p.m. due to light rail operating within its own right-of-way. In 2042, the project would reduce a transit rider's travel time by over 70 percent when compared to No Build Alternative forecasted bus travel times.

Table 3-28. 2042 Transit Travel Times (P.M. Peak Period) – Ballard Link Extension

Trip	2042 No Build Alternative (minutes)	2042 Build Alternatives (minutes)	Travel Time Change (minutes)	Travel Time Change (%)
Westlake Station to Northwest Market Street (outbound)	38	11	-27	-71%
Northwest Market Street to Westlake Station (inbound)	37	11	-26	-70%

Source: Sound Transit ridership and operational models.

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 out and M.O.S.'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. If they chose to transfer at the SODO Station before continuing to the Stadium Station, they would experience between 2 and 5 additional minutes of travel time, 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 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.

Ridership

Ridership forecasts were produced using the Sound Transit Incremental Ridership Model. Forecasts were conducted for the alternatives at the system, project, and segment levels to estimate how ridership would differ between alternatives. In some instances, a single forecast value is presented for all or a subset of the alternatives, when forecasts for individual alternatives would not notably differ. This is the case for the system and project-level forecasts, and for some of the segment-level forecasts.

For the M.O.S. under the Ballard Link Extension, two ridership forecasts are provided for the project and in the South Interbay Segment (Smith Cove Station). The first, the West Seattle and Ballard Link Extensions M.O.S. ridership modeling scenario, included the West Seattle Link Extension M.O.S. (which terminates at Delridge Station). The second, the Ballard Link Extension-only M.O.S. modeling scenario, did not assume a West Seattle Link Extension and the Ballard Link Extension terminates at SODO Station. The station forecasts in the other segments were less under the M.O.S. than the full build and therefore were not included.

<u>Systemwide Ridership</u>

Transit ridership was forecasted for the Sound Transit service area in King, Pierce, and Snohomish counties with and without the West Seattle and Ballard Link extensions in 2032 and 2042. Table 3-8 in Section 3.2.2.2 presents the total number of forecasted trips on all transit services and, of that, the net new trips that are attributable to the projects.

<u>Ballard Link Extension Project Ridership</u>

Table 3-29 shows project ridership, including the number of riders who would be new to the system (i.e., not shifting from other forms of transit). The project ridership includes all trips to any one of the project stations between and including the existing SODO and Ballard stations.

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 6.4.2.2.

Under the West Seattle and Ballard Link Extensions M.O.S. (Ballard Link Extension to Smith Cove and West Seattle Link Extension to Delridge), the Ballard Link Extension ridership would decrease to 132,000 daily riders compared to the full build ridership of up to 173,000 daily riders, as the project would terminate at the Smith Cove Station and not serve the Interbay/Ballard segment. If the West Seattle Link Extension were not built, project ridership would still decrease (140,000 riders) in the Ballard Link Extension-only M.O.S. compared to the full build ridership. Transit transfer activity at stations is the main reason for the ridership differences between the West Seattle and Ballard Link Extensions M.O.S. and the Ballard Link Extension-only M.O.S.

<u>SODO Segment Ridership</u>

The Ballard Link Extension would continue to serve the existing SODO Station in 2042. To connect to Stadium Station, riders on the Ballard-to-Tacoma line could transfer between the existing and new SODO stations to the West-Seattle-to-Everett line, transfer at the Westlake or

International District/Chinatown stations, or walk from the International District/Chinatown Station. No new stations are proposed in SODO as part of the Ballard Link Extension; however, a new SODO Station is proposed as part of the West Seattle Link Extension and is assumed to be operating in 2042. Therefore, ridership for the SODO Segment is discussed under the West Seattle Link Extension in Section 3.2.2.2.

Table 3-29. 2042 Transit Ridership (Daily Boardings) – Ballard Link Extension

Measure	Build Alternatives Ridership [a]
Ballard Link Extension Project Trips	132,000 to 173,000
New Transit Trips with Project	20,000

[a] The full build ridership values reflect a range of possible ridership scenarios, based on varying economic and demographic assumptions.

Chinatown-International District Segment Ridership

A new International District/Chinatown Station would be built near the existing station, with boardings in the Chinatown-International District Segment increasing by about 50 percent compared to the No Build Alternative (Table 3-30). This is largely due to rail-to-rail transfers between the two International District/Chinatown Station platforms which would represent the majority of boardings at these stations. A range of values is presented for the Build Alternatives because of the possibility that some rail-to-rail transfers could occur at International District/Chinatown Station or other transfer points in the light rail system.

Table 3-30. 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	9,100 to 10,800
International District/Chinatown (existing station)	23,500	21,000 to 23,400
Segment Total	**23,500**	**30,100 to 34,200**

[a] Some rail-to-rail transfers could occur here or at other transfer points in the light rail system, resulting in a range for ridership forecasts at this location

Downtown Segment Ridership

The Downtown Segment includes five new stations between Pioneer Square and Seattle Center. 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.

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 bus connections at this station location. Some of these transfers between bus and rail 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 3-31 shows the ridership for the Downtown Segment stations.

Table 3-31. 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**

South Interbay Segment Ridership

The new Smith Cove Station is expected to have the same number of daily boardings for all South Interbay Segment alternatives (Table 3-32). Under the M.O.S., the Smith Cove Station would have a substantial increase in riders compared to the full build. This increase in ridership is mainly a result of the additional bus service connections, creating more rail-to-bus activity at this M.O.S. terminus station.

The conceptual station design and environmental analysis described in Section 4.3.2.2 for arterials and local street operations and Section 6.4.2.2 for 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.

Table 3-32. 2042 South Interbay Segment Station Ridership (Daily Boardings)

Station	Ridership Build Alternatives
Smith Cove	2,600
Smith Cove (M.O.S.)	8,200

Interbay/Ballard Segment Ridership

Due to the surrounding land uses and transit connection, Ballard Station would have ridership similar to several Downtown Segment stations, with multiple bus routes connecting to the Ballard Station at Market Street between 14th Avenue Northwest and 15th Avenue Northwest in 2042 (Table 3-33). For more information, see Attachment N.1C, Transit Service Integration Technical Memorandum.

Table 3-33. 2042 Interbay/Ballard Segment Station Ridership (Daily Boardings)

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

Transit Levels of Service

Frequency

Figure 3-3 presents the average frequency of transit routes at analysis screenlines in the Ballard Link Extension during the p.m. peak period under the 2042 No Build Alternative and Build Alternatives.

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. Average frequencies would also improve due to the assumption of continued investment in bus service, including the addition of RapidRide lines at multiple locations along the project corridor. With the project and associated bus route restructuring, nearly all riders at all three screenlines would experience frequency L.O.S. of A or B, an approximately 50 percent improvement in average route frequency over the No Build Alternative.

Span

In 2042, 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 (Figure 3-4). With the project, the Ballard Link Extension would operate for 20 hours per day, or L.O.S. A.

Figure 3-3. Average Transit Route Frequency L.O.S. (2042) – Ballard Link Extension

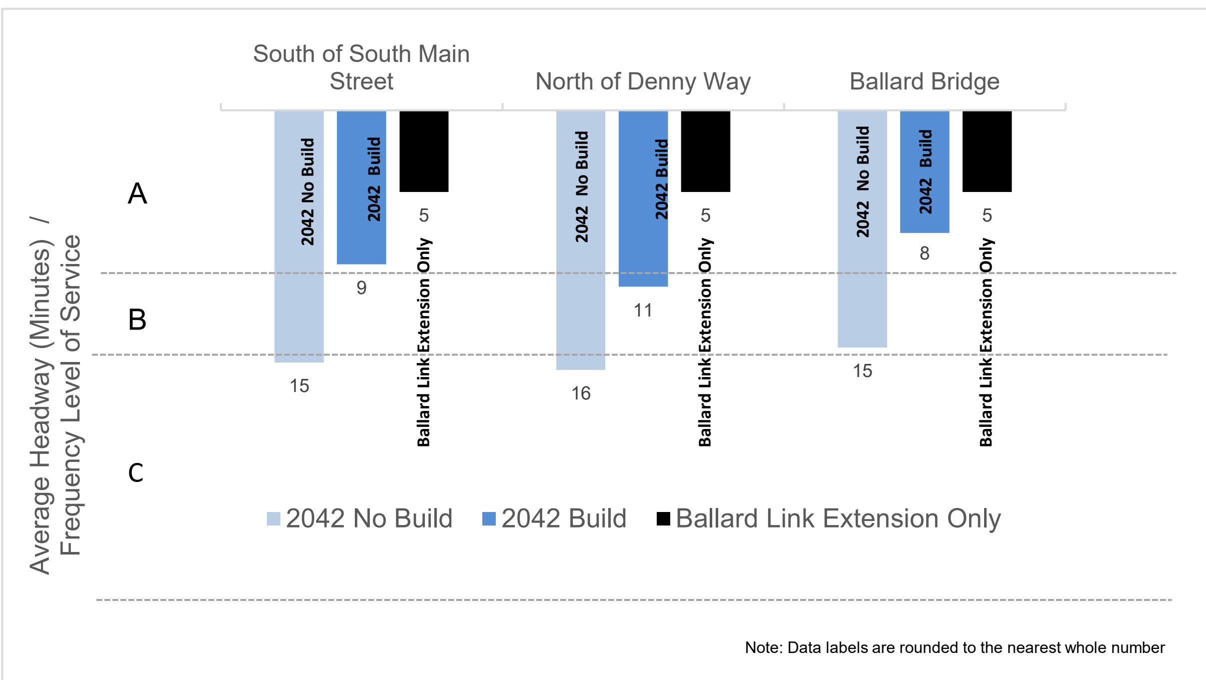
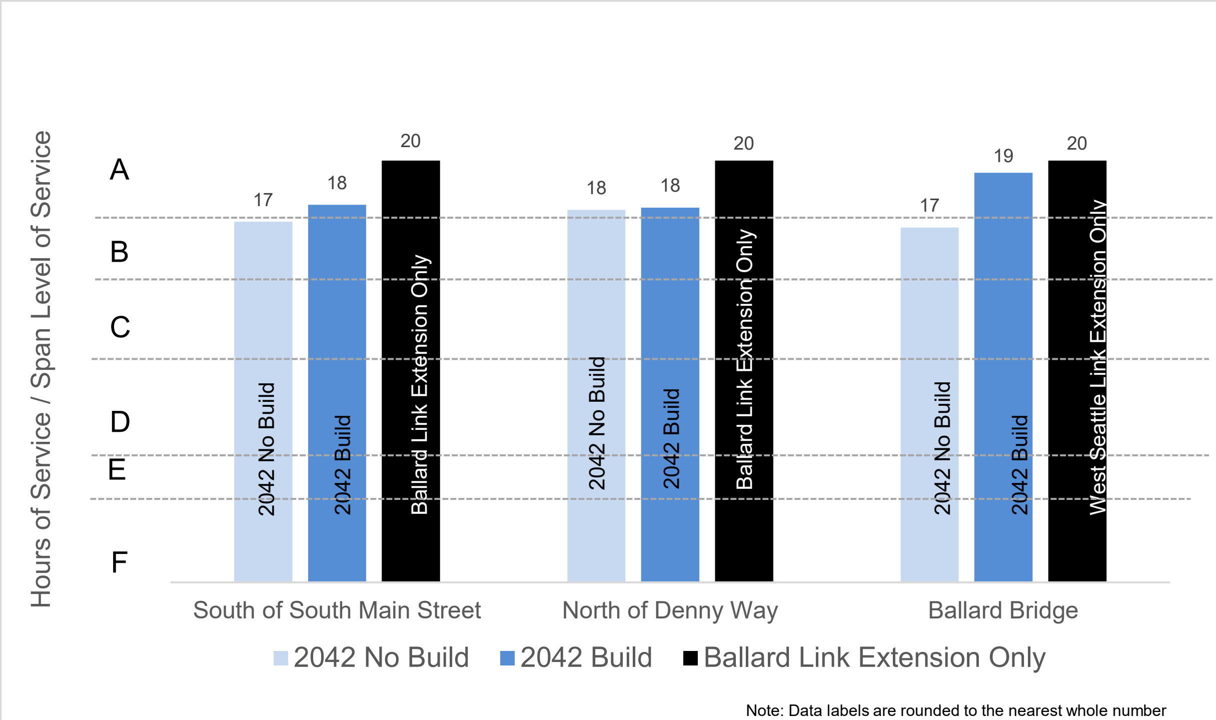


Figure 3-4. Average Transit Route Span L.O.S. (2042) – Ballard Link Extension



Reliability

Most bus service in the project corridor would continue to operate at L.O.S. E and F under the 2042 No Build Alternatives due to current and expected future congestion in the corridor (see Section 4.3). Even though bus transit speed and reliability improvements are being planned along portions of some roadways in the project corridor, overall bus reliability is not expected to improve substantially beyond existing conditions under the No Build Alternative, as buses would continue to mainly operate within general traffic.

The Build Alternative rail project would operate at L.O.S. A, as the alignments are within exclusive right-of-way separated from vehicle traffic. Under Alternative IBB-3, the moveable bridge across Salmon Bay would be required to open for certain marine vessels to pass through. 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 line. Peak hour delays would rarely occur because of bridge lift restrictions for vessels navigating through Salmon Bay. However, marine vessels navigate this corridor exempt from bridge restrictions that could disrupt service at any time.

Passenger Load

In 2042, passenger loads on the Ballard Link Extension, which will run from Ballard Station south to Tacoma, are expected to be high through Downtown Seattle, with standing room only and some crowding (see Table 3-34). Even so, this is an improvement over the No Build Alternative, in which peak period, peak direction trains would experience very high L.O.S. F conditions in the south part of Downtown Seattle. At the north of Denny Way and Ballard Bridge screenlines, bus loads are expected to decrease substantially with the project as transit riders adjust and ride light rail service. At the south of South Main Street screenline, bus loads would increase in the outbound direction due to bus service restructuring and increased ridership accessing the Link stations.

Table 3-34. 2042 Passenger Load Level of Service (P.M. Peak Period) – 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

Notes:

The source of these forecasts is the Sound Transit Incremental Ridership Model, which generates a single set of peak period values; the a.m. passenger loads are assumed to be similar to the p.m. results shown here.

P.M. peak period is 3 p.m. to 6:30 p.m.

[a] Inbound toward Downtown Seattle, outbound away from Downtown Seattle.

Construction Impacts

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

- Impacts to transit infrastructure and facilities.
- Transit service and route impacts due to roadway closures.

Transit Infrastructure and Facilities Impacts

Road, lane, and sidewalk closures may require bus stop, layover, and comfort station relocations, bus service detours, or both, during construction. Sound Transit would maintain access to existing bus stops and layovers/comfort stations to the extent feasible and coordinate with Metro and other transit providers to minimize impacts and disruptions (e.g., identifying new bus stops or layovers/comfort stations in a nearby location). Information (e.g., rider alerts) would be posted at transit stops before construction at these locations. Bus detours could also result in pavement damage to streets that were not built to accommodate bus or heavy vehicle traffic.

Sidewalk closures would also affect pedestrians accessing transit. Sound Transit would maintain pedestrian access, where feasible, through construction areas, such as providing dedicated walkways or alternative pathways around the construction area. Sound Transit would also notify the public of any closures as appropriate.

During the construction period, the SODO Busway would be closed and access to the Metro Ryerson and Atlantic/Central bus bases would be affected; see the segment-specific construction discussion for further details.

The 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 anticipated that the Center City Connector project will be complete, and the streetcar system would run from South Lake Union through downtown and the Chinatown-International District to Capitol Hill and First Hill. Construction activities for the Ballard Link Extension could result in temporary interruptions to Seattle Streetcar service during construction. The specific locations of potential construction closures by project alternative are described in relevant subsequent sections. As the project progresses, Sound Transit would work with the City to minimize streetcar impacts and, where needed, develop an operational plan to minimize impacts to streetcar service and riders.

Similar to the streetcar system, the Metro trolley bus system would be potentially impacted by construction activities. These impacts potentially occur in the Chinatown-International District, Downtown, and Interbay/Ballard segments. In some instances, the impact would be due to a street closure, and in other instances, to an impact to the overhead catenary system. Transit service adjustments could consist of running vehicles off-wire for short distances, temporarily shifting the location of the overhead catenary system within the street right-of-way, temporarily operating a route with non-trolley buses, or relocating the overhead catenary system to an entirely new pathway. The specific locations of potential construction closures are described in the relevant sections that follow. As the project advances, Sound Transit would work with Metro and the City of Seattle to minimize trolley bus impacts and develop a capital (including trolley wire relocation) and operational approach to construction impacts that are not avoidable.

In the SODO Segment, the Alternative CID-1a* connections to all of the SODO Segment alternatives would result in a closure of the existing light rail service between the SODO and International District/Chinatown stations for 6 to 7 weeks. Alternative CID-1a* would also require the Stadium Station to be closed for up to 2 years as it is rebuilt to connect to the West Seattle-to-Everett line. During this time, the Stadium Station's users (about 500 riders in the 3-hour peak period) would need to use the International District/Chinatown or SODO stations or another travel mode. Walking from the International District/Chinatown or SODO stations to South Royal Brougham Way and 3rd Avenue South, near the entrances to Lumen Field and T-Mobile Park, would add approximately 7 to 13 minutes to a trip, respectively. Use of micromobility devices (such as scooters or bike share) or taxis or transportation network companies like Lyft and Uber could reduce this time differential.

For the other Chinatown-International District Segment alternatives (Option CID-1b*, Alternative CID-2a, and Option CID-2b), light rail service would be maintained between the Stadium and SODO stations but would have intermittent periods of single-track operation.

A more detailed description of these impacts to the existing light rail system during construction can be found in Section 2.3.2, Regional Context and Travel.

Roadway Closures

Impacts Common to All Alternatives

Detailed descriptions of the roadway closures during construction, including extents and closure durations, are provided in Section 4.3.2.3, Construction Impacts; specifically see Tables 4-47 through 4-51 for a segment-by-segment listing of closure extents and durations. A summary of the transit impacts resulting from these closures are summarized by segment in Tables 3-35 through 3-39. During construction, current bus routes would be affected at some locations along the corridor. Bus reliability could potentially degrade along arterials and other transit streets with Ballard Link Extension construction due to lane closures and other construction-related activity. For areas with construction within the roadway right of-way, arterials may be partially closed with fewer vehicle lanes or be closed completely, affecting roadway operations including bus service along those arterials.

Table 3-35. Key Arterial Roadway Closures Affecting Transit Routes - SODO Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]	Non-Revenue Routes Affected [b]
SODO-1a	SODO Busway	South Massachusetts Street	South Spokane Street	Full			permanent			2	4	1	11
SODO-1a	South Holgate Street	4th Avenue South	6th Avenue South	Full	2 to 3 years					0	0	0	0
SODO-1b	SODO Busway	South Massachusetts Street	South Spokane Street	Full			permanent			2	4	1	11
SODO-1b	South Holgate Street	4th Avenue South	6th Avenue South	Full	2 to 3 years					0	0	0	0
SODO-2	SODO Busway	South Massachusetts Street	South Spokane Street	Full			7 years			2	4	1	11
SODO-2	South Holgate Street	4th Avenue South	6th Avenue South	Full	3 years					0	0	0	0

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.
Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

[b] Approximate number of routes based on 2018 routing to bases.

Routes impacted by roadway construction closures would vary from nights and weekends to multi-year closures. At locations where roadways experience full closure, bus routes may need to use alternate pathways and temporary bus facilities may need to be installed. 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.

Specific transit services, facilities, or both that are expected to be affected by construction for at least 6 months are described in the following segment-specific discussion. See Attachment N.1E, Construction-Related Roadway Modifications, for a more complete list of the roadway construction closures expected for each alternative and design option.

SODO Segment

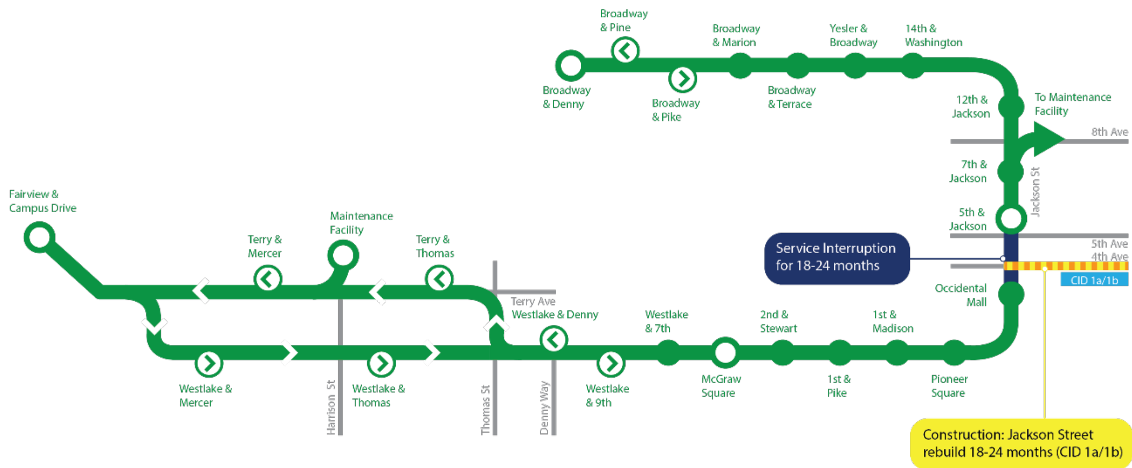
Under Preferred Alternative SODO-1a and Option SODO-1b, South Holgate Street between 4th Avenue South and 6th Avenue South would be closed for construction; however, no bus routes currently operate or are planned for this section of roadway. Alternative SODO-2 would close the SODO Busway between South Massachusetts Street and South Spokane Street during the duration of the West Seattle Link and Ballard Link extension construction periods. The SODO Busway closure would affect 60 to 80 Metro buses per peak hour 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. Temporary construction impacts on transit with the SODO Busway closure would be similar to those described in the Long-term Impacts section for Preferred Alternative SODO-1a and Option SODO-1b. The Transit Service and Facilities section in Section 3.2.2.2, Build Alternatives, describes the SODO Busway closure and impacts to bus service.

Chinatown-International District Segment

Under Alternative CID-1a*, the partial closure of 4th Avenue South would affect several bus routes, including Routes 5, 17, 18, 28, 40, 124, 131, 132, and 150 (Table 3-36). Concurrent with the partial closure of 4th Avenue South, construction of Alternative CID-1a* would also fully close Seattle Boulevard South, affecting buses connecting to the Atlantic/Central Base. The closures of 4th Avenue South from South Jackson Street through South Main Street, including the 4th Avenue South intersections with South Jackson Street and South Main Street, would directly affect bus routes including Routes 5, 7, 17, 18, 28, 36, 40, 106, 124, 131, 132, and 150 and the Seattle Streetcar. The streetcar would not be able to operate through the 4th Avenue South/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 because it is assumed the Seattle's Center City Connector project is built prior to this project's construction (Figure 3-5). 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.

Under Option CID-1b*, the full closure of 4th Avenue South would also affect a number of routes, including Routes 5, 17, 18, 28, 40, 124, 131, 132, and 150. Similar to Alternative CID-1a*, the closure of South Jackson Street and the South Jackson Street/4th Avenue South intersection would affect regular and trolley bus routes, including Routes 5, 7, 17, 18, 28, 36, 40, 106, 124, 131, 132, and 150 and the Seattle Streetcar (Figure 3-5).

Figure 3-5. Seattle Streetcar Construction Impacts – Alternative CID-1a* and Option CID-1b*



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/Central Bus Base. The partial closure of the 5th Avenue South/South Jackson Street intersection would also affect trolley bus service and interrupt streetcar service. Trolley buses could potentially be rerouted through the Chinatown-International District on 7th Avenue South or 8th Avenue South using new trolley wire built to mitigate the closure. 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. Under Alternative CID-2a, the intersection of 5th Avenue South and South Jackson Street would need to be closed for a short period. Limited traffic lanes on South Jackson Street would remain open for cars and buses. However, this partial closure would affect numerous bus routes (including trolley buses), as well as the Seattle Streetcar. The streetcar would not be able to operate through the intersection of 5th Avenue South and South Jackson Street. 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 because it is assumed the Seattle's Center City Connector project is built prior to this project's construction (Figure 3-6). 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 diagonal station configuration for Alternative CID-2a would not require relocation of the trolley bus pathway on 5th Avenue South or interrupt the Seattle 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 Seattle Streetcar on South Jackson Street and trolley buses on 5th Avenue South would be able to continue operations during construction (Figure 3-7).

Figure 3-6. Seattle Streetcar Construction Impacts – Alternative CID-2a

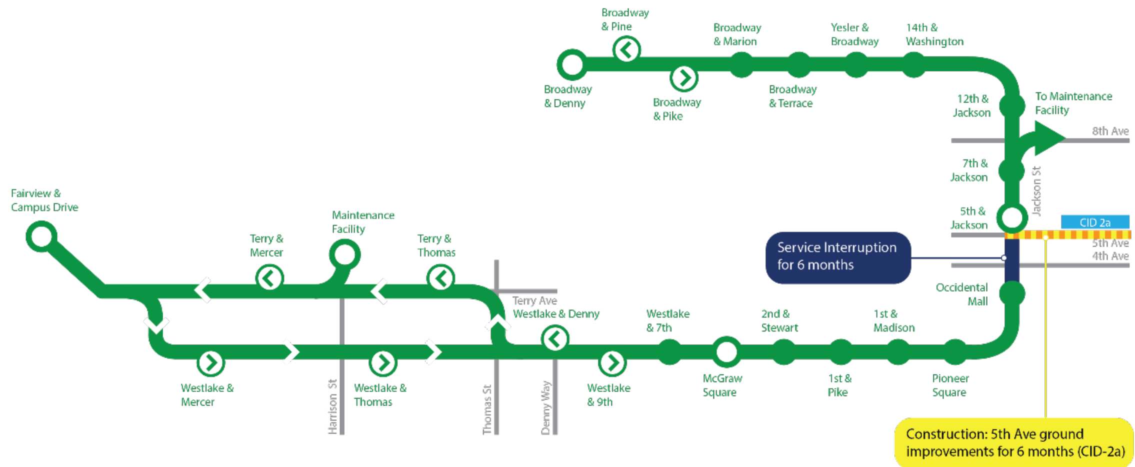
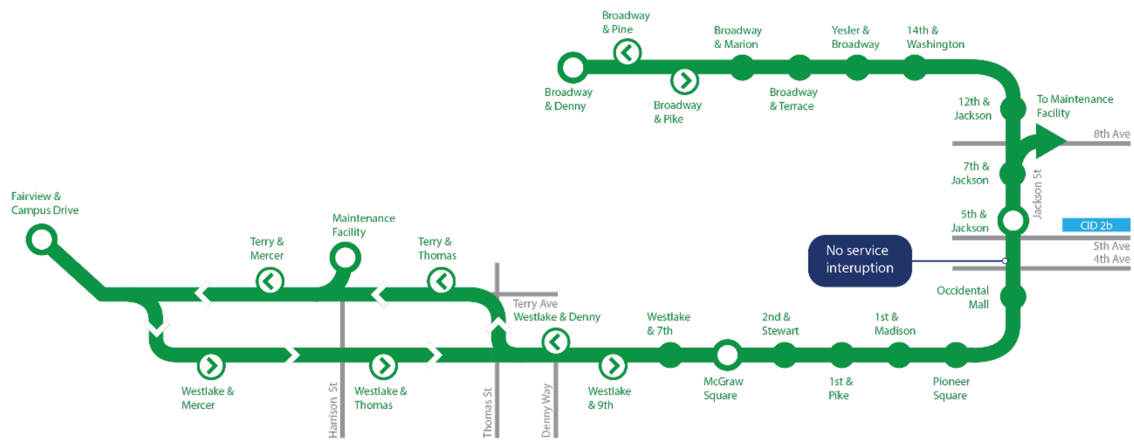


Figure 3-7. Seattle Streetcar Construction Impacts – Option CID-2b



Alternative CID-2a and Option CID-2b would build a tunnel portal north of South Massachusetts Street in the vicinity of 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 the Ryerson Bus Base along a portion of the SODO Busway between South Massachusetts Street and South Royal Brougham Way. During this period, new access to the Ryerson Bus Base, as well as potential reconfiguration of the internal bus yard, would need to be coordinated with Metro. The effects of routing bus trips out of the SODO Busway would be similar to those described in the 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.

Table 3-36. Key Arterial Roadway Closures Affecting Transit Routes - Chinatown-International District Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [b]	Express Routes Affected [b]	Local Routes Affected [b]	Streetcar Routes Affected	Non-Revenue Routes Affected [d]
CID-1a*	2nd Avenue Extension	South Jackson Street	4th Avenue South	Full			2 years			7	8	5	No	19
CID-1a*	4th Avenue South	South Jackson Street	I-90	Partial				6 years		7	8	5	No	19
CID-1a*	4th Avenue South	South Jackson Street	North side of South Main Street	Full			4 years			9	8	5	No	10
CID-1a*	Seattle Boulevard South	4th Avenue South Intersection	4th Avenue South Intersection	Full				2 years		7	8	5	No	19
CID-1a*	SODO Busway	Ryerson Bus Base	Ryerson Bus Base	Full [c]			4 years			2	1	0	No	25
CID-1a*	South Jackson Street	2nd Avenue Extension	5th Avenue South	Full [e]					2 years	11	8	5	Yes	19
CID-1a*	South Jackson Street	4th Avenue South Intersection	4th Avenue South Intersection	Full					2 years	11	8	5	Yes	19
CID-1a*	South Main Street	3rd Avenue South	4th Avenue South	Full						0	0	0	0	2

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [b]	Express Routes Affected [b]	Local Routes Affected [b]	Streetcar Routes Affected	Non-Revenue Routes Affected [d]
CID-1b*	2nd Avenue Extension	South Jackson Street	4th Avenue South	Full			6.5 years			7	8	5	No	19
CID-1b*	4th Avenue South	South Jackson Street	Seattle Boulevard South	Full				6.5 years		7	8	5	No	19
CID-1b*	4th Avenue South	South Jackson Street	Seattle Boulevard South	Partial				2 years		7	8	5	No	19
CID-1b*	SODO Busway	Ryerson Bus Base	Ryerson Bus Base	Permanent [c]			Permanent			2	1	0	No	25
CID-1b*	South Jackson Street	2nd Avenue Extension	5th Avenue South	Full					2 years	11	8	5	Yes	19
CID-1b*	South Jackson Street	4th Avenue South Intersection	4th Avenue South Intersection	Full					2 years	11	8	5	Yes	19
CID-2a*	5th Avenue South	South Jackson Street	South Weller Street	Partial			2.5 years			0	0	0	No	16
CID-2a*	5th Avenue South	South Jackson Street	South Weller Street	Full			9 months			0	0	0	Yes	16

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [b]	Express Routes Affected [b]	Local Routes Affected [b]	Streetcar Routes Affected	Non-Revenue Routes Affected [d]
CID-2a [a]	6th Avenue South	Vicinity of Royal Brougham Way	Vicinity of Royal Brougham Way	Partial			1 year			0	0	0	No	15
CID-2a*	South Jackson Street	5th Avenue South Intersection	5th Avenue South Intersection	Partial					6 months	11	8	5	Yes	19
CID-2b	5th Avenue South	South Jackson Street	South Weller Street	Partial			1 year			0	0	0	No	16
CID-2b	6th Avenue South	Vicinity of Royal Brougham Way	Vicinity of Royal Brougham Way	Partial			6 months			0	0	0	No	15

* 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.

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] Construction for the diagonal station configuration for Alternative CID-2a would have minimal effects on transit operations.

[b] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

[c] No access to Ryerson Bus Base except from South Royal Brougham Way.

[d] Approximate number of routes based on 2018 routing to bases.

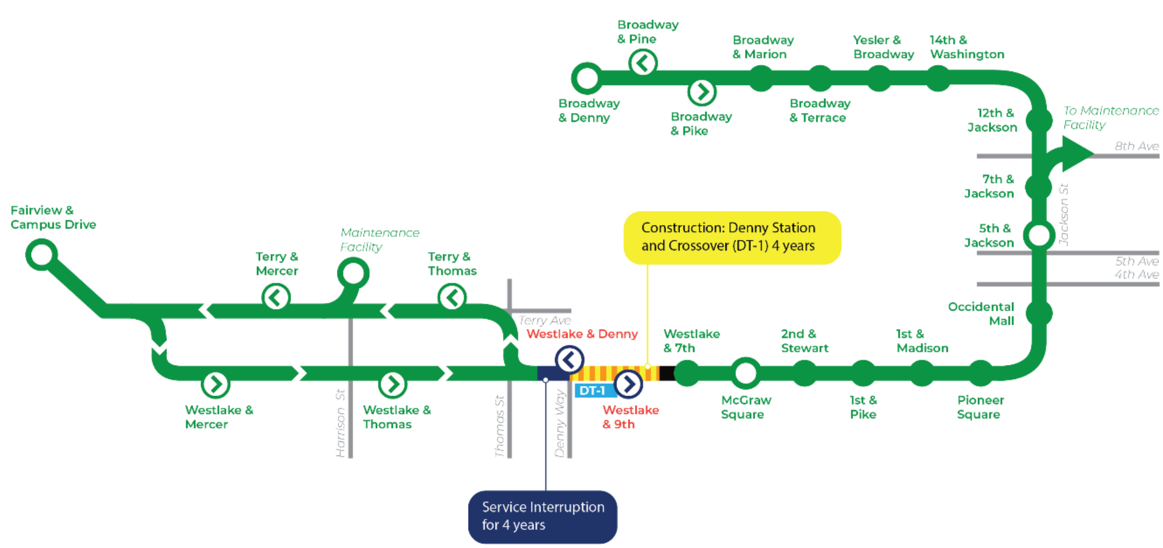
[e] Includes closure of intersections with 2nd Avenue Extension and 4th Avenue South Street.

Downtown Segment

Under Preferred Alternative DT-1, the following roadway closures are expected during construction that would affect transit services (Table 3-37):

- Harrison Street, affecting METRO CONNECTS Routes 1061 (similar to the western section of current Route 8), 2516 (similar to current Route 255, but with an extension to South Lake Union), and 3028 (not similar to an existing Metro route).
- Pine Street, affecting METRO CONNECTS Routes 1068 (similar to existing Route 11), 1213 (similar to existing Route 10), 3122 (similar to existing Route 49), and 3123 (not similar to an existing Metro route).
- Westlake Avenue affecting Route 40, the RapidRide C Line, and the South Lake Union Streetcar. The streetcar and vehicular traffic—including buses—would not be able to travel through this segment. However, the streetcar may be able to continue to operate in South Lake Union and Downtown/First Hill, but not as a connected system as it is assumed the City's Center City Connector project is built prior to this project's construction (Figure 3-8). 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. Alternative construction approaches that could allow for single-track operations of the streetcar and maintain access to the maintenance facility during construction are being considered for this location that could substantially reduce the impact to streetcar service through this segment. These alternative approaches would still require Westlake Avenue to be fully closed to buses and general purpose traffic and would likely result in additional road closures in the area as well as requiring temporary closure or relocation of one or more streetcar stops in this construction area. In addition, streetcar service in this segment would need to be halted for a period of weeks to install improvements needed to enable temporary operations through the construction area and then transition back to normal operations.

Figure 3-8. Seattle Streetcar Construction Impacts – Alternative DT-1



Trolley bus routes operating on Pine Street and Madison Street would be affected when overhead wires are de-energized during construction.

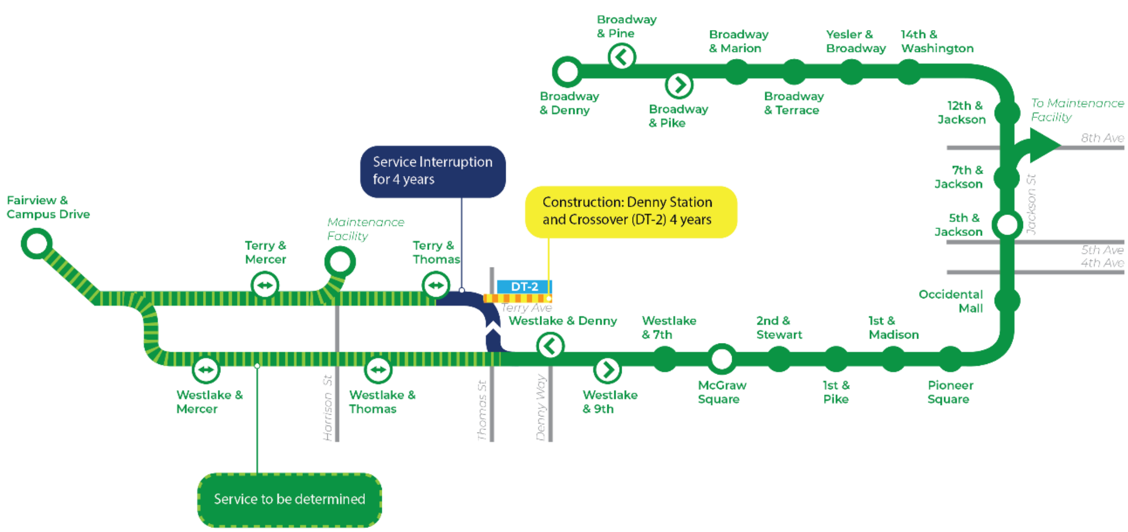
For Preferred Alternative DT-1 to connect to Alternative CID-1a*, Option CID-1b*, or Option CID-2b in the Chinatown-International District Segment, the alignment between the Chinatown-International District Segment and the Midtown Station would need to be deeper, which would require construction roadway closures for construction of the Midtown Station. This includes a closure of a portion of Madison Street, affecting the RapidRide G Line.

In addition to the closures noted above for Preferred Alternative DT-1, construction activities at the intersection of 1st Avenue North and Republican Street could impact trolley bus operations, necessitating short-term, off-wire bus service or temporarily shifting the overhead trolley wire system to maintain operations.

Under Alternative DT-2, there would be three closures that would affect transit services:

- Pine Street, affecting METRO CONNECTS Routes 1068 (similar to existing Route 11), 1213 (similar to existing Route 10), 3122 (similar to existing Route 49), and 3123 (not similar to an existing Metro route). Closure of the existing Westlake Station entrance on Pine Street between 5th Avenue and 6th Avenue would also be required; however, the station and its other entrances would remain open.
- Taylor Avenue North, affecting METRO CONNECTS Routes 1220 (similar to existing Route 4).
- Terry Avenue, affecting the Seattle Streetcar because of the closure of the intersection of Thomas Street and Terry Avenue North. The streetcar would not be able to travel northbound through the closure, which could impact the frequency and headway of the streetcar system (Figure 3-9). See Section 3.3.3.2 for more information on potential mitigation that could reduce impacts to the streetcar system.

Figure 3-9. Seattle Streetcar Construction Impacts – Alternative DT-2



In addition to the full closures noted above for Alternative DT-2, portions of Mercer Street would be partially closed for several years. The partial closure of Mercer Street would affect three Metro routes and could impact trolley bus operations, necessitating short-term, off-wire bus service or temporarily shifting the overhead trolley wire system to maintain operations.

Table 3-37. Key Arterial Roadway Closures Affecting Transit Routes - Downtown Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]	Streetcar Routes Affected [a]
DT-1	4th Avenue	Columbia Street	James Street	Partial	6 years					0	0	0	No
DT-1	4th Avenue	Madison Street Intersection	Madison Street Intersection	Partial		4 years				1	1	0	No
DT-1	4th Avenue	Marion Street	Madison Street	Partial	6 years					0	0	0	No
DT-1	4th Avenue	Pine Street	Olive Way	Full	2 years					0	0	0	No
DT-1	5th Avenue	Madison Street	Columbia Street	Full	1.5 years					0	0	0	No
DT-1	5th Avenue	Union Street	Pike Street	Partial	6 years					0	0	0	No
DT-1	7th Avenue	Westlake Avenue	Lenora Street	Partial	4 years					0	0	0	No
DT-1	8th Avenue	Westlake Avenue	Blanchard Street	Partial	4 years					0	0	0	No
DT-1	Blanchard Street	8th Avenue	Westlake Avenue	Partial		5 years				1	0	0	No
DT-1	Cherry Street	3rd Avenue	5th Avenue	Full	1 year					0	0	0	No

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]	Streetcar Routes Affected [a]
DT-1	Harrison Street	6th Avenue North	Dexter Avenue North	Full		4 years				1	1	1	No
DT-1	Harrison Street	7th Avenue North Intersection	7th Avenue North Intersection	Partial			1.5 years			4	0	2	No
DT-1	Harrison Street	Dexter Avenue North	8th Avenue North	Partial		1.5 years				1	1	1	No
DT-1	Madison Street	4th Avenue	5th Avenue	Full/Partial (depending on connection option)		1 to 3 years				1	0	0	No
DT-1	Pike Street	4th Avenue	5th Avenue	Partial		6 years				2	0	2	No
DT-1	Pine Street	4th Avenue	5th Avenue	Full		6 years				3	1	3	No
DT-1	West Republican Street	Queen Anne Avenue North	Warren Avenue North	Full	5 years					0	0	0	No
DT-1	Westlake Avenue	7th Avenue	Denny Way	Full		4 years				2	0	1	Yes
DT-2	6th Avenue	University Street	Madison Street	Partial		1 year				2	0	0	No

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]	Streetcar Routes Affected [a]
DT-2	6th Avenue	Olive Way	Stewart Street	Full	6 years					0	0	0	No
DT-2	I-5 SB Offramp	At James Street	At James Street	Partial	6 years					0	0	0	No
DT-2	Mercer Street	Warren Avenue North	1st Avenue West	Partial			3.5 years			4	3	2	No
DT-2	Pine Street	5th Avenue	6th Avenue	Full		4 years				3	1	3	No
DT-2	Taylor Avenue North	Mercer Street	Roy Street	Full		4 years				1	0	0	No
DT-2	Terry Avenue North	Denny Way	Thomas Street	Full		4 years				0	0	0	Yes

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

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 Routes 15, 17, 18, and 32 and the RapidRide D Line (Table 3-38). Transit performance would also be affected by the partial closure of 15th Avenue West for Alternative SIB-2 and Alternative SIB-3.

Table 3-38. Key Arterial Roadway Closures Affecting Transit Routes - South Interbay Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
SIB-1	Elliott Avenue West	West Republican Street	West Galer Street	Partial			1.5 years			3	3	2
SIB-1	West Republican Street	3rd Avenue West	5th Avenue West	Full	5 years					0	0	0
SIB-2	15th Avenue West	West Barrett Street	West Howe Street	Partial			1 year			2	3	0
SIB-2	Elliott Avenue West	West Republican Street	West Galer Street	Partial			9 months			3	3	2
SIB-2	West Republican Street	3rd Avenue West	5th Avenue West	Full	5 years					0	0	0
SIB-3	15th Avenue West	West Barrett Street	West Howe Street	Partial			9 months			2	3	0

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

Interbay/Ballard Segment

All of the alternatives in the Interbay/Ballard Segment could require short-term deactivation of the trolley wire along Northwest Market Street, affecting transit routes that travel along this street.

All of the alternatives would also have varying effects on multiple transit routes along 15th Avenue West. 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. See Table 3-39 for a list of key construction street closures that would affect buses in the Interbay/Ballard Segment. For a more detailed list of construction street closures, see Table 4-51.

Table 3-39. Key Arterial Roadway Closures Affecting Transit Routes - Interbay/Ballard Segment

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
IBB-1a	14th Avenue Northwest	Northwest 45th Street	Northwest 51st Street	Full	3 years					0	0	0
IBB-1a	14th Avenue West	West Emerson Street Intersection	West Emerson Street Intersection	Full	1.5 years					0	0	0
IBB-1a	16th Avenue Northwest	West Bertona Street	Thorndyke Avenue West	Full	3 years					0	0	0
IBB-1a	17th Avenue Northwest	West Dravus Street	16th Avenue Northwest	Full	3 years					0	0	0
IBB-1a	West Emerson Street	13th Avenue West	14th Avenue West	Full	1.5 years					0	0	0
IBB-1b	14th Avenue Northwest	Northwest 45th Street	Northwest 51st Street	Full	3 years					0	0	0
IBB-1b	14th Avenue Northwest	Northwest 52nd Street	Northwest 58th Street	Full	3 years					0	0	0
IBB-1b	15th Avenue West	West Dravus Interchange	West Emerson Street Interchange	Partial			6 months			2	3	0
IBB-1b	15th Avenue West On- and Off-ramps	West Dravus Street	West Dravus Street	Full		3 years				2	0	0

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
IBB-1b	14th Avenue West	West Emerson Street Intersection	West Emerson Street Intersection	Partial	6 months					0	0	0
IBB-1b	West Emerson Street	13th Avenue West	14th Avenue West	Full	1 year					0	0	0
IBB-2a*	14th Avenue Northwest	Northwest 52nd Street	Northwest 58th Street	Full	3 year					0	0	0
IBB-2a*	15th Avenue West	West Dravus Interchange	West Emerson Street Interchange	Partial			6 months			2	3	0
IBB-2a*	16th Avenue Northwest	West Bertona Street	Thorndyke Avenue West	Full	3 years					0	0	0
IBB-2a*	17th Avenue Northwest	West Dravus Street	16th Avenue Northwest	Full	3 years					0	0	0
IBB-2b*	15th Avenue West	West Dravus Interchange	West Emerson Street Interchange	Partial			6 months			2	3	0
IBB-2b*	Northwest Market Street	at 15th Avenue Northwest	at 15th Avenue Northwest	Partial			3 years			3	1	0
IBB-2b*	16th Avenue Northwest	West Bertona Street	Thorndyke Avenue West	Full	3 years					0	0	0
IBB-2b*	17th Avenue Northwest	West Dravus Street	16th Avenue Northwest	Full	3 years					0	0	0

Alternative	Affected Street	From Street	To Street	Closure Type	# of Buses: Minimal per Hour	# of Buses: 5 to 40 per Hour	# of Buses: 41 to 100 per Hour	# of Buses: 101 to 200 per Hour	# of Buses: >200 per Hour	Frequent/ RapidRide Routes Affected [a]	Express Routes Affected [a]	Local Routes Affected [a]
IBB-3	15th Avenue West	West Dravus Interchange	West Emerson Street Interchange	Partial			6 months			2	3	0
IBB-3	15th Avenue West On- and Off-ramps	West Dravus Street	West Dravus Street	Full		3 years				2	0	0

* 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.

Notes:

Non-arterial roadway closures are not shown as the potential transit impacts would be expected to be less than an arterial roadway closure.

Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[a] The type and number of bus routes affected is based on METRO CONNECTS and the assumed frequencies for different types of bus services.

3.3.3 Potential Mitigation Measures

3.3.3.1 Long-Term 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 plan as described in the Transit Service and Facilities section of Section 3.3.2.2. 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, the SODO Busway, and access to the Metro Ryerson and Atlantic/Central bus bases. These impacts would be addressed through ongoing coordination between Sound Transit, the City of Seattle, Metro, and the Federal Transit Administration 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.

3.3.3.2 Construction Impacts

Sound Transit would coordinate with Metro, City of Seattle, and the Federal Transit Administration, 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 implement 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 4.3.3 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 implement 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, 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, Federal Transit Administration, 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 Alternative CID-2a (with the diagonal station configuration) and Option CID-2b. If any of the Downtown and Chinatown-International District segment alternatives (besides Alternative CID-2a and Option CID-2b) are advanced, Sound Transit would coordinate with the City of Seattle, Federal Transit Administration, 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 or other track work or temporary passenger stations along the streetcar alignment to maintain streetcar service during construction, where feasible. For example, under Alternative DT-2, additional track could be installed in the vicinity of Westlake Avenue North and Harrison Street to maintain streetcar service during construction.

4 ARTERIAL AND LOCAL STREET OPERATIONS

This section presents the following information for the WSBLE Project:

- Existing operations of the arterials and local roadways in the study area and their intersection L.O.S.
- Future condition traffic forecasts and light rail station trip generation.
- Future No Build Alternative and Build Alternative traffic operations and peak hour intersection L.O.S. compared to project-specific L.O.S. thresholds.
- Potential effects on local access to adjacent properties and traffic circulation.
- Construction impacts, including road closures, detours, traffic diversions, truck traffic and haul routes and, where appropriate, traffic analysis of certain construction impacts.

The arterial and local street analysis evaluates locations where traffic circulation, access, and operations are most likely to be affected by the WSBLE alternatives. The specific intersections studied vary by time period and alternative, as described further in this section.

4.1 Introduction to Arterial and Local Street Operations

This section describes the arterials and local roadway facilities, and intersection operations within the study area for existing conditions, future no build conditions, and Build Alternatives. The traffic forecasting and operations analysis methods are documented in the WSBLE *Transportation Technical Analysis Methodology* (Sound Transit 2020). While in general, intersections are considered to be failing if they do not meet the L.O.S. threshold set by the agency, the City of Seattle does not have an official intersection L.O.S. threshold. For the purposes of this analysis, failing intersections are defined as L.O.S. E or F as agreed to with the City of Seattle. For Build Alternatives, affected intersections are identified and 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 have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative) See Attachment N.1D, Existing and Future Intersection Levels of Service, for more detail. The following sections present key observations related to arterial and local street operations for the WSBLE Project.

4.1.1 West Seattle Link Extension

- All alternatives would generally result in increased intersection vehicle delays near the stations because of increased activity such as vehicle trips from passenger pick-ups and drop-offs, including transportation network company activity (e.g., Uber, Lyft) and pedestrians and bicyclists. Volumes range from less than 10 additional p.m. peak hour trips at the SODO Station to over 130 vehicle trips at the Alaska Junction Station. Bus volumes accessing the stations would also increase.
- There are no traffic operations differentiators at the study intersections for the three SODO Build Alternatives. Preferred Alternative SODO-1a and Option SODO-1b would construct a new Lander Street overpass, which would eliminate an at-grade vehicle crossing with the existing Central Link light rail and would close the SODO Busway. Alternative SODO-2 would allow the SODO Busway to remain open in this segment and maintain the existing at-grade crossing.
- There are no long-term traffic operations impacts with the Build Alternatives in the Duwamish Segment.

- Within the Delridge Segment, Alternative DEL-5 and Alternative DEL-6* would increase delay on Delridge Way Southwest because of the proposed signal at Delridge Way Southwest/23rd Avenue Southwest. There would also be some local street closures with several of the alternatives. The street grid network would allow for local rerouting.
- Within the West Seattle Junction Segment, there would be increased traffic delay at intersections adjacent to most of the Alaska Junction Station alternatives as a result of the added vehicle, pedestrian, and bicycle activity generated by the new station. While there would be some local street closures, the street grid network would allow for reroutes.
- Construction activities would affect traffic patterns and congestion particularly within the Delridge Segment for construction along Delridge Way Southwest, Southwest Genesee Street, Andover Street Southwest, and Avalon Way Southwest. The Lower Height Dakota Street Station alternatives (Preferred Alternative DEL-2a* and Option DEL-2b*) that lead to tunnel options into the West Seattle Junction typically have fewer traffic construction effects, because more of the alignments are outside of street rights-of-way. Construction activities along arterials in the West Seattle Junction Segment would also create substantial traffic diversions and increased congestion levels on arterial streets such as Fauntleroy Way Southeast, Southwest Avalon Way, and Southwest Alaska Street, as well as adjacent side streets.

4.1.2 Ballard Link Extension

- The alternatives would result in increased traffic activity near the new stations, with added vehicle trips from passenger pick-ups and drop-offs, including transportation network company activity. Volumes range from less than 10 additional p.m. peak hour trips at the SODO Station to over 250 trips at the Ballard Station. Bus volumes accessing the stations would also increase. Traffic conditions would also be affected adjacent to the Downtown Seattle stations due to high pedestrian volumes crossing the streets accessing the stations.
- There are few traffic operations differentiators at the study intersections for the three SODO Build Alternatives. Each would construct a new South Holgate Street overpass, which would eliminate an at-grade vehicle crossing with the existing Central Link light rail. Alternative SODO-2 would allow the SODO Busway to remain open in this segment.
- Within the Downtown, South Interbay, and Interbay/Ballard Segments, several intersections would show increased delay due to pick-up and drop-off activities and high pedestrian volumes. While different locations are affected between the Build Alternatives, there are no substantial traffic differentiators within these segments.
- The construction of underground stations in the Chinatown-International District and Downtown segments would disrupt several arterial streets for multiple years under each of the alternatives. In the Chinatown-International District Segment, construction of the alternatives along 4th Avenue South (Alternative CID-1a* and Option CID-1b*) would have the most extensive traffic effects due to the need for full or partial closures of the heavily traveled 4th Avenue South and connecting streets such as Seattle Boulevard South and South Jackson Street. Construction of the 5th Avenue South alternatives (Alternative CID-2a and Option CID-2b) would disrupt local traffic operations within the Chinatown-International District, but the broader traffic impacts would be less.
- Construction activities would also directly impact arterial and local roadways in the Downtown, South Interbay, and Interbay/Ballard segments, most notably Pine Street, Westlake Avenue, 15th Avenue West, West Dravus Street/15th Avenue West interchange, and 14th Avenue Northwest.

4.2 West Seattle Link Extension

4.2.1 Affected Environment

The West Seattle Link Extension includes the following segments: SODO, Duwamish, Delridge, and West Seattle Junction. This section includes discussion about the main vehicle travel through the study area and intersection operations. Roadway network and daily traffic volumes in the West Seattle Link Extension area are shown on Figure 4-1.

4.2.1.1 Arterials and Local Roadways

SODO Segment

The SODO Segment starts at the Link light rail SODO Station and continues south to South Forrest Street. The northern portions of SODO are included within the Ballard Link Extension project. The roadway network in the SODO neighborhood consists of a grid of arterials that serve industrial land uses and through movements for vehicles traveling north-south. Important north-south arterials in this segment are 1st Avenue South, 4th Avenue South, 6th Avenue South, and South Airport Way which provide connections to Downtown Seattle, a major employment center and a Puget Sound Regional Council-designated Regional Growth Center. 1st Avenue South and 4th Avenue South have higher traffic volumes as they also connect Downtown Seattle to State Route 99, the West Seattle Bridge, and Interstate 90. The east-west arterials of South Spokane Street and South Lander Street are also important connections; South Spokane Street connects to the West Seattle Bridge, Interstate 5, and Beacon Hill, while South Lander Street connects industrial land uses through SODO.

There are at-grade BNSF Railway 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.

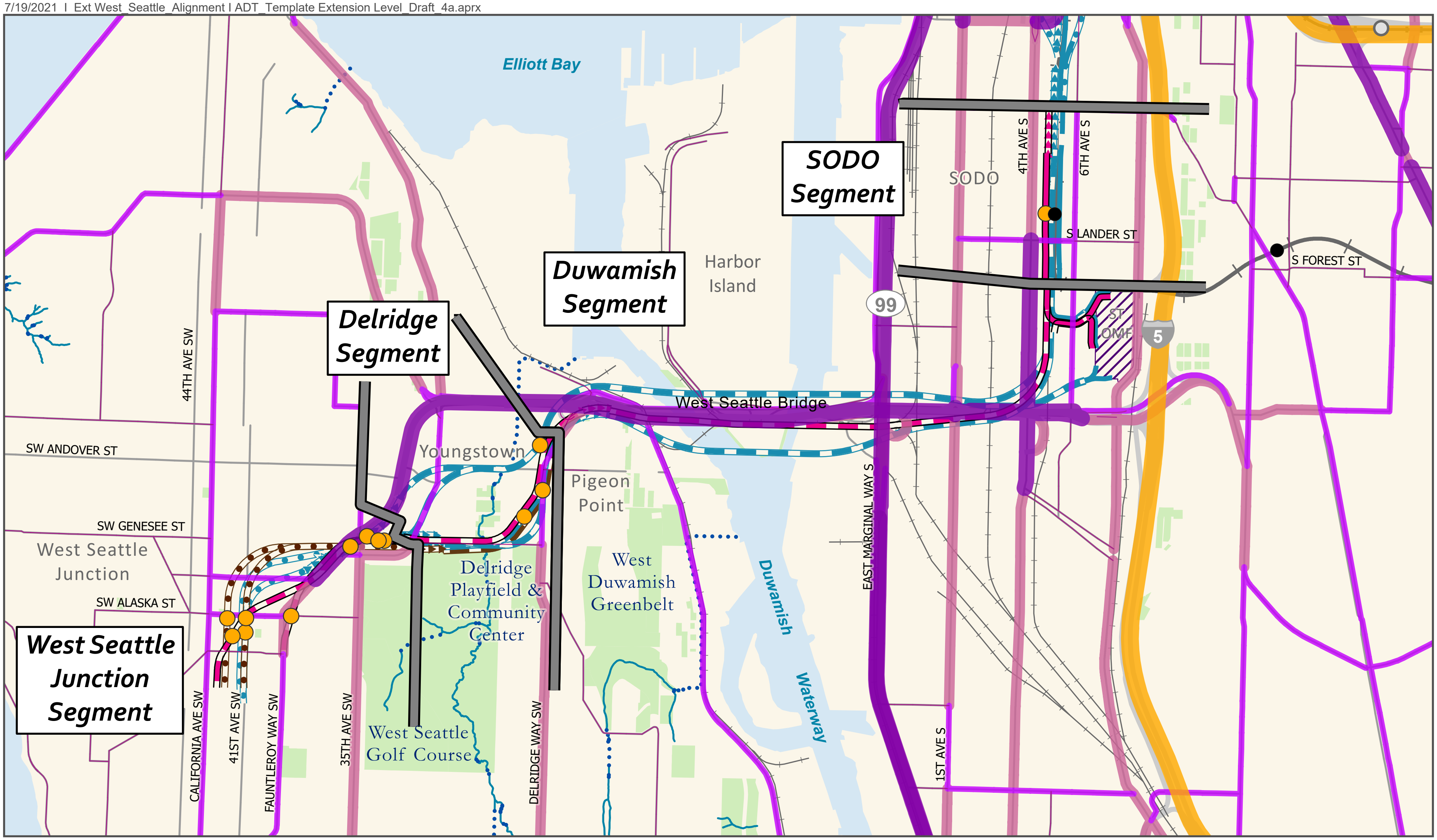
The SODO Busway is an important route for King County Metro (Metro) buses. Hundreds of daily active (i.e., routes in service carrying passengers) and non-active (i.e., deadhead) bus trips use the SODO Busway to access the Ryerson and Atlantic/Central bus bases. The existing Link light rail tracks are currently east of the SODO Busway, and there is an at-grade crossing with vehicle traffic on South Lander Street between 4th Avenue South and 6th Avenue South. The major existing street facilities and characteristics such as street classification, number of lanes, speed limit, average daily traffic (A.D.T.), and presence of bike lanes or sidewalks are shown in Table 4-1.

Table 4-1. Existing Local Roadway Segments – SODO Segment, West Seattle Link Extension

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
1st Avenue South	Principal	4 to 5	30	27,000 to 30,000	No	Yes
4th Avenue South	Principal	6	30	29,000 to 37,000	No	Yes
6th Avenue South	Minor	2	25	5,900 to 8,800	No	Partial
Airport Way South	Principal	4	30	11,200 to 21,100	No	Yes
South Lander Street	Minor	4 to 5	25	5,700 to 12,600	Yes	Yes
South Spokane Street	Minor	4	25	10,000	No	Yes

Note: The table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted (City of Seattle 2018).



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

Average Annual Weekday Traffic (2018)

≤8,000 17,000 32,000 100,000 > 100,000

0 0.5 1 Mile

N

FIGURE 4-1
Existing Daily Traffic Volumes
West Seattle Link Extension

West Seattle and Ballard Link Extensions

DRAFT: For internal discussion only. Not reviewed or approved on behalf of any party.

Duwamish Segment

The east-west connections across the Duwamish Waterway (also known as the Duwamish River) include lower South Spokane Street, which connects West Seattle, Harbor Island, and the Terminal 18 and 5 Port of Seattle facilities to SODO, and the elevated West Seattle Bridge, which connects West Seattle through Fauntleroy Way Southwest to SODO and Downtown Seattle. Lower Southwest Spokane Street also has a separated bicycle and pedestrian trail. The major street facilities and characteristics such as street classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-2.

Table 4-2. Existing Local Roadway Segments – Duwamish Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
Southwest Spokane Street	Principal	2 to 4	25	10,300	Yes	Yes
West Seattle Bridge	Principal	4 to 7	40 to 45	102,600	No	No

Note: The table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted (City of Seattle 2018).

[b] Includes one or more transit-only lanes.

Delridge Segment

In Delridge, the major arterial is north-south Delridge Way Southwest, which is a major transit corridor as well as one of the main access roads to the West Seattle Bridge. East-west travel is limited due to the terrain and park properties. The main east-west street is Southwest Genesee Street, which is a lower volume, 2-lane street. 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. East of Delridge Way Southwest, there are more residential land uses with relatively lower traffic volumes.

The major existing street facilities and characteristics such as street classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-3.

Table 4-3. Existing Local Roadway Segments – Delridge Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
Delridge Way Southwest	Principal	4 to 5 [b]	25	17,000 to 23,500	Yes	Yes
Southwest Genesee Street	Collector	2	25	4,000	No	Yes

Note: The table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted (City of Seattle 2018).

[b] Includes one or more transit-only lanes.

West Seattle Junction Segment

In West Seattle, the existing roadway network is a mix of arterials that connect neighborhoods to Alaska Junction and to the West Seattle Bridge, along with 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 connects to most residential neighborhoods in West Seattle. The other north-south arterials are California Avenue Southwest, which provides access to Alaska Junction and Admiral Junction, and 35th Avenue Southwest, which provides access to the West Seattle Bridge from communities to the south.

Both of these arterials are major transit corridors. Southwest Alaska Street is the main east-west arterial connecting West Seattle neighborhoods to Alaska Junction and Fauntleroy Way Southwest. Southwest Oregon Street is another east-west arterial one block north of Alaska Street. The major existing street facilities and characteristics such as street classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-4.

Table 4-4. Existing Local Roadway Segments – West Seattle Junction Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
35th Avenue Southwest	Principal	3 to 4	25	5,200 to 22,600	No	Yes
Avalon Way Southwest	Minor	2 to 3	25	14,800 to 20,200	Yes	Yes
California Avenue Southwest	Minor	4	25	10,000 to 13,600	Yes	Yes
Fauntleroy Way Southwest	Principal	3 to 4	25	29,700 to 37,000	Yes	Yes
Southwest Alaska Street	Minor	3 to 4 [b]	25	7,400 to 13,400	No	Yes
Southwest Oregon Street	Minor	2	25	9,500	No	Yes

Note: The table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted (City of Seattle 2018).

[b] Includes one or more transit-only lanes.

4.2.1.2 Intersection Operations

Key intersections adjacent to potential station areas were evaluated during peak hours to better understand existing traffic operations. All analysis intersections were evaluated during the a.m. and p.m. peak hour. For the a.m. and p.m. peak hour analysis, the peak 1-hour traffic count for each intersection (between 6 a.m. and 8 a.m. and 4 p.m. and 6 p.m.) was entered into the traffic analysis software. While the p.m. peak hour generally represents the most congested period of the day, some locations have worse a.m. operations as a result of local land uses and traffic patterns.

Intersection operations were evaluated by calculating the average delay (in seconds) per vehicle and translating that delay into a qualitative L.O.S. The L.O.S. ranges from A to F, where L.O.S. A represents little to no congestion with under-used lane capacity and free-flow travel speeds, 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. There are separate L.O.S. delay thresholds for signalized intersections and unsignalized intersections, as defined by the *Highway Capacity Manual* (Transportation Research Board 2016). For additional information, see Attachment N.1D.

Intersections are generally considered to be failing if they do not meet the L.O.S. threshold set by the governing agency; however, the City of Seattle does not have an adopted intersection L.O.S. threshold. In the absence of an adopted City of Seattle L.O.S. threshold, intersections that operate at L.O.S. E and L.O.S. F are identified as failing within this section as agreed upon by the City of Seattle. Attachment N.1D provides a detailed summary of the traffic analysis results for the existing a.m. and p.m. peak hour conditions, signal control, and the applicable L.O.S. threshold.

SODO Segment

In SODO, the majority of vehicles travel north in the a.m. peak period towards Seattle and reverse directions during the p.m. peak period. There are three main north-south corridors in SODO that help to ease congestion during peak periods. In the SODO Segment, peak hour analysis was performed at four intersections; the results are shown in Table 4-5. Currently, all intersections operate at L.O.S. D or better during the a.m. and p.m. peak hours. Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown on Figure 4-2.

Table 4-5. P.M. and A.M. Peak Intersection Level of Service - SODO Segment, West Seattle and Ballard Link Extensions

Intersection	Existing P.M.	Existing A.M.
4th Avenue South/South Holgate Street	C	D
4th Avenue South/South Lander Street	D	D
6th Avenue South/South Holgate Street	C	B
6th Avenue South/South Lander Street	B	B

Duwamish Segment

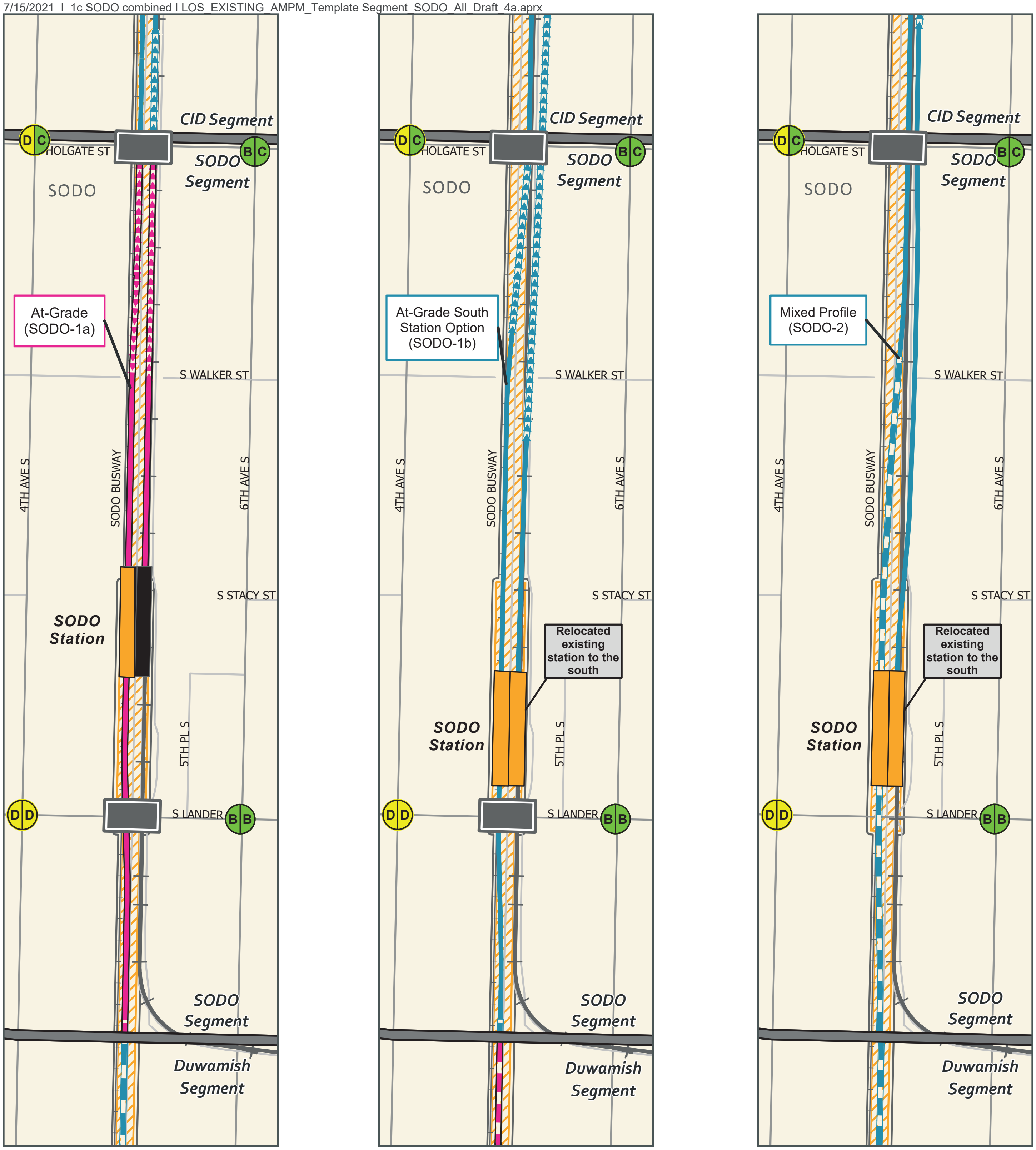
Across the Duwamish Waterway, the seven study intersections currently operate at L.O.S. D or better during both a.m. and p.m. peak hours. Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown in Table 4-6 and on Figure 4-3.

Table 4-6. P.M. and A.M. Peak Level of Service - Duwamish Segment

Intersection	Existing P.M.	Existing A.M.
4th Avenue South/South Spokane Street (North)	A	A
4th Avenue South/South Spokane Street (South)	B	D
Chelan Avenue Southwest/Southwest Spokane Street	B	B
East Marginal Way/South Spokane Street [a]	A	A
Southwest Spokane Street/11th Avenue Southwest	A	A
Southwest Spokane Street/West Marginal Way/Terminal 5	A	A
West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street	D	D

[a] Higher delays can be experienced from nearby port and terminal operations in the area.

7/15/2021 I 1c SODO combined I LOS_EXISTING_AMPM_Template Segment_SODO_All_Draft_4a.aprx



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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

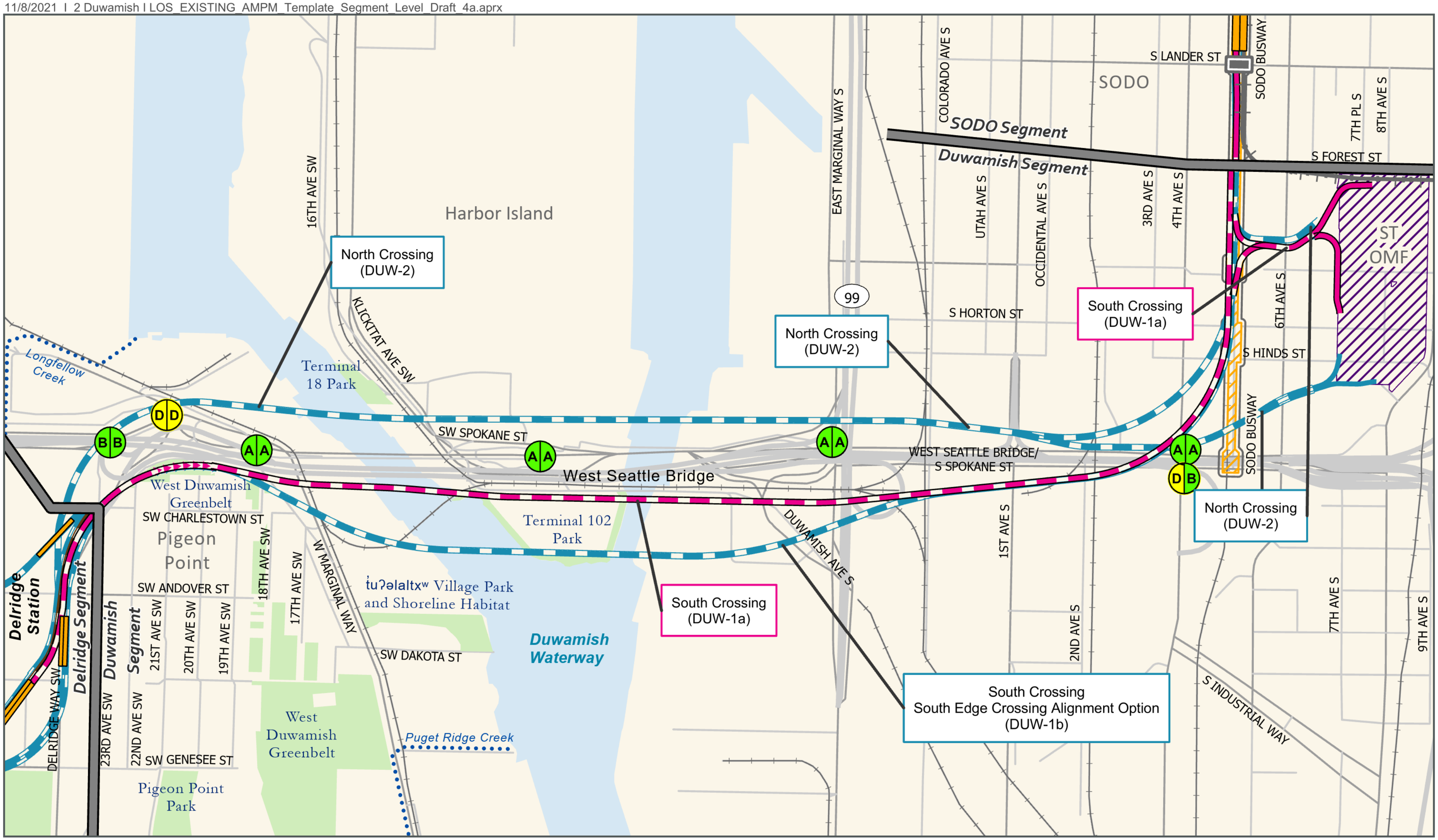
Intersection Type

- Stop-Controlled
- Signalized

0 300 600 Feet N

FIGURE 4-2
Existing A.M. and P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions



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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

Intersection Type
- Stop-Controlled
- Signalized

0 800 1,600 Feet
N

FIGURE 4-3
Existing A.M. and P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Duwamish Segment

West Seattle and Ballard Link Extensions

Delridge Segment

In Delridge, the predominant flow of traffic is along Delridge Way Southwest, northbound in the morning and southbound in the afternoon. Four study intersections were analyzed in the Delridge Segment. Southwest Dakota Street/Delridge Way Southwest is side-street stop-controlled, Delridge Way Southwest/23rd Avenue Southwest is right-turn-only out of 23rd Avenue Southwest, and the other intersections are signalized. During the p.m. peak hour, the peak direction of travel is southbound on Delridge Way Southwest with vehicle queues that can extend to the West Seattle Bridge. During the a.m. peak hour, the peak direction of travel is northbound on Delridge Way Southwest and 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: Delridge Way Southwest/Southwest Andover Street (L.O.S. F in both peak hours) and Delridge Way Southwest/Southwest Genesee Street (L.O.S. F in the p.m. peak hour).

Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown in Table 4-7 and on Figure 4-4.

Table 4-7. P.M. and A.M. Peak Level of Service - Delridge Segment

Intersection	Existing P.M.	Existing A.M.
Delridge Way Southwest/23rd Avenue Southwest	C	C
Southwest Andover Street/Delridge Way Southwest	F	F
Southwest Dakota Street/Delridge Way Southwest	C	D
Southwest Genesee Street/Delridge Way Southwest	D	F

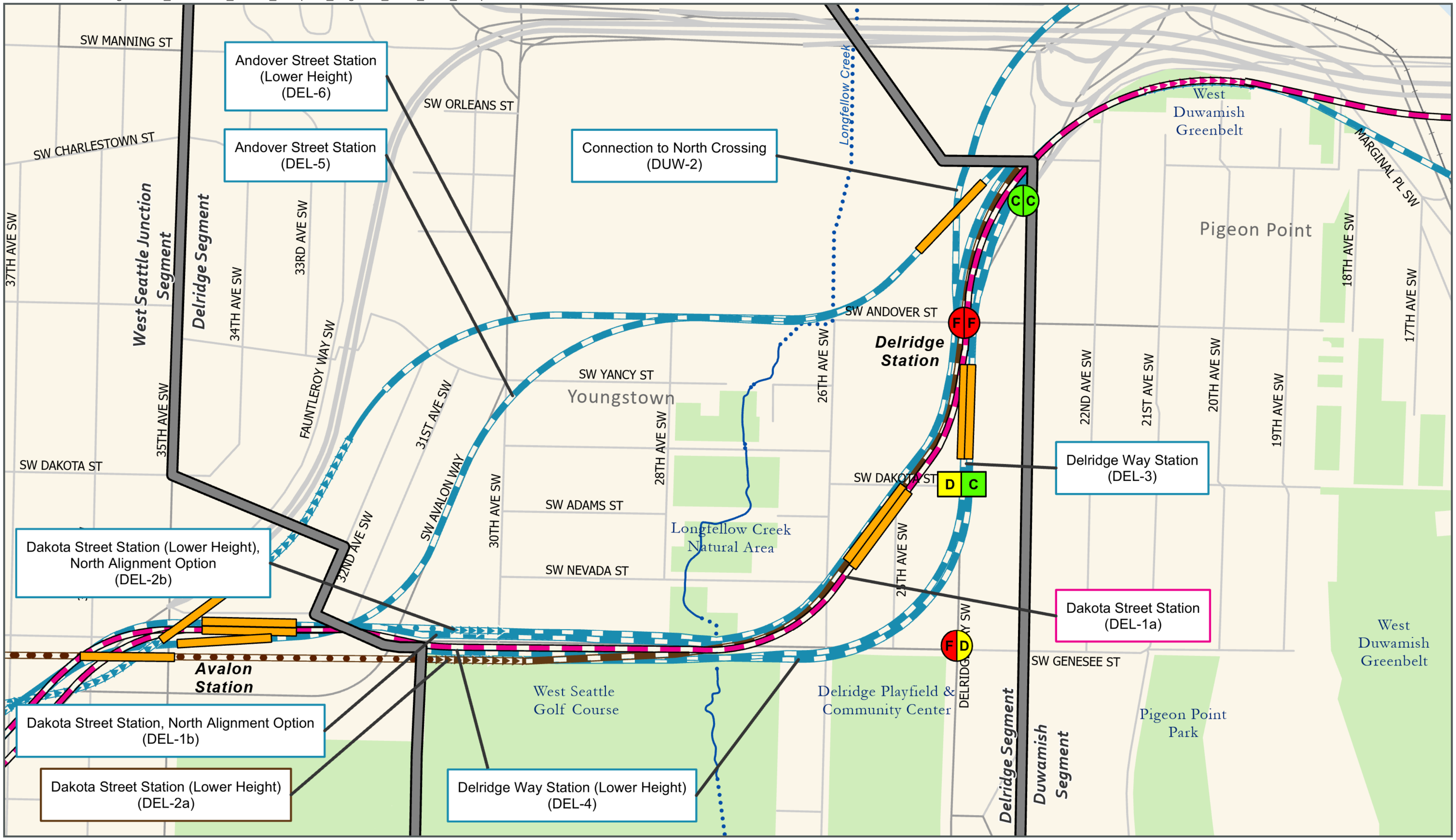
West Seattle Junction Segment

In the West Seattle Junction Segment, 17 intersections were evaluated near the Alaska Junction Station and Avalon Station options. During the p.m. peak hour, the peak directional travel is westbound on Southwest Alaska Street and southbound on Fauntleroy Way and 35th Avenue Southwest. In the a.m. period, the majority of vehicles are traveling northbound towards the West Seattle Bridge to Downtown Seattle or other regional destinations. Five intersections operate at L.O.S. E or F in either a.m. or p.m. peak hours:

- California Avenue Southwest and Southwest Alaska Street (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- California Avenue Southwest and Southwest Edmunds Street (L.O.S. E in p.m. peak hour).
- Fauntleroy Way Southwest and 35th Avenue Southwest (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Fauntleroy Way Southwest and 38th Avenue Southwest (L.O.S. F in p.m. peak hour).
- Southwest Avalon Way and Southwest Genesee Street (L.O.S. F in both peak hours).

Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown in Table 4-8 and on Figure 4-5.

11/8/2021 I 3 Delridge I LOS_EXISTING_AMPM_Template_Segment_Level_Draft_4a.aprx



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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

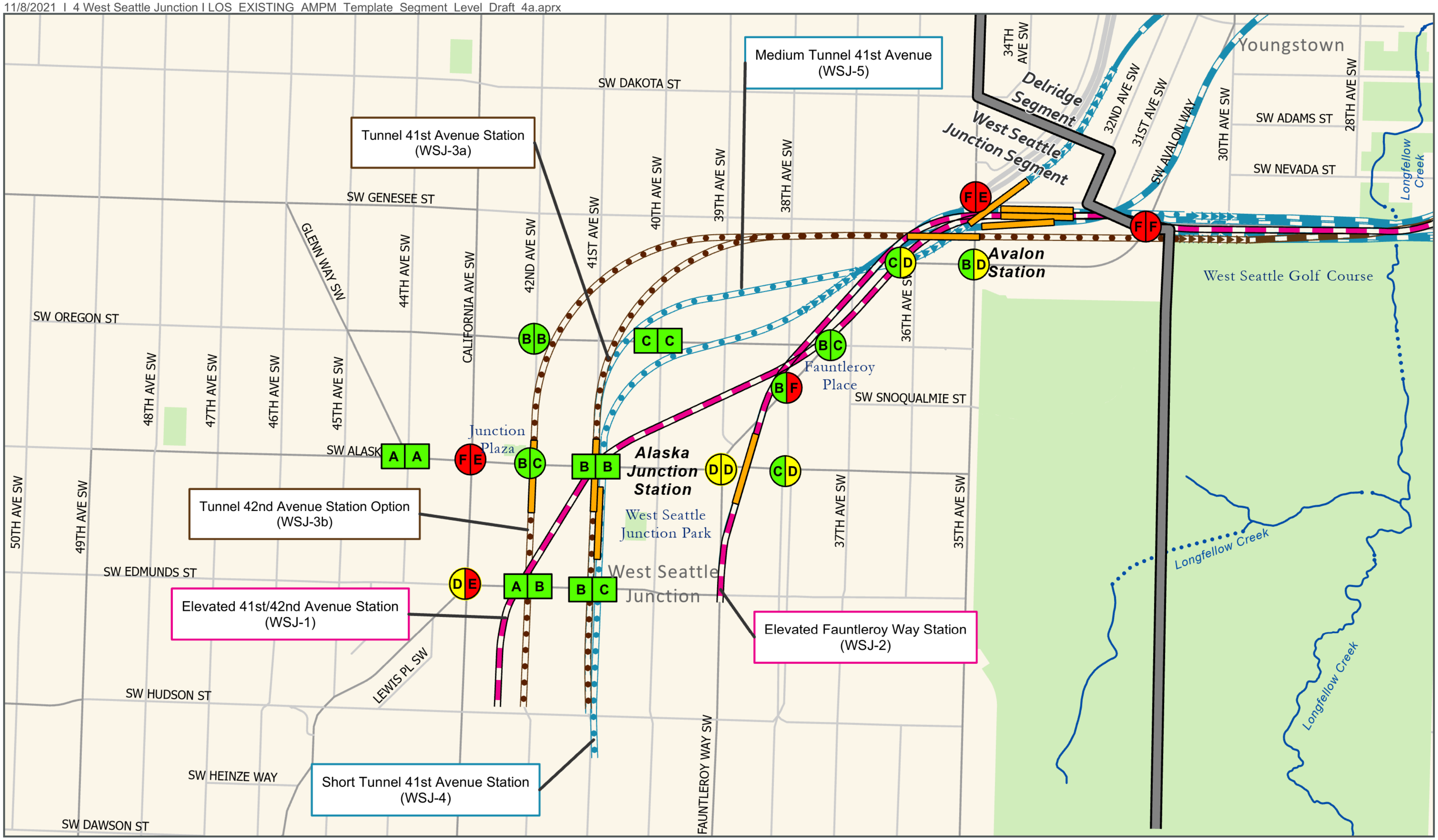
Intersection Type

Stop-Controlled Signalized

FIGURE 4-4
Existing A.M. and 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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

Intersection Type

- Stop-Controlled
- Signalized

0 500 1,000 Feet N

FIGURE 4-5
Existing A.M. and 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

Intersection queues are evident during the a.m. and p.m. peak hours at the Southwest Alaska Street/Fauntleroy Way Southwest intersection, and during the p.m. peak hour at the Southwest Alaska Street/California Avenue Southwest intersection.

Table 4-8. P.M. and A.M. Peak Level of Service - West Seattle Junction Segment

Intersection	Existing P.M.	Existing A.M.
35th Avenue Southwest/Southwest Avalon Way	D	B
40th Avenue Southwest/Southwest Oregon Street	C	C
41st Avenue Southwest/Southwest Alaska Street	B	B
41st Avenue Southwest/Southwest Edmunds Street	C	B
42nd Avenue Southwest/Southwest Alaska Street	C	B
42nd Avenue Southwest/Southwest Edmunds Street	B	A
42nd Avenue Southwest/Southwest Oregon Street	B	B
44th Avenue Southwest/Southwest Alaska Street	A	A
California Avenue Southwest/Southwest Alaska Street	E	F
California Avenue Southwest/Southwest Edmunds Street	E	D
Fauntleroy Way Southwest/35th Avenue Southwest	E	F
Fauntleroy Way Southwest/38th Avenue Southwest	F	B
Fauntleroy Way Southwest/Southwest Alaska Street	D	D
Fauntleroy Way Southwest/Southwest Avalon Way	D	C
Fauntleroy Way Southwest/Southwest Oregon Street	C	B
Southwest Alaska Street/38th Avenue Southwest	D	C
Southwest Avalon Way/Southwest Genesee Street	F	F

4.2.2 Environmental Impacts

This section describes the property access and circulation and roadway and traffic conditions for the Build Alternatives compared to the No Build Alternative, organized by segment as well as during construction.

4.2.2.1 No Build Alternative

As part of the No Build Alternative, other transportation projects in the study area assumed to be completed 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 Duwamish Segment. 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 Appendix A, Future Transportation Project List, in Attachment N.1A, Transportation Technical Analysis Methodology 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). Forecasts within 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, intersections are expected to operate worse in the future under the no build condition than in 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 (see Figures 4-6 through 4-19).

4.2.2.2 Long-term Impacts

The long-term traffic impacts were evaluated using 2032 and 2042 traffic forecasts and include the effects of additional buses accessing the stations, vehicle traffic (pick-up, drop-off, and transportation network company activity) and non-motorized volumes generated by the Build Alternatives. The interim terminus condition is conducted for year 2032 conditions when the West Seattle Link Extension terminates at the SODO Station without the Ballard Link Extension.

Beyond the results presented in this section, Attachment N.1D provides a detailed summary of the traffic analysis results for the existing a.m. and p.m. peak hour conditions, signal control, and potentially affected intersections with the project. In general intersections are considered to be failing if they do not meet the L.O.S. threshold set by the agency; however, the City of Seattle does not have an official intersection L.O.S. threshold. For the purposes of this analysis, failing intersections are defined as L.O.S. E or F as agreed to with the City of Seattle.

Property Access and Circulation

This section describes the main roadway modifications and traffic circulation changes under the No Build Alternative and proposed with 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 drawings in Appendix J of the Draft Environmental Impact Statement show additional detail about each alternative.

SODO Segment

No Build Alternative

The No Build Alternative assumed completion of the Lander Street Bridge project, which constructs a new vehicle overpass between 1st Avenue South and 4th Avenue South and eliminates an at-grade crossing with the BNSF Railway rail line.

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would build a new South Lander Street vehicle overpass elevated above the light rail tracks between 4th Avenue South and 6th Avenue South. The overpass could affect access to the adjacent United States Postal Service garage; alternative access and egress from this garage would be provided on 4th Avenue South. The South Lander Street overcrossing would eliminate an existing at-grade conflict with the existing Central Link light rail, which interrupts the traffic flow accessing adjacent properties and east-west traffic circulation at one of the few places to cross existing tracks.

Preferred Alternative SODO-1a would close the SODO Busway permanently. There are fewer revenue bus trips in the future displaced from the busway, as some bus routes will be replaced with the completion of other Link extensions in the region. Permanent closure of the SODO

Busway would displace remaining buses to potential alternative routes along 4th Avenue South and 6th Avenue South. See the segment-specific arterial and local street information later in this section for effects to traffic operations, and see Section 3.2.2.2 for detailed information on the long-term effects to transit.

Other Build Alternative and Option (SODO-1b and SODO-2)

As with Preferred Alternative SODO-1a, Option SODO-1b would build a new South Lander Street vehicle overpass. Option SODO-1b includes a pedestrian crossing on the new overpass to accommodate bus transfers at the SODO Station. Both alternatives provide access to the SODO Station by constructing the east leg of the South Stacy Street/4th Avenue South intersection, as shown in the Draft Environmental Impact Statement drawings.

Option SODO-1b would close the SODO Busway permanently. The SODO Busway would be relocated to the west within the exiting right-of-way and remain open with Alternative SODO-2.

Duwamish Segment

No Build Alternative

The No Build Alternative assumed the Southwest Spokane Street/West Marginal Way/Terminal 5 intersection modification, which would remove the north leg. This is assumed to be completed as part of the Terminal 5 redevelopment by 2032.

All Build Alternatives (DUW-1a, DUW-1b, and DUW-2)

The Build Alternatives in this segment would not change any existing roadway channelization. All traffic movements would remain along public roadways and at private property access points. Notably, 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 near Terminal 5. There could be some traffic circulation and property access changes after construction related to properties that have been fully or partially acquired during construction.

Delridge Segment

No Build Alternative

The No Build Alternative assumed completion of the RapidRide H Line Corridor improvements along the Delridge Way Southwest corridor, which includes rechannelizing portions of the corridor for a business access transit lane in both the northbound and southbound directions. This segment also assumed completion of the 35th Avenue Southwest/Southwest Avalon Way Repaving project (i.e., 35th/Avalon Paving Project), which extends into the West Seattle Junction Segment, and includes rechannelization of Southwest Avalon Way and turn restrictions closer to Fauntleroy Way Southwest.

Preferred Alternative (DEL-1a) and Preferred Alternative with Third-Party Funding (DEL-2a*)

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. Left-turn access could be restricted in these sections with the median, but the street grid network would allow for local rerouting, such as using Southwest Nevada Street to maintain access to the properties.

Preferred Alternative DEL-2a* would close 25th Avenue Southwest below the station to through traffic. The street grid network would allow for local rerouting, such as using 26th Avenue

Southwest, Southwest Nevada Street, or Delridge Way Southwest to maintain access to properties.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

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 could be restricted in these sections with the median, but the street grid network would allow for local rerouting, such as using Southwest Nevada Street to maintain access to the properties.

Option DEL-2b* would close 25th Avenue Southwest below the station to through traffic, and close 30th Avenue Southwest north of Southwest Genesee Street. The street grid network would allow for local rerouting, such as using 26th Avenue Southwest, Southwest Nevada Street, or Delridge Way Southwest to maintain access to 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 on the southside of Southwest Andover Street west of 26th Avenue Southwest, but this is not expected to affect traffic circulation. 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 for local rerouting, such as using 30th Avenue Southwest or 32nd Avenue Southwest to maintain access to properties.

Alternative DEL-6* would construct a new median on Southwest Andover Street west of 26th Avenue Southwest to place columns for the elevated track which would restrict some left-turn access, but the street network would allow for rerouting, such as using Southwest Nevada Street or Southwest Dakota Street to maintain access to properties. A new traffic signal is also proposed 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.

West Seattle Junction Segment

No Build Alternative

The No Build Alternative assumes completion of the Fauntleroy Boulevard project and the 35th Avenue/Southwest Avalon Paving project.

Preferred Alternatives (WSJ-1 and WSJ-2)

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

Preferred Alternative and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*)

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

Other Build Alternatives (WSJ-4* and WSJ-5*)

Alternative WSJ-4* would close 38th Avenue Southwest north of Southwest Oregon Street and 37th Avenue Southwest north of Fauntleroy Way Southwest and create turnaround areas at the new street ends. These street closures would be needed to accommodate the elevated track's transition to a tunnel Alaska Junction Station. The existing street grid network in this area would allow vehicles to use other streets such as 39th Avenue Southwest to reach their destination.

Alternative WSJ-5* may close Southwest Genesee Street approaching 35th Avenue Southwest. Station access would occur on Southwest Genesee Street and with a new road connection between the station and Southwest Avalon Way, east of 35th Avenue Southwest. Alternative WSJ-5* would also modify the northbound approach at the Avalon Way Southwest/Southwest Genesee Street intersection to allow left-turn access to the drop-off and pick-up locations on Southwest Genesee Street near the station.

Travel Demand Forecasts

Traffic volumes were forecasted for the 2042 a.m. and p.m. peak hours for the West Seattle Link Extension based on Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Forecasts within the West Seattle Link Extension study area are predicted to have an average annual traffic volume growth rate in the study area of up to approximately 0.4 percent during the a.m. and p.m. peak hours in the No Build Alternative.

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. Station forecasts for the a.m. and p.m. peak hour are similar, but the boardings and alightings are inversely related. Three different types of station trips were estimated:

- Passenger drop-off and pick-up (including transportation network companies).
- Buses.
- Walk and bicycle trips (non-motorized trips).

The calculated increase in vehicle and non-motorized trips at each station were added to the No Build Alternative traffic volume forecasts to estimate traffic volumes with the Build Alternatives. This forecast process is conservative because it does not reduce background traffic growth to account for people changing their travel mode from driving with the No Build Alternative to using transit with the project.

These different trips associated with each station were assigned to the surrounding streets based on existing and future travel patterns and the location of the station facilities, such as transit stops, passenger pick-up and drop-off spaces, and entrances. The number of buses with the Build Alternatives were also adjusted based on the plan documented in the Transit Service Integration technical memorandum (Attachment N.1C). Beyond the changes to the vehicle trips around the station areas, the walk and bicycle trips generated at the stations were also incorporated into the traffic analysis, because this can affect intersection L.O.S. The walk and bicycle trips forecasted at each station were also an input to the pedestrian L.O.S. assessment in Section 6.3.2.2. None of the stations include park-and-ride lots.

Table 4-9 presents forecasts of trip activity at proposed and existing stations in the project corridor by mode for the 2032 p.m. peak hour interim terminus condition. Under the interim terminus condition, the highest level of station activity occurs at the SODO Station, as it includes a substantial number of transit transfers occurring within the station area. Trip generation at the remaining stations is relatively low due to the required transfer at SODO for trips into Downtown

Seattle and beyond as well as the King County Metro assumption that high-frequency bus service would continue operating within the project corridor into Downtown Seattle.

Table 4-10 presents forecasts of trip activity for the 2042 p.m. condition. As in 2032, the SODO Station has the highest number of boardings, but most of these are rail-to-rail transit transfers and do not involve new trips beyond the station area. Among the other stations, the Alaska Junction and Delridge stations have the highest number of new trips, mainly due to the density of surrounding land use and bus-to-rail transfers, respectively. Avalon Station, which is not anticipated to be a transfer hub and has relatively low land use density, has the lowest trip activity of any West Seattle Link Extension station.

Under the West Seattle and Ballard Link Extensions Minimum Operable Segment (M.O.S.), the West Seattle Link Extension is assumed to have an interim terminus at Delridge Station. Station trip generation was re-evaluated and presented in Section 3.2.2.2 as part of the transit ridership forecasts. Based on those forecasts, the peak hour trips (most notably pick-up, drop-off, and transit transfers) at the Delridge Station would increase in the M.O.S. compared to the full extension. The majority of the increased vehicle trips compared to the full extension are assumed to access the station from the west, because the Avalon and Alaska Junction stations would not be built. See Table 4-10 for the specific Delridge Station trip generation under the M.O.S.

Arterial and Local Street Operations

The a.m. and p.m. peak hour analysis for the No Build Alternative was evaluated for all study intersections. The p.m. peak hour generally represents the most congested period of the day and was therefore conducted for all Build Alternatives; however some locations may have worse a.m. operations due to local land uses and traffic patterns. The No Build Alternative a.m. analysis was one factor used to determine which locations warranted a.m. analysis in the Build Alternatives. See Attachment N.1A, Transportation Technical Analysis Methodology Report, for more detail.

Table 4-9. 2032 P.M. Peak Hour Station Trip Generation Forecasts by Mode – West Seattle Link Extension

Segment	Station	Walk and Bike	Drop-off/Pick-up [a]	Transit Transfers	Total Station Trips [b]
SODO	SODO – Build and (No Build)	600 (600)	50 (50)	1,500 (250)	2,100 (900)
Delridge	Delridge	50	50	100	150
West Seattle Junction	Avalon	50	50	50	100
West Seattle Junction	Alaska Junction	350	50	100	500

Note: Values in parentheses indicate forecasted ridership for the existing station only under the 2042 no build condition.

[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.

Table 4-10. 2042 P.M. Peak Hour Station Trip Generation Forecasts by Mode – West Seattle Link Extension

Segment	Station	Alternative	Walk and Bike	Drop-off/Pick-up [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 [d]	Alternative DEL-5 and Alternative DEL-6*	100	50	1,300	1,400
Delridge	Delridge	Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, Option DEL-2b*, Alternative DEL-3, and Alternative DEL-4*	150	50	1,300	1,500
Delridge	Delridge (M.O.S.)	All Build Alternatives	150	100	2,400	2,600
West Seattle Junction	Avalon	All Build Alternatives	150	50	100	250
West Seattle Junction	Alaska Junction	Preferred Alternative WSJ-1, Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*	700	100	600	1,500
West Seattle Junction	Alaska Junction	Preferred Alternative WSJ-2 and Alternative WSJ-5*	700	100	700	1,500

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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.

[d] Delridge Station with Andover Street Station alternatives.

Intersections are generally considered to be failing if they do not meet the L.O.S. threshold set by the governing agency; however, the City of Seattle does not have an adopted intersection L.O.S. threshold. In the absence of an adopted City of Seattle L.O.S. threshold, intersections that operate at L.O.S. E and L.O.S. F were identified as failing as agreed upon with the City of Seattle. For Build Alternatives, affected intersections are identified and 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 have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative). See Attachment N.1D for more detailed intersection L.O.S. and queuing results.

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 station access points.

SODO Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the SODO Segment are shown in Table 4-11 and Table 4-12 and on Figure 4-6 and Figure 4-7.

Table 4-11. 2042 P.M. Peak Intersection Level of Service - SODO Segment, West Seattle and Ballard Link Extensions

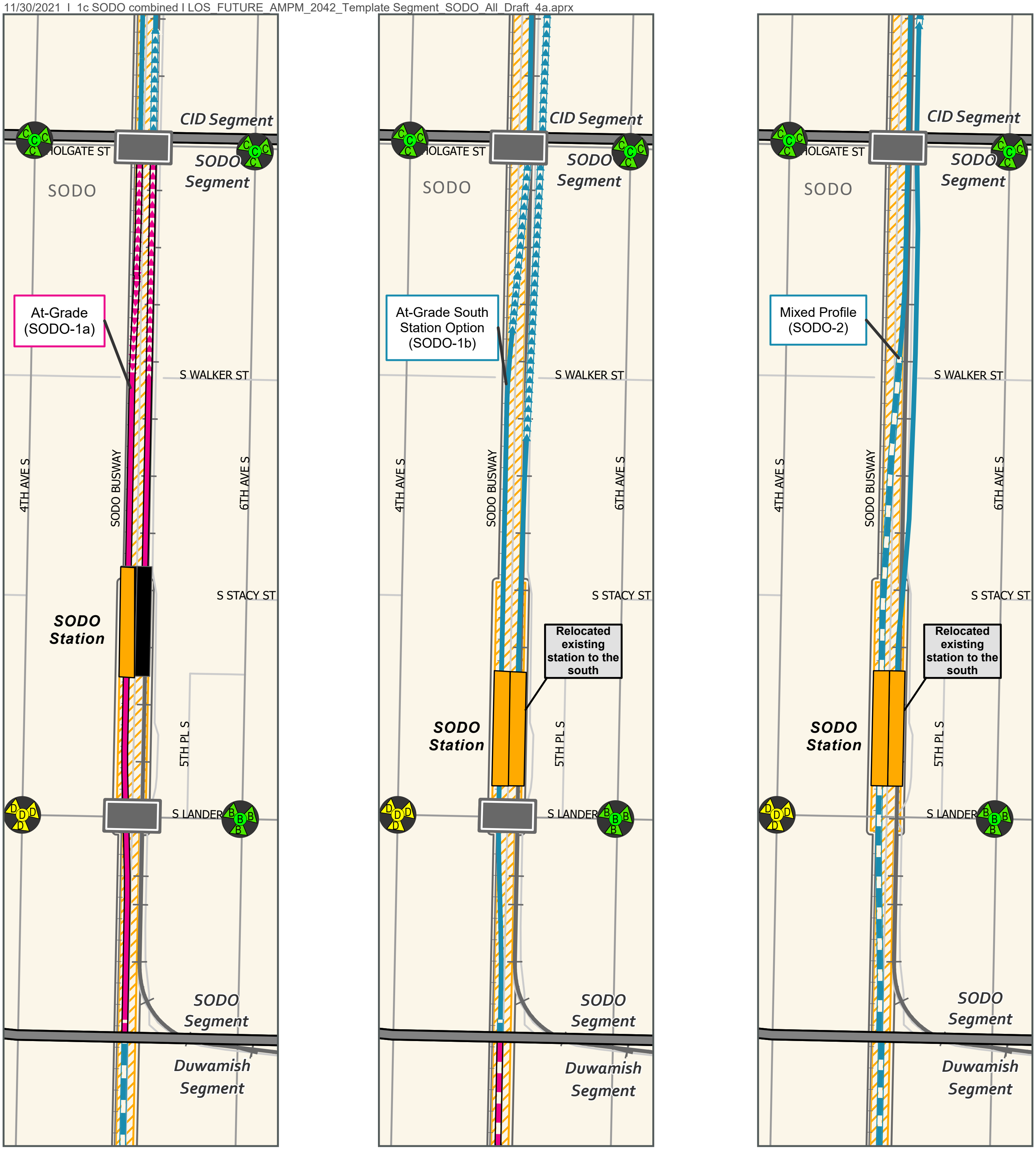
Intersection	No Build Alternative	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
4th Avenue South/South Holgate Street	C	C	C	C
4th Avenue South/South Lander Street	D	D	D	D
6th Avenue South/South Holgate Street	C	C	C	C
6th Avenue South/South Lander Street	B	B	B	B

Table 4-12. 2042 A.M. Peak Intersection Level of Service - SODO Segment, West Seattle and Ballard Link Extensions

Intersection	No Build Alternative	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
4th Avenue South/South Holgate Street	C	C	C	C
4th Avenue South/South Lander Street	D	Not Analyzed	Not Analyzed	Not Analyzed
6th Avenue South/South Holgate Street	C	Not Analyzed	Not Analyzed	Not Analyzed
6th Avenue South/South Lander Street	B	Not Analyzed	B	Not Analyzed

Note: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

11/30/2021 I 1c SODO combined I LOS_FUTURE_AMPM_2042_Template Segment_SODO_All_Draft_4a.aprx



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

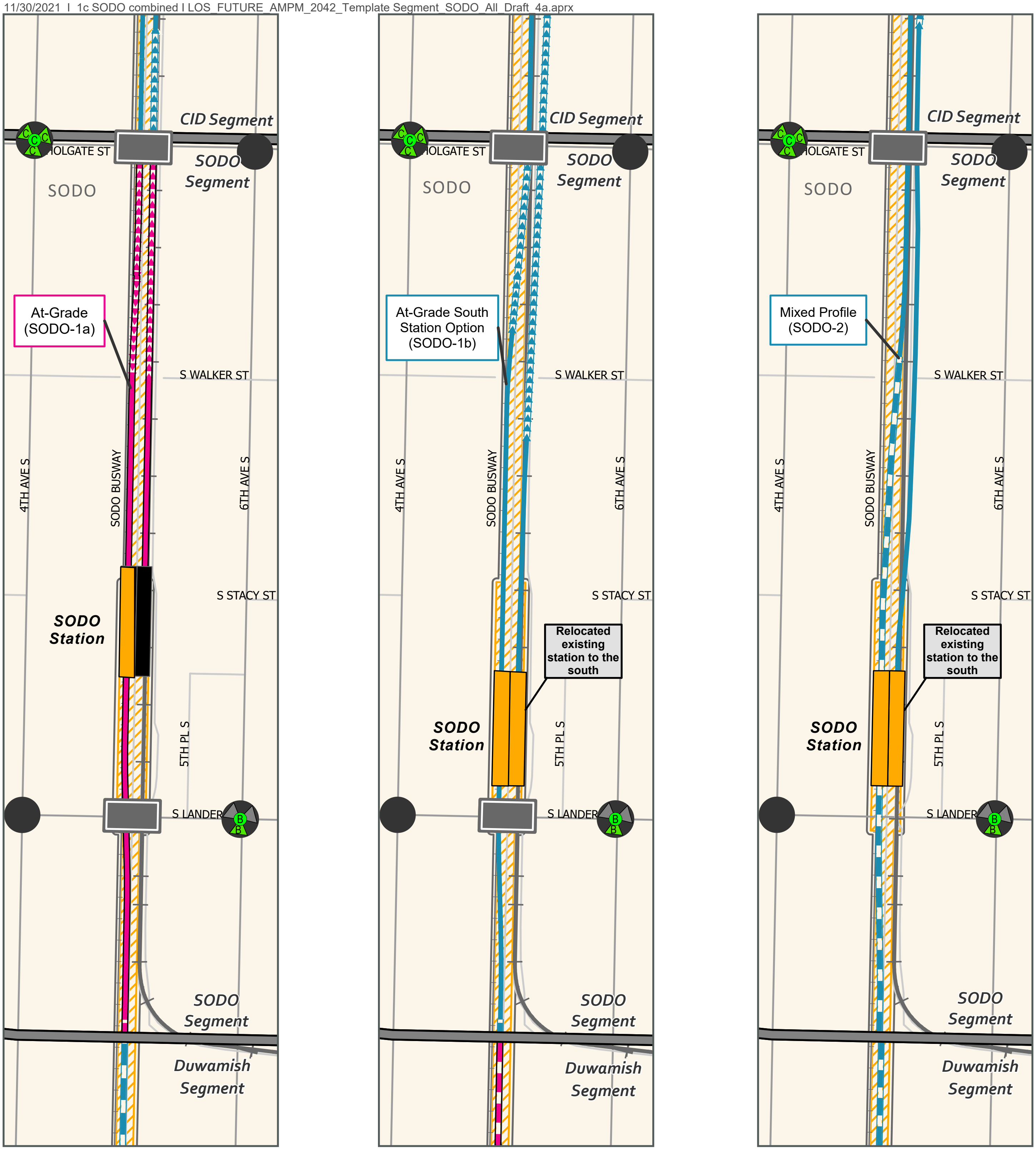
Intersection Not Analyzed

FIGURE 4-6
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet N

11/30/2021 I 1c SODO combined I LOS_FUTURE_AMPM_2042_Template Segment_SODO_All_Draft_4a.aprx



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

Intersection Not Analyzed

FIGURE 4-7
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet
N

2042 No Build Alternative

Under the 2042 No Build Alternative, traffic volumes are expected to increase along 4th Avenue South and South Spokane Street compared to existing conditions. However, all study intersections would continue to operate at L.O.S. D or better under both a.m. and p.m. peak periods.

2042 Build Alternatives

In 2042, Preferred Alternative SODO-1a and Option SODO-1b would permanently close the SODO Busway. The closure of the SODO Busway would displace Metro buses, which use the busway for active bus trips and for buses deadheading (i.e., non-revenue trips) to and from the Ryerson and Atlantic/Central bus bases. These 30 to 50 total buses in the peak hour would most likely shift to 4th Avenue South and would not result in a change in traffic L.O.S. relative to the No Build Alternative. See Section 3.2.2.2 for more information on the long-term transit effects of the SODO Busway closure.

The new Lander Street overpass between 4th Avenue South and 6th Avenue South under Preferred Alternative SODO-1a and Option SODO-1b 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 pedestrians transfer from bus stops to the station. The SODO Station is expected to generate fewer than 10 additional vehicle trips in either the a.m. or p.m. peak hour (most of the transit trips at the SODO Station are transfers from other transit routes, bike access, or walk access). The traffic operations results for Alternative SODO-2 would be the same relative to the No Build Alternative at the study intersections.

Although the Stadium Station is north of the SODO Segment under all Build Alternatives, this station would be served by the West Seattle Link Extension. Ridership at this station is relatively low today and no noticeable change in vehicle trips is expected during the peak hour under any of the Build Alternatives compared to the No Build Alternative. Traffic operations around the station are therefore not expected to be impacted under any of the Build Alternatives.

2032 No Build Alternative

The L.O.S. results for 2032 No Build Alternative are similar to the 2042 No Build Alternative, as all study intersections are expected to operate at L.O.S. D or better.

2032 Interim Terminus Condition

During the 2032 interim conditions, the West Seattle Link Extension would terminate at the SODO Station. Intersection operation results are shown in Table 4-13 and Table 4-14 and on Figure 4-8 and Figure 4-9.

The results for the 2032 Build Alternatives are also similar to the 2042 Build Alternatives. The SODO Station is expected to generate fewer than five additional vehicle trips in either the a.m. or p.m. peak hour under all 2032 Build Alternatives.

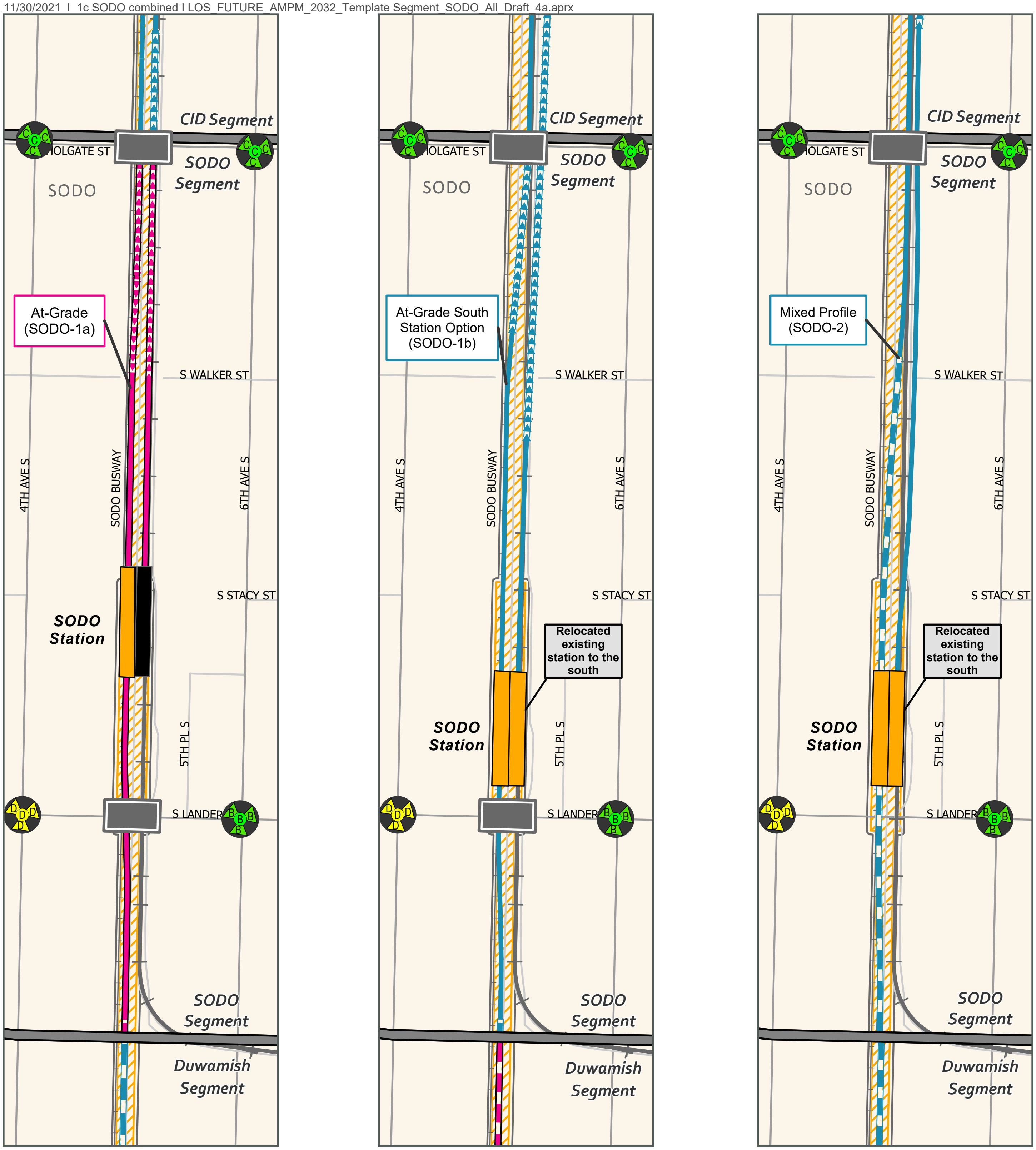
Table 4-13. 2032 P.M. Peak Intersection Level of Service - SODO Segment, West Seattle Link Extension

Intersection	No Build Alternative	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
4th Avenue South/South Holgate Street	C	C	C	C
4th Avenue South/South Lander Street	D	D	D	D
6th Avenue South/South Holgate Street	C	C	C	C
6th Avenue South/South Lander Street	B	B	B	B

Table 4-14. 2032 A.M. Peak Intersection Level of Service - SODO Segment, West Seattle Link Extension

Intersection	No Build Alternative	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
4th Avenue South/South Holgate Street	C	Not Analyzed	Not Analyzed	Not Analyzed
4th Avenue South/South Lander Street	D	D	D	D
6th Avenue South/South Holgate Street	C	Not Analyzed	Not Analyzed	Not Analyzed
6th Avenue South/South Lander Street	B	Not Analyzed	Not Analyzed	Not Analyzed

Note: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.



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

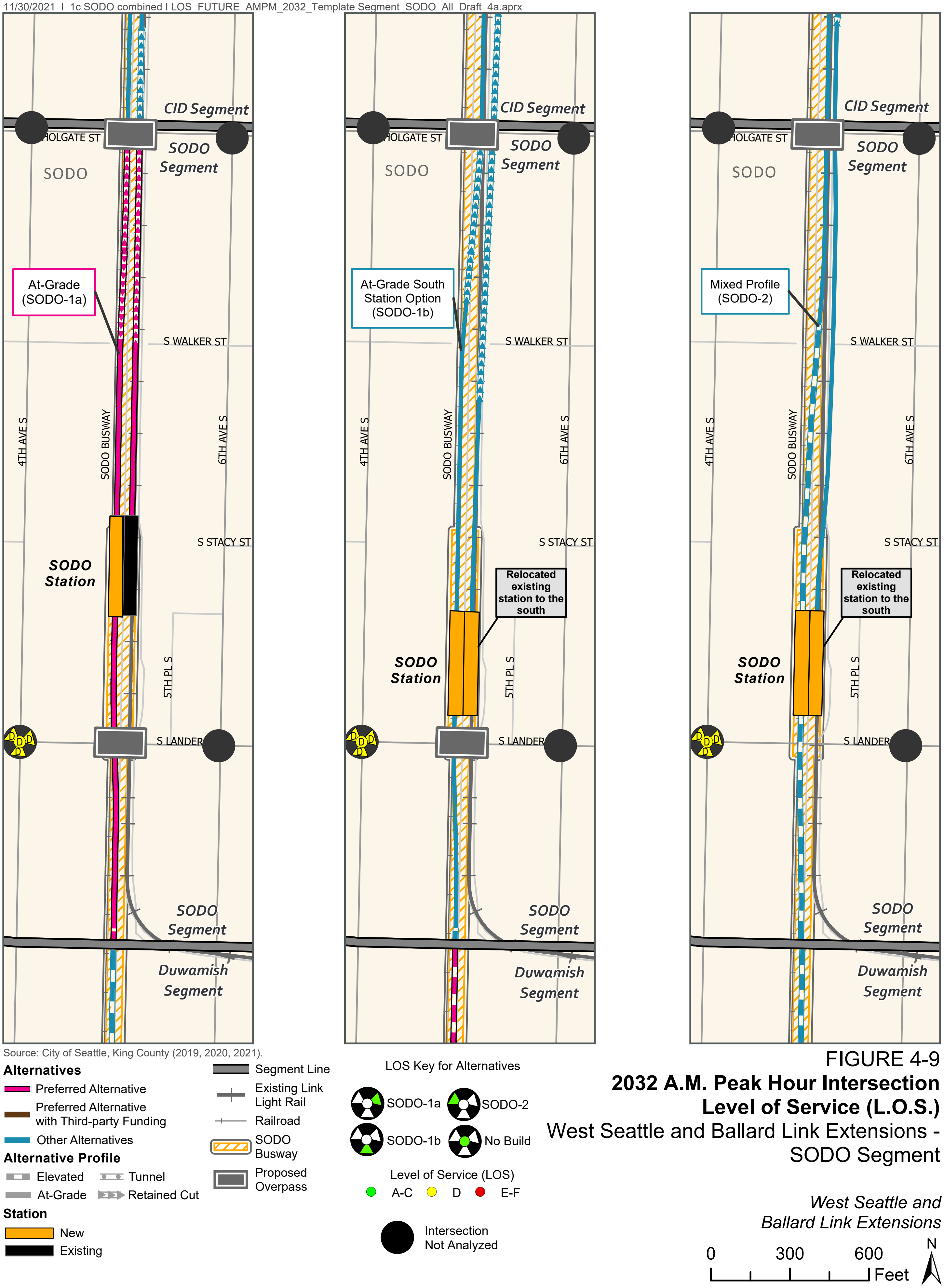
Intersection Not Analyzed

FIGURE 4-8
2032 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet
N

11/30/2021 I 1c SODO combined I LOS_FUTURE_AMPM_2032_Template Segment_SODO_All_Draft_4a.aprx



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

FIGURE 4-9
2032 A.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

Duwamish Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the Duwamish Segment are shown in Table 4-15 and Table 4-16 and on Figure 4-10 and Figure 4-11.

Table 4-15. 2042 P.M. Peak Level of Service - Duwamish Segment

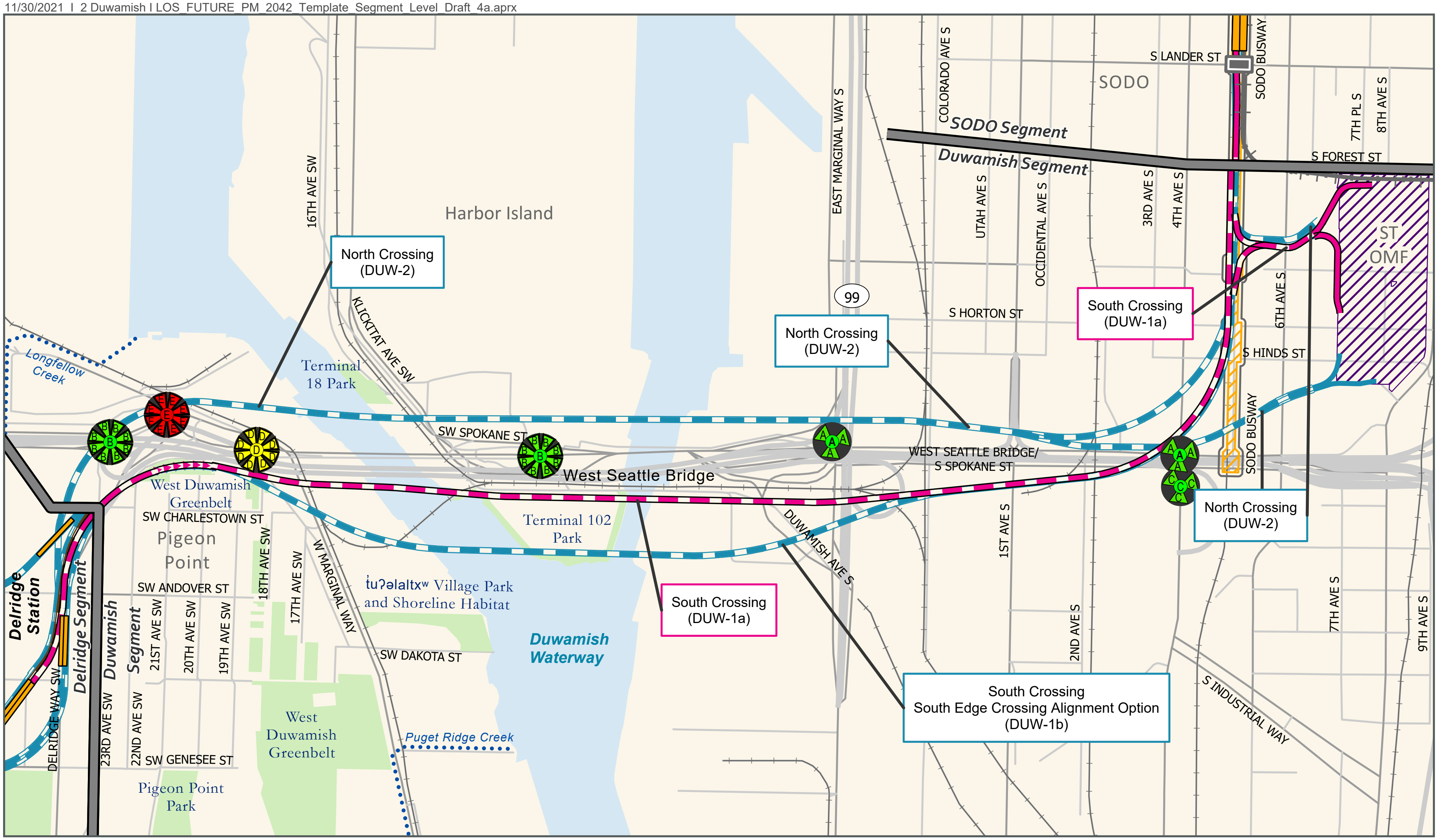
Intersection	No Build Alternative	Preferred South Crossing Alternative (DUW-1a)	South Crossing Alternative South Edge Alignment Option (DUW-1b)	North Crossing Alternative (DUW-2)
4th Avenue South/South Spokane Street (North)	A	A	A	A
4th Avenue South/South Spokane Street (South)	C	C	C	C
Chelan Avenue Southwest/Southwest Spokane Street	B	B	B	B
East Marginal Way/South Spokane Street	A	A	A	A
Southwest Spokane Street/11th Avenue Southwest	B	B	B	B
Southwest Spokane Street/West Marginal Way/Terminal 5	D	D	D	D
West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street	E	E	E	E

Table 4-16. 2042 A.M. Peak Level of Service - Duwamish Segment

Intersection	No Build Alternative	Preferred South Crossing Alternative (DUW-1a)	South Crossing Alternative South Edge Alignment Option (DUW-1b)	North Crossing Alternative (DUW-2)
4th Avenue South/South Spokane Street (North)	A	Not Analyzed	Not Analyzed	Not Analyzed
4th Avenue South/South Spokane Street (South)	C	Not Analyzed	Not Analyzed	Not Analyzed
Chelan Avenue Southwest/Southwest Spokane Street	B	B	B	B
East Marginal Way/South Spokane Street	B	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Spokane Street/11th Avenue Southwest	D	D	D	D
Southwest Spokane Street/West Marginal Way/Terminal 5	C	Not Analyzed	Not Analyzed	Not Analyzed
West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street	D	D	D	D

Note: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

11/30/2021 I 2 Duwamish I LOS_FUTURE_PM_2042_Template_Segment_Level_Draft_4a.aprx



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

LOS Key for Alternatives

Del-1a, Del-2a, Del-3, SODO-1a
Del-1b, Del-2b, Del-4, SODO-1b
Del-5, Del-6, No Build, SODO-2
No Build

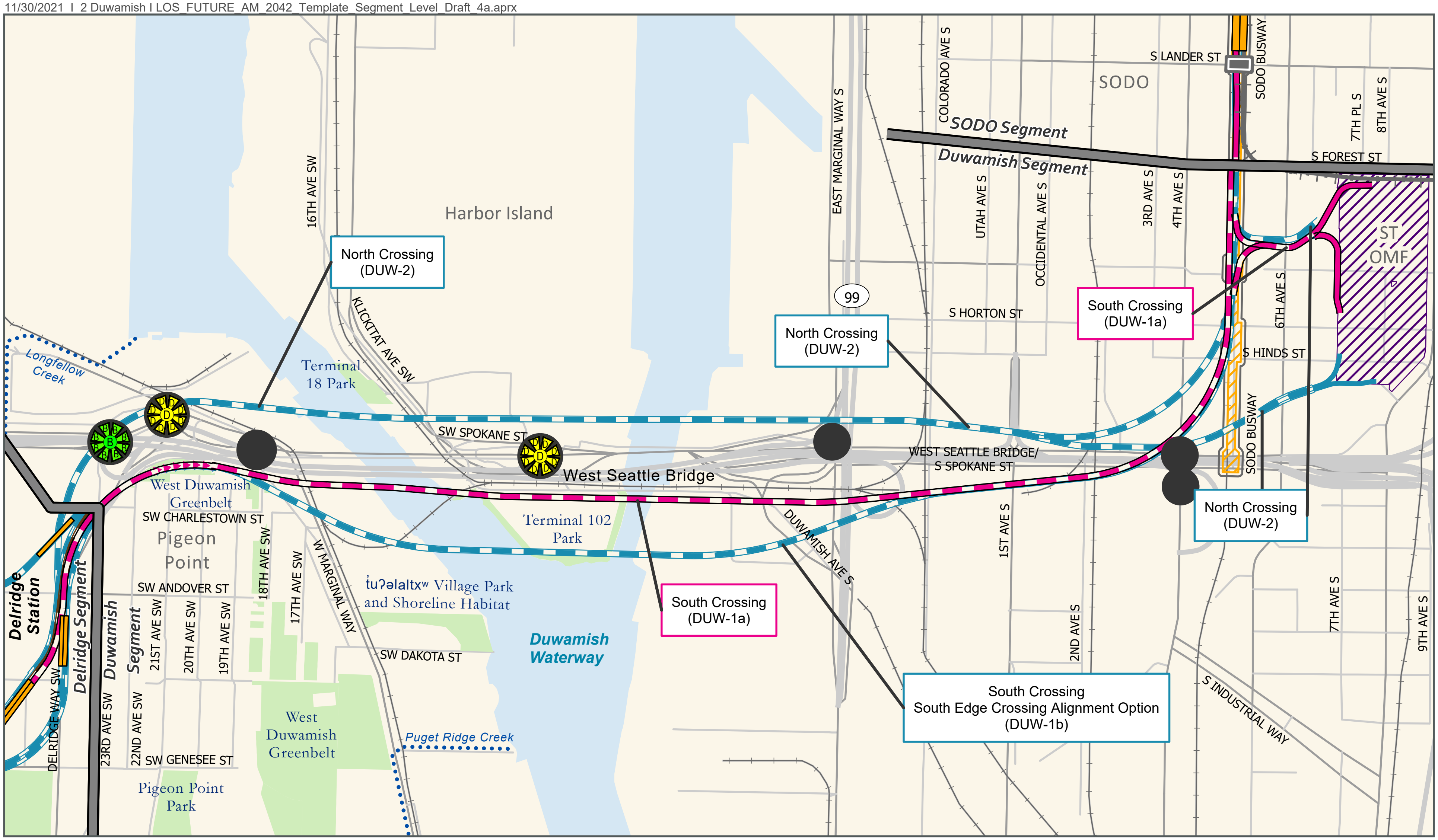
Level of Service (LOS)
A-C D E-F

FIGURE 4-10
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Duwamish Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

11/30/2021 I 2 Duwamish I LOS_FUTURE_AM_2042_Template_Segment_Level_Draft_4a.aprx



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

LOS Key for Alternatives

Del-1a, Del-2a, Del-3, SODO-1a
Del-1b, Del-2b, Del-4, SODO-1b
Del-5, Del-6, No Build, SODO-2
No Build

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

Intersection Not Analyzed

FIGURE 4-11
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Duwamish Segment
West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

2042 No Build Alternative

Under the 2042 No Build Alternative, general vehicle and truck volumes increase along Southwest Spokane Street with the planned redevelopment of Terminal 5. Chelan Avenue/Southwest Spokane Street and Southwest Spokane Street/11th Avenue Southwest continue to operate at L.O.S. B or better during both a.m. and p.m. peak periods. Because most of the vehicle traffic is east-west through trips, more of the traffic signal green time can be allocated to the major through movements, which results in a low average delay per vehicle.

As a part of the Terminal 5 Redevelopment, the north approach of the West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street intersection will be closed and all Terminal 5 traffic will be rerouted to use the intersection of Southwest Spokane Street/Terminal 5 access ramp. With these access changes and volume increases, the West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street intersection is expected to operate at L.O.S. E during the p.m. peak hour and L.O.S. D during the a.m. peak hour. Delay also increases at the Southwest Spokane Street/Terminal 5 access ramp, which would operate at L.O.S. D during the p.m. peak hour and L.O.S. C during the a.m. peak hour.

2042 Build Alternatives

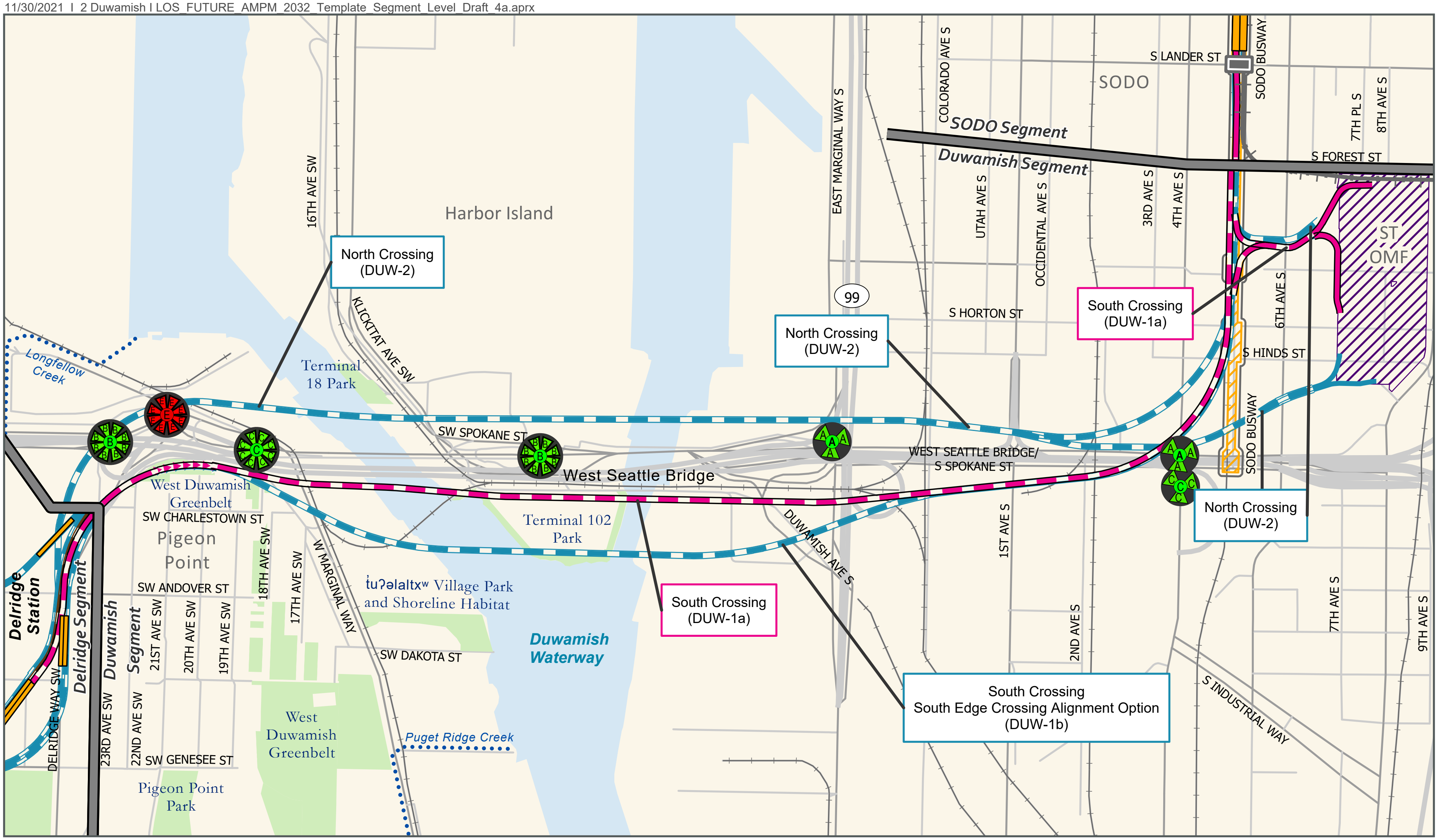
There are no proposed stations in the Duwamish Segment. Preferred Alternative DUW-1a, Option DUW-1b, and Alternative DUW-2 would have no guideway structures within the public street system that would affect traffic operations. A minimal increase in traffic volumes for pick-up or drop-off vehicle trips (fewer than 10 vehicles) associated with the Delridge Station would travel through these study intersections in both the a.m. and p.m. peak periods compared to the No Build Alternative. Therefore, under all Build Alternatives, there is no substantial change in delay and the study intersections would continue to operate at a similar L.O.S. as the 2042 No Build Alternative.

2032 Interim Terminus Condition

Under the 2032 interim condition, the West Seattle Link Extension would terminate at the SODO Station. Intersection operation results are shown in Table 4-17 and Table 4-18 and on Figure 4-12 and Figure 4-13.

Table 4-17. 2032 P.M. Peak Level of Service - Duwamish Segment

Intersection	No Build Alternative	Preferred South Crossing Alternative (DUW-1a)	South Crossing Alternative South Edge Alignment Option (DUW-1b)	North Crossing Alternative (DUW-2)
4th Avenue South/South Spokane Street (North)	A	A	A	A
4th Avenue South/South Spokane Street (South)	C	C	C	C
Chelan Avenue Southwest/Southwest Spokane Street	B	B	B	B
East Marginal Way/South Spokane Street	A	A	A	A
Southwest Spokane Street/11th Avenue Southwest	B	B	B	B
Southwest Spokane Street/West Marginal Way/Terminal 5	C	C	C	C
West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street	E	E	E	E



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

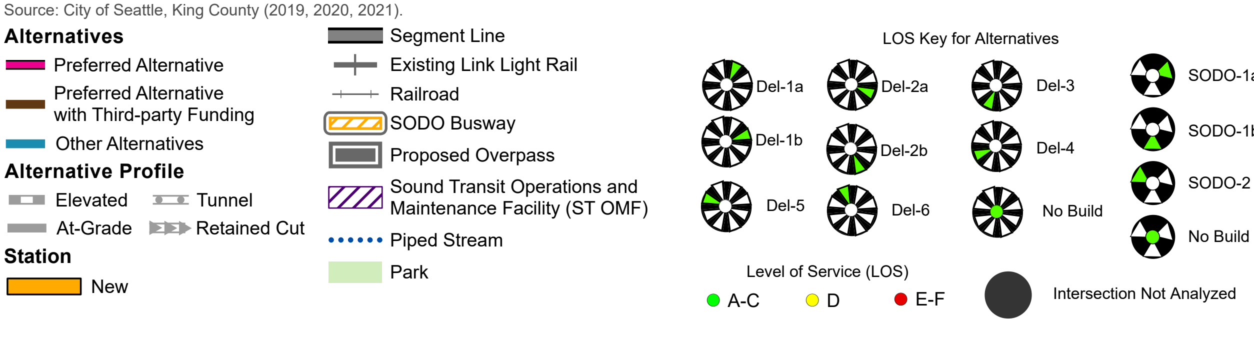
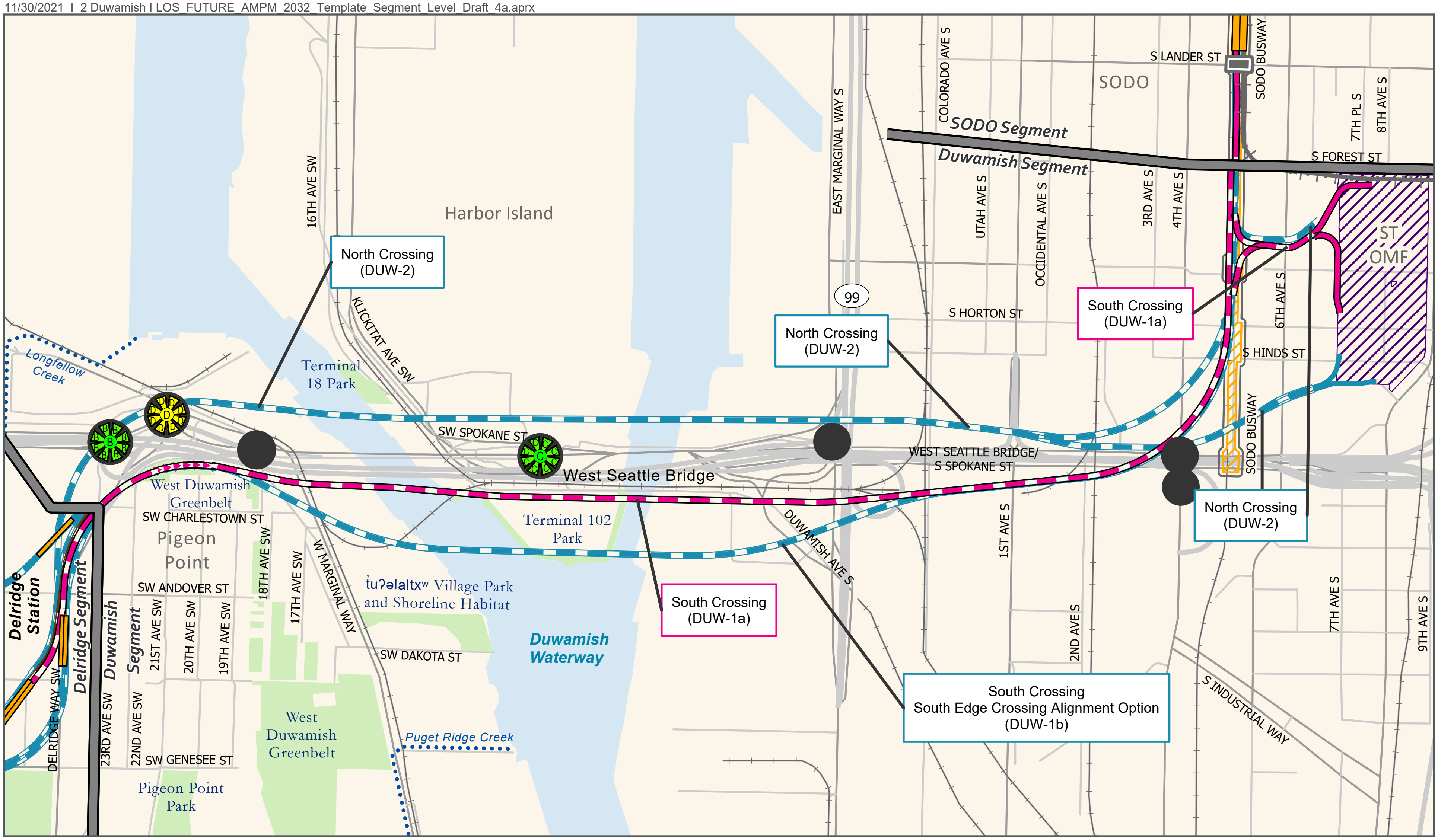


FIGURE 4-12
2032 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Duwamish Segment
West Seattle and Ballard Link Extensions



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

LOS Key for Alternatives

Del-1a, Del-1b, Del-5, Del-2a, Del-2b, Del-6, Del-3, Del-4, No Build, SODO-1a, SODO-1b, SODO-2, No Build

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

Intersection Not Analyzed

FIGURE 4-13
2032 A.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Duwamish Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

Table 4-18. 2032 A.M. Peak Level of Service - Duwamish Segment

Intersection	No Build Alternative	Preferred South Crossing Alternative (DUW-1a)	South Crossing Alternative South Edge Alignment Option (DUW-1b)	North Crossing Alternative (DUW-2)
4th Avenue South/South Spokane Street (North)	A	Not Analyzed	Not Analyzed	Not Analyzed
4th Avenue South/South Spokane Street (South)	C	Not Analyzed	Not Analyzed	Not Analyzed
Chelan Avenue Southwest/Southwest Spokane Street	B	B	B	B
East Marginal Way/South Spokane Street	B	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Spokane Street/11th Avenue Southwest	C	C	C	C
Southwest Spokane Street/West Marginal Way/Terminal 5	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
West Marginal Way/Chelan Avenue Southwest/Southwest Spokane Street	D	D	D	D

Note: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

The access changes to Terminal 5 and traffic growth associated with the terminal are assumed to occur in the 2032 No Build Alternative. All study intersections would continue to operate at L.O.S. D or better except for West Marginal Way/Chelan Avenue Southwest and Southwest Spokane Street, which would operate at L.O.S. E in the p.m. peak period. The 2032 Build Alternative traffic operations would be similar to the No Build Alternative.

Delridge Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the Delridge Segment are shown in Table 4-19 and Table 4-20 and on Figure 4-14 and Figure 4-15.

<u>2042 No Build Alternative</u>

Under the 2042 No Build Alternative, traffic volumes are expected to increase along Delridge Way Southwest. While many of the intersections in the vicinity of the Delridge Station operate at L.O.S. D or better in the p.m. and a.m. peak hour, the following intersections along Delridge Way Southwest would operate at L.O.S. E or F:

- Delridge Way Southwest and 23rd Avenue Southwest (L.O.S. E in a.m. peak hour).
- Southwest Andover Street and Delridge Way Southwest (L.O.S. F in both peak hours).
- Southwest Dakota Street/Delridge Way Southwest (L.O.S. F in both peak hours).
- Southwest Genesee Street/Delridge Way Southwest (L.O.S. E in a.m. peak hour).

During the p.m. peak period, southbound queues would extend on average back to the Seattle Fire Station, and under the worst conditions, queues could extend under the West Seattle Bridge overpass. During the a.m. peak period, northbound queues at Southwest Genesee Street/Delridge Way Southwest could extend back to the Delridge Playfield, and at Southwest Andover Street/Delridge Way Southwest, northbound queues could extend through the intersection of Southwest Dakota Street/Delridge Way Southwest.

Table 4-19. 2042 P.M. Peak Level of Service - Delridge Segment

Intersection	No Build Alternative	Preferred Dakota Street Station Alternative (DEL-1a)	Dakota Street Station Alternative North Alignment Option (DEL-1b)	Preferred Dakota Street Station Lower Height Alternative (DEL-2a)*	Dakota Street Station Lower Height Alternative 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)*
Delridge Way Southwest/23rd Avenue Southwest	C	C	C	C	C	C	C	F [a]	F [a]
Southwest Andover Street/Delridge Way Southwest	F	F	F	F	F	F	F	F	F
Southwest Dakota Street/Delridge Way Southwest	F	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]
Southwest Genesee Street/Delridge Way Southwest	C	C	C	C	C	C	C	C	C

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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.

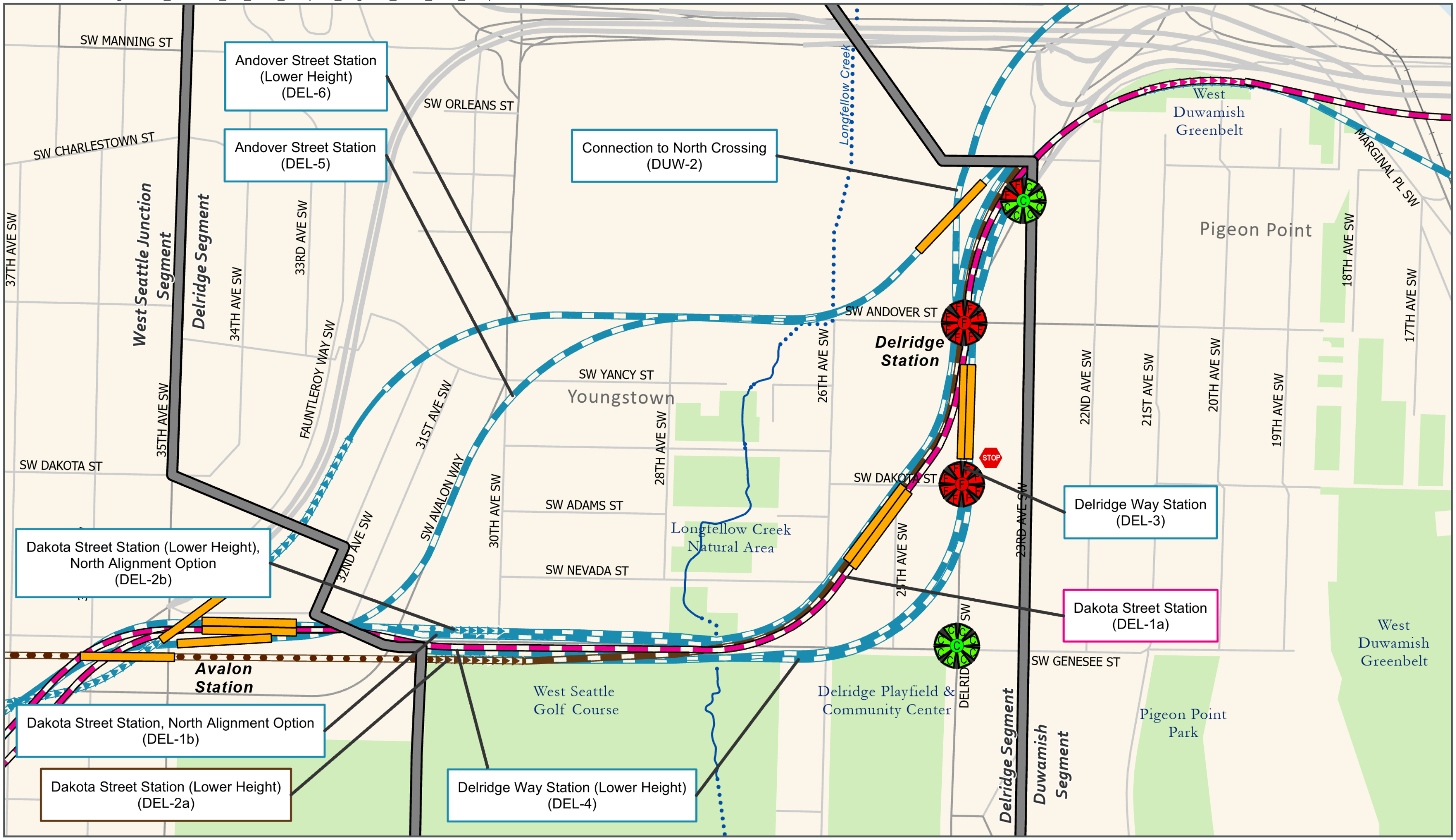
[a] An affected intersection in the Build Alternative is expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, have noticeably worse vehicle delays in the Build Alternative.

Table 4-20. 2042 A.M. Peak Level of Service - Delridge Segment

Intersection	No Build Alternative	Preferred Alternative - Dakota Street Station (DEL-1a)	Preferred Dakota Street Station Lower Height Alternative (DEL-2a)*	Dakota Street Station Alternative North Alignment Option (DEL-1b)	Dakota Street Station Lower Height Alternative 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)*
Delridge Way Southwest/23rd Avenue Southwest	E	E	E	E	E	E	E	F [a]	F [a]
Southwest Andover Street/Delridge Way Southwest	F	F	F	F	F	F	F	F	F
Southwest Dakota Street/Delridge Way Southwest	F	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]	F [a]
Southwest Genesee Street/Delridge Way Southwest	E	E	E	E	E	E	E	E	E

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.



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

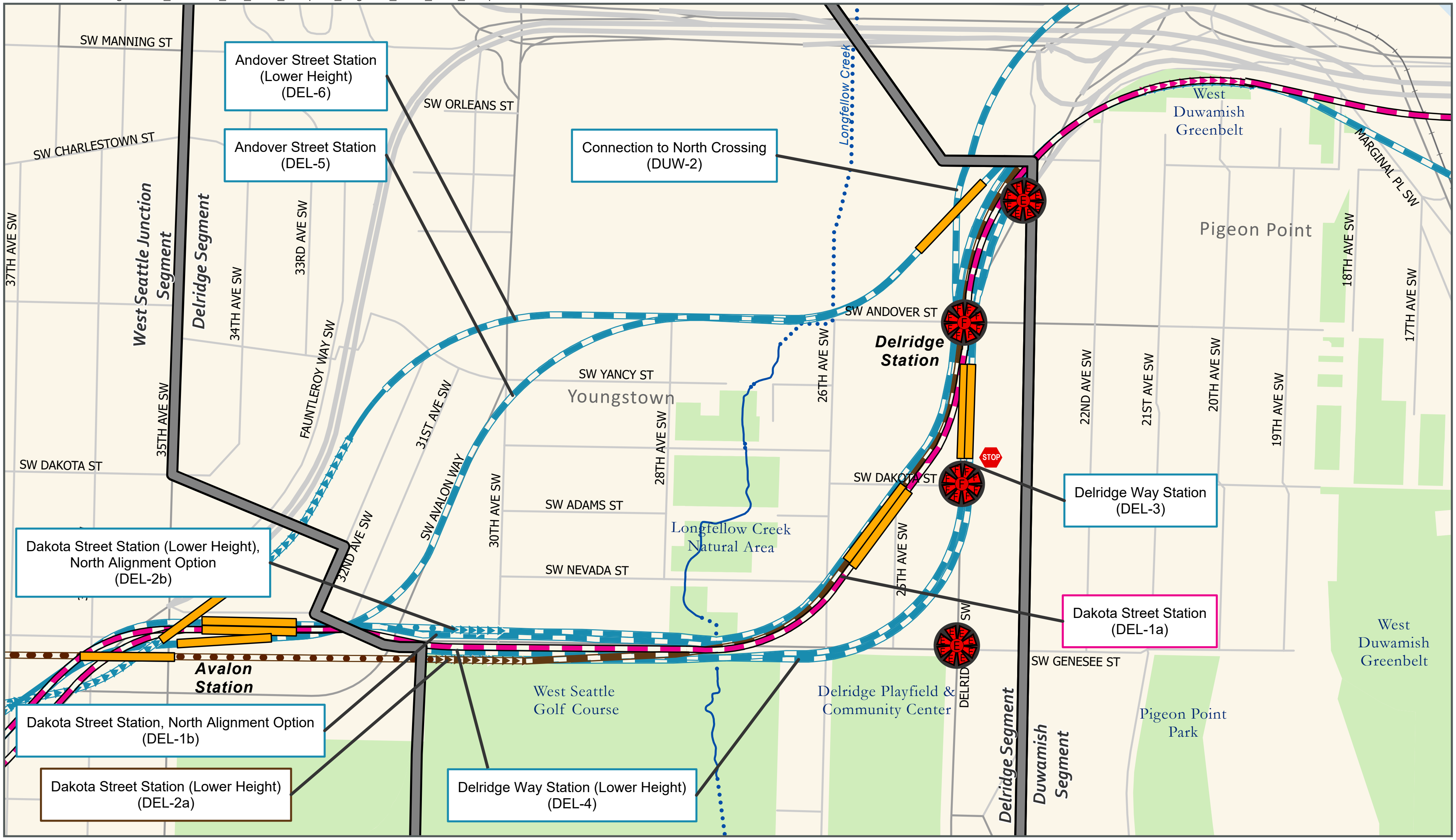
Level of Service (LOS)
- A-C
- D
- E-F

STOP Stop-Controlled Intersection

0 400 800 Feet N

FIGURE 4-14
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
West Seattle Link Extension - Delridge 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
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 4-15
2042 A.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

2042 Build Alternatives

Under 2042 Build Alternatives, all Build Alternatives would affect the side-street stop-controlled Southwest Dakota Street/Delridge Way Southwest intersection as it serves as access for the proposed station pick-up/drop-off zones, and would operate at a worse L.O.S. F condition for both a.m. and p.m. peak periods relative to the No Build Alternative.

For Alternative DEL-5 and Alternative DEL-6*, the station entrances and pick-up/drop-off zones are located on Southwest Andover Street. A new signal at Delridge Way Southwest/23rd Avenue Southwest would be installed to facilitate pedestrian crossings between bus stops and the new station in both alternatives. The intersection is affected by the traffic signal as it would operate at L.O.S. F conditions because of expected high pedestrian crossing volumes delaying the major northbound and southbound through vehicle movements on Delridge Way Southwest. Long vehicle queues on Delridge Way could form.

2042 Build Alternatives M.O.S.

Under the M.O.S., the West Seattle Link Extension is assumed to have an interim terminus at Delridge Station. Traffic operations analysis for this terminus Delridge Station assumed additional bus service connections at the station and increased pick-up/drop-off and pedestrian activity with increased station ridership compared to the full project extension to the Alaska Junction Station. Preferred Alternative DEL-2a*, Option DEL-2b*, Alternative DEL-3, and Alternative DEL-4* would result in additional buses making turns at the stop-controlled Southwest Dakota Street/Delridge Way Southwest intersection, adding delay while maintaining an L.O.S. F condition. Alternative DEL-3 and Alternative DEL-4* would also affect the Southwest Genesee Street/Delridge Way Southwest intersection during the a.m. period, which would operate at a worse L.O.S. E condition because of increased southbound and eastbound approach vehicle volumes. Alternative DEL-5 and Alternative DEL-6* would also affect the Southwest Andover Street/Delridge Way Southwest intersection and the 23rd Avenue Southwest/Delridge Way Southwest intersection, because they would operate at a worse L.O.S. F condition in both the a.m. and p.m. peak periods because of increased vehicle activity near this station under the M.O.S. More local streets intersections adjacent to the station entrances may also experience higher delays with increased vehicle trips.

2032 No Build Alternative

Under the 2032 No Build Alternative, there are slight volume increases along Delridge Way Southwest. Intersection operation results are shown in Table 4-21 and Table 4-22 and on Figure 4-16 and Figure 4-17.

Intersections in the vicinity of the Delridge Station would operate at L.O.S. D or better in 2032 in the p.m. and a.m. peak hour with the exception of the following intersections:

- Southwest Andover Street/Delridge Way Southwest (L.O.S. F in both peak hours).
- Southwest Dakota Street/Delridge Way Southwest (L.O.S. F in a.m. peak hours).
- Southwest Genesee Street/Delridge Way Southwest (L.O.S. E in a.m. peak hour).

Queuing along Delridge Way Southwest would be similar to existing conditions.

2032 Interim Terminus Condition

The 2032 Build Alternatives traffic operation results are similar to the 2032 No Build Alternative results. The Southwest Dakota Street/Delridge Way Southwest intersection is affected for Alternative DEL-3 and Alternative DEL-4* in the p.m. peak hour compared to the No Build Alternative. This is mostly due to increased vehicles turns from the side-street stop-controlled intersection onto Delridge Way Southwest.

Table 4-21. 2032 P.M. Peak Level of Service - Delridge Segment

Intersection	No Build Alternative	Preferred Dakota Street Station Alternative (DEL-1a)	Dakota Street Station Alternative North Alignment Option (DEL-1b)	Preferred Dakota Street Station Lower Height Alternative (DEL-2a)*	Dakota Street Station Lower Height Alternative 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)*
Delridge Way Southwest/23rd Avenue Southwest	C	C	C	C	C	C	C	F [a]	F [a]
Southwest Andover Street/Delridge Way Southwest	F	F	F	F	F	F	F	F	F
Southwest Dakota Street/Delridge Way Southwest	D	D	D	D	D	E [a]	E [a]	D	D
Southwest Genesee Street/Delridge Way Southwest	C	C	C	C	C	C	C	C	C

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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.

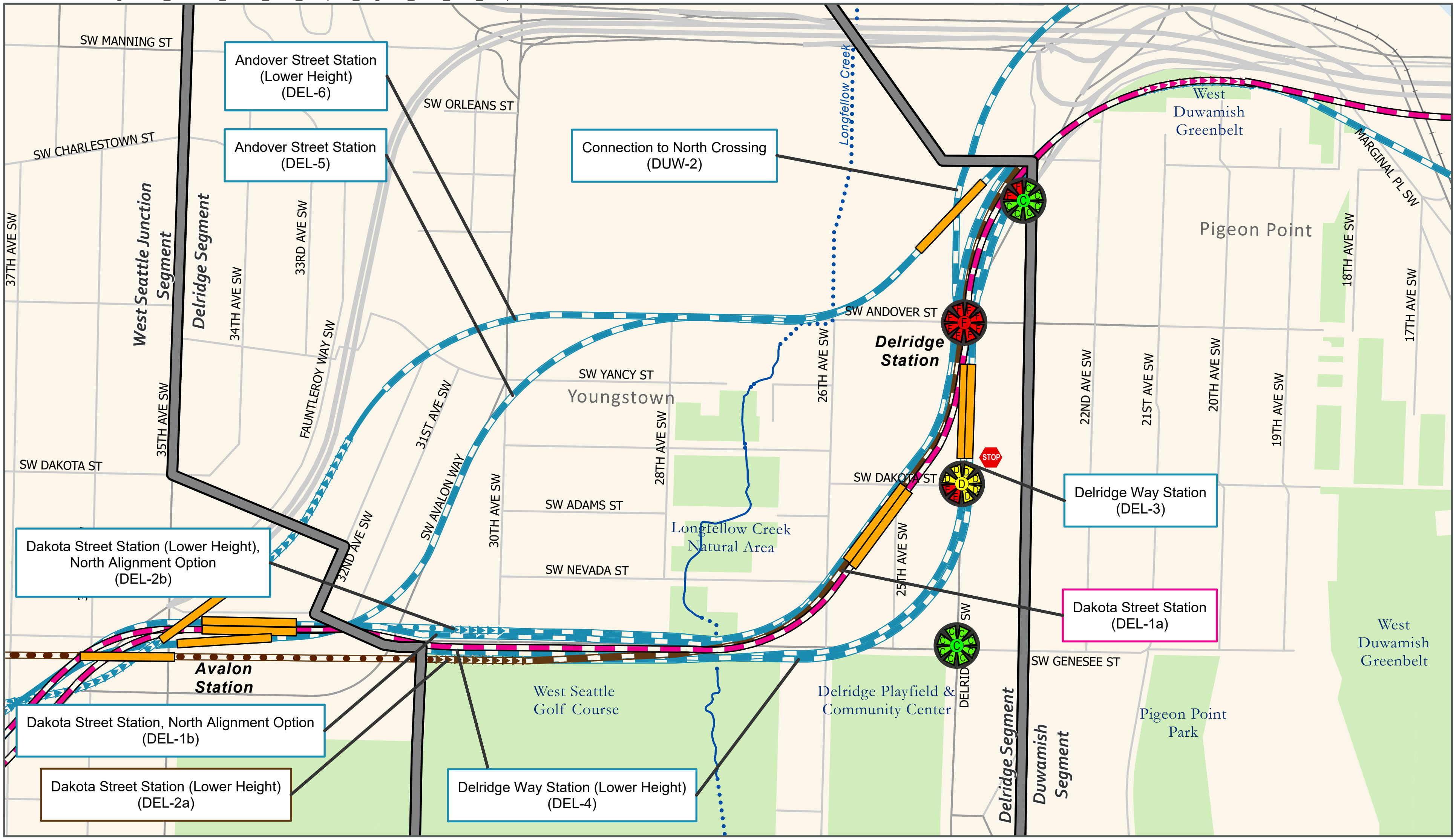
[a] An impacted intersection in the Build Alternative is expected to degrade from L.O.S. D or better in the No Build Alternative to L.O.S. E or F with the project or, if it already operates at L.O.S. E or F in the No Build Alternative, have noticeably worse vehicle delays in the Build Alternative.

Table 4-22. 2032 A.M. Peak Level of Service - Delridge Segment

Intersection	No Build Alternative	Preferred Dakota Street Station Alternative (DEL-1a)	Dakota Street Station Alternative North Alignment Option (DEL-1b)	Preferred Dakota Street Station Lower Height Alternative (DEL-2a)*	Dakota Street Station Lower Height Alternative 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)*
Delridge Way Southwest/23rd Avenue Southwest	D	D	D	D	D	D	D	F [a]	F [a]
Southwest Andover Street/Delridge Way Southwest	F	F	F	F	F	F	F	F	F
Southwest Dakota Street/Delridge Way Southwest	F	F	F	F	F	F	F	F	F
Southwest Genesee Street/Delridge Way Southwest	E	E	E	E	E	E	E	E	E

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.



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 4-16

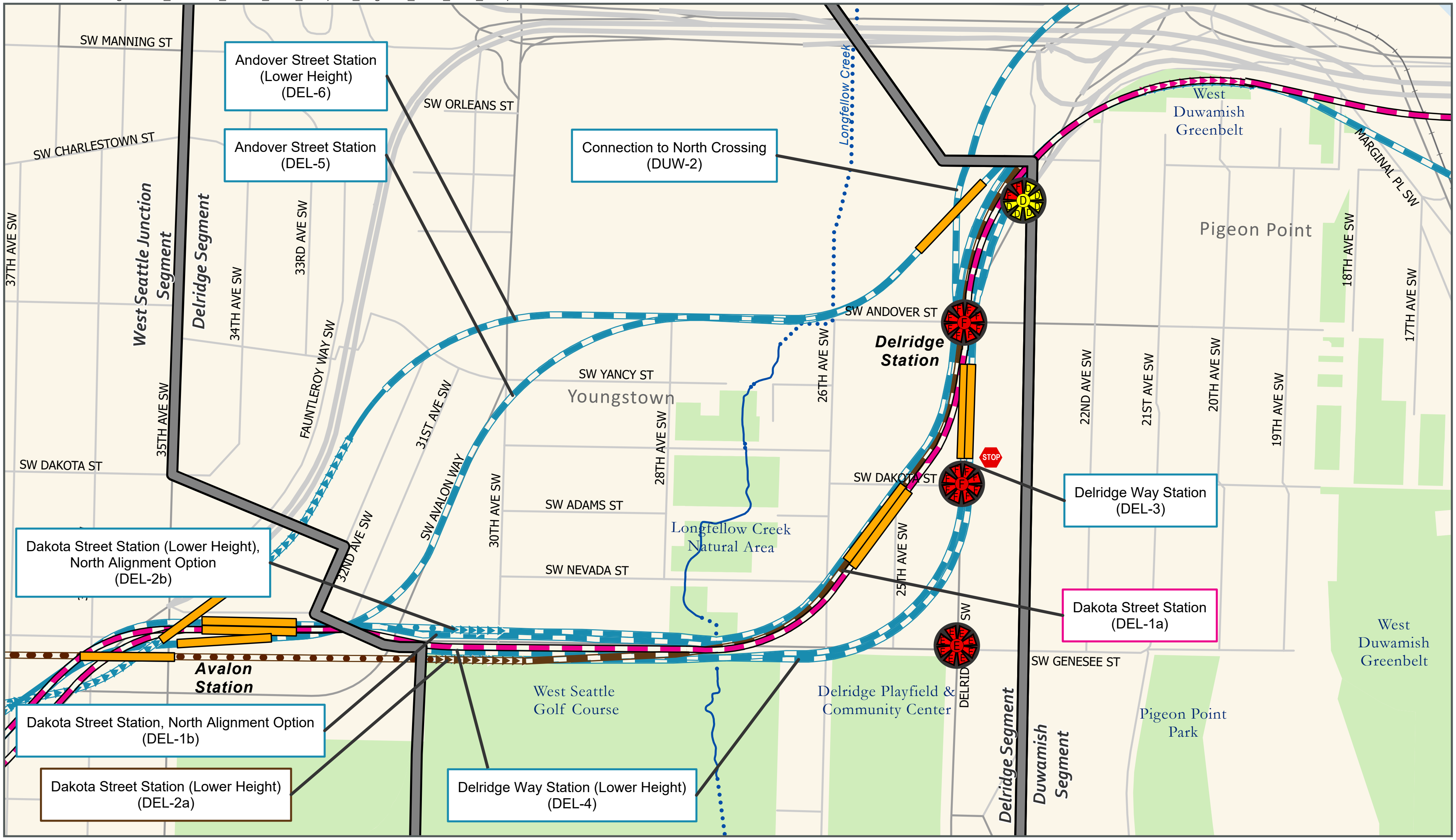
2032 P.M. Peak Hour Intersection Level of Service (L.O.S.)

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

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 4-17

2032 A.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

Alternative DEL-5 and Alternative DEL-6* would have a potential impact at the new traffic signal at Delridge Way Southwest/23rd Avenue Southwest with the high volume pedestrian crossings that would delay vehicle travel on Delridge Way Southwest during both the a.m. and p.m. peak hours. Vehicle queues could form on Delridge Way Southwest.

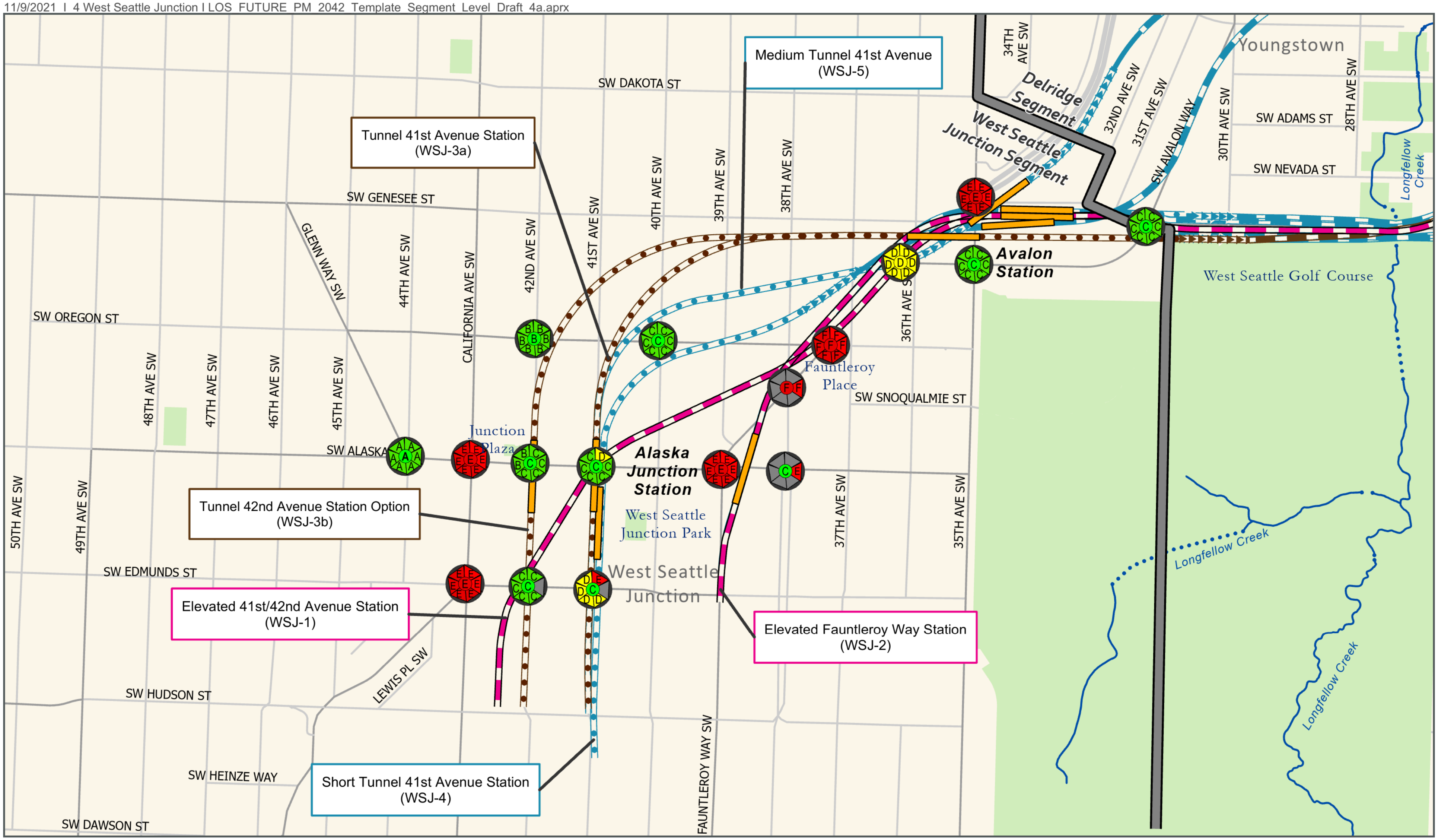
West Seattle Junction Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the West Seattle Junction Segment are shown in Table 4-23 and Table 4-24 and on Figure 4-18 and Figure 4-19.

<u>2042 No Build Alternative</u>

Under the 2042 No Build Alternative, there are large volume increases along Southwest Avalon Way, Fauntleroy Way Southwest, and Southwest Alaska Street. Intersections in the vicinity of the West Seattle Junction Station and Avalon Station would operate at L.O.S. D or better in the p.m. and a.m. peak hours with the exception of the following intersections:

- California Avenue Southwest/Southwest Alaska Street (L.O.S. E in p.m. peak hour).
- California Avenue Southwest/Southwest Edmunds Street (L.O.S. E in p.m. peak hour).
- Fauntleroy Way Southwest/35th Avenue Southwest (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Fauntleroy Way Southwest/38th Avenue Southwest (L.O.S. F in p.m. peak hour, L.O.S. E in a.m. peak hour).
- Fauntleroy Way Southwest/Southwest Alaska Street (L.O.S. E in both peak hours).
- Fauntleroy Way Southwest/Southwest Oregon Street (L.O.S. F in p.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

- Segment Line
- Stream
- Piped Stream
- Park

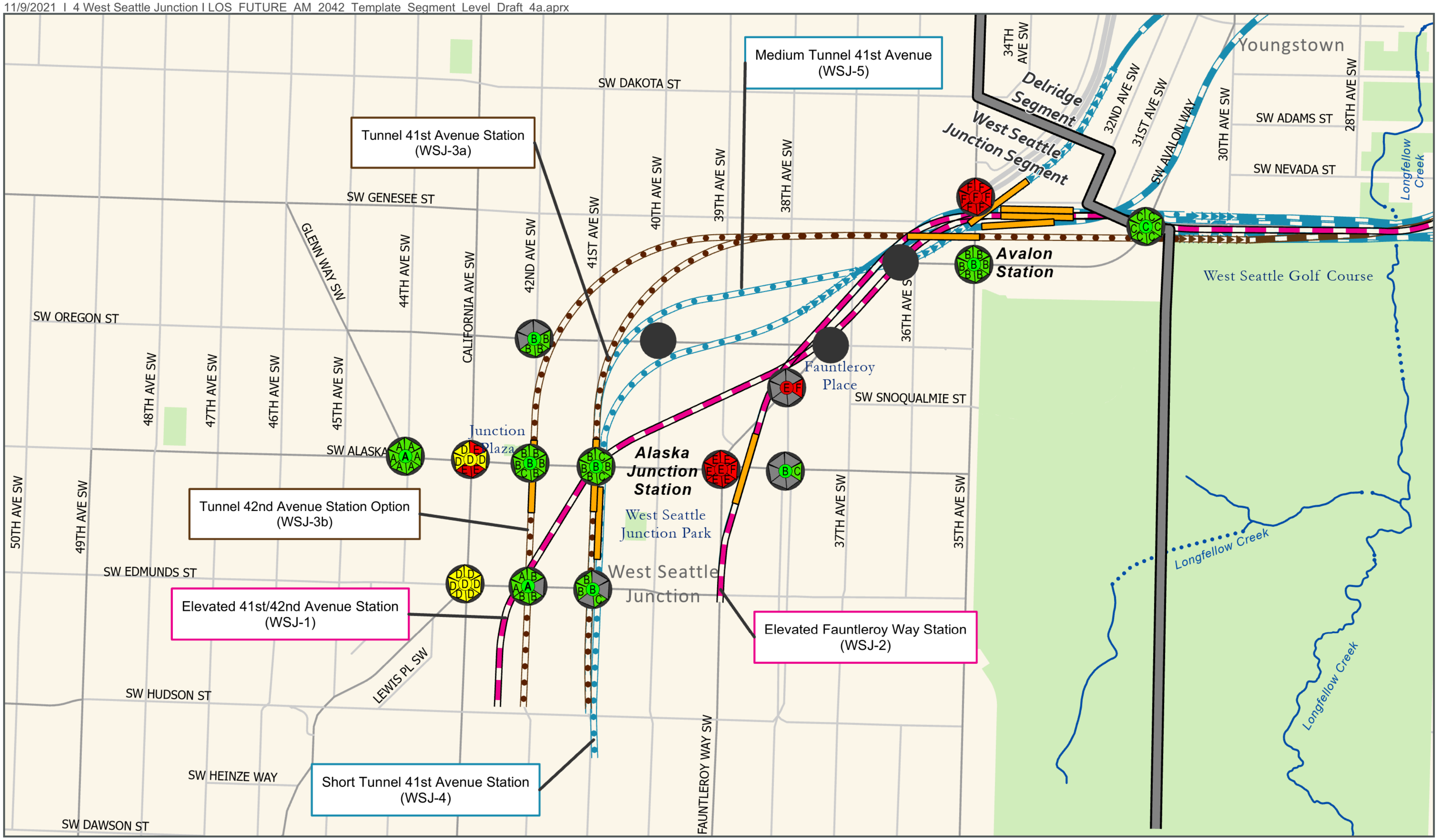
LOS Key for Alternatives
- WSJ-1
- WSJ-3b
- WSJ-2
- WSJ-4
- WSJ-3a
- WSJ-5
- No Build

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

0 500 1,000 Feet
N

FIGURE 4-18
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

11/9/2021 I 4 West Seattle Junction I LOS_FUTURE_AM_2042_Template_Segment_Level_Draft_4a.aprx



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-3b
- WSJ-2
- WSJ-4
- WSJ-3a
- WSJ-5
- No Build

Level of Service (LOS)
- A-C
- D
- E-F
- Intersection Not Analyzed

FIGURE 4-19

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

West Seattle Link Extension - West Seattle Junction Segment

West Seattle and Ballard Link Extensions

0 500 1,000 Feet

N

Table 4-23. 2042 P.M. Peak Level of Service - West Seattle Junction Segment

Intersection	No Build Alternative	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)*
35th Avenue Southwest/Southwest Avalon Way	C	C	C	C	C	C	C
40th Avenue Southwest/Southwest Oregon Street	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
41st Avenue Southwest/Southwest Alaska Street	C	D	C	C	C	C	C
41st Avenue Southwest/Southwest Edmunds Street	C	E [a]	Not Analyzed	D	D	D	D
42nd Avenue Southwest/Southwest Alaska Street	C	C	C	C	C	B	B
42nd Avenue Southwest/Southwest Edmunds Street	C	C	Not Analyzed	C	C	C	C
42nd Avenue Southwest/Southwest Oregon Street	B	B	B	B	B	B	B
44th Avenue Southwest/Southwest Alaska Street	A	A	A	A	A	A	A
California Avenue Southwest/Southwest Alaska Street	E	E	E	E [a]	E [a]	E	E
California Avenue Southwest/Southwest Edmunds Street	E	E	E	E	E	E	E
Fauntleroy Way Southwest/35th Avenue Southwest	E	E	E	E	E	E	E
Fauntleroy Way Southwest/38th Avenue Southwest	F	Not Analyzed	F [a]	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Fauntleroy Way Southwest/Southwest Alaska Street	E	E	E [a]	E	E	E	E

Intersection	No Build Alternative	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)*
Fauntleroy Way Southwest/Southwest Avalon Way	D	D	D	D	D	D	D
Fauntleroy Way Southwest/Southwest Oregon Street	F	F	F	F	F	F	F
Southwest Alaska Street/38th Avenue Southwest	C	Not Analyzed	E [a]	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Avalon Way/Southwest Genesee Street	C	C	C	C	C	C	C

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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 affected 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.

Table 4-24. 2042 A.M. Peak Level of Service - West Seattle Junction Segment

Intersection	No Build Alternative	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)*
35th Avenue Southwest/Southwest Avalon Way	B	B	B	B	B	B	B
40th Avenue Southwest/Southwest Oregon Street	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
41st Avenue Southwest/Southwest Alaska Street	B	C	B	C	B	B	B
41st Avenue Southwest/Southwest Edmunds Street	B	Not Analyzed	Not Analyzed	C	Not Analyzed	B	B
42nd Avenue Southwest/Southwest Alaska Street	B	B	B	B	C	B	B
42nd Avenue Southwest/Southwest Edmunds Street	A	B	Not Analyzed	B	B	A	A
42nd Avenue Southwest/Southwest Oregon Street	B	Not Analyzed	B	B	B	Not Analyzed	Not Analyzed
44th Avenue Southwest/Southwest Alaska Street	A	A	A	A	A	A	A
California Avenue Southwest/Southwest Alaska Street	D	E [a]	D	E [a]	E [a]	D	D
California Avenue Southwest/Southwest Edmunds Street	D	D	D	D	D	D	D
Fauntleroy Way Southwest/35th Avenue Southwest	F	F	F	F	F	F	F
Fauntleroy Way Southwest/38th Avenue Southwest	E	Not Analyzed	F [a]	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Fauntleroy Way Southwest/Southwest Alaska Street	E	E	F [a]	E	E	E	E

Intersection	No Build Alternative	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)*
Fauntleroy Way Southwest/Southwest Avalon Way	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Fauntleroy Way Southwest/Southwest Oregon Street	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Alaska Street/38th Avenue Southwest	B	Not Analyzed	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Avalon Way/Southwest Genesee Street	C	C	C	C	C	C	C

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

[a] An affected 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.

During the p.m. peak hour at the Southwest Alaska Street/Fauntleroy Way Southwest intersection, southbound queues extend halfway up the block on average, and under the worst conditions extend just south of 38th Avenue Southwest. At the Southwest Alaska Street/California Avenue Southwest intersection, westbound queues can extend through the intersection Southwest Alaska Street/42nd Avenue Southwest under the worst conditions. During the a.m. peak hour at Southwest Alaska Street/Fauntleroy Way Southwest, northbound queues may extend through the intersection of Southwest Edmunds Street/Fauntleroy Way Southwest under the worst conditions.

2042 Build Alternatives

Under all Build Alternatives in the West Seattle Segment, the study intersections in the vicinity of the Avalon Station are expected to operate similar to the 2042 No Build Alternative, as the Avalon Station generates relatively low pick-up and drop-off trips. The Avalon Station in both Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would include a pick-up/drop-off zone on Southwest Genesee Street, requiring a modification to the northbound approach at Southwest Avalon Way/Southwest Genesee Street from a through-only lane (as part of the 35th/Avalon Paving Project) to a shared northbound through/left-turn lane to provide access to the pick-up/drop-off zone on Southwest Genesee Street near the station. Fewer than 20 northbound left turns are expected, and this intersection would continue operating at L.O.S. C.

The Alaska Junction Station would generate a substantial number of passenger pick-up and drop-off trips that would increase delay at intersections in the vicinity of the pick-up/drop-off zones. Preferred Alternative WSJ-1 would degrade the L.O.S. results and affect the following intersections:

- 41st Avenue Southwest/Southwest Edmunds Street (L.O.S. E in p.m. peak hour).
- California Avenue Southwest/Southwest Alaska Street (L.O.S. E in a.m. peak hour).

Preferred Alternative WSJ-2 would affect the following intersections:

- Fauntleroy Way Southwest/38th Avenue Southwest (L.O.S. F in both peak hours).
- Fauntleroy Way Southwest/Southwest Alaska Street (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Southwest Alaska Street/38th Avenue Southwest (L.O.S. E in p.m. peak hour).

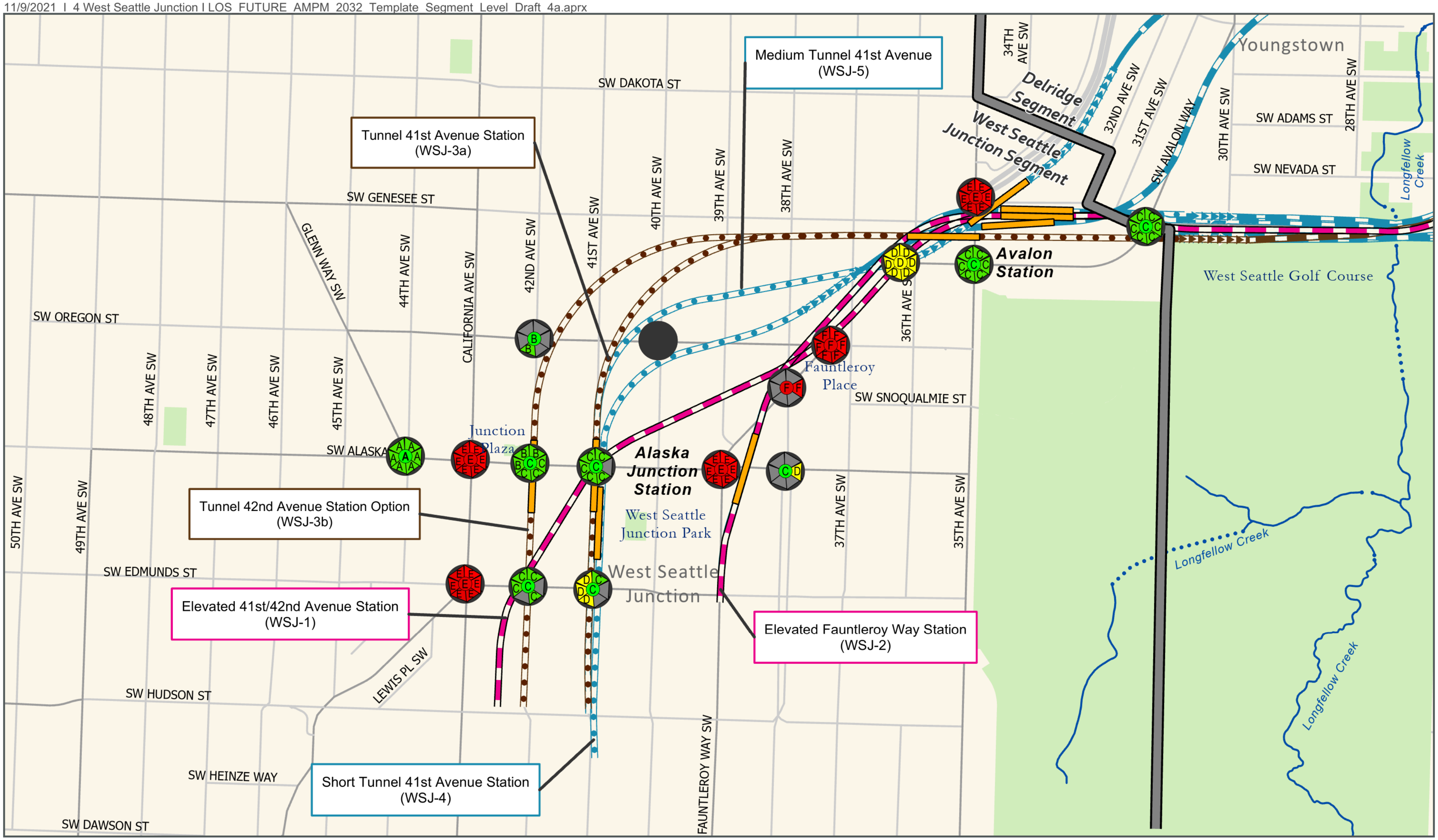
Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would affect the Southwest Alaska Street/California Avenue Southwest intersection in both peak hours due to increased vehicle trips and pedestrian crossings near the station.

Alternative WSJ-4* and Alternative WSJ-5* would have similar traffic operations results compared to the 2042 No Build Alternative. Delays at intersections near station entrances may increase slightly, but no intersections are expected to be adversely affected.

2032 No Build Alternative

The 2032 No Build Alternative traffic operation results are similar to the 2042 No Build Alternative results. Intersection operation results are shown in Table 4-25 and Table 4-26 and on Figure 4-20 and Figure 4-21.

11/9/2021 I 4 West Seattle Junction I LOS_FUTURE_AMPM_2032_Template_Segment_Level_Draft_4a.aprx



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

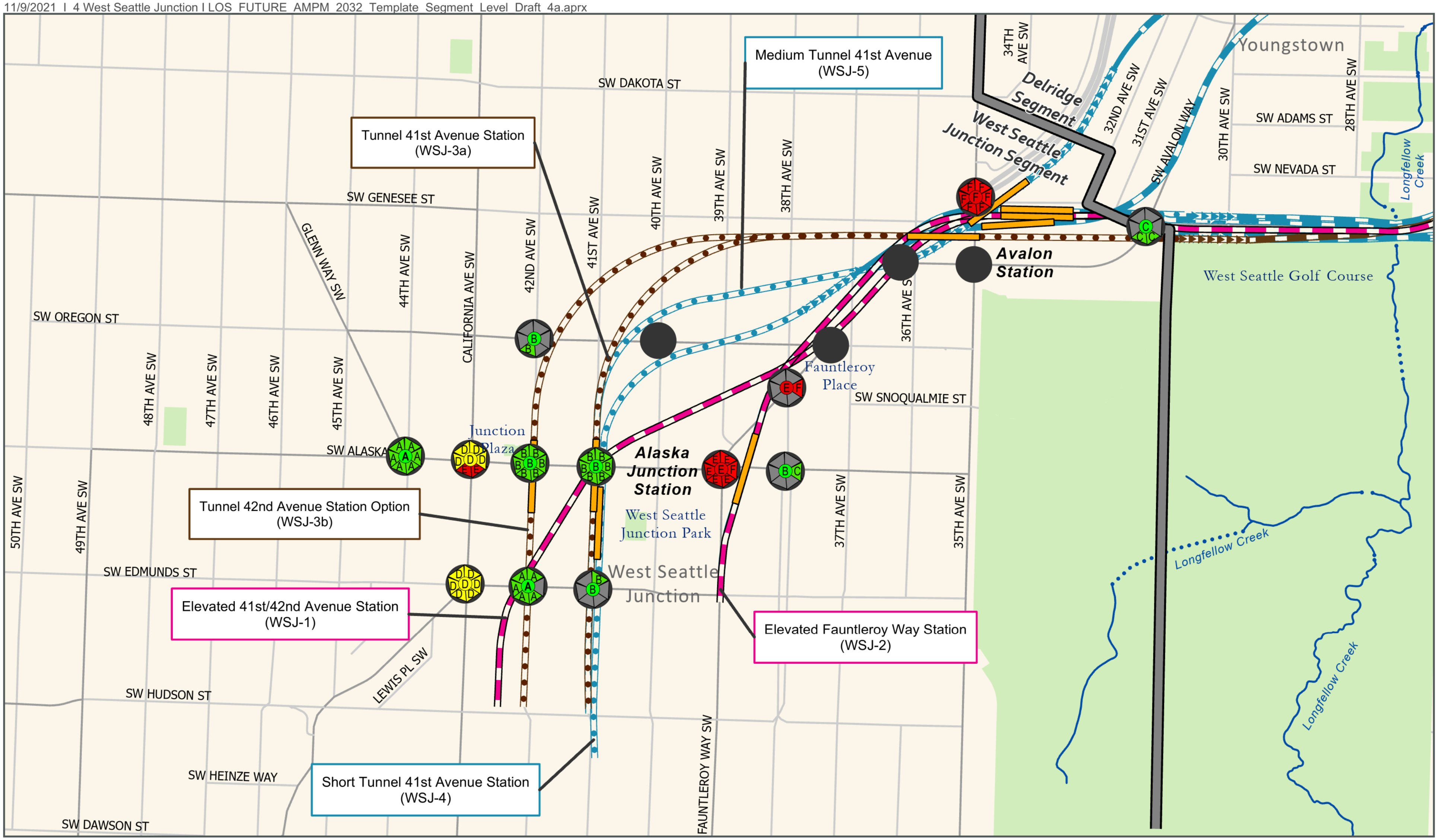
LOS Key for Alternatives
- WSJ-1
- WSJ-2
- WSJ-3a
- WSJ-3b
- WSJ-4
- WSJ-5
- No Build

Level of Service (LOS)
- A-C
- D
- E-F
- Intersection Not Analyzed

0 500 1,000 Feet N

FIGURE 4-20
2032 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

11/9/2021 I 4 West Seattle Junction I LOS_FUTURE_AMPM_2032_Template_Segment_Level_Draft_4a.aprx



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-3b
- WSJ-2
- WSJ-4
- WSJ-3a
- WSJ-5
- No Build

Level of Service (LOS)
- A-C
- D
- E-F
- Intersection Not Analyzed

0 500 1,000 Feet N

FIGURE 4-21

2032 A.M. Peak Hour Intersection Level of Service (L.O.S.)

West Seattle Link Extension - West Seattle Junction Segment

West Seattle and Ballard Link Extensions

Table 4-25. 2032 P.M. Peak Level of Service - West Seattle Junction Segment

Intersection	No Build Alternative	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)*
35th Avenue Southwest/Southwest Avalon Way	C	C	C	C	C	C	C
40th Avenue Southwest/Southwest Oregon Street	C	C	C	C	C	C	C
41st Avenue Southwest/Southwest Alaska Street	C	C	Not Analyzed	C	C	C	C
41st Avenue Southwest/Southwest Edmunds Street	C	C	Not Analyzed	Not Analyzed	D	D	D
42nd Avenue Southwest/Southwest Alaska Street	C	B	C	C	C	B	B
42nd Avenue Southwest/Southwest Edmunds Street	C	C	Not Analyzed	C	Not Analyzed	C	C
42nd Avenue Southwest/Southwest Oregon Street	B	Not Analyzed	Not Analyzed	Not Analyzed	B	Not Analyzed	Not Analyzed
44th Avenue Southwest/Southwest Alaska Street	A	A	A	A	A	A	A
California Avenue Southwest/Southwest Alaska Street	E	E	E	E	E	E	E
California Avenue Southwest/Southwest Edmunds Street	E	E	E	E	E	E	E
Fauntleroy Way Southwest/35th Avenue Southwest	E	E	E	E	E	E	E
Fauntleroy Way Southwest/38th Avenue Southwest	F	Not Analyzed	F	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Fauntleroy Way Southwest/Southwest Alaska Street	E	E	E	E	E	E	E
Fauntleroy Way Southwest/Southwest Avalon Way	D	D	D	D	D	D	D

Intersection	No Build Alternative	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)*
Fauntleroy Way Southwest/Southwest Oregon Street	F	F	F	F	F	F	F
Southwest Alaska Street/38th Avenue Southwest	C	Not Analyzed	D	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Avalon Way/Southwest Genesee Street	C	C	C	C	C	C	C

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.

Table 4-26. 2032 A.M. Peak Level of Service - West Seattle Junction Segment

Intersection	No Build Alternative	Preferred Elevated 41st/42nd Avenue Southwest Station Alternative (WSJ-1)	Preferred Elevated Fauntleroy Way Southwest Station Alternative (WSJ-2)	Preferred Tunnel 41st Avenue Southwest Station Alternative (WSJ-3a)*	Preferred Tunnel 42nd Avenue Southwest Station Option (WSJ-3b)*	Short Tunnel 41st Avenue Southwest Station Alternative (WSJ-4)*	Medium Tunnel 41st Avenue Southwest Station Alternative (WSJ-5)*
35th Avenue Southwest/Southwest Avalon Way	B	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
40th Avenue Southwest/Southwest Oregon Street	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
41st Avenue Southwest/Southwest Alaska Street	B	B	B	B	B	B	B
41st Avenue Southwest/Southwest Edmunds Street	B	B	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
42nd Avenue Southwest/Southwest Alaska Street	B	B	B	B	B	B	B
42nd Avenue Southwest/Southwest Edmunds Street	A	A	Not Analyzed	A	A	A	A
42nd Avenue Southwest/Southwest Oregon Street	B	Not Analyzed	Not Analyzed	Not Analyzed	B	Not Analyzed	Not Analyzed
44th Avenue Southwest/Southwest Alaska Street	A	A	A	A	A	A	A
California Avenue Southwest/Southwest Alaska Street	D	D	D	E [a]	E [a]	D	D
California Avenue Southwest/Southwest Edmunds Street	D	D	D	D	D	D	D
Fauntleroy Way Southwest/35th Avenue Southwest	F	F	F	F	F	F	F
Fauntleroy Way Southwest/38th Avenue Southwest	E	Not Analyzed	F [a]	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Fauntleroy Way Southwest/Southwest Alaska Street	E	E	F [a]	E	E	E	E
Fauntleroy Way Southwest/Southwest Avalon Way	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed

Intersection	No Build Alternative	Preferred Elevated 41st/42nd Avenue Southwest Station Alternative (WSJ-1)	Preferred Elevated Fauntleroy Way Southwest Station Alternative (WSJ-2)	Preferred Tunnel 41st Avenue Southwest Station Alternative (WSJ-3a)*	Preferred Tunnel 42nd Avenue Southwest Station Option (WSJ-3b)*	Short Tunnel 41st Avenue Southwest Station Alternative (WSJ-4)*	Medium Tunnel 41st Avenue Southwest Station Alternative (WSJ-5)*
Fauntleroy Way Southwest/Southwest Oregon Street	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Alaska Street/38th Avenue Southwest	B	Not Analyzed	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Southwest Avalon Way/Southwest Genesee Street	C	Not Analyzed	Not Analyzed	C	C	Not Analyzed	Not Analyzed

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

[a] An affected 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.

In the 2032 No Build Alternative, intersections in the vicinity of the West Seattle Junction Station and Avalon Station would operate at L.O.S. D or better in the p.m. and a.m. peak hour, with the exception of the following intersections:

- California Avenue Southwest/Southwest Alaska Street (L.O.S. E in p.m. peak hour).
- California Avenue Southwest/Southwest Edmunds Street (L.O.S. E in p.m. peak hour).
- Fauntleroy Way Southwest/35th Avenue Southwest (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Fauntleroy Way Southwest/38th Avenue Southwest (L.O.S. F in p.m. peak hour, L.O.S. E in a.m. peak hour).
- Fauntleroy Way Southwest/Southwest Alaska Street (L.O.S. E in both peak hours).
- Fauntleroy Way Southwest/Southwest Oregon Street (L.O.S. F in p.m. peak hour).

2032 Interim Terminus Condition

Under all Build Alternatives in the West Seattle Segment, the study intersections in the vicinity of the Avalon Station are expected to operate similarly to the 2032 No Build Alternative.

At the Alaska Junction Station, the 2032 Build Alternatives would generate fewer vehicle trips due to pick-up and drop-off activity compared to the 2042 Build Alternatives. Preferred Alternative WSJ-1 would have slightly increased delay at intersections compared to the 2032 No Build Alternative, but no intersections are expected to be adversely affected.

Preferred Alternative WSJ-2 would affect the Fauntleroy Way Southwest/Southwest Alaska Street intersection in the a.m. peak hour and the Fauntleroy Way Southwest/38th Avenue Southwest intersection in both peak hours, as the station would attract vehicle trips to and from the loading zones on 38th Avenue Southwest.

Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would affect the California Southwest/Southwest Alaska Street intersection, which would operate at L.O.S. E in the a.m. peak hour

Alternative WSJ-4* and Alternative WSJ-5* would have similar traffic operation results as the 2032 No Build Alternative. No intersections are expected to be affected under these alternatives.

4.2.2.3 Construction Impacts

This section describes the potential construction impacts to roadway conditions, including conceptual haul routes; construction traffic; and roadway closures and diversions and their effects on traffic conditions. 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. Detailed construction planning, including sequencing, will be provided in later phases of the environmental analysis once project design is sufficiently advanced.

Impacts Common to All Alternatives

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 for the City's Major Truck Streets) and WSDOT's Interstate and State Route facilities, including Interstates 5, 90, and 405 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 whenever possible but would sometimes need to include local streets to access construction areas not adjacent to the arterial street system. West Seattle Link Extension construction areas where local streets would be necessary for access include the following:

- Delridge tunnel portals for Preferred Alternative DEL-2a*, Option DEL-2b*, Alternative DEL-4*, and Alternative DEL-6* in the Delridge Segment.
- Pigeon Point construction staging area for Preferred Alternative DUW-1a and Option DUW-1b in the Duwamish Segment.
- Portals for the West Seattle Junction Segment tunnel alternatives (Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, Alternative WSJ-4*, and Alternative WSJ-5*), and the station areas for all alternatives, including the elevated alternatives.

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

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.

Property Access, Roadway Impacts, and Detour Routes

Construction for each alternative would require road and lane closures that could also affect transit, non-motorized travel, and freight, as addressed in Sections 3.2.2.2, 6.3.2.2, and 9.2.2.2, respectively. Sound Transit will coordinate with the City of Seattle as the project advances to identify and finalize proposed detour routes and determine if those roads would be able to accommodate increased volumes. In general, traffic 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 the contractor.

The following discussion 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, Construction-Related Roadway Modifications, for a more detailed list of the roadway construction closures expected for each alternative.

For long-term (over 1 year on key arterial streets) closures, an analysis of these traffic impacts was performed using 2032 as a representative analysis year for the construction period. Potential diversion routes were identified, and traffic volumes were rerouted to adjacent roadways. The analysis describes locations where there could be additional congestion as a result of the construction activities.

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

SODO Segment

Figure 4-22 and Table 4-27 provide a summary of the major construction closures in the SODO Segment.

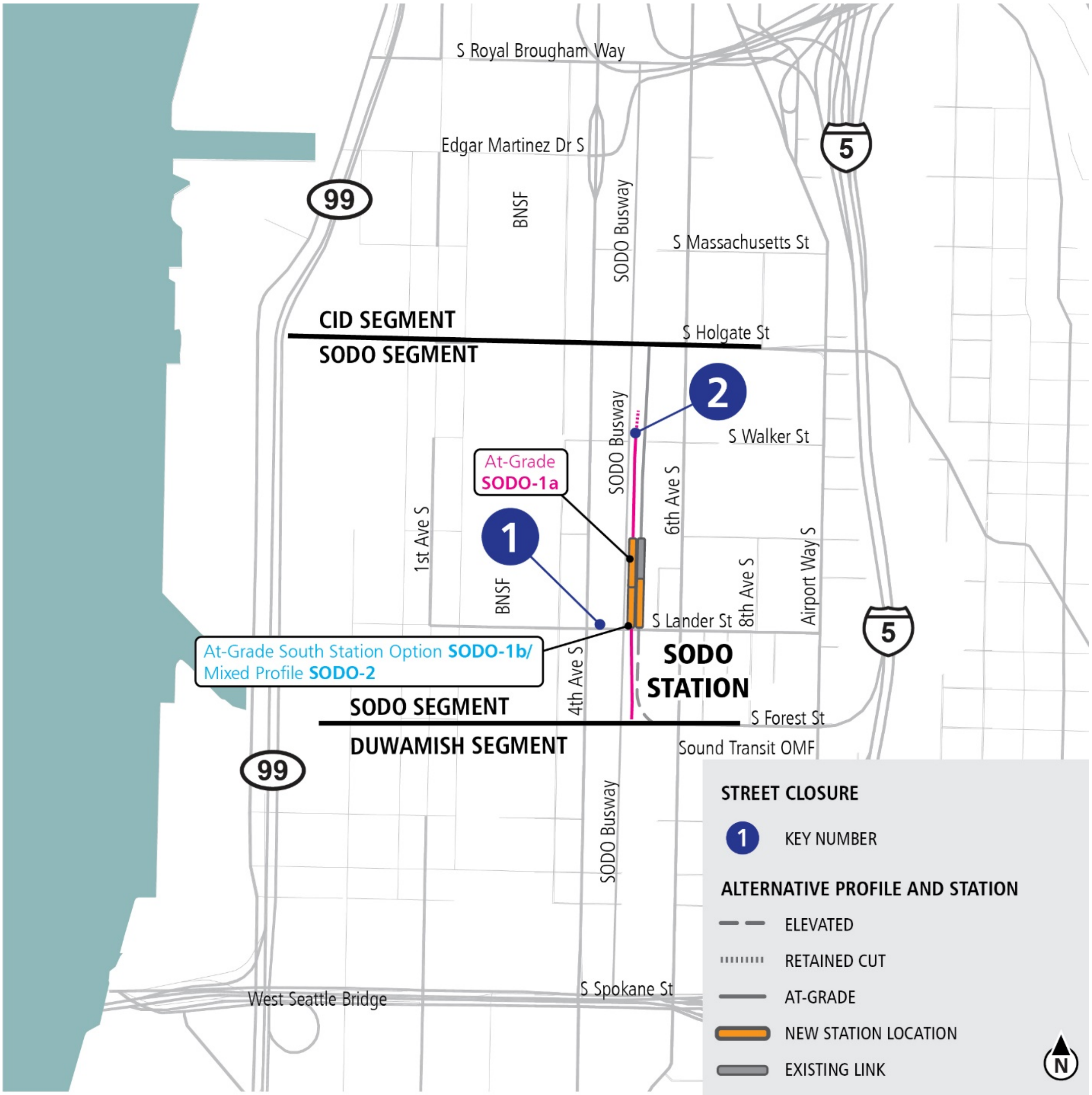


Figure 4-22. Key Construction Roadway Closures – SODO Segment

Table 4-27. Key Construction Roadway Closures – SODO Segment

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

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 in the SODO Segment.

Some of the expected roadway closures would result in traffic diversions within the SODO Segment. Table 4-28 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other roadways in the West Seattle area. The sections following Table 4-28 further describe the traffic effects for each of the SODO Segment alternatives.

Table 4-28. Key Arterial Roadway Closure Traffic Diversion Summary – SODO Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
SODO-1a, SODO-1b	South Lander Street (4th Avenue South to 6th Avenue South)	900 to 1,100	South Holgate Street 4th Avenue South (south of South Lander Street) [b] 6th Avenue South (north of South Lander Street) South Spokane Street Airport Way South
SODO-1a, SODO-1b, SODO-2	SODO Busway (South Massachusetts Street to South Spokane Street)	60 to 80 buses	4th Avenue South [b] 6th Avenue South

Note: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

Preferred Alternative (SODO-1a) and Other Option (SODO-1b)

Preferred Alternative SODO-1a and Option SODO-1b would close South Lander Street between 4th Avenue South and 6th Avenue South during construction of a new overpass. The SODO-1b Option moves the existing SODO Station further south to the new South Lander Street overcrossing, and results in a longer construction period to build the extra structure to connect Lander to the station access at the top of the bridge.

Closing South Lander Street would require diverting a substantial number of peak hour vehicle trips, including relatively high truck volumes. Probable diversion routes would include South

Holgate Street and South Spokane Street, along with portions of 4th Avenue South, 6th Avenue South, and Airport Way South. The intersection L.O.S. in the area is not expected to be substantially affected. Based on the predicted future volumes, the resulting traffic diversions could be adequately accommodated within the adjacent street system.

The SODO Busway closure from South Massachusetts Street to South Spokane Street during construction of Alternative SODO-2 would displace 60 to 80 buses to either 4th Avenue South or 6th Avenue South, but would not substantially affect general traffic conditions along these streets (see the Construction Impacts section under Section 3.2.2.2, Build Alternatives, for more details on construction-related bus service impacts). The permanent closure of the SODO Busway with Preferred Alternative SODO-1 and Option SODO-1b would occur at the beginning of construction, as described in the Long-term Impacts section of Section 3.2.2.2.

Other Build Alternative (SODO-2)

Alternative SODO-2 would require the closure of the SODO Busway from South Massachusetts Street to South Spokane Street during the construction period. The closure would displace Metro buses to either 4th Avenue South or 6th Avenue South. The effects would be similar to those reported for SODO -1a and SODO-1b for a permanent closure (see Section 4.2.2.2 for effects on general purpose traffic and Section 3.2.2.2 for effects on transit).

Duwamish Segment

Road closures in the Duwamish Segment would include short-term partial and full roadway closures.

Preferred Alternative (DUW-1a) and Other Option (DUW-1b)

Preferred Alternative DUW-1a and Option DUW-1b would require short-term (9-month-or-less, and/or night and weekend) partial and full roadway closures for the guideway crossings over several City streets, including Southwest Spokane Street, East Marginal Way, and West Marginal Way, and State Route 99. Crossing over the West Seattle Bridge and Delridge Way Southwest would require night and weekend partial closures. Some local street construction access would also be required in the Pigeon Point area.

Other Build Alternative (DUW-2)

Alternative DUW-2 would require full and partial road closures during nights and weekends for the guideway crossings over 6th Avenue South, 4th Avenue South, 1st Avenue South, and State Route 99. Crossing the Duwamish Waterway, the guideway construction would require night and weekend partial closures of Klickitat Avenue Southwest and West Marginal Way. Crossing over the West Seattle Bridge would require night and weekend partial closures, along with a partial 3-month closure of Chelan Avenue Southwest west of West Marginal Way Southwest/Southwest Spokane Street. Increased traffic congestion is expected along Chelan Avenue Southwest with this partial closure; however, one lane can be maintained in each direction.

Delridge Segment

Local, minor, and principal arterials would be affected by construction in the Delridge Segment. Road closures would range from partial road closures for short-term durations to full road closures for long-term durations. Figure 4-23 and Table 4-29 provide a summary of the major construction closures.

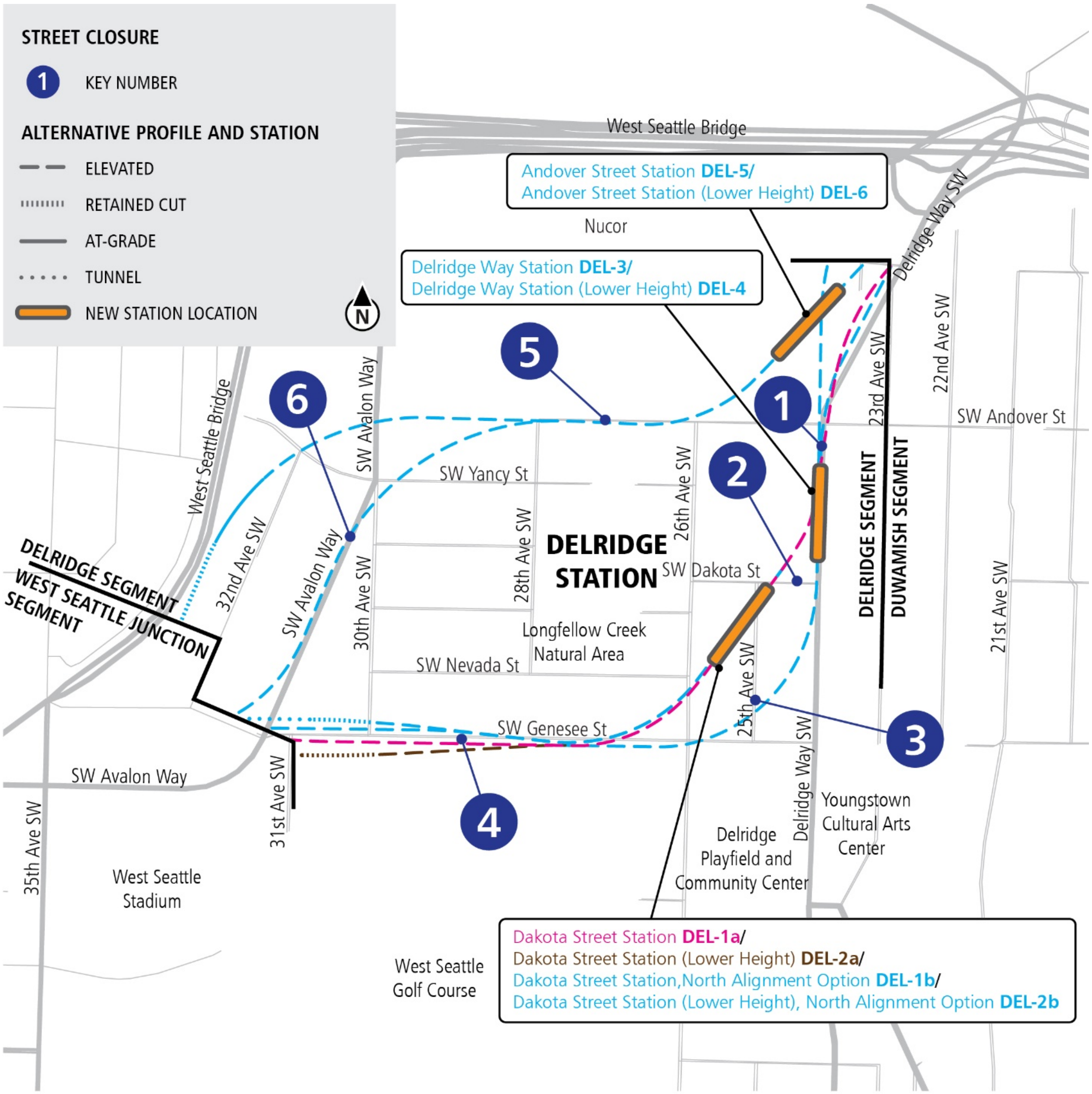


Figure 4-23. Key Construction Roadway Closures – Delridge Segment

Table 4-29. Key Construction Roadway Closures – Delridge Segment

Key Number	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)*
1	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
2	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
3	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

Key Number	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)*
4	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
5	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
6	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

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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.

Some of the expected roadway closures would result in traffic diversions within the Delridge Segment. Table 4-30 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other roadways in the Delridge area. The sections following Table 4-30 further describe the traffic effects for each of the Delridge Segment alternatives.

Table 4-30. Key Arterial Roadway Closure Traffic Diversion Summary –Delridge Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
DEL-1a, DEL-1b, DEL-3	Southwest Genesee Street (26th Avenue Southwest to Southwest Avalon Way)	410 to 500	Southwest Andover Street Southwest Avalon Way Southwest Yancy Street 26th Avenue Southwest
DEL-3, DEL-4*	Delridge Way Southwest (23rd Avenue Southwest to Southwest Dakota Street)	420 to 520	West Seattle Bridge [b] Southwest Genesee Street Southwest Avalon Way Southwest Genesee Street Southwest Andover Street 26th Avenue Southwest
DEL-5	Southwest Andover Street (26th Avenue Southwest to 28th Avenue Southwest) Southwest Avalon Way (Southwest Yancy Street to Southwest Genesee Street)	1,600 to 1,900	West Seattle Bridge [b] Delridge Way Southwest [b] Southwest Genesee Street 30th Avenue Southwest
DEL- 6*	Southwest Andover Street (26th Avenue Southwest to 28th Avenue Southwest)	180 to 220	Delridge Way Southwest [b] Southwest Genesee St 26th Avenue Southwest Southwest Yancy Street

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.
[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.
[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a would cross over Delridge Way Southwest for construction of the guideway over the street. Portions of Delridge Way Southwest would likely have short-term closures for this construction. The construction of the Delridge Station would require a long-term closure of 25th Avenue Southwest.

The construction of the guideway along Southwest Genesee Street would require full closure of the street between 26th Avenue Southwest and Avalon Way Southwest. While the volumes on

Southwest Genesee Street are moderate, this street provides 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. The primary diversion routes would likely be Southwest Andover Street, Southwest Yancy Way, and Southwest Avalon Way, resulting in increased congestion at intersections along these routes. Local streets within Youngstown would also be affected, including 26th Avenue Southwest and 28th Avenue Southwest.

Preferred Alternative with Third-Party Funding (DEL-2a)*

Preferred Alternative DEL-2a* would have construction activities similar to Preferred Alternative DEL-1a, although Southwest Genesee Street would likely only require short-term full closures on nights and weekends.

Other Build Alternatives (DEL-1b, DEL-2b, DEL-3, DEL-4*, DEL-5, and DEL-6*)*

Option DEL-1b would have impacts similar to Preferred Alternative DEL-1a along Delridge Way Southwest and in the vicinity of the Delridge Station. Although the guideway would be located north of Southwest Genesee Street, construction activities would likely require the full closure of this street. Diversion routes and affected intersections would be similar to Preferred Alternative DEL-1a.

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

Alternative DEL-3 would require construction closure of one to three lanes on Southwest Delridge Way from 23rd Avenue Southwest to Southwest Dakota Street. These lane closures would potentially divert up to a third of the traffic from Delridge Way Southwest to 35th Avenue Southwest and/or Southwest Avalon Way via the West Seattle Bridge. It is also anticipated that some traffic could divert away from Delridge Way Southwest using the parallel 26th Avenue Southwest to bypass the construction area. These diversions would create additional traffic and congestion along those streets. The two unsignalized intersections at 26th Avenue Southwest/Southwest Genesee Street and Southwest Yancy Street/Southwest Avalon Way would also experience increased delay for turning vehicles. This alternative would require closure of Southwest Genesee Street with impacts similar to those identified for Preferred Alternative DEL-1a. Construction of the Delridge Station would also close Dakota Street Southwest during construction, resulting in localized traffic diversions.

Alternative DEL-4* would have impacts similar to Alternative DEL-3 along Southwest Delridge Way. Southwest Genesee Street could remain open except for short-term closures to construct the guideway across this street.

Alternative DEL-5 construction would require a full closure of Andover Street Southwest (26th Avenue Southwest to 28th Avenue Southwest) and Southwest Avalon Way (Southwest Yancy Street to Southwest Genesee Street), likely during overlapping periods. This would result in a substantial diversion of vehicle trips within the Delridge area. The primary diversion routes would include Delridge Way Southwest, Southwest Genesee Street, and the West Seattle Bridge/Fauntleroy Way Southwest. The Southwest Genesee Street corridor would likely experience heavy congestion at both the Delridge Way Southwest and Southwest Avalon Street intersections. Traffic diverted to the West Seattle Bridge would likely increase congestion at the intersections of Fauntleroy Way Southwest with 35th Avenue Southwest and Southwest Avalon Way. Higher volumes on Delridge Way Southwest would also add to congestion at Southwest Andover Street, although volumes on Southwest Andover Street would be reduced. With these closures, access to the Nucor Steel property would be maintained. Southwest Yancy Street and Delridge Way Southwest would also be closed for short periods during nights and weekends for guideway construction over the roadway. Local access to properties within the Youngstown neighborhood would require diversions around the two closure areas.

Alternative DEL-6* would also require the full closure of Andover Street Southwest from 26th Avenue Southwest to 28th Avenue Southwest, although access to Nucor Steel would be retained. Closures to Avalon Way Southwest and Southwest Yancy Streets would be short term. The traffic volumes on Southwest Andover Street are relatively low and would likely be diverted to Delridge Way Southwest, Southwest Genesee Street, and Southwest Avalon Way. Congestion could increase at the unsignalized intersections of Southwest Genesee Street/26th Avenue Southwest and Southwest Avalon Way/Southwest Yancy Street for diverted traffic needing to access the properties in the Youngstown neighborhood. Delridge Way Southwest would also be partially closed north of Andover Way Southwest for short periods for guideway construction over the roadway.

West Seattle Junction Segment

Construction in the West Seattle Junction Segment would range from partial road closures for short-term durations to potentially full road closures for long-term durations. Figure 4-24 and Table 4-31 provide a summary of the major construction closures.

Preferred Alternatives (WSJ-1 and WSJ-2)

Under Preferred Alternative WSJ-1, the short section of 36th Avenue Southwest between Southwest Genesee Street and Fauntleroy Way Southwest would be 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 between 35th Avenue Southwest and Southwest Oregon Street would be closed on nights and weekends for guideway construction. Traffic effects would likely be minimal during these low volume times, although access to the West Seattle Bridge would be restricted, with trips likely diverted to 35th Avenue Southwest for this purpose. 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 conditions.

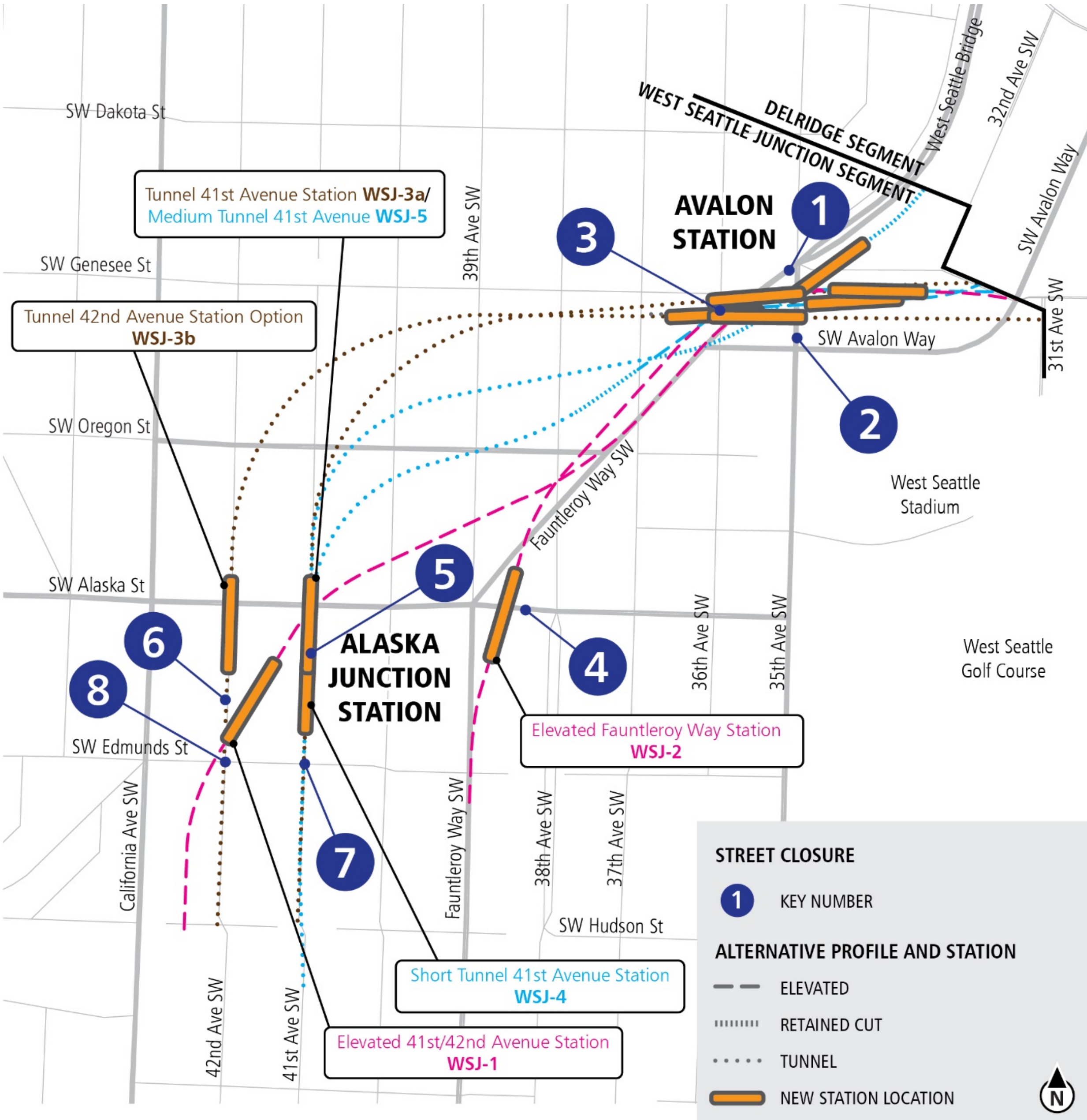


Figure 4-24. Key Construction Roadway Closures – West Seattle Junction Segment

Preferred Alternative WSJ-2 would have similar construction effects as Preferred Alternative WSJ-1 except at the Alaska Junction Station area. Southwest Alaska Street would be closed during station construction between 38th Avenue Southwest and 39th Avenue Southwest. This section of Southwest Alaska Street has relatively low traffic volume but serves as a roadway connection between Alaska Junction and 35th Avenue Southwest. With the closure, a majority of the traffic would likely travel along Fauntleroy Way Southwest between Southwest Alaska Street and 35th Avenue Southwest, resulting in higher congestion levels at intersections with 38th Avenue Southwest, Southwest Oregon Street, and Southwest Avalon Way.

Table 4-31. Key Construction Roadway Closures – West Seattle Junction Segment

Key Number	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)*
1	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
2	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
3	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
4	Southwest Alaska Street	38th Avenue Southwest to Fauntleroy Way Southwest	Not applicable	Full closure, 3 years	Not applicable	Not applicable	Not applicable	Not applicable
5	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

Key Number	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)*
6	42nd Avenue Southwest	North of Southwest Alaska Street to Southwest Hudson Street	Partial closure, 9 months Full closure, nights/weekends [c]	Not applicable	Not applicable	Full closure, 4 years [d]	Not applicable	Not applicable
7	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
8	Southwest Edmunds Street	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, of the Draft Environmental Impact Statement, 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] Extends to south of Southwest Hudson Street; includes 1-year partial closure of Southwest Alaska Street east of 41st Avenue Southwest.

[c] Extent limited to block north of Southwest Edmunds Street.

[d] Includes 4-year partial closure of Southwest Hudson Street at 42nd Avenue Southwest.

Some of the expected roadway closures would result in traffic diversions within the West Seattle Segment. Table 4-32 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other roadways in the West Seattle area. The sections following Table 4-32 further describe the traffic effects for each of the West Seattle Junction Segment alternatives.

Table 4-32. Key Arterial Roadway Closure Traffic Diversion Summary –West Seattle Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
WSJ-2	Southwest Alaska Street (38th Avenue Southwest to Fauntleroy Way Southwest)	500 to 600	Fauntleroy Way Southwest [b] 38th Avenue Southwest
WSJ-3a*, WSJ-3b*, WSJ-5*	Fauntleroy Way Southwest (West Seattle Bridge to Southwest Avalon Way)	900 to 1,100	35th Avenue Southwest Southwest Genesee Street Southwest Dakota Street Southwest Alaska Street [b] Delridge Way Southwest [b]
WSJ-3a*, WSJ-3b*, WSJ-5*	35th Avenue Southwest (West Seattle Bridge to Southwest Avalon Way)	1,500 to 1,900	Fauntleroy Way Southwest [b] Southwest Alaska Street [b] 37th Avenue Southwest 38th Avenue Southwest 40th Avenue Southwest 42nd Avenue Southwest

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

Preferred Alternative and Option with Third-Party Funding (WSJ-3a and WSJ-3b*)*

Under Preferred Alternative WSJ-3a*, there would be multiple roadway closures.

35th Avenue Southwest would be closed between Fauntleroy Way Southwest and Southwest Avalon Way and would divert over 1,500 p.m. peak hour vehicles. This roadway section is a key connection between the West Seattle Bridge and areas to the south along 35th Avenue Southwest and for north-south connections across Fauntleroy Way Southwest. The primary diversion routes could include Southwest Alaska Street to the west of 35th Avenue Southwest, connecting to either 37th Avenue Southwest or 38th Avenue Southwest for access to Fauntleroy Way Southwest. Intersections along these routes, several of which are unsignalized, would likely experience substantial increases in traffic delay. Increases in volumes along Fauntleroy Way Southwest between 38th Avenue Southwest and 35th Avenue Southwest would add to congestion in that corridor, which is a major freight and transit route. Traffic that normally would use 35th Avenue Southwest to travel into the North Admiral neighborhood would also likely divert across Southwest Alaska Street through the Alaska Junction. Traffic congestion would likely increase along these routes.

One to three lanes on Fauntleroy Way Southwest would be closed between the West Seattle Bridge and Southwest Avalon Street. Up to 1,000 p.m. peak hour vehicle trips would likely divert from Fauntleroy Way Southwest, which is a major truck street and provides access to the Fauntleroy - Vashon Island Ferry Terminal. Primary diversion routes would likely be along 35th Avenue Southwest (if open, depending on construction schedules) from Fauntleroy Way Southwest to Southwest Alaska Street and along Southwest Alaska Street from 35th Avenue Southwest to Fauntleroy Way Southwest. Efforts would be made to minimize any simultaneous closures of 35th Avenue Southwest and Fauntleroy Way Southwest. Delridge Way Southwest could also be a diversion route for traffic coming from the West Seattle Bridge heading further south within West Seattle. Congestion could increase at the Southwest Andover Street and Southwest Genesee Street intersections along this route. Traffic heading towards Alaska Junction could also divert from Fauntleroy Way Southwest west along Southwest Genesee Street and/or Southwest Dakota Street to California 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 handled within the adjacent street system. Southwest Alaska Street at 41st Avenue Southwest would be partially closed for a few months during the construction of the cut-and-cover West Seattle Junction Station, although traffic along Southwest Alaska Street could be maintained.

The construction effects of Preferred Option WSJ-3b* would be similar to those described for Alternative WSJ-3a* except that the Alaska Junction effects would be along 42nd Avenue Southwest.

Other Build Alternatives (WSJ-4 and WSJ-5*)*

Alternative WSJ-4* would have similar construction effects as Preferred Alternative WSJ-3a*. The partial closure of Fauntleroy Way Southwest and the full closure of 36th Avenue Southwest at the Avalon Station would be shorter in duration. 35th Avenue Southwest would also be closed, but only during nights and weekends, with fewer traffic effects. Closures and traffic effects at the Alaska Junction Station would be similar to Preferred Alternative WSJ-3a*.

41st Avenue Southwest between Southwest Alaska Street through Southwest Hudson Street would be closed, creating localized traffic diversions. Southwest Edmunds Street at 41st Avenue Southwest would also be closed. There would be short-term partial closures of Southwest Alaska Street at the station location. Fauntleroy Way Southwest would also have closures of two to three lanes at the Avalon tunnel station. Traffic effects would be similar to Preferred Alternative WSJ-3a*. Construction of this short section would add to localized peak hour congestion at this location, with some potential diversions to Delridge Way Southwest or Avalon Way Southwest.

Under Alternative WSJ-5*, the roadway closures on 35th Avenue Southwest and Fauntleroy Way Southwest at the Avalon cut-and-cover station and on 41st Avenue Southwest at the Alaska Junction Station. would result in traffic diversion effects similar to Preferred Alternative WSJ-3a*. This alternative would allow 36th Avenue Southwest to remain open at the Avalon Station.

4.2.3 Potential Mitigation Measures

4.2.3.1 Long-term Mitigation

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 4-33.

Table 4-33. Potentially Impacted Intersections to be Considered for Mitigation – West Seattle Link Extension

Segment	Intersection	Alternative	Primary Cause(s) of Impact
Delridge Segment	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
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 Segment	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
Delridge Segment	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
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
West Seattle Junction Segment	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
West Seattle Junction Segment	Southwest Alaska Street/California Avenue Southwest	Preferred Alternative WSJ-3a* or Preferred Option WSJ-3b*	Increased pick-up/drop-off activity

Sound Transit will continue to work with the City of Seattle and the Federal Transit Administration as the West Seattle Link Extension project design progresses to minimize project-related intersection delays. Where additional project-related delays are unavoidable, Sound Transit will work with the City of Seattle to identify potential mitigation at the intersections identified in Table 4-33 with the intent of either meeting agreed-upon L.O.S. thresholds during the a.m. and p.m. peak hours or attain 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 the Federal Transit Administration, 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.

4.2.3.2 Construction Mitigation

Sound Transit will 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 (such as bus, streetcar, and light rail).

Potential construction mitigation measures will 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 will 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:

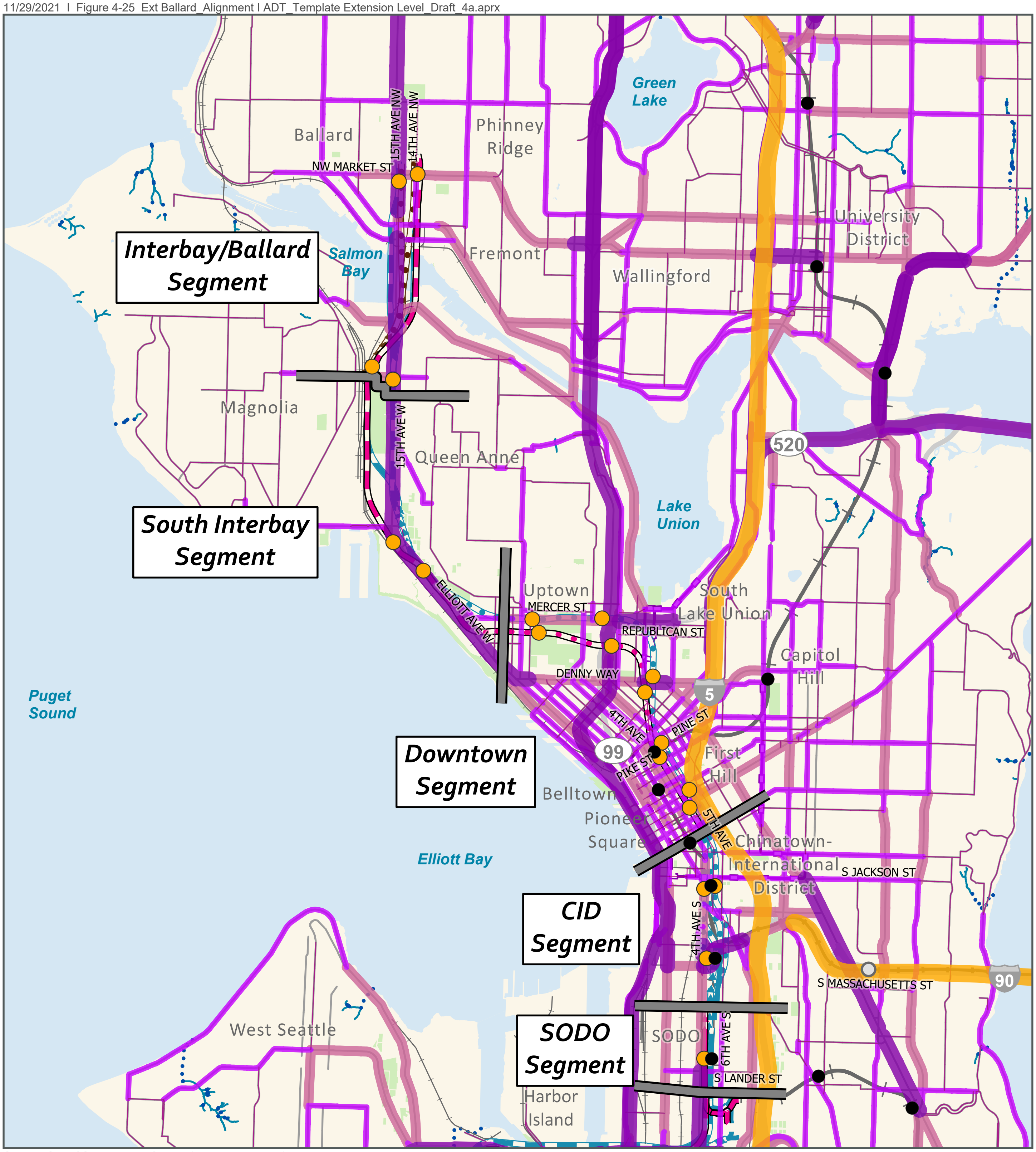
- Install advance warning signs and highly-visible construction barriers and use flaggers where needed.
- Consider a variety of traffic and travel demand management strategies, such as supporting employer incentives or programs to use transit.
- Clearly sign and provide detour routes when streets are fully or partially closed for elevated guideway and trench construction. 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.

4.3 Ballard Link Extension

4.3.1 Affected Environment

The Ballard Link Extension includes the following segments: SODO, Chinatown-International District, Downtown, South Interbay, and Interbay/Ballard. This section includes discussion about vehicle travel through the study area and intersection operations. Roadway network and daily traffic volumes in the Ballard Link Extension area are shown on Figure 4-25.



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

Average Annual Weekday Traffic (2018)

≤8,000 17,000 32,000 100,000 > 100,000

0 0.5 1 Mile

N

FIGURE 4-25
Existing Daily Traffic Volumes
Ballard Link Extension

West Seattle and Ballard Link Extensions

4.3.1.1 Arterials and Local Roadways

SODO Segment

The SODO Segment for the Ballard Link Extension project starts at the Link light rail SODO Station and continues a short distance north to South Holgate Street. In addition to the roadway network described for the West Seattle Link Extension in Section 4.2.1.1, Arterials and Local Roadways, for the Ballard Link Extension, South Holgate Street is an important link between SODO and the North Beacon Hill neighborhood. The SODO Segment integrates closely with the Chinatown-International District Segment, with facilities shown in Table 4-34.

Chinatown-International District Segment

Roadways and volumes in the Chinatown-International District Segment of the study area are shown in Table 4-34. The main north-south roadways are 1st Avenue South, 4th Avenue South, 6th Avenue South, Seattle Boulevard South, and Airport Way South. The main east-west roadways are South Jackson Street, South Dearborn Street, and South Royal Brougham Way.

In the Chinatown-International District Segment, several north-south arterials provide important routes to Downtown Seattle. 1st Avenue South and 4th Avenue South connects 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, other businesses in the Chinatown-International District and Pioneer Square neighborhoods. South Jackson Street is a major east-west connection between the Waterfront, Pioneer Square, 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 major existing local street facilities and characteristics such as street classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-34.

Downtown Segment

Roadways and volumes in the Downtown Segment of the study area are shown in Table 4-35. The Downtown Segment of the study area 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, 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 Downtown Segment, arterials provide access to and between major employment hubs within Downtown Seattle, a Puget Sound Regional Council-designated Regional Growth Center. The major existing local roadway facilities and characteristics such as roadway classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-35.

Table 4-34. Existing Local Roadway Segments – SODO and Chinatown-International District Segments

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
4th Avenue South	Principal	4 to 6 [b]	25 to 30	16,700 to 36,900	No	Yes
5th Avenue South	Minor	2 to 3	25	4,500 to 5,500	No	Yes
6th Avenue South	Minor	2	25	4,200	No	Partial
Airport Way South	Principal	4	30	6,800	No	Yes
South Dearborn Street	Principal	4	25	9,000 to 22,400	Yes	Yes
South Jackson Street	Principal	4	25	11,300 to 14,500	No	Yes
South Royal Brougham Way	Principal	2 to 4	25	2,600 to 9,600	Partial	Partial
Seattle Boulevard South	Principal	4	25	7,000 to 16,000	No	Yes
South Holgate Street	Minor	4 to 5	25	10,000 to 13,600	No	Yes

Note: Table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information unless otherwise noted.

[b] Includes one or more transit-only lanes.

Table 4-35. Existing Local Roadway Segments – Downtown Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
1st Avenue North	Principal	2 to 3	20 to 25	4,400 to 7,900	Partial	Yes
1st Avenue West	Collector/Minor	2	20 to 25	2,800 to 3,500	No	Yes
4th Avenue	Principal	4 [b]	25	14,000 to 23,900	No	Yes
5th Avenue	Minor	3	25	3,500 to 18,600	No	Yes
5th Avenue North	Principal	4 to 5	20 to 25	14,500 to 14,800	Yes	Yes
6th Avenue	Principal	2 to 3 [b]	25	8,100 to 31,400	No	Yes
7th Avenue North	Principal	6	30 to 40	10,500	No	Yes
8th Avenue	Minor	2 to 4	25	3,300	No	Yes
9th Avenue	Minor	2	25	4,000	No	Yes
9th Avenue North	Principal	2	25	3,900 to 7,800	Partial	Yes
Columbia Street	Principal	3	25	4,600 to 8,800	No	Yes
Denny Way	Principal	4	25	25,700 to 33,300	No	Yes
Dexter Avenue North	Minor	2 to 4	25	8,000 to 17,900	Yes	Yes
Madison Street	Principal	2	25	8,200 to 10,900	No	Yes
Marion Street	Minor	2	25	8,000 to 14,600	Yes	Yes
Mercer Street	Principal	4 to 6	25	18,100 to 35,000	Partial	Yes
West Mercer Street/West Mercer Place	Principal	2 to 4	25	11,000 to 18,100	No	Yes
Olive Way	Principal	3 to 4 [b]	25	8,000 to 12,500	No	Yes
Pike Street	Principal	2 [b]	25	8,500 to 13,000	Yes	Yes
Pine Street	Principal	2 [b]	25	5,500 to 10,000	Yes	Yes
Queen Anne Avenue North	Minor	2 to 4	20 to 25	9,700 to 14,200	Partial	Yes
Republican Street	Minor	2	25	2,500	No	Yes
Roy Street	Principal	2	20 to 25	5,600 to 9,300	Yes	Yes
Seneca Street	Principal	3	25	9,600 to 12,200	No	Yes
Spring Street	Principal	2 to 3 [b]	25	2,700 to 14,600	Yes	Yes
Taylor Avenue North	Minor	2	25	8,300	Partial	Yes

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
Westlake Avenue/ Westlake Avenue North	Principal	4 [b]	20 to 25	4,500 to 9,100	No	Yes
West Roy Street	Minor	2	20 to 25	6,000	Partial	Yes

Note: Table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted.

[b] Includes one or more transit-only lanes.

South Interbay Segment

Roadways and volumes in the South Interbay Segment of the study area are shown in Table 4-36. The main north-south roadways are 15th Avenue West and Elliott Avenue West. The main east-west roadways are West Mercer Place, West Galer Street Flyover, and the Magnolia Bridge (West Garfield Street).

The Elliott Avenue West/15th Avenue West corridor connects Downtown Seattle with the Magnolia and Ballard neighborhoods to the west and north, respectively. West Mercer Place provides a connection between Uptown and Elliott Avenue West. Gilman Drive West connects the Queen Anne neighborhood to 15th Avenue West, and the Magnolia Bridge provides access from downtown to the Magnolia neighborhood. 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 major existing local roadway facilities and characteristics such as roadway classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-36.

Table 4-36. Existing Local Roadway Segments – South Interbay Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
15th Avenue West	Principal	4 to 6 [b]	30	43,000 to 43,700	Yes	Yes
Elliott Avenue West	Principal	5 to 6 [b]	25	43,600 to 59,900	Yes	Yes
West Galer Street Flyover	Minor	2 to 3	20 to 25	6,600	No	Partial
West Mercer Place	Principal	2	25	11,000	No	Partial

Note: Table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted.

[b] Includes one or more transit-only lanes.

Interbay/Ballard Segment

Roadways and volumes in the Interbay/Ballard Segment of the study area are shown in Table 4-37. The main north-south roadways are 14th Avenue Northwest, 15th Avenue Northwest/15th Avenue West, and 20th Avenue Northwest. The main east-west roadways are West Dravus Street, West Emerson Street, and West Nickerson Street, Northwest Leary Way, and Northwest Market Street.

Table 4-37. Existing Local Roadway Segments – Interbay/Ballard Segment

Roadway	Arterial Classification	Number of Lanes	Speed Limit (miles per hour)	A.D.T. [a]	Bike Lanes	Sidewalk
14th Avenue Northwest	Collector	2	20	6,900 to 9,100	No	Yes
15th Avenue Northwest/15th Avenue West	Principal	4 to 6 [b]	30	35,000 to 51,500	No	Yes
20th Avenue Northwest	Collector	2	25	6,300	Partial	Yes
Northwest Leary Way	Principal	4	25	10,000 to 16,000	No	Yes
Northwest Market Street	Principal/Minor	4	25	10,300 to 28,600	No	Yes
West Dravus Street	Principal/Minor	2 to 4	25	10,100 to 21,100	No	Yes
West Emerson Street	Principal	2 to 4	25	14,100 to 19,800	Partial	Partial
West Nickerson Street	Principal	2	25	18,500	Partial	Partial

Note: Table only includes study area roads classified as arterial and above.

[a] A.D.T. based on latest available traffic count information (2017-2018) unless otherwise noted.

[b] Includes one or more transit-only lanes.

The Interbay/Ballard Segment is also served by the 15th Avenue West/15th Avenue Northwest corridor, 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.

The major existing local roadway facilities and characteristics such as roadway classification, number of lanes, speed limit, A.D.T., and presence of bike lanes or sidewalks are shown in Table 4-37.

4.3.1.2 Intersection Operations

Key intersections adjacent to potential station areas were evaluated during peak hours to better understand existing traffic operations. All analysis intersections were evaluated during the a.m. and p.m. peak hour. For the a.m. and p.m. peak hour analysis, the peak 1-hour traffic count (occurring between 7 and 9 a.m. and 4 and 6 p.m.) for each intersection was entered into the traffic analysis software. While the p.m. peak hour generally represents the most congested period of the day, some locations may have worse a.m. operations due to local land uses and traffic patterns. The existing a.m. and p.m. peak hour analysis were used to determine which locations warranted a.m. analysis in the 2042 build conditions.

Intersection operations were evaluated by calculating the average delay (in seconds) per vehicle and translating that delay into a qualitative L.O.S. L.O.S. ranges from A to F, where L.O.S. A represents little to no congestion with under-utilized lane capacity and free-flow travel speeds and L.O.S. F represents poor operating conditions with vehicle queuing and frequent stop-and-go travel. There are separate L.O.S. delay thresholds for signalized intersections and unsignalized intersections as defined by the *Highway Capacity Manual* (Transportation Research Board 2016). For additional information, see Attachment N.1D, Existing and Future Intersection Levels of Service.

Intersections were considered to be failing if they do not meet the L.O.S. threshold set by the governing agency; however, the City of Seattle does not have an official intersection L.O.S. threshold. For the purposes of this analysis, failing intersections were defined as L.O.S. E or F. See Attachment N.1D for more detail.

SODO Segment

Intersection level of service results for the SODO Segment are the same for both the West Seattle Link and Ballard Link extension projects; see Table 4-5 and Figure 4-2 in Section 4.2.1.1. Attachment N.1D provides a detailed summary of the traffic analysis results for the existing a.m. and p.m. peak hour conditions, signal control, and the applicable L.O.S. threshold.

Chinatown-International District Segment

For the Chinatown-International District Segment, existing peak hour analysis was performed at ten intersections in the vicinity of the new International District/Chinatown Station. Those intersections operate at L.O.S. D or better in the p.m. and a.m. peak hour with the exception of the following intersections:

- 4th Avenue South/Seattle Boulevard (L.O.S. E in both peak hours).
- 4th Avenue South/South Jackson Street (L.O.S. F in a.m. peak hour).
- 5th Avenue South midblock crossing south of South Weller Street, (L.O.S. F in p.m. peak hour).
- 5th Avenue South/South Dearborn Street (L.O.S. F in p.m. peak hour, L.O.S. E in a.m. peak hour).

During the a.m. peak hour, congestion from the 4th Avenue South/South Jackson Street intersection can result in a queue that degrades operations at upstream intersections such as 5th Avenue South/South Jackson Street and 4th Avenue South/Weller Street. Results for the a.m. and p.m. peak hour traffic operations at the study intersections are in Table 4-38 and are shown on Figure 4-26. Attachment N.1D provides a detailed summary of the traffic analysis results for the existing a.m. and p.m. peak hour conditions, signal control, and the applicable L.O.S. threshold.

Table 4-38. Existing Intersection Level of Service – Chinatown-International District Segment

Intersection	P.M. Peak Hour Level of Service	A.M. Peak Hour Level of Service
4th Avenue South/Edgar Martinez Drive	D	B
4th Avenue South/Seattle Boulevard	E	E
4th Avenue South/South Jackson Street	C	F
4th Avenue South/South Royal Brougham Way	B	C
4th Avenue South/South Weller Street Bridge	D	C
5th Avenue/South Dearborn Street	F	E
5th Avenue South Midblock Crossing south of South Weller Street	F	D
5th Avenue South/South Jackson Street	B	C
5th Avenue South/South King Street	A	A
5th Avenue South/South Weller Street	B	B

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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

Intersection Type
- Stop-Controlled
- Signalized

0 700 1,400 Feet N

FIGURE 4-26
Existing A.M. and P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Chinatown-International District Segment
West Seattle and Ballard Link Extensions

Downtown Segment

For the Downtown Segment, existing peak hour analysis was performed at 38 intersections; 4 of the intersections do not meet the L.O.S. threshold during the p.m. peak hour and 7 do not meet the L.O.S. threshold during the a.m. peak hour. Within the downtown area, high levels of traffic volumes, closely spaced intersections, and large pedestrian and bicycle activity contribute to the congestion on many of the one-way streets in the downtown core. Spillback from congested intersections affects the rest of the network in a complex way because of the many closely spaced intersections. Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown on Figure 4-27. Existing intersection L.O.S. results are also shown in Table 4-39 for the p.m. peak hour and a.m. peak hour.

Intersections in the vicinity of the Midtown Station currently operate at L.O.S. D or better during the peak hours with the exception of the following:

- 4th Avenue/Madison Street (L.O.S. F in a.m. peak hour).
- 5th Avenue/Columbia Street (L.O.S. F in p.m. peak hour, L.O.S. E in a.m. peak hour).
- 5th Avenue/Marion Street (L.O.S. F in a.m. peak hour).
- 6th Avenue/Seneca Street (L.O.S. F in both peak hours).
- 6th Avenue/Spring Street (L.O.S. F in both peak hours).

Intersections in the vicinity of the Westlake Station currently operate at L.O.S. D or better during both peak hours.

Intersections near the Denny Station currently operate at L.O.S. D or better during both peak hours with the exception of Westlake Avenue North/John Street, which currently operates at L.O.S. F during the p.m. peak hour.

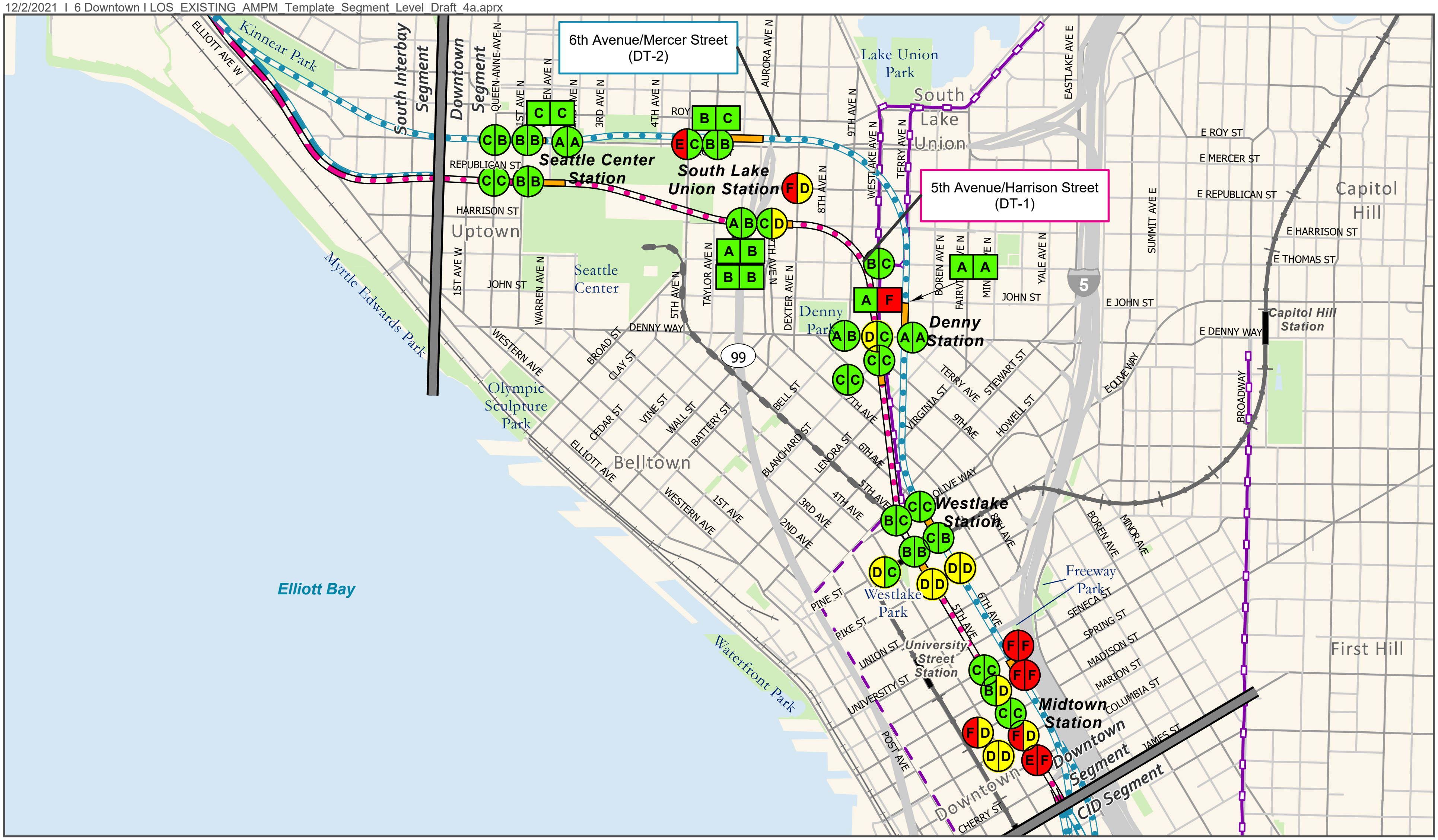
Near the South Lake Union Station, intersections currently operate at L.O.S. D or better during both peak hours with the exception of Dexter Avenue North/Republican Street and 5th Avenue North/Mercer Street, which currently operate at L.O.S. F and L.O.S. E during the a.m. peak hour, respectively.

All intersections near the Seattle Center Station currently operate at L.O.S. C or better during both peak hours.

Table 4-39. Existing Intersection Level of Service – Downtown Segment

Intersection	P.M. Peak Hour Level of Service	A.M. Peak Hour Level of Service
1st Avenue North/Mercer Street	B	B
1st Avenue North/Republican Street	B	B
4th Avenue/Madison Street	D	F
4th Avenue/Marion Street	D	D
4th Avenue/Pine Street	C	D
5th Avenue/Columbia Street	F	E
5th Avenue/Madison Street	C	C
5th Avenue/Marion Street	D	F
5th Avenue/Olive Way	C	B
5th Avenue/Pike Street	D	D

Intersection	P.M. Peak Hour Level of Service	A.M. Peak Hour Level of Service
5th Avenue/Pine Street	B	B
5th Avenue/Seneca Street	C	C
5th Avenue/Spring Street	D	B
5th Avenue North/Mercer Street	C	E
6th Avenue/Olive Way	C	C
6th Avenue/Pike Street	D	D
6th Avenue/Pine Street	B	C
6th Avenue/Spring Street	F	F
6th Avenue North/Harrison Street	B	A
6th Avenue North/Thomas Street	B	A
6th Avenue South/Seneca Street	F	F
8th Avenue/Blanchard Street	C	C
9th Avenue North/Denny Way	B	A
Aurora Avenue North/Harrison Street	D	C
Dexter Avenue North/Republican Street	D	F
Queen Anne Avenue North/West Mercer Street	B	C
Queen Anne Avenue North/West Republican Street	C	C
State Route 99/Thomas Street	B	B
Taylor Avenue North/Mercer Street	B	B
Taylor Avenue North/Roy Street	C	B
Terry Avenue North/Denny Way	A	A
Terry Avenue North/John Street	A	A
Warren Avenue North/Mercer Street	A	A
Warren Avenue North/Roy Street	C	C
Westlake Avenue/Blanchard Street	C	C
Westlake Avenue North/Denny Way	C	D
Westlake Avenue North/John Street	F	A
Westlake Avenue North/Thomas Street	C	B



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

Intersection Level of Service

AM PM

- A-C
- D
- E-F

Intersection Type
- Stop-Controlled
- Signalized

0 1,000 2,000 Feet

N

FIGURE 4-27
Existing A.M. and P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Downtown Segment

West Seattle and Ballard Link Extensions

South Interbay Segment

For the South Interbay Segment, existing peak hour analysis was performed at five intersections. Two of the intersections do not meet the L.O.S. threshold during the p.m. peak hour and one does not meet the L.O.S. threshold during the a.m. peak hour. Results for the a.m. and p.m. peak hour traffic operations at the study intersections are shown on Figure 4-28. Existing intersection L.O.S. results are also shown in Table 4-40 for the p.m. peak hour and the a.m. peak hour. Near the Smith Cove Station, all of the intersections meet the L.O.S. threshold during both peak hours with the exception of Elliott Avenue West/West Mercer Place, which currently operates at L.O.S. E during the p.m. peak hour, and Elliott Avenue West/West Prospect Street, which currently operates at L.O.S. E during both peak hours.

Table 4-40. Existing Intersection Level of Service – South Interbay Segment

Intersection	P.M. Peak Hour Level of Service	A.M. Peak Hour Level of Service
Alaskan Way West/West Galer Street Flyover	B	B
Elliott Avenue/West Galer Street	A	A
Elliott Avenue West/West Galer Street Flyover	B	B
Elliott Avenue West/West Mercer Place	E	D
Elliott Avenue West/West Prospect Street	E	E

Interbay/Ballard Segment

For the Interbay/Ballard Segment, existing peak hour analysis was performed at 10 intersections. All of the intersections meet the L.O.S. threshold during the p.m. peak hour, and three intersections do not meet the L.O.S. threshold during the a.m. peak hour. Results for p.m. peak hour traffic operations at the study intersections are shown on Figure 4-29. Existing intersection L.O.S. results are also shown in Table 4-41 for the p.m. peak hour and the a.m. peak hour.

Table 4-41. Existing Peak Hour Intersection Level of Service – Interbay/Ballard Segment

Intersection	P.M. Peak Hour Level of Service	A.M. Peak Hour Level of Service
14th Avenue Northwest/Northwest Market Street	B	B
15th Avenue Northwest/Northwest 54th Street	D	E
15th Avenue Northwest/Northwest Market Street	D	E
15th Avenue Northwest - Northbound Ramps/Northwest Leary Way	D	C
15th Avenue Northwest - Southbound Ramps/Northwest Leary Way	D	C
15th Avenue West/West Bertona Street	D	E
15th Avenue West - Northbound Ramps/West Dravus Street	C	C
15th Avenue West - Southbound Ramps/West Dravus Street	D	D
17th Avenue Northwest/Northwest Market Street	B	B
17th Avenue West/West Dravus Street	A	A

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

Intersection Level of Service

AM PM
- A-C
- D
- E-F

Intersection Type
- Stop-Controlled
- Signalized

0 800 1,600 Feet
N

FIGURE 4-28
Existing A.M. and P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - South Interbay Segment
West Seattle and Ballard Link Extensions

12/2/2021 I 8 Interbay Ballard I LOS_EXISTING_AMPM_Template_Segment_Level_Draft_4a.aprx

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

Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives
- Segment Line
- Railroad
- Stream
- Park

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

Station
- New

Intersection Level of Service

AM PM

- A-C
- D
- E-F

Intersection Type
- Stop-Controlled
- Signalized

FIGURE 4-29
Existing A.M. and 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

Near the Interbay Station, intersections operate at L.O.S. D or better during both peak hours with the exception of 15th Avenue West/West Bertona Street, which currently operates at L.O.S. E during the a.m. peak hour.

Intersections in the vicinity of the Ballard Station currently operate at L.O.S. D or better during both peak hours with the exception of 15th Avenue Northwest/Northwest Market Street and 15th Avenue Northwest/Northwest 54th Street, which currently operate at L.O.S. E during the a.m. peak hour.

4.3.2 Environmental Impacts

This section describes the long-term property access and circulation and roadway and traffic conditions for the Build Alternatives compared to the No Build Alternative, by segment. It also describes temporary impacts during construction.

4.3.2.1 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.1G, Bicycle Master Plan Project List.

Traffic volumes for the No Build Alternative are forecasted for the 2042 a.m. and p.m. peak hours based on Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Peak hour traffic volumes 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 operate worse than in 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 (see Figures 4-6 and 4-7 and Figures 30 through 37).

4.3.2.2 Long-term Impacts

The long-term impacts are evaluated using 2042 traffic forecasts and includes the effects of additional buses accessing the stations, additional vehicle traffic (pick-up, drop-off, and transportation network company activity) and non-motorized volumes generated by the Build Alternatives.

Beyond the results presented in this section, Attachment N.1D provides a detailed summary of the traffic analysis results for the existing a.m. and p.m. peak hour conditions, signal control, and the applicable L.O.S. threshold.

Property Access and Circulation

This section describes the main roadway modifications and traffic circulation changes under the No Build Alternative and proposed with 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 due to guideway column placement. 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 drawings in Appendix J of the Draft Environmental Impact Statement show additional detail about each alternative.

SODO Segment

No Build Alternative

The No Build Alternative assumed completion of the Lander Street Bridge project, which constructs a new vehicle overpass between 1st Avenue South and 4th Avenue South and eliminates an at-grade crossing with the BNSF Railway rail line.

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a 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 Central Link light rail that interrupts east-west traffic flow in the area. Some parcels would be acquired to build the overpass, and access to remaining properties on this section of South Holgate Street would be maintained with new driveways potentially on 4th Avenue South or 6th Avenue South.

The existing SODO Busway extends north into the Chinatown-International District Segment. As described for the West Seattle Link Extension in Section 4.2.2.2, the SODO Busway would be closed for Preferred Alternative SODO-1a, but access to the Ryerson Bus Base along the busway would remain open.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b and Alternative SODO-2 would also construct an elevated South Holgate Street overpass between 4th Avenue South and 6th Avenue South for the Ballard Link Extension, with the same results as for Preferred Alternative SODO-1a.

The SODO Busway would be closed for Option SODO-1b, but access to the Ryerson Bus Base along the busway would remain open. Alternative SODO-2 would allow the SODO Busway to remain open; however, this alternative can only connect to Alternative CID-1a* and Alternative CID-2a.

Chinatown-International District Segment

No Build Alternative

There are no roadway capacity changes under the No Build Alternative for the Chinatown-International District Segment.

4th Avenue Shallow Alternative (CID-1a)*

Alternative CID-1a* would remove an existing travel lane on 4th Avenue South from south of Seattle Boulevard to South Jackson Street, and would eliminate the existing southbound left-turn lane access to the Union Station parking garage near the South Weller Street Bridge. For analysis purposes, it was assumed that the northbound bus lane would be repurposed because the number of buses traveling on this section of 4th Avenue South would be substantially reduced when Ballard Link Extension light rail service begins, but other roadway channelization options would be considered in coordination with the City of Seattle and Metro as the project advances.

4th Avenue Deep Station Option (CID-1b)*

Option CID-1b* would remove an existing travel lane on 4th Avenue South from south of Seattle Boulevard to South Jackson Street and would eliminate the existing southbound left-turn lane access to the Union Station parking garage near the South Weller Street Bridge.

Option CID-1b* would also permanently close the portion of the SODO Busway that accesses the Ryerson Bus Base north of South Massachusetts Street. Buses would most likely shift to 4th Avenue South.

5th Avenue Shallow Alternative (CID-2a) and 5th Avenue Deep Station Option (CID-2b)

No changes are proposed to the general purpose traffic circulation under Alternative CID-2a and Option CID-2b.

Downtown Segment

No Build Alternative

The No Build Alternative assumes the Seattle Arena Redevelopment improvements, such as the implementation of transit-only lanes on 1st Avenue North from Denny Way to Republican Street and on Queen Anne Avenue North from John Street to Mercer Street, and a transit queue jump at 1st Avenue North/Republican Street. Near the Westlake and Midtown stations, the No Build Alternative assumes the business access transit lanes along 4th Avenue, 6th Avenue, and Olive Way are repurposed to general purpose lanes as under the No Build Alternative bus service is not planned to occur along these streets as defined in the Transit Service Integration technical memorandum (Attachment N.1C). The northbound contraflow bus lane would be repurposed as a southbound general purpose lane at 5th Avenue/Marion Street and 5th Avenue/Columbia Street. Signalization is also assumed for the intersection of Aurora Avenue North/Thomas Street near the South Lake Union Station.

Preferred Alternative (DT-1)

Preferred Alternative DT-1 would close 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.

Other Build Alternative (DT-2)

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

South Interbay Segment

No Build Alternative

The No Build Alternative assumes the installation of a signal at the intersection of Alaskan Way West/West Galer Street Flyover near the Smith Cove Cruise Terminal.

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 would construct medians to support guideway columns on Elliott Avenue West south of the Smith Cove Station. Signal modifications at the Elliott Avenue West/West Galer Street Flyover intersection would be needed to allow for transit and pick-up and drop-off vehicle access to the station. Left-turn access from Elliott Avenue West to approximately ten properties would be restricted.

Other Build Alternatives (SIB-2 and SIB-3)

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. Protected left-turn lanes would remain at Gilman Drive West and West Armory Way.

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

Interbay/Ballard Segment

No Build Alternative

There are no roadway modification or traffic circulation changes under the No Build Alternative for the Interbay/Ballard Segment.

Preferred Alternative (IBB-1a)

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

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would require access modifications. 17th Avenue West 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 terminated just south of the re-aligned 17th Avenue West. Access to remaining properties in this area would be maintained, as detailed in Appendix J of the Draft Environmental Impact Statement.

Other Build Alternative and Option (IBB-1b and IBB-3)

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

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.

Travel Demand Forecasts

Traffic volumes were forecasted for the 2042 a.m. and p.m. peak hours for the Ballard Link Extension based on Puget Sound Regional Council's population and land use forecasts (Puget Sound Regional Council 2019). Peak hour traffic volumes at intersections in the Ballard Link Extension study area are expected to grow by an average of 0.8 percent per year between 2019 and 2042 under the No Build Alternative.

For the Build Alternatives, Sound Transit used station characteristics and information from its transit ridership model (Sound Transit 2019) to calculate the anticipated vehicular trip generation for each station area. Station forecasts for the a.m. and p.m. peak hour are similar, but the boardings and alightings are inversely related. Three different types of station trips were estimated:

- Passenger drop-off and pick-up (including transportation network companies).
- Buses.

- Walk and bicycle trips (non-motorized trips).

The calculated increase in vehicle and non-motorized trips at each station were added to the No Build Alternative traffic volume forecasts to estimate traffic volumes with the Build Alternatives. This forecast process is conservative because it does not reduce background traffic growth to account for people changing their travel mode from driving with the No Build Alternative to using transit with the project.

These different trips associated with each station were assigned to the surrounding streets based on existing and future travel patterns and the location of the station facilities, such as transit stops, passenger pick-up and drop-off spaces, and entrances. The number of buses with the Build Alternatives are also adjusted based on the plan documented in the Transit Service Integration technical memorandum (Attachment N.1C). Beyond the changes to the vehicle trips around the station areas, the walk and bicycle trips generated at the stations were also incorporated into the traffic analysis because this can affect intersection L.O.S. The walk and bicycle trips forecasted at each station were also an input to the pedestrian L.O.S. assessment in Section 6.4.2.2. None of the stations include long-term motor vehicle parking (such as park-and-ride lots).

Table 4-42 presents forecasts of trip activity at proposed and existing stations in the project corridor by mode for the full build and M.O.S. in the p.m. peak hour. Because the SODO Station will be completed as a part of the West Seattle Link Extension, forecasted trip activity at the station is shown in Section 4.2.1.

The station with the greatest number of new trips expected (among the existing and proposed stations) is the Westlake Station, where ridership would increase by about 40 percent over the No Build Alternative. However, most of those would be rail-to-rail transfers and would not affect the surrounding surface street system. At most other stations, total ridership is lower than at Westlake but there are more new walking or cycling trips to and from the stations. Some existing stations would experience less activity as riders shift to other stations, taking advantage of the expanded light rail system. Existing stations that could experience less activity with the project include the University Street (in the existing Downtown Seattle Transit Tunnel) and Pioneer Square stations and the existing platforms at the International District/Chinatown and Westlake stations.

Under the M.O.S., the Ballard Link Extension is assumed to have an interim terminus at the Smith Cove Station. Station trip generation for year 2042 was performed for the stations with higher ridership under this condition than in the full-length condition. Station ridership is presented in Section 3.3.2.2 as part of the transit ridership forecasts. Based on those forecasts, the peak hour trips (most notably pick-up and drop-off and transit transfers) at the Smith Cove Station would increase in the M.O.S. The majority of the increased vehicle trips compared to the full extension are assumed to access the station from the north, because the Interbay and Ballard stations would not be built. See Table 4-42 for the specific Smith Cove Station trip generation under the M.O.S.

Table 4-42. 2042 P.M. Peak Hour Station Trip Generation Forecasts by Mode – Ballard Link Extension

Segment	Station	Alternative	Walk and Bike	Drop-off/Pick-up [a]	Transit Transfers	Total Station Trips [b]
CID	Stadium – Build and (No Build)	All Alternatives	700 (600)	50 (50)	0 (10)	700 (700)
CID	International District/Chinatown - Build and (No Build)	Alternative CID-1a* and Option CID-1b*	3,900 (3,000)	200 (150)	4,000 (3,100)	8,100 (6,300)
CID	International District/Chinatown – Build and (No Build)	Alternative CID-2a and Option CID-2b	3,800 (3,000)	200 (150)	5,300 (3,100)	9,300 (6,300)
Downtown	Pioneer Square – Build and (No Build)	Preferred Alternative DT-1	2,800 (3,300)	150 (150)	100 (150)	3,000 (3,600)
Downtown	Pioneer Square – Build and (No Build)	Alternative DT-2	2,900 (3,300)	150 (150)	100 (150)	3,200 (3,600)
Downtown	Midtown	Preferred Alternative DT-1	3,500	150	250	3,800
Downtown	Midtown	Alternative DT-2	3,100	150	200	3,400
Downtown	University Street – Build and (No Build)	All Alternatives	5,800 (6,600)	250 (300)	250 (1,200)	6,300 (8,100)
Downtown	Westlake – Build and (No Build)	Preferred Alternative DT-1	12,500 (12,100)	600 (600)	6,000 (1,400)	19,000 (14,000)
Downtown	Westlake – Build and (No Build)	Alternative DT-2	13,700 (12,100)	600 (600)	5,800 (1,400)	20,100 (14,000)
Downtown	Denny	Preferred Alternative DT-1	3,400	150	600	4,100
Downtown	Denny	Alternative DT-2	2,500	150	600	3,300
Downtown	South Lake Union	Preferred Alternative DT-1	2,000	100	1,000	3,100
Downtown	South Lake Union	Alternative DT-2	1,200	50	500	1,800
Downtown	Seattle Center	All Build Alternatives	2,500	100	350	3,000
South Interbay	Smith Cove	Preferred Alternative SIB-1	500	50	150	700
South Interbay	Smith Cove	Alternative SIB-2 and Alternative SIB-3	450	50	200	700

Segment	Station	Alternative	Walk and Bike	Drop-off/Pick-up [a]	Transit Transfers	Total Station Trips [b]
South Interbay	Smith Cove (M.O.S.)	All Alternatives	500	100	1,700	2,300
Ballard/Interbay	Interbay	All Full Build Alternatives	200	50	800	1,100
Ballard/Interbay	Ballard	All Full Build Alternatives	1,400	200	1,800	3,400

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Values in parentheses indicate forecasted ridership for the existing station only under the 2042 no build condition.

[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.

Arterial and Local Street Operations

The a.m. and p.m. peak hour analysis for the No Build Alternative was evaluated for all study intersections. Even though the p.m. peak hour generally represents the most congested period of the day and was therefore conducted for all Build Alternatives, some locations may have worse a.m. operations due to local land uses and traffic patterns. The No Build Alternative a.m. analysis was used to determine which locations warranted a.m. analysis in the Build Alternatives. See Attachment N.1A, Transportation Technical Analysis Methodology Report, for more detail.

Intersections are considered to be failing if they do not meet the L.O.S. threshold set by the governing agency; however, the City of Seattle does not have an adopted intersection L.O.S. threshold. In the absence of an adopted City of Seattle L.O.S. threshold, intersections that operate at L.O.S. E and L.O.S. F are identified as failing. For Build Alternatives, affected intersections are identified and 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 have noticeably worse vehicle delays in the Build Alternative (10 percent or higher vehicle delay than in the No Build Alternative).See Attachment N.1D, Existing and Future Intersection Levels of Service, for more detailed intersection L.O.S. and queuing results.

SODO Segment

Intersection level of service results for the SODO Segment are the same for both the West Seattle Link and Ballard Link extension projects; see Table 4-11 and Table 4-12 and Figure 4-6 and Figure 4-7 in Section 4.2.1 for the p.m. and a.m. No Build Alternative and Build Alternatives intersection analysis results.

Chinatown-International District Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the Chinatown-International District Segment are shown in Table 4-43 and Table 4-44 and on Figure 4-30 and Figure 4-31.

<u>2042 No Build Alternative</u>

Under the 2042 No Build Alternative, intersections in the vicinity of the new International District/Chinatown Station would operate at L.O.S. D or better in the p.m. and a.m. peak hour, with the exception of the following intersections:

- 4th Avenue South/Seattle Boulevard (L.O.S. E in both peak hours).
- 4th Avenue South/South Jackson Street (L.O.S. E in p.m. peak hour and L.O.S. F in a.m. peak hour).
- 5th Avenue South Midblock Crossing south of South Weller Street (L.O.S. F in both peak hours).

During the a.m. peak hours, the 4th Avenue South/South Jackson Street intersection can queue back and degrade operations at upstream intersections such as 5th Avenue South/South Jackson Street and 4th Avenue South/Weller Street.

Table 4-43. P.M. Peak Intersection Level of Service - Chinatown-International District Segment

Intersection	No Build Alternative	4th Avenue Shallow Alternative (CID-1a)*	4th Avenue Deep Station Option (CID-1b)*	5th Avenue Shallow Alternative (CID-2a)	5th Avenue Deep Station Option (CID-2b)
4th Avenue South/Edgar Martinez Drive	C	C	C	C	C
4th Avenue South/Seattle Boulevard	E	E	E	D	D
4th Avenue South/South Jackson Street	E	E	E	E	E
4th Avenue South/South Royal Brougham Way	D	D	D	D	D
4th Avenue South/South Weller Street Bridge	D	D	D	C	C
5th Avenue/South Dearborn Street	D	D	D	D	D
5th Avenue South Midblock Crossing south of South Weller Street	F	F [a]	F [a]	F [a]	F [a]
5th Avenue South/South Jackson Street	C	D	D	D	D
5th Avenue South/South King Street	A	A	A	A	A
5th Avenue South/South Weller Street	B	B	B	B	B

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.

Table 4-44. A.M. Peak Intersection Level of Service - Chinatown-International District Segment

Intersection	No Build Alternative	4th Avenue Shallow Alternative (CID-1a)*	4th Avenue Deep Station Option (CID-1b)*	5th Avenue Shallow Alternative (CID-2a)	5th Avenue Deep Station Option (CID-2b)
4th Avenue South/Edgar Martinez Drive	B	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
4th Avenue South/Seattle Boulevard	E	E [a]	E [a]	E	E
4th Avenue South/South Jackson Street	F	F	F	F	F
4th Avenue South/South Royal Brougham Way	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
4th Avenue South/South Weller Street Bridge	D	D	D	D	D
5th Avenue/South Dearborn Street	C	C	C	C	C
5th Avenue South Midblock Crossing south of South Weller Street	F	F [a]	F [a]	F [a]	F [a]
5th Avenue South/South Jackson Street	B	C	C	C	C
5th Avenue South/South King Street	A	A	A	A	A
5th Avenue South/South Weller Street	A	A	A	B	B

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Limited a.m. analysis was performed for locations that met the criteria in Attachment N.1A, Transportation Technical Analysis Methodology Report.

[a] An affected 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.

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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 4-30
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
- 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
- Intersection Not Analyzed

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

0 700 1,400 Feet
N

FIGURE 4-31
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Chinatown-International District Segment
West Seattle and Ballard Link Extensions

2042 Build Alternatives

Alternative CID-1a* and Option CID-1b* would affect the 4th Avenue South/Seattle Boulevard intersection in the a.m. peak hour because of the reduced capacity from the removal of the northbound business access transit lane and the reduced storage of the southbound left-turn lane.

In addition, all Build Alternatives, in both the a.m. and p.m. peak hour, would affect the L.O.S. at the 5th Avenue South midblock crossing (south of South Weller Street) because of the increased pedestrian and bicycle activity generated by the new station.

Downtown Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the Downtown Segment are shown in Table 4-45 and Table 4-46 and on Figure 4-32 and Figure 4-33.

2042 No Build Alternative

Under the 2042 No Build Alternative, 8 of the 38 study intersections would operate at L.O.S. E or F in the p.m. peak hour and 12 would operate at L.O.S. E or F in the a.m. peak hour within the Downtown Segment. High levels of traffic volumes, including turning movements, closely spaced intersections, and pedestrian and bicycle activity contribute to the congestion on many of the one-way streets in the downtown core.

Intersections in the vicinity of the Midtown Station would operate at L.O.S. D or better in the p.m. and a.m. peak hour with the exception of the following intersections:

- 4th Avenue/Madison Street (L.O.S. E in a.m. peak hour).
- 4th Avenue/Marion Street (L.O.S. E in a.m. peak hour).
- 5th Avenue/Columbia Street (L.O.S. E in a.m. peak hour).
- 6th Avenue/Seneca Street (L.O.S. F in both peak hours).
- 6th Avenue/Spring Street (L.O.S. F in both peak hours).

Near the Westlake Station, intersections would operate at L.O.S. D or better during the p.m. peak hour with the exception of 6th Avenue/Pike Street, which would operate at L.O.S. E in the p.m. peak hour and L.O.S. F in a.m. peak hour, and 5th Avenue/Pike Street, which would operate at L.O.S. E in the a.m. peak hour.

Intersections near the Denny Station would operate at L.O.S. D or better in both the p.m. and a.m. peak hour with the exception of the following intersections:

- 8th Avenue/Blanchard Street (L.O.S. F in p.m. peak hour).
- Westlake Avenue North/Blanchard Street (L.O.S. F in both peak hours).
- Westlake Avenue North/Denny Way (L.O.S. E in a.m. peak hour).
- Westlake Avenue North/John Street (L.O.S. F in both peak hours).

The intersections in close proximity to the South Lake Union Station operate at L.O.S. D or better with the exception of Dexter Avenue North, which would operate at L.O.S. F in both the p.m. and a.m. peak hour, and Aurora Avenue North and Harrison Street, which would operate at L.O.S. E in the p.m. peak hour.

All intersections in the vicinity of the Seattle Center Station would operate at L.O.S. D or better during the p.m. peak hour. During the a.m. peak hour, intersections near the Seattle Center Station operate at L.O.S. C or better, with the exception of Queen Anne Avenue North/West Mercer Street, which would operate at L.O.S. F.

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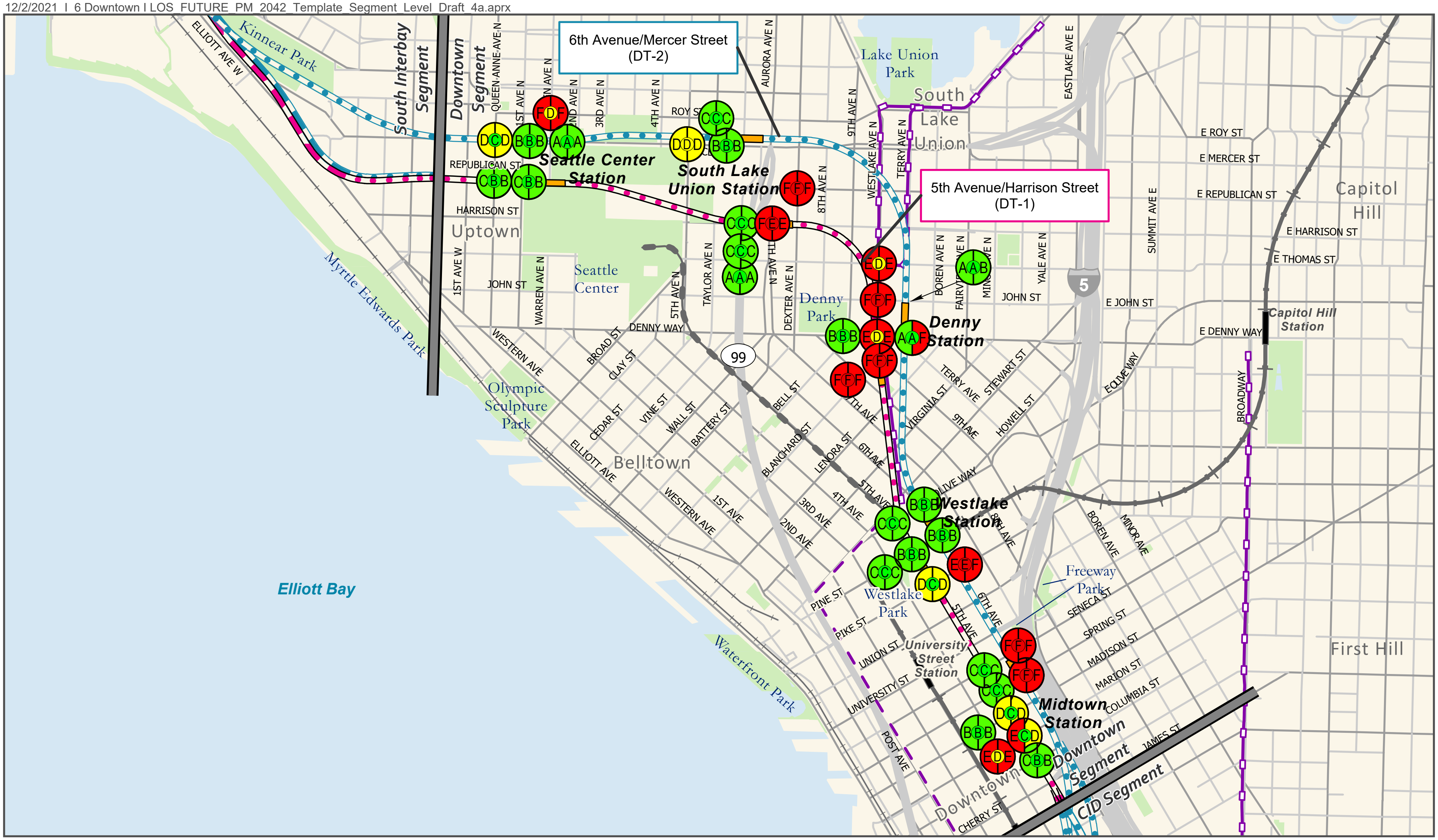

Source: City of Seattle, King County (2019, 2020, 2021).

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 4-32

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

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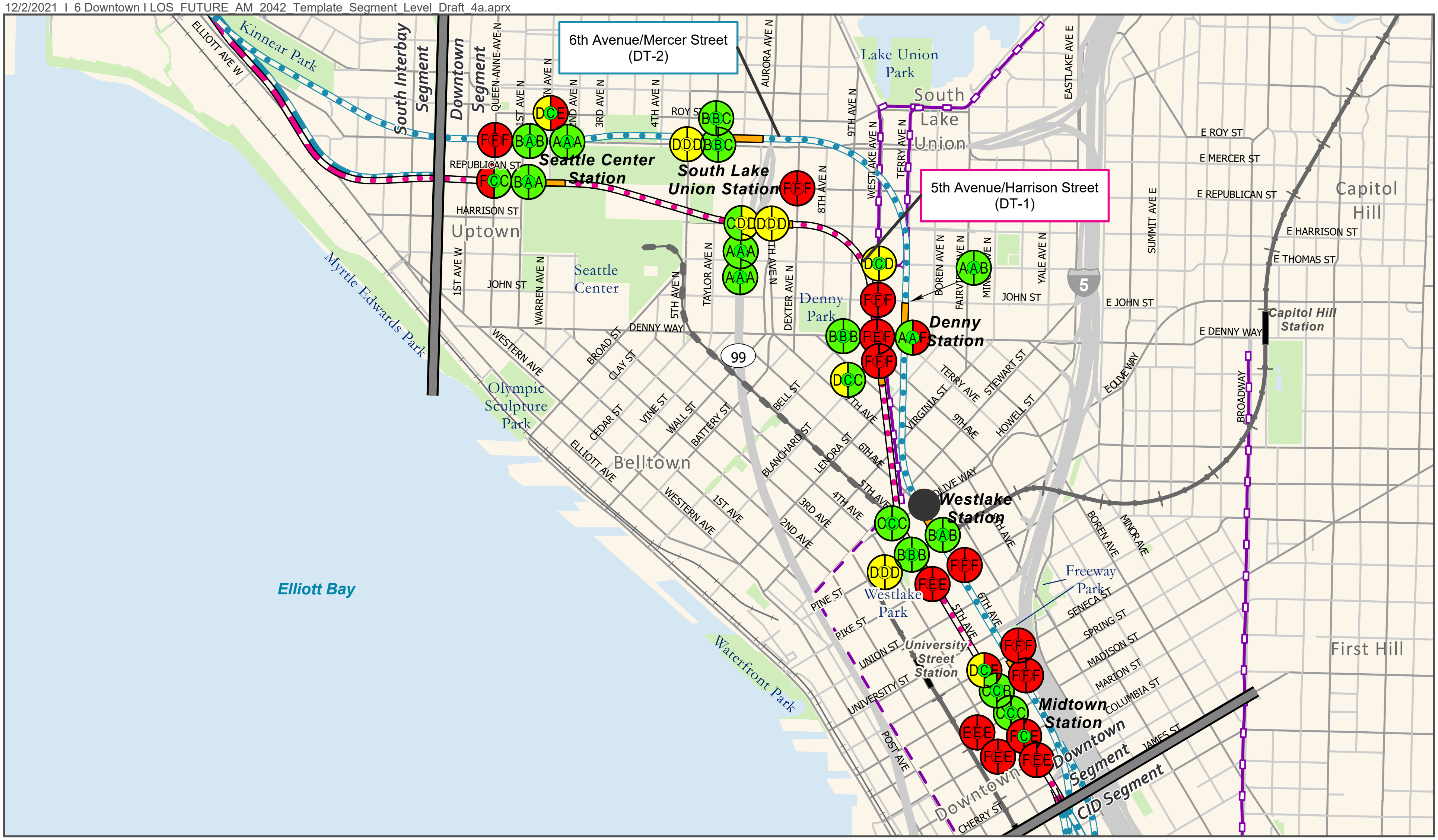


Source: City of Seattle, King County (2019, 2020, 2021).

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
- Intersection Not Analyzed

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

0 1,000 2,000 Feet

N

FIGURE 4-33
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Downtown Segment

West Seattle and Ballard Link Extensions

Table 4-45. 2042 P.M. Peak Hour Intersection Level of Service - Downtown Segment

Intersection	No Build Alternative	Preferred 5th Avenue/Harrison Street Alternative (DT-1)	6th Avenue/Mercer Street Alternative (DT-2)
1st Avenue North/Mercer Street	B	B	B
1st Avenue North/Republican Street	B	C	B
4th Avenue/Madison Street	B	B	B
4th Avenue/Marion Street	D	E [a]	E [a]
4th Avenue/Pine Street	C	C	C
5th Avenue/Columbia Street	B	C	B
5th Avenue/Madison Street	C	D	D
5th Avenue/Marion Street	C	E [a]	D
5th Avenue/Olive Way	C	C	C
5th Avenue/Pike Street	C	D	D
5th Avenue/Pine Street	B	B	B
5th Avenue/Seneca Street	C	C	C
5th Avenue/Spring Street	C	C	C
5th Avenue North/Mercer Street	D	D	D
6th Avenue/Olive Way	B	B	B
6th Avenue/Pike Street	E	E [a]	F [a]
6th Avenue/Pine Street	B	B	B
6th Avenue/Seneca Street	F	F	F [a]
6th Avenue/Spring Street	F	F	F [a]
6th Avenue North/Harrison Street	C	C	C
6th Avenue North/Thomas Street	C	C	C
8th Avenue/Blanchard Street	F	F	F [a]
9th Avenue North/Denny Way	B	B	B
Aurora Avenue North/Harrison Street	E	F [a]	E
Dexter Avenue North/Republican Street	F	F [a]	F [a]
Queen Anne Avenue North/West Mercer Street	C	D	D
Queen Anne Avenue North/West Republican Street	B	C	B
State Route 99/Thomas Street	A	A	A
Taylor Avenue North/Mercer Street	B	B	B
Taylor Avenue North/Roy Street	C	C	C
Terry Avenue North/Denny Way	A	A	F [a]
Terry Avenue North/John Street	A	A	B
Warren Avenue North/Mercer Street	A	A	A

Intersection	No Build Alternative	Preferred 5th Avenue/Harrison Street Alternative (DT-1)	6th Avenue/Mercer Street Alternative (DT-2)
Warren Avenue North/Roy Street	D	F [a]	F [a]
Westlake Avenue/Blanchard Street	F	F [a]	F [a]
Westlake Avenue North/Denny Way	D	E [a]	E [a]
Westlake Avenue North/John Street	F	F [a]	F [a]
Westlake Avenue North/Thomas Street	D	E [a]	E [a]

[a] An affected 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.

Table 4-46. 2042 A.M. Peak Hour Intersection Level of Service - Downtown Segment

Intersection	No Build Alternative	Preferred 5th Avenue/Harrison Street Alternative (DT-1)	6th Avenue/Mercer Street Alternative (DT-2)
1st Avenue North/Mercer Street	A	B	B
1st Avenue North/Republican Street	A	B	A
4th Avenue/Madison Street	E	E	E
4th Avenue/Marion Street	E	F [a]	E
4th Avenue/Pine Street	D	D	D
5th Avenue/Columbia Street	E	F [a]	E
5th Avenue/Madison Street	C	C	C
5th Avenue/Marion Street	C	F [a]	E [a]
5th Avenue/Olive Way	C	C	C
5th Avenue/Pike Street	E	F [a]	E [a]
5th Avenue/Pine Street	B	B	B
5th Avenue/Seneca Street	C	D	E [a]
5th Avenue/Spring Street	C	C	B
5th Avenue North/Mercer Street	D	D	D
6th Avenue/Olive Way	B	Not Analyzed	Not Analyzed
6th Avenue/Pike Street	F	F [a]	F [a]
6th Avenue/Pine Street	A	B	B
6th Avenue/Seneca Street	F	F	F [a]
6th Avenue/Spring Street	F	F	F [a]
6th Avenue North/Harrison Street	D	C	D
6th Avenue North/Thomas Street	A	A	A
8th Avenue/Blanchard Street	C	D	C

Intersection	No Build Alternative	Preferred 5th Avenue/Harrison Street Alternative (DT-1)	6th Avenue/Mercer Street Alternative (DT-2)
9th Avenue North/Denny Way	B	B	B
Aurora Avenue North/Harrison Street	D	D	D
Dexter Avenue North/Republican Street	F	F [a]	F [a]
Queen Anne Avenue North/West Mercer Street	F	F [a]	F [a]
Queen Anne Avenue North/West Republican Street	C	F [a]	C
State Route 99/Thomas Street	A	A	A
Taylor Avenue North/Mercer Street	B	B	C
Taylor Avenue North/Roy Street	B	B	C
Terry Avenue North/Denny Way	A	A	F [a]
Terry Avenue North/John Street	A	A	B
Warren Avenue North/Mercer Street	A	A	A
Warren Avenue North/Roy Street	C	D	E [a]
Westlake Avenue/Blanchard Street	F	F [a]	F [a]
Westlake Avenue North/Denny Way	E	F [a]	F [a]
Westlake Avenue North/John Street	F	F [a]	F [a]
Westlake Avenue North/Thomas Street	C	D	D

[a] An affected 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.

2042 Build Alternatives

Under Preferred Alternative DT-1 and Alternative DT-2, additional activity generated by the stations generally causes an increase in the delays experienced by the study intersections. This increased activity stems from additional vehicle pick-up and drop-off trips as well as pedestrians and bicyclists. Many of the study intersections have common impacts between the two Downtown Segment alternatives. Intersections that are uniquely affected by a particular alternative are a result of different station locations, which therefore have different pedestrian, bicyclist, and vehicle pick-up and drop-off travel patterns. Intersection queuing for both Build Alternatives is generally increased compared to the No Build Alternative but the same factors, such as closely spaced intersections, one-way streets, and high pedestrian volume conflicts, are prominent in the intersection queuing spillback in the Downtown Segment.

Within the Downtown Segment, Preferred Alternative DT-1 would affect 10 intersections in the p.m. peak hour and 11 intersections in the a.m. peak hour. The following intersections would experience higher delay compared to the No Build Alternative and operate at L.O.S. E or F:

- 4th Avenue/Marion Street (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- 5th Avenue/Columbia Street (L.O.S. F in a.m. peak hour).
- 5th Avenue/Marion Street (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- 5th Avenue/Pike Street (L.O.S. F in a.m. peak hour).
- 6th Avenue/Pike Street (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Aurora Avenue North/Harrison Street (L.O.S. F in p.m. peak hour).
- Dexter Avenue North/Republican Street (L.O.S. F in both peak hours).
- Queen Anne Avenue North/West Mercer Street (L.O.S. F in a.m. peak hour).
- Queen Anne Avenue North/West Republican Street (L.O.S. F in a.m. peak hour).
- Warren Avenue North/Roy Street (L.O.S. F in p.m. peak hour).
- Westlake Avenue/Blanchard Street (L.O.S. F in both peak hours).
- Westlake Avenue North/Denny Way (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Westlake Avenue North/John Street (L.O.S. F in both peak hours).
- Westlake Avenue North/Thomas Street (L.O.S. E in p.m. peak hour).

Near the Midtown, Westlake and Denny stations, the affected intersections primarily experience increases in intersection delay due to the high pedestrian activity compounded with poor operations in the No Build Alternative.

At the South Lake Union Station, the effects at Aurora Avenue North/Harrison Street are unique in that the new station is located directly at that intersection, which adds to the existing effects of high traffic volumes coming from and to Aurora Avenue North.

The intersections near the Seattle Center Station have effects similar to the South Lake Union Station, where the intersections closest to the station, such as Queen Anne Avenue North/West Mercer Street and Queen Anne Avenue North/West Republican Street, are more affected by the additional vehicle trips and pedestrians generated. Warren Avenue North/Roy Street is a two-way stop-controlled intersection, and the increase in intersection delay is generally attributed to the minor street, stop-controlled approach.

In Alternative DT-2, 12 intersections would be affected during both the p.m. and the a.m. peak hour. The following intersections would experience higher delay compared to the No Build Alternative and operate at L.O.S. E or F:

- 4th Avenue/Marion Street (L.O.S. E in p.m. peak hour).
- 5th Avenue/Pike Street (L.O.S. E in a.m. peak hour).
- 5th Avenue/Seneca Street (L.O.S. E in a.m. peak hour).
- 6th Avenue/Pike Street (L.O.S. F in both peak hours).

- 6th Avenue/Seneca Street (L.O.S. F in both peak hours).
- 6th Avenue/Spring Street (L.O.S. F in both peak hours).
- 8th Avenue/Blanchard Street (L.O.S. F in p.m. peak hour).
- Dexter Avenue North/Republican Street (L.O.S. F in both peak hours).
- Queen Anne Avenue North/West Mercer Street (L.O.S. F in a.m. peak hour).
- Terry Avenue North/Denny Way (L.O.S. F in both peak hours).
- Warren Avenue North/Roy Street (L.O.S. F in p.m. peak hour, L.O.S. E in a.m. peak hour).
- Westlake Avenue/Blanchard Street (L.O.S. F in both peak hours).
- Westlake Avenue North/Denny Way (L.O.S. E in p.m. peak hour, L.O.S. F in a.m. peak hour).
- Westlake Avenue North/John Street (L.O.S. F in both peak hours).
- Westlake Avenue North/Thomas Street (L.O.S. E in p.m. peak hour).

At the Midtown Station, 6th Avenue/Spring Street and 6th Avenue/Seneca Street would have noticeably higher intersection delay in both peak hours than under the No Build Alternative because of their proximity to the station's pick-up and drop-off areas. These two intersections are also Interstate 5 ramp terminals. Several intersections near the Denny Station would operate with higher intersection delays compared to the No Build Alternative in the p.m. peak hour. Most noticeably, Terry Avenue North/Denny Way would degrade from L.O.S. A to L.O.S. F in both peak hours because of the high increase in pedestrian activity.

All intersections in the vicinity of the South Lake Union Station would operate similar to the No Build Alternative in both peak hours with the exception of Dexter Avenue North/Republican Street, which would be mainly affected by the additional pick-up and drop-off vehicle trips.

Near the Seattle Center Station, Queen Anne Avenue North/West Mercer Street would worsen with the project because of its proximity to the station location and the effects of increased vehicle and pedestrian activity generated by the station. For both alternatives, Preferred Alternative DT-1 and Alternative DT-2, the increase in delay at Warren Avenue North/Roy is generally attributed to the minor street, stop-controlled approach.

South Interbay Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the South Interbay Segment are shown in Table 4-47 and Table 4-48 and on Figure 4-34 and Figure 4-35.

<u>2042 No Build Alternative</u>

Under the 2042 No Build Alternative, intersections near the Smith Cove Station would operate at L.O.S. D or better in the p.m. and a.m. peak hour with the exception of the following intersections:

- Alaskan Way West/West Galer Street Flyover (L.O.S. E in p.m. peak hour).
- Elliott Avenue West/West Galer Street Flyover (L.O.S. F in a.m. peak hour).
- Elliott Avenue West/West Mercer Place (L.O.S. F in p.m. peak hour and L.O.S. E in a.m. peak hour).
- Elliott Avenue West/West Prospect Street (L.O.S. F in both peak hours).

<u>Build Alternatives</u>

Each of the 2042 Build Alternatives would affect the Elliott Avenue West/West Galer Street Flyover intersection in the p.m. peak hour. This increase in intersection delay is mainly due to the additional pick-up and drop-off trips as well as the modified signal phasing to accommodate new northbound left-turn movements and new eastbound movements for outbound pick-up and drop-off trips. Intersection queuing would also increase along northbound Elliott Avenue West near the West Galer Street Flyover for Preferred Alternative SIB-1.

2042 Build Alternatives M.O.S.

Under the M.O.S., the Ballard Link Extension is assumed to have an interim terminus at the Smith Cove Station. All of the alternatives under the M.O.S. would generate higher vehicle pick-up and drop-off trips, pedestrian activity, and transit transfers than the full-length condition. Compared to the full-length condition, intersection operations would generally be similar under the M.O.S. except at the Elliott Avenue West and West Prospect Street intersection, which would be affected under Alternative SIB-3 in the a.m. peak hour.

Table 4-47. 2042 P.M. Peak Hour Intersection Level of Service - South Interbay Segment

Intersection	No Build Alternative	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)
Alaskan Way West/West Galer Street Flyover	E	E	E	E
Elliott Avenue West/West Galer Street	A	B	A	A
Elliott Avenue West/West Galer Street Flyover	D	F [a]	E [a]	E [a]
Elliott Avenue West/West Mercer Place	F	F	F	F
Elliott Avenue West/West Prospect Street	F	F	F	F

[a] An affected 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.

Table 4-48. 2042 A.M. Peak Hour Intersection Level of Service - South Interbay Segment

Intersection	No Build Alternative	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)
Alaskan Way West/West Galer Street Flyover	B	Not Analyzed	Not Analyzed	Not Analyzed
Elliott Avenue West/West Galer Street	A	A	A	A
Elliott Avenue West/West Galer Street Flyover	F	F	F	F
Elliott Avenue West/West Mercer Place	E	E	E	E
Elliott Avenue West/West Prospect Street	F	F	F	F

[a] An affected 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.

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

FIGURE 4-34
2042 P.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

0 800 1,600 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
- Park

LOS Key for Alternatives
- SIB-1
- SIB-3
- SIB-2
- No Build
- Intersection Not Analyzed

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

FIGURE 4-35
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

Interbay/Ballard Segment

Intersection operation results for the 2042 No Build Alternative and Build Alternatives in the Downtown Segment are shown in Table 4-49 and Table 4-50 and on Figure 4-36 and Figure 4-37.

2042 No Build Alternative

Under the 2042 No Build Alternative, intersections in the Interbay/Ballard Segment would operate at L.O.S. D or better in the p.m. and a.m. peak hour with the exception of the following intersections:

- 15th Avenue Northwest/Northwest 54th Street (L.O.S. E in p.m. peak, L.O.S. F in a.m. peak).
- 15th Avenue Northwest/Northwest Market Street (L.O.S. E in p.m. peak, L.O.S. F in a.m. peak).
- 15th Avenue West/West Bertona Street (L.O.S. E in p.m. peak, L.O.S. F in a.m. peak).

2042 Build Alternatives

Intersection operations for all Build Alternatives are mostly similar to the No Build Alternative, with only slight increases in delay in both the a.m. and p.m. peak hour.

Near the Ballard Station, the 15th Avenue Northwest/Northwest Market Street intersection would be affected in the p.m. peak hour for all Build Alternatives mainly due to the increase in pedestrian activity and additional pick-up and drop-off trips.

Preferred Option IBB-2b* and Alternative IBB-3 would affect the 15th Avenue Northwest/Northwest 54th Street intersection in the a.m. peak hour generally due to the combination of higher pedestrian activity and additional pick-up and drop-off vehicle trips.

4.3.2.3 Construction Impacts

This section describes the construction conditions on the roadway system, including conceptual haul routes, construction traffic levels, type of roadway closures, and potential diversions, along with the effects these closures would have on traffic conditions. 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. Detailed construction planning, including sequencing, will be provided in later phases of the environmental analysis once project design is sufficiently advanced.

Impacts Common to All Alternatives

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 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 construction and construction staging areas. Some oversize construction vehicles may need to use designated alternative routes.

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 4-36
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

12/2/2021 I 8 Interbay Ballard I LOS_FUTURE_AM_2042_Template_Segment_Level_Draft_4a.aprx

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
- Intersection Not Analyzed

Level of Service (LOS)

- A-C
- D
- E-F

0 800 1,600 Feet

N

FIGURE 4-37
2042 A.M. Peak Hour Intersection Level of Service (L.O.S.)
Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

Table 4-49. 2042 P.M. Peak Hour Intersection Level of Service - Interbay/Ballard Segment

Intersection	No Build Alternative	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 Market Street	C	C	C	C	B	B
15th Avenue Northwest/Northwest 54th Street	E	D	D	D	E	E
15th Avenue Northwest/Northwest Market Street	E	F [a]	F [a]	F [a]	F [a]	F [a]
15th Avenue Northwest - Northbound Ramps/Northwest Leary Way	D	D	D	D	D	D
15th Avenue Northwest - Southbound Ramps/Northwest Leary Way	D	D	D	D	D	D
15th Avenue West/West Bertona Street	E	F	E	F	F	E
15th Avenue West -Northbound Ramps/West Dravus Street	D	D	D	D	D	D
15th Avenue West -Southbound Ramps/West Dravus Street	D	D	D	D	D	D
17th Avenue Northwest/Northwest Market Street	B	B	B	B	B	B
17th Avenue West/West Dravus Street	A	B	A	B	B	A

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.

Table 4-50. 2042 A.M. Peak Hour Intersection Level of Service - Interbay/Ballard Segment

Intersection	No Build Alternative	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 Market Street	B	B	B	C	B	B
15th Avenue Northwest/Northwest 54th Street	F	F	F	F	F [a]	F [a]
15th Avenue Northwest/Northwest Market Street	F	F	F	F	F	F
15th Avenue Northwest - Northbound Ramps/Northwest Leary Way	C	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
15th Avenue Northwest - Southbound Ramps/Northwest Leary Way	C	C	C	C	C	C
15th Avenue West/West Bertona Street	F	F	F	F	F	F
15th Avenue West -Northbound Ramps/West Dravus Street	C	C	D	C	C	D
15th Avenue West -Southbound Ramps/West Dravus Street	C	C	D	C	C	D
17th Avenue Northwest/Northwest Market Street	B	B	B	B	B	B
17th Avenue West/West Dravus Street	A	B	A	B	B	A

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] An affected 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.

Certain construction areas would not be 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 adjacent to the arterial street system. Construction vehicles would need to travel on local streets for access to the south and north downtown tunnel portals and the station areas for all alternatives. In addition, the Midtown and Westlake stations lie within the City of Seattle's Downtown Traffic Control Zone, which requires permits to be issued for vehicles 30 feet or longer (City of Seattle 2012).

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

Over the duration of the construction period, the major construction activities for the Draft Environmental Impact Statement alternatives are 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 per hour) within that range.

Property Access, Roadway Impacts, and Detour Routes

Construction for each alternative would require road and lane closures that could also affect transit, non-motorized travel, and freight, as addressed in Sections 3.3.2.2, 6.4.2.2, and 9.3.2.2, respectively. Sound Transit will coordinate with the City of Seattle as the project advances to identify and finalize proposed detour routes and determine if those roads would be able to accommodate increased volumes. 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 the contractor.

The following discussion 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, Construction-Related Roadway Modifications, for a more detailed list of the roadway construction closures expected for each alternative.

For long-term (over 1 year on key arterial streets) closures, an analysis of these traffic impacts was performed using 2032 as a representative analysis year for the construction period. Potential diversion routes were identified, and traffic volumes were rerouted to adjacent roadways. The analysis describes locations where there could be additional congestion as a result of the construction activities.

If property access is restricted, temporary alternate access to these properties, if feasible, 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. Additional road or lane closures may be needed for utility relocation, which will be determined during final design in coordination with the utility owner.

SODO Segment

Arterial roadways would be primarily affected by construction in this segment, mostly by partial road closures for long-term durations during construction. Figure 4-38 and Table 4-51 provide a summary of the major construction closures in the SODO Segment.

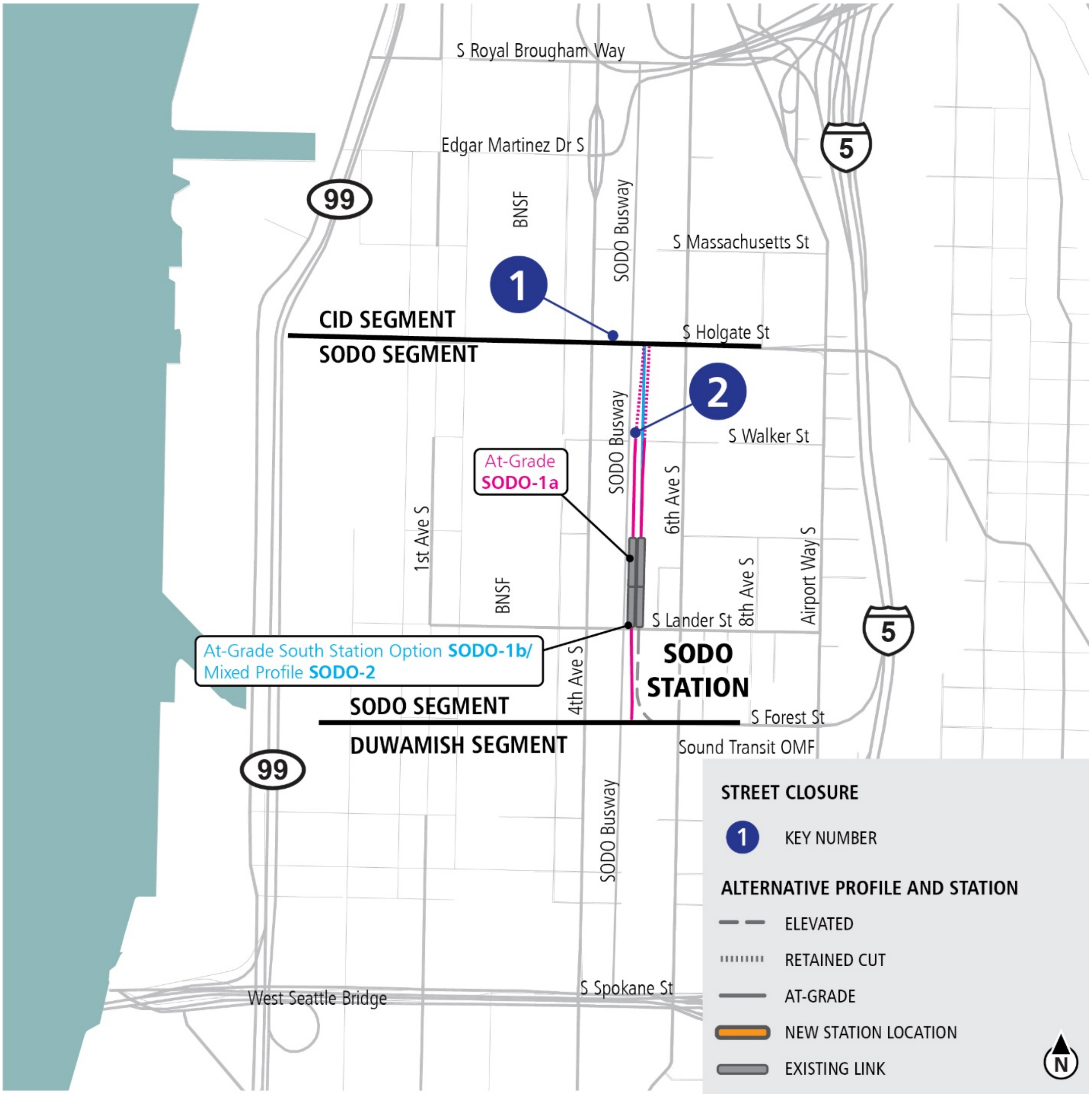


Figure 4-38. Key Construction Roadway Closures – SODO Segment

Table 4-51. Key Construction Roadway Closures – SODO Segment

Key Number	Affected Street	Extents [a]	Preferred At-Grade Alternative (SODO-1a)	At-Grade Alternative South Station Option (SODO-1b)	Mixed Profile Alternative (SODO-2)
1	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 [b]
2	SODO Busway [d]	South Massachusetts Street to South Spokane Street	Permanently closed	Permanently closed	Full closure, 7 years [e]

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] 2 years (if connecting to Alternative CID-2a or Option CID-2b), 3 years (if connecting to Alternative CID-1a* or Option CID-1b*).

[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 in 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.

Some of the expected roadway closures would result in traffic diversions within the SODO Segment. Table 4-52 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other roadways in the West Seattle area. The sections following Table 4-52 further describe the traffic effects for each of the SODO Segment alternatives.

Table 4-52. Key Arterial Roadway Closure Traffic Diversion Summary –SODO Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
SODO-1a, SODO-1b, SODO-2	South Lander Street (4th Avenue South to 6th Avenue South)	800 to 1,000	South Lander Street [b] 1st Avenue South [b] 6th Avenue South South Royal Brougham Way Edgar Martinez Drive South [b] Airport Way South
SODO-1a, SODO-1b, SODO-2	SODO Busway (South Massachusetts Street to South Spokane Street)	60 to 80 buses	4th Avenue South [b] 6th Avenue South

Note: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

The three SODO alternatives (Preferred Alternative SODO-1a, Option SODO-1b, and Alternative SODO-2) would each include the construction of a new South Holgate overpass across the SODO Busway 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, a City of Seattle heavy haul route, would require diverting approximately 900 peak hour vehicle trips, including relatively high truck volumes. Potential diversion routes would include South Lander Street, Edgar Martinez Drive South, and South Royal Brougham Way, along with portions of 6th Avenue South and Airport Way South. South Lander Street would be closed during construction of some of the West Seattle Link Extension alternatives in the SODO Segment, but South Holgate Street and South Lander Street would not be closed at the same time. While there is sufficient roadway capacity on most of these streets to accommodate the diverted traffic, the intersection of South Lander Street and 6th Avenue South would become further congested, as would the Edgar Martinez Drive South/1st Avenue South intersection. The added volumes on South Royal Brougham Way would also cause delays and vehicle queuing at the Link light rail signalized crossing.

The SODO Busway would remain closed for the duration of construction with Alternative SODO-2. Construction of both the West Seattle Link 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. However, there would be substantially more bus traffic on South Massachusetts Street and/or South Royal Brougham Street entering and exiting the bases. 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 Sections 3.2.2.2 and 4.2.2.2 for more information).

Chinatown-International District Segment

Local, minor, and principal arterials would be affected by construction. Road closures would range from partial road closures for short-term durations to potentially full road closures for long-term durations. Figure 4-39 and Table 4-53 provide a summary of the major construction closures for this segment.

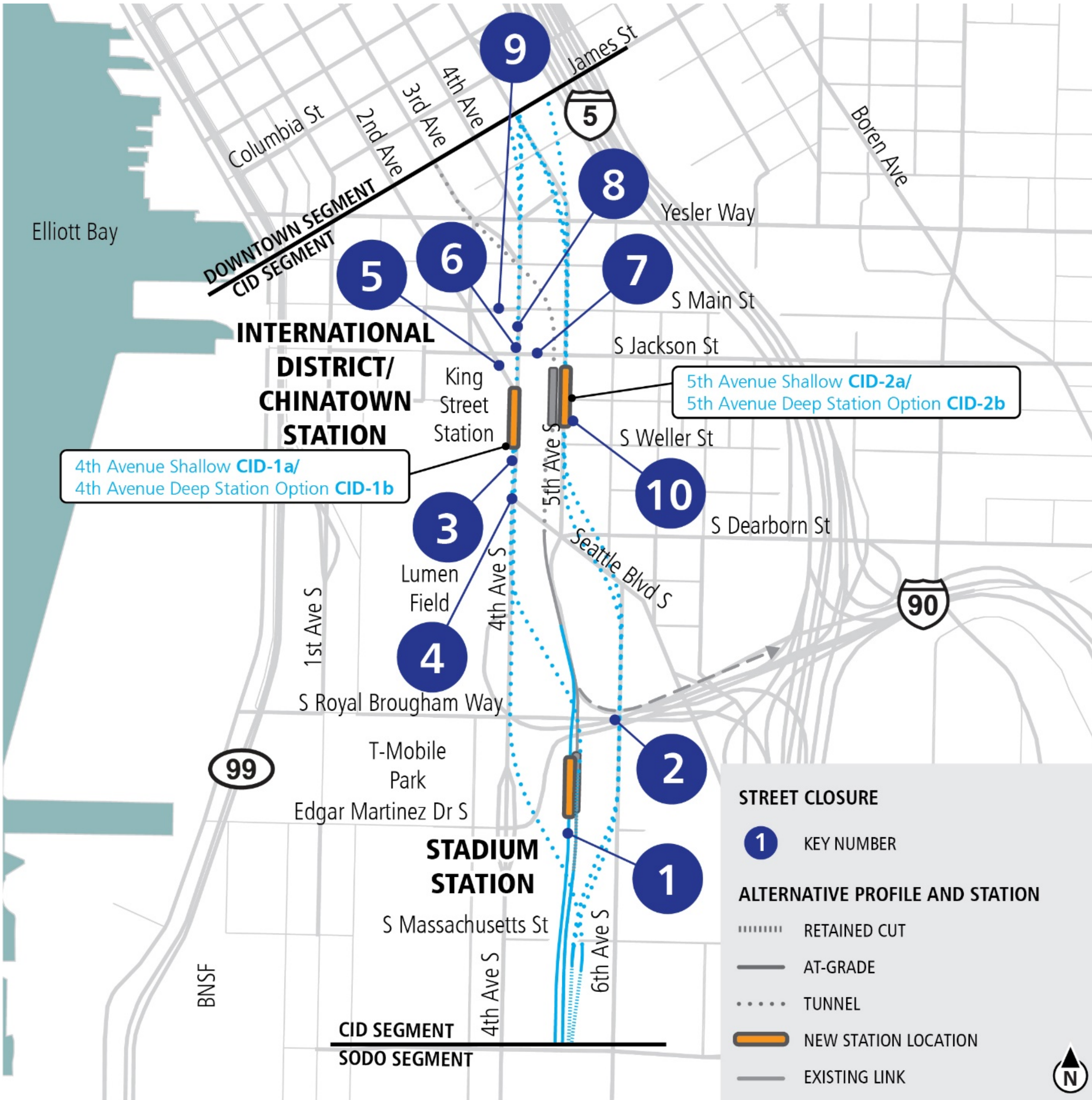


Figure 4-39. Key Construction Roadway Closures – Chinatown-International District Segment

The primary effects from construction would occur with the two 4th Avenue Build Alternatives (Alternative CID-1a* and Option CID-1b*), as described below. 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 throughout arterial and local streets within the Chinatown-International District and surrounding areas.

Some of the expected roadway closures would result in traffic diversions within the Chinatown-International District Segment. Table 4-54 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other arterials in the area. The next sections further describe the traffic effects for each of the Chinatown-International District Segment alternatives.

*4th Avenue Shallow Alternative (CID-1a)**

Alternative CID-1a* would have multiple partial and full closures of 4th Avenue South and connecting streets for several years. This alternative would also fully close access to the Ryerson Bus Base from the SODO Busway (see Section 3.3.2.2 for more details).

<u>4th Avenue South Partial Closure (South Jackson Street to Interstate 90 Off-ramp)</u>

4th Avenue South would be under construction to build the light rail station and replace key portions of the 4th Avenue viaduct. The construction would likely be performed over multiple years in two stages (east side and west side) linearly along the corridor, allowing two lanes of traffic to be maintained.

To estimate the likely worse-case traffic condition, it was assumed that southbound traffic on 4th Avenue South would remain open and northbound traffic would be diverted. This would be expected to divert over 1,000 p.m. peak hour vehicles to other streets. The major diversion route would likely be 1st Avenue South, resulting in increased congestion and poor operations between South Jackson Street and Edgar Martinez Drive. Diverted volumes would also likely use local streets in the Chinatown-International District Segment, notably 6th Avenue South and Maynard Avenue South. It was assumed that 5th Avenue South would be primarily restricted to buses between Seattle Boulevard South to South Jackson Street. As the project advances, other roadway configurations and traffic control plans could be analyzed for different time periods.

Concurrent with the 4th Avenue South partial closure, full closures of Seattle Boulevard South, the 2nd Avenue Extension and 4th Avenue South/South Jackson Street Intersection, South Jackson Street, South Main Street, and another section of 4th Avenue South could occur. These street closures would substantially affect traffic movements and congestion throughout the Chinatown-International District and SODO segments and affect a major entry point into Downtown Seattle from the south.

Table 4-53. Key Construction Roadway Closures – Chinatown-International District Segment

Key Number	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)
1	Ryerson Bus Base Access from SODO Busway	North of South Massachusetts Street	Full closure, 4 years	Permanently closed	Not applicable	Not applicable
2	6th Avenue South	In the vicinity of South Royal Brougham Way	Not applicable	Not applicable	Partial closure, 1 year	Partial closure, 6 months
3	4th Avenue South	South Jackson Street to Seattle Boulevard South	Partial closure, 6 years (extends from South Jackson Street to Interstate 90 ramps)	Full closure, 6.5 years Partial closure, 2 years	Not applicable	Not applicable
4	Seattle Boulevard South	4th Avenue South	Full closure, 2 years	Not applicable	Not applicable	Not applicable
5	2nd Avenue Extension	South Jackson Street to 4th Avenue South	Full closure, 2 years	Full closure, 6.5 years	Not applicable	Not applicable
6	4th Avenue South/South Jackson Street	Intersection	Full closure, 2 years	Full closure, 2 years	Not applicable	Not applicable
7	South Jackson Street	2nd Avenue Extension to 5th Avenue South	Full closure, 2 years	Full closure, 2 years	Partial closure, 6 months at intersection with 5th Avenue South	Not applicable
8	4th Avenue South	South Main Street to north side of South Jackson Street	Full closure, 4 years	Not applicable	Not applicable	Not applicable
9	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
10	5th Avenue South	South Jackson Street to South Weller Street	Not applicable	Not applicable	Partial closure, 2.5 years Full closure, 9 months [b]	Partial closure, 1 year

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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] Includes 6-month partial closure of intersection at South Jackson Street.

Table 4-54. Key Arterial Roadway Closure Traffic Diversion Summary – Chinatown-International District Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
CID-1a*, CID-1b*	4th Avenue South-South Jackson Street to Seattle Boulevard South	CID-1a*: Partial Closure [b] 1,000 to 1,200 CID-1b*: Full Closure 2,000 to 2,400	South Jackson Street [c] 6th Avenue South Maynard Avenue South Airport Way South South Royal Brougham Way Edgar Martinez Drive [c] 1st Avenue South [c] Alaskan Way South
CID-1a*	Seattle Boulevard/4th Avenue South Intersection	1,200 to 2,400 [d]	South Jackson Street [c] 6th Avenue South Maynard Avenue South Airport Way South South Royal Brougham Way Edgar Martinez Drive [c] 1st Avenue South [c] Alaskan Way South
CID-1a*, CID-1b*	South Jackson Street-2nd Avenue Extension to 5th Avenue South [e]	1,700 to 2,100	6th Avenue South Maynard Avenue South Airport Way South South Royal Brougham Way Edgar Martinez Drive [c] 1st Avenue South [c] Alaskan Way South South Washington Street Yesler Way
CID-1a*	4th Avenue South-South Jackson Street to North Side of South Main Street	1,000 to 1,200	South Jackson Street [c] 6th Avenue South Maynard Avenue South Airport Way South South Royal Brougham Way Edgar Martinez Drive [c] 1st Avenue South [c] Alaskan Way South
CID-2a, CID-2b	5th Avenue South-South Jackson Street to South Weller Street [f]		4th Avenue South [c] Seattle Boulevard South [c] 6th Avenue South South Jackson Street [c]

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[b] Extends to Interstate 90 off-ramp.

[c] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

[d] Depends on sequencing with other roadway closures.

[e] Includes closure of intersections with 2nd Avenue Extension and 4th Avenue South Street.

[f] The diagonal station configuration would require a partial closure of 5th Avenue South but would not affect the 5th Avenue South/South Jackson Street intersection.

Seattle Boulevard South (at 4th Avenue South)

This street would be closed, potentially while the east side of 4th Avenue South is also under construction. The closure would likely divert several hundred peak hour vehicle trips throughout the Chinatown-International District Segment. Streets affected could include 6th Avenue South and Maynard Avenue South in the Chinatown-International District, resulting in increased congestion at intersections along South Jackson Street. Traffic would also be diverted from 4th Avenue South at South Royal Brougham Way over to 6th Avenue South, and along Airport Way South. The added volumes on South Royal Brougham Way would cause delays and vehicle queuing at the existing Link light rail signalized crossing.

South Jackson Street and 4th Avenue South/South Jackson Street Intersection

South Jackson Street would be closed between 2nd Avenue Extension and 5th Avenue South, including the full closure of the 4th Avenue South/South Jackson Street Intersection. The construction would cause traffic diversions within the Chinatown-International District Segment. Notably, the closure of South Jackson Street would divert traffic to the east-west parallel streets such as South Main Street and South Washington Street. 4th Avenue South would be open from South Main Street to the north. Yesler Way South would experience increased congestion approaching downtown from the east. With this closure, the Seattle Streetcar service would also be modified, as addressed in Section 3.3.2.2.

4th Avenue South (South Jackson Street through South Main Street)

This section of 4th Avenue South would be closed, along with the connecting sections of South Main Street. The effects of this closure would be similar to those of the 4th Avenue South/South Jackson Street Intersection closure; however, when this closure is occurring, South Jackson Street would likely remain open.

*4th Avenue Deep Station Option (CID-1b)**

Option CID-1b* would close sections of 4th Avenue South and South Jackson Street, including the South Jackson Street/4th Avenue South intersection. This alternative would also permanently close the Ryerson Bus Base (refer to the Transit Service and Facilities section in Section 3.3.2.2, Build Alternatives).

4th Avenue South (South Jackson Street to Seattle Boulevard South)

4th Avenue South would be under construction to build the light rail station and replace key portions of the 4th Avenue viaduct. All traffic on 4th Avenue South would be diverted. This is expected to divert over 2,000 p.m. peak hour vehicles from northbound and southbound 4th Avenue South to other streets. Traffic diversions and increased congestion would likely occur within the study area on 1st Avenue South, while regional highways Interstate 5 and State Route 99 could also experience additional traffic as people bypass the increased congestion within the Chinatown-International District Segment. Increased volumes and congestion would be likely along local streets in the Chinatown-International District Segment, notably 6th Avenue South and Maynard Avenue South. It was assumed that 5th Avenue South would be primarily restricted to buses between Seattle Boulevard South to South Jackson Street. Heavily congested intersections would include those along South Jackson Street and 1st Avenue South. Added volumes on South Royal Brougham Way would also cause delays and vehicle queuing at the existing Link light rail signalized crossing.

<u>South Jackson Street and 4th Avenue South/South Jackson Street Intersection</u>

A section of South Jackson Street, including the 4th Avenue South/South Jackson Street intersection, would be closed for viaduct reconstruction. These closures would likely occur for a portion of the 4th Avenue South full closure. The traffic diversion effects would be similar to those described for Alternative CID-1a*.

5th Avenue Shallow Alternative (CID-2a)

With this alternative, 5th Avenue South between South Jackson Street and South Weller Street would have several phases of closures: one lane would be closed during the beginning and end of station construction. Between these periods, 5th Avenue South would be closed for less than a year. Two local streets, South King Street and South Weller Street, would have closures during station construction, while 6th Avenue South would require partial closures in the station vicinity.

During the closures, approximately 500 p.m. peak hour vehicles would likely be diverted to 4th Avenue South and 6th Avenue South, causing additional traffic congestion along those routes and along South Jackson Street. The intersection of 5th Avenue South/South Jackson Street would need to be partially closed for a few months, requiring a reduction of up to two travel lanes with service effects to the Seattle Streetcar. The closure of 5th Avenue South would also require the relocation of the Metro trolley bus wires and service. The Seattle Streetcar and trolley bus service impacts are further described in Section 3.3.2.3.

The section of 6th Avenue South north and south of Royal Brougham Way would be reduced to one lane in each direction for ground treatments related to the downtown tunnel. While traffic diversions from 6th Avenue would likely be limited, there would be temporary disruptions to key property access, including the Metro employee parking garage and the adjacent Greyhound Bus terminal. Sound Transit would coordinate with King County to maintain access to the employee parking garage during construction.

The diagonal station configuration would require a partial closure of 5th Avenue South but would not affect the 5th Avenue South/South Jackson Street intersection.

5th Avenue Deep Station Option (CID-2b)

Under Option CID-2b, there could be partial intersection closures of 5th Avenue South at South King Street and South Weller Street. Construction would also lead to short-term partial closures of 6th Avenue South near and at South Royal Brougham Way. Traffic diversions with these closures are expected to be limited, but there could be temporary disruptions to access to the Greyhound Bus terminal.

Downtown Segment

Local, minor, and principal arterials would be affected by construction. Road closures would range from partial road closures for short-term durations to potentially full road closures for long-term durations. Figure 4-40, Figure 4-41, and Table 4-55 provide a summary of the major construction closures for this segment.

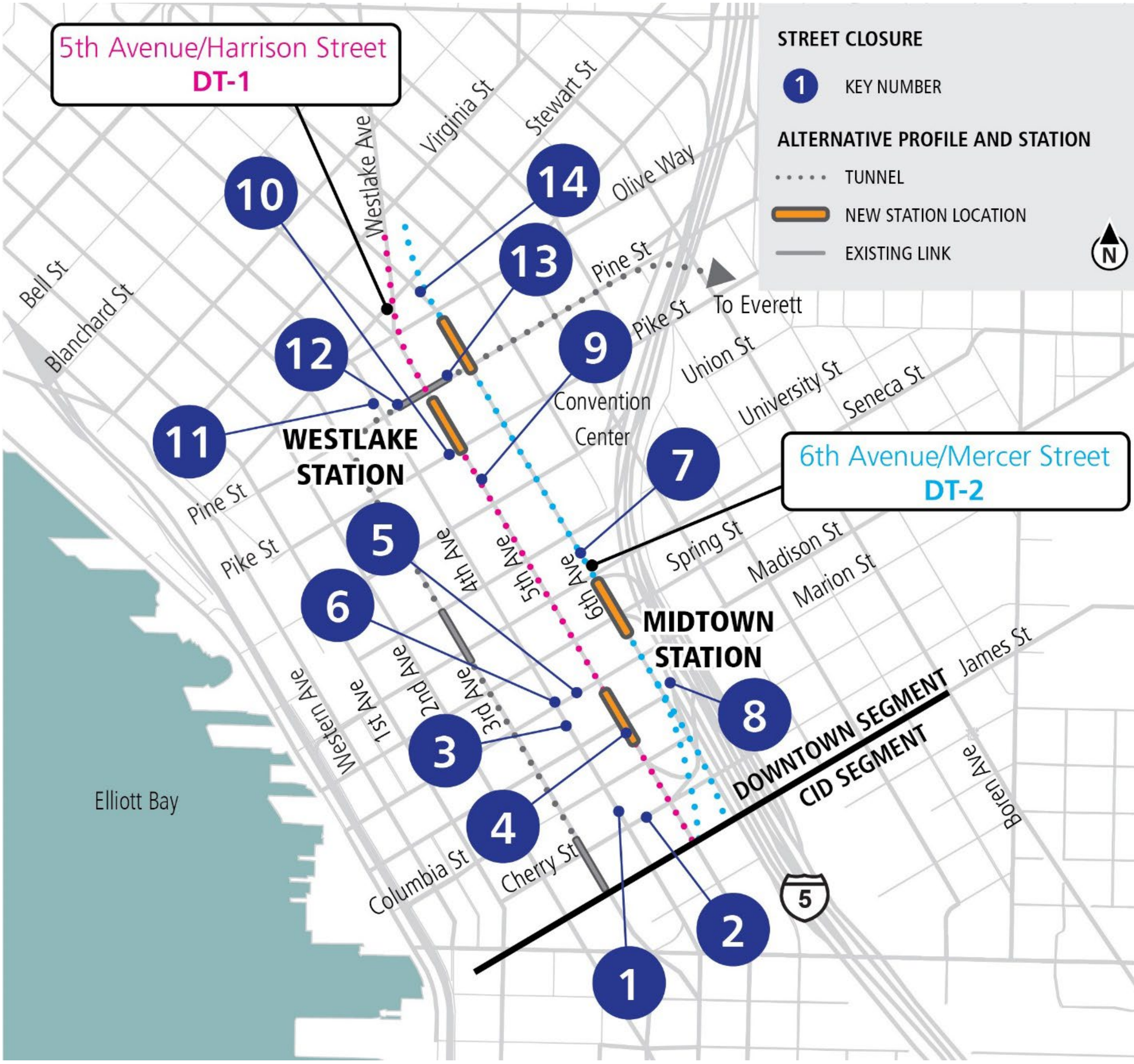


Figure 4-40. Key Construction Roadway Closures – Downtown Segment, South

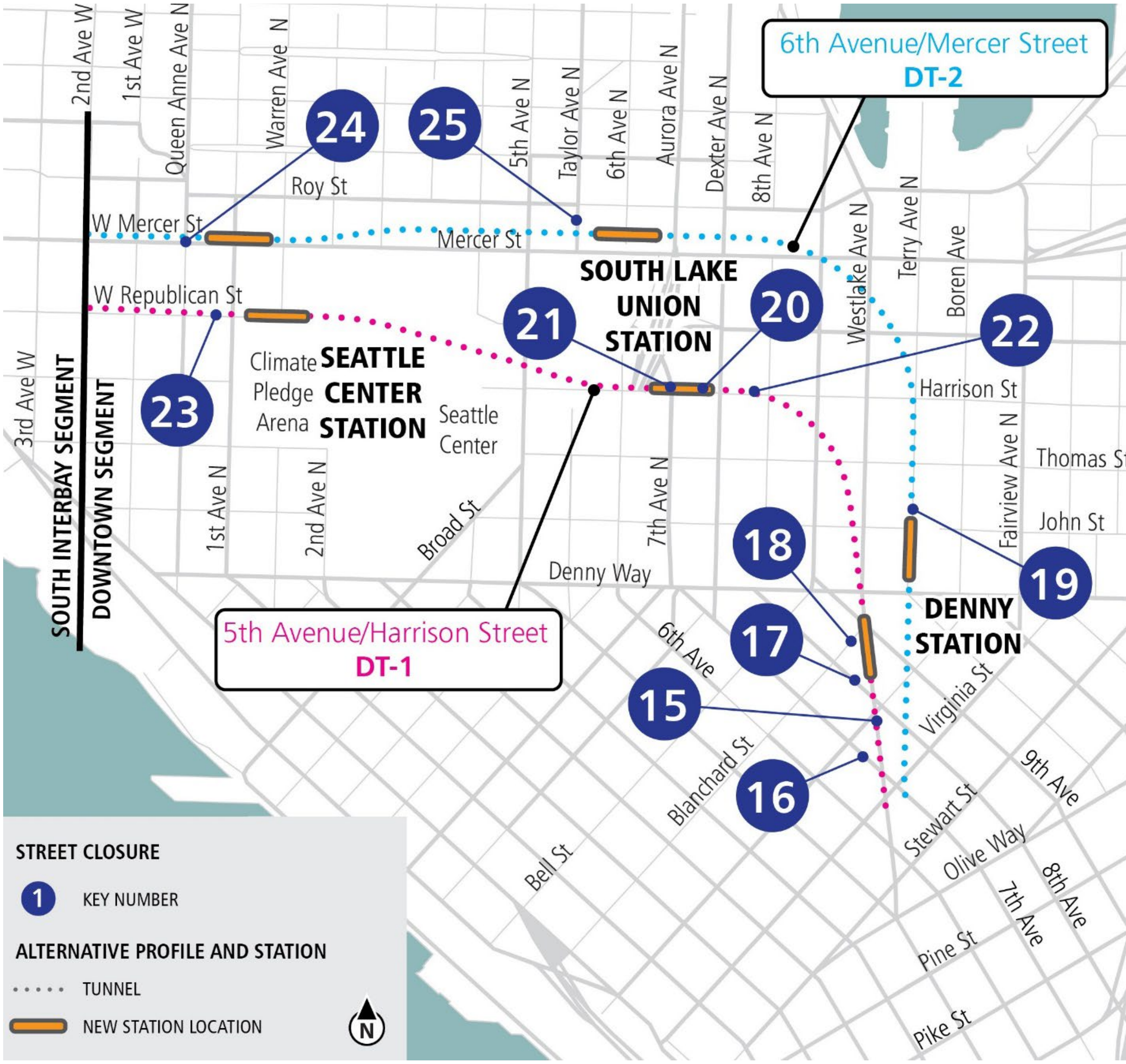


Figure 4-41. Key Construction Roadway Closures – Downtown Segment, North

Construction closures in the Downtown Segment may impact the transit network, including the Seattle Streetcar and Metro trolley bus system. For information regarding those potential impacts, see Section 3.3.2.2. Construction closures in the Downtown Segment may also impact the pedestrian and bicycle network. For information regarding those potential impacts, see Section 6.3.2.2.

Table 4-55. Key Construction Roadway Closures – Downtown Segment

Key Number	Affected Street	Extents [a]	Preferred 5th Avenue/Harrison Street Alternative (DT-1) [b]	6th Avenue/Mercer Street Alternative (DT-2)
1	4th Avenue	Columbia Street to James Street	Partial closure, 6 years	Not applicable
2	Cherry Street	3rd Avenue to 5th Avenue	Full closure, 1 year	Not applicable
3	4th Avenue	Marion Street to Madison Street	Partial closure, 6 years	Not applicable
4	5th Avenue	Madison Street to Columbia Street	Full closure, up to 1.5 years [c]	Not applicable
5	Madison Street	4th Avenue to 5th Avenue	Full closure, 1 to 3 years (may by partial closure depending on connection option)	Not applicable
6	4th Avenue/Madison Street	Intersection	Partial closure, 4 years	Not applicable
7	6th Avenue	University Street to Madison Street (includes intersections at Seneca, Spring and Marion streets)	Not applicable	Partial closure, 1 year
8	Interstate 5 Southbound Off-ramp to James Street	Near Madison Street	Not applicable	Partial closure, 6 years
9	5th Avenue	Union Street to Pike Street	Partial closure, 6 years	Not applicable
10	Pike Street	4th Avenue to 5th Avenue	Partial closure, 6 years	Not applicable
11	4th Avenue	Pine Street to Olive Way	Full closure, 2 years	Not applicable
12	Pine Street	4th Avenue to 5th Avenue	Full closure, 6 years	Not applicable
13	Pine Street	5th Avenue to 6th Avenue	Not applicable	Full closure, 4 years
14	6th Avenue	Olive Way to Stewart Street	Not applicable	Full closure, 6 years
15	Westlake Avenue	7th Avenue to Denny Way [d]	Full closure, 4 years [d,e]	Not applicable
16	7th Avenue	Westlake Avenue to Lenora Street	Partial closure, 4 years	Not applicable
17	8th Avenue	Westlake Avenue to Blanchard Street	Partial closure, 4 years	Not applicable
18	Blanchard Street	8th Avenue to 9th Avenue/Westlake Avenue	Partial closure, 5 years	Not applicable
19	Terry Avenue North	Denny Way to Thomas Street (includes intersections at John and Thomas streets)	Not applicable	Full closure, 4 years

Key Number	Affected Street	Extents [a]	Preferred 5th Avenue/Harrison Street Alternative (DT-1) [b]	6th Avenue/Mercer Street Alternative (DT-2)
20	Harrison Street	6th Avenue North to Dexter Avenue North	Full closure, 4 years	Not applicable
21	Harrison Street/7th Avenue	Intersection	Partial closure, 1.5 years	Not applicable
22	Harrison Street	Dexter Avenue North to 8th Avenue North (includes intersection at Dexter Avenue North)	Partial closure, 1.5 years	Not applicable
23	Republican Street	Queen Anne Avenue North to Warren Avenue North	Full closure, 5 years [f]	Not applicable
24	Mercer Street	Warren Avenue North to 1st Avenue West	Not applicable	Partial closure, 3.5 years
25	Taylor Avenue North	Mercer Street to Roy Street	Not applicable	Full closure, 4 years

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] 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.

[d] If alternate construction methods are used to maintain streetcar operations (see Section 3.3.2.2), Westlake Avenue would instead be closed between Stewart Street and Thomas Street for up to 6 years. The intersections of Westlake Avenue/Lenora Street/8th Avenue, and Westlake Avenue/9th Street/Blanchard Street would be closed for 7 years.

[e] Includes 9-month partial closure of intersections at 8th Avenue and 9th Avenue/Blanchard Street.

[f] Includes 15-month full closure of intersection at 1st Avenue North.

Preferred Alternative (DT-1)

With the guideway construction through the Downtown Segment being entirely underground, the construction-related traffic impacts in this segment occur at or near the station locations. 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 station entrances, which could result in 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 describes the notable longer-term closures surrounding each of the new stations for Preferred Alternative DT-1.

Some of the expected roadway closures would result in traffic diversions within the downtown area. Table 4-56 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other arterials in the downtown area.

Table 4-56. Key Arterial Roadway Closure Traffic Diversion Summary – Downtown Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
DT-1	4th Avenue (Columbia Street to James Street, Marion Street to Madison Street)	350 to 450	1st Avenue [b] 7th Avenue [b]
DT-1	4th Avenue (Pine Street to Olive Way)	1,400 to 1,800	Pike Street [b] 6th Avenue [b] Union Street 1st Avenue [b]
DT-1	Cherry Street (3rd Avenue to 5th Avenue)	950 to 1,200	James Street [b] University Street [b]
DT-1	Harrison Street/7th Avenue	750 to 900	Mercer Street [b] John Street
DT-1	Madison Street (4th Avenue to 5th Avenue)	450 to 550	Seneca Street [b]
DT-1	Pike Street (4th Avenue to 5th Avenue	100 to 150	Olive Way [b] University Street [b]
DT-1	Westlake Avenue (7th Avenue to Denny Way) [c]	900 to 1,100	Dexter Avenue [b] Fairview Avenue [b]
DT-1, DT-2	Pine Street (4th Avenue to 5th Avenue, 5th Avenue to 6th Avenue)	350 to 450	Union Street Stewart Street 5th Avenue [b] 6th Avenue [b]
DT-2	6th Avenue (Olive Way to Stewart Street)	500 to 600	8th Avenue 4th Avenue [b]
DT-2	6th Avenue (University Street to Madison Street)	150 to 200	4th Avenue [b]
DT-2	Interstate 5 Southbound Off-ramp to James Street	150 to 200	Interstate 5 Southbound Off-ramp to Union Street
DT-2	Mercer Street (Warren Avenue North to 1st Avenue West)	350 to 450	Republican Street Denny Way [b]

Note: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

[c] If alternate construction methods are used to maintain streetcar operations (see Section 3.3.2.2), Westlake Avenue would instead be closed between Stewart Street and Thomas Street.

Midtown Station

There are several closures related to the construction of the Midtown Station. The location and duration of these closures would vary depending on which alternative they connect to in the Chinatown-International District Segment.

If Preferred Alternative DT-1 is connected with Alternative CID-2a in the Chinatown-International District Segment, the following multi-year street closures are anticipated:

- One lane on 4th Avenue would be closed near the station entrance in the vicinity of Madison Street.
- One lane on Madison Street would be closed near the station entrance in the vicinity of 4th Avenue (full closure of Madison Street between 4th Avenue and 5th Avenue may be required).

If Preferred Alternative DT-1 connects with either Alternative CID-1a*, Option CID-1b*, or Option CID-2b in the Chinatown-International District Segment, the following street closures are anticipated:

- 5th Avenue would be closed from Madison Street to Columbia Street.
- Columbia Street at 5th Avenue would be partially closed near the station entrance, affecting one general purpose lane and the sidewalk.
- One lane on 4th Avenue would be closed near the station entrance in the vicinity of Madison Street.
- Madison Street would be closed between 4th Avenue and 5th Avenue and partially closed at the station entrance near 4th Avenue.
- The connection to the Interstate 5 high-occupancy-vehicle express lanes reversible ramp at 5th Avenue and Columbia Street would also be fully closed. The portion of the ramp that connects to 5th Avenue and Cherry Street would remain open.

With the 5th Avenue and Columbia Street roadway closures and the full Madison Street roadway closure, 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, resulting in increased congestion along these streets. Some trips bound for northbound Interstate 5 that would have used the Interstate 5 high-occupancy-vehicle express lanes ramp connection at 5th Avenue and Columbia Street are anticipated to 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. In addition to this ramp closure, any short-term closure of Interstate 5 or State Route 99 ramps would likely create additional traffic circulation on local streets.

Westlake Station

Construction of the Westlake Station would require a full closure of 4th Avenue. Traffic would likely detour to 1st Avenue via Union Street and Pine Street and to 6th Avenue via Pike Street. This section of 4th Avenue carries 1,500 vehicle trips in the p.m. peak hour; therefore, traffic rerouting to other streets would likely create additional congestion on those streets.

Construction of this station would also require a full closure on Pine Street. Pine Street carries slightly fewer than 300 trips in the p.m. peak hour and is a one-way westbound street in this area. Traffic would likely divert to Stewart Street, Union Street, 5th Avenue, and 6th Avenue, creating additional congestion along these streets.

Denny Station

With the construction of the Denny Station, a section of Westlake Avenue would need to be fully closed for multiple years. Traffic would likely use Dexter Avenue and Fairview Avenue instead.

In addition to the Westlake Avenue roadway closures, other streets that would be impacted include a partial closure of 8th Avenue and 7th Avenue affecting one general purpose lane. Traffic diversions in this area would span multiple streets and would likely not have a substantial impact to one single street, but would create additional circulation within the street grid system that could add to traffic congestion on streets such as Dexter Avenue, Fairview Avenue, and 6th Avenue.

South Lake Union Station

Sections of Harrison Street would need to be closed for the construction of the South Lake Union Station. Access to and from Aurora Avenue North (State Route 99) via 7th Avenue North would remain open. In the p.m. peak hour, these sections of Harrison Street carry between 300 to 500 vehicles. While there is limited east-west connectivity around this closure, existing east-west traffic on Harrison Street would be able to divert to Mercer Street and John Street. Traffic congestion would get worse at intersections along these routes with diverted trips.

Seattle Center Station

The construction of the Seattle Center Station would require closures of sections of Republican Street. East-west traffic would likely divert to nearby parallel streets, such as Mercer Street or Harrison Street, and north-south traffic would divert to parallel streets such as 1st Avenue West or 2nd Avenue West.

Other Build Alternative (DT-2)

As with the preferred alternative, Alternative DT-2 is entirely underground except at the stations, and the construction-related traffic impacts in this segment occur at or near the station locations. In general, street closures would be needed for cut-and-cover station construction or station entrance construction. The following describes the notable longer-term closures for this alternative surrounding each of the proposed stations.

Midtown Station

Construction of the Midtown Station under this alternative would require a partial closure of 6th Avenue. Station and tunnel vent shaft 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 lane closure would likely not affect Interstate 5 mainline operations due to their occurring at night. All lane closures on state facilities would be coordinated with WSDOT to minimize the potential for impacts.

Westlake Station

Construction of the Westlake Station under this alternative would require closure of Pine Street. Pine Street carries slightly more than 400 trips in the p.m. peak hour and is a one-way westbound street in this area. Traffic would likely divert to Stewart Street, Union Street, 7th Avenue, and 8th Avenue, creating additional congestion along these streets.

Construction of the Westlake Station under this alternative would require a closure of 6th Avenue. Northbound traffic would likely divert to 4th Avenue and 8th Avenue, resulting in additional traffic congestion at intersections along these streets.

Denny Station

Construction of the Denny Station would require a full closure of Terry Avenue North, including the intersections on Terry Avenue North at North Thomas Street and North John Street. Traffic would be expected to use Westlake Avenue North or Boren Avenue North instead. With the

North Thomas Street intersection closure, Seattle Streetcar service would be impacted, as discussed in Section 3.3.2.2.

South Lake Union Station

Construction of the South Lake Union Station would require a closure of Taylor Avenue North. 6th Avenue North north of Mercer Street would also be closed for multiple years. Traffic that uses Taylor Avenue North would be expected to divert to 5th Avenue North.

Seattle Center Station

Station construction would require the partial closure of Mercer Street between Warren Avenue North and 1st Avenue West. There are limited east-west arterials in this area for traffic use to bypass the construction area. Traffic would likely use Denny Way, increasing traffic congestion along Denny Way.

South Interbay Segment

Local, minor, and principal arterials would be affected by construction. Road closures would range from partial road closures for short-term durations to potentially full road closures for long-term durations. Figure 4-42 and Table 4-57 provide a summary of the major construction closures for this segment.

Table 4-57. Key Construction Roadway Closures – South Interbay Segment

Key Number	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)
1	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
2	Elliott Avenue West	West Republican Street to West Galer Street	Partial closure, 1.5 years	Partial closure, 9 months [b]	Partial closure, nights/weekends
3	15th Avenue West	West Barrett Street to West Howe Street	Not applicable	Partial closure, 1 year	Partial closure, 9 months [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] Limited to south of West Mercer Place.

[c] Limited to vicinity of West Armory Way intersection.

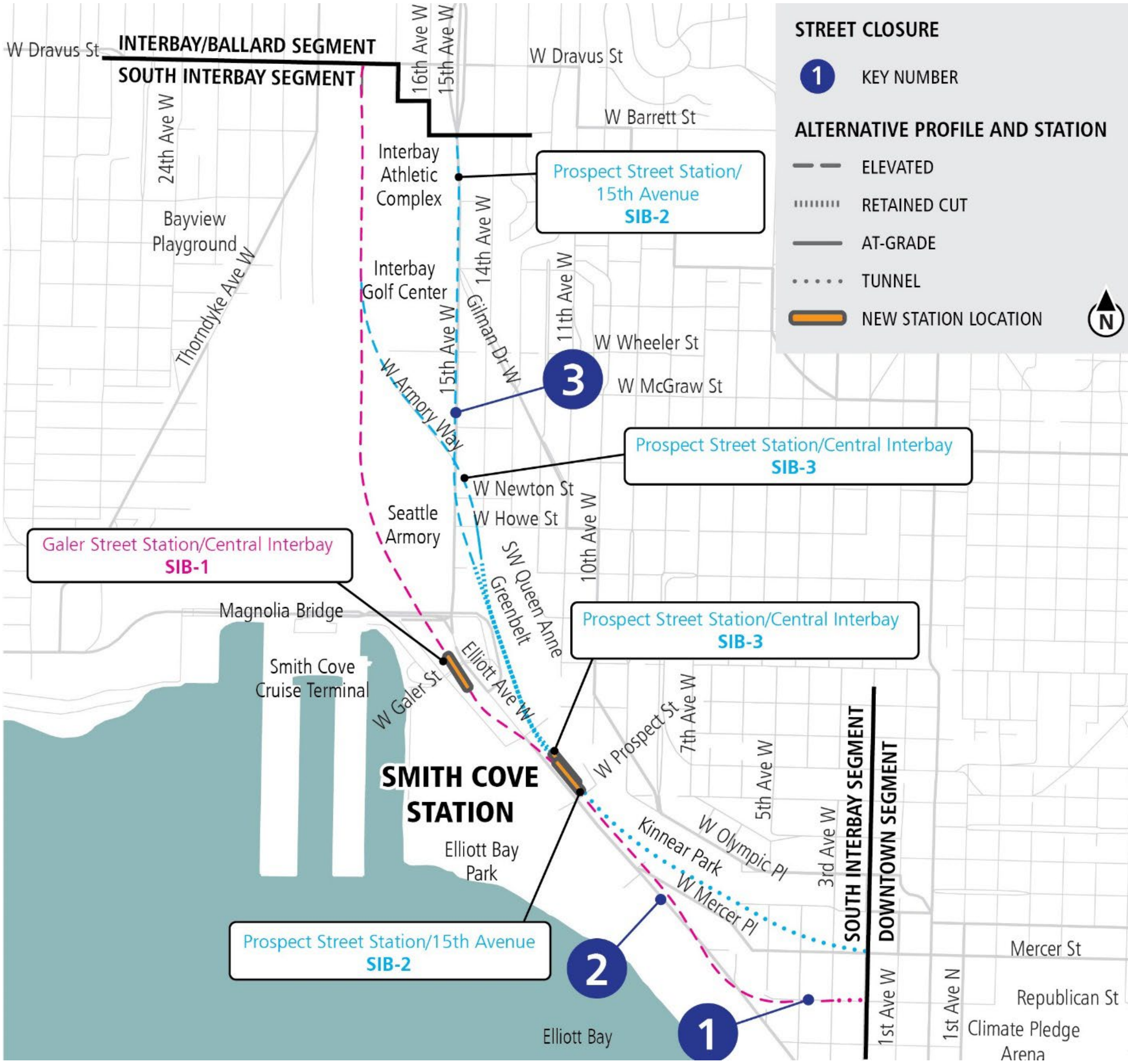


Figure 4-42. Key Construction Roadway Closures – South Interbay Segment

Preferred Alternative (SIB-1)

The primary construction closure for Preferred Alternative SIB-1 would be the partial closure of Elliott Avenue West. This would be in two locations: where the guideway crosses Elliott Avenue West near West Mercer Street and again near the West Galer Street Flyover. At each location, up to four travel lanes would need to be closed. One of the lanes closed would be the center two-way left-turn lane, but the closure of other travel lanes would increase congestion on Elliott Avenue West. While most trips would remain on Elliott Avenue West, it is likely that the increased congestion would result in some trips diverting to Gilman Drive West and West Olympic Place or to West Nickerson Street.

The other notable closure would be in the vicinity of the tunnel portal, where West Republican Street would need to be closed between 3rd Avenue West and 5th Avenue West. Traffic volumes along this section of West Republican Street are low, so vehicles diverted to nearby streets are not expected to impact traffic congestion. Limited local access to properties on West Republican Street would be maintained.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 would construct an elevated guideway on 15th Avenue West, in the center of the roadway. This guideway construction would require a partial closure of 15th Avenue West between West Armory Way and West Barrett Street, which would likely increase congestion on 15th Avenue West. While travel would remain on 15th Avenue West, some trips, likely 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. About 10 percent of the traffic volumes along 15th Avenue West would likely divert to other streets.

Similar to the preferred alternative, Alternative SIB-2 would include the partial closure of Elliott Avenue West; however, it would only occur in one location where the guideway crosses Elliott Avenue West between 6th Avenue West and West Mercer Place.

Also similar to the preferred alternative, Alternative SIB-2 would require a closure of West Republican Street.

Some of the expected roadway closures would result in traffic diversions within the South Interbay area. Table 4-58 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other arterials in the South Interbay area.

Table 4-58. Key Arterial Roadway Closure Traffic Diversion Summary – South Interbay Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
SIB-1, SIB-2	Elliott Avenue West (West Republican Street to West Galer Street)	1,300 to 1,600	Gilman Drive West West Olympic Place West Nickerson Street [b]
SIB-2, SIB-3	15th Avenue West (West Barrett Street to West Howe Street)	350 to 450	Queen Anne Avenue North West Dravus Street [b]

Note: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans.

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

Construction closures associated with Alternative SIB-3 would consist of short-term lane shifts or closures on nights and weekends where the guideway is constructed along Elliott Avenue West in the vicinity of West Prospect Street and where the elevated guideway crosses 15th Avenue West near West Armory Way.

Interbay/Ballard Segment

Local, minor, and principal arterials would be affected by construction. Road closures would range from partial road closures for short-term durations to potentially full road closures for long-term durations. Some of the road closures could affect the trolley bus service and are described in Section 3.3.2.2. Figure 4-43 and Table 4-59 provide a summary of the major construction closures for this segment.

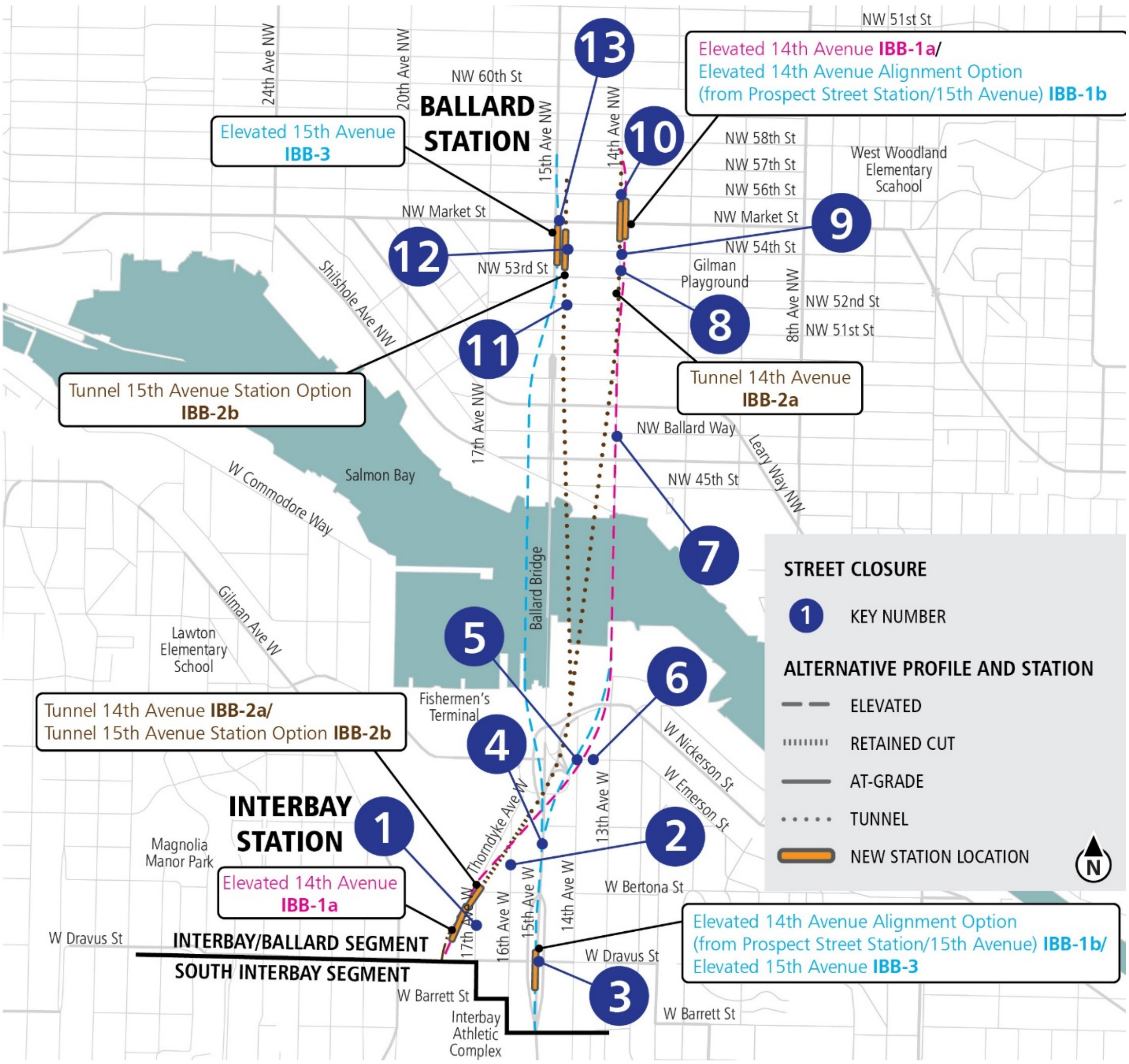


Figure 4-43. Key Construction Roadway Closures – Interbay/Ballard Segment

Table 4-59. Key Construction Roadway Closures – Interbay/Ballard Segment

Key Number	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)
1	17th Avenue West/ Thorndyke Avenue West	West Dravus Street to 16th Avenue West	Full closure, 3 years [b]	Not applicable	Full closure, 3 years [b]	Full closure, 3 years [b]	Not applicable
2	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
3	West Dravus Street/15th Avenue West On- and Off-ramps	Intersections	Not applicable	Full closure, 3 years [c]	Not applicable	Not applicable	Full closure, 3 years [c]
4	15th Avenue West	West Dravus Street interchange to West Emerson Street interchange	Full closure, nights/weekends [d]	Partial closure, 6 months Full closure, nights/weekends [e]	Partial closure, 6 months [d]	Partial closure, 6 months [d]	Partial closure, 6 months Full closure, nights/weekends [e]
5	14th Avenue West	At West Emerson Street	Full closure, 1.5 years	Partial closure, 6 months	Not applicable	Not applicable	Not applicable
6	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
7	14th Avenue Northwest	Northwest 45th Street to Northwest 51st Street [f]	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable	Not applicable
8	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
9	Northwest 54th Street	At 14th Avenue Northwest	Full closure, 3 years	Full closure, 3 years	Full closure, 3 years	Not applicable	Not applicable
10	Northwest 56th Street	At 14th Avenue Northwest	Not applicable	Not applicable	Full closure, 3 years	Not applicable	Not applicable

Key Number	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)
11	Northwest 52nd Street	East of 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Full closure, 4 years	Full closure, nights/weekends
12	Northwest 54th Street	East of 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Full closure, 4 years	Full closure, 3 years
13	Northwest Market Street	At 15th Avenue Northwest	Not applicable	Not applicable	Not applicable	Partial closure, 3 years	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 one 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 intersection at West Bertona Street.

[c] Closure would be intermittent over 3 years, in 1-month increments.

[d] In the vicinity of West Emerson Street interchange.

[e] In the vicinity of West Dravus Street interchange.

[f] Includes intersections with Northwest 46th Street, Northwest Ballard Way, Northwest 49th Street, and Northwest 50th Street.

Some of the expected roadway closures would result in traffic diversions within the Interbay/Ballard area. Table 4-60 summarizes the potential volumes diverted due to long-term arterial roadway closures, along with an estimated range of volumes diverted to other arterials in the Interbay/Ballard area. The sections following Table 4-60 further describe the traffic effects for each of the Ballard Segment alternatives.

Table 4-60. Key Arterial Roadway Closure Traffic Diversion Summary – Interbay/Ballard Segment

Alternative	Arterial Roadway Closure	Potential Volume Diversion (vehicles/hour in 2032 P.M. Peak Hour)	Potentially Affected Roadways [a]
IBB-1b, IBB-3	West Dravus Street/15th Avenue West On- and Off-ramps	650 to 850	West Emerson Street [b]
IBB-1b, IBB-2a*, IBB-2b*, IBB-3	15th Avenue West (West Dravus Interchange to West Emerson Street Interchange)	500 to 600	Gilman Drive West Thorndyke Avenue West West Nickerson Street [b] Westlake Avenue North [b]
IBB-1a, IBB-1b	West Emerson Street (13th Avenue West to 14th Avenue West)	1,300 to 1,600	West Dravus Street [b]
IBB-1a, IBB-1b, IBB-2a*	14th Avenue Northwest (Northwest 45th Street to Northwest 51st Street, Northwest 52nd Street to Northwest 58th Street)	750 to 950	15th Avenue Northwest [b]
IBB-2b*, IBB-3	Northwest Market Street (At 15th Avenue Northwest	400 to 500	Northwest 56th Street 14th Avenue Northwest

* As described in the introduction to Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, 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: Non-arterial roadway closures are not shown, as the potential volume diversion would be expected to be less than an arterial roadway closure.

[a] Most-likely-affected roadways are listed. Other roadways could be affected depending on final construction plans

[b] Denotes a street that is anticipated to be at or near capacity during the p.m. peak hour in 2032.

Preferred Alternative (IBB-1a)

Near the Interbay Station, the guideway construction would require closure of Thorndyke Avenue West and of the intersection of 16th Avenue West and Thorndyke Avenue West. Traffic volumes on Thorndyke Avenue West are relatively low and any traffic impacts due to diverted trips are expected to be minimal.

Guideway and station construction would require a closure of 14th Avenue Northwest. In addition, the following streets would also be closed at 14th Avenue Northwest: Northwest 46th Street, Northwest 47th Street, Northwest 49th Street, and Northwest 50th Street. As there is a grid street system in this area, it is expected that the adjacent streets would be used for circulation and access with any of these closures, however, being lower volume streets, increased traffic congestion is not anticipated. Guideway construction would also necessitate the closure of West Emerson Street at 14th Avenue West.

Other Build Option (IBB-1b)

Construction of the Interbay Station and guideway would require short-term closures of the West Dravus Street on- and off-ramps to 15th Avenue Northwest for multiple years. These closures would be phased over multiple years to minimize the traffic impact. At this time, it is assumed up to two of the ramps would be potentially closed at any one time. West Dravus Street would remain open for east-west travel except for short-duration night or weekend closures. During these closures, traffic would likely be diverted to use the West Emerson Street interchange. While traffic volumes would be higher on West Emerson Street, minimal overall congestion increases are expected.

In addition to the closures along 14th Avenue Northwest described for Preferred Alternative IBB-1a, this option would require a partial closure of 15th Avenue West. 15th Avenue West is a principal arterial and the partial closure would likely increase traffic congestion through this area. There are some diversion options using arterial streets near this closure, such as Gilman Avenue West and Thorndyke Avenue West, as well as West Nickerson Street and Westlake Avenue North, so substantial traffic on local streets is not anticipated.

Also similar to the preferred alternative, 14th Avenue West at West Emerson Street and 13th Avenue West north of West Nickerson Street will need to be closed.

*Preferred Alternative with Third-Party Funding (IBB-2a)**

Construction of the Interbay Station would require a closure on Thorndyke Avenue Northwest. Thorndyke Avenue Northwest is a relatively low volume street and its closure is not anticipated to substantially change traffic conditions on other streets. The primary traffic impacts associated with Preferred Alternative IBB-2a* would be along 14th Avenue Northwest for construction of the Ballard Station. Station construction would require the closure of a section of 14th Avenue Northwest. Diverted traffic would likely travel through the Northwest Market Street and 15th Avenue Northwest intersection, which would increase congestion at this intersection.

Ballard Station construction would also require the full closure of Northwest 54th Street and Northwest 56th Street at 14th Avenue Northwest. Northwest 54th Street and Northwest 56th Street are relatively low volume streets and their closures are not anticipated to substantially change traffic conditions on other streets.

*Preferred Option with Third-Party Funding (IBB-2b)**

Similar to Preferred Alternative IBB-1a and Preferred Alternative IBB-2a*, construction of the Interbay Station would also necessitate the closure of Thorndyke Avenue Northwest. The primary traffic impacts associated with Preferred Option IBB-2b* would be for Ballard Station construction, requiring closure of Northwest 52nd Street and Northwest 54th Street east of 15th Avenue Northwest. These streets are low volume and therefore the diversion to nearby streets is not expected to substantially increase traffic congestion on 14th Avenue Northwest or 15th Avenue Northwest.

Other Build Alternative (IBB-3)

The primary traffic impacts associated with Alternative IBB-3 would be for station and guideway construction along 15th Avenue West at West Dravus Street and station construction near Northwest Market Street. Construction of the Interbay Station and guideway would require short-term closures of the West Dravus Street on- and off-ramps to 15th Avenue Northwest.

These closures would be phased over multiple years to minimize the traffic impact. At this time, it is assumed up to two of the four ramps would be potentially closed at any one time. West Dravus Street would remain open for east-west travel except for short-duration night or weekend closures. During these closures traffic would likely be diverted to use the West Emerson Street interchange. While traffic volumes would be higher on West Emerson Street, minimal overall congestion increases are expected. Construction of the Ballard Station would require the closure of Northwest 54th Street east of 15th Avenue Northwest. During this same period, the northbound curb lane of 15th Avenue Northwest would likely be closed, which could slightly increase congestion on 15th Avenue Northwest. In addition, traffic that uses Northwest 54th Street would likely use adjacent streets such as Northwest 53rd Street, resulting in minor delay increases at 14th Avenue Northwest and Northwest 53rd Street.

4.3.3 Potential Mitigation Measures

4.3.3.1 Long-term Mitigation

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 4-61. All potential mitigation measures would be determined and agreed-upon jointly by Sound Transit and the City of Seattle and in coordination with the Federal Transit Administration.

Table 4-61. Potentially Impacted Intersections to be Considered for Mitigation – Ballard Link Extension

Segment	Intersection	Alternative	Primary Cause(s) of Impact
Chinatown-International District Segment	5th Avenue South midblock crossing (south of South Weller Street)	All Build Alternatives	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 4-45 and Table 4-46)	Preferred Alternative DT-1	Increased pick-up/drop-off activity and non-motorized station access
	16 intersections (see Table 4-45 and Table 4-46)	Alternative DT-2	Increased pick-up/drop-off activity and non-motorized station access
South Interbay	Elliott Avenue West/West Galer Street Flyover	All Build Alternatives	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 Build Alternatives	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

Sound Transit will continue to work with the City of Seattle and the Federal Transit Administration as the Ballard Link Extension project design progresses to minimize project-related intersection delays. Where additional project-related delays are unavoidable, Sound Transit would coordinate with the City of Seattle and the Federal Transit Administration to review potential mitigation at the intersections identified in Table 4-61 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, in coordination with the Federal Transit Administration, 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.

4.3.3.2 Construction Mitigation

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 (such as 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 will 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 will 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.

5 PARKING

5.1 Introduction

This section describes existing on- and off-street parking conditions along the WSBLE corridor and around stations. It describes changes in parking supply with the No Build Alternative and Build Alternatives and also documents 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 commute by light rail (also known as hide-and-ride). Hide-and-ride parking could adversely affect local businesses and residents who rely on that parking. It also discusses the temporary construction impacts such as loss of on- and off-street parking and construction worker parking.

The study areas for on-street parking are 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. Detailed parking inventory was not collected along the light rail alignments or for station areas in the Downtown or Chinatown-International District segments where all parking has time restrictions; however, changes to parking supply are documented wherever they occur. Sound Transit also identified off-street parking facilities with publicly available parking that would be impacted by the construction, operation, or both, of the proposed alignments. Midday parking demand counts were conducted for on-street parking and in public off-street lots within each Build Alternative study area to determine the percent of available parking spaces that were occupied. Parking supply and occupancy counts were performed midday on weekdays between September 2019 and early December 2019.

The long-term parking effects analysis considered two parking impacts: (1) the amount of on-street parking eliminated with an alternative's station or alignment and (2) the potential for hide-and-ride parking near stations. Parking supply temporarily displaced by construction activities and restored after construction would be in addition to any parking identified to be permanently displaced. If required, potential mitigation measures to address parking impacts are also identified.

All of the station alternatives in both the West Seattle Link Extension and Ballard Link Extension, except for those in the Chinatown-International District and Downtown segments, are currently surrounded by varying degrees of unrestricted parking that could be affected by hide-and-ride parking.

Consistent with the existing light rail stations in Seattle and the City of Seattle curb-use policies, Sound Transit expects that the Seattle Department of Transportation would manage parking near new stations, such as by placing restrictions (including time limits or permit restrictions) where no restrictions currently exist, thereby limiting the potential for hide-and-ride parking around new stations.

Sound Transit would not create new long-term parking (i.e., park-and-ride lots) at any WSBLE stations to accommodate light rail commuters.

5.1.1 Key Parking Findings, West Seattle Link Extension

For most of the West Seattle Link Extension Build Alternatives, permanently removed parking would range between about 40 and 70 on-street parking spaces in each segment, with the following exceptions:

- In SODO, Preferred Alternative SODO-1a would remove 75 to 100 spaces to accommodate the station and rail alignment. Alternative SODO-2 would remove 15 to 25 on-street spaces.
- The Duwamish Segment would have no station and only Alternative DUW-2 would result in any permanent parking loss, with 5 to 15 on-street parking spaces removed along the rail alignment.
- In the Delridge Segment, Option DEL-2b* would remove 75 to 95 on-street spaces.
- Within the West Seattle Junction Segment, Preferred Alternative WSJ-1, Preferred Alternative WSJ-3a*, and Preferred Option WSJ-3b* would permanently remove 210, 174, and 219 off-street public parking spaces, respectively. Within the West Seattle Junction Segment, Alternative WSJ-4* and Alternative WSJ-5* would affect more parking, with from 105 to 135 and 70 to 90 on-street spaces removed, respectively.

Most of the West Seattle Link Extension Build Alternatives would temporarily remove on-street parking spaces during construction of the guideway and stations, which also includes parking that may be used as staging or storage areas. Most parking removal would occur in the Delridge and West Seattle Junction segments. Alternatives with higher levels of parking impact during construction are as follows:

- Alternative DUW-2 would affect 95 to 120 on-street parking spaces.
- Option DEL-1b, Alternative DEL-3, Alternative DEL-5, and Alternative DEL-6* in the Delridge Segment would temporarily affect 120 to 150, 80 to 100, 160 to 200, and 75 to 100 on-street spaces, respectively.
- Preferred Alternative WSJ-3a* would temporarily remove 190 to 240 on-street spaces, and Alternative WSJ-5* would temporarily remove 200 to 250 on-street parking spaces.

Table 5-1 summarizes the parking that would be permanently removed by the West Seattle Link Extension, as well as parking temporarily removed during construction.

Table 5-1. Summary of On-Street Parking Impacts of West Seattle Link Extension

Segment	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
SODO	15 to 100	0 to 20
Duwamish	0 to 15	40 to 120
Delridge	5 to 95	30 to 200
West Seattle Junction	30 to 135	75 to 250

5.1.2 Key Parking Findings, Ballard Link Extension

For most of the Ballard Link Extension Build Alternatives, the total amount of permanently removed parking would be up to 40 on-street parking spaces, with the following exceptions:

- All Chinatown-International District alternatives would permanently remove parking spaces in private lots or garages. Alternative CID-1a* and Option CID-1b* would remove about 200 stalls from the private parking garage under Union Station near 4th Avenue South. Alternative CID-2a and Option CID-2b would remove 80 spaces in a surface lot located on the corner of South King Street and 6th Avenue South.

- In the Chinatown-International District Segment, Option CID-1b* and Alternative CID-2a (including the diagonal station configuration) would remove 45 to 60 and 50 to 65 on-street parking spaces, respectively. Option CID-2b would remove 35 to 45 spaces.
- In the Downtown Segment, Preferred Alternative DT-1 would remove 70 to 90 on-street parking spaces and about 220 off-street spaces; Alternative DT-2 would remove 80 to 105 on-street parking spaces and 183 public off-street spaces.
- In the Interbay/Ballard Segment, Preferred Alternative IBB-1a and Preferred Alternative IBB-2a* would remove 75 to 95 on-street parking spaces. Preferred Option IBB-2b* would remove 35 to 50 on-street parking spaces.

During construction, most of the Ballard Link Extension Build Alternatives would temporarily remove 150 to 250 on-street parking spaces. Alternatives that would have higher or lower levels of parking impact during construction are as follows:

- The SODO Segment alternatives are not expected to have temporary parking impacts during construction.
- Alternative CID-1a* and Option CID-1b* are not expected to have temporary parking impacts during construction. Option CID-2b would remove 40 to 50 on-street parking spaces during construction.
- Alternative DT-2 would remove 210 to 260 on-street parking spaces during construction. Preferred Alternative DT-1 and Alternative DT-2 would each use the 283-space surface lot under Interstate 5 for construction staging. In addition, Preferred Alternative DT-1 could block egress from the Columbia Tower Garage for 6 to 9 months during construction on Cherry Street. This garage, with about 680 parking spaces, has a separate access point on Columbia Street.
- Alternative SIB-2 and Alternative SIB-3 would remove 215 to 265 and 45 to 60 on-street parking spaces during construction, respectively.
- During construction, Preferred Alternative IBB-1a would remove 380 to 470 on-street spaces and Option IBB-1b would remove 290 to 360 on-street spaces. Preferred Alternative IBB-2a* would remove 255 to 315 on-street spaces and Alternative IBB-3 would remove 75 to 100 on-street parking spaces during construction.

Table 5-2 summarizes the parking that would be permanently removed by the Ballard Link Extension, as well as parking temporarily removed during construction.

Table 5-2. Summary of On-Street Parking Impacts, Ballard Link Extension

Segment	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
SODO	0 to 5	0
Chinatown-International District	10 to 65	0 to 195
Downtown	45 to 90	130 to 235
South Interbay	0 to 25	45 to 265
Interbay/Ballard	0 to 100	75 to 470

5.2 West Seattle Link Extension

5.2.1 Affected Environment

The affected environment for parking includes the area within 0.25 mile of alternative stations, and within one block of the proposed alignments. Within the station areas, Sound Transit inventoried the number of on-street parking spaces, the percentage of the on-street spaces that are unrestricted, and recorded parking utilization. Occupancy surveys in the station areas were performed midday on weekdays (from 9 a.m. to 3 p.m.) to assess potential for hide-and-ride. The number of off-street parking spaces available for general public use within the parking study area was also identified. Parking supply was documented along the segments to assess potential temporary or permanent loss of parking due to the project.

5.2.1.1 SODO Segment

The parking inventoried for the SODO Segment is shown on Figure 5-1. Table 5-3 presents the on-street parking supply and occupancy inventoried for the SODO Segment station areas, by alternative.

Table 5-3. Inventoried Station Area On-Street Parking Supply and Occupancy in the SODO Segment

Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
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%

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

[b] Midday occupancy data was collected by Heffron Transportation, Inc. in November 2019.

5.2.1.2 Duwamish Segment

On-street parking was not inventoried in the Duwamish Segment because there would be no stations with the alternatives in.

There is a Port of Seattle-owned surface parking lot for trucks at the south end of Terminal 25. Port-related tractors (the driving mechanism for a tractor-trailer combination truck) are allowed to park in the lot between shifts and overnight. This lot has capacity for 142 truck tractors. An overnight parking count performed in January 2018 (Heffron Transportation, Inc. 2018) determined that 136 truck tractors were parked in the lot.

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
- Public Off-Street Parking Lots
- On-Street Parking Study Area

FIGURE 5-1
Parking
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet
N

5.2.1.3 Delridge Segment

The parking inventoried for the Delridge Segment is shown on Figure 5-2. Table 5-4 presents the on-street parking supply and occupancy inventoried for the Delridge Segment station areas, by alternative.

Table 5-4. Inventoried Station Area On-Street Parking Supply and Occupancy in the Delridge Segment

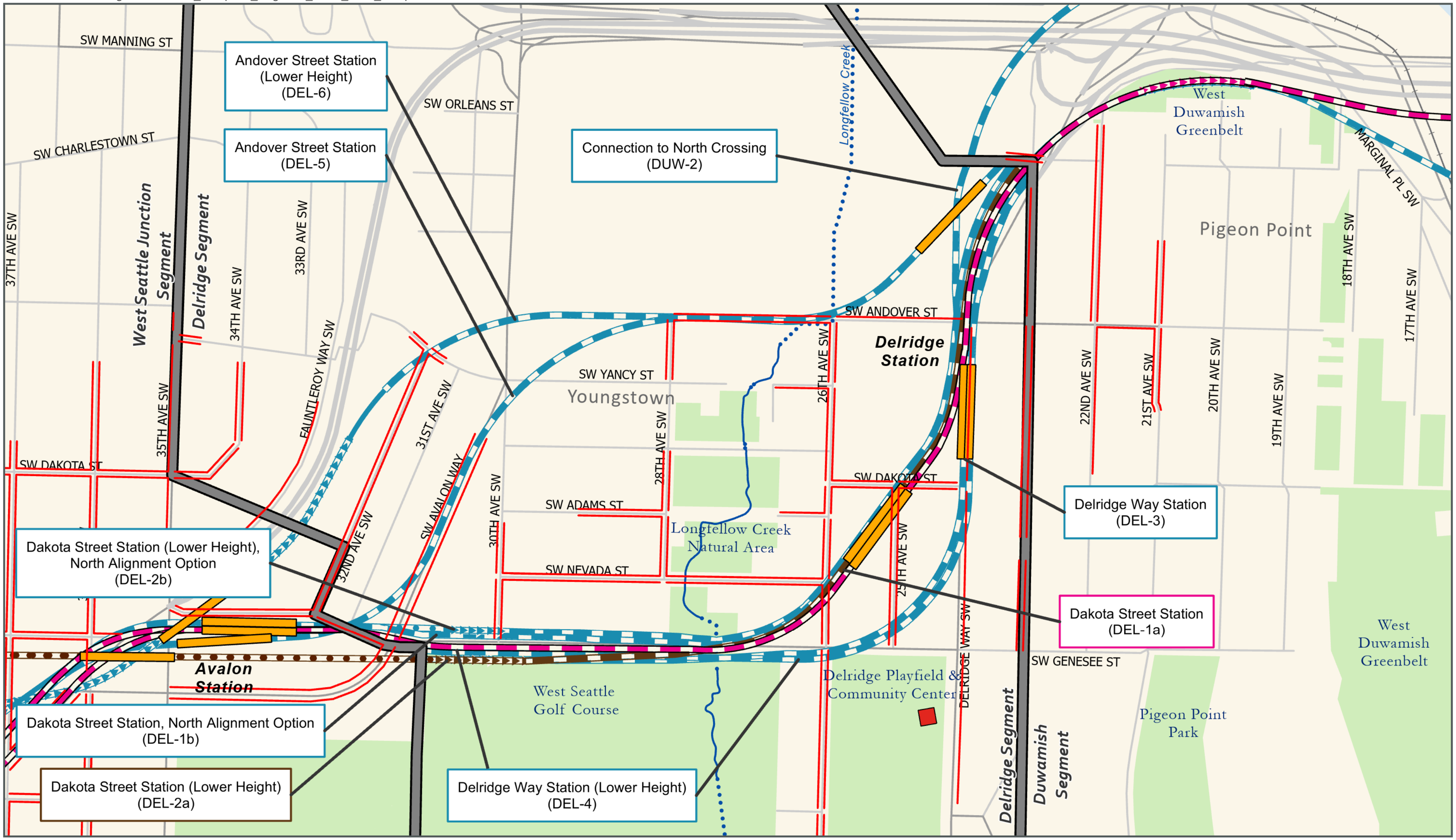
Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
Preferred Dakota Street Station (DEL-1a)	421	1	422	59%
Dakota Street Station North Alignment Option (DEL-1b)	421	1	422	59%
Preferred Dakota Street Station Lower Height (DEL-2a)*	421	1	422	59%
Dakota Street Station 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%

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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] Midday occupancy data was collected by Heffron Transportation, Inc. in November 2019.

There is one off-street 38-space public parking lot located in the station area for the following six Delridge Segment alternatives: Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, Option DEL-2b*, Alternative DEL-3, and Alternative DEL-4*. It is located at the Delridge Community Center and Skate Park and had a midday occupancy of 37 percent in December 2019.



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

- Public Off-Street Parking Lots
- On-Street Parking Study Area

FIGURE 5-2
Parking
West Seattle Link Extension - Delridge Segment

West Seattle and Ballard Link Extensions

0 400 800 Feet
N

5.2.1.4 West Seattle Junction Segment

The parking study area for the West Seattle Junction Segment is shown in Figure 5-3. This segment would include two stations: the Avalon Station and the Alaska Junction Station. Table 5-5 presents the on-street parking supply and occupancy inventoried for the West Seattle Junction Segment station areas by alternative.

Table 5-5. Inventoried Station Area On-Street Parking Supply and Occupancy in the West Seattle Junction Segment

Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
Preferred Elevated 41st/42nd Avenue Station (WSJ-1)	633, Avalon Station 242, Alaska Junction Station	74, Avalon Station 699, Alaska Junction Station	707, Avalon Station 941, Alaska Junction Station	54%, Avalon Station 66%, Alaska Junction Station
Preferred Elevated Fauntleroy Way Station (WSJ-2)	633, Avalon Station 476, Alaska Junction Station	74, Avalon Station 476, Alaska Junction Station	707, Avalon Station 952, Alaska Junction Station	54%, Avalon Station 71%, Alaska Junction Station
Preferred Tunnel 41st Avenue Station (WSJ-3a)*	595, Avalon Station 264, Alaska Junction Station	238, Avalon Station 714, Alaska Junction Station	833, Avalon Station 978, Alaska Junction Station	58%, Avalon Station 68%, Alaska Junction Station
Preferred Tunnel 42nd Avenue Station Option (WSJ-3b)*	595, Avalon Station 132, Alaska Junction Station	238, Avalon Station 809, Alaska Junction Station	833, Avalon Station 941, Alaska Junction Station	58%, Avalon Station 65%, Alaska Junction Station
Short Tunnel 41st Avenue Station (WSJ-4)*	633, Avalon Station 264, Alaska Junction Station	74, Avalon Station 714, Alaska Junction Station	707, Avalon Station 978, Alaska Junction Station	54%, Avalon Station 68%, Alaska Junction Station
Medium Tunnel 41st Avenue Station (WSJ-5)*	595, Avalon Station 264, Alaska Junction Station	238, Avalon Station 714, Alaska Junction Station	833, Avalon Station 978, Alaska Junction Station	58%, Avalon Station 68%, Alaska Junction Station

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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] Midday occupancy data was collected by Heffron Transportation, Inc. in November 2019.

There is one public parking lot located within the Avalon Station study area of all six segment alternatives. The 249-space lot serves users of the West Seattle Stadium and Golf Course. It has restrictions such as time limits or payment requirements, and had a midday occupancy of 6 percent in December 2019. Higher occupancy of this recreational-use parking lot is likely to occur during summer months.

5.2.2 Environmental Impacts

Potential long-term parking impacts for the West Seattle Link Extension alternatives would be from the potential for hide-and-ride parking near light rail stations and the removal of parking along the alternative alignments at the stations, both permanently and temporarily during construction.

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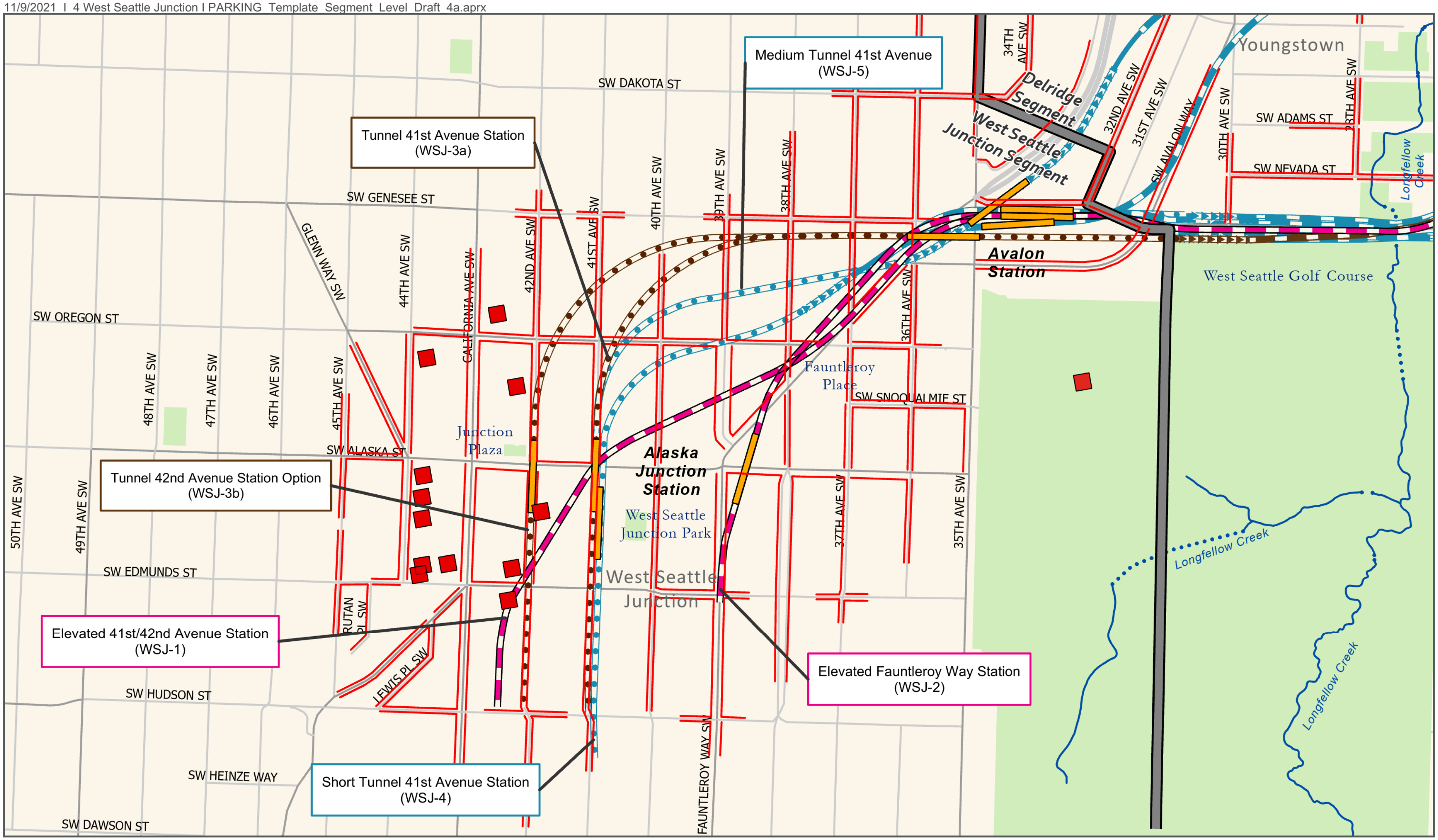

Source: City of Seattle, King County (2019, 2020, 2021).

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

- Public Off-Street Parking Lots
- On-Street Parking Study Area

FIGURE 5-3
Parking
West Seattle Link Extension -
West Seattle Junction Segment

West Seattle and Ballard Link Extensions

0 500 1,000 Feet N

5.2.2.1 No Build Alternative

The No Build Alternative would not remove on-street or off-street parking or change parking characteristics in the West Seattle Link Extension study area.

5.2.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All 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 Seattle Department of Transportation 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 segment discussions below.

SODO Segment

Table 5-6 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the West Seattle Link Extension SODO Segment alternatives.

Table 5-6. Displaced (Permanent and Temporary) Parking in the SODO Segment, West Seattle Link Extension

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would permanently remove the most on-street parking of the SODO Segment alternatives, with 20 to 30 on-street parking spaces converted to station passenger or bus loading zones on 4th Avenue South and 5th Place South, and 55 to 70 spaces removed on 5th Place South, South Bayview Street, and South Lander Street to accommodate the station and rail alignment. No public off-street parking would be removed with this alternative.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b would have the next-most on-street parking spaces removed of the SODO Segment alternatives, with 10 to 15 spaces converted to station passenger or bus load zones on 4th Avenue South and 5th Place South and 20 to 30 spaces removed on South Holgate Street and South Lander Street to accommodate the station and rail alignment.

Alternative SODO-2 effects would be similar to Preferred Alternative SODO-1a in the amount of on-street parking converted to station passenger or bus load zones: 15 to 25 spaces on 4th Avenue South and 5th Place South. However, it would not affect other on-street parking in the station area.

No public off-street parking would be removed with these alternatives.

Duwamish Segment

Table 5-7 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the Duwamish Segment alternatives.

Table 5-7. Displaced (Permanent and Temporary) Parking in the Duwamish Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

Preferred Alternative (DUW-1a)

Preferred Alternative DUW-1a would not have any permanent on-street parking impacts.

Other Build Alternative and Option (DUW-1b and DUW-2)

Option DUW-1b would not have any permanent on-street parking impacts.

Alternative DUW-2 would remove 5 to 15 on-street spaces on South Hinds Street to accommodate the rail alignment.

Delridge Segment

Table 5-8 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the Delridge Segment alternatives.

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a would convert 35 to 50 spaces on Southwest Dakota Street, Delridge Way Southwest, 23rd Avenue Southwest, and 26th Avenue Southwest to station passenger or bus loading zones at the station. No public off-street parking would be removed with this alternative.

Table 5-8. Displaced (Permanent and Temporary) Parking in the Delridge Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Similar to Preferred Alternative DEL-1a, Preferred Alternative DEL-2a* would also convert 35 to 50 spaces on Southwest Dakota Street, Delridge Way Southwest, 23rd Avenue Southwest, and 26th Avenue Southwest to passenger or bus loading zones at the station. An additional 25 to 30 spaces on 25th Avenue Southwest south of Southwest Dakota Street would be removed to accommodate the rail or station alignment. No public off-street parking would be removed with this alternative.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

Sound Transit expects the Option DEL-1b impacts to be similar to Preferred Alternative DEL-1a, with 35 to 50 spaces converted to station passenger or bus loading zones on Southwest Dakota Street, Delridge Way Southwest, 23rd Avenue Southwest, and 26th Avenue Southwest. Option DEL-2b* would convert 35 to 50 spaces to station passenger or bus loading zones on Southwest Dakota Street, Delridge Way Southwest, and 26th Avenue Southwest. Option DEL-2b* is also expected to have 40 to 45 spaces removed along 25th Avenue Southwest south of Southwest Dakota Street and 30th Avenue Southwest North of Southwest Genesee Street to accommodate the station and rail alignment.

Alternative DEL-3 and Alternative DEL-4* would convert 35 to 50 spaces to station passenger or bus loading zones on Southwest Dakota Street, Delridge Way Southwest, and 23rd Avenue Southwest.

Sound Transit expects that Alternative DEL-5 and Alternative DEL-6* would have fewer spaces converted to station passenger or bus loading zones, 5 to 10 spaces and 15 to 25 spaces respectively on Southwest Andover Street, and no additional parking removed to accommodate the station or rail alignment. No public off-street parking spaces would be removed with these alternatives.

West Seattle Junction Segment

Table 5-9 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the West Seattle Junction Segment alternatives. Off-street parking impacts are also noted in the table.

Table 5-9. Displaced (Permanent and Temporary) Parking in the West Seattle Junction Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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 55 [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

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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 public off-street parking spaces would also be removed with Preferred Alternative WSJ-1.

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

<u>Preferred Alternatives (WSJ-1 and WSJ-2)</u>

Preferred Alternative WSJ-1 would affect the fewest number of on-street parking spaces, with 30 to 45 spaces converted to station passenger or bus loading zones on Southwest Alaska Street, 41st Avenue Southwest, and 42nd Avenue Southwest. However, this alternative would also remove 210 public off-street spaces: 174 spaces in the 4704 42nd Avenue Southwest lot, 8 spaces in the 4200 Southwest Edmunds Street lot, and 28 spaces in the 4810 42nd Avenue Southwest lot.

Preferred Alternative WSJ-2 would convert 45 to 60 spaces to station passenger or bus loading zones on Southwest Alaska Street, 37th Avenue Southwest, 38th Avenue Southwest, and Fauntleroy Way Southwest. No public off-street parking would be removed with this alternative.

Both Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2 have the potential to reduce or modify on-street parking on Fauntleroy Way Southwest, adjacent to or below the elevated guideway structure from potential changes to the street configuration. Preferred Alternative WSJ-1 would affect 10 to 15 spaces, and Preferred Alternative WSJ-2 would affect 5 to 10 spaces.

<u>Preferred Alternatives with Third-Party Funding (WSJ-3a* and WSJ-3b*)</u>

Preferred Alternative WSJ-3a* would convert 45 to 65 spaces to station passenger or bus loading zones on Southwest Alaska Street and 41st Avenue Southwest. Preferred Option WSJ-3b* would convert 40 to 50 spaces to station passenger or bus loading zones on Southwest Alaska Street, 42nd Avenue Southwest, and California Avenue Southwest; it would also remove 0 to 5 on-street parking spaces on 36th Avenue Southwest to accommodate the station. No public off-street parking would be removed with either of these two alternatives.

Other Build Alternatives (WSJ-4* and WSJ-5*)

Alternative WSJ-4* would convert 60 to 75 spaces to station passenger or bus loading zones (up to 65 on 40th Avenue Southwest, 41st Avenue Southwest, and Southwest Alaska Street and up to 10 spaces on Southwest Genesee Street and Southwest Avalon Way). This alternative would also remove 45 to 60 spaces along 37th Avenue Southwest and 38th Avenue Southwest along the guideway. Alternative WSJ-5* would also convert 70 to 90 spaces to station passenger or bus loading zones (up to 65 on 41st Avenue Southwest and Southwest Alaska Street, and up to 25 spaces on Southwest Genesee Street and Southwest Avalon Way). No public off-street parking spaces would be removed with either of these two alternatives.

Construction Impacts

This analysis has identified potential temporary parking impacts during construction with each West Seattle Link Extension Build Alternative, as well as the potential for construction workers to park near the construction areas. The temporary parking impacts are in addition to permanent parking losses described in the Long-term Impacts section above or parking lost through property acquisition. Tables 5-6 through 5-9 presented the potential temporary removal of parking during construction of the guideway and stations, which also includes parking that may be used as staging or storage areas. The known temporary parking removals are described further by segment in this section. It is noted that additional short-term removal of parking could be needed during night or weekend construction beyond those areas depending on the construction activities. Parking would be restored after construction is complete. For information on key roadway construction closures, including extents and durations, see Section 4.2.2.3.

Impacts Common to All Alternatives

Sound Transit expects that construction employee vehicles would be limited only to the number that could park within the construction staging areas. 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.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would not remove additional on-street or off-street parking spaces during construction. There could be a temporary loss of parking along 6th Avenue South during utility relocation.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b and Alternative SODO-2 construction could temporarily remove 15 to 20 on-street parking spaces along 5th Place South between South Lander Street and South Bayview Street.

Duwamish Segment

Preferred Alternative (DUW-1a)

Preferred Alternative DUW-1a would temporarily remove 40 to 55 on-street parking spaces along 6th Avenue South between South Forest Street and South Horton Street during construction.

Other Build Alternative and Option (DUW-1b and DUW-2)

Similar to Preferred Alternative DUW-1a, Option DUW-1b and Alternative DUW-2 would temporarily remove 40 to 55 on-street parking spaces along 6th Avenue South between South Forest Street and South Horton Street during construction. In addition, Alternative DUW-2 would temporarily remove 45 to 65 on-street parking spaces located under State Route 99 north of South Spokane Street during construction and would also temporarily affect the Terminal 25 truck parking lot, which can accommodate 142 truck tractors.

Delridge Segment

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a would temporarily remove 60 to 80 on-street parking spaces on 25th Avenue Southwest, 26th Avenue Southwest, Delridge Way Southwest, Southwest Dakota Street, and Southwest Genesee Street during construction.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Preferred Alternative DEL-2a* would temporarily remove 30 to 40 on-street parking spaces on Southwest Dakota Street, 26th Avenue Southwest and Delridge Way Southwest during construction.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

Option Del-1b would temporarily remove 120 to 150 on-street parking spaces on Southwest Avalon Way, 25th Avenue Southwest, 26th Avenue Southwest, Delridge Way Southwest, and Southwest Genesee Street during construction.

Option DEL-2b* would temporarily remove 30 to 40 on-street parking spaces on Southwest Dakota Street, 26th Avenue Southwest, and Delridge Way Southwest during construction.

Alternative DEL-3 would temporarily remove 80 to 100 on-street parking spaces on Delridge Way Southwest, 25th Avenue Southwest, Southwest Dakota Street, and Southwest Genesee Street during construction.

Alternative DEL-4* temporarily remove 70 to 90 on-street parking spaces on Delridge Way Southwest, 25th Avenue Southwest, and Southwest Dakota Street during construction.

Alternative DEL-5 would temporarily remove 160 to 200 on-street parking spaces on Southwest Yancy Street, Southwest Andover Street, and Southwest Avalon Way during construction.

Alternative DEL-6* would temporarily remove 75 to 100 on-street parking spaces on Southwest Avalon Way and Southwest Andover Street during construction.

None of these alternatives are expected to affect public off-street parking during construction.

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

During construction, Preferred Alternative WSJ-1 would temporarily remove 105 to 130 on-street parking spaces on 40th Avenue Southwest, 42nd Avenue Southwest, Fauntleroy Way Southwest, 36th Avenue Southwest, 38th Avenue Southwest, Southwest Edmunds Street, and 39th Avenue Southwest.

Preferred Alternative WSJ-2 would temporarily remove 75 to 95 on-street parking spaces on Fauntleroy Way Southwest, 37th Avenue Southwest, 38th Avenue Southwest, Southwest Alaska Street, Southwest Genesee Street, 36th Avenue Southwest, and Southwest Oregon

Street during construction. Off-street parking would not be affected by project construction activities with either of these alternatives.

Preferred Alternative and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*)

Preferred Alternative WSJ-3a* would temporarily remove a total of 190 to 240 on-street parking spaces during construction, 175 to 215 spaces along 41st Avenue Southwest, and 15 to 25 spaces on Southwest Genesee Street and 36th Avenue Southwest.

Preferred Option WSJ-3b* would temporarily remove 85 to 110 spaces on 42nd Avenue Southwest during construction. Neither alternative would affect public off-street parking during construction.

Other Build Alternatives (WSJ-4* and WSJ-5*)

Alternative WSJ-4* would remove 95 to 125 spaces on 41st Avenue Southwest during construction. Alternative WSJ-5* would temporarily remove 200 to 250 on-street parking spaces, 175 to 215 spaces along 41st Avenue Southwest, and 25 to 35 spaces along 37th Avenue Southwest. Construction activities would not affect public off-street parking with either of these alternatives.

5.2.3 Potential Mitigation Measures

5.2.3.1 Long-term 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.

5.2.3.2 Construction Impacts

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 (i.e., bus bridges) implemented as mitigation for interruptions 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.

5.3 Ballard Link Extension

5.3.1 Affected Environment

The affected environment for parking includes the area within 0.25 mile of alternative stations, and within one block of the proposed alignments. Within the station areas, Sound Transit inventoried the number of on-street parking spaces, the percentage of the on-street spaces that are unrestricted, and recorded parking utilization. Parking occupancy was not collected for station areas in the Downtown or Chinatown-International District segments, where the existing parking surrounding the station areas is restricted by time limits, vehicle type or payment requirements which discourages hide-and-ride parking. For the rest of the segments, occupancy surveys in the station areas were performed midday on weekdays (9 a.m. to 3 p.m.). The number of off-street parking spaces available for general public use within the parking study area was also identified.

5.3.1.1 SODO Segment

The parking inventoried for the SODO Segment is described in Section 5.2.1.1 for the West Seattle Link Extension.

5.3.1.2 Chinatown-International District Segment

On- and off-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, detailed parking supply and occupancy studies were not performed.

5.3.1.3 Downtown Segment

On- and off-street parking surrounding the potential stations within the Downtown Segment is restricted during weekday hours with time limits and/or payment requirement, therefore there is little to no potential for hide-and-ride activity. Detailed parking supply and occupancies studies were not performed for alternatives in this segment due to the large inventory of parking.

5.3.1.4 South Interbay Segment

The parking inventoried for the South Interbay Segment is shown on Figure 5-4. Table 5-10 shows the on-street parking supply and occupancy inventoried for the South Interbay Segment alternatives.

Table 5-10. Inventoried Station Area On-Street Parking Supply and Occupancy in the South Interbay Segment

Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
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%

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

[b] Midday occupancy data was collected by Heffron Transportation, Inc. in November 2019.

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

- Public Off-Street Parking Lots
- On-Street Parking Study Area

0 800 1,600 Feet

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FIGURE 5-4
Parking
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

5.3.1.5 Interbay/Ballard Segment

Table 5-11 shows the on-street parking supply and occupancy inventoried for the Interbay/Ballard Segment alternatives. The parking study area for the Interbay/Ballard Segment is shown on Figure 5-5.

The area has three public parking lots that serve users of the Interbay Athletic Complex. Depending on the station location, there are between 82 and 152 off-street public parking spaces within each study area. The southern lot in the station area for Option IBB-1b and Alternative IBB-3 is unrestricted, and the remaining off-street parking lots have restrictions such as time limits or payment requirements. The midday parking occupancy of these lots was 33 percent in December 2019.

5.3.2 Environmental Impacts

For the Ballard Link Extension alternatives, Sound Transit considered potential long-term parking impacts by examining the potential for hide-and-ride parking near light rail stations and removal of parking near the stations or along the alignment, both permanently and temporarily during project construction.

5.3.2.1 No Build Alternative

The No Build Alternative would not remove on-street or off-street parking or change parking characteristics in the Ballard Link Extension study area.

5.3.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All 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, which could adversely affect local businesses and residents who rely on that parking for other purposes. Consistent with all existing light rail stations in Seattle, it is expected that the Seattle Department of Transportation 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.

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 assumes 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 by segment below.

Table 5-11. Inventoried Station Area On-Street Parking Supply and Occupancy in the Interbay/Ballard Segment

Alternative	Unrestricted Spaces	Restricted Spaces [a]	Total Spaces	Percent Occupied [b]
Preferred Elevated 14th Avenue (IBB-1a)	366, Interbay Station 720, Ballard Station	67, Interbay Station 77, Ballard Station	433, Interbay Station 797, Ballard Station	94%, Interbay Station 85%, Ballard Station
Elevated 14th Avenue Alignment Option (from Prospect Street Station/15th Avenue) (IBB-1b)	375, Interbay Station 720, Ballard Station	49, Interbay Station 77, Ballard Station	424, Interbay Station 797, Ballard Station	72%, Interbay Station 85%, Ballard Station
Preferred Tunnel 14th Avenue (IBB-2a)*	257, Interbay Station 720, Ballard Station	66, Interbay Station 77, Ballard Station	323, Interbay Station 797, Ballard Station	103%, Interbay Station [c] 85%, Ballard Station
Preferred Tunnel 15th Avenue Station Option (IBB-2b)*	257, Interbay Station 510, Ballard Station	66, Interbay Station 205, Ballard Station	323, Interbay Station 715, Ballard Station	103%, Interbay Station [c] 100%, Ballard Station
Elevated 15th Avenue (IBB-3)	375, Interbay Station 510, Ballard Station	49, Interbay Station 205, Ballard Station	424, Interbay Station 715, Ballard Station	72%, Interbay Station 100%, Ballard Station

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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] Midday occupancy data was collected by Heffron Transportation, Inc. in November 2019.

[c] Parking utilization rates in excess of 100% can occur when vehicles encroach into areas where parking is not allowed (e.g., parking 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.

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

- Public Off-Street Parking Lots
- On-Street Parking Study Area

FIGURE 5-5
Parking
Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

SODO Segment

Table 5-12 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the Ballard Link Extension SODO Segment alternatives. Parking effects in SODO are not identical for the West Seattle Link and Ballard Link extensions, as the alignments of the two projects differ in location and design.

Table 5-12. Displaced (Permanent and Temporary) Parking in the SODO Segment, Ballard Link Extension

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

<u>Preferred Alternative (SODO-1a)</u>

With Preferred Alternative SODO-1a, construction of the overpass on South Holgate Street could permanently remove up to five parking spaces along that street.

<u>Other Build Alternative and Option (SODO-1b and SODO-2)</u>

Option SODO-1b and Alternative SODO-2 would remove the same amount of on-street parking spaces as Preferred Alternative SODO-1a.

Chinatown-International District Segment

Table 5-13 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the Chinatown-International District Segment alternatives. Off-street parking impacts are also noted in the table. As detailed in the following paragraphs, many of the parking removals occur south of South Dearborn Street.

Table 5-13. Displaced (Permanent and Temporary) Parking in the Chinatown-International District Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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]	40 to 50

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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 public off-street stalls from the parking garage under Union Station near 4th Avenue South.

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

[c] The diagonal station configuration for Alternative CID-2a would remove 20 to 30 on-street parking stalls during construction. Both Alternative CID-2a and the diagonal station configuration for Alternative CID-2a would have similar loss of off-street parking.

Alternative CID-1a* would convert 10 to 20 on-street parking spaces to station passenger or bus loading zones on 5th Avenue South. Option CID-1b* would convert 10 to 20 on-street parking spaces to station passenger or bus loading zones on 5th Avenue South and remove an additional 35 to 40 on-street parking spaces along South Massachusetts Street between the SODO Busway and 6th Avenue South. These alternatives would also remove about 200 stalls from the 1,086-stall Union Station Garage near 4th Avenue South.

Alternative CID-2a and Option CID-2b would convert 15 to 20 on-street parking spaces to station passenger or bus loading zones on 5th Avenue South and South King Street and remove an additional 35 to 45 on-street parking spaces along South Massachusetts Street between the SODO Busway and 6th Avenue South. These alternatives would also remove 80 public off-street stalls from the surface lot at 515 South King Street.

Downtown Segment

Table 5-14 shows the number of on-street parking spaces that would be permanently or permanently displaced by the Downtown Segment alternatives. Off-street parking impacts are also noted in the table.

Table 5-14. Displaced (Permanent and Temporary) Parking in the Downtown Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
Preferred 5th Avenue/Harrison Street (DT-1)	70 to 90 [a]	185 to 235 [c]
6th Avenue/Mercer Street (DT-2)	45 to 60 [b]	130 to 165 [d]

[a] 218 off-street public parking spaces also would be permanently removed.

[b] 183 off-street public parking spaces also would be permanently removed.

[c] Preferred Alternative DT-1 would temporarily remove the surface lot under Interstate 5 (283 spaces) during construction. Construction activities on Cherry Street could block egress from the Columbia Tower parking garage, which has approximately 680 parking spaces.

[d] The surface lot under Interstate 5 (283 spaces) also would be temporarily removed during construction.

Preferred Alternative (DT-1)

Preferred Alternative DT-1 would have 70 to 90 on-street parking spaces converted to station passenger or bus loading zones in the vicinity of the stations (up to 10 spaces on Columbia Street near the Midtown Station, 10 spaces on Pike Street and Pine Street near the Westlake Station, 15 spaces on 8th Avenue and 9th Avenue near the Denny Station, 20 spaces on Harrison Street near the South Lake Union Station, and 35 spaces on Republican Street near the Seattle Center Station). It would remove 218 off-street public parking spaces (75 spaces in the Westlake Center garage, 103 spaces in the United Parking lot at 312 Cherry Street, and 40 spaces in the United Parking lot at 4th Avenue and Columbia Street).

Other Build Alternative (DT-2)

Alternative DT-2 would have 45 to 60 on-street parking spaces converted to station passenger or bus loading zones in the vicinities of the five Downtown Segment stations (no spaces near the Midtown Station; up to 10 spaces on 6th Avenue near the Westlake Station; 20 spaces on Terry Avenue near the Denny Station; 30 spaces on Taylor Avenue North, Roy Street, and 6th Avenue near the South Lake Union Station; and 45 spaces on Mercer Street, 1st Avenue North, and Warren Avenue North near the Seattle Center Station) and cumulative removal of 183 off-street parking spaces (111 spaces in three Impark lots along 6th Avenue and Stewart Street, 53 spaces in two Diamond lots on Roy Street and 6th Avenue North, and 19 spaces in two lots near the Seattle Center Station).

South Interbay Segment

Table 5-15 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the South Interbay Segment alternatives.

Table 5-15. Displaced (Permanent and Temporary) Parking in the South Interbay Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 would have 15 to 25 on-street parking spaces on Elliott Avenue West converted to station passenger or bus loading zones at the station. No public off-street parking would be removed with this alternative.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 is not expected to remove any on-street parking. Alternative SIB-3 would convert 0 to 5 spaces on Elliott Avenue West to station passenger or bus load zones.

Interbay/Ballard Segment

Table 5-16 shows the number of on-street parking spaces that would be permanently or temporarily displaced by the Interbay/Ballard Segment alternatives.

Table 5-16. Displaced (Permanent and Temporary) Parking in the Interbay/Ballard Segment

Alternative	On-Street Parking Permanently Removed (Spaces)	Additional On-Street Parking Temporarily Removed during Construction (Spaces)
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

* As described in the introduction to Chapter 2, Alternatives Considered, of the Environmental Impact Statement, 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.

Preferred Alternative (IBB-1a)

Preferred Alternative IBB-1a would have 75 to 95 on-street parking spaces converted to station passenger or bus loading zones on 14th Avenue Northwest near the two stations. No public off-street parking would be removed with this alternative.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Preferred Alternative IBB-2a* would have 75 to 100 on-street parking spaces converted to station passenger or bus loading zone (up to 50 spaces on 16th Avenue West and 17th Avenue West, and up to 50 spaces on 14th Avenue Northwest, Northwest Market Street, and Northwest 56th Street). Preferred Option IBB-2b* would have 35 to 50 spaces converted to passenger or bus loading zones on 17th Avenue West.

Other Build Alternative and Option (IBB-1b and IBB-3)

Up to 5 on-street spaces on 16th Avenue West would be converted to station passenger or bus loading zones for Option IBB-1b and Alternative IBB-3.

Construction Impacts

This analysis identified potential temporary parking impacts during construction for each alternative as well as the potential for construction workers to park near the construction areas. The temporary parking impacts are in addition to permanent parking losses described in the Long-term Impacts section above or parking lost through property acquisition. Tables 5-12 through 5-16 present the potential temporary removal of parking during construction. 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 by segment in this section. Parking would be restored after construction is complete. For information on key roadway construction closures, including extents and durations, see Section 4.3.2.3.

Impacts Common to All Alternatives

It is expected that construction employee vehicles would be limited only to the number that can park within the construction staging area. Construction employees that could not park directly within the construction areas could use paid parking lots and garages or park on local streets and arterials where parking is unrestricted. This is expected to encourage a higher use of alternative transportation modes by construction employees, including the use of transit and carpooling. Construction worker parking near designated construction staging areas could affect the nearby parking supply during heavy construction periods.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a is expected to have only minor temporary parking impacts during construction.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b and Alternative SODO-2 are expected to have only minor temporary parking impacts during construction.

Chinatown-International District Segment

4th Avenue Shallow Alternative and 4th Avenue Deep Station Option (CID-1a* and CID-1b*)

Alternative CID-1a* and Option CID-1b* are not expected to impact parking during construction.

5th Avenue Shallow Alternative and 5th Avenue Deep Station Option (CID-2a and CID-2b)

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 20 to 30 on-street parking spaces on 5th Avenue South, 6th Avenue South, and South King Street would be temporarily removed.

Downtown Segment

Preferred Alternative (DT-1)

Preferred Alternative DT-1 could temporarily remove up 185 to 235 on-street parking spaces on 4th Avenue, 5th Avenue, 7th Avenue, 8th Avenue, Blanchard Street, Pine Street, Columbia Street, Harrison Street, Pike Street, Republican Street, and Westlake Avenue, Cherry Street (if connecting to Alternative CID-2a), and Madison Street and Marion Street (if connecting to any other Chinatown-International District alternative) during construction. This alternative would remove the 283-space surface parking lot under Interstate 5 and use it for construction staging. This alternative 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.

Other Build Alternative (DT-2)

Alternative DT-2 could remove 130 to 165 on-street parking spaces during construction on 5th Avenue, 6th Avenue, 6th Avenue North, Mercer Street, Pine Street, Taylor Avenue, Terry Avenue, West Mercer Street, and Warren Avenue North In addition, this alternative would remove the 283-space surface parking lot under Interstate 5 and use it for construction staging.

South Interbay Segment

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 could temporarily remove 200 to 250 on-street parking spaces on West Republican Street and Elliott Avenue West during construction.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 could remove 215 to 265 on-street spaces on West Republican Street, Elliott Avenue West, and 15th Avenue West during project construction. Alternative SIB-3 could temporarily remove 45 to 60 on-street parking spaces on West Howe Street, West Newton Street, and Elliott Avenue West during construction. Neither of these alternatives would affect off-street parking spaces during construction.

Interbay/Ballard Segment

Preferred Alternative (IBB-1a)

Preferred Alternative IBB-1a could remove 380 to 470 on-street parking spaces on 14th Avenue West, West Emerson Street, 16th Avenue West, Thorndyke Avenue West, and 14th Avenue Northwest during construction. No public off-street parking would be affected by project construction.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Preferred Alternative IBB-2a* could remove 255 to 315 on-street spaces on 16th Avenue West, 17th Avenue West, and Thorndyke Avenue West during construction.

Preferred Option IBB-2b* could remove 160 to 200 on-street spaces on Northwest 51st Street, Northwest 52nd Street, Northwest 53rd Street, Northwest 54th Street, 16th Avenue West, 17th Avenue West, and Thorndyke Avenue West during construction. Neither of these alternatives would affect off-street parking spaces during construction.

Other Build Alternative and Option (IBB-1b and IBB-3)

Option IBB-1b could remove 290 to 360 on-street spaces on 14th Avenue Northwest, 15th Avenue West, West Emerson Street, and 14th Avenue West during construction.

Alternative IBB-3 would have the lowest level of on-street impact during project construction, with 75 to 100 on-street parking spaces temporarily removed on Northwest 50th Street, Northwest 51st Street, Northwest 49th Street, Shilshole Avenue Northwest, West Bertona Street, 15th Avenue West, Northwest Ballard Way, Northwest 46th Street, and Northwest Leary Way during construction. Neither of these alternatives would affect off-street parking spaces during construction.

5.3.3 Potential Mitigation Measures

5.3.3.1 Long-Term 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.

5.3.3.2 Construction Impacts

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 (i.e., 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.

6 NON-MOTORIZED FACILITIES

This chapter describes existing pedestrian facilities and sidewalks, bicycle facilities, and multi-use trails. It describes project changes to pedestrian and bicycle facilities and circulation, including an analysis of pedestrian level of service (L.O.S.) at sidewalks, crosswalks, and intersection corners within one block of each station entrance. Walksheds and bikesheds were used to show the areas around each station that are accessible to pedestrians and bicyclists. Project impacts to pedestrian and bicycle facilities during construction such as closures and detours are described, along with potential mitigation measures.

> 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.

6.1 West Seattle and Ballard Link Extensions

- All alternatives could temporarily affect non-motorized facilities and Americans with Disabilities Act accessibility during construction. Sound Transit would work with the City of Seattle and other partner agencies to develop and implement a construction management plan to provide alternate facilities to the extent possible.

6.1.1 West Seattle Link Extension

- Some street connections would be permanently closed, requiring pedestrians and/or bicyclists to use other streets under Preferred Alternative DEL-2a*, Option DEL-2b*, Alternative WSJ-4*, and Alternative WSJ-5*.
- There are no long-term impacts to *Pedestrian Master Plan* (City of Seattle 2017a) projects, sidewalks, school access, or safety because any affected facilities would be rebuilt to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020]) or to a standard agreed to by Sound Transit and the City of Seattle.
- No *Seattle Bicycle Master Plan* (City of Seattle 2014) projects would be affected by the Build Alternatives.
- All sidewalks, crosswalks, and corners are expected to have sufficient capacity to serve demand.
- Construction activity within the transportation roadway system would result in closed or modified non-motorized facilities for various durations throughout the project. These would include regional facilities such as the SODO Trail, the West Seattle Bridge Trail, and the Alki Trail. Americans with Disabilities Act-compliant access or detours would be maintained.

6.1.2 Ballard Link Extension

- There would be no long-term impacts to *Pedestrian Master Plan* (City of Seattle 2017a) projects, sidewalks, school access, or safety because any affected facilities would be rebuilt to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020]) or to a standard agreed to by Sound Transit and the City of Seattle.

- One *Seattle Bicycle Master Plan* (City of Seattle 2014) project could be affected under Alternative CID-1a* and Option CID-1b*. Several *Seattle Bicycle Master Plan* (City of Seattle 2014) projects could be affected under Preferred Alternative SIB-1, Alternative SIB-3, Preferred Alternative IBB-1a, and Option IBB-1b.
- In the Chinatown-International District Segment, each alternative would have one to three sidewalks, crossings, or corners operating at L.O.S. F. In the Downtown Segment, both Preferred Alternative DT-1 and Alternative DT-2 would have one crossing operate at L.O.S. F. All other sidewalks, crosswalks, and corners in the other segments are expected to have sufficient capacity to serve demand.
- Construction activity within the transportation roadway system would result in closed or modified non-motorized facilities for various durations throughout the project. These would include regional facilities such as the SODO Trail and the Ship Canal Trail. Within the Chinatown-International District Segment, the alternatives along 4th Avenue South (Alternative CID-1a* and Option CID-1b*) would likely close the Weller Street pedestrian bridge. Americans with Disabilities Act-compliant access or detours would be maintained.

6.2 Introduction to Non-motorized Facilities

This section describes the existing and planned pedestrian and bicycle conditions and facilities within the project corridor, especially near stations. This includes facilities such as sidewalks, stairways, multi-use paths, bicycle lanes, cycle tracks, signed bike routes, and greenways. Walksheds and bikesheds were used to show the areas around each station that are accessible to pedestrians and bicyclists. The sheds are defined as the distance a person can walk or bicycle in 10 minutes around each station. This translates to roughly a 0.5-mile walk distance and a 1.5-mile bicycle distance to or from a station by streets and trails. The bikeshed methodology assumes an average speed consistent with traditional bicycles; riders using electric-assist bicycles could travel longer distances within 10 minutes. Signalized crossing delay at intersections and topography were factored into the analysis because they affect travel times and travel choices.

Pedestrian L.O.S. at sidewalks, crosswalks, and intersection corners within one block of each station entrance was evaluated using methods consistent with the *Highway Capacity Manual 2010* (Transportation Research Board 2010). The methodology considers the number of pedestrians using the facility, the width or area of the facility, and signal timings at signalized intersections. The study facilities include a combination of existing infrastructure and new improvements that would be made as part of station construction. Forecasted pedestrian volumes account for background growth in pedestrian activity as well as the mode of access expected to be used by light rail riders. Because the p.m. peak hour was found to have higher pedestrian volumes than the a.m. peak hour, the Environmental Impact Statement includes analysis of p.m. peak hour pedestrian L.O.S. This analysis identifies sidewalk and crosswalk facilities performing at L.O.S. F and intersection corners with less than 4 square feet of waiting space per person. Because the 2042 ridership forecasts are higher than the 2032 ridership forecasts, 2042 is used for analysis to provide a more conservative assessment of potential impacts. More details can be found in Attachment N.1A, Transportation Technical Analysis Methodology Report.

6.3 West Seattle Link Extension

6.3.1 Affected Environment

This section describes the existing non-motorized facilities within the West Seattle Link Extension study area.

6.3.1.1 Sidewalks and Crosswalks

Existing sidewalks, trails, marked crosswalks, and curb ramps were inventoried in all areas covered by the 10-minute walksheds and bikesheds. Sidewalks on both sides of the roadway are prevalent near most of the new stations throughout the study area, as shown on Figure 6-1 through Figure 6-4. Marked crosswalks are generally provided at intersections on arterial and collector streets.

SODO Segment

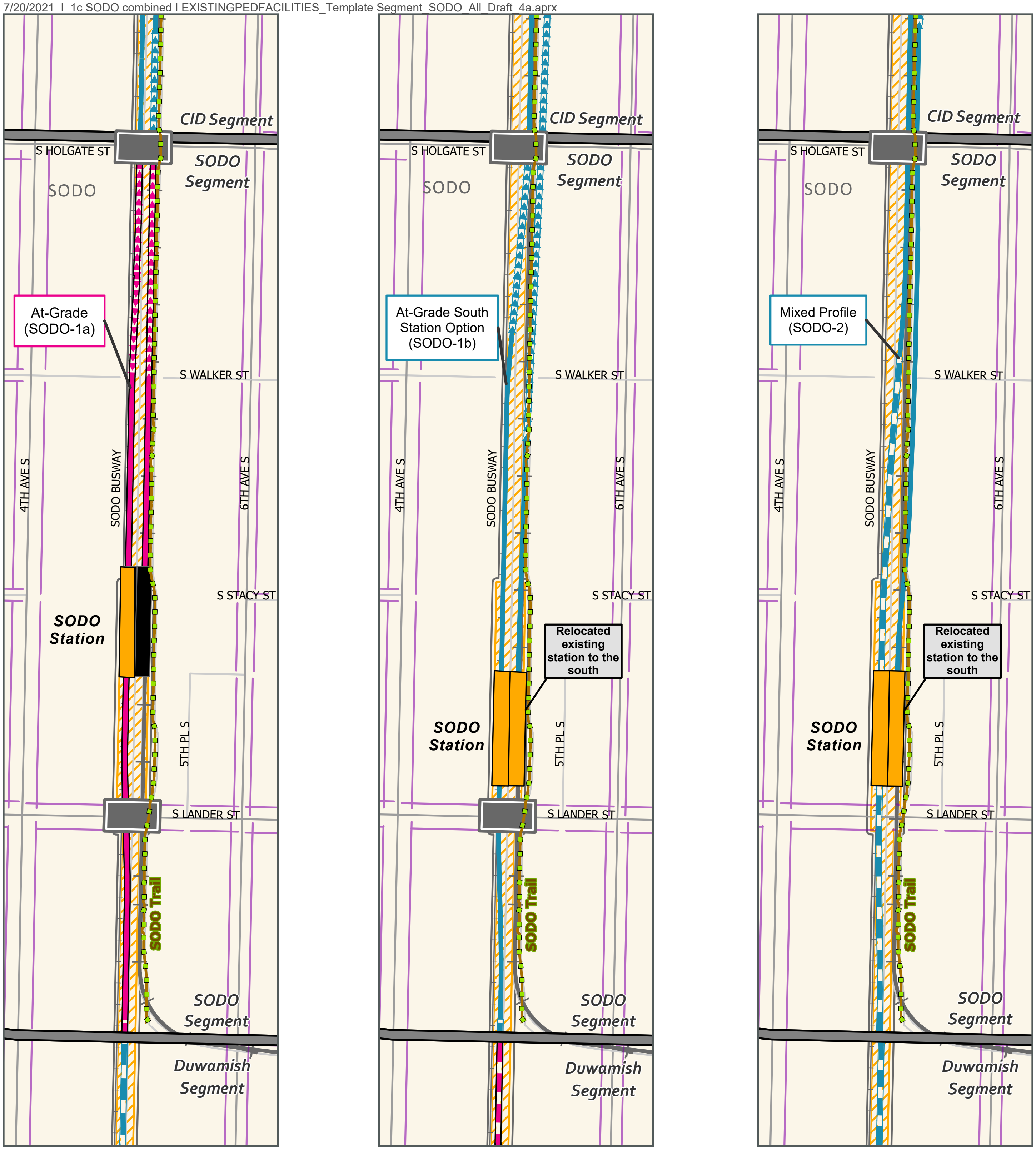
The SODO Segment is characterized by industrial and commercial land use patterns. There are generally sidewalks and curb ramps on both sides of the roadway near the new SODO Station, but there are gaps in coverage. For example, South Stacy Street has sidewalk gaps east of 6th Avenue South. Many streets in the area have impediments or conditions not conducive to walking. Impediments 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 prevalence of heavy trucks. The pedestrian facilities on 6th Avenue South near South Lander Street have many of these challenging characteristics. Marked crosswalks exist at most key intersections on arterial and collector streets, but due to long block lengths, they can be more than 0.25 mile apart.

Duwamish Segment

The Duwamish Segment is also characterized by industrial and commercial land use patterns east of the Duwamish Waterway and by residential, industrial, and commercial uses west of the Duwamish Waterway. The major arterials generally have sidewalks on both sides, but there are gaps in coverage, particularly east of the waterway. For instance, there are sidewalk gaps on 6th Avenue South, south of South Forest Street, and along South Horton Street. Many streets in the area have impediments or conditions not conducive to walking. Impediments include parked cars partially or fully blocking the sidewalk, lack of a curb separating the sidewalk from the roadway, long block lengths that limit connectivity and increase walking distances, and prevalence of heavy trucks.

Delridge and West Seattle Junction Segments

The Delridge and West Seattle Junction segments are predominantly residential or commercial in character with sidewalks generally on both sides of the roadway near the new Delridge, Avalon, and Alaska Junction stations, with a few short gaps in coverage and curb ramps missing in several locations. Gaps include nearby residential streets such as Southwest Andover Street, 28th Avenue Southwest, and 30th Avenue Southwest, which provide access to commercial areas on Delridge Way Southwest and bus stops on Southwest Genesee Street and Southwest Avalon Way, as well as within industrial areas north of the West Seattle Bridge. Marked crosswalks exist at most intersections on arterial and collector streets but are not typically found on residential streets, because they are not typically merited on this roadway type.



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
- Trail
- Sidewalks

FIGURE 6-1
Existing Pedestrian Facilities
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet
N

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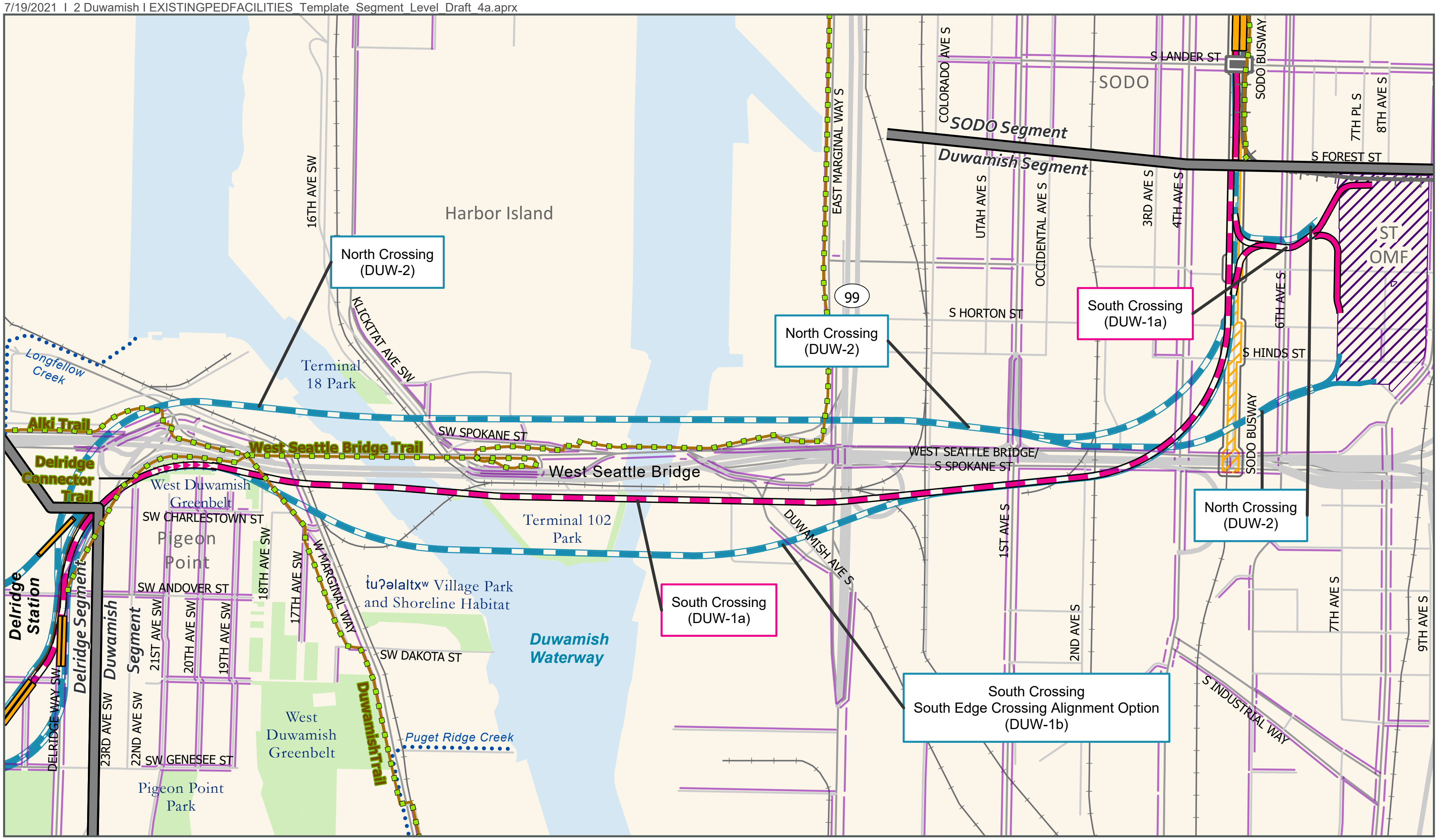

Source: City of Seattle, King County (2019, 2020, 2021).

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
- Trail
- Sidewalks

FIGURE 6-2
Existing Pedestrian Facilities
West Seattle Link Extension - Duwamish Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet N

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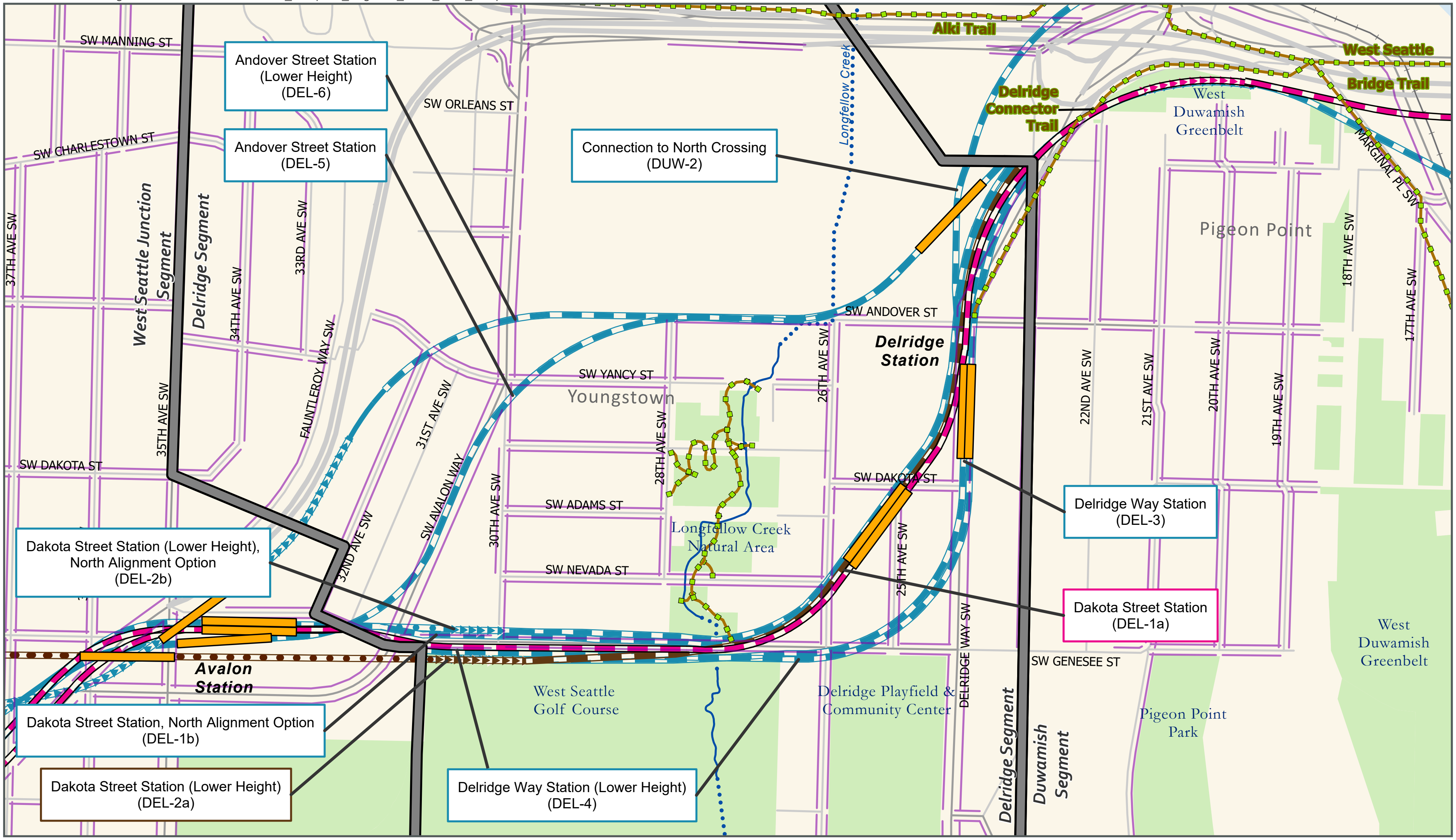


Source: City of Seattle, King County (2019, 2020, 2021).

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

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

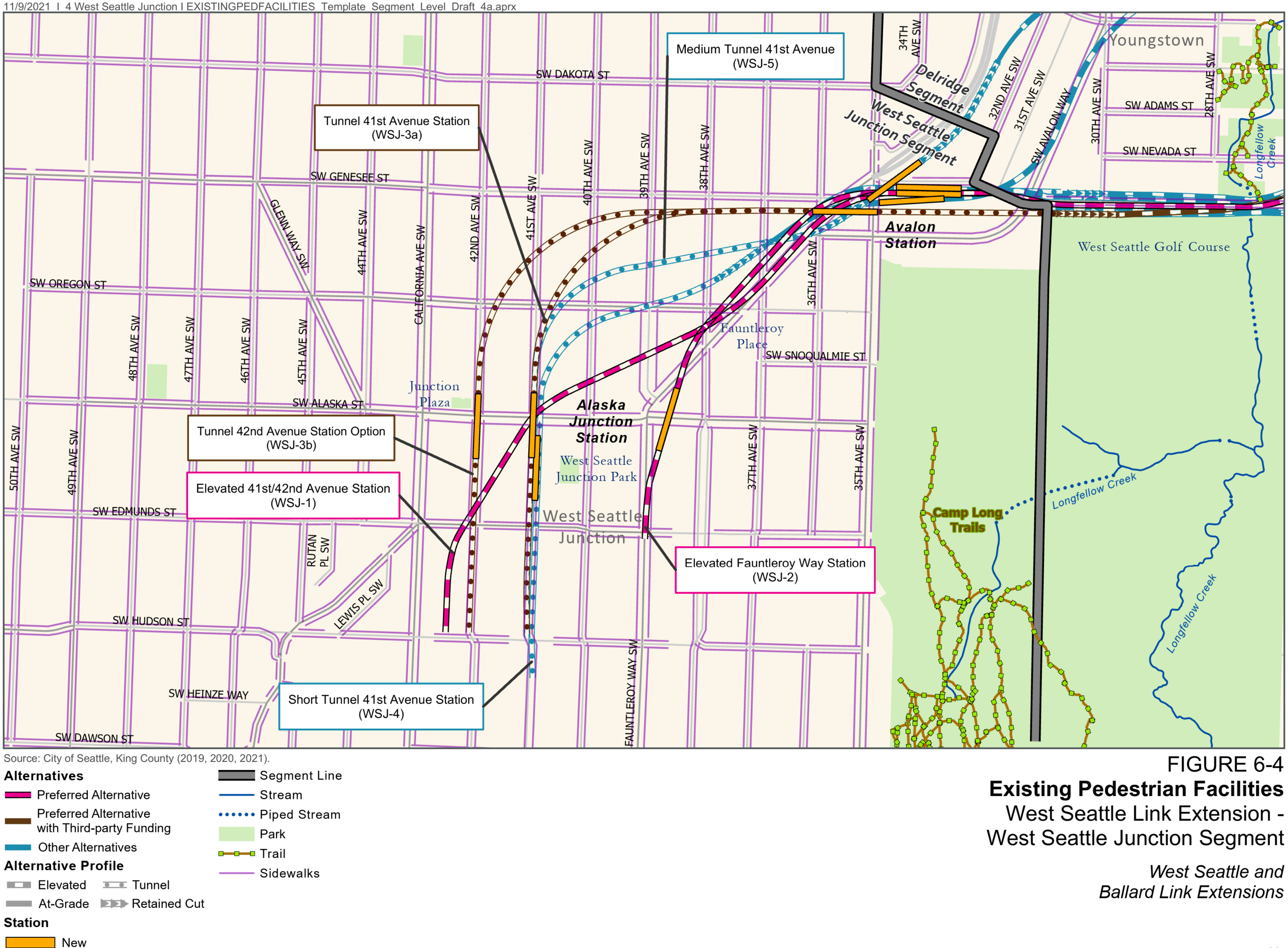
Station
- New

- Segment Line
- Railroad
- Stream
- Piped Stream
- Park
- Trail
- Sidewalks

FIGURE 6-3
Existing Pedestrian Facilities
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).

FIGURE 6-4
Existing Pedestrian Facilities
West Seattle Link Extension - West Seattle Junction Segment

West Seattle and Ballard Link Extensions

6.3.1.2 Bicycle Facilities and Multi-use Trails

Most of the study area lacks designated facilities for cyclists, as shown on Figure 6-5. Bicycle facilities near stations include bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails.

SODO Segment

In the SODO Segment, the SODO Trail runs north-south near SODO Station, between Interstate 90 and South Forest Street with plans to extend the trail south to South Dawson Street. No dedicated bicycle facilities currently connect to the SODO Trail or run east-west through the segment. There are sharrows on 1st Avenue South and South Lander Street, which serve as designated bicycle routes in which bicycles share the travel lane with vehicles.

Duwamish Segment

In the Duwamish Segment, the West Seattle Bridge Trail connects across the Duwamish Waterway along South Spokane Street between East Marginal Way South and Delridge Way Southwest. East of the Duwamish Waterway, East Marginal Way South has bicycle lanes without separation north of the West Seattle Bridge and sharrows on 1st Avenue South. West of the Duwamish Waterway, the Duwamish Trail runs parallel to the waterway as a paved path, with the final 0.5 mile to the West Seattle Bridge routed on the western sidewalk of West Marginal Way (this section is planned to be replaced by a multi-use trail on the east side of West Marginal Way). At the West Seattle Bridge, the Duwamish Trail connects to the Alki Trail, which continues to the north.

The City has plans to improve bicycle facilities along East Marginal Way South through a combination of multi-use trails and sidewalk improvements.

Delridge and West Seattle Junction Segments

Roadways in the Delridge and West Seattle Junction segments have a combination of bicycle lanes with and without separation, neighborhood greenways, and multi-use trails, but the facilities are disjointed. There are no contiguous east-west connections in the immediate vicinity of the new station areas in these segments aside from the West Seattle Bridge Trail. The main north-south spines are 21st Avenue Southwest and 26th Avenue Southwest, which are neighborhood greenways, and Fauntleroy Way Southwest and Delridge Way Southwest, which have bicycle lanes without separation. Southwest Admiral Way and Southwest Alaska Street have bicycle lanes without separation; Southwest Avalon Way has protected bicycle lanes between 35th Avenue Southwest and Southwest Spokane Street.

6.3.2 Environmental Impacts

This section discusses the future non-motorized conditions (year 2042) under the No Build Alternative and the anticipated non-motorized conditions under each Build Alternative. The West Seattle Link Extension station options could affect surrounding non-motorized facilities and the way pedestrians access and circulate within each of the station areas. This section describes future pedestrian and bicycle facilities, walksheds and bikesheds, school walking routes, Americans with Disabilities Act accessibility, non-motorized trip activity at the stations, and sidewalk, crosswalk, and corner operations. 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. The Federal Transit Administration considers pedestrian and bicycle improvements within 0.5 mile and 3 miles of station areas 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 Fund included in the Sound Transit 3 Plan.

6.3.2.1 No Build Alternative

Under the No Build Alternative for the West Seattle Link Extension, non-motorized projects in the *Seattle Bicycle Master Plan* (City of Seattle 2014) and *Pedestrian Master Plan* (City of Seattle 2017a) 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 on Figure 6-5. Figure 6-5 shows existing and planned No Build bike facilities and does not include project improvements. A full list of projects is included in Attachment N.1A. 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.

6.3.2.2 Build Alternatives

Long-term Impacts

The project proposes pedestrian and bicycle improvements at the stations to serve the projected increases in pedestrian and bicycle travel generated by the West Seattle Link Extension. Specific improvements affecting pedestrian circulation, such as new connections or signals, are described by segment. As the design advances, Sound Transit would continue to work with the City of Seattle to determine appropriate pedestrian and bicycle improvements to support station access. Any new facilities would meet Americans with Disabilities Act requirements. New facilities would also meet local and federal design standards for pedestrian and bicycle facilities, as appropriate.

Impacts Common to All Alternatives

Based on the information available when this analysis was being prepared, no projects listed in the *Seattle Bicycle Master Plan* would be impacted by the Build Alternatives. None of the Build Alternatives would result in long-term impacts to *Pedestrian Master Plan* projects, sidewalks, school access, or safety, because any affected facilities would be rebuilt to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020]) 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 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.

Figure 6-6 shows existing and future bicycle facilities and bikesheds for the 2042 Build Alternatives.

Topography limits how far a cyclist could travel, so both directions to and from a new station are shown. Due to topography, either the direction of travel to or from a station could be more constrained. The bikeshed displays the theoretical maximum distance a cyclist could travel on the roadway network in a given amount of time, regardless of the specific type of facility provided.

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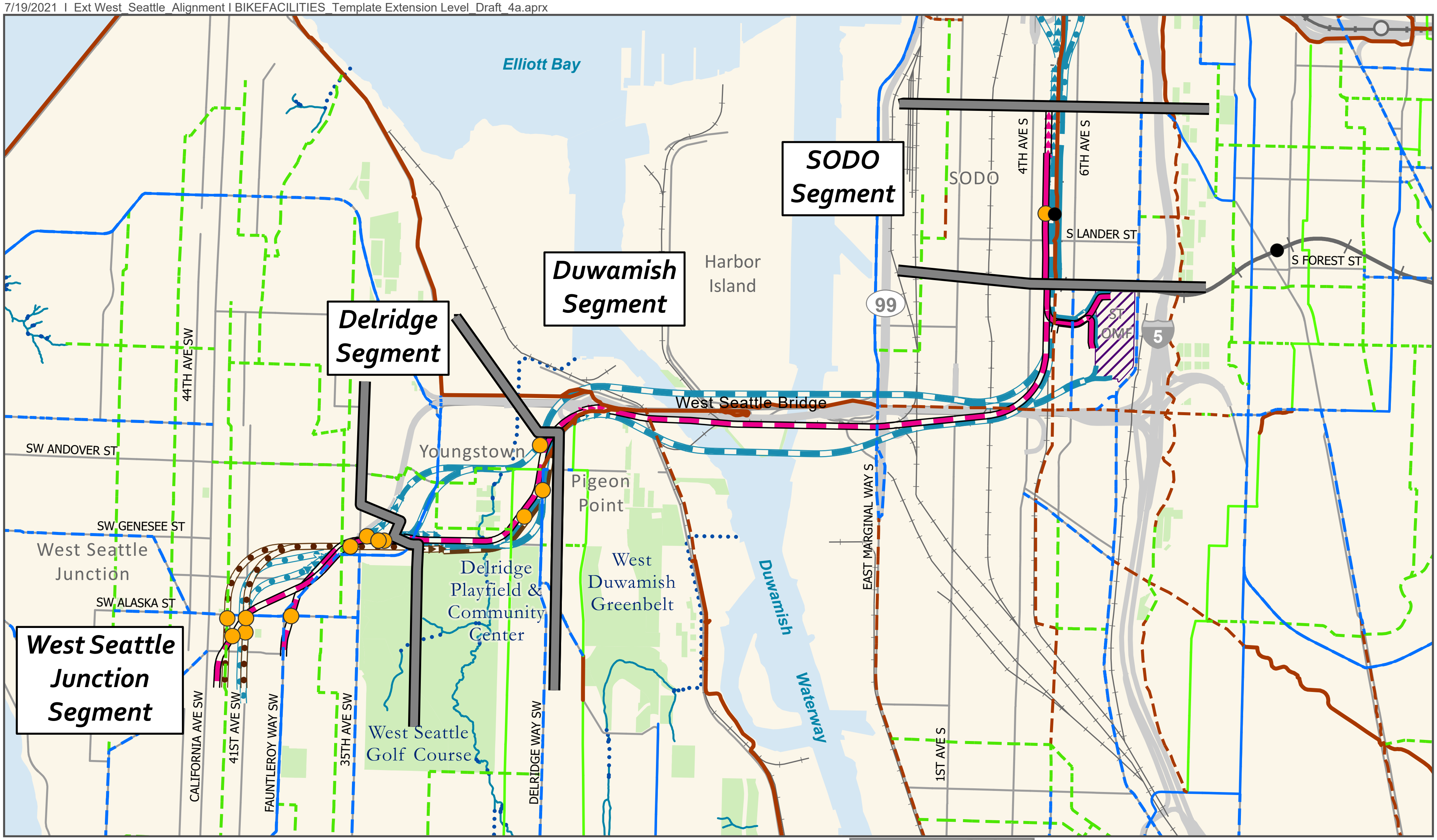


Source: City of Seattle, King County (2019, 2020, 2021).

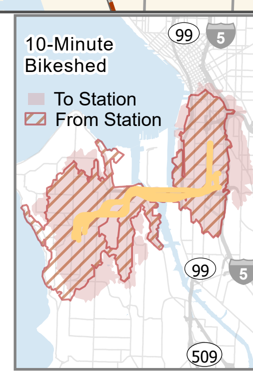
Alternatives
- Preferred Alternative
- Preferred Alternative with Third-party Funding
- Other Alternatives

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

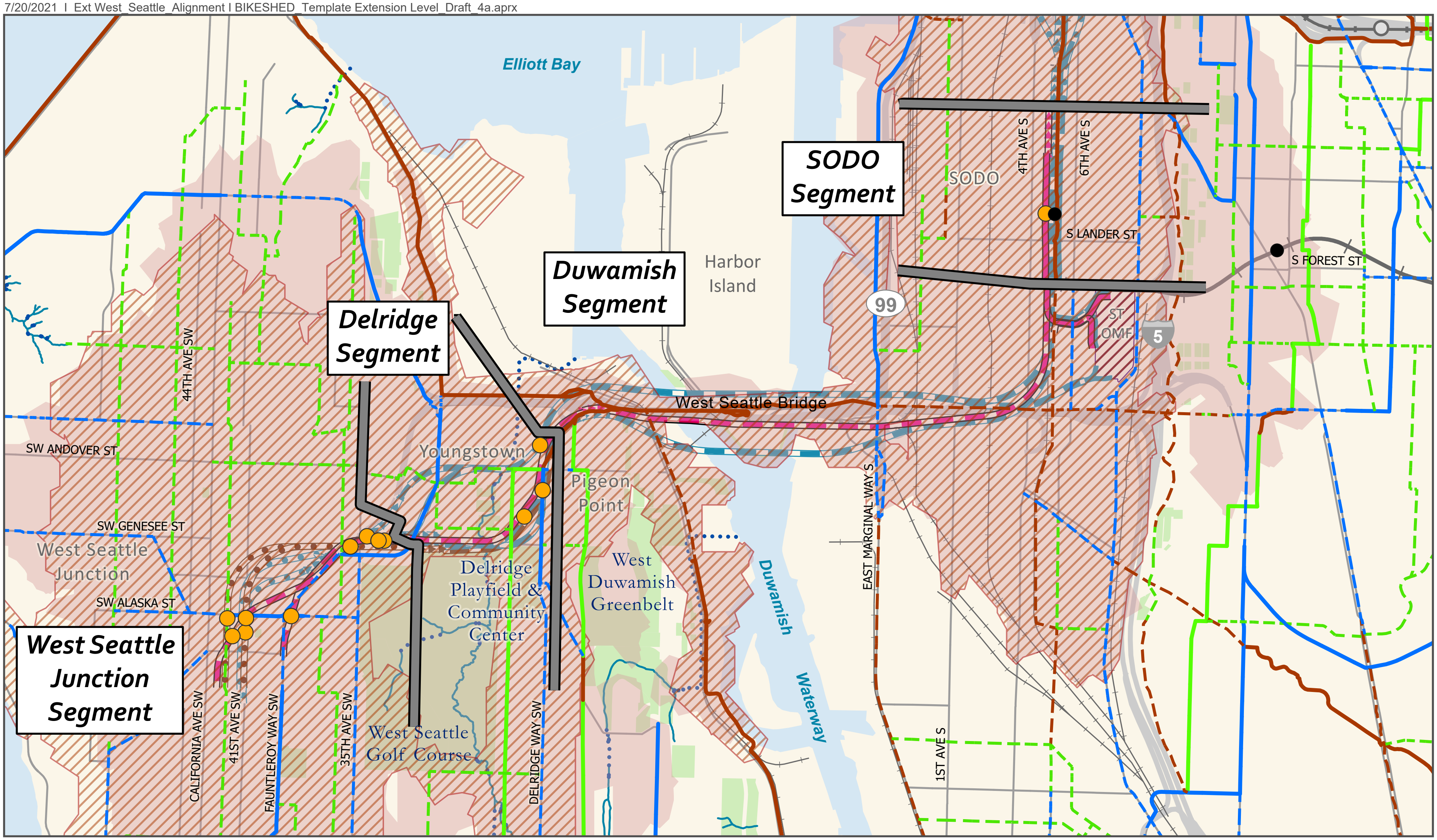


0 0.5 1 Mile

N

FIGURE 6-5
Existing Bike and Planned Bike Facilities
West Seattle Link Extension

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
- 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

10-Minute Bikeshed
- To Station
- From Station

0 0.5 1 Mile

N

FIGURE 6-6
West Seattle Bikeshed
West Seattle Link Extension

West Seattle and Ballard Link Extensions

Most of the Build Alternatives do not include network changes that would affect the existing walksheds and bikesheds; any changes are described under the individual alternatives in the following discussion. Projects included in the *Seattle Bicycle Master Plan* and *Pedestrian Master Plan* are assumed to be in place by 2042, though these do not affect the walksheds and bikesheds; rather, these projects influence how comfortable walking and bicycling within the sheds will be. Any effects to *Pedestrian Master Plan* or *Seattle Bicycle Master Plan* projects are described by segment for applicable alternatives in the following sections. 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. Sound Transit will coordinate with the City of Seattle on sidewalk width standards as the project advances.

SODO Segment

Figure 6-7 shows the walksheds and surrounding pedestrian facilities for the alternatives at the SODO Station. The land uses within the walkshed and bikeshed around the station are generally industrial and commercial. There are sidewalk gaps, limited bicycle facilities, long blocks, and freight vehicles in the station area. Under all alternatives, cyclists could continue to access the station using 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.

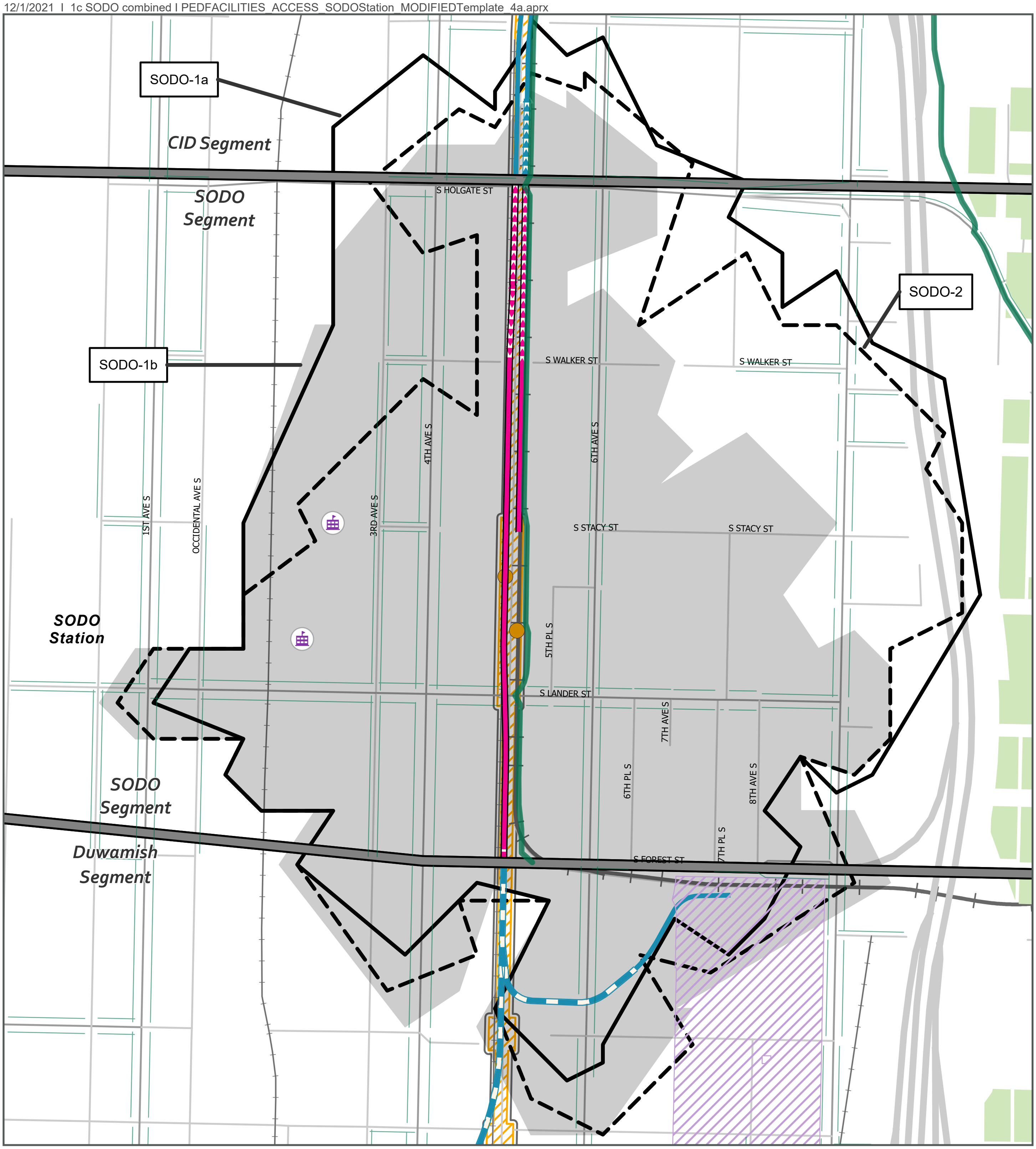
<u>Preferred Alternative (SODO-1a)</u>

Preferred Alternative SODO-1a would create new pedestrian connections to serve station entrances, which increase the pedestrian walksheds for the station compared to the No Build Alternative. Preferred Alternative SODO-1a proposes station access along the South Stacy Street corridor between 4th Avenue South and 6th Avenue South through a combination of new roadway construction along South Stacey Street between 4th Avenue South and the concourse to serve passenger pick-up and drop-off, the concourse across the light rail station, and a roadway loop constructed to serve paratransit loading between the concourse and 6th Avenue South. These connections would provide riders with better non-motorized access to the SODO Station by shortening the distance that riders approaching from north of South Lander Street would have to walk. The new connections provided by this alternative would slightly increase the area reachable by bicycle from the stations, but at this scale the effect would be slight.

Preferred Alternative SODO-1a would include the Lander Street roadway overpass between 4th Avenue South and 6th Avenue South. The new overpass would include a sidewalk or multi-use path that would separate pedestrians and bicyclists from the current at-grade rail crossing. Bus stops, pedestrian, and bicycle access would be provided at-grade.

Most boardings and alightings at the SODO Station during the p.m. peak hour would be light rail to light rail transfers that occur within the station area. In addition to those riders transferring between rail lines, a smaller number of riders would either be transferring from the bus, walking, bicycling, or using pick-up and drop-off to access the SODO Station for all alternatives.

A high volume of pedestrians is expected on 5th Avenue South and the SODO Busway north of South Lander Street; however, this is the location of the station platform, which would have an effective width large enough to accommodate the forecasted pedestrian volumes.



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
- Sidewalks
- Multi-use Trails
- Sound Transit Operations & Maintenance Facility (ST OMF)
- Park
- School

10-Minute Walkshed (from station)
- SODO Station SODO-1a
- SODO Station SODO-1b
- SODO Station SODO-2

FIGURE 6-7
Pedestrian Facilities and Station Pedestrian Access
West Seattle and Ballard Link Extensions - SODO Segment

West Seattle and Ballard Link Extensions

0 300 600 Feet

N

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b would create new pedestrian connections to serve station entrances, which increase the pedestrian walksheds for the stations compared to the No Build Alternative. Option SODO-1b would improve upon the existing non-motorized access with a new roadway loop serving passenger pick-up and drop-off, paratransit loading, and bus layover between 4th Avenue South and the light rail stations. The new connections provided by this alternative would slightly increase the area reachable by bicycle from the stations, but at a 10-minute bikeshed scale, the effect would be slight. Option SODO-1b would also include the Lander Street roadway overpass between 4th Avenue South and 6th Avenue South, as described for Preferred Alternative SODO-1a. Bus stops would be provided on the new overpass, with a midblock crossing and pedestrian signal at the crest of the overpass connecting to the SODO Station so that people transferring to or from the bus would not have to walk or bike along the steep grade of the overpass to reach the station. Pedestrians and bicyclists could also access the station from the at-grade level.

Alternative SODO-2 would provide access to the east station entrance using the existing South Bayview Street, which would not substantially affect the existing walkshed around the station.

The non-motorized trip generation for Option SODO-1b and Alternative SODO-2 would be the same as described for Preferred Alternative SODO-1a.

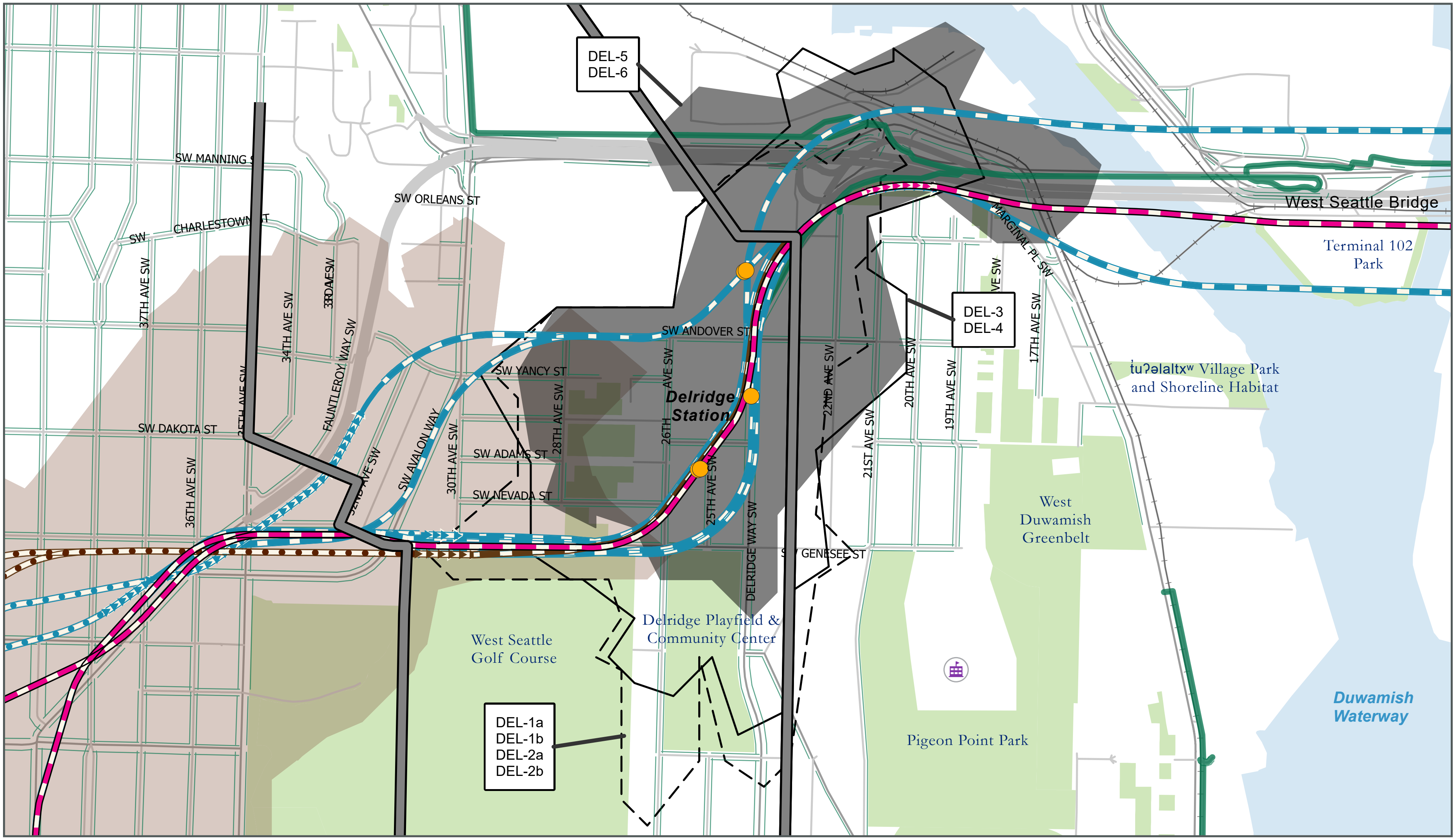
Duwamish Segment

Because the Duwamish Segment does not include any stations, no walksheds, bikesheds, or pedestrian trip generations are associated with this segment. Columns associated with the elevated guideway for the North Crossing Alternative (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.

Delridge Segment

Figure 6-8 shows the walksheds and surrounding pedestrian facilities for the alternatives at the Delridge Station.

The land uses within the walkshed around Delridge Station for Preferred Alternative DEL-1a, Option DEL-1b, Preferred Alternative DEL-2a*, and Option DEL-2b* are generally residential with some commercial uses, whereas the land uses around Alternative DEL-5 and Alternative DEL-6* include more commercial and industrial uses. The land uses around Alternative DEL-3 and Alternative DEL-4* are a mix of those around the Dakota Street alternative and Andover Street alternative station locations, with less residential use than the Dakota Street alternatives and less commercial and industrial use than the Andover Street alternatives. A small area along the 28th Avenue Southwest corridor would fall within the walksheds of both the Avalon and Delridge stations.



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

- Segment Line
- Railroad
- Park
- Sidewalks
- Multi-useTrails
- School

10-Minute Walkshed (from station)
- Delrige Station DEL-1ab, DEL-2ab
- Delrige Station DEL-3, DEL-4
- Delrige Station DEL-5, DEL-6
- Avalon and West Seattle Junction Station Walksheds

FIGURE 6-8
Pedestrian Facilities and Station Pedestrian Access
West Seattle Link Extension - Delridge Segment

West Seattle and Ballard Link Extensions

0 630 1,260 Feet
N

Stations for all the alternatives 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. There are sidewalks on both sides of most roadways near the new stations, with only a few gaps in coverage on nearby residential streets, including Southwest Andover Street, 28th Avenue Southwest, and 30th Avenue Southwest, and near industrial areas north of the West Seattle Bridge. For all alternatives, cyclists could generally access the Delridge Station area using 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 Trail; and protected bicycle lanes on Delridge Way Southwest and Southwest Avalon Way. Alternative DEL-5 and Alternative DEL-6* would add a new pedestrian signal at Delridge Way and 23rd Avenue Southwest to facilitate pedestrians walking between the bus bays and the station entrance.

All alternatives would have elevated guideway with columns that could encroach on existing sidewalks through the Delridge Segment, but Sound Transit would rebuild the affected facilities to the extent possible. These include:

- The vicinity of 26th Avenue Southwest and Southwest Andover Street (Alternative DEL-5 and Alternative DEL-6*).
- 26th Avenue Southwest and Southwest Genesee Street (Preferred Alternative DEL-1a, Preferred Alternative DEL-2a*, Alternative DEL-3, and Alternative DEL-4*).
- Southwest Genesee Street from 26th Avenue Southwest to Longfellow Creek (Preferred Alternative DEL-1a and Option DEL-2b*).

<u>Preferred Alternative (DEL-1a) and Preferred Alternative with Third-Party Funding (DEL-2a*)</u>

Preferred Alternative DEL-1a and Preferred Alternative DEL-2a* have approximately the same number of riders during the p.m. peak hour at the Delridge Station, most of whom are transferring between light rail and buses coming from White Center, Burien, and other communities from the south. The RapidRide H Line is expected to have the highest number of light rail transfers. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity to serve the pedestrian demand.

Under Preferred Alternative DEL-1a and Preferred Alternative DEL-2a*, there would be no entrance at Southwest Dakota Street on the east side of Delridge Way Southwest and no signalized crossing at that location. The nearest signalized crossings are roughly 650 feet to either side of the intersection (at Southwest Andover Street and at Southwest Genesee Street), so some riders may cross Delridge Way Southwest at Southwest Dakota Street without a signal. Sound Transit, Metro, and the City of Seattle are assessing alternative pathways that would enable closer stop placement.

Under Preferred Alternative DEL-2a*, 25th Avenue Southwest would be closed to through traffic below the station, but pedestrian and bicycle access would be maintained.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

Option DEL-2b* would permanently close 30th Avenue Southwest north of Southwest Genesee Street, potentially eliminating pedestrian and bicycle access at that location. Under Option DEL-2b*, 25th Avenue Southwest would also be closed to through traffic below the station, but pedestrian and bicycle access would be maintained.

The non-motorized trip generation for Option DEL-1b, Option DEL-2b*, Alternative DEL-3, Alternative DEL-4*, Alternative DEL-5, and Alternative DEL-6* would be the same as described for Preferred Alternative DEL-1a.

Under Option DEL-1b and Option DEL-2b*, there would be no entrance at Southwest Dakota Street on the east side of Delridge Way Southwest and no signalized crossing at that location. The nearest signalized crossings are roughly 650 feet to either side of the intersection (at Southwest Andover Street and at Southwest Genesee Street), so some riders may cross Delridge Way Southwest at Southwest Dakota Street without a signal. Sound Transit, Metro, and the City of Seattle are assessing alternative pathways that would enable closer stop placement.

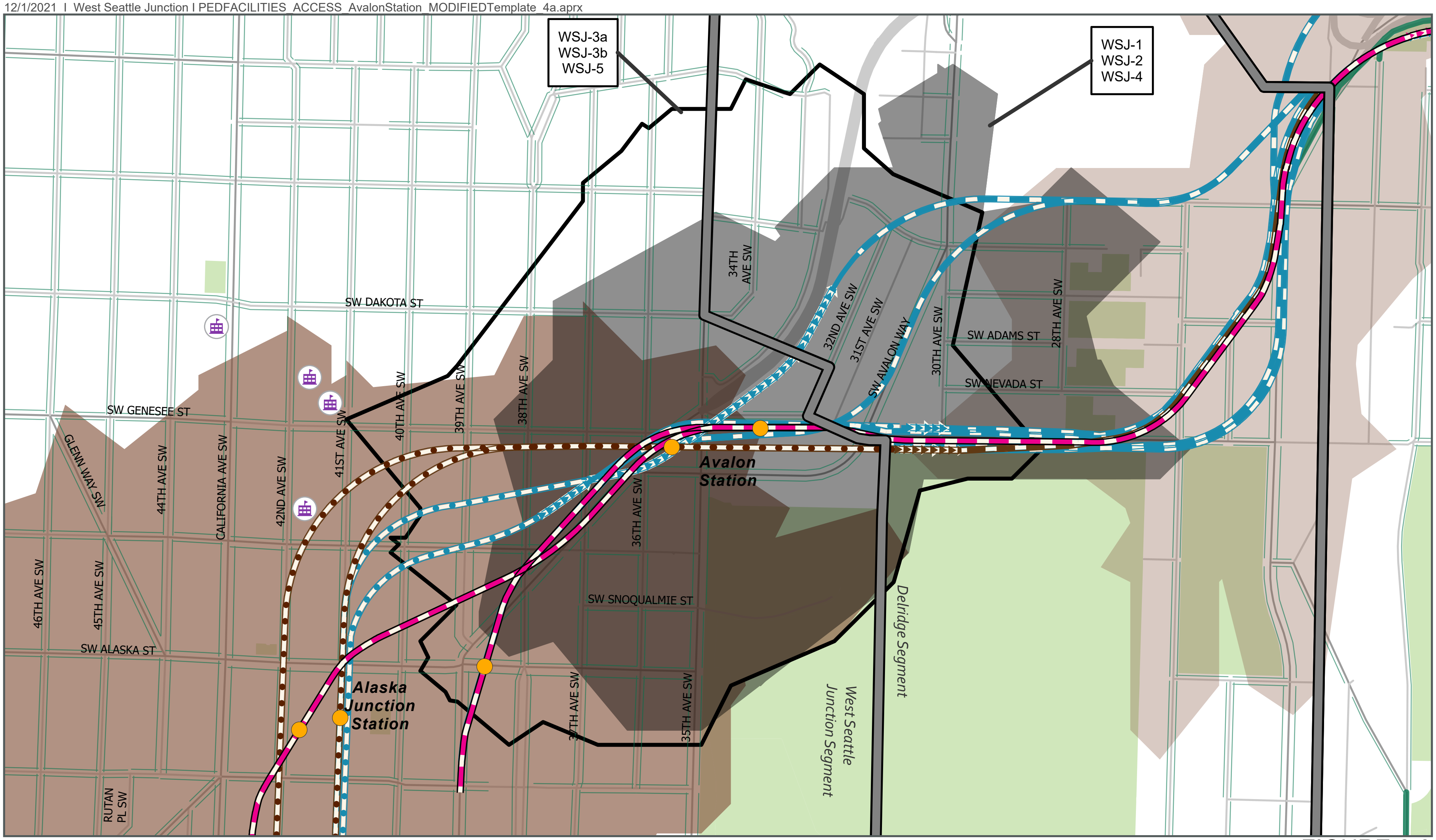
Under the West Seattle and Ballard Link Extensions M.O.S., the Delridge Station would be the southern terminus of the West Seattle Link Extension and would therefore have higher ridership than the full-build project. Over 90 percent of the riders would access the light rail station by bus from Alaska Junction, White Center, Burien, and communities to the south. The RapidRide H Line is expected to have the highest number of bus-to-light rail transfers. The remaining riders would access the station by walking or biking.

All pedestrian crossings and corners within one block of Delridge Station entrances are expected to have sufficient capacity to serve the demand from the M.O.S. Sidewalks are also expected to have sufficient capacity to serve the pedestrian demand, with two exceptions. The sidewalk on 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*. Similarly, 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*. In both of these locations, the L.O.S. F condition is due to the high number of riders transferring between transit stops on Delridge Way Southwest and the station entrances.

West Seattle Junction Segment

Figure 6-9 and Figure 6-10 show the walksheds and surrounding pedestrian facilities for the Build Alternatives at the Avalon and Alaska Junction stations, respectively. The areas falling within the 10-minute walkshed would vary depending on station location. At the Avalon Station, the walksheds for the two preferred alternatives (Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2), as well as Alternative WSJ-4*, are very similar because the stations are close together. The remaining alternatives would have walksheds slightly farther to the west but covering a similarly sized area. The walksheds around Alaska Junction Station vary more as the station locations are up to about 1,200 feet apart. All walksheds except for Preferred Alternative WSJ-2 would include more commercial areas along California Avenue Southwest, whereas the land uses within the walkshed for Preferred Alternative WSJ-2 are more residential. Due to the close proximity of the Avalon and Alaska Junction stations, portions of the walksheds would overlap. As noted in the Delridge Segment discussion, portions of the Avalon Station walksheds could overlap with portions of the Delridge Station walksheds.

12/1/2021 I West Seattle Junction I PEDFACILITIES_ACCESS_AvalonStation_MODIFIEDTemplate_4a.aprx



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

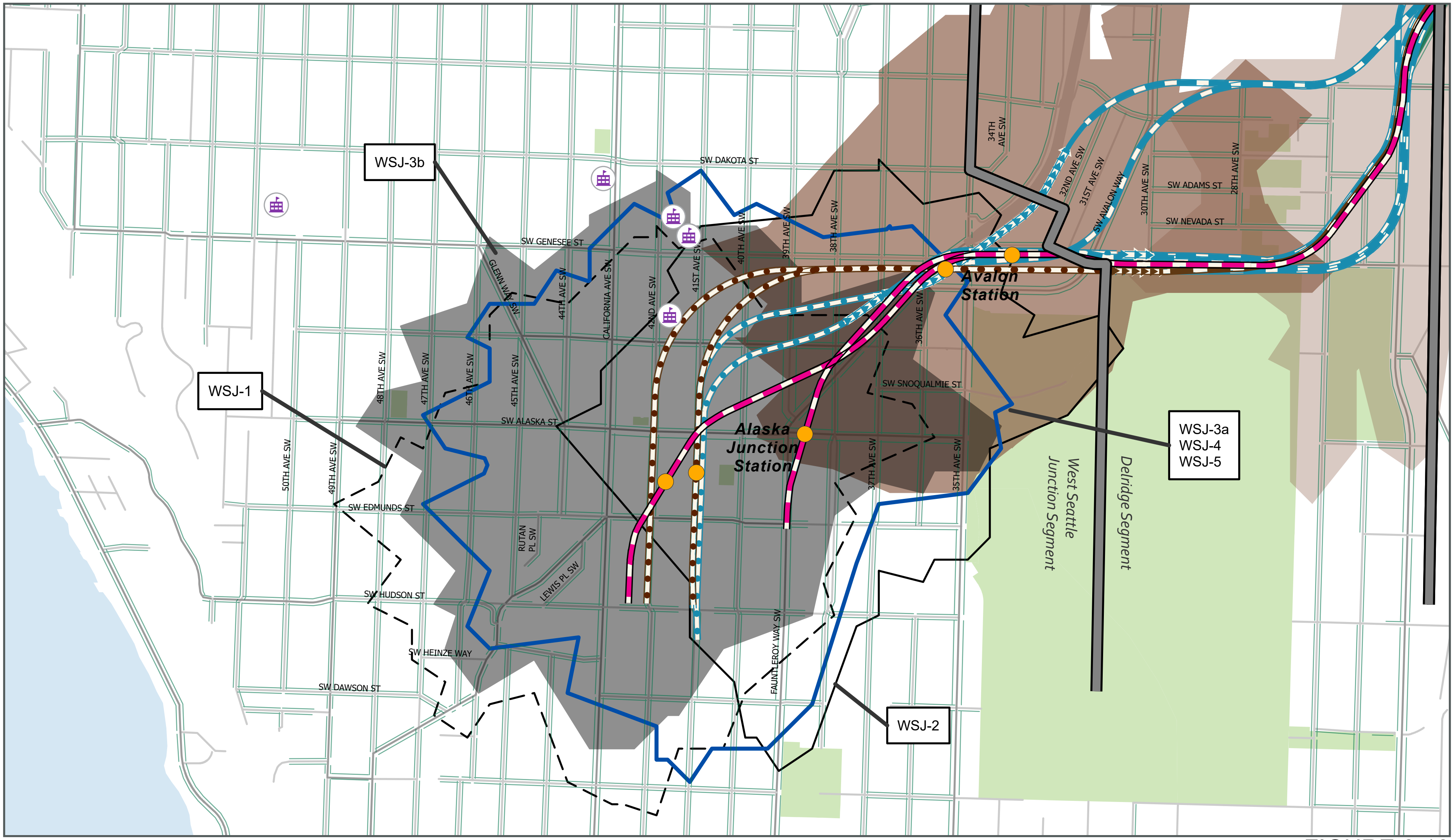
- Segment Line
- Park
- Sidewalks
- Multi-use Trails
- School

10-Minute Walkshed (from station)

- Avalon Station WSJ-1, 2, 4
- Avalon Station WSJ-3a, 3b, 5
- Alaska Junction Station Walksheds
- Delridge Station Walksheds

FIGURE 6-9
Avalon Station Pedestrian Facilities and Station Pedestrian Access
West Seattle Link Extension - West Seattle Junction Segment
West Seattle and Ballard Link Extensions

0 525 1,050 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
- Park
- Sidewalks
- Multi-use Trails
- School

10-Minute Walkshed (from station)
- Alaska Station WSJ-1
- Alaska Station WSJ-2
- Alaska Station WSJ-3b
- Alaska Station WSJ-3a, 4, 5
- Avalon Station Walksheds
- Delridge Station Walksheds

FIGURE 6-10
Alaska Junction Station Pedestrian Facilities and Station Pedestrian Access
West Seattle Link Extension - West Seattle Junction Segment
West Seattle and Ballard Link Extensions

0 710 1,420 Feet
N

There are generally sidewalks on both sides of the roadway near the new stations with minimal gaps in coverage, though there are curb ramps missing in several locations within the walksheds. Topography is a limiting factor for both pedestrian and bicycle mobility. For all alternatives, cyclists could access the Alaska Junction and Avalon stations using the following planned routes:

- Neighborhood greenways:
  - 36th Avenue Southwest.
  - 42nd Avenue Southwest.
  - 45th Avenue Southwest.
  - 48th Avenue Southwest.
  - Southwest Andover Street.
- Bicycle lanes:
  - Glenn Way Southwest.
  - Erskine Way Southwest.
  - Southwest Charlestown Street.
  - Southwest Genesee Street.
- Protected bicycle lanes:
  - 35th Avenue Southwest.
  - Fauntleroy Way Southwest.
  - Southwest Admiral Way.
  - Southwest Alaska Street.
  - Southwest Avalon Way.

There are three schools within the 10-minute walkshed from the new Alaska Junction Station:

- Holy Rosary Elementary, grades Pre-K to 8 (private).
- Hope Lutheran School, grades Pre-K to 8 (private).
- Seattle Lutheran High School, grades 9 to 12 (private).

There are no designated school crossings, crossing guards, or school patrols near the station, and all roadways adjacent to the station have sidewalks.

<u>Preferred Alternatives (WSJ-1 and WSJ-2)</u>

Columns associated with the elevated guideway for Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2 could encroach on sidewalks along the Fauntleroy Way Southwest corridor, but Sound Transit would rebuild the affected facilities to the extent possible.

About half of riders at the Avalon and Alaska Junction stations would be pedestrians or bicyclists. With Alaska Junction Station, the surrounding mixed-use development and built environment would generate the high number of people walking to or from the station.

<u>Preferred Alternative and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*)</u>

The non-motorized trip generation for Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would be the same as described for Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2.

<u>Other Build Alternatives (WSJ-4* and WSJ-5*)</u>

Alternative WSJ-4* would permanently close 37th Avenue Southwest north of Fauntleroy Way and 38th Avenue Southwest at the guideway north of Southwest Oregon Street, 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. Alternative WSJ-5* would permanently close Southwest Genesee Street 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. Pedestrian and bicycles could reroute to Southwest Avalon Way instead.

The non-motorized trip generation for Alternative WSJ-4* and Alternative WSJ-5* would be the same as described for Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2.

Construction Impacts

Impacts Common to All Alternatives

During light rail construction, construction activity within and along roadways (such as elevated guideway construction) would impact non-motorized travel modes; see Chapter 4, Arterial and Local Street Operations, for discussion of specific roadways, including extents and durations of key closures. As part of these roadway closures, the construction activities could close sidewalks or reduce the sidewalk width within the construction areas along the impacted roadways, though Americans with Disabilities Act-compliant access would be maintained or detours would be provided. In some locations, crosswalks may be closed for construction, although they would remain open to the extent feasible.

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 being temporarily removed to accommodate the project construction. There could also be bicycle facility closures and reduced bicycle lane widths within or adjacent to construction areas.

Pedestrians, people with disabilities that require the use of Americans with Disabilities Act-accessible curb ramps, and bicyclists might have to use alternate routes and/or navigate closures. 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. 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. In locations where a dedicated non-motorized facility used by cyclists must be temporarily closed, such as a protected bicycle lane or multi-use path, Sound Transit will work with the City of Seattle to identify and implement an alternate route that achieves, to the extent feasible, a similar level of protection and comfort afforded by the facility to be closed.

The conditions described above could affect areas throughout the alignment for a range of durations. Trails, bicycle lanes, greenways, signed bicycle routes, 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 by alternative in the following sections. For roadway closures that could affect sidewalks only, see Section 4.2.2.3, Construction Impacts.

SODO Segment

For all alternatives, 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.

Duwamish Segment

Preferred Alternative (DUW-1a) and Other Option (DUW-1b)

Under Preferred Alternative DUW-1a and Option DUW-1b, the Delridge Connector Trail from Delridge Way Southwest to the West Seattle Bridge Trail would be rerouted during construction. Rather than run along the east side of Delridge Way Southwest, the trail would be detoured 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.

Other Build Alternative (DUW-2)

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.

Delridge Segment

Preferred Alternative (DEL-1a) and Other Option (DEL-1b)

Under Preferred Alternative DEL-1a and Option DEL-1b, the closure of Southwest Genesee Street would temporarily preclude its use by pedestrians and cyclists in addition to motorized vehicles. Because there are no parallel routes to the south, pedestrians and bicycles would likely reroute to the north. Due to the irregular street grid in that area, there would be some out-of-direction travel required. Traffic diversion from Southwest Genesee Street would likely cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway. Traffic diversion is discussed in more detail in the Delridge Segment section of Section 4.2.2.3, Construction Impacts.

Preferred Alternative with Third-Party Funding (DEL-2a*) and Other Option (DEL-2b*)

No non-motorized effects beyond the general roadway impacts described in the introduction to this section are expected for Preferred Alternative DEL-2a* or Option DEL-2b*.

Other Build Alternatives (DEL-3, DEL-4*, DEL-5, and DEL-6*)

Under Alternative DEL-3 and Alternative DEL-4*, the partial closure of Delridge Way Southwest for multiple years would affect the sidewalk and bicycle lane on one side of the street at a time during construction. Portions of Southwest Genesee Street would be fully closed under Alternative DEL-3 and partially closed under Alternative DEL-4*. Because there are no parallel routes to Southwest Genesee Street to the south, pedestrians and bicycles would reroute to the north. Due to the irregular street grid in that area, there would be some out-of-direction travel required. Traffic diversion from Delridge Way Southwest and Southwest Genesee Street would likely cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway. Traffic diversion is discussed in more detail in the Delridge Segment section of Section 4.2.2.3, Construction Impacts.

Under Alternative DEL-5 and Alternative DEL-6*, construction activities would fully close pedestrian and bicycle access along Southwest Andover Street. The roadway is signed as a bike route by the City of Seattle. Pedestrians and bicycles could use Southwest Genesee Street as an alternate route. Alternative DEL-5 would also fully close a portion of Southwest Avalon Way, including the protected bike lanes along that segment. Pedestrians and bicycles could use 32nd Avenue Southwest as an alternate route. Traffic diversion from Southwest Andover Street and Southwest Avalon Way would cause an increase in vehicle traffic on 26th Avenue Southwest, which is a neighborhood greenway. Traffic diversion is discussed in more detail in the Delridge Segment section of Section 4.2.2.3, Construction Impacts.

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

No non-motorized effects beyond the general roadway impacts described in the introduction to this section are expected under Preferred Alternative WSJ-1.

Under Preferred Alternative WSJ-2, portions of Southwest Alaska Street and 39th Avenue Southwest would be closed, temporarily removing 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 years 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 and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*) and Other Build Alternatives (WSJ-4* and WSJ-5*)

Under Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, and Alternative WSJ-5*, portions of 35th Avenue Southwest would be closed for varying durations. Because there are no parallel routes to the east, pedestrians and bicycles could use 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*, Southwest Hudson Street would be closed to pedestrians and bicycles at 42nd Avenue Southwest.

6.3.3 Potential Mitigation Measures

6.3.3.1 Long-term 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 will 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 an L.O.S. F at the following locations:

- 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*.
- Sidewalk on the west side of Delridge Way Southwest north of Andover Street for Alternative DEL-5 and Alternative DEL-6*.

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 will 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 will 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.

6.3.3.2 Construction Impacts

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 will 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 a minimum they will 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 will 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.

6.4 Ballard Link Extension

6.4.1 Affected Environment

This section describes the existing non-motorized facilities within the Ballard Link Extension study area.

6.4.1.1 Sidewalks and Crosswalks

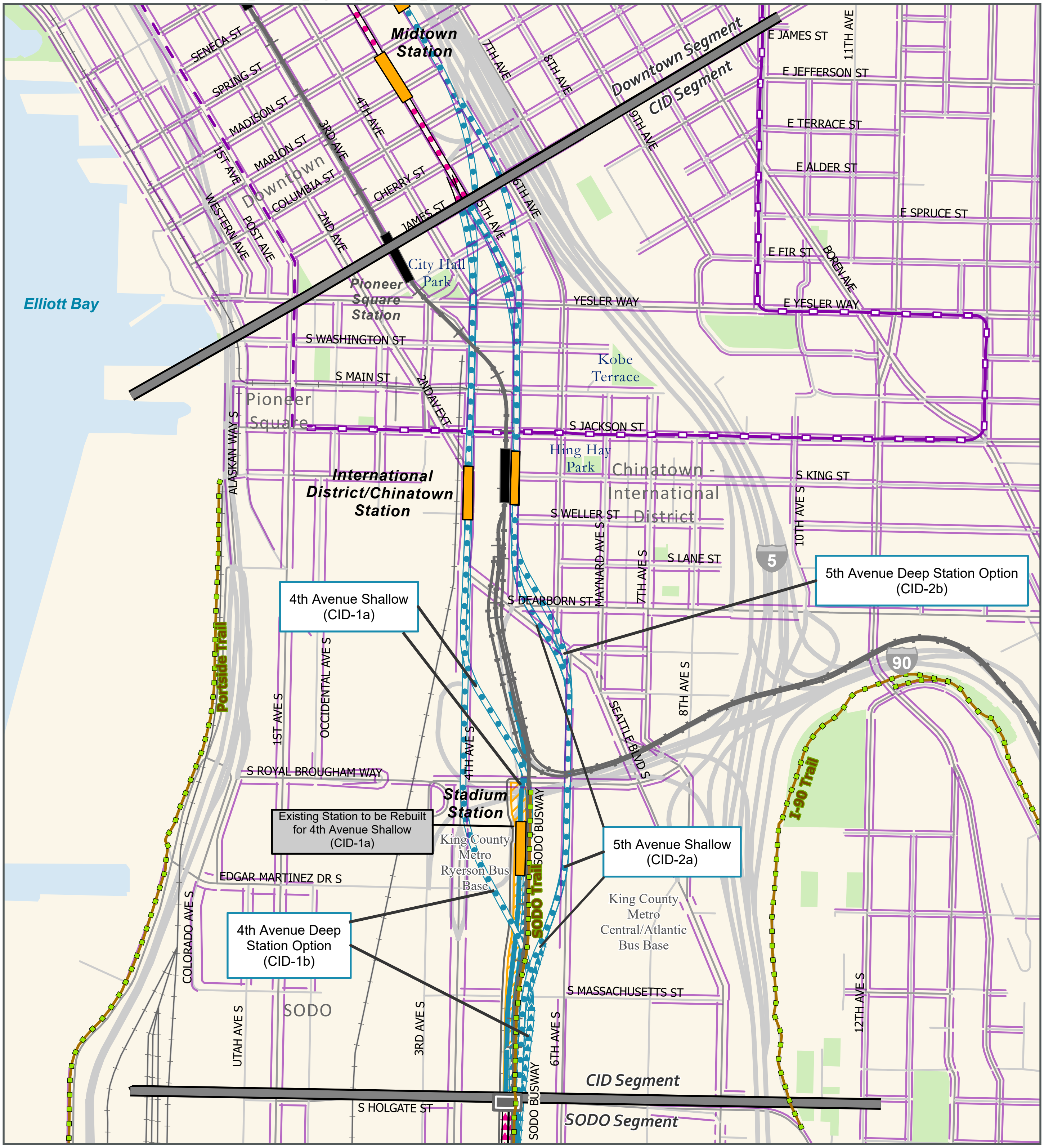
Existing sidewalks, marked crosswalks, and curb ramps were inventoried in all areas covered by the 10-minute walksheds and bikesheds. Sidewalks on both sides of the roadway are prevalent near most of the new stations throughout the study area, as shown on Figure 6-11 through Figure 6-14. There are marked crosswalks and curb ramps at most intersections downtown, but near new stations outside downtown, marked crosswalks are generally provided at intersections on arterial and collector streets. For discussion of the SODO Segment affected environment, see Section 6.3.1.1.

In the more urban Chinatown-International District and Downtown segments, sidewalks, curb ramps, and marked crosswalks are prevalent and provide numerous walking route options with minimal gaps near the new stations. Near the new Denny Station, Terry Avenue North has a sidewalk on only one side of the street, and a few key intersections on Dexter Avenue North near South Lake Union Station lack crosswalks, leaving nearly 800 feet between marked crossings. The Chinatown-International District and Downtown segments have protected bicycle lanes and bicycle lanes without separation.

In the more industrial South Interbay Segment, there are generally sidewalks and curb ramps on both sides of the roadway near the new Smith Cove Station locations, but there are some gaps in the network. For example, West Mercer Place east of Elliott Avenue West lacks a sidewalk on both sides of the street. Many streets in these areas have impediments or are not conducive to walking. Impediments include parked cars partially or fully blocking the sidewalk, lack of a curb separating the sidewalk from the roadway, long block lengths and wide roads that limit connectivity and increase walking distances, and the presence of heavy trucks.

In the Interbay/Ballard Segment, sidewalks are prevalent near the new Ballard Station and provide numerous walking route options with minimal gaps near the new station. Marked crosswalks exist at most intersections on arterial and collector streets but are not typically found on residential streets. Curb ramps are generally prevalent in the area except for a segment of 14th Avenue Northwest and some residential streets to the east. Near the Interbay Station, there are sidewalk gaps near some potential station locations, such as 17th Avenue West. Curb ramps are generally present along main roadways but are missing along some local roadways in residential areas to the east and west of the station area.

There are two crosswalks in the study area that currently operate at L.O.S. F: the crosswalk across 4th Avenue South at the Weller Street Bridge in the Chinatown-International District Segment and the crosswalk across 9th Avenue on the east side of Westlake Avenue in the Downtown Segment. This is caused by high p.m. peak hour pedestrian volumes, where both crosswalks currently have approximately 600 to 700 people crossing during the 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
- East Link Light Rail (Under Construction)
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- SODO Busway
- Proposed Overpass
- Park
- Trail
- Sidewalks

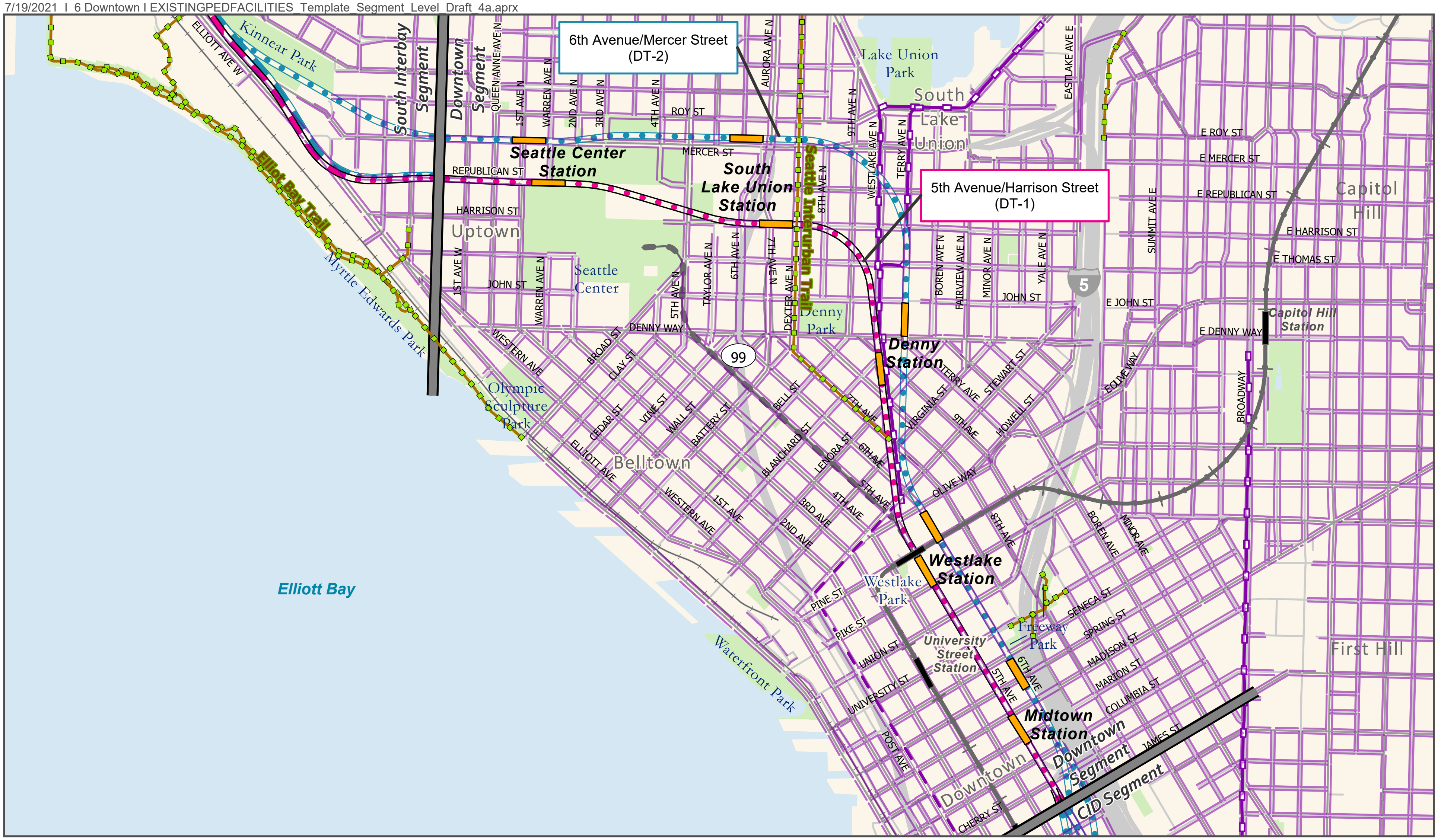
FIGURE 6-11
Existing Pedestrian Facilities
Ballard Link Extension - Chinatown-International District Segment

West Seattle and Ballard Link Extensions

0 700 1,400 Feet

N

7/19/2021 I 6 Downtown I EXISTINGPEDFACILITIES_Template_Segment_Level_Draft_4a.aprx



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

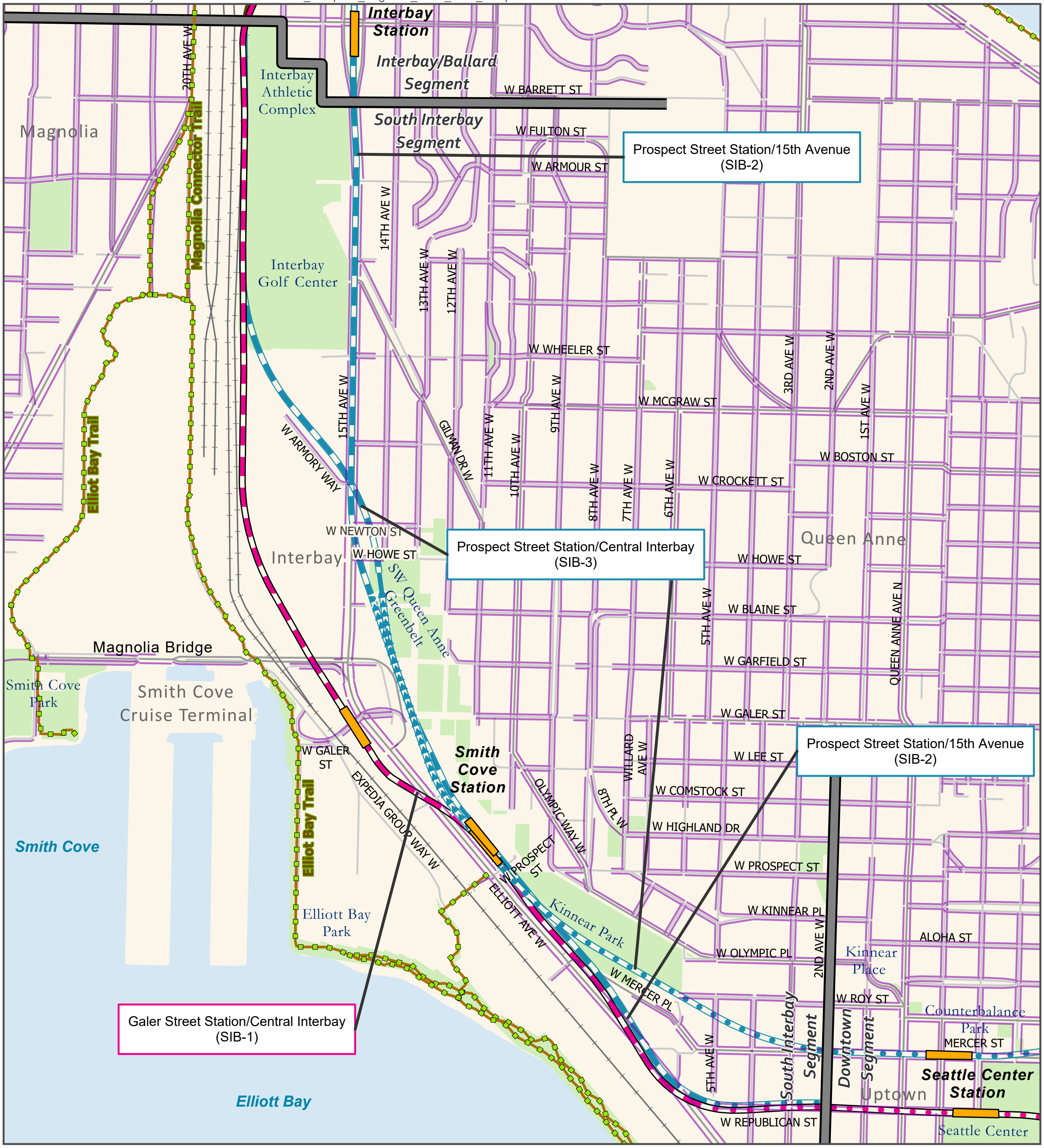
- Segment Line
- Existing Link Light Rail
- Monorail
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- Park
- Trail
- Sidewalks

FIGURE 6-12
Existing Pedestrian Facilities
Ballard Link Extension -
Downtown Segment

West Seattle and
Ballard Link Extensions

0 1,000 2,000 Feet
N

12/6/2021 I 7 South Interbay I EXISTINGPEDFACILITIES_Template_Segment_Level_Draft_4a.aprx



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
- Trail
- Sidewalks

FIGURE 6-13
Existing Pedestrian Facilities
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

0 800 1,600 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
- Park
- Trail
- Sidewalks

FIGURE 6-14
Existing Pedestrian Facilities
Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
N

6.4.1.2 Bicycle Facilities and Multi-use Trails

Most of the study area lacks designated facilities for cyclists, as shown on Figure 6-15. Bicycle facilities near stations include unprotected or protected bicycle lanes, neighborhood greenways, and multi-use trails. However, many of these facilities are disjointed, and cyclists generally lack a connected network of bicycle facilities to access the new stations from adjacent neighborhoods.

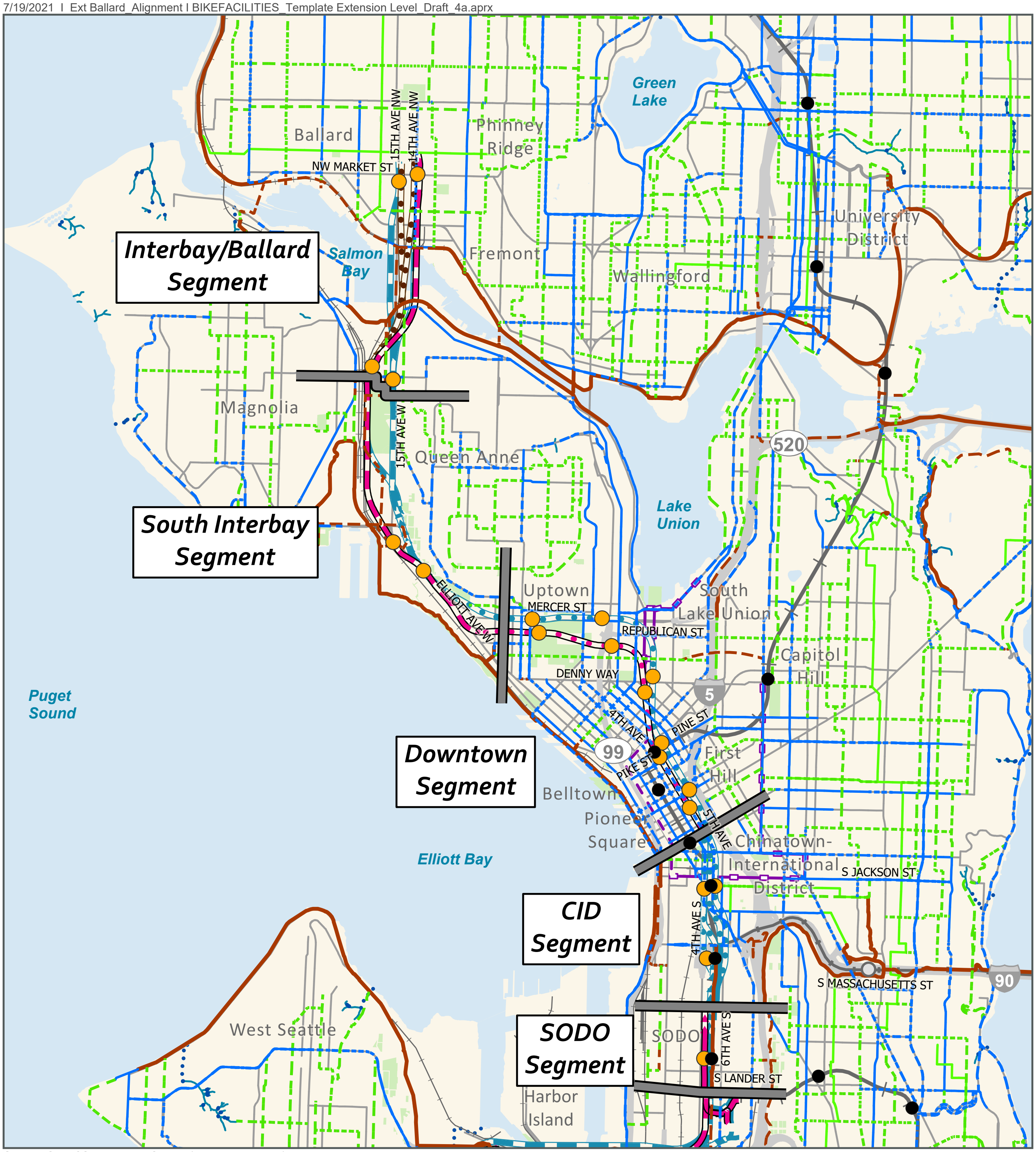
The station areas in the Chinatown-International District and Downtown segments (International District/Chinatown, Midtown, Westlake, Denny, South Lake Union, and Seattle Center stations) have the most existing bicycle facilities within the study area, but cycling can be difficult due to high traffic volumes. There are protected bicycle lanes and bicycle lanes without separation throughout Downtown Seattle, South Lake Union, and Uptown, but there are gaps in the existing network. Key north-south connections include the 2nd Avenue protected bicycle lane, the 7th Avenue/Dexter Avenue bicycle lanes (portions of which are protected bicycle lanes), and the Elliott Bay Trail along the waterfront. Similarly, there are east-west connections on Yesler Way, Pike Street, Pine Street, and Mercer Street. Several other east-west bicycle facilities exist, although they are discontinuous. Bicycle facilities near the new Denny Station are more limited, as there are no east-west routes. In the Seattle Center and South Lake Union station areas, there are a variety of protected and unprotected bicycle lanes, including Mercer Street, the Westlake cycle track, and Dexter Avenue, but there are gaps.

In the South Interbay and Interbay/Ballard segments, a network of multi-use trails is available, but some key connections are missing, especially near the Smith Cove and Interbay stations. The Elliott Bay Trail is a north-south connection that provides direct bicycle access facilitated by the Helix pedestrian bridge at West Prospect Street to allow cyclists to cross the railroad tracks.

However, east-west facility connections with neighborhoods adjacent to the trail are largely missing, with the exception of bicycle lanes on Thorndyke Avenue West and the Ship Canal Trail, which connects to the Magnolia Connector Trail at the intersection of Gilman Avenue West and West Emerson Place. The Magnolia Connector Trail provides north-south connectivity between Magnolia through Interbay (west of the BNSF Railway tracks) to the Elliott Bay Trail.

Some cyclists also use the business access and transit lanes along the Elliott Avenue West/15th Avenue West corridor, which are signed as a bike route, but cycling can be difficult due to high traffic volumes and speeds. Connections up Queen Anne Hill to the east are limited and difficult to navigate.

Residential roadways surrounding the new Ballard Station 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. The Burke-Gilman Trail provides east-west access across North Seattle connecting to the Ballard Station area. Northwest 58th Street is a neighborhood greenway that also provides east-west connectivity further to the north. The main north-south bicycle routes in the Ballard neighborhood are 8th Avenue Northwest, 17th Avenue Northwest, and 24th Avenue Northwest.



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

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

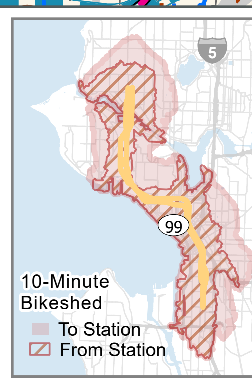


FIGURE 6-15
Existing Bike and Planned Bike Facilities
Ballard Link Extension

West Seattle and Ballard Link Extensions

0 0.5 1 Mile
N

6.4.2 Environmental Impacts

This section discusses the future non-motorized conditions (year 2042) under the No Build Alternative and the anticipated non-motorized conditions under each Build Alternative. The Ballard Link Extension would affect surrounding non-motorized facilities and the way pedestrians access and circulate within each of the new station areas. This section describes future pedestrian and bicycle facilities; walksheds and bikesheds; school walking routes; Americans with Disabilities Act accessibility; non-motorized trip activity at the stations; and sidewalk, crosswalk, and corner operations. 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 part of existing local plans by partner agencies, or potentially funded in partnership with Sound Transit. For example, FTA considers pedestrian and bicycle improvements within ½ mile and 3 miles of station areas 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 Fund included in the Sound Transit 3 Plan.

6.4.2.1 No Build Alternative

Under the No Build Alternative for the Ballard Link Extension, non-motorized projects in the *Seattle Bicycle Master Plan* (City of Seattle 2014) and *Pedestrian Master Plan* (City of Seattle 2017a) are assumed to be built, as are improvements related to the Seattle Arena Renovation Project, such as two-way protected bicycle lanes along 1st Avenue North and Queen Anne Avenue North. The *Seattle Bicycle Master Plan* calls for creating new connections or filling gaps via construction of 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 other projects. A full list of projects is included in Attachment N.1A.

6.4.2.2 Build Alternatives

Long-term Impacts

The project proposes pedestrian and bicycle improvements at the stations to serve the projected increases in pedestrian and bicycle travel generated by the Ballard Link Extension. Specific improvements affecting pedestrian circulation, such as new connections or signals, are described by segment. As the design advances, Sound Transit would continue to work with the City of Seattle to determine the most appropriate pedestrian and bicycle improvements to support station access. Any new facilities would meet Americans with Disabilities Act requirements. New facilities would also meet local and federal design standards for pedestrian and bicycle facilities, as appropriate.

Impacts Common to All Alternatives

Based on the information available when this analysis was being prepared, none of the Build Alternatives would result in long-term impacts to *Pedestrian Master Plan* projects, sidewalks, school access, or safety, because any affected facilities would be rebuilt to meet Americans with Disabilities Act requirements as well as applicable design standards (such as Seattle Streets Illustrated [City of Seattle 2020]) 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 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.

Figure 6-16 shows existing and future bicycle facilities and bikesheds for the 2042 Build Alternatives. Topography limits how far a cyclist could travel, so both directions to and from a new station are shown. Due to topography, either direction of travel to or from a station would be more constrained. The bikeshed displays the theoretical maximum distance a cyclist could travel on the roadway network in a given amount of time, regardless of the specific type of facility provided. Most of the Build Alternatives do not include network changes that would affect the existing walksheds and bikesheds. Any changes are described by segment in the following sections.

Projects included in the *Seattle Bicycle Master Plan* and *Pedestrian Master Plan* are assumed to be in place by 2042, though these do not affect the walksheds and bikesheds; rather, these projects influence how comfortable walking and bicycling within the sheds will be. Any effects to *Seattle Bicycle Master Plan* or *Pedestrian Master Plan* projects are described by segment in the following sections. Sound Transit will coordinate with the City of Seattle on sidewalk width standards as the project advances.

SODO Segment

The SODO Station in the SODO Segment is associated with the West Seattle Link Extension and the corresponding environmental impacts are discussed in Section 6.3.2. All alternatives of the Ballard Link Extension would include the new South Holgate Street overpass in the SODO Segment. The overpass would be constructed to allow the SODO Trail to pass beneath it with the necessary clearances, and there would be a surface connection at the South Holgate Street/6th Avenue South intersection. Based on the available information at the time this analysis was prepared, no projects listed in the *Seattle Bicycle Master Plan* would be impacted by the Build Alternatives.

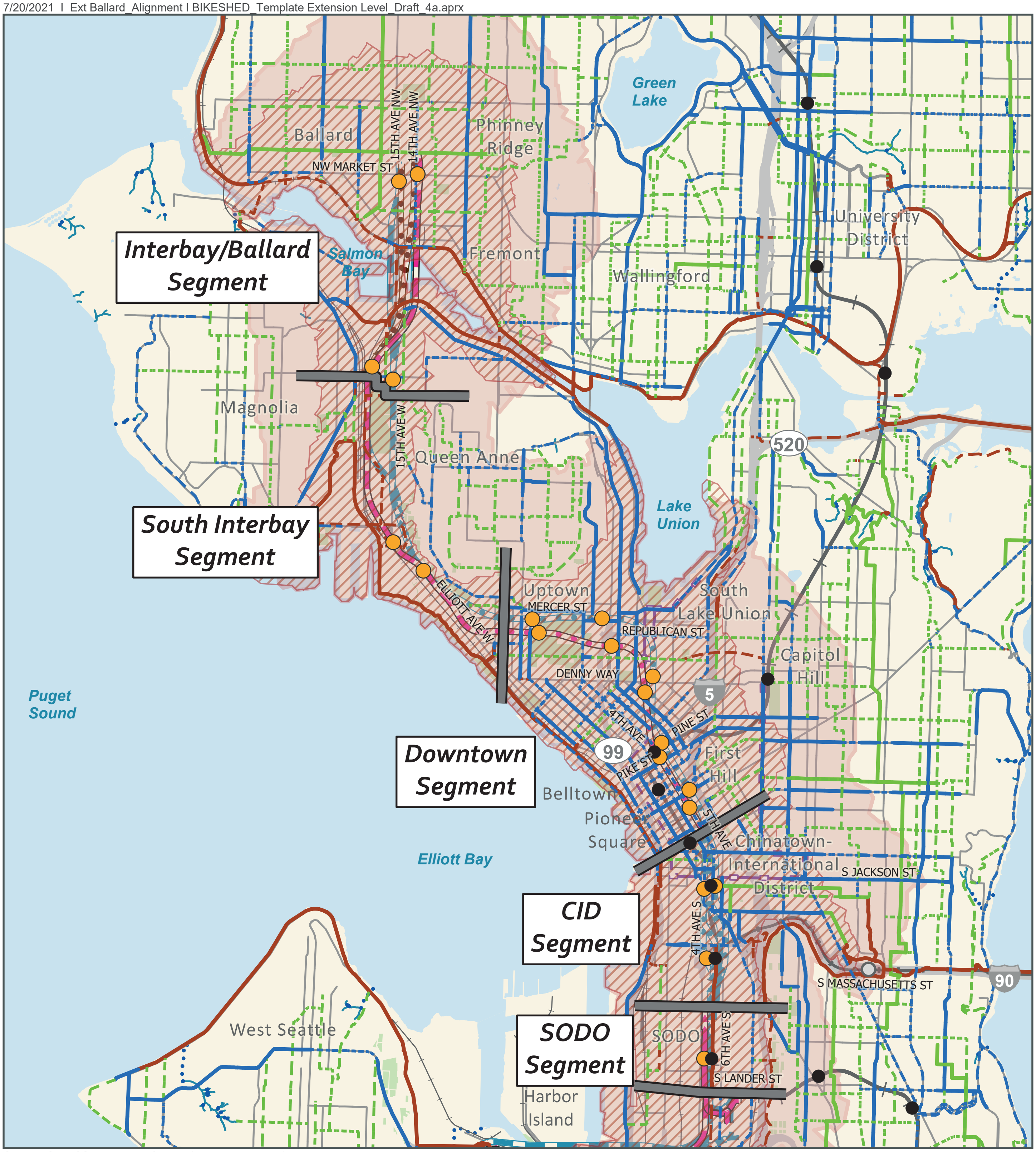
The SODO Station is part of the West Seattle Link Extension and non-motorized trip generation and pedestrian L.O.S. associated with that station is discussed in Section 6.3.2.

Chinatown-International District Segment

All Build Alternatives would be in tunnels through most of the Chinatown-International District Segment, minimizing the light rail infrastructure’s direct effects to the surrounding pedestrian and bicycle facilities. The Stadium Station would be reconstructed as part of Alternative CID-1a*; it would remain as is for all other alternatives.

Figure 6-17 shows the walksheds and surrounding pedestrian facilities for the Build Alternatives at the International District/Chinatown Station. Because all alternatives are within two blocks of each other, there are no substantial differences between the walksheds. There are limited east-west connections near the station, in part due to the railroad to the west and Interstate 5 to the east, so people walking would be able to travel farther to the north and south than they would to the east and west. Most of Lumen Field falls within a 10-minute walkshed for the station, along with Pioneer Square and the Chinatown-International District.

For all alternatives, cyclists could access the stations using a network of existing and planned bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails.



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

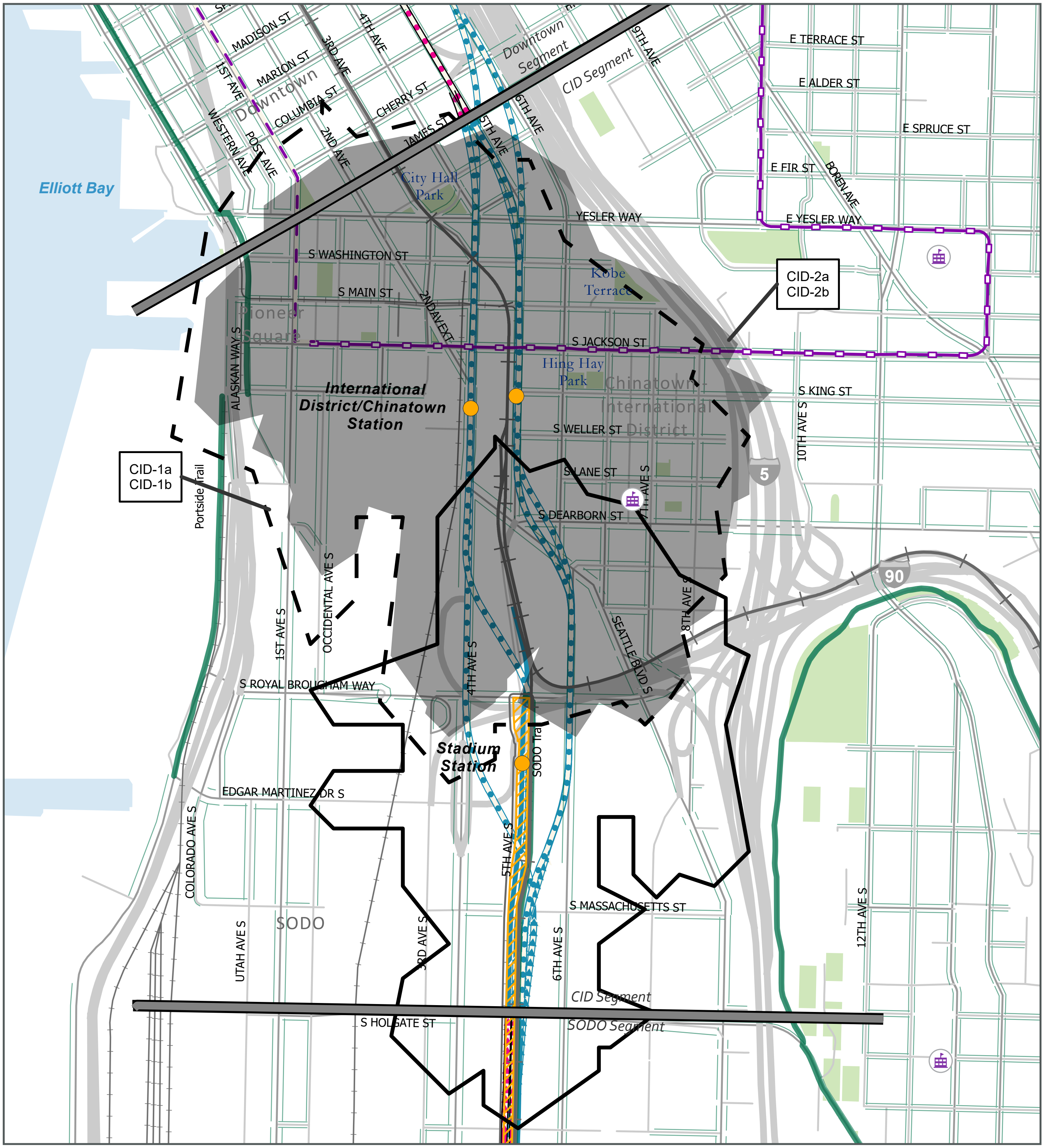
Bike Facilities
- Bike Lane (In-Street Separation)
- Multi-Use Trail
- Neighborhood Greenway

10-Minute Bikeshed
- To Station
- From Station

0 0.5 1 Mile
N

FIGURE 6-16
Ballard Bikeshed
Ballard Link Extension

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
- Existing Link Light Rail
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- SODO Busway
- Park
- Sidewalks
- Multi-use Trails
- School

10-Minute Walkshed (from station)
- CID Station CID-1a, 1b
- Stadium Station
- CID Station CID-2a, 2b

0 700 1,400 Feet

N

FIGURE 6-17
Pedestrian Facilities and Station Pedestrian Access
Ballard Link Extension - Chinatown-International District Segment
West Seattle and Ballard Link Extensions

There is one private school for grades 6 to 12 within the 10-minute walkshed from the new station, Puget Sound Community School. There are no designated school crossings, crossing guards, or school patrols in the vicinity of the station. While this area generally has sidewalks, there are some gaps. Because affected streets would be rebuilt to meet applicable design standards including the Americans with Disabilities Act and Seattle Streets Illustrated (City of Seattle 2020), or to a standard agreed to by Sound Transit and the City of Seattle, no long-term impacts to school access are anticipated.

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 on the West Seattle Link Extension line that goes north to Everett would be able to reach both stations directly. Riders on the Ballard Link Extension that goes south to Tacoma and the East Link line would be able to use the International District/Chinatown Station but would have to transfer at either the International District/Chinatown Station or SODO Station or walk from the International District/Chinatown Station to reach the Stadium Station.

<u>4th Avenue Shallow Alternative and 4th Avenue Deep Station Option (CID-1a* and CID-1b*)</u>

Alternative CID-1a* and Option CID-1b* could impact one project listed in the *Seattle 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 (*Seattle Bicycle Master Plan* project 303; City of Seattle 2014). Because 4th Avenue South and South Jackson Street, including the roadway bridge structure, would be reconstructed to include widened sidewalks, the project would likely limit space to implement the bicycle project as currently designed without reallocating space from another mode.

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.

The crosswalk across 4th Avenue South at South Weller Street is expected to operate at L.O.S. F for Alternative CID-1a* and Option CID-1b*. This location would also operate at L.O.S. F under the No Build and Build Alternative; however, the project would add pedestrians during the p.m. peak hour. The southwest corner of 4th Avenue South and South Jackson Street is expected to operate at L.O.S. F under Alternative CID-1a* and Option CID-1b*. This location would also be at L.O.S. F under the No Build Alternative, but the project would add pedestrians during the p.m. peak hour. The station alternatives on 4th Avenue South (Alternative CID-1a* and Option CID-1b*) would provide a direct underground passenger transfer to the southbound line of the existing International District/Chinatown Station. Passenger transfer to the northbound line would be less convenient, requiring passengers to go up to street level and then go down to the existing station platform which includes leaving and re-entering the fare paid zone. Because the final configuration of light rail transfers between the stations would substantially affect pedestrian flows at the street level, additional sidewalk improvements may be identified.

Alternative CID-1a* and Option CID-1b* would construct additional station entrances at the International District/Chinatown Station and would include new station entrances west of the existing entrances (and therefore closer to T-Mobile Park and Lumen Field): one on the west side of 4th Avenue South at the eastern end of the Weller Street Bridge and one on the east side of 4th Avenue South at 2nd Avenue Extension South.

As the Weller Street Bridge is the most direct connection between the International District/Chinatown Station and the nearby event venues, Alternative CID-1a* and Option CID-1b* would provide a more direction connection for event attendees.

5th Avenue Shallow Alternative and 5th Avenue Deep Station Option (CID-2a and CID-2b)

Ridership at the new station is expected to be higher for Alternative CID-2a and Option CID-2b. These alternatives are expected to have somewhat fewer pedestrians and bicyclists access the station, but more people transferring between transit services. Transit transfers would account for roughly two-thirds of riders, with most of those occurring between the two light rail lines or the Sounder commuter rail. Pedestrians and bicycles making up another one-quarter of riders.

Under Alternative CID-2a and Option CID-2b, the sidewalk on the east side of 5th Avenue South between South Jackson Street and South King Street is expected to operate at L.O.S. F because it is the sidewalk leading to the single new station entrance. This location would operate at L.O.S. E or better under the No Build Alternative. The station alternatives on 5th Avenue South (Alternative CID-2a and Option CID-2b) would provide a direct underground passenger transfer to the northbound line of the existing International District/Chinatown Station. Passenger transfer to the southbound line would be less convenient, requiring passengers to go up to street level and then go down to the existing station platform, leaving and re-entering the fare paid zone. All other sidewalks, crosswalks, and corners within one block of the station entrances would have sufficient capacity to serve projected demand. Because the final configuration of light rail transfers between the stations would substantially affect pedestrian flows at the street level, additional sidewalk improvements may be identified.

The existing Stadium Station (to be rebuilt as part of the Ballard Link Extension), which would serve the West Seattle Link Extension connecting north to Everett, would generate few new boardings and alightings per p.m. peak hour under all Ballard Link Extension Build Alternatives. The ridership estimate and analysis presented in this section is based on a typical day, rather than a special event surge in demand. At the Stadium Station, the pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity to serve the pedestrian demand.

On event days, the Stadium and International District/Chinatown stations serve attendees and staff of events at T-Mobile Park and Lumen Field, with capacities of roughly 48,000 and 72,000, respectively. The frequency of event surges 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, along with other concerts and events. Events are currently occurring at these venues and will continue when the Ballard Link Extension is in operation. Before and after these events, there would be surges of demand in pedestrian areas near the stations, and pedestrians could experience congestion depending on the event time and attendance.

Alternative CID-2a and Option CID-2b would also construct additional station entrances at the International District/Chinatown Station and would include a new station entrance east of the existing entrances on the east side of 5th Avenue South at South King Street.

Alternative CID-2a and Option CID-2b would require all event attendees to use the Weller Street Bridge and cross 4th Avenue South. The existing congested conditions at the crosswalk across 4th Avenue South at South Weller Street would be exacerbated during event surges. During existing event surges, the Weller Street crossing and bridge become congested as pedestrians queue while waiting to cross 4th Avenue South. This is more notable during post-event surges as pedestrians travel up the stairs from the parking lot north of Lumen Field and across the bridge; this condition would also be exacerbated with the project under all alternatives. Currently, some event attendees choose a less congested path to bypass the Weller Street Bridge and continue north along the west side of King Street Station and east along South Jackson Street to reach the station entrances; it is likely additional pedestrians would continue to use this pathway as well as other less congested routes during event surges in the future.

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 will be considered throughout station design as the project advances, and Sound Transit will 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. The conceptual drawings included in Draft Environmental Impact Statement Appendix J, Conceptual Design Drawings, illustrate the station entrances and station area conditions for riders.

Downtown Segment

Preferred Alternative DT-1 and Alternative DT-2 would operate in tunnels in this segment, minimizing direct project impacts to existing or planned bicycle and pedestrian facilities. Figure 6-18 shows the walksheds and surrounding pedestrian facilities for the Build Alternatives at the stations in the Downtown Segment. The areas covered by the walksheds around the Midtown, Westlake, and Denny stations are generally similar among alternatives. At the South Lake Union Station, the station locations are more separated between alternatives and the surrounding land uses are more varied than other stations in the Downtown Segment. For the South Lake Union Station, Preferred Alternative DT-1 is southeast of Alternative DT-2, so the walkshed covers more mixed-use areas south of Mercer Street and east of State Route 99 and fewer mixed-use areas north of Mercer Street and west of State Route 99 in Uptown. Preferred Alternative DT-1 is expected to have slightly higher ridership than Alternative DT-2 because of better pedestrian connectivity between the South Lake Union Station and transfer opportunities for bus routes along Harrison Street and the RapidRide E line.

Because the Seattle Center Station for Preferred Alternative DT-1 is further south than for Alternative DT-2, the walkshed covers more of Seattle Center and commercial uses and covers slightly less residential land use in Uptown.

Within the Downtown Segment, sidewalks and marked crosswalks are prevalent in most station areas with minimal gaps, though Terry Avenue North only has a sidewalk on one side of the street near the Denny Station and a few key intersections on Dexter Avenue North near the South Lake Union Station lack crosswalks. For all alternatives, cyclists could access the stations using a well-connected network of existing and planned bicycle lanes, protected bicycle lanes, neighborhood greenways, and multi-use trails like the Elliott Bay Trail, but topography is a limiting factor for bicycle access at the Midtown and Seattle Center stations in particular (for example steep grades in the Queen Anne Hill neighborhood north of Seattle Center).

There are four schools within a 10-minute walk from the proposed stations in the Downtown Segment:

- Center School, grades 9 to 12 (public).
- Emerald City School, grades 1 to 8 (private).
- Morningside Academy, grades 1 to 9 (private).
- Spruce Street School, grades K to 5 (private).

There is a designated school crossing at West Olympic Place and 3rd Avenue West (roughly 0.25 mile northwest of Seattle Center Station), but there are no crossing guards or school patrols near the Downtown Segment stations. The Seattle Center Station would be used by attendees of large events at Seattle Center, particularly the new arena at Seattle Center.

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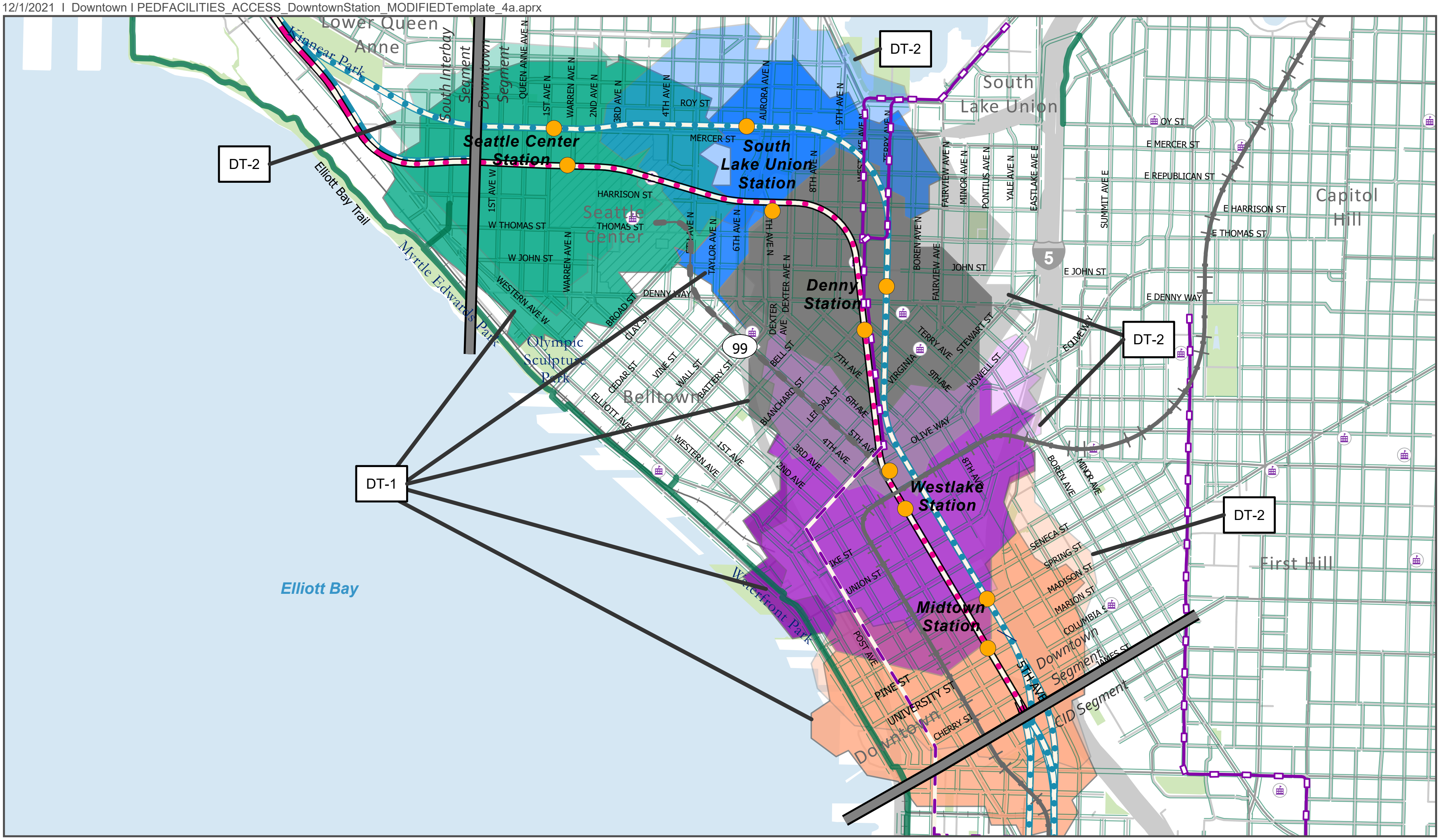


Source: City of Seattle, King County (2019, 2020, 2021).

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
- Monorail
- Existing Streetcar
- Center City Connector Streetcar (Construction Paused)
- Railroad
- Park
- School

10-Minute Walkshed (from station)
- Denny Station DT-1
- Denny Station DT-2
- Westlake Station DT-1
- Westlake Station DT-2
- Midtown Station DT-1
- Midtown Station DT-2
- South Lake Union Station DT-1
- South Lake Union Station DT-2
- Seattle Center Station DT-1
- Seattle Center Station DT-2

0 1,000 2,000 Feet

N

FIGURE 6-18
Pedestrian Facilities and Station Pedestrian Access
Ballard Link Extension - Downtown Segment
West Seattle and Ballard Link Extensions

Riders on the Ballard Link Extension, which provides Link service to Tacoma, would be able to reach the station directly. Riders along the West Seattle Link Extension, which connects with Link service north to Everett, would have to transfer at Westlake Station. Riders on East Link could transfer at either the International District/Chinatown or Westlake stations.

Preferred Alternative (DT-1)

Midtown Station

Most riders would walk or bike to the Midtown Station under Preferred Alternative DT-1. The pedestrian L.O.S. analysis found that all sidewalks, crosswalks, and corners within one block of the Midtown Station entrances would have sufficient capacity to meet demand.

Westlake Station

Boardings and alightings at the Westlake Station would increase substantially compared to the No Build Alternative during the p.m. peak hour under Preferred Alternative DT-1, most of which would be transfers between the underground light rail platforms of the new and existing station. Because of the new light rail connections, the number of light-rail-to-bus transfers would be less than the No Build Alternative. Therefore, the number of additional riders on the surface streets would be limited; these people would be walking, biking, or being picked up or dropped off. The pedestrian L.O.S. analysis found that all sidewalks, crosswalks, and corners within one block of the Westlake Station entrances would have sufficient capacity to meet demand.

Denny Station

Most riders at the Denny Station would access it by walking or cycling. 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. All other sidewalks, crosswalks, and corners within one block of Denny Station entrances would have sufficient capacity to meet demand.

South Lake Union Station

Most riders at the South Lake Union Station would also access it by walking or cycling under Preferred Alternative DT-1. All sidewalks, crosswalks, and corners within one block of the South Lake Union Station entrances would have sufficient capacity to meet demand for the Preferred Alternative.

Seattle Center Station

Most riders at the Seattle Center Station would access it by walking or cycling (see the Travel Demand Forecasts section of Section 4.3.3.2, Environmental Impacts). The pedestrian L.O.S. analysis found that sidewalks, crosswalks, and corners within one block of Seattle Center Station entrances would have sufficient capacity to meet weekday demand under both alternatives.

The new arena at Seattle Center, Climate Pledge Arena, which is scheduled to open in 2021, will have a capacity of nearly 19,000 and will host events up to several times a week. The station's location adjacent to the Seattle Center campus and Climate Pledge Arena in particular will result in ridership surges before and after large events. While events at Climate Pledge Arena could be more frequent than those affecting the Stadium and International District/Chinatown stations, the surge in demand would be smaller because of the lower venue capacity. During event surges, pedestrians could experience congestion depending on the event time and attendance.

Preferred Alternative DT-1 would have a station entrance located on the Seattle Center campus, thereby not requiring a street crossing for riders accessing the campus. Event attendees could use pedestrian pathways on the campus, which tend to be substantially wider than typical sidewalks in the area; riders could also use sidewalks along 1st Avenue North, Republican Street, and Warren Avenue North to reach the entrance. The second station entrance with Preferred Alternative DT-1 would require event attendees to cross 1st Avenue North and walk along the Republican Street sidewalk.

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 the area. Sound Transit will consider event management throughout station design as the project advances and will 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 will 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 Draft Environmental Impact Statement Appendix J, Conceptual Design Drawings, illustrate the station entrances and station area conditions for riders.

Other Build Alternative (DT-2)

Midtown Station

Similar to Preferred Alternative DT-1, most riders would walk or bike to or from the Midtown Station (rather than taking transit or using pick-up/drop-off) under Alternative DT-2. The pedestrian L.O.S. analysis found that all sidewalks, crosswalks, and corners within one block of the Midtown Station entrances would have sufficient capacity to meet demand.

Westlake Station

Boardings and alightings would increase substantially compared to the No Build Alternative during the p.m. peak hour at the Westlake Station under Alternative DT-2, of which most are riders transferring between the underground light rail platforms of the new and existing station. As with Preferred Alternative DT-1, proportionately fewer light rail-to-bus transfers would take place under Alternative DT-2 compared to the No Build Alternative, and most new riders on the surface streets would be walking, biking, or being picked up or dropped off. The pedestrian L.O.S. analysis found that all sidewalks, crosswalks, and corners within one block of the Westlake Station entrances would have sufficient capacity to meet demand.

Denny Station

Most riders at the Denny Station would walk or bike to or from the station under Alternative DT-2. All sidewalks, crosswalks, and corners within one block of the Denny Station entrances would have sufficient capacity to meet demand for Alternative DT-2.

South Lake Union Station

Most riders at the South Lake Union Station would walk or bike to or from the station under Alternative DT-2. Under Alternative DT-2, the crosswalk across Taylor Avenue North on the north side of Mercer Street is expected to operate at L.O.S. E in the No Build Alternative and L.O.S. F with the project. All other sidewalks, crosswalks, and corners within one block of the South Lake Union Station entrances would have sufficient capacity to meet demand.

Seattle Center Station

Most riders at the Seattle Center Station would either walk or bike to or from the station under Alternative DT-2. Alternative DT-2 would require riders to cross at least one roadway to access the Seattle Center campus. The nearest station entrance would be reached using Warren Avenue North and either the sidewalk along Republican Street or the wider pedestrian pathway on August Wilson Way. The second station entrance with Alternative DT-2 would require riders to travel along additional sidewalk blocks and cross several streets to reach the northwest corner of First Avenue North and Mercer Street.

The pedestrian L.O.S. analysis found that sidewalks, crosswalks, and corners within one block of the Seattle Center Station entrances would have sufficient capacity to meet weekday demand under both alternatives.

South Interbay Segment

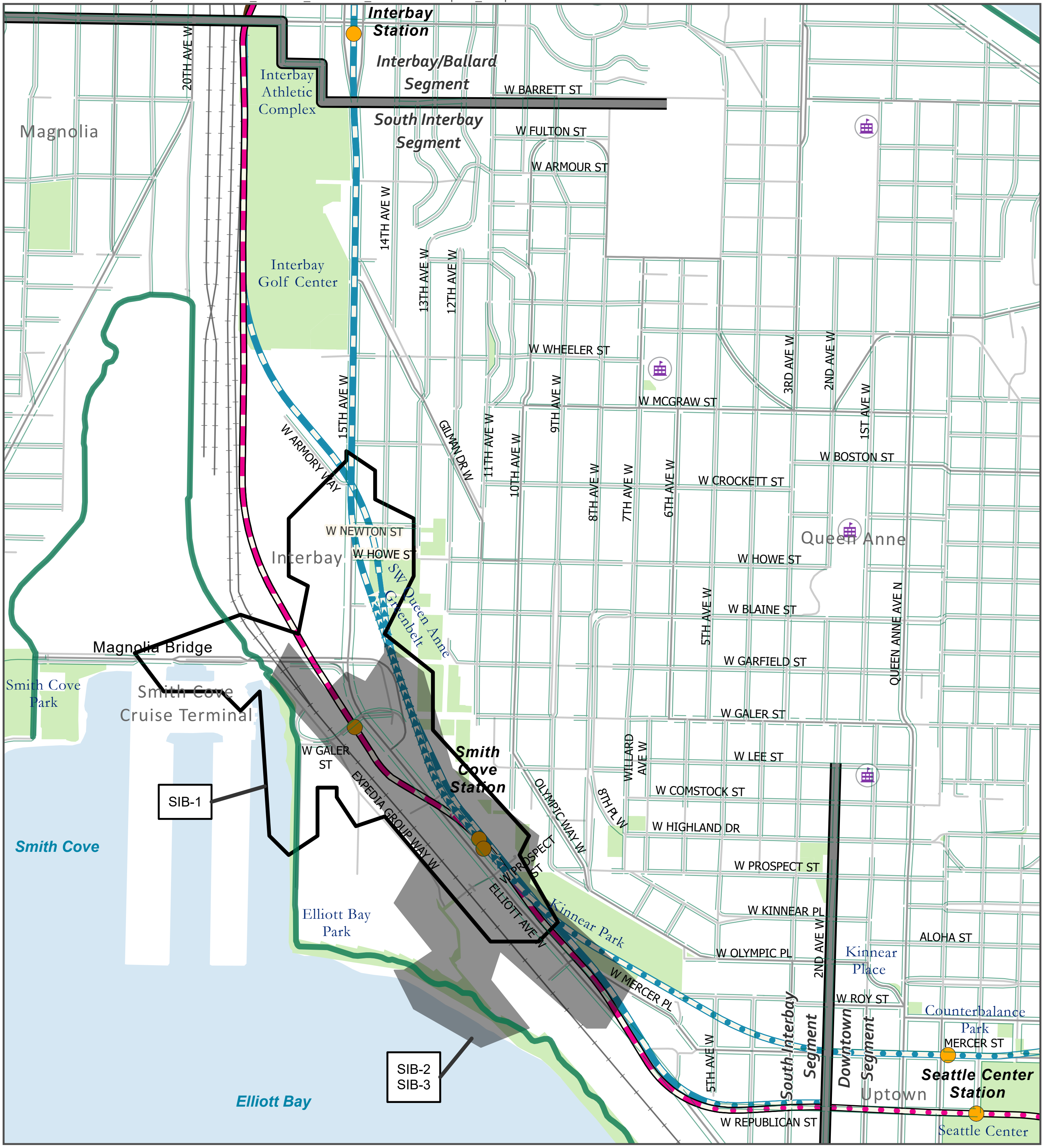
Figure 6-19 shows the walksheds and surrounding pedestrian facilities for the Build Alternatives at the Smith Cove Station. The areas falling within the 10-minute walksheds vary depending on station location. As Preferred Alternative SIB-1 is further north on Elliott Avenue West than the other alternatives, this station's walkshed extends further north and west into commercial, residential, and industrial areas north of the Magnolia Bridge and adjacent to the Pier 91 Smith Cove Cruise Terminal. In comparison, the Alternative SIB-2 and Alternative SIB-3 walksheds include more commercial and industrial land use near Pier 86 and along Elliott Avenue West near West Mercer Place.

There are generally sidewalks on both sides of the roadway near the new station, but there are gaps in coverage, such as West Mercer Place east of Elliott Avenue West and in some of the industrial areas, which may redevelop in the future. Cyclists could access the station using the Elliott Bay Trail for all alternatives. Some cyclists may also use the business access and transit lanes along the Elliott Avenue West/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. Under Preferred Alternative SIB-1, people walking or bicycling to the station from Pier 91, the Armory, or Expedia properties would likely use the Elliott Bay Trail and the non-motorized ramp on the West Galer Street Flyover. However, under the other South Interbay Build Alternatives, people would likely access the station using the Helix pedestrian bridge because of its proximity to these station locations.

<u>Preferred Alternative (SIB-1)</u>

Preferred Alternative SIB-1 could potentially impact a trail extension project for the Elliott Bay Trail where the planned trail and planned light rail alignment would both be between the Interbay Athletic Complex and the railway tracks. For planned projects such as the *Seattle Bicycle Master Plan* trail extension, Sound Transit would work with the City as the project design advances to either accommodate the planned trail improvement or realign the new trail to accommodate the light rail alignment if Preferred Alternative SIB-1 were advanced.

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 surge in demand. On days when cruise ships are docking at the Smith Cove Cruise Terminal at Pier 91, there could be an increase in station activity because 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. The Smith Cove Cruise Terminal can host up to two ships per day with passenger capacities up to 4,000 per ship. During those days when the cruise ships are docked at Pier 91, the Smith Cove Station is expected to be able to accommodate that increased level of demand. 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.



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
- Sidewalks
- Multi-useTrails
- School

10-Minute Walkshed (from station)
- Smith Cove Station SIB-1
- Smith Cove Station SIB-2, 3

FIGURE 6-19
Pedestrian Facilities and Station Pedestrian Access
Ballard Link Extension - South Interbay Segment

West Seattle and Ballard Link Extensions

0 800 1,600 Feet
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<u>Other Build Alternatives (SIB-2 and SIB-3)</u>

Columns associated with the elevated guideway for Alternative SIB-2 and Alternative SIB-3 could encroach on sidewalks in the immediate station area. In addition, Alternative SIB-2 could encroach on sidewalks along 15th Avenue West. However, neither of these alternatives would result in long-term impacts to Pedestrian Master Plan projects, sidewalks, or school access because any affected facilities would be rebuilt to meet applicable design standards including the Americans with Disabilities Act and 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 and an alternate design cannot be agreed upon in the original location, Sound Transit would work with the City of Seattle to develop mitigation.

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 between the Interbay Athletic Complex and the railway tracks. For planned projects such as the *Seattle Bicycle Master Plan* trail extension, Sound Transit would work with the City as the project design advances to either accommodate the planned trail improvement or realign the new trail to accommodate the light rail alignment if Alternative SIB-3 were advanced.

The non-motorized trip generation for Alternative SIB-2 and Alternative SIB-3 would be the same as described for Preferred Alternative SIB-1. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the station entrances would have sufficient capacity to serve the pedestrian demand for both Alternative SIB-2 and Alternative SIB-3.

Under the Ballard Link Extension-only M.O.S., the Smith Cove Station would be the northern terminus of the Ballard Link Extension and would therefore have higher ridership than the full project. Most of the riders would access the light rail station by bus from Ballard and Magnolia. For all alternatives, all sidewalks, crossings, and corners within one block of the Smith Cove Station entrances would have sufficient capacity to serve the demand from the M.O.S.

Interbay/Ballard Segment

Figure 6-20 shows the walksheds and surrounding pedestrian facilities for the Build Alternatives at the Interbay and Ballard stations. The areas falling within the 10-minute walkshed vary depending on station location. For instance, because the Interbay Station for Option IBB-1b and Alternative IBB-3 is further east than under the other alternatives (including Preferred Alternative IBB-1a), the walkshed extends further east into residential areas of Queen Anne Hill and does not include as much residential land use in Magnolia west of the railroad tracks.

<u>Preferred Elevated 14th Avenue Alternative (IBB-1a)</u>

Most of the trips at the Interbay Station are a result of transfers between the light rail station and buses that serve the Interbay neighborhood, with relatively few being riders that access the station by walking or biking from the surrounding neighborhoods. The pedestrian L.O.S. analysis found that all pedestrian facilities within one block of the Interbay Station would have sufficient capacity to serve demand.

Approximately half of the trips at the Ballard Station are a result of transfers between the light rail station and buses that serve the Ballard neighborhood. The majority of the remaining trips are people walking or biking to the station from the surrounding Ballard neighborhood. The pedestrian L.O.S. analysis found that all sidewalks, crosswalks, and corners within one block of the Ballard Station entrances would have sufficient capacity to serve demand.

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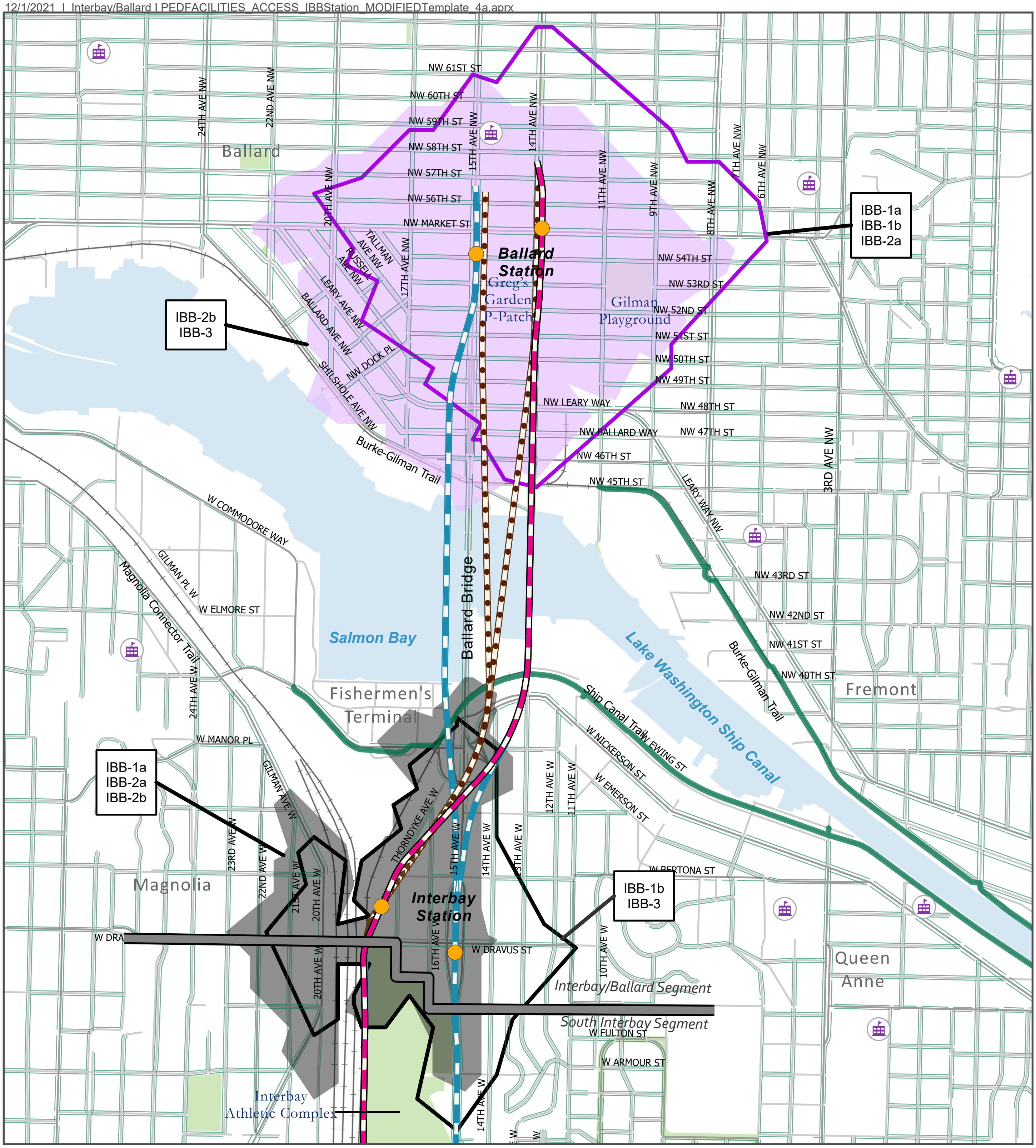

Source: City of Seattle, King County (2019, 2020, 2021).

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
- Sidewalks
- Multi-use Trails
- School

10-Minute Walkshed (from station)
- Ballard Station IBB-1a, 1b, 2a
- Ballard Station IBB-2b, 3
- Interbay Station IBB-1b, 3
- Interbay Station 1a, 2a, 2b

0 800 1,600 Feet

N

FIGURE 6-20
Pedestrian Facilities and Station Pedestrian Access
Ballard Link Extension - Interbay/Ballard Segment

West Seattle and Ballard Link Extensions

Preferred Alternative IBB-1a could impact a planned project in Seattle's 2014 Bicycle Master Plan to place bicycle lanes on 14th Avenue Northwest between Northwest 46th Street and Northwest 58th Street, and a neighborhood greenway from Northwest 45th Street to Northwest 46th Street. Columns associated with the elevated guideway could encroach on sidewalks near the Ballard Station. The alternative could also encroach on sidewalks along 14th Avenue Northwest. However, Sound Transit would rebuild the affected facilities to the extent possible.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Similar to Alternative IBB-1a, most of the trips at Interbay Station and approximately half of the trips at Ballard Station under Preferred Option IBB-2a* are a result of transfers between the light rail station and buses that serve the Interbay and Ballard neighborhoods respectively.

The non-motorized trip generation for Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would be the same as described for Preferred Alternative IBB-1a. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the Interbay and Ballard station entrances would have sufficient capacity to serve the pedestrian demand for both Preferred Alternative IBB-2a* and Preferred Option IBB-2b*.

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

Other Build Alternative and Option (IBB-1b and IBB-3)

While Option IBB-1b and Alternative IBB-3 would capture some residential use east of 15th Avenue West in Interbay, it is generally lower density than that west of the railroad tracks. There are generally sidewalks on both sides of the roadway near the new stations, but there are gaps in coverage near industrial uses in Interbay, such as on the west side of 17th Avenue West. Marked crosswalks exist at most intersections on arterial and collector streets but are not typically found on residential streets. In Ballard, Alternative IBB-3 would provide closer access to the Ballard core compared to those alternatives near 14th Avenue Northwest (Preferred Alternative IBB-1a, Option IBB-1b, and Preferred Alternative IBB-2a*), and riders would not have to cross 15th Avenue Northwest. There is one private school within the 10-minute walkshed from the new Ballard Station: Saint Alphonsus School, which is grades Pre-K to 8. There are designated school crossings at 14th Avenue Northwest and Northwest 58th Street and at 15th Avenue Northwest and Northwest 59th Street, and all roadways adjacent to the station have sidewalks.

The non-motorized trip generation for Option IBB-1b and Alternative IBB-3 would be the same as described for Preferred Alternative IBB-1a. The pedestrian L.O.S. analysis determined that sidewalks, crosswalks, and intersection corners within one block of the Interbay and Ballard station entrances would have sufficient capacity to serve the pedestrian demand for both Option IBB-1b and Alternative IBB-3.

Cyclists could access the Interbay Station using the Magnolia Connector Trail to West Dravus Street, 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 using a combination of the planned bicycle lanes on 14th Avenue Northwest, the Burke-Gilman Trail, existing and planned neighborhood greenways running both north-south and east-west (17th Avenue Northwest, 11th Avenue Northwest/12th Avenue Northwest, Northwest 53rd Street, Northwest 58th Street, and Northwest 64th Street), 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.

Option IBB-1b could impact a planned project in Seattle's 2014 Bicycle Master Plan to place bicycle lanes on 14th Avenue Northwest between Northwest 46th Street and Northwest 58th Street, as well as a neighborhood greenway from Northwest 45th Street to Northwest 46th Street. Columns associated with the elevated guideway in Option IBB-1b and Alternative IBB-3 could encroach on sidewalks near the Ballard Station. Alternative IBB-3 could encroach on sidewalks along a section of 15th Avenue Northwest and on Northwest Ballard Way and Northwest Leary Way west of the Ballard Bridge. Option IBB-1b could encroach on sidewalks along 14th Avenue Northwest. However, neither Option IBB-1b nor Alternative IBB-3 would result in long-term impacts to Pedestrian Master Plan projects, sidewalks, or school access because any affected facilities would be rebuilt to meet applicable design standards including the Americans with Disabilities Act and Streets Illustrated, 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.

Construction Impacts

Impacts Common to All Alternatives

During light rail construction, construction activity within and along roadways (such as elevated guideway construction) would impact non-motorized travel modes; see Chapter 4 for a discussion of specific roadways. As part of these roadway closures, the Ballard Link Extension Build Alternatives could close sidewalks or reduce the sidewalk width within the construction areas along the impacted roadways, though Americans with Disabilities Act-compliant access or detours would be maintained. In some locations, crosswalks may be closed for construction, although they would remain open to the extent feasible. Although sidewalks or paths that students use to reach schools may be affected, no designated school crossings are expected to be affected. The project may result in Americans with Disabilities Act-accessible curb ramps being removed on a temporary or permanent basis to accommodate the building footprint itself or to facilitate construction.

There may 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. In locations where a dedicated non-motorized facility used by cyclists must be temporarily closed, such as a protected bicycle lane or multi-use path, Sound Transit will work with the City of Seattle to identify and implement an alternate route that achieves, to the extent feasible, a similar level of protection and comfort afforded by the facility to be closed.

Pedestrians, people with disabilities that require the use of Americans with Disabilities Act-accessible curb ramps, and bicyclists may have to use alternate routes and/or navigate closures. 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.

The conditions described above could affect areas throughout the alignment for a range of durations. Trails, bicycle lanes, greenways, signed bicycle routes, 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 or more are described by segment in the following sections. For information on roadway construction closures, including extents and durations, see Section 4.3.2.3, Construction Impacts.

SODO Segment

Under Preferred Alternative SODO-1a, Option SODO-1b, and Alternative SODO-2 in the SODO Segment, South Holgate Street would be closed across the SODO Busway; the nearest east-west non-motorized routes would be South Lander Street and South Royal Brougham Way, which are both roughly 0.5 mile away. The closure would eliminate pedestrian and bicycle access along that east-west connection as well as the connection to the SODO Trail, which would also be closed for the duration of construction in the SODO Busway 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 Lander Street. Traffic diversion is discussed in more detail in the SODO section of Section 4.3.2.3, Construction Impacts.

Chinatown-International District Segment

<u>4th Avenue Shallow Alternative (CID-1a)*</u>

The SODO Trail, a portion of which is located in the Chinatown-International District Segment, will also be affected by construction as described for the SODO Segment. Under Alternative CID-1a*, the 4th 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 under both Alternative CID-1a*, during which pedestrian detours to South Main Street may be required.

Under Alternative CID-1a*, 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, where pedestrians may need divert to South Main Street.

<u>4th Avenue Deep Station Option (CID-1b)*</u>

Option CID-1b* would be similar to Alternative CID-1a*, affecting the SODO Trail, 4th Avenue South access to the Weller Street Bridge, 4th Avenue South and its connecting streets.

<u>5th Avenue Shallow Alternative (CID-2a)</u>

Under Alternative CID-2a, 5th Avenue South would be partially and fully closed during station construction, potentially affecting its existing bike lane. South Jackson Street would be partially closed at 5th Avenue South, limiting 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 between the Chinatown-International District community and the existing light rail station. The partial closure of 6th Avenue South in the station vicinity could also affect pedestrian movements. 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. Sidewalk closures on 6th Avenue South in the station vicinity for the diagonal station configuration could affect pedestrian movements.

<u>5th Avenue Deep Station Option (CID-2b)</u>

Under Option CID-2b, 6th Avenue South would be partially closed, and 5th Avenue South would be partially and fully closed during station construction similar to Alternative CID-2a.

Traffic diversion is discussed in more detail in the Chinatown-International District Segment section of Section 4.3.2.3, Construction Impacts.

Downtown Segment

<u>Preferred Alternative (DT-1)</u>

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, limiting pedestrian and bicycle access (Table 3-28); the dense street grid in the Downtown Segment could provide multiple alternate routes for non-motorized users. For construction of the Seattle Center Station, the closure of Republican Street/August Wilson Way would affect the neighborhood greenway and pathway into Seattle Center.

<u>Other Build Alternative (DT-2)</u>

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 City's 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.

South Interbay Segment

<u>Preferred Alternative (SIB-1)</u>

Under Preferred Alternative SIB-1, the stairway to the West Galer Street Flyover may be closed on nights and weekends; pedestrians could use the Helix pedestrian bridge, 1,700 feet to the south, as an alternate access route across the railroad tracks.

<u>Other Build Alternatives (SIB-2 and SIB-3)</u>

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.

Interbay/Ballard Segment

<u>Preferred Alternative (IBB-1a)</u>

Under Preferred Alternative IBB-1a, 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.

<u>Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)</u>

No specific non-motorized effects beyond the general roadway impacts described in Impacts Common to All Alternatives in this section are expected under Preferred Alternative IBB-2a* or Preferred Option IBB-2b*.

<u>Other Build Alternative and Option (IBB-1b and IBB-3)</u>

Under 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.

Under Alternative IBB-3, the portion of sidewalk on the West 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.

Traffic diversion is discussed in more detail in the Interbay/Ballard section of Section 4.3.2.3, Construction Impacts.

6.4.3 Potential Mitigation Measures

6.4.3.1 Long-term Impacts

The Ballard Link Extension may permanently impact existing or planned designated bicycle facilities or routes. Sound Transit will 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:

- Crosswalk across 4th Avenue South at South Weller 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.
- 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.

- Southwest corner of 4th Avenue South and South Jackson Street for Alternative CID-1a* and Option CID-1b*.

Sound Transit will 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.

6.4.3.2 Construction

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 would 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 will 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 a minimum they will 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 will 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 identifies operational strategies and improvements to maintain operations and access to 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.

7 SAFETY

This chapter summarizes the study area safety and collision data for arterials and local streets. This includes describing new WSBLE Project improvements affecting safety and potential safety impacts (increases or decreases in collisions) for arterials, local streets, and non-motorized modes. Safety impacts associated with WSBLE construction are also described.

7.1 Key Findings

- Under the no build condition, safety performance is expected to remain largely the same as the existing conditions, with slight growth in traffic volumes and no major transportation infrastructure projects that would substantially alter the travel patterns within the study area.
- The safety of the transportation system is expected to be minimally affected by the West Seattle Link and Ballard Link extensions because all light rail alternatives would be grade-separated and operate in exclusive right-of-way (in a tunnel, elevated, or in exclusive facilities when at-grade).
- The project 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 up to 120,000 vehicle miles traveled per day in the region. A mode shift where people use transit and travel less by car would reduce the overall number of potential conflicts.
- The primary safety impacts would be the increase in potential conflicts around station areas as a result of increased vehicle or non-motorized activity in these areas. Stations would be designed to include appropriate non-motorized facilities to accommodate this expected level of activity and coordinated with the City of Seattle. Station access would be through signalized or controlled locations, and in some instances grade-separated crossings.
- Although pedestrian and bicyclist activity is expected to increase around stations, the increase in conflicts is relatively small compared to the number of conflicts already experienced within the dense and heavily used pedestrian and bicycle areas.
- For construction, Sound Transit would develop a Maintenance of Traffic Plan based on the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and Seattle Department of Transportation's *Traffic Control Manual for In-street Work*. During construction, some roadways would be partially or fully closed. While the number of collisions on the network within any given segment are expected to be similar, streets used as alternate routes would have more vehicles traveling on them potentially creating more collisions on those streets.
- Construction also may temporarily close some sidewalks, crosswalks, and bicycle facilities. Some closures may detour divert bicyclists away from dedicated facilities to shared facilities, but Sound Transit would coordinate with the City of Seattle to identify appropriate alternate facilities.

7.2 Introduction to Transportation Safety

To assess the current safety conditions within the WSBLE study area, collision data was collected for the most recent 5-year period between 2014 and 2018. The safety study area is defined as approximately one block radius around the alignment and stations (equivalent to 330-foot buffer). Over the 5-year period, a total of 5,632 collisions occurred within this study area. The 20 roadway segments and 20 intersections where the highest number of collisions occurred over the 5-year period are summarized for the affected environment to highlight the key trends in collisions along the corridor and around station locations.

The City of Seattle's safety initiative, Vision Zero, aims to eliminate all traffic deaths by 2030, and the City has employed several strategies to achieve this mission, including efforts to increase transit use. 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 Vision Zero corridor prioritization in the WSBLE study areas.

Overall, the West Seattle Link and Ballard Link extensions would potentially shift up to 20,000 people per day from driving, or other non-transit modes, to using transit. This would result in a potential reduction of up to 120,000 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.

7.3 West Seattle Link Extension

7.3.1 Affected Environment

Several roadways within the West Seattle Link Extension study area are identified as high crash corridors in the Seattle Department of Transportation's Vision Zero 2017 Progress Report.

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. 4th Avenue South, 6th Avenue South, Delridge Way Southwest, Southwest Avalon Way, Fauntleroy Way Southwest, and California Avenue Southwest are all corridors in the West Seattle Link Extension area that are 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, that are likely to reduce collisions and their severity.

Intersections between the roadway system and the existing light rail system are also potential conflict points. While most of the existing light rail system is grade-separated and does not interact with other modes, portions of the Link light rail system are at-grade and at intersections vehicle and non-motorized traffic have direct conflicts with light rail vehicles where they cross the existing light rail guideway. Within the project corridor, the light rail system operates at-grade in the SODO Segment and there are at-grade roadway crossings of the existing light rail guideway at South Holgate Street. Dynamic and static warning signs, signals, and zigzag or gated pedestrian crossings are present in these locations to alert drivers and pedestrians of the presence or potential presence of light rail vehicles.

Roadway segments and intersections potentially affected by the Build Alternatives were summarized and sorted based on total collision frequency. Table 7-1 summarizes the 20 intersections with the highest number of collisions, by severity, within this study area. The majority of collisions were property damage only collisions. No fatal collisions occurred at these intersections. Angle collisions were the most common collision type, which is typical for intersections. More information regarding the distribution of collision types at these intersections in included in Attachment N.1H, Historical Collisions by Collision Type.

Table 7-1. Top 20 Collision Intersections by Severity (2014 to 2018) – West Seattle Link Extension

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
Duwamish	1st Avenue South and South Spokane Street (northbound)	0	0	8	2	0	10
Duwamish	1st Avenue South and South Spokane Street (southbound)	0	1	6	12	0	19
Duwamish	1st Avenue South off-ramp and South Spokane Street (southbound)	0	0	2	4	0	6
Duwamish	2nd Avenue South and South Spokane Street (southbound)	0	0	2	5	0	7
Duwamish	4th Avenue South and South Spokane Street (northbound)	0	1	16	13	0	30
Duwamish	4th Avenue South and South Spokane Street (southbound)	0	0	7	15	1	23
Duwamish	East Marginal Way South and South Spokane Street (northbound)	0	0	2	10	0	12
Delridge	39th Avenue Southwest and Southwest Genesee Street	0	0	2	3	0	5
Delridge	Delridge Way Southwest and Southwest Andover Street	0	0	5	6	0	11
West Seattle Junction	35th Avenue Southwest and Southwest Avalon Way	0	0	13	16	1	30
West Seattle Junction	37th Avenue Southwest and Fauntleroy Way Southwest	0	0	2	4	0	6

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
West Seattle Junction	38th Avenue Southwest and Southwest Oregon Street	0	0	5	1	0	6
West Seattle Junction	39th Avenue Southwest and Fauntleroy Way Southwest	0	0	4	2	0	6
West Seattle Junction	40th Avenue Southwest and Southwest Oregon Street	0	0	1	2	2	5
West Seattle Junction	42nd Avenue Southwest and Southwest Alaska Street	0	0	5	3	0	8
West Seattle Junction	California Avenue Southwest and Southwest Oregon Street	0	0	8	5	0	13
West Seattle Junction	Fauntleroy Way Southwest and Southwest Alaska Street	0	0	3	12	3	18
West Seattle Junction	Fauntleroy Way Southwest and Southwest Avalon Way	0	0	6	2	1	9
West Seattle Junction	Fauntleroy Way Southwest and Southwest Oregon Street	0	1	3	5	1	10
West Seattle Junction	Fauntleroy Way Southwest and West Seattle Bridge eastbound	0	0	4	7	1	12

[a] Locations are included within 330 feet of the West Seattle Link Extension or station areas.

Table 7-2 summarizes the 20 roadway segments with the highest number of collisions within the study area. The SODO Segment had relatively high collision frequencies compared to other areas. For the roadway segments analyzed along the West Seattle Link Extension, the highest number of collisions occurred at the West Seattle Bridge eastbound lane between the Alaskan Way Viaduct on-ramp and Delridge Way Seattle Bridge eastbound on-ramp. Nearly half of the 20 highest-collision roadway segments are on or near the West Seattle Bridge.

For these high-collision intersections and roadway segments within the West Seattle Link Extension study area, over half of the collisions resulted in property damage only. There was 1 fatal collision, which was attributed to a fixed object, and 14 serious injury collisions, 5 of which were pedestrian-related and 4 of which were bicycle-related.

Table 7-2. Top 20 Collision Roadway Segments by Severity (2014 to 2018) – West Seattle Link Extension

Segment	Location [a]	Fatal Collision	Serious Injury Collision	Injury Collision	Property Damage Only Collision	Unknown Collisions	Total Collisions
SODO	South Holgate Street between 4th Avenue South and 5th Avenue South	0	0	1	8	4	13
SODO	East Marginal Way South between South Spokane Street (south) and East Marginal Way South (northbound)	0	0	2	8	1	11
Duwamish	Alaskan Way Viaduct northbound on-ramp between Spokane Street–Alaskan Ramp and Alaskan Way Viaduct northbound	0	0	5	13	0	18
Duwamish	Alaskan Way Viaduct southbound West Seattle Bridge westbound off-ramp between Alaskan Way Viaduct southbound and West Seattle Bridge westbound	1	0	3	11	0	15
Duwamish	West Seattle Bridge between East Marginal Way South and Southwest Spokane Street (northbound)	0	0	1	10	3	14
Duwamish	West Seattle Bridge eastbound between Alaskan Way Viaduct northbound on-ramp and Delridge-West Seattle Bridge eastbound on-ramp	0	1	19	32	0	52
Duwamish	West Seattle Bridge eastbound between Delridge-West Seattle Bridge eastbound on-ramp and 26th Avenue Southwest on-ramp	0	0	12	19	2	33
Duwamish	West Seattle Bridge eastbound between West Seattle Bridge eastbound 4th Avenue off-ramp and 1st Avenue South off-ramp	0	0	8	18	1	27
Duwamish	West Seattle Bridge westbound off-ramp	0	0	8	9	0	17

Segment	Location [a]	Fatal Collision	Serious Injury Collision	Injury Collision	Property Damage Only Collision	Unknown Collisions	Total Collisions
	between West Seattle Bridge westbound and West Seattle Bridge westbound–Chelan off-ramp						
Duwamish	West Seattle Bridge westbound between Alaskan Way Viaduct southbound West Seattle Bridge westbound off-ramp and West Seattle Bridge westbound off-ramp	0	0	3	13	0	16
Duwamish	West Seattle Bridge westbound off-ramp between West Seattle Bridge westbound–Chelan off-ramp and Delridge Way Southwest	0	0	6	9	0	15
Delridge	Delridge Way Southwest between Southwest Andover Street and Southwest Dakota Street	0	0	11	7	3	21
Delridge	Delridge Way Southwest between Southwest Dakota Street and Southwest Genesee Street	0	2	9	10	2	23
Delridge	Southwest Avalon Way between 30th Avenue Southwest and Southwest Genesee Street	0	1	4	9	0	14
Delridge	Southwest Avalon Way between 35th Avenue Southwest and 36th Avenue Southwest	0	1	3	8	2	14
Delridge	Southwest Avalon Way between Southwest Genesee Street and 35th Avenue Southwest	0	0	4	16	2	22
West Seattle Junction	35th Avenue Southwest between Fauntleroy Way Southwest and Southwest Avalon Way	0	1	5	9	2	17

Segment	Location [a]	Fatal Collision	Serious Injury Collision	Injury Collision	Property Damage Only Collision	Unknown Collisions	Total Collisions
West Seattle Junction	42nd Avenue Southwest between Southwest Alaska Street and Southwest Edmunds Street	0	0	1	15	5	21
West Seattle Junction	42nd Avenue Southwest between Southwest Oregon Street and Southwest Alaska Street	0	1	3	7	4	15
West Seattle Junction	Southwest Oregon Street between California Avenue Southwest and 44th Avenue Southwest	0	0	0	9	2	11

[a] Locations are included within 330 feet of the West Seattle Link Extension and station areas.

7.3.2 Environmental Impacts

The transportation safety impacts of the West Seattle Link Extension were assessed qualitatively for each alternative. This assessment takes into consideration the concept designs for the West Seattle Link Extension alternatives and how travel patterns, volume, and transportation network changes may change conflicts and impact overall transportation safety. This also includes a consideration of vehicles, pedestrians, and bicyclists, particularly focused on the area surrounding stations.

In general, while vehicle volumes and activity around station areas would increase, the project is expected to shift people from using non-transit modes to riding transit. Sound Transit is proposing pedestrian and bicyclist circulation improvements adjacent to stations, such as new connections or signals, both of which would potentially eliminate conflicts in some locations. In general, these aspects of the project are likely to improve safety at near the stations, which will be described in the following sections.

Safety is generally described in this section in terms of potential conflicts between modes (e.g., the number of pedestrians that might interact with motor vehicles). However, a variety of other factors that could influence safety could be considered at more advanced stages of design, including speed differential between users, improved visibility between users, or potential applications of shared space designs.

7.3.2.1 No Build Alternative

The transportation safety performance under the No Build Alternative is expected to be similar or better than the existing conditions given these projects along with the expected modest background traffic volume growth.

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 bicycle and greenway improvements. The RapidRide H Line Project includes improvements to Delridge Way Southwest that have the potential to reduce crashes, severity, or both by providing non-motorized facilities (e.g., bicycle greenways and signalized crossings) on a high crash corridor. The Fauntleroy Way Southwest Boulevard Project will reconfigure the street cross-section on Fauntleroy Way Southwest, also a high crash corridor, with bicycle lanes and a raised median, which also have the potential to reduce collisions or their severity.

Beyond these planned improvements, the City of Seattle routinely conducts Vision Zero progress reports to assess previous projects and identifies prioritized locations for future projects. Therefore, it is expected that beyond the specific projects identified above, additional projects to improve the safety of the transportation system would be performed by City of Seattle prior to the WSBLE being built.

7.3.2.2 Build Alternatives

Long-term Impacts

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 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 up to 120,000 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, 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 denser 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 coordinated with the City of Seattle.

SODO Segment

Preferred Alternative (SODO-1a)

With Preferred Alternative SODO-1a, the guideway would be within the SODO Busway right-of-way and separated from general purpose traffic. Buses would no longer use the SODO Busway, which would become a rail-only facility with this alternative. As part of the project's transit integration plan (see Attachment N.1C, Transit Service Integration Technical Memorandum), many of the bus routes that currently use the SODO Busway would be truncated or eliminated. Therefore, the additional bus traffic on general streets with the SODO Busway transition to a rail-only facility is not expected to be substantial. A roadway overcrossing at South Lander Street 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. Additionally, no portion of the guideway would be within the roadway in this segment; therefore, the guideway would not impact vehicle safety.

Pedestrian and bicyclist interactions would remain similar to the No Build Alternative or potentially improve because the expected increase in non-motorized volumes (about 400 daily trips) is negligible and the South Lander Street overcrossing would provide grade-separated crossings.

Other Build Alternative and Option (SODO-1b and SODO-2)

Transportation safety issues and impacts with Option SODO-1b are expected to be similar to Preferred Alternative SODO-1a because the Lander Street overcrossing would also be constructed as part of this alternative, the SODO Busway would be eliminated, and no portion of the existing or new guideway would be within the roadway.

With Alternative SODO-2, the elevated guideway within the West Seattle Link Extension would maintain the SODO Busway and buses would continue to operate in this facility. No portion of the guideway would be within the roadway system in the segment; therefore, the guideway 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, existing rail and bus traffic would still have an at-grade signalized crossing at South Lander Street.

Duwamish Segment

About half of the top collision locations identified in Section 7.3.1, Affected Environment, are within the Duwamish Segment, but none of the alternatives would affect vehicular or non-motorized safety in the segment because 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. The alternatives in this segment do not include a station.

Delridge Segment

Preferred Alternative (DEL-1a)

The guideway with Preferred Alternative DEL-1a would be outside of or adjacent to the roadway except for a few 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 (this also applies to 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. Safety impacts due to guideway columns outside of the roadway would be minimal to none.

Pedestrian and bicyclist volumes are expected to increase (more than 500 daily trips) around the Delridge Station area, creating the potential for increased conflicts near the station, but the station would be designed to accommodate this level of activity and station access would be at signalized/controlled locations.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Alternative DEL-2a* would have similar transportation safety issues and impacts to Preferred Alternative DEL-1a.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

Option DEL-2b*, Alternative DEL-3, Alternative DEL-4*, Alternative DEL-5, and Alternative DEL-6* would all have similar transportation safety issues and impacts to Preferred Alternative DEL-1a.

Option DEL-1b would also be similar to Preferred Alternative DEL-1a but would have a guideway column in the middle of a new median on Southwest Genesee Street, which may have an impact on safety. The project would ensure adequate lateral clearance from the guideway columns to any travel lanes, including to and from the Nucor Steel property, however, to minimize any impact.

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

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

Portions of the elevated guideway in Preferred Alternative WSJ-1 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.

The elevated Avalon Station with Preferred Alternative WSJ-1 is expected to only experience a small increase in daily vehicle traffic around the station; therefore, there is expected to be a negligible impact to vehicle safety. Pedestrian and bicyclist daily volumes are expected to increase (over 600 daily trips), which is likely to have a negligible impact on safety around the station area.

Four of the highest-collision locations identified in Section 7.3.1 (42nd Avenue Southwest between Southwest Oregon Street and Southwest Alaska Street, 42nd Avenue Southwest between Southwest Alaska Street and Southwest Edmunds Street, and the intersections of

42nd Avenue Southwest/Southwest Alaska Street, California Avenue Southwest/Southwest Oregon Street), are adjacent to the Alaska Junction Station area for Preferred Alternative WSJ-1. However, similar to the Avalon Station, the small increase in daily vehicle traffic around the station is likely to have a negligible impact on vehicle safety around the station area.

With this Alaska Junction Station location, there would be an increase in pedestrian and bicyclist volumes on the surrounding transportation system (more than 2,000 daily trips). 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 station access locations are not along the arterial streets in this area, which would concentrate the station pedestrian and bicyclist activity away from the higher vehicle volumes on Southwest Alaska Street and California Avenue Southwest. The Alaska Junction Station area would also be designed to accommodate this level of activity and station access would be at signalized or controlled locations. Although the pedestrian and bicyclist activity is expected to increase at this station, the increase in conflicts is relatively small compared to the number of conflicts already experienced in this dense and already pedestrian- and bicycle-oriented area.

The Avalon Station with Preferred Alternative WSJ-2 would have the same safety impacts as the Avalon Station with Preferred Alternative WSJ-1.

The transportation safety impacts of Preferred Alternative WSJ-2 would also be similar to Preferred Alternative WSJ-1, except that the station is in a less dense pedestrian area along Fauntleroy Way Southwest. However, about a dozen of the top collision locations identified in Section 7.3.1 are near the Alaska Junction Station with Preferred Alternative WSJ-2. Design of the station and alignment through this area would adhere to City of Seattle roadway standards, considering the collision history and include potential applicable roadway treatments to minimize the conflicts.

The daily increase in non-motorized trips for Preferred Alternative WSJ-2 is about the same as Preferred Alternative WSJ-1; however, the station is closer to the major arterials (Fauntleroy Way Southwest and Southwest Alaska Street) and may have greater potential for conflicts. But the station would be designed to include appropriate non-motorized facilities to accommodate this expected level of activity and coordinated with the City of Seattle.

<u>Preferred Alternative and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*)</u>

Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would have similar transportation safety issues and impacts to Preferred Alternative WSJ-1 due to similar station locations and vehicular and non-motorized volumes around the stations.

<u>Other Build Alternatives (WSJ-4* and WSJ-5*)</u>

Alternative WSJ-4* and Alternative WSJ-5* would have similar transportation safety issues and impacts to Preferred Alternative WSJ-1; however, these alternatives would not have any guideway columns or other physical roadway impacts.

Construction Impacts

With each of the West Seattle Link Extension Build Alternatives, traffic diversion caused by light rail guideway construction would be required. These diversions would be focused on arterials, where feasible.

Refer to Section 4.2.2.3, Construction Impacts, for details on the location and duration of each closure for the West Seattle Link Extension Build Alternatives. The following sections highlight roadways that are expected to have long-term closures with access or travel pattern changes that could affect the safety of the transportation system.

Impacts Common to All Alternatives

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 Manual on Uniform Traffic Control Devices (2009) and Seattle Department of Transportation Traffic Control Manual (City of Seattle 2012). Items that would be included are described in Section 4.2.3.

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.

SODO Segment

Preferred Alternative (SODO-1a) and Other Option (SODO-1b)

In SODO, with Preferred Alternative SODO-1a and Option SODO-1b, the South Lander Street closure would redistribute traffic to adjacent streets such as South Holgate Street; this would increase volumes on some roadways and decrease volumes on others. This would likely have a mixed impact on safety as collisions are related to traffic volumes. While specific streets may see a change in safety impacts (increase or decrease), it is likely that there would be negligible overall safety impact within the segment because the total traffic volumes in the area are not expected to change.

The SODO Trail would be temporarily closed, requiring pedestrians and bicyclists to divert to an arterial, likely 4th Avenue or 6th Avenue, instead of a multi-use facility. This may increase the potential for conflicts with vehicles.

Other Build Alternative (SODO-2)

Alternative SODO-2 would require the temporary closure of the SODO Trail, similar to Preferred Alternative SODO-1a and Option SODO-1b.

Duwamish Segment

The Duwamish Segment does not have any stations or any substantial construction closures associated with any of the Build Alternatives.

Delridge Segment

All of the Delridge Segment alternatives are expected to have long-term full or partial street closures on one or more arterials. However, the overall number of collisions within the Delridge Segment is still expected to be similar to the no build condition.

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a would partially close Delridge Way Southwest and fully close Southwest Genesee Street, which is likely to increase traffic volumes on adjacent streets and potentially increase collisions on these streets.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Preferred Alternative DEL-2a* would be similar to Preferred Alternative DEL-1a, except Southwest Genesee Street would likely only require short-term full closures on nights and weekends.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

The partial Delridge Way Southwest closure associated with all of the alternatives except Alternative DEL-5 and Alternative DEL-6* is likely to increase traffic volumes on adjacent streets and potentially increase collisions on these streets.

Similarly, the full closure of Southwest Genesee Street with Option DEL-1b and Alternative DEL-3, the full closure of Southwest Avalon Way with Alternative DEL-5, and the full closure of Southwest Andover Street with Alternative DEL-5 and Alternative DEL-6* would likely lead to increased volumes on adjacent streets and potentially also increase the number of collisions on those streets.

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

The full closure of Southwest Alaska Street with Preferred Alternative WSJ-2 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 4.2.2.3, Construction Impacts. Pedestrian and bicyclist diversions are described in Section 6.3.3, Potential Mitigation Measures.

Preferred Alternative and Option with Third-Party Funding (WSJ-3a* and WSJ-3b*)

The full closure of 35th Avenue Southwest and the partial closure of Fauntleroy Way Southwest with Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would also divert vehicles to adjacent arterial streets where feasible and have similar impacts to Preferred Alternatives WSJ-1 and WSJ-2.

Other Build Alternatives (WSJ-4* and WSJ-5*)

Both Alternative WSJ-4* and Alternative WSJ-5* would partially close Fauntleroy Way Southwest similar to Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b*. Alternative WSJ-5* would also require the full closure of 35th Avenue Southwest. Closures with Alternative WSJ-4* and Alternative WSJ-5* would have similar construction impacts to Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2.

7.3.3 Potential Mitigation Measures

7.3.3.1 Long-term 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 (Section 3.2.3), arterials and local streets (Section 4.2.3), and non-motorized facilities (Section 6.3.3). 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.

7.3.3.2 Construction Impacts

During construction, Sound Transit would develop a Maintenance of Traffic Plan to adhere to federal and local agency guidelines as described in the Construction Impacts section of Section 7.3.2.2, as well as to the measures described in Section 4.2.3. The Maintenance of Traffic Plan would be created to minimize safety concerns on the transportation system during construction. The mitigation proposed in Section 3.2.3.2 for transit and Section 6.3.3.2 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.

7.4 Ballard Link Extension

7.4.1 Affected Environment

Several roadways along the Ballard Link Extension corridor are identified as high crash corridors in the Seattle Department of Transportation's *2017 Vision Zero Progress Report*. For the 2019 to 2024 portion of the Levy to Move Seattle, Elliott Avenue West was identified as a priority corridor. 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.

Intersections between the roadway system and the existing light rail system are also potential conflict points. While most of the existing light rail system is grade-separated and does not interact with other modes, portions of the Link light rail system are at-grade and vehicle and non-motorized traffic have direct conflicts with light rail vehicles at intersections. Within the project corridor, the light rail system operates at-grade in the SODO Segment. Dynamic and static warning signs, signals, and zigzag or gated pedestrian crossings are present in these locations to alert drivers and pedestrians of the presence or potential presence of light rail vehicles.

Roadway segments and intersections potentially affected by any of the project alternatives were summarized and sorted based on total collision frequency. Table 7-3 summarizes the 20 intersections with the highest number of collisions, by severity, within this study area. Most of the 20 intersections with the highest occurrence of collisions are in either the Downtown or SODO segments. The intersection of 6th Avenue and James Street experienced over 50 percent more collisions than the next-highest collision site. One approach at this intersection serves as a freeway on-ramp, with another approach on a steep grade. Several other top collision intersections also have a steep grade, suggesting that grade may be a contributing factor in collisions at some Downtown Seattle intersections.

Table 7-3. Top 20 Collision Intersections by Severity (2014 to 2018) – Ballard Link Extension

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
SODO	1st Avenue South and South Spokane Street	0	1	6	12	0	19
SODO	4th Avenue South and South Spokane Street	0	0	7	15	1	23
Chinatown-International District	4th Avenue South and South Jackson Street	0	0	19	18	0	37
Chinatown-International District	4th Avenue South and South Royal Brougham Way	0	2	10	10	0	22
Downtown	5th Avenue and Olive Way	0	0	6	23	1	30
Chinatown-International District	5th Avenue South and South Jackson Street	0	2	12	8	1	23
Downtown	5th Avenue and Pike Street	0	0	16	24	1	41
Downtown	5th Avenue and Seneca Street	1	0	9	29	0	39
Downtown	5th Avenue and Spring Street	0	2	18	27	1	48
Downtown	5th Avenue and Union Street	0	1	17	18	1	37
Downtown	5th Avenue and University Street	0	0	20	27	1	48
Downtown	6th Avenue and Cherry Street	0	2	10	25	0	37
Downtown	6th Avenue and James Street	0	1	31	41	3	76
Downtown	6th Avenue and Madison Street	0	0	3	34	5	42
Downtown	6th Avenue and Pine Street	0	0	10	8	1	19
Downtown	6th Avenue and Spring Street	0		11	10	1	22

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
Downtown	6th Avenue and University Street	0	1	14	19	0	34
Downtown	Mercer Street and Queen Anne Avenue North	0	0	13	12	2	27
Interbay/ Ballard	15th Avenue Northwest and Northwest Market Street	1	0	9	11	2	23
Interbay/ Ballard	Northbound 15th Avenue Northwest and Northwest Leary Way	0	0	3	14	4	21

[a] Locations are included within 330 feet of the Ballard Link Extension and station areas.

Most collisions were property damage only, but there were two fatal collisions reported at these intersections. More detail regarding the distribution of collision types at these intersections is included in Attachment N.1H, Historical Collisions by Collision Type.

Table 7-4 summarizes the 20 roadway segments with the highest number of collisions within 330 feet of the Ballard Link Extension alternatives. Nearly half of the highest-collision roadway segments are in the Downtown and SODO segments. Within the South Interbay Segment, the Smith Cove neighborhood has a few roadway locations with high collision frequencies.

Table 7-4. Top 20 Collision Roadway Segments by Severity (2014 to 2018) – Ballard Link Extension

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
Downtown	5th Avenue between Pike Street and Pine Street	0	0	6	13	3	22
Downtown	5th Avenue between Union Street and Pike Street	1	0	6	12	3	22
Downtown	6th Avenue between Pine Street and Olive Way	0	0	4	16	3	23
Downtown	6th Avenue between Union Street and Pike Street	0	1	5	16	2	24

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
Downtown	7th Avenue North between Thomas Street and Harrison Street [b]	0	1	7	14	2	24
Downtown	Denny Way between Westlake Avenue and Terry Avenue	0	1	3	21	2	27
Downtown	James Street between 6th Avenue and 7th Avenue	0	0	8	29	6	43
Downtown	Queen Anne Avenue North between Mercer Street and Roy Street	0	0	1	17	5	23
Chinatown-International District	4th Avenue South between Interstate 90 westbound 4th Avenue off-ramp and South Royal Brougham Way	0	0	6	19	1	26
Chinatown-International District	4th Avenue South between Seattle Boulevard South and Interstate 90 westbound 4th Avenue off-ramp	0	0	5	14	3	22
South Interbay	Elliott Avenue West between 6th Avenue West and West Mercer Street	0	0	8	15	0	23
South Interbay	Elliott Avenue West between West Lee Street and West Galer Street Flyover	0	0	14	11	0	25
South Interbay	Elliott Avenue West between West Mercer Place and West Prospect Street	0	0	16	12	4	32
South Interbay	Elliott Avenue West between West Mercer Street and West Mercer Place	0	3	21	15	5	44

Segment	Location [a]	Fatal Collisions	Serious Injury Collisions	Injury Collisions	Property Damage Only Collisions	Unknown Collisions	Total Collisions
South Interbay	Elliott Avenue West between West Prospect Street and West Lee Street	0	1	7	18	3	29
South Interbay	Mercer Street between 5th Avenue North and Taylor Avenue North	0	0	5	16	4	25
Interbay/ Ballard	Ballard Bridge between 15th Avenue West and south end of drawbridge	0	0	7	15	0	22
Interbay/ Ballard	Ballard Bridge between south end of drawbridge to north end of bridge	0	1	14	16	0	31
Interbay/ Ballard	Northwest Leary Way between 14th Avenue Northwest and 15th Avenue Northwest (northbound)	0	0	4	13	4	21
Interbay/ Ballard	Northwest Market Street between 14th Avenue Northwest and 15th Avenue Northwest	0	0	10	17	0	27

[a] Locations are included within 330 feet of the Ballard Link Extension and station areas.

[b] Data include only collisions before the closure of the State Route 99 Viaduct and opening of the State Route 99 Tunnel.

For all the high-collision intersections and roadway segments along the Ballard Link Extension, over half of the collisions resulted in property damage only. There were 3 fatal collisions, 2 of which involved pedestrians, and 21 serious injury collisions, 9 of which involved pedestrians and 4 of which involved bicyclists. Rear-end collisions were the most common collisions along roadway segments, and angle collisions were the most common collisions at intersections.

7.4.2 Environmental Impacts

The transportation safety impacts of the Ballard Link Extension were assessed qualitatively for each alternative.

This assessment takes into consideration the concept designs for the Ballard Link Extension alternatives and how travel patterns, volume, and transportation network changes may change conflicts and impact overall transportation safety. This also includes a consideration of vehicles, pedestrians, and bicyclists, particularly focused on the area surrounding stations.

In general, while vehicle volumes and activity around station areas would increase, the project is expected to shift people from using non-transit modes to riding transit, and Sound Transit is proposing pedestrian and bicyclist circulation improvements adjacent to stations, such as new connections or signals, both of which would potentially eliminate conflicts in some locations. In general, these aspects of the project are likely to improve safety near the stations, which will be described in the following sections.

7.4.2.1 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 WSBLE being built.

7.4.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All Alternatives

The transportation safety impacts common to all alternatives of the Ballard Link Extension alignment would be similar to those identified for the West Seattle Link Extension in Section 7.3.2.2.

Specific to the Ballard Link Extension, pedestrian and bicyclist activity is expected to increase (between 1,200 to 13,000 daily pedestrians and bicyclists) around each station; however, 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 be coordinated with the City of Seattle.

SODO Segment

<u>Preferred Alternative (SODO-1a)</u>

With Preferred Alternative SODO-1a, the guideway would be within the SODO Busway right-of-way and separated from general purpose traffic. A roadway overcrossing at South Holgate Street would separate the new and existing guideway from interacting with traffic at South Holgate Street, 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. No portion of the guideway would be within the roadway in this segment; therefore, the guideway would not impact vehicle safety.

Other Build Alternative and Option (SODO-1b and SODO-2)

Transportation safety issues and impacts with Option SODO-1b and Alternative SODO-2 are expected to be similar to Preferred Alternative SODO-1a because the Option SODO-1b guideway would not conflict with general purpose traffic, and a roadway overcrossing at South Holgate Street would be constructed.

Chinatown-International District Segment

With the Chinatown-International District Segment alternatives, the transportation safety surrounding the Stadium Station is not expected to change as a result of the Build Alternatives because the project does not propose an additional station in this area and the level of activity (vehicles and non-motorized trips) is not expected to be noticeably different with the project than under the No Build Alternative.

4th Avenue Shallow Alternative (CID-1a)*

Alternative CID-1a* would experience a small increase in vehicle traffic around the International District/Chinatown Station; therefore, the alternative would likely have a minimal impact on vehicle safety around the station area.

The additional pedestrian and bicyclist activity is expected to increase with Alternative CID-1a* compared to the No Build Alternative, which would increase the potential for conflicts around this already dense pedestrian area. However, the International District/Chinatown Station area is surrounded by a plaza that has multiple adjacent signalized crossings allowing large concentrations of pedestrians and bicyclists to access the station without the confines of the surrounding street system. Alternative CID-1a* would provide direct underground access for transfers with the southbound existing International District/Chinatown Station, which would require fewer passengers to use the surrounding street system to transfer between light rail lines.

4th Avenue Deep Station Option (CID-1b)*

Transportation safety with Option CID-1b* is expected to be similar to Alternative CID-1a*, including the direct underground access at the existing International District/Chinatown Station.

5th Avenue Shallow Alternative (CID-2a)

Transportation safety with Alternative CID-2a is expected to be similar to Alternative CID-1a*.

Pedestrian and bicyclist activity is expected to increase as more than 3,200 daily trips would occur with Alternative CID-2a compared to the No Build Alternative. This would increase the potential for conflicts around this already dense pedestrian area. However, the International District/Chinatown Station area is surrounded by a plaza that has multiple adjacent signalized crossings, allowing large concentrations of pedestrians and bicyclists to access the station without the confines of the surrounding street system. Alternative CID-2a provides direct underground access for transfers to the northbound light rail line of the existing International District/Chinatown Station, but passengers transferring to the southbound light rail line would need to access the existing station platform using the street level. This may mean more pedestrian activity at the street level, but the majority of activity would be within the plaza.

5th Avenue Deep Station Option (CID-2b)

Transportation safety issues and impacts with Option CID-2b are expected to be the same as with Alternative CID-2a, including the direct underground access at the existing International District/Chinatown Station.

Downtown Segment

Preferred Alternative (DT-1)

At each of the stations in the Downtown Segment, most 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 because of minimal changes in vehicular volumes associated with the station activity. Even though there would be an overall increase in the pedestrian and bicyclist activity within the Downtown Segment, the increase in volume is relatively small compared to the overall volume experienced in the highly dense, pedestrian-oriented Downtown Seattle area. The Downtown Seattle transportation system is established as a multi-modal network with driver expectations of a highly dense system of vehicles, transit users, pedestrians, and bicyclists. Therefore, the safety impacts with the additional pedestrian and bicyclist activity is expected to be negligible.

While about half of the top collision locations identified in Section 7.4.1, Affected Environment, are within this segment, the guideway would be in a tunnel for the entire segment, which would not have an effect on vehicle safety. The roadway system would resemble the No Build Alternative because any roadway impacts during construction would be rebuilt to previous conditions and would adhere to City of Seattle roadway standards. Sound Transit would coordinate with the City to identify any potential roadway treatments that would be feasible to improve the existing roadway safety conditions once the roadways are rebuilt.

Pedestrian and bicyclist activity with the existing downtown stations at Pioneer Square and University Street (in the Downtown Seattle Transit Tunnel) are expected to decrease because ridership patterns would shift to the new stations proposed with the project.

Around the Westlake Station area, pedestrian and bicyclist activity is expected to increase by more than 2,000 daily trips, which may increase the potential for conflicts around the already dense, pedestrian-heavy station area. The new platform for the Westlake Station with Preferred Alternative DT-1 would connect to the existing Westlake Station at Pine Street with underground walkways, which would reduce the amount of pedestrian activity on the street level and minimize the non-motorized safety impacts.

The Denny, South Lake Union, and Seattle Center stations are new stations that would attract more pedestrian and vehicle traffic to the area, which may increase the potential for conflicts around these stations. Each of these stations would be designed to include appropriate non-motorized facilities to accommodate the anticipated level of activity and coordinated with the City of Seattle. Station access would also be through signalized or controlled locations.

The Seattle Center Station would experience large surges in pedestrian volumes during events, typically during off-peak periods. Preferred Alternative DT-1 would be located with direct access to Seattle Center and other venues on the Seattle Center campus. This would provide a direct connection for riders that would not require them to interact with the surrounding street system. Sound Transit would work with the City of Seattle to consider event management strategies and best practices from its current management of event operations to ensure safe access during events is maintained.

Other Build Alternative (DT-2)

Transportation safety conditions with Alternative DT-2 are expected to be similar to with Preferred Alternative DT-1. However, pedestrian and vehicle volumes for the Denny and South Lake Union stations are expected to be less than with Preferred Alternative DT-1, which is likely to have a smaller impact on safety. Alternative DT-2 would require one roadway crossing for Seattle Center patrons and Climate Pledge Arena attendees when traveling to and from the

Seattle Center Station. Sound Transit would work with the City of Seattle to consider event management strategies and best practices from its current management of event operations to ensure safe access during events is maintained.

South Interbay Segment

Preferred Alternative (SIB-1)

South of the Magnolia Bridge, the Preferred Alternative SIB-1 guideway would cross Elliott Avenue West twice between West Mercer Place and West Republican Street, and again south of West Galer Street. Where this would place guideway columns within the roadway median, vehicle turns would not be allowed in those areas to maintain adequate sight distance and safe vehicle operations. This would reduce some midblock turns and shift more turns to signalized intersections, potentially reducing conflicts. North of the Magnolia Bridge, the guideway would be outside or adjacent to the roadway and would not impact any turn locations or accesses.

With the Smith Cove Station, signalized crossings of Elliott Avenue West would be provided to ensure pedestrians and bicyclists are able to access the station. Existing grade-separated pedestrian crossings (i.e., the Helix and the West Galer Street Flyover) over the rail lines would provide access to the west side of the railroad tracks, including Pier 91 and the Expedia property.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 provides an elevated guideway alongside 15th Avenue West or in the median for about a mile. South of the Magnolia Bridge, Alternative SIB-2 would be similar to Preferred Alternative SIB-1 but would not cross Elliott Avenue West south of West Galer Street and would remain on the east side of Elliott Avenue West. North of the Magnolia Bridge, the guideway would transition into the median near West Armory Way. All of these crossings would eliminate midblock turns, thereby shifting turns to signalized intersections, potentially reducing conflicts

Alternative SIB-3 would likely have similar impacts to the No Build Alternative as the guideway would only cross 15th Avenue West once at West Armory Way and would not place any columns in the median. This would maintain the existing turns and accesses.

The pedestrian and bicyclist safety impacts with the Smith Cove Station with Alternative SIB-2 and Alternative SIB-3 would be similar to Preferred Alternative SIB-1.

Interbay/Ballard Segment

Preferred Alternative (IBB-1a)

The guideway for Preferred Alternative IBB-1a would be outside of the roadway south of Salmon Bay and would maintain the roadway configuration so it is unlikely to impact vehicle safety.

The Interbay Station is expected to experience a small increase in daily vehicle traffic around the station area, which is likely to have a minimal impact on vehicle safety. Pedestrian and bicyclist volumes are expected to increase by about 1,000 daily trips and may increase the potential for conflicts around the station area, but stations would be designed to accommodate the expected level of activity and access would be at signalized/controlled crossings. The Interbay Station would be off 15th Avenue West on lower volume roadways where interactions with non-motorized traffic would be minimized.

North of Salmon Bay, the elevated guideway 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 Ballard Station, as the terminus station of the project, is expected to have a larger increase in vehicle volume (more than 700 daily trips) than other stations, which may increase the potential for vehicle conflicts around the station area. 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 expected to increase by more than 5,200 daily trips with the project at the Ballard Station. This is likely to increase the potential for conflicts around the station area and the already pedestrian-dense Ballard area in general. Stations would be designed to include appropriate non-motorized facilities to accommodate the anticipated level of activity and coordinated with the City of Seattle. Station access would be provided on either side of Northwest Market Street (not in the median) and at signalized or controlled crossings on roadways.

Signalized crossings, particularly in locations crossing 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. Although pedestrian and bicyclist activity is expected to increase, the increase in conflicts is small compared to the number of conflicts currently experienced in this dense area.

<u>Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)</u>

The tunnel alternatives (Preferred Alternative IBB-2a* and Preferred Option IBB-2b*) would avoid vehicular conflict as they are underground.

For the Interbay Station, both of these alternatives would also have minimal non-motorized safety impacts with stations off 15th Avenue West on lower volume roadways.

The Ballard Station, as the terminus station of the project, is expected to have a larger increase in vehicle volume (more than 700 daily trips) than other stations, which may increase the potential for vehicle conflicts around the station area. 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.

Preferred Option IBB-2b* would have grade-separated station access on both sides of 15th Avenue Northwest. Although pedestrian and bicyclist activity is expected to increase, the increase in conflicts is small compared to the number of conflicts currently experienced in this dense area.

<u>Other Build Alternative and Option (IBB-1b and IBB-3)</u>

Option IBB-1b and Alternative IBB-3 south of Salmon Bay 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. This is not likely to impact vehicle safety because the guideway would be within the existing median or outside of the roadway.

Both of these elevated alternatives would also have the Interbay Station straddling West Dravus Street, which would increase pedestrian activity around the West Dravus Street interchange and would increase the potential for conflicts. The station would provide station access on the outside of the interchange without needing to cross the on- and off-ramps from 15th Avenue West to minimize conflicts.

North of Salmon Bay, Option IBB-1b would travel along 14th Avenue Northwest for about 0.65 mile. 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. 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, sidewalk, 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 volume (more than 700 daily trips) than other stations, which may increase the potential for vehicle 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.

Alternative IBB-3 would have grade-separated station access on both sides of 15th Avenue Northwest. Although pedestrian and bicyclist activity is expected to increase, the increase in conflicts is small compared to the number of conflicts currently experienced in this dense area.

Construction Impacts

With each of the Ballard Link Extension Build Alternatives, traffic diversion caused by light rail guideway construction would be required. This diversion would be focused on arterials, where feasible.

Refer to Section 4.3.2.3, Construction Impacts, for details on the location and duration of the closures. The following sections highlight roadways that are expected to have long-term closures with access or travel pattern changes that could affect the safety of the transportation system.

Impacts Common to All Alternatives

The Ballard Link Extension would have similar safety impacts common to all alternatives as the West Seattle Link Extension; see Section 7.3.2.2 for further information.

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 at these locations.

SODO Segment

In SODO, with all of the alternatives, the South Holgate Street closure would redistribute traffic to adjacent streets such as South Lander Street, increasing volumes in some locations and decreasing in others. This would likely have a mixed impact on safety as collisions are related to traffic volumes. While specific streets may see a change in safety impacts (increase or decrease), 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.

However, during construction, the SODO Trail would be temporarily closed, requiring pedestrians and bicyclists to divert to an arterial, likely 4th Avenue or 6th Avenue, instead of a multi-use facility, which may increase the potential for conflicts with vehicles.

Chinatown-International District Segment

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. In addition, 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.

4th Avenue Shallow Alternative (CID-1a)*

Alternative CID-1a* would require multiple-year partial and full closures along 4th Avenue South and closures of South Jackson Street, including the 4th Avenue South and South Jackson Street intersection. These closures would likely increase volumes on adjacent streets used for diverting traffic and potentially increase collisions along those streets.

4th Avenue Deep Station Option (CID-1b)*

Option CID-1b* would be similar to Alternative CID-1a* and require multiple-year partial and full closures along 4th Avenue South and closures of South Jackson Street, including the 4th Avenue South and South Jackson Street intersection.

5th Avenue Shallow Alternative (CID-2a)

Alternative CID-2a would have multiple stages of full and partial closures on 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 alternatives (Alternative CID-1a* and Option CID-1b*) and likely to 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. The closures associated with Alternative CID-2a would potentially impact the protected bike lane on 5th Avenue South, causing bicyclists to divert to another street without dedicated bicycle facilities and to interact more with vehicles. Implementing the diagonal station configuration would not require any 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 transportation safety.

5th Avenue Deep Station Option (CID-2b)

Option CID-2b closures would have a similar impact on safety as Alternative CID-2a, but they would only be partial and shorter-term closures that may diminish the impact on safety.

Downtown Segment

Most of the full and partial roadway closures in the Downtown Segment would be for one to two blocks, but they are in the areas where traffic volumes are high and may extend for multiple years. The traffic volumes diverted to these 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.

Preferred Alternative (DT-1)

Preferred Alternative DT-1 would result in closures of Pine Street that may affect non-motorized safety. These closures would temporarily remove the sidewalks and the mid-block crossing, which would divert pedestrians to other crossings and sidewalks and may introduce more interactions with vehicles. Westbound cyclists would also be diverted to other streets, which may increase exposure with vehicles for a few blocks.

Other Build Alternative (DT-2)

Alternative DT-2 would be similar to Preferred Alternative DT-1 with the closures of Pine Street, except the midblock crossing would not be affected. Westbound cyclists would similarly be diverted to other streets, which may increase exposure with vehicles for a few blocks.

South Interbay Segment

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 would fully close West Republican Street between 3rd Avenue West and 5th Avenue West for several years; however, this part of West Republican Street has low traffic volumes and any diversion is not likely to impact safety. These alternatives would also partially close Elliott Avenue West at the locations where the guideway crosses Elliott Avenue West, which may increase the potential for collisions during construction due to increased congestion. Some diversion is possible, but it is unlikely to impact safety on those alternate roadways as most traffic is likely to remain on Elliott Avenue West.

Preferred Alternative SIB-1 would also require night and weekend closures of travel lanes on 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.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 would require the full closure of West Republican Street between 3rd Avenue West and 5th Avenue West, similar to Preferred Alternative SIB-1. Alternative SIB-2 would also temporarily reduce the number of lanes on 15th Avenue West during construction. This would create additional traffic congestion along this roadway and may increase the potential for collisions. This would divert traffic to parallel routes, which may increase collisions on those streets.

Alternative SIB-3 would also have a short-term partial closure of 15th Avenue West, similar to Alternative SIB-2.

Interbay/Ballard Segment

For all of the alternatives in this segment, many of the other closures, while multi-year, are short sections on more minor side streets. This would likely shift more traffic to nearby arterials, which are better designed to accommodate higher levels of traffic and may not impact safety as much as when traffic is diverted to residential streets.

Preferred Alternative (IBB-1a)

Preferred Alternative IBB-1a would close short sections of Thorndyke Avenue West and 16th Avenue West, but diverted traffic is likely to have a negligible impact on safety as these are low volume roads.

The full closure of 14th Avenue Northwest with Preferred Alternative IBB-1a would divert traffic to adjacent streets and potentially increase collisions on those streets. However, there are alternate routes that could help to distribute traffic and minimize these impacts.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

In addition to the closures for Preferred Alternative IBB-1a, Preferred Alternative IBB-2a* would partially close 15th Avenue West similar to Option IBB-1b. The extents of the full closure of 14th Avenue Northwest under Preferred Alternative IBB-2a* would also be a few blocks shorter than Preferred Alternative IBB-1a and Option IBB-1b, resulting in slightly less impact.

Preferred Option IBB-2b* would close short sections of Thorndyke Avenue West and 16th Avenue West, as with Preferred Alternative IBB-1a, and partially close 15th Avenue Northwest, as with Option IBB-1b.

Other Build Alternative and Option (IBB-1b and IBB-3)

In addition to the full closure of 14th Avenue Northwest, similar to Preferred Alternative IBB-1a, Option IBB-1b would partially close 15th Avenue West. This would create additional traffic congestion along this roadway segment and may increase the potential for collisions during construction. This would divert traffic to parallel routes, which may increase collisions on those streets. The Maintenance of Traffic Plan would be developed and coordinated with the City of Seattle to provide safe operations through these construction areas and along any alternate routes.

The ramps at West Dravus Street would also have periodic closures with Option IBB-1b. With two ramps closed simultaneously, traffic would likely be diverted to the West Emerson Street interchange, where collisions may increase due to the increased volume.

Alternative IBB-3 would partially close 15th Avenue West and have periodic closures at the West Dravus Street ramps, similar to Option IBB-1b.

7.4.3 Potential Mitigation Measures

7.4.3.1 Long-term 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. For the Ballard Link Extension, these project elements and potential mitigation are described in the sections for transit (Section 3.3.3), arterials and local streets (Section 4.3.3), and non-motorized facilities (Section 6.4.3). 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.

7.4.3.2 Construction Impacts

During construction, Sound Transit would develop a Maintenance of Traffic Plan to adhere to federal and local agency guidelines as described in the Construction Impacts section for the Interbay/Ballard Segment in Section 7.4.2.2, as well as to the measures described in Section 4.2.3. The Maintenance of Traffic Plan would be created to minimize safety concerns on the transportation system during construction. Also, the mitigation proposed in Section 3.3.3.2 for transit and Section 6.4.3.2 for non-motorized facilities would be implemented to maximize safety. Therefore, no additional safety-related mitigation measures for the construction period are anticipated to be necessary.

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8 NAVIGATION

8.1 Introduction to Resource and Regulatory Requirements

This section of the Draft Environmental Impact Statement discusses how the WSBLE Project would affect navigation on navigable waterways. Navigable waterways are defined by the United States Coast Guard (Coast Guard) as waters subject to tidal influence, waterways with a history of substantial commercial navigation, waterways that presently have commercial navigation, or waterways susceptible to commercial development (Coast Guard 2011).

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 as described below have been issued.

The United States Army Corps of Engineers (Corps) 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 Corps 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 Corps to review and approve proposed modifications to federally authorized Public Works 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 is preparing a navigation impact report for the Duwamish Waterway and Salmon Bay to support the Coast Guard bridge permitting process.

8.2 West Seattle Link Extension

8.2.1 Affected Environment

The study area for navigation analysis in the West Seattle Link Extension corridor extends 3 miles from the project. It includes across Elliott Bay (from the mouth of the Duwamish Waterway [also known as the Duwamish River] north to the Olympic Sculpture Park and around Duwamish Head to Alki Point), in Puget Sound (from Alki Point to Lincoln Park), and south along the Duwamish Waterway from Elliott Bay to the Corps Turning Basin 3 at Rivermile 6.2. Turning Basin 3 is the upstream extent of the Corps-maintained navigation channel in the waterway. A turning basin is a wider area of the waterway for vessels to turn around.

The Duwamish River is the only navigable waterway that would be crossed by the West Seattle Link Extension Project. It extends 12 miles from the Green River in Tukwila to Elliott Bay in Seattle. The portion of the Duwamish River in the study area is known as the Duwamish Waterway. In the study area, the Duwamish Waterway includes the Lower Duwamish, West, and East waterways. The Lower Duwamish Waterway extends 6 miles downstream or north from the Corps turning basin through the South Park, Highland Park, and Georgetown neighborhoods of Seattle to the south end of Harbor Island. The Duwamish Waterway then splits into the West Waterway and the East Waterway. The West Waterway includes the Harbor Island Reach that extends northwest from where the Lower Duwamish Waterway splits to where the West Waterway has been widened and flows north into Elliott Bay.

8.2.1.1 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. Between 2015 and 2019, vessels that requested an opening of the Spokane Street (swing) Bridge on the West Waterway consisted of approximately 90 percent tugboats, 7 percent sailboats, 2 percent fishing or motor vessels, and 1 percent yachts, derricks, and commercial, government, research, or passenger vessels.

In addition, 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 Corps 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, 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.

Recreational pleasure boat traffic on the Duwamish Waterway occurs year-round but typically peaks in the summer months between Memorial Day and Labor Day. While recreational fishing boats stored outside the waterway may fish the waterway during salmon and steelhead seasons, most recreational vessel traffic occurs as recreational vessels make their way to and from their berths on the Duwamish Waterway. Based on the number of berths available at the four marinas on the waterway, approximately 430 recreational vessels are kept on the Duwamish Waterway.

8.2.1.2 Existing Vertical Clearances, Horizontal Clearances, and Hazards

A navigation channel is a deeper channel cut into a river bed to enable larger vessels to pass through to a port. Areas outside of the navigation channels are also used by vessels to access local facilities and maneuver, hold, or avoid other vessels. The Duwamish Waterway includes two navigation channels maintained by the Corps: one that includes the West Waterway and Lower Duwamish Waterway between Elliott Bay and the Corps turning basin, and another that comprises 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.

Existing structures create horizontal or vertical restrictions to navigation. Ten existing bridges and five existing overhead cables cross the Duwamish Waterway in the study area, as listed in Tables 8-1 through 8-3. The Coast Guard has established guide clearances for the West Waterway of a 140-foot vertical clearance for fixed bridges and a 250-foot horizontal clearance for all types of bridges (Coast Guard 2017), but has not established guide clearances for the East Waterway.

Table 8-1. Existing Restrictions to Navigation in the Study Area - West 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]
Overhead cable	1.28	Power	175	Unrestricted	40	450
Spokane Street (swing) Bridge	1.33	Moveable (swing)/road	44/ Unrestricted	250	42	450
West Seattle Bridge	1.36	Fixed/road	140	150	42	450
BNSF Railway Duwamish Waterway Rail Bridge	1.45	Moveable (single-leaf bascule)/rail	7/Unrestricted	150	43	400

Sources: NOAA 2019; Corps 2020a, 2020b, 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.

Table 8-2. Existing Restrictions to Navigation in the Study Area - East 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]
Pedestrian/ bicycle pier	1.30	Fixed/multi-modal	5	16	8	390
Spokane Street (fixed) Bridge	1.31	Fixed/road	5	90	Unknown	390
West Seattle Bridge	1.34	Fixed/road	60	163	Unknown	390
Klickitat Way Bridge [d]	1.38	Fixed/road and rail	7	48	11	390
Overhead cable	1.38	Power	27	Unrestricted	11	230

Sources: NOAA 2019; Corps 2020a, 2020b, 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.

Table 8-3. Existing Restrictions to Navigation in the Study Area - Lower 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]
Overhead cable	1.95	Power	174	Unrestricted	35	760
Overhead cable	3.48	Power	160	Unrestricted	26	460
First Avenue South Bridge (west)	3.56	Moveable (double-leaf bascule)/ road	22 (39 at center)/ Unrestricted	145/120	30	890
First Avenue South Bridge (east)	3.58	Moveable (double-leaf bascule)/ road	22 (39 at center)/ Unrestricted	145/120	30	825
South Park Bridge	4.85	Moveable (double-leaf bascule)/ road	29	125	22	490
Overhead cable	5.93	Power	134	Unrestricted	15	365

Sources: NOAA 2019; Corps 2020b, 2020c, 2020d.

[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.

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 considered an obstruction to navigation (National Oceanic and Atmospheric Administration [NOAA] 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. Along the Harbor Island Reach, the areas available outside of the navigation channel are narrow and much shallower than the maintained depth of the channel.

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). If the sea level rises as projected, the vertical clearance of the existing and future aerial structures over the Duwamish Waterway would be reduced. It is reasonable to assume that the vertical clearance of the bridges and overhead cables across the Harbor Island Reach and East Waterway near the southern part of Harbor Island would be affected equally by future sea level rise.

8.2.2 Environmental Impacts

8.2.2.1 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.

8.2.2.2 Build Alternatives

Sound Transit evaluated the following three alternatives that would have bridge crossings of the Duwamish Waterway in the Duwamish Segment:

- Preferred Alternative DUW-1a.
- Option DUW-1b.
- Alternative DUW-2.

Long-term Impacts

Impacts Common to All Alternatives

The West Seattle Link Extension would cross both the East and West waterways. Sound Transit evaluated impacts to navigation in the Corps-maintained navigation channels and to vessel movements outside of the navigation channels to access local docks. Impacts to moorage were also identified. Displacement of water-dependent businesses by the West Seattle Link Extension and the related economic impacts and mitigation are described in Section 4.2.1, Acquisitions, Displacements, and Relocations, and Section 4.2.3, Economics, of the Draft Environmental Impact Statement.

Sound Transit is evaluating the feasibility of several high-level fixed bridge types to cross the Duwamish Waterway, as described in Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement. Depending on the bridge type selected, the waterway crossing could require guideway columns in the water. All bridge types would have the same or greater vertical clearance than the West Seattle Bridge. Therefore, all vessels that currently travel under the West Seattle Bridge and through the area could continue to do so. Bridge types that avoid guideway columns in the water would have fewer impacts to navigation.

All alternatives would cross the East and West waterways near existing restrictions. For the West Waterway, all alternatives would meet or exceed the existing Coast Guard guide clearances of 140-foot vertical clearance and 250-foot horizontal clearance. The projected 3- to 5-foot increase in the Duwamish Waterway water levels would correspondingly reduce vertical clearances under the existing structures and the structures of proposed alternatives over the East and West waterways.

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

<u>East Waterway</u>

All alternatives would create a new over-water structure that could affect vessel movement outside of the navigation channel. These impacts and impacts to the navigation channel are described in more detail by alternative in the following sections.

West Waterway

None of the alternatives would encroach upon the West Waterway navigation channel. All alternatives would meet or exceed the West Seattle Bridge horizontal and vertical clearances. Therefore, they would not affect the ability of vessels to sail between the West Waterway and the Lower Duwamish Waterway.

In addition to the existing Spokane Street (swing), West Seattle, and BNSF bridges, 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 and pier protection in the West Waterway 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 Harbor Island Reach, in the West Waterway, the areas available for holding or maneuvering outside of the navigation channel are already relatively narrow. Additional in-water guideway columns and pier protection would further constrain these areas. Anecdotal evidence indicates that tugs frequently tow or push barges “on the hip” or in a nearly side-by-side configuration on the Duwamish Waterway. Wider vessels, like a tug and barge configured on the hip, could have less room to navigate outside of the navigation channel and maneuver during heavy traffic. Therefore, during times with heavier vessel traffic (typically Wednesdays and Fridays and daily around 7 a.m. and 5 p.m.), increased interaction with Puget Sound Vessel Traffic Services may be needed.

Preferred South Crossing Alternative (DUW-1a)

East Waterway

Preferred Alternative DUW-1a would be about 40 feet south of the existing Southwest Klickitat Way (fixed) bridge, and about 300 feet south of the Southwest Spokane Street (fixed) bridge, both of which the Coast Guard consider a barrier to navigation. These bridges have clearances of 7 feet and 5 feet, respectively. Preferred Alternative DUW-1a would be over a portion of the East Waterway that does not include a Corps-maintained navigation channel. Therefore, the new structure would not impact navigation channels.

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. The vertical clearance under the guideway would be approximately 115 feet. This is not anticipated to negatively affect the vessels that use the Harbor Island Marina commercial dock because they are primarily tugs and work boats that require less than 115 feet of vertical clearance.

West Waterway

Preferred Alternative DUW-1a would introduce a new over-water structure about 120 feet south of the West Seattle Bridge. As described in Impacts Common to All Alternatives, this alternative would have the same or greater vertical clearance than the West Seattle Bridge. The horizontal clearance would be about 250 feet. All vessels that currently travel under the West Seattle Bridge and through the area could continue to do so. Outside of the navigation channel, in the areas used by vessels to access maritime businesses and associated docks, vertical clearance immediately under the guideway would be limited to about 140 feet.

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

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.

East Waterway

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.

West Waterway

Option DUW-1b would introduce a new over-water structure approximately 600 feet south of the West Seattle Bridge and would have similar impacts to the West Waterway as Preferred Alternative DUW-1a.

North Crossing Alternative (DUW-2)

East Waterway

Alternative DUW-2 would introduce a new over-water structure approximately 150 feet north of the Spokane Street (fixed) Bridge, which is considered a barrier to navigation with a vertical clearance of 5 feet. Alternative DUW-2 is over an Army Corps of Engineers-maintained navigation channel (a Public Work subject to the Section 408 review and approval process) that spans the width of the East Waterway. This area is primarily used by vessels to access maritime businesses and includes a dock. 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 85 feet less than the current horizontal clearance. Sound Transit would coordinate with the Corps regarding the East Waterway federal navigation project as part of the permission process pursuant to Section 408 of the Rivers and Harbors Act.

Because vessels that use this area typically require about 75 feet of vertical clearance or less, the vertical clearance of the bridge is not anticipated to prevent 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.

West Waterway

Alternative DUW-2 would introduce a new over-water structure approximately 310 feet north of the West Seattle Bridge. As described under Impacts Common to All Alternatives, this alternative would have the same or greater vertical clearance than the West Seattle Bridge. All vessels that currently travel under the West Seattle Bridge and through the area could continue to do so. However, the Harbor Island Reach is currently constrained by moored barges and other vessels that encroach on the navigation channel. Alternative DUW-2 would add another constraint to this section of the waterway if it includes in-water guideway columns. Outside of the navigation channel, in the areas used by vessels to access maritime businesses and associated docks, vertical clearance immediately under the guideway would be limited to about 140 feet.

Construction Impacts

Impacts Common to All Alternatives

Temporary work trestles may be installed in the West and East waterways to support the operation of heavy equipment. The 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 about 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. In addition, all alternatives would result in two 12-hour closures of the East and West waterways to complete the center of each over-water bridge span. For all alternatives and bridge types, 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. Sound Transit would coordinate with the Corps 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.

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 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 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 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.

Preferred South Crossing Alternative (DUW-1a)

<u>East Waterway</u>

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 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 planned 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.

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 planned 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 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.

North Crossing Alternative (DUW-2)

East Waterway

For all bridge types, scaffolding and netting under the bridge would temporarily reduce portions of the planned 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 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.

8.2.3 Potential Mitigation Measures

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

The Federal Transit Administration, 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 Coast Guard, Corps, 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 Coast Guard and Corps) 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 Coast Guard, Corps, 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.

8.3 Ballard Link Extension

8.3.1 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 Corps 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 5,800-foot-long Fremont Cut into Lake Union, which is about a mile long and half a mile wide. Portage Bay is east of Lake Union, followed by the 2,500-foot-long 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. Lake Washington is nearly 16 miles long from north to south and most of the lake is deep, with depths over 200 feet. This freshwater lake is fed by the Cedar River at the southern end near Renton, and by the Sammamish River at the northern end near Kenmore. 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.

8.3.1.1 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 daily Ballard Bridge logs were used to characterize the types of vessels traveling through Salmon Bay that require at least 46 feet of vertical clearance. Vessels that requested an opening of the Ballard Bridge between 2013 and 2017 consisted of approximately 65 percent sailboats, 20 percent tugboats, 10 percent fishing or motor vessels, and 5 percent yachts, derricks, and commercial, government, or research vessels.

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 Corps 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, 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.

8.3.1.2 Existing Vertical Clearances, Horizontal Clearances, and Hazards

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 Corps, they are considered federal navigation Projects subject to Section 408 requirements. The alternatives cross the Ship Canal. Areas outside of the navigation channel are also used by vessels to access local facilities and maneuver, hold, or avoid other vessels.

Existing structures create horizontal or vertical restrictions to the Ship Canal navigation channel and areas outside of the channel. Thirteen bridges and three overhead cables cross the Ship Canal and Lake Washington in the study area, as listed in Table 8-4 and Table 8-5. The Ballard Locks at the western end of the Ship Canal also creates a horizontal restriction.

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 8-4. Existing Restrictions to Navigation in the Study Area - Ship Canal

Structure	Approximate Rivermile [a]	Type/Use	Vertical Clearance Closed/Open (feet) [b]	Horizontal Clearance Closed/Open (feet) [c]	Channel Depth (feet)	Waterway Width, (feet) [a]
BNSF Bridge No. 6.3	1.1	Moveable (single-leaf bascule)/rail	43/ Unrestricted [d]	150/150	36	360
Ballard Locks [e]	1.3	Locks	Unrestricted	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	Power	160	Unrestricted	32	330
Overhead cable	3.6	Power	160	Unrestricted	34	280
Fremont Bridge	3.9	Moveable (double-leaf bascule)/road	14 (31 at center)/ Unrestricted	150/120	36	290
Aurora Bridge	4.0	Fixed/road	73 (136 at center)	525 (150 channel)	30	770
Overhead cable	5.6	Power	182	Unrestricted	31	515
Interstate 5 Bridge	5.6	Fixed/road	127 (138 at center)	250	31	545
University Bridge	5.7	Moveable (double-leaf bascule)/road	30 (45 at center)/ Unrestricted	171/157	32	720
Montlake Bridge	6.6	Moveable (double-leaf bascule)/road	32 (48 at center)/ Unrestricted	146/129	31	150

Sources: Corps 2018, NOAA 2020.

[a] Approximate measurement of geographic information system data in Google Earth.

[b] The vertical clearance of BNSF Bridge No. 6.3 is 43 feet above mean high water (high tide). The remaining vertical clearances obtained from NOAA's 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] NOAA (2020) indicates an overhead power cable with an authorized clearance of 155 feet is attached to BNSF Bridge No. 6.3. This overhead power cable was removed in 2010 and the vertical clearance is currently unrestricted.

[e] Ballard Locks, which was constructed by and is operated and maintained by the Army Corps of Engineers, is considered a federally authorized Public Works project subject to Section 408 requirements.

Table 8-5. Existing Restrictions to Navigation in the Study Area - Lake Washington

Structure	Type/Use	Vertical Clearance (feet) [a]	Horizontal Clearance (feet) [b]	Channel Depth (feet)	Waterway Width (feet) [c]
State Route 520 Bridge (west fixed-span west channel)	Pontoon/ road	44	142	Not available	160
State Route 520 Bridge (west fixed-span east channel)	Pontoon/ road	41	142	Not available	150
State Route 520 Bridge (east fixed-span)	Fixed/road	67	226	Not available	560
Interstate 90 Pontoon Bridge (west fixed span)	Pontoon/ road	29	195	Not available	7,700
Interstate 90 Pontoon Bridge (east fixed span)	Pontoon/ road	29	195	Not available	7,700
Interstate 90 Bridge (east)	Fixed/road	71	200	Not available	1,100

Sources: Corps 2018, NOAA 2020.

[a] Vertical clearances were obtained from NOAA's nautical charts 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.

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

[c] Approximate measurement of geographic information system data in Google Earth.

8.3.2 Environmental Impacts

8.3.2.1 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.

8.3.2.2 Build Alternatives

Long-term Impacts

Sound Transit evaluated the following three Build Alternatives that would have bridge crossings of Salmon Bay in the Interbay/Ballard Segment:

- Preferred Alternative IBB-1a.
- Option IBB-1b.
- 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.

Impacts Common to All Alternatives

Sound Transit evaluated impacts to navigation on Salmon Bay. This includes the Corps-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.

As described in Chapter 2, Alternatives Considered, of the Draft Environmental Impact Statement, Sound Transit is evaluating the feasibility of several high-level, fixed bridge types for Preferred Alternative IBB-1a and Option IBB-1b to cross Salmon Bay. Sound Transit is also evaluating 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 create a new over-water structure. 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 Corps-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. Sound Transit would continue outreach with maritime stakeholders as needed post-construction to ensure vessel operators are aware of the changed conditions.

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. Wider vessels, like a tug and barge configured on the hip, could have less room to navigate outside of the navigation channel and to maneuver during heavy traffic and with multiple recreational vessels. 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 access to the Suquamish Tribe’s Usual and Accustomed Areas.

The project would displace some water-dependent businesses for construction or operation of the project. If these properties are not needed for operation of the project, they could be used by vessels after construction. Displacement of maritime businesses by the Ballard Link Extension and the related economic impacts are described in Section 4.3.1, Acquisitions, Displacements, and Relocations, and Section 4.3.3, Economics, of the Draft Environmental Impact Statement.

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.

Preferred Alternative IBB-1a and Option IBB-1b 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. Lake Washington may also have potential replacement moorage. Preferred Alternative IBB-1a and Option IBB-1b would also relocate the 14th Avenue Northwest Boat Ramp, which is an important public maritime access point on the Ship Canal for commercial, recreational, and Tribal fishing vessels. Sound Transit would relocate the boat ramp nearby prior to construction to maintain public maritime access to the Ship Canal in this area.

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 Alternative IBB-3 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. Sound Transit would coordinate with the Coast Guard and the Corps to identify obstacles near the new piers and pier protection that could be removed or flagged. Sound Transit would also coordinate with the Coast Guard and the City of Seattle regarding the potential to synchronize the openings of Alternative IBB-3 and the Ballard Bridge to minimize the number of vessels waiting for the bridges to open.

Outside of the navigation channel, the area near Alternative IBB-3 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 Alternative IBB-3 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 would force vessels to pass beneath the southern spans of the new bridge to access the docks. While Alternative IBB-3 would not block access to the rest of Fishermen's Terminal (Docks 4 through 10 and the northwest dock), it would reduce the area available to merge into the navigation channel and would create tight turns into and out of Fishermen's Terminal. Sound Transit would work with the Coast Guard and Port of Seattle to consider whether aids to navigation are needed to address tight turns into and out of Fishermen's Terminal.

Alternative IBB-3 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, Alternative IBB-3 would remove the only bilge/pump-out facility in Fishermen's Terminal.

Construction Impacts

This section discusses potential construction impacts from the Build Alternatives with bridges across Salmon Bay. The tunnel alternatives would avoid impacts to navigation and are not discussed further in this section.

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 Corps 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 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.

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 by up to 15 feet (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 Preferred Alternative IBB-1a or Option IBB-1b. Based on vessel heights reported during surveys and coordination Sound Transit conducted with Ship Canal waterway users, these temporary vertical clearance reductions could affect some of the boats that currently access maritime facilities in Lake Union such as marinas and dry docks. In addition, the use of barges during the construction of the center span of each bridge type 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.

Elevated 15th Avenue Alternative (IBB-3)

Use of barges during construction of the vertical-lift moveable bridge span would require approximately one 24-hour closure of the Salmon Bay 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.

Following the 24-hour closure, when the vertical lift moveable bridge span is lifted into place, the span would remain in the closed position for about 48 hours to install the moveable bridge mechanisms. During this 48-hour period, the vertical clearance would be temporarily reduced to about 65 feet because netting would be used beneath the span, and vessels requiring more than approximately 65 feet of vertical clearance would not be able to pass under Alternative IBB-3. After the moveable bridge mechanisms are installed, the netting would be removed and the span would undergo testing for about 6 months before becoming fully operational. During the testing phase, the moveable bridge span would open and close in response to vessel traffic, but vessels may experience some delays or interruptions during tests.

Construction of the double-leaf bascule moveable bridge would require approximately two 48-hour closures of the navigation channel, one closure to install each leaf. Once the leaves are installed, they can remain open until the bridge enters the 6-month testing phase. During the testing phase, the double-leaf bascule would open and close in response to vessel traffic, but vessels may experience some delays or interruptions during tests.

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.

8.3.3 Potential Mitigation Measures

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

The Federal Transit Administration, 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 Usual and Accustomed Areas during construction.

Sound Transit would develop a construction navigation management plan in consultation with the Coast Guard, Corps, 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 Coast Guard and Corps) 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 Coast Guard, Corps, 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.
- 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.

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9 FREIGHT MOBILITY AND ACCESS

This chapter describes the freight transportation system within 0.5 mile of the WSBLE Build Alternatives, including the facilities and operations for truck and rail transportation. It also describes how the Build Alternatives could affect the freight system during project operation and construction. The marine freight system and potential project impacts to the marine system are presented in Chapter 8, Navigable Waterways. The assessment of freight mobility and access in this section address direct impacts from the project.

9.1 Introduction

9.1.1 Overview of Truck Street Network

The City of Seattle has designated many streets and arterials with various functions as part of its truck network. The designations include Limited Access Facility, Major Truck Street, Minor Truck Street, First/Last Mile Connector, Heavy Haul Network, Over-Legal Network, Seaport Highway Connectors, and Seaport Intermodal Connectors. Washington State Freight and Goods Transportation System designates freight facilities with numbers, T-1 through T-5, with T-1 indicating the highest volume or tonnage of freight carried. Both designations are provided in the Affected Environment for each extension.

The various truck networks are mostly concentrated in the City's two designated Manufacturing/Industrial Centers: the Duwamish Manufacturing/Industrial Center, where the SODO and Duwamish segments are located, and the Ballard Interbay Northend Manufacturing/Industrial Center, where the South Interbay and Ballard/Interbay segments are located.

9.1.1.1 Summary of Long-term Impacts to Truck Network

All alternatives would be designed to retain clearance envelopes for truck streets, including those designated for over-legal loads. The completed project would have few guideway columns that permanently affect truck access or mobility; these are described for each extension as follows.

West Seattle Link Extension

None of the alternatives would permanently affect the network of truck streets. However, in the SODO Segment, the planned grade separation on South Lander Street for Preferred Alternative SODO-1a could affect truck access to the United States Postal Service garage on the north side of South Lander Street.

Ballard Link Extension

All of the alternatives in the SODO Segment would have a new vehicle overpass on South Holgate Street, which would improve mobility for both rail and truck freight as it removes delays caused by the existing at-grade rail crossing on South Holgate Street.

None of the alternatives in the Chinatown-International District or Downtown segments would permanently affect the truck network.

Several alternatives would permanently affect the truck network in the South Interbay Segment. Preferred Alternative SIB-1 would construct medians with guideway columns to support the elevated guideway in the existing center turn lane along Elliott Avenue West from north of West Prospect Street to just south of the West Mercer Place. Alternative SIB-2 would construct a short median in the middle of Elliott Avenue West just north of West Mercer Place for columns to support the elevated guideway. It would remove left-turn access for a few parcels. Additional medians would be added on 15th Avenue West from West Newton Street to West Barrett Street for columns to support the elevated guideway. These medians would restrict left-turn access to some businesses along 15th Avenue West, and vehicles would be required to make U-turns at breaks in the medians or at signalized intersections. Large trucks may need to use the West Dravus Street interchange as a turnaround route or alternative corridors such as Westlake Avenue North and West Nickerson Street to reach businesses where left-turn access is restricted.

In the Interbay/Ballard Segment, Preferred Alternative IBB-1a and Option IBB-1b would construct large guideway column structures on each side of Salmon Bay. The columns on the south side could affect circulation and operations for businesses along this edge of Salmon Bay. Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would not affect the truck, rail, or marine networks. Alternative IBB-3 would have medians for guideway columns in the center turn lane of 15th Avenue Northwest from just south of Northwest 52nd Street to Northwest 54th Street, and between Northwest 56th Street and Northwest 57th Street. This could affect access to local businesses. Alternative IBB-3 would also have columns on the south side of Salmon Bay that could affect access and circulation within Fishermen’s Terminal.

9.1.1.2 Summary of Construction Impact to Truck Network

West Seattle Link Extension

Section 4.2.2.3 of this technical report details key construction-related facility closures in the West Seattle Extension. Construction activities would affect the truck network with long-duration full and partial closures of truck streets. In the SODO Segment, the planned grade separation on South Lander Street for Preferred Alternative SODO-1a would require closing South Lander Street. Option SODO-1b would also require closing South Lander Street. When South Lander Street is closed, it is assumed Holgate Street would remain open and could serve as a detour route for trucks.

Southwest Avalon Way, which is a Major Truck Street and part of the City’s Over-Legal Network for large trucks, could be fully closed with Alternative DEL-5. Partial closures of streets in the truck network could occur for various alternatives. This includes partial closures of Delridge Way Southwest for multiple years with Alternative DEL-3 and Alternative DEL-4*.

Fauntleroy Way Southwest would have a partial closure with Preferred Alternative WSJ-3a*, Preferred Option WSJ-3b*, and Alternative WSJ-5*. Preferred Alternative WSJ-1, Preferred Alternative WSJ-2, and Alternative WSJ-4* would have full closures on Fauntleroy Way Southwest on nights and weekends. Sound Transit would coordinate with the City of Seattle to identify alternative routes for over-dimension freight during the construction period.

Ballard Link Extension

Section 4.3.2.3 of this technical report details key construction-related facility closures in the Ballard Extension. In the SODO Segment, all three alternatives require full closure of South Holgate Street to construct a new vehicle overpass of the guideways. When South Holgate Street is closed, it is assumed South Lander Street would be open and could serve as a detour route for most trucks. However, heavy-haul trucks that use the segment to reach nearby warehouse and distribution facilities may be affected because there are no other designated Heavy Haul Network streets in the vicinity to serve those trips.

In the Chinatown-International District Segment, several major truck streets would be fully or partially closed during construction. Alternative CID-1a* requires full and partial closures of 4th Avenue South, full closure of the 4th Avenue South/South Jackson Street intersection, and full closure of Seattle Boulevard South. Option CID-1b* requires full and partial closures of 4th Avenue South and full closure of the 4th Avenue South/South Jackson Street intersection. Alternative CID-2a and Option CID-2b would partially close 6th Avenue South north and south of South Royal Brougham Way. The diagonal station configuration for Alternative CID-2a is not expected to affect truck streets.

In the Downtown Segment, Preferred Alternative DT-1 requires full closure of Harrison Street on each side of Aurora Avenue North. Although Harrison Street is not designated as a truck street, it connects to Aurora Avenue North (State Route 99) on- and off-ramps connecting to locations north of Harrison Street. Construction of Alternative DT-2 requires partial closure of Mercer Street, which is a Major Truck Street.

In the South Interbay Segment, Preferred Alternative SIB-1 would require partial closure of Elliott Avenue West. This would increase congestion on Elliott Avenue West. This alternative also requires full closure of the West Galer Street Flyover, which provides access to Terminal 91, on some nights and weekends during removal and reconstruction of the pedestrian bridge and girder erection for the station. Alternative SIB-2 requires partial closure of 15th Avenue West and the partial closure of Elliott Avenue West. This would increase congestion on 15th Avenue West and Elliott Avenue West. Alternative SIB-3 would require partial closure of 15th Avenue West in the vicinity of West Armory Way and also partial closure of Elliott Avenue West on nights and weekends.

In the Interbay/Ballard Segment, Preferred Alternative IBB-1a, Option IBB-1b, and Preferred Alternative IBB-2a* would require full closure of 14th Avenue Northwest and several cross streets. While 14th Avenue Northwest and the affected cross streets are not designated as truck streets, they do provide local access to businesses in the vicinity. The elevated alternatives would also construct large structures on each side of Salmon Bay. The guideway columns on the south side could affect circulation and operations for local businesses. All alternatives would require partial or full closures of 15th Avenue West. Option IBB-1b and Alternative IBB-3 would require rolling closures of the West Dravus Street on- and off-ramps to 15th Avenue West, and Alternative IBB-3 would require closure of Northwest Market Street at 15th Avenue Northwest on nights and weekends. Preferred Option IBB-2b* would require partial closure of the Northwest Market Street/15th Avenue Northwest intersection. Both of these streets are truck streets.

9.1.2 Overview of Truck Parking and Loading

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. In some areas, general load zones, which allow any type of vehicle, also exist. Most of these zones are longer than a standard vehicle parking space.

The project would permanently affect load zones that serve trucks or business deliveries within both the West Seattle and Ballard Link extensions, either through elimination of a street or conversion to a different curb-use function such as a transit stop or passenger load zone. The project's largest permanent effect to load zones would be near the SODO Station, where Preferred Alternative SODO-1a would permanently eliminate 14 load zones. Other West Seattle and Ballard Link extension alternatives in SODO and all other segments would permanently eliminate two or fewer load zones for all segments.

Construction activities could temporarily disrupt load zones for all alternatives. The highest number affected would be for Option SODO-1b and Alternative SODO-2, which would each affect four general load zones and three truck-only load zones on 5th Place South. Other West Seattle and Ballard Link extension alternatives in SODO and all other segments would temporarily affect fewer than five load zones.

Long-term and overnight truck parking is allowed in Seattle's industrial zones (Seattle Municipal Code 11.72.070), which includes areas in the Delridge, Duwamish, SODO, South Interbay, and Interbay/Ballard segments. The project would have no permanent effect to overnight truck parking, although some parking could be temporarily removed during construction. There is also an overnight truck parking lot at Terminal 25 that is discussed in Section 5, Parking.

Sound Transit would coordinate with the City of Seattle to replace truck load zones and truck parking where feasible.

9.1.3 Overview of Rail Network

Seattle is served by two Class I railroads: BNSF Railway and Union Pacific Railroad. The BNSF Railway's mainline passes through SODO, under Downtown Seattle, and through Interbay. The Union Pacific Railroad mainline is south of South Spokane Street. There are local rail spurs throughout the Duwamish area, including lead tracks located just south of South Spokane Street that serve Harbor Island and West Seattle as well as spur tracks along the SODO Busway that serve local businesses. Through the South Interbay and Interbay/Ballard segments, the BNSF Railway mainline is west of the 15th Avenue West/Elliott Avenue West corridor, connecting to the BNSF Balmer Yard north of the Magnolia Bridge. Local rail spurs connect warehouse sidings at Terminal 91 and the Grain Terminal at Pier 86, and to the Coastal Transportation Inc. team track. The Ballard Terminal Railroad operates a short-line railroad that serves local businesses north of Salmon Bay.

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 long-term effects to rail operations are expected. In the Duwamish Segment, ground improvements near guideway columns close to the West Seattle Lead railroad tracks could affect the track envelope. In the Interbay/Ballard Segment, the Fremont spur and the Ballard Terminal Railroad rail lines, on each side of Salmon Bay, could be affected by construction. Sound Transit would coordinate with the railroads prior to construction.

9.1.4 Overview of Marine Network

All Duwamish Segment alternatives would cross the navigation channels of the East and West waterways of the Duwamish Waterway (also known as the Duwamish River), and the elevated Interbay/Ballard Segment alternatives would cross the Salmon Bay navigation channel. Potential impacts on navigation and marine access on these waterways, including to marine freight, are described in Chapter 8, Navigable Waterways.

9.2 West Seattle Link Extension

9.2.1 Affected Environment

Almost all of the arterials and streets that comprise the study area's truck network are owned and operated by the City of Seattle. Regional highways that connect to the local network, including Interstate 5, Interstate 90, and State Route 99, are owned and operated by WSDOT.

The *City of Seattle Freight Master Plan* (City of Seattle 2016) defines the following freight network designations:

- Limited Access Facility – Supports through-movements and/or long-distance trips. These facilities include interstate and state highways, such as Interstate 5 and State Route 99.
- Major Truck Street – An arterial street serving connections to the regional network, between and through industrial land uses (Manufacturing/Industrial Centers and intermodal terminals), commercial districts, and urban centers.
- Minor Truck Street – Supports goods delivery to urban villages and neighborhood commercial districts. These streets also provide secondary connections to the Major Truck Street network, thereby creating freight system redundancy and resiliency.
- First/Last Mile Connector – Supports short truck movements to/from key freight activity centers, such as marine and intermodal terminals. These connections are all within the designated Manufacturing/Industrial Centers.

The City also has two regulatory networks related to freight: the Heavy Haul Network and the Over-Legal Network (City of Seattle 2016). These routes play an important role in moving freight loads, with appropriate permits, throughout Seattle. The City established the Heavy Haul Network to allow heavier cargo containers to be transported between the Port of Seattle, industrial businesses, and rail yards. The Over-Legal Network can accommodate trucks with larger loads, with most segments able to accommodate loads that require up to a 20-foot-wide by 20-foot-high envelope.

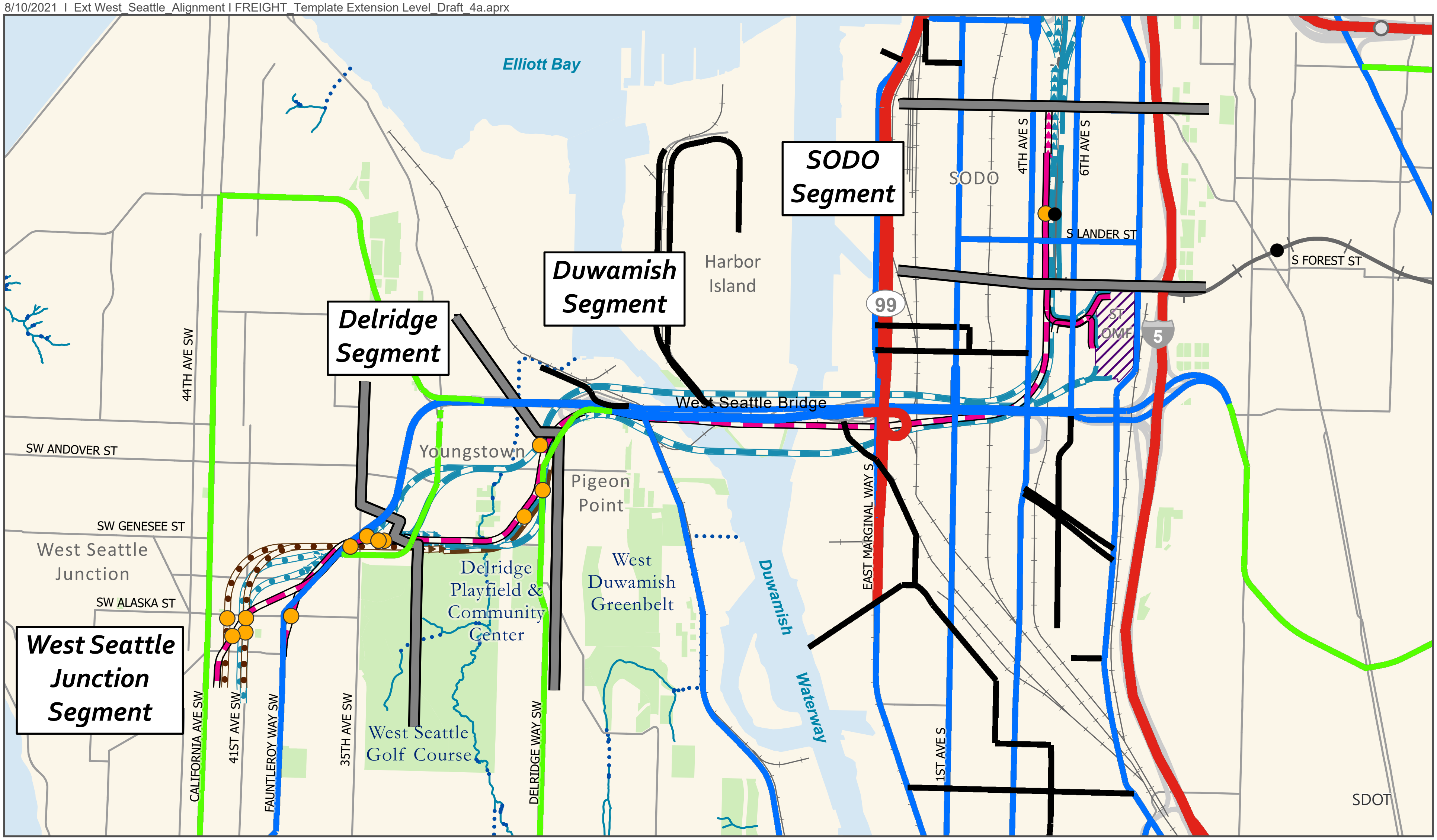
Seaport Highway Connectors and Seaport Intermodal Connectors are also highlighted in the *Freight Master Plan*. Although not officially designated, these routes are identified on arterial streets that accommodate two-way travel and direct access between the regional highway system and port or railroad intermodal facilities.

Figure 9-1 and Figure 9-2 show Seattle's truck street designations for the West Seattle Link Extension.

Some transportation facilities within the project study area are also included in the Washington State Freight and Goods Transportation System, which is a classification system for roadways, railways, and waterways based on the freight tonnage that they carry. Freight facilities are designated with numbers, T-1 through T-5, with T-1 indicating the highest volume of freight carried. (WSDOT 2020).

Rail facilities are also described in the SODO, Duwamish, and Delridge segments. There are no rail facilities in the West Seattle Junction Segment.

Marine facilities are only described for the Duwamish Segment as there are no marine facilities in the SODO, Delridge, or West Seattle segments.



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

Freight Network
- Limited Access
- Major
- Minor
- First/Last Mile Connector

FIGURE 9-1
Freight Affected Environment
West Seattle Link Extension

West Seattle and Ballard Link Extensions

0 0.5 1 Mile
N

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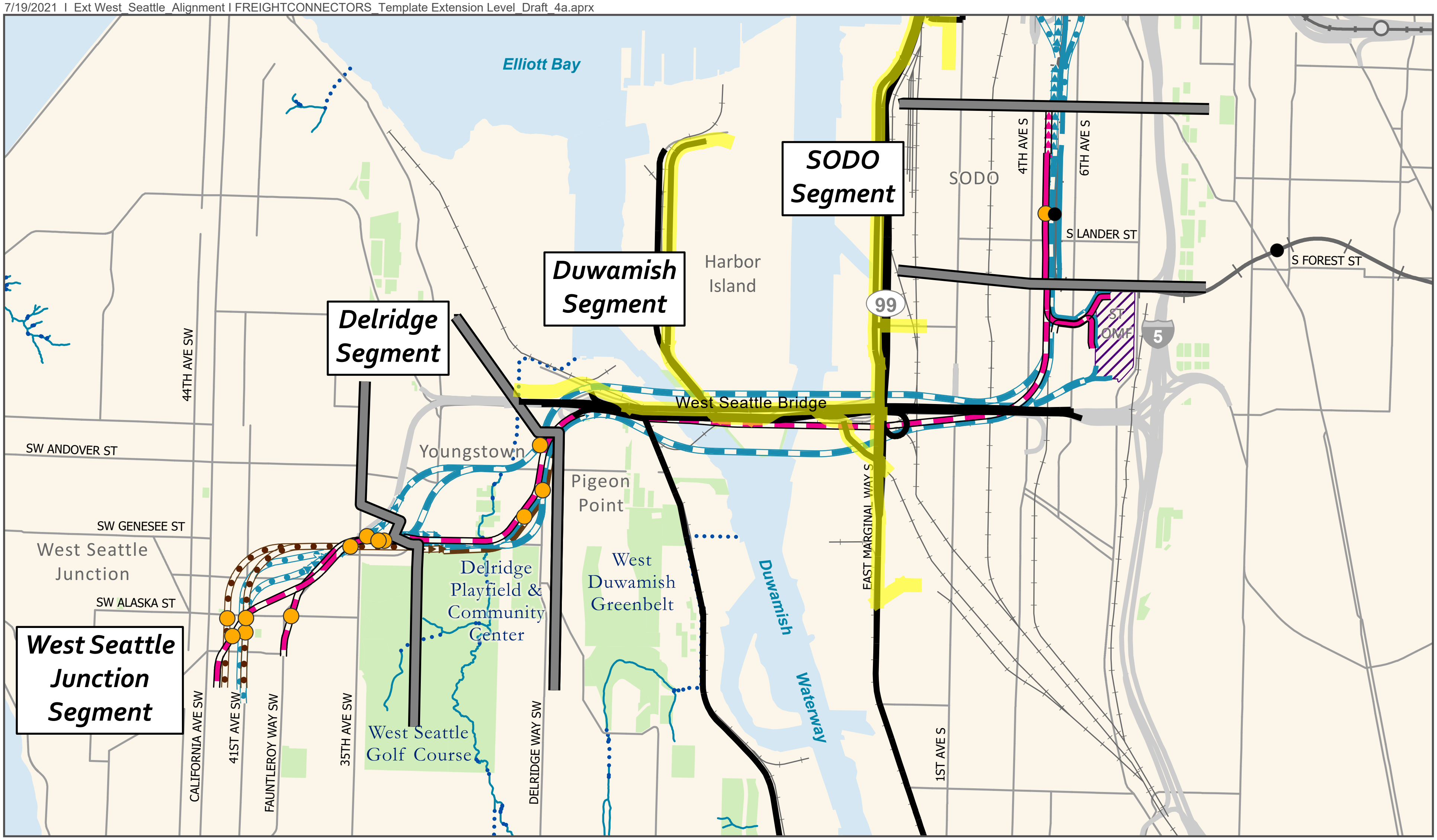


Source: City of Seattle, King County (2019, 2020, 2021).

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
- Seaport Intermodal Rail Connector
- Seaport Highway Connector

0 0.5 1 Mile

N

FIGURE 9-2
Freight Affected Environment Connectors
West Seattle Link Extension

West Seattle and Ballard Link Extensions

9.2.1.1 SODO Segment

Truck System

The SODO Segment passes through the Duwamish Manufacturing/Industrial Center. Manufacturing/Industrial Centers, which are designated employment areas with intensive, concentrated manufacturing and industrial land uses that cannot be easily mixed with other activities. They are characterized as areas of large contiguous blocks served by the region's major transportation infrastructure, including roads, rail, and port facilities. The Duwamish Manufacturing/Industrial Center is one of the largest and most intensely developed industrial and manufacturing areas in the Pacific Northwest.

Table 9-1 summarizes the existing truck transportation route characteristics of the SODO Segment study area.

Table 9-1. Truck Route Characteristics - SODO Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
6th Avenue South	Major Truck Street State T-3 corridor	Heavy Haul Network (short segment north of South Holgate Street)	None
South Holgate Street between 1st Avenue South and 6th Avenue South	Major Truck Street State T-3 corridor	Heavy Haul Network	At-grade rail crossings west of 4th Avenue include BNSF Railway mainline and Amtrak yards. At-grade rail crossing east of 4th Avenue South (Sound Transit light rail line)
South Lander Street between 1st Avenue South and Airport Way South	Major Truck Street State T-1 corridor	None	At-grade rail crossing east of 4th Avenue South (Sound Transit line)

Sources: City of Seattle 2016, WSDOT 2020.

Depending on the station and alignment locations, there are 20 to 21 truck and general load zones that serve businesses within 400 feet of the alternatives. Most of these are along 5th Place South and South Bayview Street near the SODO Station.

Rail System

The BNSF Railway mainline passes through SODO about midway between 1st Avenue South and 4th Avenue South. It crosses South Holgate Street at-grade. There are many other spur tracks that cross South Holgate Street, including those to the Amtrak/Sound Transit maintenance facility. There are also rail spurs that serve local businesses along the SODO Busway that extend north to South Massachusetts Street.

9.2.1.2 Duwamish Segment

Truck System

Table 9-2 summarizes the existing truck transportation route characteristics of the Duwamish Segment study area, which is also within the Duwamish Manufacturing/Industrial Center. In addition to the City of Seattle's truck street designations, key arterials in this segment—

South/Southwest Spokane Street, West Marginal Way Southwest, East Marginal Way South, and the West Seattle Bridge/Spokane Street Viaduct—are designated as T-1 or T-2 truck freight corridors in the statewide Freight and Goods Transportation System network. East Marginal Way South and Southwest Spokane Street are also part of the City's Over-Legal Network, and several streets within the study area are in the City's Heavy Haul network. Streets designated as both a Seaport Highway Connector and Seaport Intermodal Rail Connector include the West Seattle Bridge/Spokane Street Viaduct, South Spokane Street, East Marginal Way South, and West Marginal Way Southwest.

Table 9-2. Truck Route Characteristics - Duwamish Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
4th Avenue South, north of Argo Yard	Major Truck Street State T-2 corridor	None	None
6th Avenue South, north of South Spokane Street	Major Truck Street State T-3 corridor	None	One at-grade rail crossing
Delridge Way Southwest between West Seattle Bridge and 23rd Avenue Southwest	Minor Truck Street Seaport Highway Connector State T-2 corridor	None	None
East Marginal Way South	Major Truck Street Seaport Intermodal Rail Connector Seaport Highway Connector State T-1 corridor	Over-Legal Network Heavy Haul Network	Five at-grade rail crossings
South Spokane Street between 23rd Avenue Southwest and Interstate 5	Major Truck Street Seaport Highway Connector Seaport Intermodal Rail Connector State T-2 corridor	Over-Legal Network Heavy Haul Network	Seven at-grade rail crossings Bridge openings at Duwamish Waterway
West Marginal Way Southwest between South Spokane Street and Terminal 5	Last/First Mile Connector Seaport Intermodal Rail Connector Seaport Highway Connector State T-2 corridor	Heavy Haul Network	One at-grade rail crossing
West Seattle Bridge/ Spokane Street Viaduct between 23rd Avenue Southwest and Interstate 5	Major Truck Street Seaport Highway Connector Seaport Intermodal Rail Connector State T-1 corridor	Heavy Haul Network	None

Sources: City of Seattle 2016, WSDOT 2020.

There are two general load zones within 400 feet of the alternative alignments in this segment. They are located on 6th Avenue South near South Hanford Street.

Rail System

The BNSF Railway mainline passes through the Duwamish Segment about midway between 1st Avenue South and 4th Avenue South. It crosses South Spokane Street and South Horton Street at-grade.

Both railroads have major intermodal transfer hubs in the Duwamish Segment. The BNSF Railway's Seattle International Gateway Yard is just east of State Route 99 between South Hanford Street and South Massachusetts Street. The Union Pacific Railroad Argo Yard is south of South Spokane Street and east of East Marginal Way South. Both terminals receive and discharge cargo by truck, a large proportion of which passes through the Port of Seattle's marine terminals.

The Port of Seattle's Terminal 5 and Terminal 18 have on-dock intermodal rail yards, which allow the direct transfer of containers between rail and ship within the terminals. During both the arrival and departure maneuvers, trains to the Terminal 5 on-dock intermodal yard block the at-grade crossing of West Marginal Way Southwest (just north of Southwest Spokane Street) and require lowering of the rail bridge across the Duwamish Waterway. Terminals 5 and 18 trains use the lead tracks across Harbor Island along the south side of Klickitat Avenue Southwest. There are other rail storage yards and local rail spurs throughout the Duwamish Segment, including the Whatcom Yard west of State Route 99, the West Marginal Branch line on the west side of the Duwamish Waterway, and storage yards on Harbor Island. There are also local spur tracks along the SODO Busway south of South Forest Street. Train movements across Harbor Island can block both main driveways to Terminal 102, which is an industrial park on the south end of Harbor Island. When this occurs, vehicles can access that terminal through a Port-owned bridge that connects the south tip of Harbor Island to the east side of the Duwamish Waterway.

9.2.1.3 Delridge Segment

Truck System

The Delridge Segment is in an area with a mix of residential, commercial, and industrial/manufacturing land uses. Its largest industrial business is the Nucor Steel plant. Table 9-3 summarizes the existing truck transportation route characteristics of the Delridge Segment.

Table 9-3. Truck Route Characteristics – Delridge Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
Delridge Way Southwest	Minor Truck Street Seaport Highway Connector State T-2 corridor	None	Low-clearance under pedestrian bridge for northbound trucks north of Southwest Oregon Street
Fauntleroy Way Southwest	Major Truck Street State T-3 corridor	Over-Legal Network south of Southwest Avalon Way	Low-clearance location under pedestrian bridge at Southwest Andover Street
Southwest Avalon Way	Minor Truck Street State T-3 corridor	Over-Legal Network	None

Sources: City of Seattle 2016, WSDOT 2020.

There are two load zones within 400 feet of the alternative alignments in this segment. One is a truck-only load zone located on Southwest Andover Street west of Delridge Way Southwest, and the other is a general load zone located on Southwest Yancy Street east of Southwest Avalon Way.

Rail System

There is one rail facility partially in this segment, the rail tracks at Nucor Steel Seattle. The Nucor Steel plant is connected to the rail tracks of BNSF Railway's West Seattle Yard just west of the Port of Seattle's Terminal 5. The railroad tracks access the site through the northwest corner of the plant lot under the West Seattle Bridge and across South Spokane Street at-grade. These spurs and yard connect to the BNSF Railway mainline by shared tracks that cross the south tip of Harbor Island (West Seattle Lead).

9.2.1.4 West Seattle Junction Segment

The West Seattle Junction Segment is in an area with a high level of commercial development, mixed with residential uses. Most of the freight activity is related to local business deliveries. Table 9-4 summarizes the existing truck transportation route characteristics of the West Seattle Junction Segment.

Table 9-4. Truck Route Characteristics – West Seattle Junction Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
California Avenue Southwest	Minor Truck Street State T-3 corridor	None	None
Fauntleroy Way Southwest	Major Truck Street State T-3 corridor	Over-Legal Network south of Southwest Avalon Way	Low-clearance location under pedestrian bridge at Southwest Andover Street
Southwest Avalon Way	Minor Truck Street State T-3 corridor	Over-Legal Network	None

Sources: City of Seattle 2016, WSDOT 2020.

Depending on the station and alignment locations, there are 16 to 28 general load zones and up to six truck-only load zones near businesses within 400 feet of the alternatives. The truck-only load zones are concentrated on Fauntleroy Way Southwest north of 39th Avenue Southwest and on 37th Avenue Southwest north of Southwest Snoqualmie Street.

9.2.2 Environmental Impacts

This section discusses the future freight conditions for the No Build Alternative and Build Alternatives, including effects to the truck network, rail network, and marine network. In general, long-term or short-term impacts to traffic operations, as described in Chapter 4, Arterial and Local Street Operations, would affect both general and truck traffic. This section summarizes the potential effects unique to freight traffic or facilities.

9.2.2.1 No Build Alternative

With the No Build Alternative, there are no planned changes to the freight network, although slight growth in traffic volumes is expected in the future, which would increase congestion on designated freight routes. As part of the transportation analysis, future planned industrial and port developments are assumed. In the West Seattle Link Extension project corridor, this includes improvements at Terminal 5 as well as increased freight throughput at Terminal 18.

9.2.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All Build Alternatives

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.

At new stations, there would be functional changes to the surrounding curb uses. In some locations, existing truck-only/commercial vehicle load zones would be modified to support the station as a transit stop or passenger load zone area. Most stations would eliminate fewer than five load zones.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would build a new vehicle overpass over the guideways on South Lander Street, which is a Major Truck Street. The vehicle overpass would be designed to accommodate trucks, and would eliminate delay with the existing light rail crossing. The overpass could affect access for the adjacent United States Postal Service garage that serves trucks. Alternative access and egress from this garage is provided on 4th Avenue South.

Spur tracks along the SODO Busway north of South Forest Street would be removed. No other impacts to the rail network are expected.

Preferred Alternative SODO-1a would permanently eliminate 14 load zones. This includes 3 truck-only load zones, 4 general load zones on 5th Place South, and 4 general load zones on South Bayview Street, where the station would be located. The new vehicle overpass on South Lander Street would also eliminate two general load zones and one truck-only load zone. Adjacent businesses would be acquired for the station, which could reduce or eliminate demand for the affected load zones.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b would also build a new overpass on South Lander Street. This option would have a pedestrian crossing at the top of the overpass that could add delay for trucks. Alternative SODO-2 would not have an overpass at South Lander Street, and the new guideway would be elevated above South Lander Street. The existing Link light rail track would remain at-grade, and trucks would continue to experience short-duration closures when trains cross South Lander Street. The new vehicle overpass on South Lander Street would eliminate two general load zones and one truck-only load zone. Alternative SODO-2 would not affect any load zones.

Spur tracks along the SODO Busway north of South Forest Street would be removed. No other impacts to the rail network are expected.

Duwamish Segment

Preferred Alternative (DUW-1a)

No stations are proposed in the Duwamish Segment, and Preferred Alternative DUW-1a would have no structures within the public street system or Port of Seattle terminals that would permanently affect traffic or truck operations, including over-legal trucks. No load zones would be affected.

Preferred Alternative DUW-1a would cross several major rail facilities, including the BNSF Railway mainline and the Seattle International Gateway Yard lead tracks, but it would have no long-term effects on rail operations. It would retain the existing local rail spurs along both sides of the SODO Busway south of South Forest Street.

Other Build Alternative and Option (DUW-1b and DUW-2)

Option DUW-1b and Alternative DUW-2 would not affect truck or rail operations. Alternative DUW-2 includes a guideway column near Terminal 18, but this column would be located outside of the gate queuing area. No load zones would be affected.

Delridge Segment

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a would not affect the truck or rail networks in this segment. No load zones would be affected.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Preferred Alternative DEL-2a* would not affect the truck or rail networks in this segment. No load zones would be affected.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

None of the other alternatives would affect the truck or rail networks in this segment.

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

Neither Preferred Alternative WSJ-1 nor Preferred Alternative WSJ-2 would affect the truck network, and there is no freight rail system in this segment. No load zones would be affected.

Preferred Alternatives with Third-Party Funding (WSJ-3a* and WSJ-3b*)

Neither Preferred Alternative WSJ-3a* nor Preferred Option WSJ-3b* would affect the truck or rail networks in this segment. No load zones would be affected.

Other Build Alternative and Option (WSJ-4* and WSJ-5*)

None of the other alternatives would affect the truck or rail networks in this segment. No load zones would be affected.

Construction Impacts

Impacts Common to All Build Alternatives

Construction activities for all Build Alternatives are expected to eliminate on-street load zones that trucks can use 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. Freight facilities 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 by alternative in the following sections. Specific information about each closure is provided in Section 4.2.2.3, Construction Impacts.

Temporary removal of parking during construction could affect trucks, which are allowed to legally park long-term and overnight on streets in industrial areas.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would build a new vehicle overpass over the guideways on South Lander Street, which is a Major Truck Street. Construction is expected to require a full closure of South Lander Street. When South Lander Street is closed, it is assumed South Holgate Street would remain open and would likely be the primary diversion route for trucks. No additional load zones beyond those described as long-term impacts would be removed for construction.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b would also build a vehicle overpass on South Lander Street, with a full closure of South Lander Street. When South Lander Street is closed, South Holgate Street would remain open and would likely be the primary diversion route for trucks. Alternative SODO-2 would not have an overpass at South Lander Street and would not require long-term closure of South Lander Street. Construction of Option SODO-1b and Alternative SODO-2 would affect seven load zones, which includes four general load zones and three truck-only load zones on 5th Place South.

Duwamish Segment

Preferred Alternative (DUW-1a)

Preferred Alternative DUW-1a would have no major construction effects to the truck network. It could require short-term partial closures of key streets in the truck network (i.e., Spokane Street, State Route 99, East Marginal Way, and West Marginal Way) when the guideway is built over those streets. It would have a guideway column close to the BNSF Railway tracks east of East Marginal Way South, for which ground improvements could extend into the track envelope and require temporary closures of the tracks. It would also have a guideway column adjacent to the BNSF Railway Duwamish Waterway rail bridge, which could be affected by construction barges, cranes, and other heavy equipment crossing or in proximity to BNSF Railway tracks. Construction of the guideway and columns could also temporarily affect the local business rail spurs on each side of the SODO Busway.

Preferred Alternative DUW-1a would affect two general load zones on 6th Avenue South between South Forest Street and South Horton Street.

Other Build Alternative and Option (DUW-1b and DUW-2)

Option DUW-1b would have similar impacts as Preferred Alternative DUW-1a.

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. Ground improvements for this column would extend into the west leg of the intersection on Chelan Avenue Southwest. There would be a guideway column located in the Terminal 18 employee parking lot just west of the Terminal 18 truck gate queue area, but it 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. Alternative DUW-2 would span the lead rail track serving Harbor Island but is not expected to disrupt rail operations. Construction of the guideway and columns could also temporarily affect the local business rail spurs on each side of the SODO Busway.

Both Option DUW-1b and Alternative DUW-2 would affect two general load zones on 6th Avenue South between South Forest Street and South Horton Street.

Delridge Segment

Preferred Alternative (DEL-1a)

Preferred Alternative DEL-1a is not expected to affect any designated truck streets or load zones during construction.

Preferred Alternative with Third-Party Funding (DEL-2a*)

Preferred Alternative DEL-2a* is not expected to affect any designated truck streets during construction.

Other Build Alternatives and Options (DEL-1b, DEL-2b*, DEL-3, DEL-4*, DEL-5, and DEL-6*)

Nucor Steel is adjacent to two alternatives that would be constructed along Southwest Andover Street. Alternative DEL-5 and Alternative DEL-6* would require a full closure of Southwest Andover Street. Construction of the tall bridge footings and structure are expected to close Southwest Andover Street, but access to the Nucor facility by vehicle and rail would be maintained. Nucor access could also be affected by Alternative DEL-3 and Alternative DEL-4*, which would require a partial closure of Delridge Way Southwest for multiple years.

Alternative DEL-5 would require the full closure of Southwest Avalon Way. This 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.

West Seattle Junction Segment

Preferred Alternatives (WSJ-1 and WSJ-2)

Preferred Alternative WSJ-1 and Preferred Alternative WSJ-2 would require a full closure on Fauntleroy Way Southwest on nights and weekends. Preferred Alternative WSJ-1 would affect four general load zones along 38th Avenue Southwest and 39th Avenue Southwest. Preferred Alternative WSJ-2 would affect three truck-only load zones on Fauntleroy Way Southwest, and four general load zones on various other streets.

There is no rail network in this segment.

Preferred Alternatives with Third-Party Funding (WSJ-3a* and WSJ-3b*)

Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* 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. Construction could affect over-dimension freight if vertical or horizontal clearances are less than 20 feet. Preferred Alternative WSJ-3a* and Preferred Option WSJ-3b* would affect two general load zones.

Other Build Alternatives (WSJ-4* and WSJ-5*)

Alternative WSJ-4* would require a full closure on Fauntleroy Way Southwest on nights and weekends. Alternative WSJ-5* would require partial closure of Fauntleroy Way Southwest. Alternative WSJ-4* would not remove any load zones, and Alternative WSJ-5* would affect one general load zone.

9.2.3 Potential Mitigation Measures

9.2.3.1 Long-term 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 Seattle Department of Transportation to manage curb use in the station vicinities. This would include locating commercial vehicle and truck-only load zones to service business needs. For more information, see Section 5.2.3, Parking Mitigation.

9.2.3.2 Construction Impacts

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 the 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.

9.3 Ballard Link Extension

9.3.1 Affected Environment

The types of truck street designations in the City of Seattle were previously described in Section 9.2.1, Affected Environment, for the West Seattle Link Extension. Streets that are part of the designated truck network are concentrated in the South Interbay and Interbay/Ballard segments, which include part of the Ballard Interbay Northend Manufacturing/Industrial Center. This area includes industrial lands on both sides of Salmon Bay as well as the Seattle Armory, Port of Seattle's Terminal 86, 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.

Figure 9-3 and Figure 9-4 show the truck street designations for the Ballard Link Extension study area.

Marine facilities and navigation through Salmon Bay are described in Chapter 8.

9.3.1.1 SODO Segment

See Section 9.2.1.1 for a description of freight facilities in the SODO Segment.

9.3.1.2 Chinatown-International District Segment

Truck System

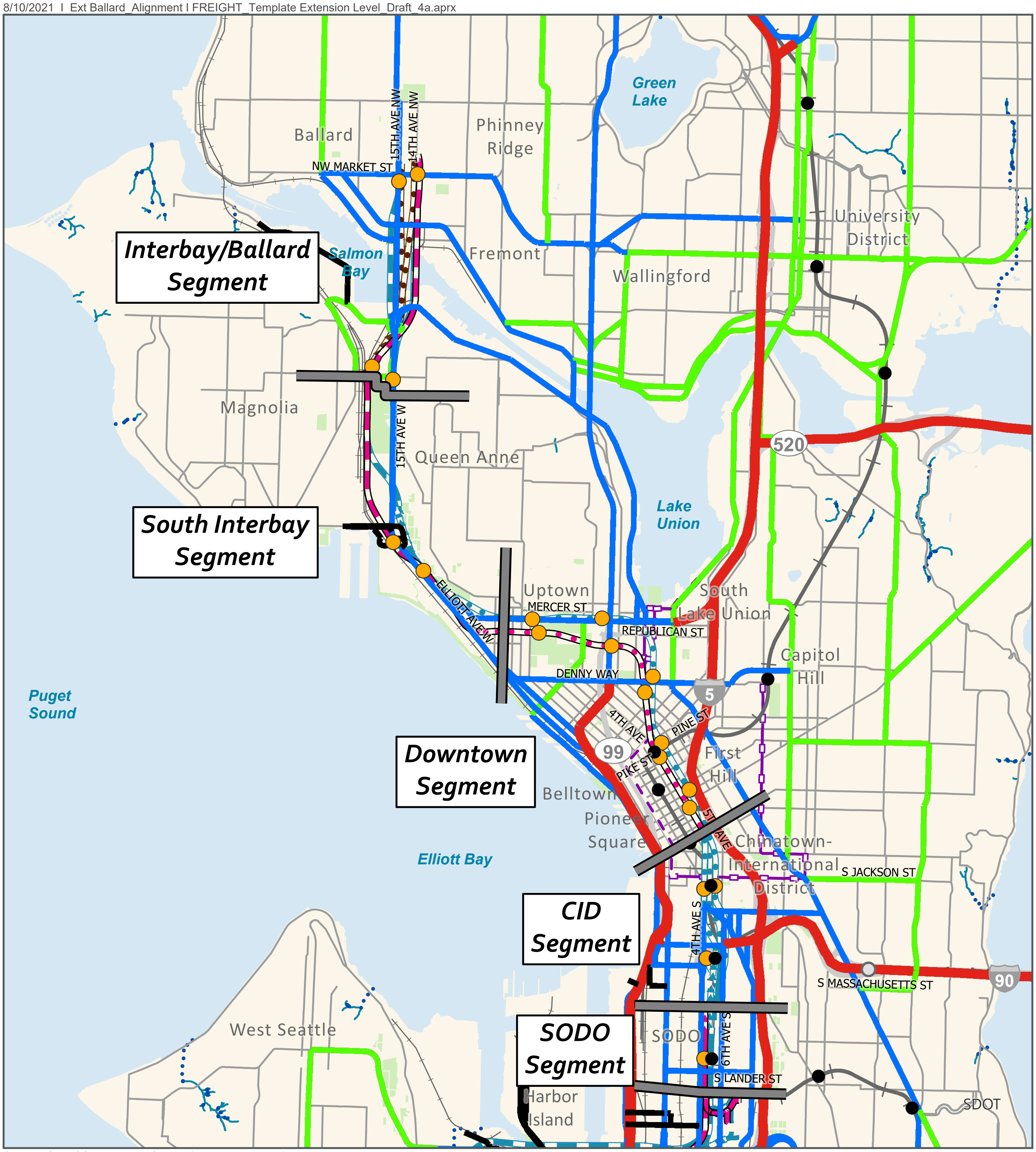
The Chinatown-International District Segment is in an area with a high level of commercial development, mixed with residential uses. Major interchanges with Interstates 5 and 90 are in the Chinatown-International District Segment: Interstate 90 has ramps to 4th Avenue South and South Edgar Martinez Drive (South Atlantic Street), while Interstate 5 has an interchange at South Dearborn Street. Table 9-5 summarizes the existing truck transportation route characteristics of the Chinatown-International District Segment study area.

Table 9-5. Truck Route Characteristics – Chinatown-International District Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
4th Avenue South, south of Seattle Boulevard South	Major Truck Street State T-3 corridor	None	None
6th Avenue South, south of South Dearborn Street	Major Truck Street State T-3 corridor	None	None
Airport Way South, south of South Charles Street	Major Truck Street State T-1 corridor	Over-Legal Network	None
Seattle Boulevard South	Major Truck Street State T-3 corridor	Over-Legal Network	None
South Dearborn Street	Major Truck Street State T-3 corridor	Over-Legal Network	None

Sources: City of Seattle 2016, WSDOT 2020.

Depending on the station and alignment locations, there are 21 to 39 load zones that serve businesses within 400 feet of the alternatives. This includes up to 9 truck-only load zones, up to 12 commercial vehicle load zones, and up to 18 general load zones. The truck-only load zones are concentrated on 6th Avenue South between South Royal Brougham Way and South Dearborn Street, and along South Royal Brougham Way east of 6th Avenue South.



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

Freight Network
- Limited Access
- Major
- Minor
- First/Last Mile Connector

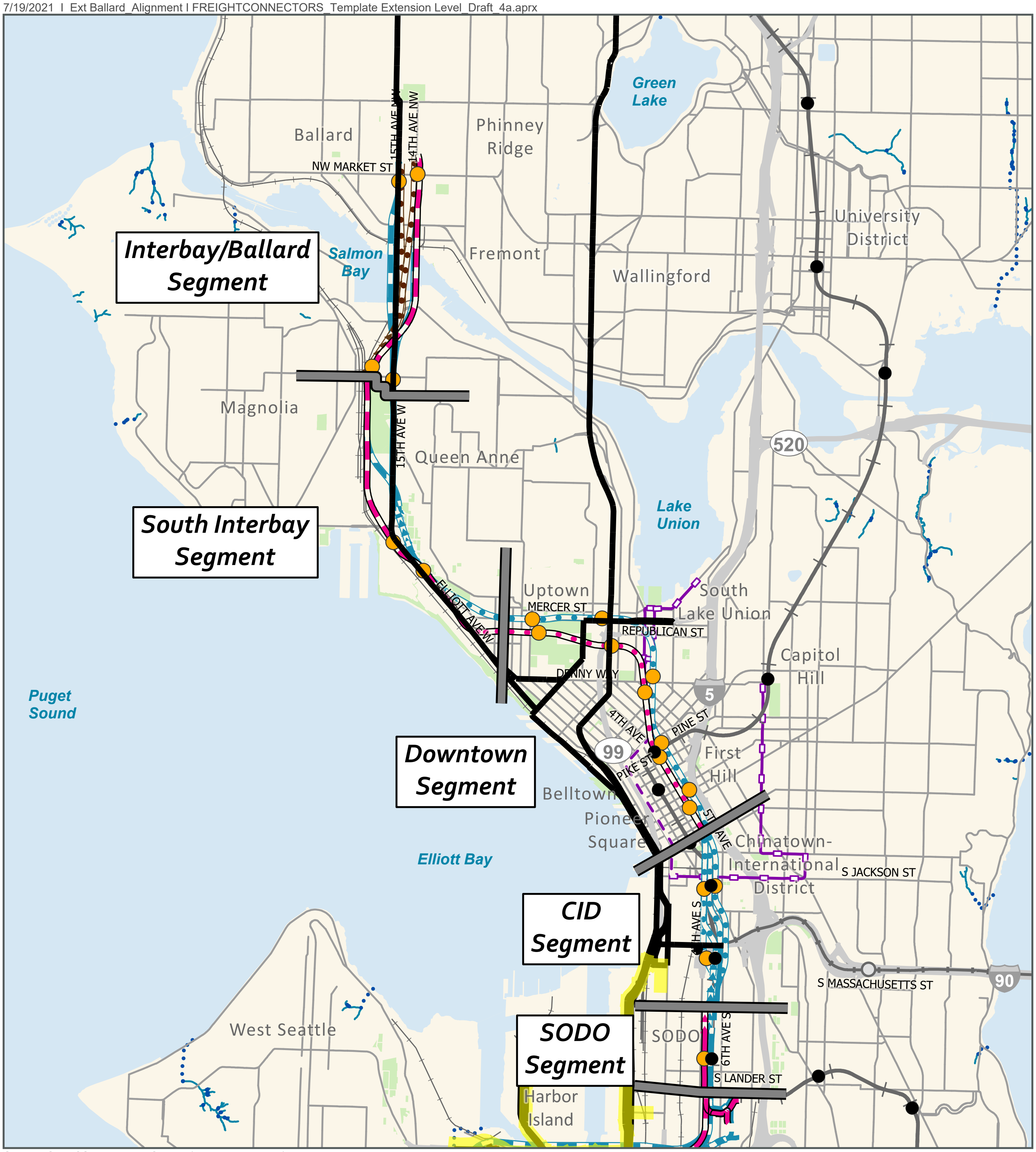
0 0.5 1 Mile

N

FIGURE 9-3
Freight Affected Environment
Ballard Link Extension

West Seattle and Ballard Link Extensions

7/19/2021 I Ext Ballard_Alignment I FREIGHTCONNECTORS_Template Extension Level_Draft_4a.aprx



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
- Seaport Intermodal Rail Connector
- Seaport Highway Connector

0 0.5 1 Mile
N

FIGURE 9-4
Freight Affected Environment Connectors
Ballard Link Extension

West Seattle and Ballard Link Extensions

Rail System

The BNSF Railway mainline passes through this segment to the west of 4th Avenue South. It is grade-separated at all crossings and is in a tunnel under Downtown Seattle north of South Washington Street.

9.3.1.3 Downtown Segment

Truck System

The Downtown Segment is in an area with a high level of dense commercial development, mixed with residential uses. Truck movements to and through the core area of Downtown Seattle are subject to the restrictions of the Downtown Traffic Control zone. Vehicles over 30 feet in length are prohibited in the Downtown Traffic Control zone between the hours of 6 a.m. and 7 p.m. Monday through Saturday except with a permit (Seattle Municipal Code 11.62.080). The Downtown Traffic Control zone is bounded by Yesler Way on the south, Lenora Street on the north, 8th Avenue on the east, and 1st Avenue on the west. The Seattle Municipal Code also prohibits large trucks (over 30 feet long, over 8 feet wide, or over 32,000 pounds) from using Denny Way between Western Avenue and Olive Way during the commuter peak periods (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.) (Seattle Municipal Code 11.62.120).

Table 9-6 summarizes the existing truck transportation route characteristics of the Downtown Segment study area.

Table 9-6. Truck Route Characteristics - Downtown Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
Aurora Avenue North, north of Denny Way	Major Truck Street Seaport Highway Connector State T-2 corridor	None	None
Denny Way west of Melrose Avenue	Major Truck Street Seaport Highway Connector (West of Broad Street) State T-3 corridor	None	Large trucks prohibited during peak commuter periods
Elliott Avenue West, south of 1st Avenue West	Major Truck Street Seaport Highway Connector T-1 to the north of Broad Street, T-3 to the south	Over-Legal Network	None
Mercer Street/West Mercer Street/West Mercer Place	Major Truck Street Seaport Highway Connector (between 5th Avenue North and Dexter Avenue North) State T-3 corridor	None	None

Sources: City of Seattle 2016, WSDOT 2020.

There are hundreds of commercial vehicle and general load zones in the Downtown Segment, as well as some truck-only load zones. Those affected by the project are described in Section 9.3.2.2.

Rail System

The BNSF Railway mainline traverses Downtown Seattle in a tunnel, mostly west of 2nd Avenue, and connects to at-grade tracks along the east side of Alaskan Way, north of Lenora Street.

9.3.1.4 South Interbay Segment

Truck System

The South Interbay Segment is in an area that primarily consists of industrial and manufacturing land uses. It encompasses a large portion of the Ballard Interbay Northend Manufacturing/Industrial Center, which is one of two designated Manufacturing/Industrial Centers in the city. It includes industrial lands on both sides of Salmon Bay as well as the Port of Seattle's Terminal 86 and Terminal 91. It also includes the BNSF Balmer Yard and industrial properties along the 15th 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. The Port of Seattle's Terminal 91 has two active piers that serve industrial uses as well as the Port's Smith Cove Cruise Terminal. During the peak cruise season between early April and late September, the cruise terminal can accommodate two cruise ships. Typical operations for each cruise ship involve disembarking passengers in the morning, reprovisioning the ship, and then embarking passengers for the next cruise in the same afternoon.

Table 9-7 summarizes the existing truck transportation route characteristics of the South Interbay Segment study area.

Table 9-7. Truck Route Characteristics – South Interbay Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
15th Avenue West, north of Elliott Avenue West	Major Truck Street Seaport Highway Connector State T-2 corridor	Over-Legal Network	None
Alaskan Way West north of West Galer Street Flyover	First/Last Mile Connector	None	None
Elliott Avenue West, south of 15th Avenue West	Major Truck Street Seaport Highway Connector State T-2 corridor	Over-Legal Network	None
Magnolia Bridge	First/Last Mile Connector	None	Bridge weight restriction, no trucks allowed from center lanes to Pier 91 facility
West Galer Street Flyover	First/Last Mile Connector	None	None
West Mercer Place/West Mercer Street, east of Elliott Avenue West	Major Truck Street State T-3 corridor	None	None

Sources: City of Seattle 2016, WSDOT 2020.

Depending on the station and alignment locations, there are 23 to 40 load zones near businesses within 400 feet of the station and elevated guideways. This includes up to 34 general load zones and up to 6 truck-only load zones.

Rail System

The BNSF Railway mainline is west of the 15th Avenue West/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. There are also storage and lead tracks near the Port's grain terminal at Terminal 86, parallel to the mainline. Local rail spurs connect from the Balmer Yard to warehouse sidings at Terminal 91.

West Dravus Street, the Magnolia Bridge, and the West Galer Street Flyover provide grade-separated access over the mainline and storage yard tracks. The pedestrian bridge at West Prospect Street (known as the Helix bridge) is also grade-separated from the mainline tracks.

9.3.1.5 Interbay/Ballard Segment

Truck System

The Interbay/Ballard Segment is in an area with a mix of residential, commercial, and industrial/manufacturing land uses. Most of the Interbay/Ballard Segment is within the Ballard Interbay Northend Manufacturing/Industrial Center and includes industries and maritime businesses along both sides of Salmon Bay and the Port of Seattle's Fishermen's Terminal.

Table 9-8 summarizes the existing truck transportation route characteristics of the Interbay/Ballard Segment study area.

Table 9-8. Truck Route Characteristics – Interbay/Ballard Segment

Street Corridor	Freight Classification(s)	Over-Legal or Heavy Haul Designation	Freight Constraints
15th Avenue West/Northwest	Major Truck Street Seaport Highway Connector State T-2 corridor	Over-Legal Network	Two low-clearance locations under West Emerson Street flyover and West Dravus Street
Northwest 46th Street, west of 15th Avenue Northwest	Major Truck Street State T-4 corridor	None	Low-clearance location under 15th Avenue Northwest
Northwest Leary Way and Leary Avenue Northwest	Major Truck Street State T-2/T-3 corridor	Over-Legal Network (east of 15th Avenue Northwest)	None
Northwest Market Street	Major Truck Street State T-3 corridor	None	None
Shilshole Avenue Northwest, west of Northwest 46th Street	Major Truck Street State T-3 corridor	None	None
West Emerson Street, west of 15th Avenue West	Minor Truck Street	Over-Legal Network	None
West Nickerson Street, east of 15th Avenue West	Major Truck Street State T-2 corridor	Over-Legal Network	None

Sources: City of Seattle 2016, WSDOT 2020.

Depending on the station and alignment locations, there are 22 to 34 load zones near businesses within 400 feet of the alternatives. This includes up to 25 general load zones and 9 truck-only load zones.

Rail System

The Interbay/Ballard Segment is traversed by the BNSF Railway mainline as well as the Ballard Terminal Railroad, a short-line railroad that provides service to local businesses on the north side of Salmon Bay. The BNSF Balmer Yard is located at the south end of this segment.

Ballard Terminal Railroad tracks extend northwest from Northwest 40th Street and 6th Avenue Northwest to a connection with the BNSF Railway mainline near the Shilshole Bay Marina (WSDOT 2009). Just west of the Ballard Bridge is the Western Pioneer Transfer Yard, which is a 620-foot siding where freight can be transferred from railcar to truck. The railroad’s switch engine is stored in a pen east of the 14th Avenue Northwest/Northwest 45th Street intersection.

The BNSF Railway owns a rail spur that extends north from its main Balmer Yard in Interbay towards Fremont. A double track extends under the Ballard Bridge and along the north side of the Ship Canal Trail to just east of 13th Avenue West. The northernmost track is used as a “Team Track” for industrial shipping, primarily for Coastal Transportation Inc., which uses the track to ship seafood that has arrived from Alaska by ship or to receive supplies that will be transported to Alaska (Heffron Transportation, pers. comm. 2019).

9.3.2 Environmental Impacts

This section discusses the future freight conditions for the No Build Alternative and Build Alternatives, including effects to the truck and rail networks. In general, long-term or short-term impacts to traffic operations, as described in Chapter 4, would affect both general and truck traffic. This section summarizes the potential effects unique to freight traffic or facilities.

9.3.2.1 No Build Alternative

With the No Build Alternative, there are no planned changes to the freight network, although in the future, slight growth in traffic volumes are expected that would increase congestion on designated freight routes. As part of the transportation analysis, future planned industrial and port developments are assumed. In the Ballard Link Extension project corridor, this includes new industrial and cruise ship uses at Terminal 91 and uplands development at Fishermen’s Terminal.

9.3.2.2 Build Alternatives

Long-term Impacts

Impacts Common to All Alternatives

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.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would have a new vehicle overpass on South Holgate Street, which is designated as a Major Truck Street and part of the Heavy Haul Network. The vehicle overpass would improve mobility for both rail and truck freight as it removes delays caused by the existing at-grade rail crossing on South Holgate Street. This overpass would be designed to accommodate trucks.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b and Alternative SODO-2 would have similar freight effects as Preferred Alternative SODO-1a.

Chinatown-International District Segment

All alternatives would be below street grade north of South Massachusetts Street. None are expected to affect the truck or rail freight system.

Downtown Segment

All alternatives through downtown would be in tunnels. None are expected to affect the truck or rail freight systems.

South Interbay Segment

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 would have segments of medians with guideway columns to support the elevated track structure in the existing center turn lane along Elliott Avenue West from north of West Prospect Street to just south of the West Mercer Place. Left-turn access to some businesses along Elliott Avenue West would be restricted, and vehicles would be required to make U-turns at breaks in the medians or at signalized intersections. Large trucks may need to 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.

Preferred Alternative SIB-1 would not affect the rail network in this segment.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 would have a median in the middle of Elliott Avenue West just north of West Mercer Place for columns to support the elevated guideway. It would remove left-turn access for a few parcels. Medians would be added on 15th Avenue West from West Newton Street to West Barrett Street for columns to support the elevated guideway. Left-turn access would be restricted along this segment of 15th Avenue West. U-turn opportunities would be provided at signalized intersections, and out-of-direction travel to alternative corridors such as Westlake Avenue North and West Nickerson Street or using the Dravus Street interchange may be needed to reach business destinations. No roadway changes are proposed with Alternative SIB-3.

None of the other alternatives would affect the rail network in this segment

Interbay/Ballard Segment

Preferred Alternative (IBB-1a)

Preferred Alternative IBB-1a would construct large guideway column structures on each side of Salmon Bay for the elevated crossing. The columns on the south side could affect circulation and operations for businesses along this edge of Salmon Bay.

Preferred Alternative IBB-1a would also locate 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.

No long-term effects to the network of major truck streets or rail network.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would not affect the truck or rail networks.

Other Build Alternative and Option (IBB-1b and IBB-3)

Option IBB-1b would construct large guideway column structures on each side of Salmon Bay for the elevated crossing. The columns on the south side could affect circulation and operations for businesses along this edge of Salmon Bay.

Alternative IBB-3 would have medians for guideway columns in the center turn lane of 15th Avenue Northwest from just south of Northwest 52nd Street to Northwest 54th Street, and between Northwest 56th Street and Northwest 57th Street. This is not expected to affect access to local businesses. This alternative would also have guideway columns on the south side of Salmon Bay that could affect access and circulation within Fishermen’s Terminal.

Construction Impacts

Impacts Common to All Build Alternatives

Construction activities for all Build Alternatives are expected to eliminate 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 of the station 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 segments discussion.

Freight facilities 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 by alternative in the following sections. Specific information about each closure is provided in Section 4.3.2.3, Construction Impacts.

SODO Segment

Preferred Alternative (SODO-1a)

Preferred Alternative SODO-1a would build a new vehicle overpass over the guideways on South Holgate Street, which is designated as a Major Truck Street and part of the Heavy Haul Network. Construction of the overpass is expected to require a full closure of South Holgate Street. When South Holgate Street is closed, it is assumed 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 to reach nearby warehouse and distribution facilities may be affected because there are no other designated Heavy Haul Network streets in the vicinity to serve those types of vehicles.

Other Build Alternative and Option (SODO-1b and SODO-2)

Option SODO-1b and Alternative SODO-2 would also build a new vehicle overpass on South Holgate Street. Option SODO-1b and Alternative SODO-2 would require a full closure of South Holgate Street. When South Holgate Street is closed, it is assumed South Lander Street would be open and could serve as an alternate route for most trucks. Similar to Preferred Alternative SODO-1a, heavy-haul trucks could be affected.

Chinatown-International District Segment

Alternative CID-1a* would have multi-year partial and full closures of 4th Avenue South, which is a Major Truck Street south of Seattle Boulevard South. This alternative 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 diverted to other streets, such as 1st Avenue South and 6th Avenue South. Option CID-1b* would also have partial and full closures of 4th Avenue South for several years.

Alternative CID-1a* would rebuild the bridges over the BNSF Railway mainline tracks at South Main Street and South Jackson Street and 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 have a partial closure of 6th Avenue South near South Royal Brougham Way, which is also a Major Truck Street. The diagonal station configuration for Alternative CID-2a is not expected to affect truck streets.

Downtown Segment

Preferred Alternative (DT-1)

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 the Aurora Avenue North (State Route 99), which is a Major Truck Street and a T-2 highway in WSDOT's Freight and Goods Transportation System Network. Alternative routes to Harrison Street could include John Street or Denny Way.

Preferred 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, where there are two commercial load zones and three general load zones, and on Republican Street between 1st Avenue North and Warren Avenue North, where there are three general load zones.

Other Build Alternative (DT-2)

Construction of Alternative DT-2 would require the partial closure of a section of Mercer Street/West Mercer Street, a Major Truck 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 (i.e., 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 (Seattle Municipal Code 11.62.120).

Alternative DT-2 could affect up to 29 load zones, which includes 12 general load zones, 13 commercial load zones, and 4 truck-only load zones. The most concentrated effect would be on Terry Avenue North between Thomas Street and Lenora Street, which has six general load zones, four commercial load zones, and three truck-only load zones. Other streets with high concentrations of affected load zones are Warren Avenue North between Mercer Street and Roy Street, with three commercial load zones, and 6th Avenue between Pike Street and Pine Street, with three commercial load zones.

South Interbay Segment

Preferred Alternative (SIB-1)

Preferred Alternative SIB-1 would require partial closure of Elliott Avenue West, with up to four travel lanes closed. This alternative also requires full closure of the West Galer Street Flyover (designated as a First/Last Mile Connector and providing access to Terminal 91) on some nights and weekends during removal and reconstruction of the pedestrian bridge and girder erection for the station.

Preferred Alternative SIB-1 could require temporary removal of up to 10 load zones, which includes 9 general load zones and 1 truck-only zone. The highest concentration would be located near the tunnel portal on West Republican Street west of 2nd Avenue West, where there are five general load zones.

Other Build Alternatives (SIB-2 and SIB-3)

Alternative SIB-2 requires partial closure of a section of 15th Avenue West. Two lanes could be closed. Similar to the preferred alternative, Alternative SIB-2 would include the partial closure of Elliott Avenue West. Alternative SIB-3 would require short-term partial closures of 15th Avenue West and Elliott Avenue West during construction.

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 would be located near the tunnel portal on West Republican Street west of 2nd Avenue West, where there are five general load zones. 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 three general and one truck-only load zone spread among several streets.

Interbay/Ballard Segment

Preferred Alternative (IBB-1a)

Preferred Alternative IBB-1a would require full closure of 15th Avenue West on nights and weekends and would also require a closure of 14th Avenue Northwest and a number of cross streets that connect to the 14th Avenue Northwest corridor. While 14th Avenue Northwest and the affected cross streets are not designated as truck streets, they do provide local access to businesses in the vicinity.

Preferred Alternative IBB-1a 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.

Preferred Alternative IBB-1a would affect three general load zones and one truck-only load zone, spread among several streets. The truck-only load zone is located on 14th Avenue Northwest.

Construction of Preferred Alternative IBB-1a 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.

Preferred Alternative and Option with Third-Party Funding (IBB-2a* and IBB-2b*)

Preferred Alternative IBB-2a* and Preferred Option IBB-2b* would require partial closure of 15th Avenue West. Preferred Alternative IBB-2a* would fully close 14th Avenue Northwest and some cross streets during construction. While 14th Avenue Northwest and the affected cross streets are not designated as truck streets, they do provide local access to businesses in the vicinity. Preferred Option IBB-2b* would require a partial closure of the Northwest Market Street/15th Avenue Northwest intersection; both streets are Major Trucks Streets.

Preferred Alternative IBB-2a* would affect four general load zones near the proposed 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.

Other Build Alternative and Option (IBB-1b and IBB-3)

Option IBB-1b 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. It would require a partial closure on 15th Avenue West, as well as a full closure on nights and weekends, and would also require rolling closures of the West Dravus Street on- and off-ramps to 15th Avenue West. 15th Avenue West is a Major Truck Street. Additional congestion would be expected along 15th Avenue West, which could delay truck movements or incur out-of-direction travel with the West Dravus Street ramps closures. This alternative would affect six load zones, which includes three general load zones and three truck-only load zones, along several streets. The truck-only load zones are located on 14th Avenue Northwest. Construction of 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.

Alternative IBB-3 would also require a partial closure on 15th Avenue West and a full closure of this street on nights and weekends, as well as rolling closures of the West Dravus Street on- and off-ramps. Alternative IBB-3 would require full closure of the Northwest Market Street/15th Avenue Northwest intersection on nights and weekends. This alternative would affect 11 load zones, which includes 8 general load zones and 3 truck-only load zones, along several streets; of these, 5 are located on Northwest Leary Way between 15th Avenue Northwest and 17th Avenue Northwest. Construction of this alternative would also cross over the BNSF Railway lead tracks as well as the Ballard Terminal Railroad. 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.

9.3.3 Potential Mitigation Measures

9.3.3.1 Long-term 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 local business needs. For more information, see Section 5.3.3, Parking Mitigation.

9.3.3.2 Construction Impacts

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 could 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 these 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 upon with the BNSF Railway.

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10 INDIRECT AND SECONDARY IMPACTS

This section presents the project's indirect and secondary transportation impacts, which are those that occur later in time or are farther removed in distance during project operation and construction. Any additional mitigation measures beyond those described in previous sections are also discussed.

10.1 Regional Travel

The completion of the WSBLE would provide reliable light rail service between West Seattle and Ballard and a majority of the region's urban centers, including Downtown Seattle. Light rail service could help facilitate potential increases in residential and employment uses around the stations. This could lead to changes in regional and local travel patterns as trips both to and from these areas increase for all travel modes, affecting transit, local traffic volumes, parking demand, and non-motorized users.

10.2 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, around the stations. Sound Transit's ridership forecasting model uses Puget Sound Regional Council's 2014 Land Use Targets data for its population and employment projections. These plans forecast substantial population and employment growth in and around the WSBLE study area by 2042.

Because 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, transit-oriented development around future light rail stations. However, the mode of access to and from stations may shift to include more non-motorized and less automobile access as the population and employment densities increase within station walksheds and bikesheds. For example, development around stations could increase the number of pedestrians in an area, but this increase could be offset by fewer people needing to transfer from buses to rail or be picked up or dropped off. The increased density around stations could also reduce bus trips in other parts of the system. Also, in general, door-to-door travel times would be shorter for residents within walking distance to stations.

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.

10.3 Arterial and Local Street Operations

Increased automobile and bus trips to and from the station areas could result from potential increases in land use development around the light rail stations along the corridor. The increase in traffic could cause additional impacts on the arterials and local streets. Mode shifts from automobile 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.

10.4 Parking

Increase in parking demand around station areas along the WSBLE corridor might result from the potential increase in land use development surrounding these areas. The demand for parking more than 0.25 mile from the stations could increase because riders could park along feeder bus routes and travel to the station by bus.

10.5 Non-motorized Facilities

Additional pedestrian and bicycle trips to the station could result from potential increases in higher-density residential and commercial developments. Likewise, light rail ridership at the affected station could potentially increase. These trips may travel along streets that lack sufficient facilities or Americans with Disabilities Act accessibility. However, that increase in usage could encourage local jurisdictions to improve these facilities.

10.6 Safety

The potential for increases in residential and employment uses around the light rail stations could lead to an increase in non-motorized activity and further conflicts between all travel modes (i.e., automobile, transit, and non-motorized).

10.7 Freight Mobility and Access

Increased automobile and bus trips to and from the station areas could result from potential increases in land use development around the light rail stations along the WSBLE corridor. The increase in traffic could cause additional impacts on the arterials and local street operations near stations, which could affect freight mobility and access on local roadways. Any impacts on freight would be similar to those for automobile.

10.8 Navigation

No indirect effects to navigation are anticipated. See Sections 4.2.3 and 4.3.3, Economics, of the Draft Environmental Impact Statement for discussion of indirect effects to maritime businesses.

11 CUMULATIVE IMPACTS

This section describes how the cumulative long-term incremental transportation effects of the project, in conjunction with past, present, and reasonably foreseeable future actions, are accounted for in the previous transportation analysis. Cumulative short-term construction transportation impacts are also presented.

11.1 Impacts during Operation

The analysis of future traffic and transit impacts in this technical report is a cumulative analysis based on the results of traffic modeling and ridership modeling that incorporate past, funded, and approved future actions, as well as projected growth that would result from development in the region. Other reasonably foreseeable transit and development projects could affect transit ridership and travel patterns within the study area, including traffic operations near new stations. This could include possible transit-oriented development in station areas, which would likely increase the numbers of people walking or biking to stations.

As the WSBLE Project becomes operational, its contribution to cumulative impacts on transportation would be beneficial in several ways. The project would contribute travel efficiencies in addition to those provided by the other reasonably foreseeable future transportation improvement projects listed in Draft Environmental Impact Statement Appendix K, Present and Future Development, Transportation, and Public Works Projects in the Study Area. It would increase the number of people traveling in the project corridor, with more people riding transit, while reducing the number of vehicle miles traveled and vehicle hours of delay compared to the No Build Alternative. Fewer vehicle miles and hours traveled within the corridor could improve general traffic conditions, including freight mobility within the study area.

The project, in combination with other reasonably foreseeable future transit projects, is not expected to have a cumulative impact on parking throughout the study area. The project would either remove or convert some street parking to bus (or other transit) loading zones; however, the project would also be removing some of the residential or commercial land uses that created demand for parking in these areas. Sound Transit would work with the Seattle Department of Transportation to consider appropriate on-street parking measures within a 0.25-mile radius of each station to discourage hide-and-ride activity and to make sure parking is available for residents and businesses in the area. While other transportation projects could also remove street parking to implement their improvements, these changes would be consistent with City goals and policies related to curb space management. With the project creating a more connected and accessible regional transit system, especially in the commercial and residential areas along the project corridor, transit ridership would increase and reduce the need for parking within the study area.

11.2 Impacts during Construction

During the 5- to 10-year period of civil construction, the WSBLE Project may add to and interact with construction impacts from other transportation and development projects being built at the same time. Construction in or near roadways typically requires temporary lane closures, detours, and traffic delays. Interactions among two or more concurrent construction projects can intensify these impacts. However, most reasonably foreseeable future actions that can be reliably identified at present would be completed or near completion before WSBLE Project construction would begin.

Other transportation projects in the study area could have construction periods that would overlap with the WSBLE Project, and if they include road closures, they could contribute to cumulative traffic impacts on travel throughout Downtown Seattle and adjacent neighborhoods. In bored-tunnel areas, the WSBLE Project would not affect traffic flow outside of station, station shaft, and portal locations. WSDOT, the City of Seattle, Metro, and Sound Transit have been coordinating and would continue to coordinate on the construction schedules for transit projects to avoid major construction work on overlapping corridors at the same time. The proposed project could include building roadway overpasses at South Lander Street and South Holgate Street, two of the few major east-west streets in SODO that cross the light rail and BNSF Railway tracks. Preferred Alternative SODO-1a and Option SODO-1b would include construction of two roadway overpasses, one at South Lander Street as part of the West Seattle Link Extension and one at South Holgate Street as part of the Ballard Link Extension. Cumulative traffic-related construction impacts in the SODO Segment would be minimized using a phased approach between the West Seattle Link Extension and the Ballard Link Extension. Access for all types of vehicles and non-motorized access would be maintained on one roadway while the other is under construction. South Lander Street and South Holgate Street would not be closed for construction at the same time.

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