FINAL EIS

EAST LINK PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT

Appendix H1
Transportation Technical Report

SOUNDTRANSIT
CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

Washington State
Department of Transportation

U.S. Department of Transportation
Federal Transit
Administration

July 2011

SOUND TRANSIT EAST LINK PROJECT

APPENDIX H1

Transportation Technical Report

Prepared for:
Sound Transit

Prepared by:
CH2M HILL
Fehr and Peers

July 2011

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General Acronyms and Abbreviations

acc./MVM	accidents/million vehicle miles
ADA	Americans with Disabilities Act
ADT	average daily traffic
APC	automatic passenger count
AVL	automatic vehicle location
AWSC	all-way stop controlled
Bel-Red	Bellevue-Redmond
CAC	collision analysis corridor
CAL	collision analysis location
CIP	Capital Improvement Program
CT	Community Transit
DSTT	Downtown Seattle Transit Tunnel
Eastside	east side of Lake Washington
EIS	environmental impact statement
FFS	free flow speed
FGTS	Freight Goods Transportation System
FHWA	Federal Highway Administration
GP	general purpose
HAC	high-accident corridor
HAL	high-accident location
HCM	Highway Capacity Manual
HCT	high-capacity transit
HOT	high-occupancy toll

HOV	high-occupancy vehicle
HV	heavy vehicles
I-405	Interstate 405
I-90	Interstate 90
KCM	King County Metro
LOS	level of service
Metro	King County Metro
MEV	million entering vehicles
MF	maintenance facility
MP	milepost
mph	miles per hour
MVMT	million vehicle miles traveled
MPMT	million person miles traveled
N/A	not applicable
PDO	property damage only
PMT	person miles traveled
PSRC	Puget Sound Regional Council
RPZ	residential parking zone
RR	railroad
Sea-Tac Airport	Seattle-Tacoma International Airport
SOV	SOV
SR	State Route
ST	Sound Transit
ST2	Sound Transit 2
TCQSM	Transit Capacity and Quality of Service Manual
TCRP	Transit Cooperative Research Program
TFP	transportation facilities plan
TRB	Transportation Research Board
TWLT	two-way left turn
TWSC	two-way stop controlled
v/c ratio	volume-to-capacity ratio
VHT	vehicle hours traveled
VMT	vehicle miles traveled
WSDOT	Washington State Department of Transportation

1.0 Introduction

This *Transportation Technical Report* evaluates existing and future local, corridor, and regional transportation impacts and potential mitigation associated with the alternatives of the proposed Sound Transit East Link Project. These alternatives are described in Chapter 2 of the East Link Project Final Environmental Impact Statement (EIS).

1.1 Transportation Elements and Study Area

The evaluation considered a number of transportation elements, including regional travel patterns and facilities, transit operations and levels of service, traffic operations and safety related to arterial and freeway system, parking, nonmotorized circulation, freight circulation, and navigable waterways. For each of these elements, this report describes the affected environment under the project's existing conditions (2007) and the environmental impacts for two future years, 2020 and 2030. The year 2020 was selected for analysis because it aligns with the project's estimated year of opening. Year 2030 provides a horizon-year analysis consistent with the regional and local agency planning period.

East Link is a light rail system that would connect Seattle with the growing urban areas on the east side of Lake Washington (the Eastside). The system would originate in south Downtown Seattle, where it would connect with Sound Transit's Central Link at the International District/Chinatown Station. It then would travel east across Lake Washington via Interstate 90 (I-90) to Mercer Island, Downtown Bellevue, and the Bel-Red/Overlake area, terminating in Downtown Redmond. The project that this report evaluates consists of 25 alternatives, associated various light rail stations, and maintenance facility sites. These project elements are described in Chapter 2 of the East Link Project Final EIS. As shown in Exhibit 1-1, the project has been divided into the following five segments:

- Segment A, Interstate 90
- Segment B, South Bellevue
- Segment C, Downtown Bellevue
- Segment D, Bel-Red/Overlake
- Segment E, Downtown Redmond

The general study area for the transportation evaluation encompasses the I-90 corridor between Seattle and I-405, proceeding through Downtown Bellevue and the Bel-Red area, and then following State Route (SR) 520 to Redmond. To assess regional and corridor operations throughout the study area, six screenlines were established to evaluate transit and vehicle travel performance. This study area includes the I-90 freeway between I-5 and I-405 and approximately 151 intersections on surface streets. To evaluate pedestrian circulation, a half-mile radius surrounding stations was established. Bicycle circulation was also evaluated, but within a larger, 1-mile radius from the stations. Parking was evaluated within a quarter-mile radius surrounding the stations. As described in the transit section of this report (Section 4.0), Sound Transit and King County Metro service planners reviewed future bus routes in the no-build condition and as part of this project. Exhibits 1-2 to 1-4 depict the transportation analysis areas within the five segments in the study area.

This technical report discusses each transportation element individually. The discussion of each element covers the affected environment, expected environmental impacts (comparing the No Build Alternative, or no-build condition, to the East Link Project alternatives, or build condition), and potential mitigation.

The transportation planning process has involved local jurisdictions, state agencies, federal agencies, transit agencies, and other interested parties. The East Link Final EIS and this technical report evolved through identifying and prioritizing regional and local transportation needs and developing local and regional transportation plans.

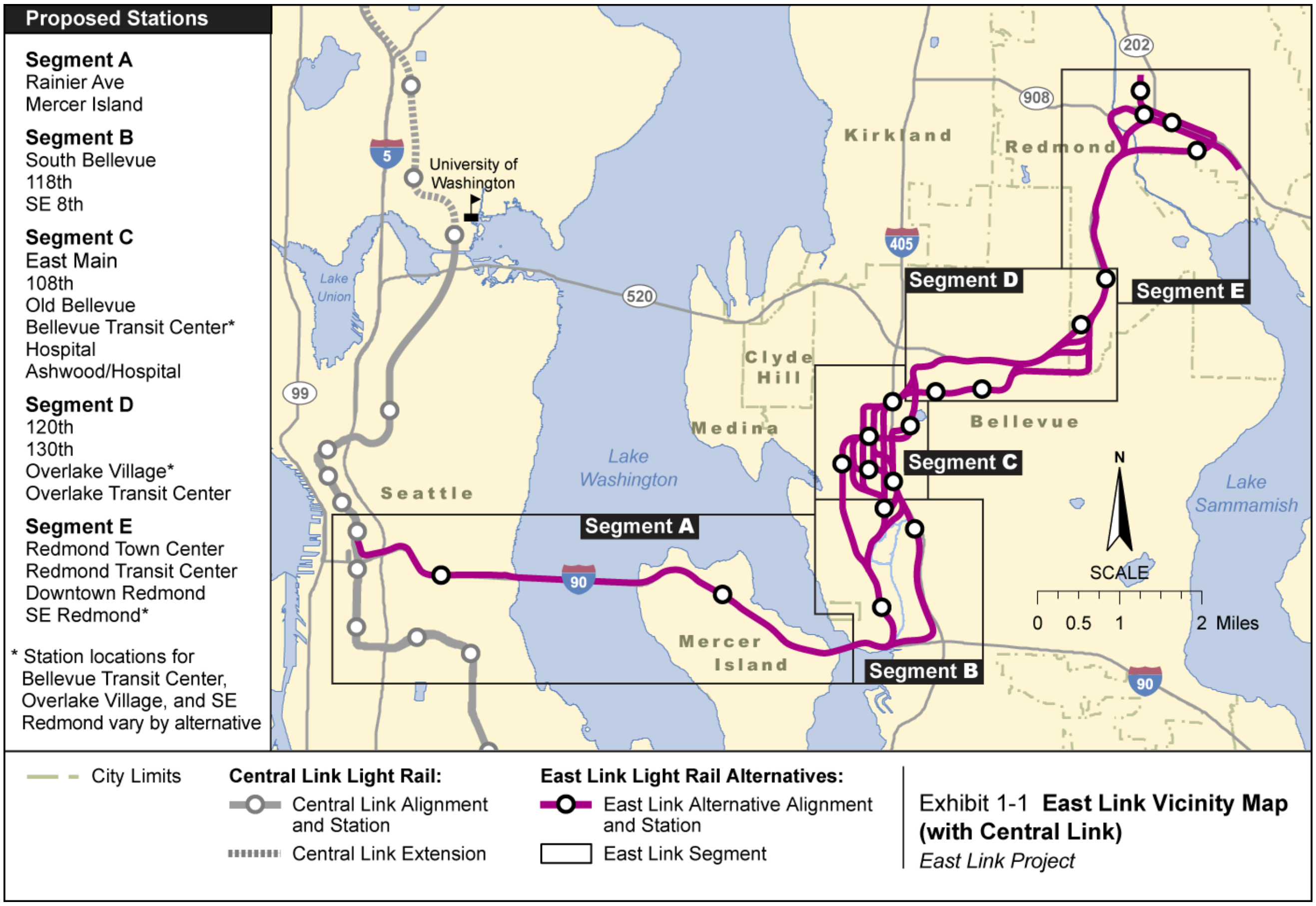


Exhibit 1-1 **East Link Vicinity Map (with Central Link)**
East Link Project

During the preparation of this technical report and related elements of the Final EIS, staff from the Federal Transit Administration, Sound Transit, and Washington State Department of Transportation (WSDOT) met and coordinated with staff planners and engineers representing the following agencies and jurisdictions:

- Federal Highway Administration (FHWA)
- King County Metro (Metro)
- City of Seattle
- City of Mercer Island
- City of Bellevue
- City of Redmond

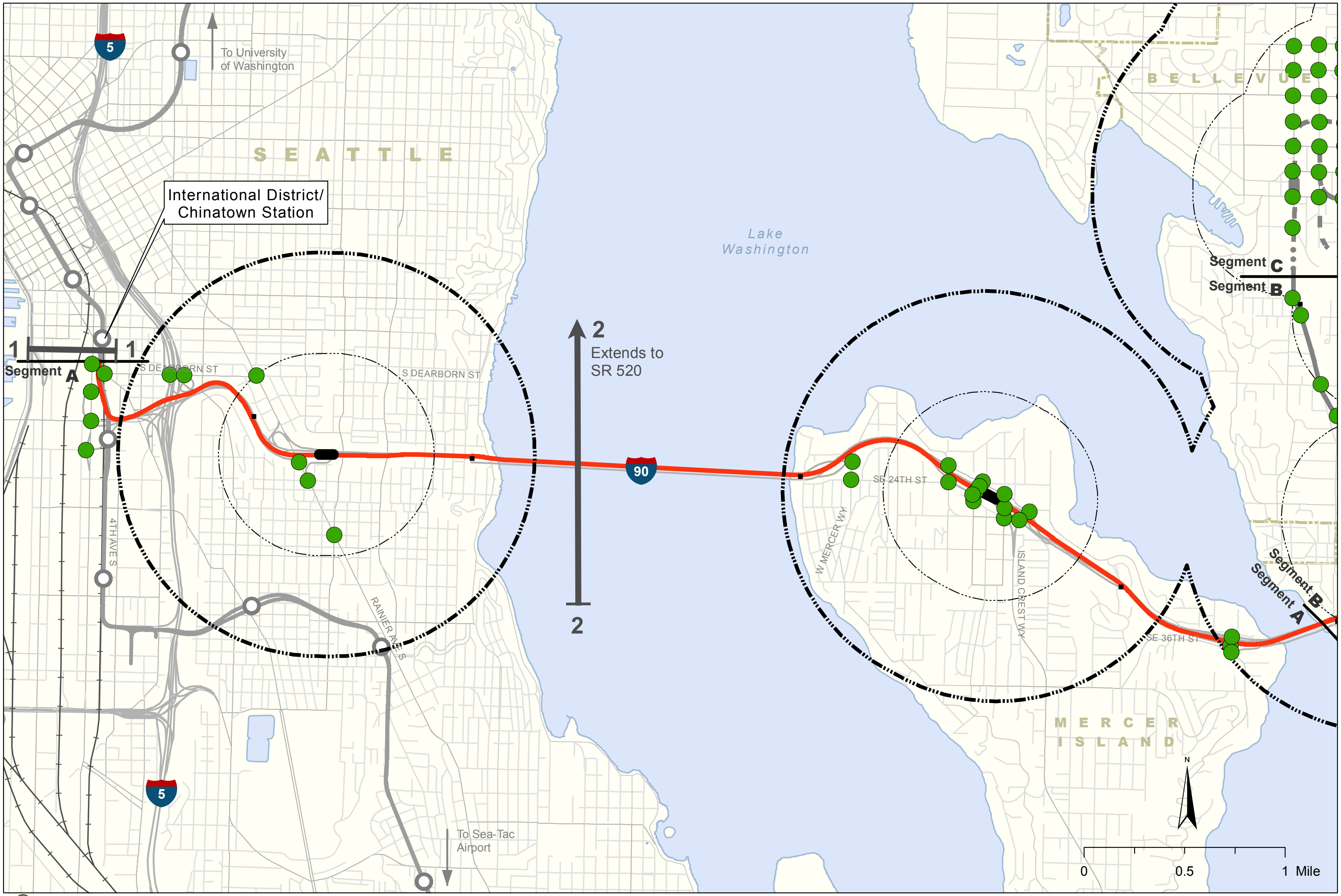
1.2 Meeting the Need for the Project

The analysis in this technical report demonstrates that the East Link Project would fully meet the need for the project in all the categories presented in Chapter 1 of the East Link Project Final EIS:

- Increased demand for transit service
- Regional urban growth center plan requirements for high-capacity transit (HCT) investments
- Increased congestion on I-90
- Operating deficiencies in regional bus transit
- Limited transit capacity and connectivity

1.2.1 Increased Demand for Transit Services

Without East Link, existing and projected transit service would not meet transportation reliability and capacity needs for the Eastside corridor. In response to the combination of population and employment growth and associated congestion, transit ridership is expected to double across Lake Washington and between Bellevue and Redmond by 2030 in the No Build Alternative, further highlighting the importance of providing reliable transit service.



Study Intersection
Screenline
Sidewalk and On-Street Parking Study Area (1/2 mile)
Bicycle Study Area (1 mile)

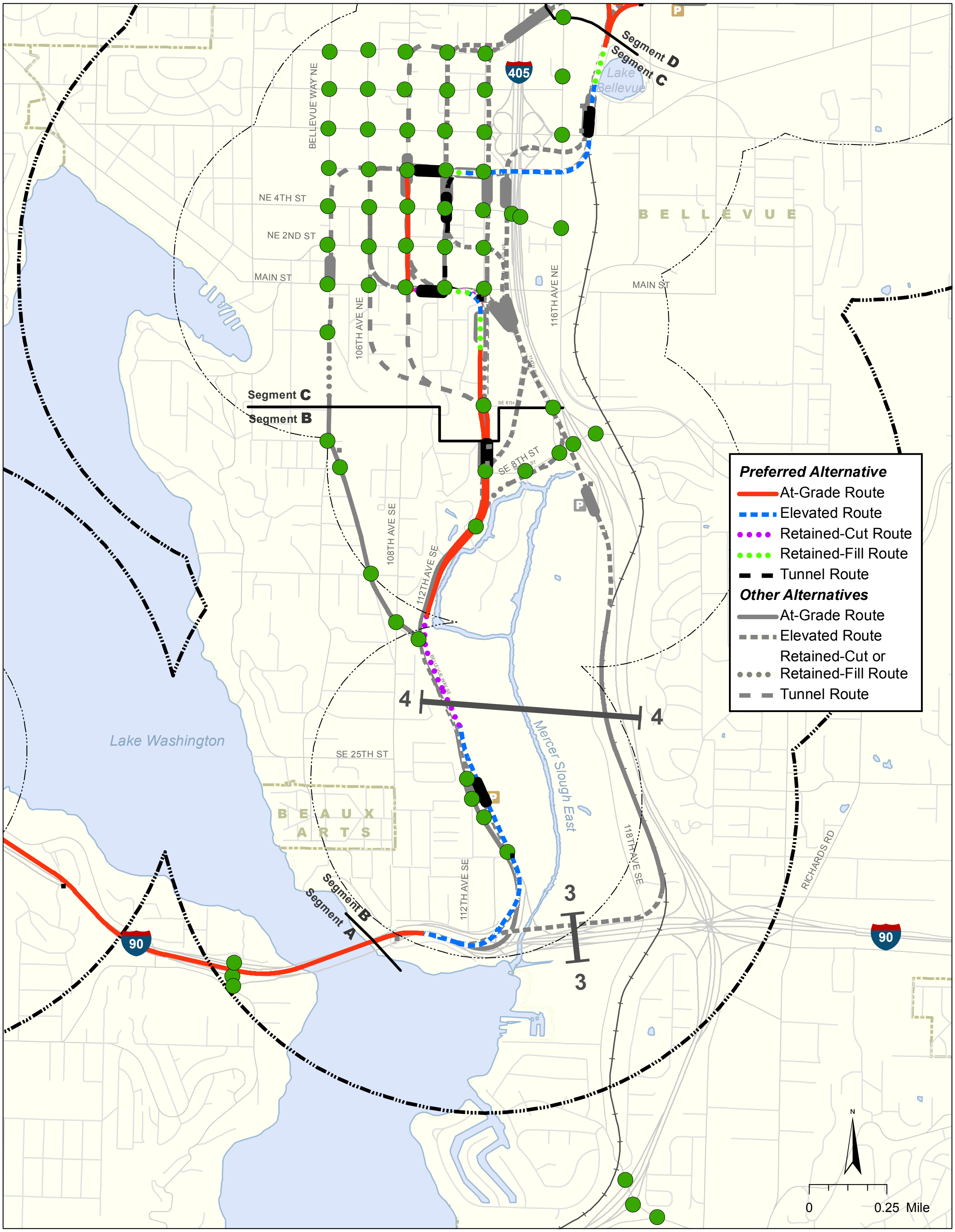
Preferred Alternative
At-Grade Route
Elevated Route
Retained-Cut Route
Retained-Fill Route
Tunnel Route

Other Alternatives
At-Grade Route
Elevated Route
Retained-Cut or Retained-Fill Route
Tunnel Route

Traction Power Substation
Proposed Station
Central Link Alignment and Station

Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 1-2 **Transportation and Local Street Analysis Study Area Segment A**
East Link Project

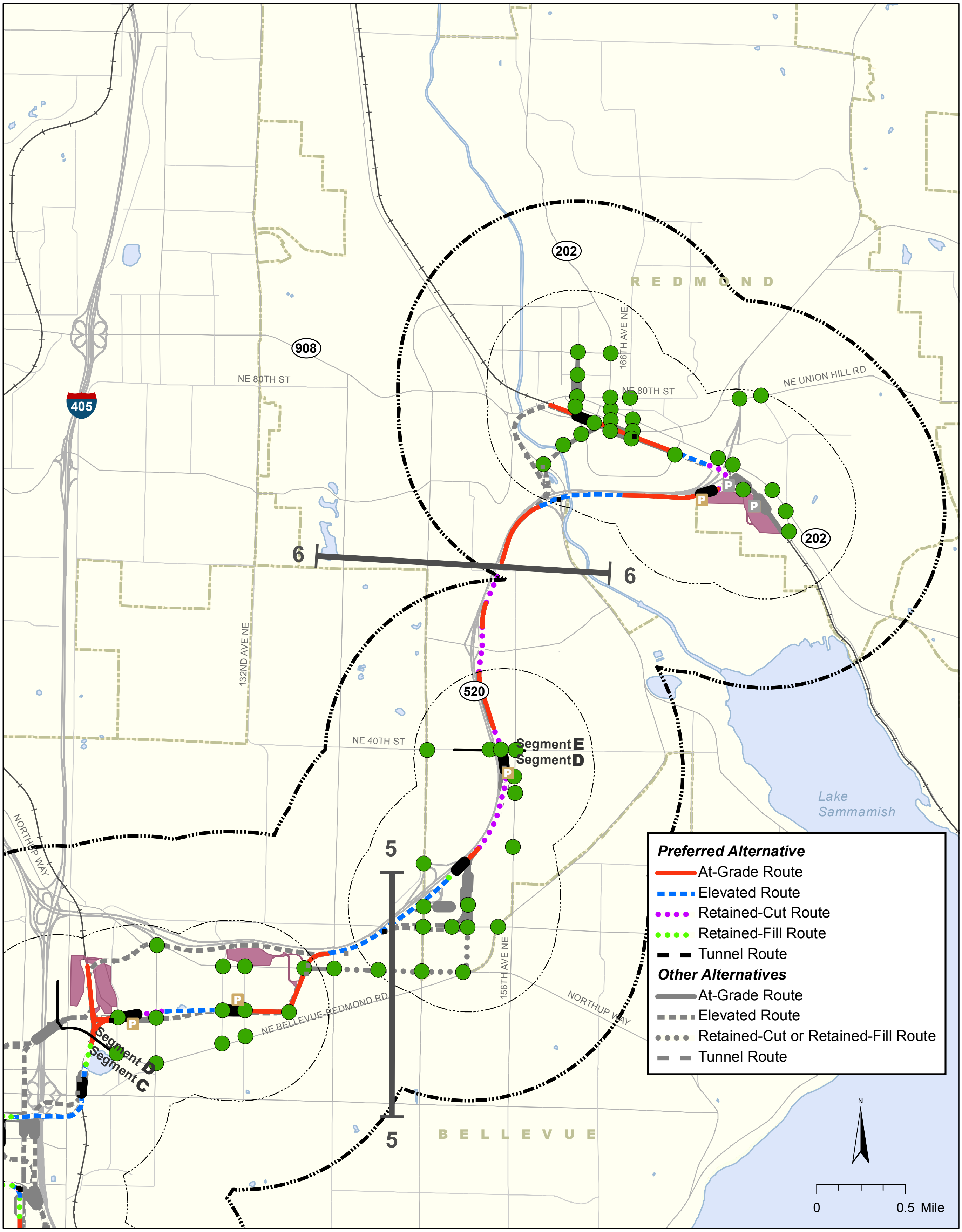


Source: Data from King County (2006).

- Study Intersection
- Screenline
- Sidewalk and On-Street Parking Study Area (1/2 mile)
- Bicycle Study Area (1 mile)
- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Exhibit 1-3 **Transportation and Local Street Analysis Study Area Segments B and C**

East Link Project



Study Intersection
Screenline
Sidewalk and On-Street Parking Study Area (1/2 mile)
Bicycle Study Area (1 mile)
Traction Power Substation
Proposed Station
Maintenance Facility and Access Track
New and/or Expanded Park-and-Ride Lot

Source: Data from King County (2006).

Exhibit 1-4 **Transportation and Local Street Analysis Study Area Segments D and E**
East Link Project

East Link would meet the growing demand for reliable transit alternatives. Within the East Link corridor, the travel mode in the future is predicted to shift, generally reducing the percent of single-occupant vehicles (SOVs) and increasing the percent of high-occupancy vehicles (HOVs) (vanpools and carpools) and transit (buses and light rail), modes that carry more people within the limited transportation space. With the project, transit ridership across Lake Washington would increase by about 25 percent during the afternoon (PM) peak period; thus, close to 16 percent of the total number of people traveling across the lake would be using transit. This shift to transit indicates the growing demand for reliable high-capacity modes of travel that are consistent with urban environments and are crucial to providing person mobility rather than roadway vehicle capacity.

1.2.2 Regional Urban Growth Center Plan Requirements for High-Capacity Transit Investments

In accordance with Puget Sound Regional Council's (PSRC's) adopted *Transportation 2040* plan (PSRC, 2010a) and the Washington State Growth Management Act objectives, Bellevue, Seattle, and Redmond have made land use and planning decisions for increased employment and residential density based in part on the long-term vision of HCT connections across I-90. Traffic projections indicate that most major roadways in the study area will be congested and will fail to move vehicle travel effectively by 2030. This would occur even with implementing planned transportation improvements on SR 520, I-90 (without East Link), and I-405. With the East Link Project, HCT would connect the region's dense commercial and residential centers, as well as major employers, across Lake Washington without being hindered by the increasingly congested highways.

1.2.3 Increased Congestion on I-90

Roads leading into and out of the urban centers of Seattle and Downtown Bellevue are forecasted to be at capacity in the near future, increasing travel time between these two key employment and population centers. For example, I-90 is expected to reach its vehicular capacity during the peak traffic periods within the near future (around year 2015) (WSDOT, 2006**)**. This would further constrain travel for all modes, including freight, HOVs, and buses. This highlights the need for increased transit service because transit provides greater capacity and is more reliable than SOVs. Light rail also provides a safer transportation alternative because it operates in its own right-of-way for most of the project.

The East Link Project would more than double the I-90 person capacity across Lake Washington without any roadway widening. Being able to move more people in both directions, especially in the reverse-peak direction (eastbound in the morning [AM] and westbound in the afternoon [PM]), where travel times are expected to double in the future, would improve the mobility into and out of the urban centers served by the project on both sides of Lake Washington (Seattle, Bellevue, Overlake, and Redmond).

1.2.4 Operating Deficiencies in Regional Bus Transit

The travel time between the key urban centers of Seattle and Downtown Bellevue would improve with light rail service because light rail has faster travel times and better reliability than bus service or automobiles. The East Link Project analysis estimates that light rail travel between Seattle and Downtown Bellevue would take less than 20 minutes and between Seattle and Downtown Redmond between 29 and 39 minutes, regardless of time of day or level of traffic congestion. This is a savings of up to 25 minutes compared with an automobile currently traveling between these locations. In the afternoon peak period, it can take approximately 45 minutes to travel between Seattle and Bellevue (via I-90) and up to 55 minutes to travel between Seattle and Redmond (via SR 520) (Sound Transit, 2011). In the future, these automobile times are expected to continue to rise, and therefore light rail would provide an even greater travel time savings.

Light rail service to the Eastside would substantially improve transit service reliability throughout the project vicinity. It is expected that bus reliability in the future will continue to operate at failing levels (i.e., not meeting level of service [LOS] standards) without the project and that most bus routes would not meet scheduled headways (the time between bus arrivals). Buses would continue to be an unreliable travel choice in the project area, for instance across Lake Washington and in Downtown Bellevue and Redmond, because bus service would be slowed by heavily congested roadways. Bus speeds between Seattle and Downtown Bellevue are predicted to decrease approximately 30 percent by year 2030 as congestion worsens, even with improvements to I-90, because arterials connecting I-90 to these urban centers would not be improved. This poor bus reliability would not benefit transit ridership and would not provide an attractive transportation choice for the region. The frequency of transit throughout the day would improve because light rail would arrive at least every 15 minutes, compared with average bus arrival increments of every 30 minutes in peak hours and less frequently during off-peak hours. Light rail would also serve more hours of the day with expanded service coverage of 20 hours—a substantial improvement over existing and planned bus service.

1.2.5 Limited Transit Capacity and Connectivity

Light rail service would not only provide increased service frequency, faster travel times, and longer hours of service throughout the day, but would also be able to carry more passengers to connecting bus routes. The bus routes that share connections with the light rail system would likely have higher ridership. By the year 2030, approximately 10,000 new riders would choose to use transit each day with the addition of light rail serving Eastside communities. In addition, the East Link Project is forecasted to contribute between 46,000 and 52,500 daily riders to the region's light rail system. This is expected to eliminate about 230,000 vehicle miles traveled and about 10,000 hours of travel each day in the region in 2030.

The East Link light rail project would have the capacity to carry 9,000 to 12,000 people per hour in each direction, which would more than double the person-carrying capacity of I-90. The ability to carry this many people is equivalent to about 7 to 10 freeway lanes of vehicle traffic. Without light rail's ability to move more people in both directions across Lake Washington, there would continue to be roadway capacity constraints that would not efficiently and reliably serve the growing residential and commercial land use densities on the Eastside.

2.0 Methodology and Assumptions

The methodology and assumptions used to analyze the transportation impacts of the East Link Project have been compiled in a *Transportation Methods and Assumptions Report* (CH2M HILL, 2010). That report, provided in Appendix A of this technical report, presents the following information:

- Agency guidelines and regulations that govern or influence the analysis of local and projectwide impacts associated with the project
- Transportation analysis methodology, including relevant definitions, data collection, regional traffic analysis, corridor traffic analysis, and construction impact analysis
- Assessment methods related to data collection, travel demand forecasting, and local and projectwide LOS standards
- Surface street and freeway traffic analysis and impact assessment methods that list the locations of the analyses, describe the LOS assessment for signalized and unsignalized intersections, and describe the local street and freeway safety analysis
- Assessment methods for impacts related to light rail station and park-and-ride areas, parking, nonmotorized facilities and modes, property access and circulation, freight, transit, and construction

The transportation evaluation was performed at three levels of assessment. The first two, the regional and corridor levels, provide information on the larger surrounding area and on screenlines through major transportation corridors. The third level, the operational level, analyzes specific locations and provides in-depth analysis to determine the operational impacts of the project. Table 2-1 identifies the types of analyses done at each level and lists the measures that were used to evaluate the performance of the project. All cooperating agencies reviewed these measures.

TABLE 2-1
East Link Transportation Analyses and Measures of Performance

Assessment Level	Analysis Type	Measure of Performance
Regional Level	Ridership	East Link ridership (patrons)
	VMT/VHT	VMT/VHT values
Corridor Level	Screenline Analysis	Transit ridership
		v/c ratio
		Mode share
Operational Level	Intersection Analysis	Intersection LOS and delay
		Vehicle queue length
	Freeway Analysis	Segment LOS and density
		Person and vehicle carrying throughput
		Travel times (GP, HOV and transit, rail, and freight)
		Access modifications
	Ridership	Station ridership
	Freeway Safety	Predictive assessment with reversible center roadway conversion
	Alignment Safety	Qualitative assessment of at-grade or elevated alignments within or adjacent to surface streets

TABLE 2-1
East Link Transportation Analyses and Measures of Performance

Assessment Level	Analysis Type	Measure of Performance
	Transit	Service frequency, hours of service, passenger load and reliability LOS, travel times, and transfers
	Nonmotorized	Station area pedestrian LOS
		Sidewalk, trail, and bicycle facility inventory, access, and circulation
	Parking	On-street supply and/or demand Direct alignment impacts

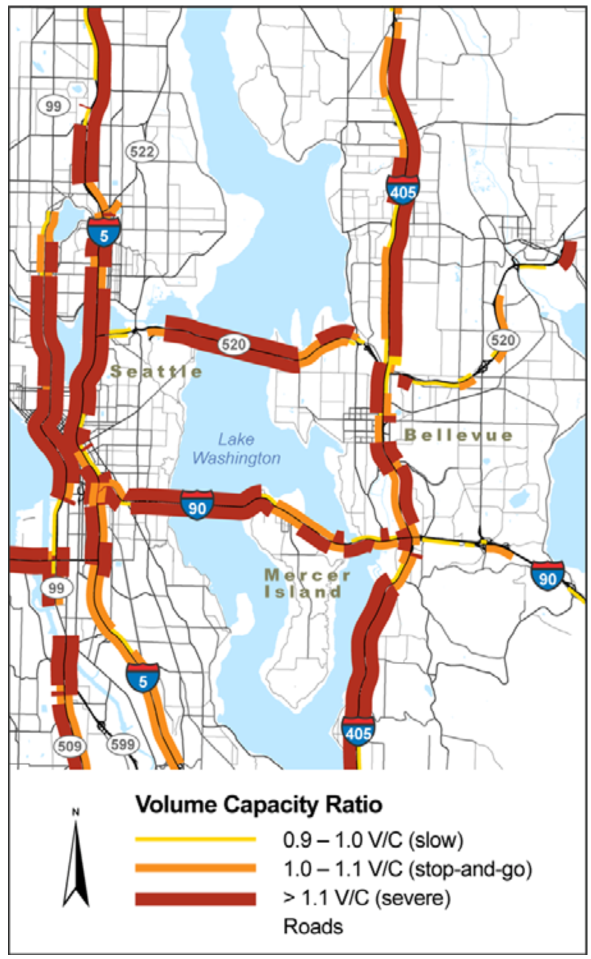
HOV high-occupancy vehicle
LOS level of service
v/c ratio volume-to-capacity ratio
VHT vehicle hours traveled
VMT vehicle miles traveled

3.0 Regional Travel

3.1 Section Overview

This section describes the project's existing conditions (year 2007) and potential project impacts on regional facilities in the central Puget Sound region. Regional travel metrics include vehicle miles traveled (VMT) and vehicle hours traveled (VHT), as well as volume-to-capacity ratio (v/c ratio) and mode choice at the six screenline locations through the study area. These regional metrics and screenline data are based on information from the PSRC transportation demand model and Sound Transit's transit ridership model, which include the urbanized areas of King, Pierce, and Snohomish Counties.

Without light rail service across Lake Washington, I-90 is expected to reach its vehicular capacity in the near future, and congestion would continue to worsen as v/c ratios approach 1.0 in the future. Without a more reliable transportation alternative across I-90, all modes would be affected, including HOV and transit. Roadways that lead into and out of the urban centers of Downtown Seattle and Downtown Bellevue will be at capacity in the near future, as indicated by v/c ratios at or near 1.0 on Screenlines 1, 2, and 4 (see Section 3.2.3). This condition will substantially constrain travelers' ability to travel into the region's key employment and population areas and highlights the importance of increased use of transit because of its greater capacity and reliability for moving people compared with SOVs. Exhibit 3-1 shows that travel across the lake and on I-5 and I-405 will operate in stop-and-go to severe traffic conditions by year 2030.



Source: PSRC (2007).

EXHIBIT 3-1
PSRC 2030 PM Highway Volume-to-Capacity Ratios without East Link

The East Link Project would link Seattle, the region's main urban downtown area, with the Eastside communities, connecting the region's dense commercial and residential centers as well as major employers across Lake Washington. Light rail would support increased density in Bellevue, Redmond, and Seattle, consistent with regional land use plans and Washington Growth Management Act goals to preserve natural resources. Higher density provides economic growth and opportunities for more effective infrastructure development. Travel between the key urban centers (Seattle and Downtown Bellevue) would improve with light rail service because light rail would have greater capacity and be a more reliable mode of travel than SOVs.

The analysis estimates that light rail travel between the International District/Chinatown Station in Seattle and the proposed Bellevue Transit Center Station would take less than 20 minutes. East Link light rail service between the International District/Chinatown Station and Downtown Redmond is expected to take approximately 35 minutes. These travel times are a savings of about 25 minutes compared with an automobile currently traveling between these locations. Light rail travel times between key stations are further discussed in Section 4.3.3.5, Transit Travel Times. Because of these travel time benefits, people would choose to ride light rail in lieu of driving their vehicles, and the regionwide (includes King, Pierce, and Snohomish Counties) VMT and VHT are expected to decrease up to 0.2 percent with the project. Within the project vicinity (the area encompassing the project alternatives between Bellevue and Redmond), the mode share is expected to shift from predominantly SOVs to a more balanced mode share among SOVs, HOVs, and transit. With East Link, transit ridership across Lake Washington would increase around 25 percent during the afternoon (PM) peak period.

Providing light rail along I-90 would remove vehicle access to and from the reversible center roadway. This change along I-90 would not affect other regional highways such as SR 520, I-5, and I-405. Travel on these highways with the project is forecasted to remain similar to the No Build Alternative. The v/c ratios on Screenlines 1, 2, and 4 (Exhibits 1-2, 1-3, and 1-4), which cross these highways or connect to them, would be either similar or slightly improved with East Link.

3.2 Affected Environment

3.2.1 Vehicle Miles Traveled / Vehicles Hours Traveled

Today, more than 70 million vehicle miles of travel occur daily within the Puget Sound region. This results in close to 2 million hours of travel for all users of the transportation system. In the AM peak period (6 to 9 a.m.), about 12 million total vehicle miles occur each day, which equates to slightly more than 300,000 total vehicle hours. In the PM peak period (3 to 6 p.m.), there are about 15 million total VMT and over 400,000 total VHT. Thirty-seven percent of the daily vehicle miles traveled occur in the AM and PM peak periods, and over 40 percent of all daily hours of travel occur in the AM and PM peak periods. This indicates that the more congested periods in the Puget Sound region are during the AM and PM work commuting periods. Table 3-1 provides existing daily regional VMT and VHT information.

TABLE 3-1
Existing Regional Travel

Time of Day	VMT	VHT
AM peak period (6 to 9 a.m.)	11,843,700	307,000
Nonpeak period	44,968,200	1,086,500
PM peak period (3 to 6 p.m.)	14,948,800	432,500
Daily total	71,760,700	1,826,100

Source: PSRC (2007).
VHT vehicle hours traveled
VMT vehicle miles traveled

The regional highways within the study area serve a substantial number of vehicle trips in the central Puget Sound region and beyond in terms of vehicle travel and freight delivery, as noted in PSRC's regional transportation plan, *Destination 2030* (PSRC, 2001). SOVs were the dominant mode of regionwide travel in year 2006, accounting for 44 percent of the trips made. A large number of trips also occurred in vehicles with two or more passengers (HOVs). Together, SOV and HOV travel accounted for 84 percent of the person trips made in 2006. The remaining trips were by transit, walking, and other modes (PSRC, 2007). Major regional transit service providers within the study area include King County Metro, Sound Transit, and Community Transit. Major highway facilities, including I-90, I-5, I-405, and SR 520, serve most of the regional trips within the study area.

3.2.2 Regional Highways

I-90 is a major east-west interstate highway that extends from Boston to Chicago to Seattle, where it intersects the western portion of the East Link Project corridor. In Washington, I-90 connects various freight and state routes originating in Seattle, through Mercer Island and Bellevue, to the eastern side of the state and beyond. The section of I-90 that crosses Lake Washington, including the floating bridges (Lacey V. Murrow Memorial Bridge and Homer M. Hadley Memorial Bridge), has three general-purpose (GP) lanes in each direction and a reversible center roadway that operates as a peak directional expressway. The reversible center roadway is used by HOVs, buses, and Mercer Island traffic. These reversible lanes are located between the Mount Baker Tunnel in Seattle and the Bellevue Way SE interchange in Bellevue. The reversible roadway is physically separated from the eastbound and westbound mainline lanes and operates in the westbound direction in the morning and eastbound in the afternoon and evenings. In 2006, average daily traffic (ADT) volumes on the floating bridges midspan were between 140,000 and 150,000 vehicles; this includes about 135,000 vehicles per day in the eastbound and westbound mainline lanes and about 15,000 daily vehicles in the reversible center roadway (WSDOT, 2007a).

I-5 is the primary north-south West Coast route in the United States, connecting the U.S. borders with Canada and Mexico. In Washington, this interstate is a major transportation corridor in the Puget Sound region and serves as a main highway connection among the communities from Vancouver to Bellingham. In 2006, the ADT for this corridor was slightly less than 160,000 vehicles (WSDOT, 2007a).

I-405 is an interstate route that travels through Segments B and C. This interstate facility parallels I-5 on the east side of Lake Washington and connects to and from I-5 in Tukwila and Lynnwood. I-405 has system interchanges that connect with I-90 and with state routes such as SR 167, SR 520, and SR 526. In urban areas of the project corridor, specifically in Downtown Bellevue, I-405 consists of six lanes with HOV facilities. In 2006, the ADT on I-405 in Bellevue was approximately 172,000 vehicles (WSDOT, 2007a).

SR 520 is a state highway that provides east-west connections across Lake Washington between Seattle and the Eastside communities of Kirkland, Bellevue, and Redmond. The section of SR 520 that spans Lake Washington is an important segment of the state highway network because it connects the large employment centers in Bellevue, Redmond, and Seattle. In 2006, approximately 115,000 vehicles per day traveled on the floating bridge portion of SR 520 (WSDOT, 2007a).

3.2.3 Screenline Performance

Six screenlines were established to assess the travel in each corridor of the study area. As shown in Exhibits 1-2 through 1-4, the six screenlines include key arterials and highways at the following locations:

1. City of Seattle: A north-south screenline south of South Jackson Street that extends between and includes Alaskan Way, 4th Avenue South, and the I-90 D2 Roadway (this screenline analyzed only in the Section 4.0 transit analysis)
2. Lake Washington (including SR 520 and I-90): An east-west screenline between the I-90 Mount Baker Tunnel and Mercer Island
3. Interstate 90 (at Mercer Slough): An east-west screenline between the Bellevue Way and I-405 interchanges
4. South Bellevue: A north-south screenline that extends between and includes Bellevue Way and I-405
5. Bellevue-Redmond (Bel-Red): An east-west screenline that extends between and includes SR 520 and NE 8th Street in the City of Bellevue
6. Redmond (Grasslawn Area): A north-south screenline that includes 140th Avenue NE and extends to Marymoor Park (City of Redmond Screenline 6 in the *Redmond Transportation Master Plan* [City of Redmond, 2010])

These screenlines provided a snapshot of traffic operations and mode share along each corridor based on the travel demand estimated from the PSRC and Sound Transit models. Vehicle v/c is a ratio of demand to capacity for a highway facility and was used as the primary performance measure to assess regional travel on the highways. Capacity deficiencies might exist when a v/c ratio exceeds 0.9; a v/c ratio of 1.0 suggests demand equals capacity, and a v/c ratio over 1.0 suggests that demand exceeds capacity. Mode shares measure highway user demand in terms of vehicular type, including SOVs, HOVs, and transit.

The screenlines were also used to analyze transit LOS and ridership, as described in Section 4.0 (Transit). To better understand the impacts of the project on I-90, two screenline locations on I-90—west of Mercer Island and between the Bellevue Way and I-405 interchanges—were used to determine vehicle and person throughput, as described in Section 5.2. Throughput is a function of the operating condition and vehicle data, which were provided by the *VISSIM* microsimulation software program.

Table 3-2 shows the performance of screenlines for existing PM peak-hour conditions. Screenlines 2 and 4, which cross I-90 and SR 520 (Screenline 2) and I-90 and I-405 (Screenline 4), are areas with heavy congestion in both directions in the PM peak hour. This congestion is indicated by v/c ratios above 0.9, which is expected because these three highways are some of the more heavily traveled highways in the region. A v/c ratio of 0.9 and above indicates capacity deficiencies and the need for improved travel efficiency. Most other screenlines have a v/c ratio less than 0.7. Although Screenline 3 is located on I-90, its v/c ratio is considerably less than at Screenline 2 because of the additional roadway capacity (collector-distributor system) provided between the Bellevue Way and I-405 interchanges to manage the flow of traffic to and from these closely spaced interchanges.

Person mode share in the study area varies depending on the transportation choice, congestion, and land use (e.g., commercial, residential, and retail) surrounding the area. For example, some of the higher HOV and transit mode shares are seen leaving Seattle (Screenline 1 southbound and Screenline 2 eastbound). At Screenline 5 westbound (for instance, a trip to Seattle across SR 520), a higher HOV mode share occurs compared with the eastbound HOV mode share into Redmond. The highest transit mode share occurs at Screenline 1 southbound and Screenline 2 eastbound. Overall, the SOV mode is the dominant mode choice, with more than 50 percent usage. HOV usage generally varies between 25 and 40 percent, and transit is less than 10 percent.

TABLE 3-2
Existing PM Peak-Hour Screenline Performance

Screenline	Direction	V/C Ratio	Person Mode Share (percent) (SOV /HOV/transit)
1 (City of Seattle)	Northbound	0.57	53/45/2
	Southbound	0.78	60/31/19
2 (Lake Washington)	Westbound	0.99	62/33/5
	Eastbound	0.91	57/30/13
3 (I-90)	Westbound	0.58	59/39/2
	Eastbound	0.62	58/38/4
4 (South Bellevue)	Northbound	0.98	58/41/1
	Southbound	1.08	60/37/3
5 (Bel-Red)	Westbound	0.60	55/41/4
	Eastbound	0.67	62/33/5
6 (Redmond)	Northbound	0.64	71/26/3
	Southbound	0.41	58/40/2

Source: PSRC (2007).
HOV high-occupancy vehicle
SOV single-occupant vehicle
v/c ratio volume-to-capacity ratio

3.3 Environmental Impacts

Regional travel conditions for the East Link Project were evaluated based on travel demand information obtained using the PSRC transportation demand model and Sound Transit's transit ridership model, which include King, Pierce, and Snohomish Counties. Regional population and employment forecasts suggest that the regional highways within the project vicinity will continue to serve increasing travel demand. Future roadway capacity projects will continue to complete the HOV system and allow for an increase in carpool trips, but they generally do not substantially improve high-capacity modes of travel. Based on these forecasts and driver travel patterns, the number of miles and hours traveled were estimated to forecast VMT and VHT. Within the project vicinity on each roadway, the future vehicle demand and mode share were predicted, giving the v/c ratios (congestion) and mode share at each of the project's six screenlines; the results of this analysis are presented in the following subsections.

3.3.1 Travel Demand Forecasts

Future year analysis was performed for the years 2020 and 2030 based on PSRC's current population and land-uses forecasts and regional model (spring 2007). The PSRC model was enhanced by integrating the Bellevue-Kirkland-Redmond transportation network to provide a more detailed roadway system in the project vicinity. In the future 2020 and 2030 (both no-build and build) conditions, a substantial number of highway and arterial improvements were assumed. For the build condition, the PSRC model includes light rail to the Eastside and other highway and transit modifications that are not part of the no-build condition. Table 3-3 lists the transportation programs and/or projects and the future year when they were assumed to occur. Appendix A, Attachment 1, provides the complete list of future projects assumed in years 2020 and 2030.

TABLE 3-3
No Build Alternative Transportation Programs and Projects

Program/Project	Horizon Year 2020	Horizon Year 2030	Comments
Roadway			
Nickel Package	X	X	Approved 2003
Transportation Partnership Account	X	X	Approved 2005
I-90 Two-Way Transit and HOV Operations Project	X	X	Stages 1 through 3 and also without Stage 3
Local Agencies			
CIPs /TFPs	X	X	Typically 6-year (or near term) funding commitments
Comprehensive and transportation plans	X	X	Typically 15- to 20-year list of funded and unfunded projects; funded projects included as part of CIP/ TFP lists.
Puget Sound Regional Council			
Destination 2030		X	Selected projects included (refer to Appendix A)
Transit			
Sound Transit			
Sound Move Program	X	X	Approved 1996
ST2 Plan[a]	X[b]	X	Approved November 2008; package of projects expected to be built over the next 15 years
King County Metro			
Service Implementation Plans	X	X	
Transit Service Integration Plan	X	X	Prepared for East Link Project
Transit Now Plan	X	X	Approved 2006

[a] The ST2 Plan is a package of HCT investments in the regional transit system, which includes light rail in the Eastside corridor.
[b] Not all projects identified in this program are expected to be built by 2020; refer to Appendix A, Attachment 1, for the project list by horizon year.

CIP Capital Improvement Program
HCT high-capacity transit
HOV high-occupancy vehicle
ST2 Sound Transit 2 Plan
TFP Transportation Facility Plan

Table 3-4 lists annual traffic volumes and growth rates, based on the 2020 and 2030 PSRC travel demand models. Vehicle growth forecasted from the 2020 and 2030 PSRC travel demand models was applied to existing (2007) volumes to estimate future volumes. No-build traffic volumes in Segment A (which includes I-90) are predicted to grow at an average annual rate (up to year 2030) of about 2.0 percent in both AM and PM peak periods. The highest no-build traffic growth will occur in Segments A and D at about 2.5 percent per year by 2020 and about 2.0 percent per year by 2030.

For the build condition, the Sound Transit ridership forecasting model was also used, in conjunction with the PSRC model, to develop the 2020 and 2030 East Link light rail system ridership estimates associated with the project alternatives. For Sound Transit's planning purposes, a representative alternative was created as a "baseline" alternative used in the analysis. This representative alternative is the combination of alternatives that generally follows the path of *Preferred Interstate 90 Alternative (A1)*, 112th SE Bypass Alternative (B3), Couplet Alternative (C4A), D2A - NE 24th Design Option, and *Preferred Marymoor Alternative* (E2).

TABLE 3-4
No-Build PM Peak-Hour Travel Demand Forecasts

Segment	Existing (2007)	2020 No-Build		2030 No-Build	
	Vehicles	Vehicles	Annual Growth Rate (percent)	Vehicles	Annual Growth Rate (percent)
Segment A[a]	71,600	98,600	2.5	107,700	1.8
Segment B	7,100	7,900	0.8	8,900	1.0
Segment C	16,900	20,000	1.3	25,000	1.7
Segment D	15,700	21,600	2.5	24,000	1.9
Segment E	16,500	20,500	1.7	23,100	1.5

[a] In Segment A, the values represent a 3-hour peak-period. The AM peak-period annual growth rate is 2.4 percent by 2020 and 2.1 percent by 2030.

Note: Vehicle totals were created by calculating the total number of entering and exiting vehicle volumes in each segment.

Although two methods were used to analyze roadway conditions near potential stations in the build condition (discussed further in Section 6.0), the method that relies on auto forecasts from the PSRC model is more appropriate for the discussion of regional travel in this section. The PSRC model method was used to identify the shift in traffic demand and patterns within a congested transportation system. The transit ridership associated with the light rail alternatives and the transit service modifications (based on the 2020 and 2030 Transit Service Integration Plans developed by King County Metro and Sound Transit for East Link Project planning [Sound Transit, 2007a]) was incorporated into the modeling process to understand the change in auto demands and their patterns with the project. Overall, in the build condition there would be a slight reduction in the auto forecasts as approximately 10,000 people are forecasted to shift their mode of transportation and choose to use light rail by year 2030. Further discussion of travel demand forecasts is provided in Sections 5.0 and 6.0.

3.3.2 Vehicle Miles Traveled/Vehicles Hours Traveled

The East Link Project impacts on regional travel were assessed in terms of both VMT and VHT. Changes in VMT indicated that people would travel either less or farther to get to their destinations. Changes in VHT generally reflect the change in congestion or the trip's length. For instance, less congestion might correlate to fewer hours of travel. Table 3-5 compares the regionwide (King, Pierce, and Snohomish Counties) VMT and VHT for both 2020 and 2030 no-build and build conditions. The data in the table for the build condition present a range from a low to high ridership. By 2030, the alternatives that would produce the highest ridership in their segments are Alternative B1, C1T, and C3T; *Preferred Alternative D2A;* and E2 - Redmond Transit Center Design Option. These alternatives would generate a projectwide ridership between 50,000 and 52,500. The lowest ridership among alternatives by segment would be Alternatives B7, C9A, C14E, D3, and E1, resulting in a projectwide ridership range between 48,000 and 49,500 daily riders.

In both 2020 and 2030, regional VMT and VHT conditions would improve with East Link compared with the no-build conditions. The greatest reduction in VMT/VHT would be with the highest daily ridership (projectwide ridership of about 52,500 in 2030); this would reduce VMT and VHT by about 229,000 miles (0.20 percent) and 9,000 hours (0.20 percent) each day, respectively. The lowest daily ridership (projectwide ridership of about 46,000 in 2030) would reduce the VMT by 0.18 percent and VHT by 0.16 percent each day. In all cases, the VMT and VHT would be lower in the build condition than in the no-build condition because the East Link Project would provide another mode of travel for people to use in lieu of the automobile. The forecasts support a conclusion that VMT and VHT would be lower with any of the East Link alternatives compared with the No Build Alternative.

TABLE 3-5
2020 and 2030 Regional Travel Impact Comparison Summary

Measure	2020					2030				
	No-Build	Low-Ridership Alternative	Percent Change	High-Ridership Alternative	Percent Change	No-Build	Low-Ridership Alternative	Percent Change	High-Ridership Alternative	Percent Change
Daily new transit riders	N/A	7,300	N/A	9,200	N/A	N/A	8,900	N/A	11,500	N/A
Daily VMT	97,417,900	97,280,100	-0.14	97,240,700	-0.18	116,690,200	116,481,400	-0.18	116,461,200	-0.20
Daily VHT	3,085,600	3,080,800	-0.16	3,080,500	-0.20	4,463,000	4,455,900	-0.16	4,453,900	-0.20

Source: PSRC (2010b); Sound Transit (2010a).

N/A not applicable
VHT vehicle hours traveled
VMT vehicle miles traveled

3.3.3 Screenline Performance

The following subsections summarize screenline vehicle performance results during the PM peak hour in no-build and build conditions for years 2020 and 2030. Generally, with the East Link Project, the roadway v/c ratios would remain the same or improve slightly (lower values) compared with the no-build condition. The mode share would generally become less dominated by SOVs as the transit share increases. This mode shift is critical to providing increased person mobility in an area with limited opportunities for road expansion.

By converting the I-90 reversible center roadway to light rail, other regional highways would not be affected because v/c ratios across Screenlines 1, 2, and 4 (which include I-90, SR 520, and I-405) with the project remain similar to or less than the no-build condition. Table 3-6 shows year 2020 and 2030 v/c ratios at each screenline, Exhibits 3-2 and 3-3 show the PM peak-hour mode share at each screenline for years 2020 and 2030, and Section 5.0 further discusses I-90 operations (including vehicle and person throughput and capacity, travel time, LOS and congestion, and safety).

TABLE 3-6
2020 and 2030 PM Peak-Hour Volume-to-Capacity Ratios at Screenlines

Screenline	Direction	2020 V/C Ratio		2030 V/C Ratio	
		No-Build	East Link	No-Build	East Link
1 (City of Seattle)	Northbound	0.89	0.88	0.95	0.94
	Southbound	1.08	1.07	1.16	1.14
2 (Lake Washington)	Westbound	1.06	1.04	1.13	1.12
	Eastbound	1.01	1.14	1.02	1.17
3 (I-90)	Westbound	0.60	0.60	0.70	0.68
	Eastbound	0.69	0.63	0.82	0.72
4 (South Bellevue)	Northbound	1.03	1.02	1.12	1.10
	Southbound	1.02	1.04	1.22	1.23
5 (Bel-Red)	Westbound	0.59	0.59	0.75	0.75
	Eastbound	0.74	0.75	0.77	0.78
6 (Redmond)	Northbound	0.76	0.76	0.86	0.86
	Southbound	0.53	0.54	0.59	0.58

Source: PSRC (2010b).
v/c ratio volume-to-capacity ratio

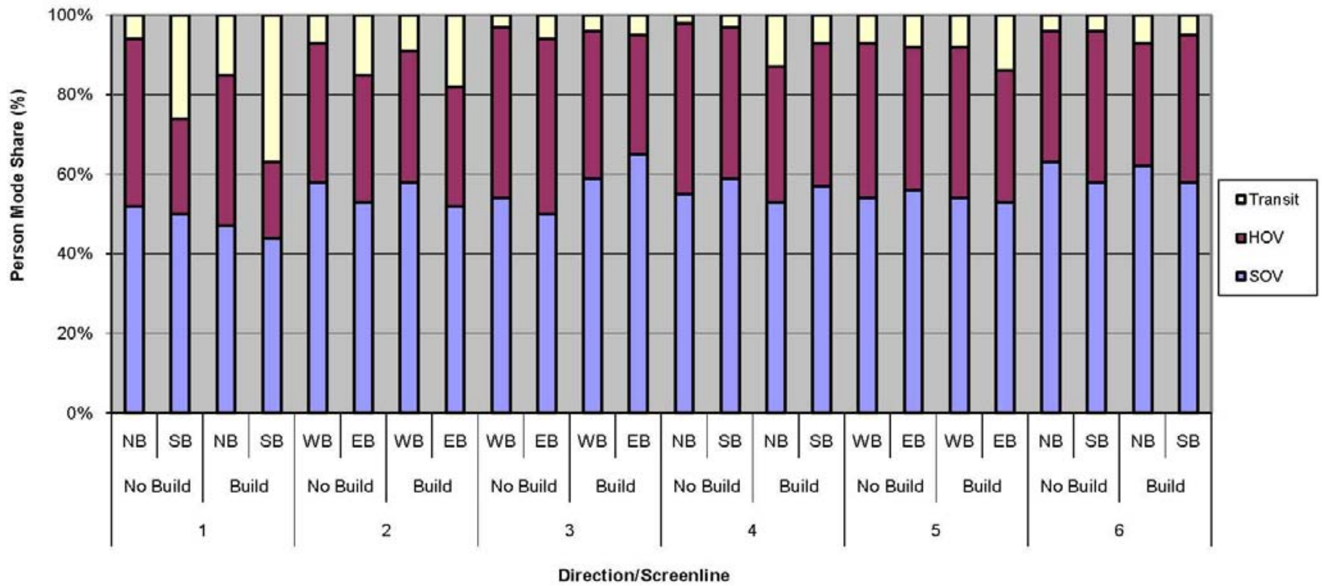


EXHIBIT 3-2
2020 PM Peak-Hour Person Screenline Mode Share

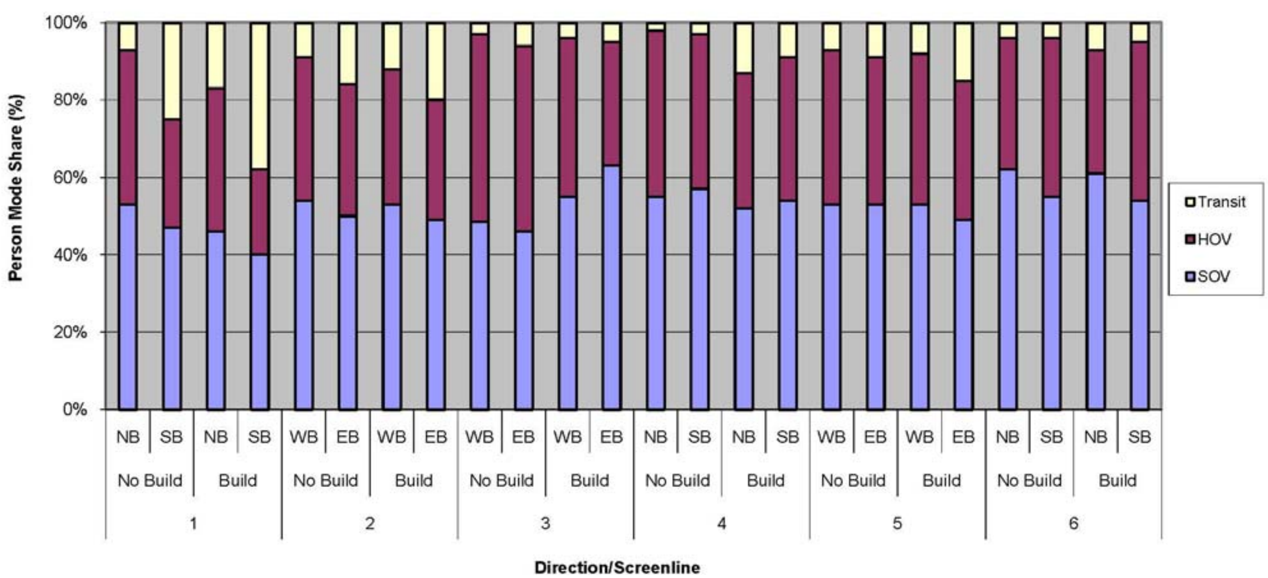


EXHIBIT 3-3
2030 PM Peak-Hour Person Screenline Mode Share

3.3.3.1 Screenline 1: City of Seattle

In the 2020 and 2030 no-build conditions, the mode share among SOV, HOV, and transit users across Screenline 1 would generally stay constant. Heading south from downtown Seattle, the v/c ratios in the no-build condition were greater than 1.10, indicating congested conditions. In the 2020 and 2030 build conditions, the mode share would change, with transit usage more than doubling. With a shift to transit, a slight improvement in the screenline v/c ratios is predicted in the build condition. This increase in transit share is due to adding light rail service and modifying transit service across this screenline.

3.3.3.2 Screenline 2: Lake Washington (Includes I-90 and SR 520)

In the future no-build and build conditions, the westbound and eastbound v/c ratios crossing Screenline 2 would increase compared with existing conditions to over 1.0, indicating highly congested conditions. With the build condition, the v/c ratio in the peak eastbound direction in the PM peak period is expected to increase slightly because vehicle access to the reversible center roadway would be prohibited. Even so, the increased transit use with the project would increase the person throughput across this screenline and provide additional capacity for growth (as described further in Section 5.3.3). In the westbound direction, the v/c ratio is expected to improve with the build condition because providing light rail would shift the modes across the lake to a higher transit emphasis and thus reduce congestion.

The travel modes across Screenline 2 would shift among SOVs, HOV, and transit in the future. The percentage of SOV users in both westbound and eastbound directions would slightly decrease in the future no-build conditions as congestion worsens and people choose alternative modes, such as HOV and transit. In both the 2020 and 2030 build conditions, SOV and HOV usage would decrease as people choose to use transit. Providing light rail across Lake Washington would increase the transit usage in 2030 by about 25 percent, suggesting a substantial shift from auto to transit. HOVs are expected to shift slightly between I-90 and SR 520 due to the HOV capacity on each facility. This shift would be caused in part by the planned SR 520 HOV lane improvements and I-90 center roadway closure. Nevertheless, overall volumes on SR 520 are expected to remain similar to the no-build condition.

3.3.3.3 Screenline 3: Interstate 90 (at Mercer Slough)

In the future no-build condition across this screenline, v/c ratios would increase slightly in the eastbound and westbound directions compared with existing conditions. In the build condition, v/c ratios would decrease in both directions, compared with the no-build condition, indicating that levels of congestion would improve. The overall slight decrease in the v/c ratio across Screenline 3 could be attributed to the slight shift in travel patterns associated with the East Link Project at this location.

Mode shift patterns indicate that in the future no-build condition, SOV usage would decrease and HOV and transit usage would increase compared with the existing conditions. In the build condition, the HOV share would decline due to the reasons noted above for Screenline 2. The transit mode share would stay relatively similar between the no-build and build conditions because East Link would not cross I-90 east of Bellevue Way.

3.3.3.4 Screenline 4: South Bellevue

In the 2020 and 2030 no-build conditions, v/c ratios would be above 1.0 in both directions. Improvements along I-405 would reduce future congestion to be at or slightly more than existing levels as the v/c ratios across this screenline are expected to be at or above 1.00. This indicates that travel into and out of this key Eastside urban center (Downtown Bellevue) would remain constrained, and vehicle mobility and access would continue to be hindered. By 2030, the v/c ratios in the build condition would be similar and operate with a minimum v/c ratio of 1.10 in both directions. This suggests high levels of vehicular congestion would still occur.

The mode share for the northbound and southbound directions is expected to remain similar between the existing and no-build conditions. In the build condition, however, the transit mode share would substantially increase as people adjust and ride light rail into and out of Bellevue and the Eastside. Overall, by 2030 the transit share of total trips is expected to reach over 10 percent with the project. This is a substantial increase from the 2 to 3 percent transit share in the no-build condition.

3.3.3.5 Screenline 5: Bellevue-Redmond (Bel-Red)

The v/c ratios across Screenline 5 in the no-build condition are expected to increase and further constrain vehicle travel in the future. By year 2030, v/c ratios are expected to reach up to 0.77. In the build condition, v/c ratios would remain similar to the no-build condition.

In the no-build conditions, the mode share percentages would remain similar to the existing conditions, with approximately 50 to 55 percent SOV users and 35 to 40 percent HOV users. Transit users would account for between 7 and 9 percent in either direction. In the build condition, transit use is expected to increase by over 60 percent (up to a 15 percent mode share) in the eastbound direction and by about 15 percent (to an 8 percent mode share) in the westbound direction as people shift to ride light rail. This is expected to decrease SOV usage to between 45 and 55 percent by 2030.

3.3.3.6 Screenline 6: Redmond (Grasslawn)

Compared with existing conditions, the future no-build v/c ratios across Screenline 6 are expected to increase in the northbound and southbound directions. In the build condition, v/c ratios would remain similar to the no-build ratios in both the northbound and southbound directions.

The mode share in the no-build condition is expected to have slightly less emphasis on the SOV compared with the existing conditions and show a slight increase in HOV usage. Transit would account for less than 5 percent in both directions along the corridor. In the build condition, transit usage is expected to increase up to 7 percent of the total mode share. This is expected to reduce dependence on SOV travel compared with the no-build condition.

3.4 Potential Mitigation

No mitigation to regional travel would be required because, overall, highways and arterials would not experience adverse changes in operations. The v/c ratios and mode share would generally remain similar to no-build conditions or improve with the East Link Project. For specific mitigation measures along I-90, refer to Section 5.0.

4.0 Transit

4.1 Section Overview

This section describes the existing and no-build condition regional transit facilities, operations, and services within the study area and the East Link Project impacts on transit facilities and services. The ridership forecasts show that by year 2030, between 46,000 and 52,500 riders would use East Link each day, and slightly more than 10,000 new daily transit riders would benefit from light rail along the East Link corridor. Transit usage across Lake Washington would increase by about 25 percent. Direct connections by light rail would be created between Northgate, the University District, Mercer Island, South Bellevue, and the Bel-Red, Overlake, and Downtown Redmond areas. In addition, light rail to the Eastside would substantially improve transit service reliability. It is expected that bus reliability in the future would continue to operate at failing levels without the project, with most transit routes operating at a reliability of LOS E or F. Data from similar light rail services in North America suggest that the reliability of light rail would be LOS A, and even though Sound Transit's Central Link system is in its first years of operations, its 2010 third quarter year-to-date service reliability data showed schedule adherence at about 80 percent and headway adherence above 90 percent (Sound Transit, 2010a). The frequency of transit throughout the day would also improve because light rail would operate with headways of 15 minutes or less, compared to the average bus headways of 30 minutes or longer expected in the future during off-peak hours without the project. Light rail would also serve the area with expanded service coverage for 20 hours of the day, which is a substantial improvement over many of the future bus routes.

Without the project, buses would continue to be an unreliable travel choice in the study area—for instance, across Lake Washington between Seattle and Bellevue and in Downtown Bellevue and Redmond—because bus service would be slowed by heavily congested roadways. Between Downtown Seattle and Downtown Bellevue, bus speeds are predicted to decrease by slightly more than 30 percent by year 2030, even with improvements to I-90, because no improvements are planned for the roadways connecting I-90 to these urban centers, especially to and from downtown Bellevue. Therefore, bus reliability would continue to operate poorly as scheduled headways are not met. The poor reliability of bus service would not benefit transit ridership and would not provide an attractive transportation choice for the region.

4.2 Affected Environment

Within the study area, transit services are provided by King County Metro, Sound Transit, and Community Transit. Regional express buses and local buses provide service to several transit centers and park-and-ride facilities. The frequency and number of bus routes in service increase during the peak periods, primarily in the peak direction of travel.

4.2.1 Regional Transit Facilities, Operations, and Services

The major transfer points within the study area are transit centers and park-and-ride facilities. King County Metro, Sound Transit, and Community Transit provide service to these facilities. There are four transit centers along the project corridor. The largest are the International District/Chinatown Station, Bellevue Transit Center, and the Overlake Transit Center; the transit center in Downtown Redmond is smaller. Within the study area, there are park-and-ride facilities in all project segments except Segment C. Table 4-1 lists the existing transit facilities in the study area. In addition to bus service, private shuttles in Downtown Bellevue and Overlake provide service between the transit centers and various commercial destinations. Sound Transit's Regional Express buses provide regional transit service to commuters in the study area as well as in other parts of King County and Pierce and Snohomish counties. King County Metro provides express and local service throughout King County and most of the local service within the study area. Community Transit provides service between Snohomish County and King County, and has one express bus route, CT 441, within the study area. Sound Transit and King County Metro bus services that cross Lake Washington and connect Downtown Seattle to Downtown Bellevue, Overlake, and Downtown Redmond currently serve over 13,000 daily transit riders (King County Metro, 2008a).

TABLE 4-1
Existing Bus Transit Facilities in Study Area

Transit Facility	Type of Facility	Rider Amenities	Served by Routes	Park-and-Ride Stalls
International District/ Chinatown Station	Station	Bike racks	KCM 41, 71, 72, 73, 74X, 101, 106, 150, 174, 194, 212, 217, 225, 229, 255, 256, 301 ST 550	none
Bellevue Transit Center	Transit center station	Bike racks, rider services building	KCM 220, 222, 230, 232, 233, 234, 237, 240, 243, 249, 253, 261, 271, 280, 342, 630, 885, 886, 921 ST 532, 535, 550, 555, 556, 560, 564, 565	none
South Bellevue Park-and-Ride	Park-and-ride facility	Bike racks	KCM 222, 240, 942 ST 550, 560	519
Wilburton Park-and-Ride	Park-and-ride facility	Bike racks	KCM 167, 243, 280, 342, 885, 921, 952 ST 560	186
Mercer Island Park-and-Ride	Park-and-ride facility	Bike lockers and racks	KCM 201, 202, 203, 204, 205, 213, 216, 942 ST 550, 554	447
Bear Creek Park-and-Ride	Park-and-ride facility	Bike lockers	KCM 216, 233, 251, 253, 266, 268, 269, 922 ST 540, 545	283
Overlake Village Park-and-Ride	Park-and-ride facility	Bike racks	KCM 222, 242, 247, 249, 250, 253, 261, 269 CT 441	203
Overlake Transit Center	Transit center station, park-and-ride facility	Bike lockers and racks, bicycle service center, customer service office	KCM 222, 225, 229, 230, 232, 233, 245, 247, 256, 268, 269, 644 CT 441 ST 545, 564, 565	170
Redmond Transit Center	Transit center station, park-and-ride facility	Bike lockers and racks	KCM 220, 249, 250, 251, 253, 254, 265, 266, 291, 922, 929 ST 540, 545	377

Note: Transit routes and park-and-ride stalls listed as of spring 2007, except the Mercer Island Park-and-Ride, which was inventoried in February 2008.
Source King County Metro (2008b).
CT Community Transit
ST Sound Transit
KCM King County Metro

In the study area, King County Metro provides fixed-route local and express buses. It also provides Americans with Disabilities Act (ADA) Paratransit, dial-a-ride, vanpool, ride matching, and park-and-ride services. During peak periods, the average headway for King County Metro buses is about 30 minutes. Metro has implemented its *Six-Year Transit Development Plan for 2002 to 2007* (King County Metro, 2004, 2009) as an effort to continue to improve service between residential areas and transit hubs and activity centers. This plan was last updated in fall of 2004. Metro's first 6-year plan, spanning the years 1996-2001, was the catalyst for a major redesign of King County's Metro Transit system.

Within the study area, Sound Transit's Regional Express buses have approximate average headways of 30 minutes. A few Sound Transit routes (such as ST 550 between Bellevue and Seattle) offer more frequent service, with headways of about 10 to 15 minutes. In Downtown Seattle, Sound Transit also offers other services, including the Sounder commuter rail and the Central Link light rail system. The International District/Chinatown Station, a bus and Central Link station in the downtown Seattle Transit Tunnel, provides a connection to Sounder and Amtrak services at the nearby King Street Station. Central Link light rail offers light rail service from Downtown Seattle to the Seattle-Tacoma International Airport (Sea-Tac Airport). Headways for the light rail lines are currently 7.5 minutes in each direction for the peak period. Sounder commuter rail operates during the peak periods, running trains from Tacoma and Everett. The Seattle to Tacoma Sounder commuter rail has seven peak direction trains and two reverse-peak direction trains for both peak periods. The Seattle to Everett Sounder commuter rail has five peak direction trains and one reverse-peak direction train for both peak periods.

In general, during the peak periods, the number of buses and routes in the peak direction are greater than the number of buses running in the opposite "reverse-peak" direction. Midday, off-peak, and weekend transit service is limited, and many of the routes in the study area do not operate as often during these times. Available routes during these times also operate with less frequent headways, generally about 1 hour. Existing bus routes within the study area are listed in Table 4-2.

4.2.2 Methodology and Analysis for Transit Operations and Level of Service

The six screenlines described in Section 3.2, in addition to the service areas served by the project and key transit hubs within the study boundaries, were used to measure transit (bus and light rail) LOS performance in the study area. Although there are numerous other transit routes that cross these screenlines or serve these transit hubs or areas, the bus routes that were selected for evaluation are those most likely to have their ridership influenced by the East Link Project. The analysis of project alternatives includes both light rail and bus service on the Eastside, whereas the No Build Alternative includes only bus service on the Eastside. Existing and future regional and local transit services were evaluated based on the following categories:

- Service coverage and circulation
- Service frequency LOS
- Hours of service LOS
- Passenger load LOS
- Reliability of service LOS (on-time performance and headway adherence)
- Transit travel times
- Transfers
- Light rail ridership

The transit LOS performance levels were analyzed using the methodology defined by the and Transit Cooperative Research Program's (TRCP's*) TCRP Report 100: Transit Capacity and Quality of Service Manual* (TCQSM)(Transit Research Board [TRB], 2003). The Transportation Methods and Assumptions Report in Appendix A of this Transportation Technical Report provides a detailed discussion of the transit LOS methodology.

Transit LOS measures were analyzed for the PM peak hour (5:00 to 6:00 p.m.) to describe transit performance during the period when traffic congestion and transit ridership are the highest. For transit LOS performance, LOS A indicates more frequent service, more hours served during the day, high reliability, and minimal passenger crowding in a transit vehicle. LOS F indicates infrequent service, minimal hours served during the day, low reliability, and passenger crowding in a transit vehicle. The coverage area is defined as the area(s) for which transit provides service. Circulation is defined as the route(s) on which transit operates. Appendix B of this report provides the TCQSM descriptions of each of the transit LOS levels, their ranges, and their grade descriptions. The existing and future transit LOS values for each of the LOS measures are provided in Appendix C, Tables C-3, C-4, C-5, and C-6. The individual components of transit LOS performance are defined as follows:

- **Service frequency LOS** is the number of times within the PM peak hour that a bus or light rail train stops at a specific location. Generally, the shorter the headway between buses for a transit route (the less time a rider has to wait between bus arrivals), the better the service frequency LOS. Bus routes that have headways of less than 10 minutes are considered LOS A, whereas headways higher than 60 minutes are LOS F.

- The **hours of service LOS** measures the total transit operating hours provided within a 24-hour (daily) period. Hours of service LOS is intended to measure the availability of transit service to riders and potential users. The longer the period that transit service is provided throughout the day, the better the LOS.

  From a bus rider's perspective, bus routes that serve two areas are perceived as a single service between these two areas. To reflect these connections, pairs of specific areas served by East Link were evaluated. These areas evaluated are Northgate, University District, Downtown Seattle, Mercer Island, South Bellevue, Downtown Bellevue, Bel-Red, Overlake, and Downtown Redmond. Transit performance between these service areas was evaluated for service frequency LOS and hours of service LOS.

TABLE 4-2
Existing Bus Routes Evaluated in Study Area

Route	Stop Locations in Study Area	Service Area	Schedule (with headways)
KCM 111	I-90	Downtown Seattle, I-90 and Rainier, Newport Hills Park-and-Ride, Kennydale, Renton Highlands Park-and-Ride, Renton Highlands, Maplewood Heights, Lake Kathleen	Weekdays (5:15 a.m. to 7:30 a.m., 3:30 p.m. to 6:00 p.m.) every 30 minutes
KCM 114	I-90	Downtown Seattle, I-90 and Rainier, Newport Hills Park-and-Ride, Kennydale, Renton Highlands Park-and-Ride, Renton Highlands, Maplewood Heights, Lake Kathleen	Weekdays (5:30 a.m. to 7:45 p.m., 4:00 p.m. to 5:30 p.m.) every 30 minutes
KCM 202	North Mercer Island	Downtown Seattle, North Mercer Island, South Mercer Island	Weekdays (6:15 a.m. to 8:30 a.m., 3:00 p.m. to 7:30 p.m.) every 15 to 30 minutes
KCM 205	North Mercer Island	University District, Montlake, First Hill Seattle, North Mercer Island, South Mercer Island	Weekdays (6:30 a.m. to 8:30 a.m., 1:30 p.m. to 5:30 p.m.) every 60 minutes
KCM 210	I-90	Downtown Seattle, I-90 and Rainier, Factoria, Eastgate, Issaquah Transfer Point	Weekdays (6:00 a.m. to 7:30 a.m., 3:30 p.m. to 5:30 p.m.) every 20 to 30 minutes
KCM 212	I-90, Overlake	Downtown Seattle, I-90 and Rainier, Factoria, Eastgate I-90 Freeway Station, Eastgate Park-and-Ride	Weekdays (6:30 a.m. to 9:30 a.m., 3:30 p.m. to 7:15 p.m.) every 10 minutes
KCM 214	I-90	Downtown Seattle, I-90 and Rainier, Issaquah Transfer Point, Issaquah, Preston, Fall City, Snoqualmie Falls, Snoqualmie, North Bend, Factory Stores of North Bend	Weekdays (4:45 a.m. to 7:30 a.m., 3:30 p.m. to 6:30 p.m.) every 15 to 30 minutes
KCM 216	I-90, North Mercer Island, Redmond	Downtown Seattle, I-90 and Rainier, North Mercer Island, Pine Lake, South Sammamish Park-and-Ride, Redmond, Bear Creek Park-and-Ride	Weekdays (5:45 a.m. to 8:15 a.m., 3:30 p.m. to 8:00 p.m.) every 30 minutes
KCM 217	I-90	Downtown Seattle, I-90 and Rainier, Factoria, Eastgate Park-and-Ride, Eastgate, North Issaquah	Weekdays (6:45 a.m. to 7:45 a.m., 4:45 p.m. to 5:45 p.m.) every 30 minutes
KCM 218	I-90	Issaquah Highlands Park-and-Ride, Eastgate I-90 Freeway Station, I-90 and Rainier, Downtown Seattle	Weekdays (6:00 a.m. to 9:00 a.m., 3:30 p.m. to 6:45 p.m.) every 20 minutes
KCM 220	Bellevue, Redmond	Redmond Park-and-Ride, Redmond Town Centre, Rose Hill, South Kirkland Park-and-Ride, Bellevue	Weekdays (6:30 a.m. to 5:45 p.m.) every 30 to 60 minutes
KCM 225	I-90, Overlake	Downtown Seattle, I-90 and Rainier, Eastgate I-90 Freeway Station, Eastgate Park-and-Ride, Phantom Lake, Overlake, Overlake Transit Center	Weekdays (5:30 a.m. to 6:00 a.m., 3:45 p.m. to 5:00 p.m.) every 30 minutes
KCM 229	I-90, Overlake	Overlake Transit Center, Overlake, Crossroads, Phantom Lake, Eastgate Park-and-Ride, Eastgate I-90 Freeway Station, I-90 and Rainier, Downtown Seattle	Weekdays (6:00 a.m. to 7:45 a.m., 4:00 p.m. to 6:00 p.m.) every 30 to 60 minutes
KCM 230	Bellevue, Overlake, Redmond	Kingsgate Park-and-Ride, Totem Lake Mall, Rose Hill, 124th Avenue NE, NE 85th Street, Kirkland Transit Center, Lake Washington Boulevard, South Kirkland Park-and-Ride, Bellevue Way NE, Bellevue Transit Center, NE 8th Street, Crossroads, Overlake, Microsoft, 156th Avenue NE, SR 520, Redmond	Weekdays (4:30 a.m. to 11:45 p.m.) every 30 minutes Saturday (5:30 a.m. to 11:30 p.m.) every 30 minutes Sunday (6:30 a.m. to 11:30 p.m.) every 60 minutes
KCM 232	Bellevue, Overlake, Redmond	Duvall, Cottage Lake, English Hill, Redmond, SR 520, I-405, Overlake, Bellevue, Bellevue Transit Center	Weekdays (5:30 a.m. to 8:00 a.m., 4:15 p.m. to 6:30 p.m.) every 20 minutes
KCM 233	Bellevue, Overlake, Redmond	Avondale Road NE and Avondale Place NE, Bear Creek Park-and-Ride, 148th Avenue NE, 156th Avenue NE, Microsoft, Overlake, Bell-Red Road, Bellevue Transit Center	Weekdays (6:00 a.m. to 7:30 p.m.) every 30 minutes Saturday (8:00 a.m. to 6:00 p.m.) every 60 minutes
KCM 249	Bellevue, Overlake	Redmond Park-and-Ride, West Lake Sammamish Pkwy, Sammamish Viewpoint Park, Overlake, Overlake Park-and-Ride, NE 20th Street, 116th Avenue NE, Bellevue Transit	Weekdays (6:15 a.m. to 6:45 p.m.) every 30 minutes Saturday (7:15 a.m. to 7:15 p.m.) every 60 minutes

TABLE 4-2
Existing Bus Routes Evaluated in Study Area

Route	Stop Locations in Study Area	Service Area	Schedule (with headways)
		Center	
KCM 253	Bellevue, Overlake	Bear Creek Park-and-Ride, Redmond Park-and-Ride, Redmond Civic Center, 148th Avenue NE, Overlake, Overlake Park-and-Ride, Crossroads, Bellevue Transit Center	Weekdays (5:15 a.m. to 11:00 p.m.) every 30 minutes Saturday (6:00 a.m. to 11:00 p.m.) every 30 minutes Sunday (8:00 a.m. to 11:00 p.m.) every 60 minutes
KCM 268	Overlake, Redmond	Downtown Seattle, Montlake, SR 520 Stops, Overlake Transit Center, Bear Creek Park-and-Ride, 185th Avenue NE and Redmond-Fall City Road	Weekdays (6:00 a.m. to 7:30 a.m., 3:30 p.m. to 5:45 p.m.) every 30 minutes
KCM 269	Overlake, Redmond	Issaquah Transfer Point, Issaquah Highlands Park-and-Ride, Issaquah-Pine Lake Road, South Sammamish Park-and-Ride, 228th Avenue NE, Sahalee Way NE, Redmond-Fall City Road, Bear Creek Park-and-Ride, Overlake, Overlake Park-and-Ride	Weekdays (6:00 a.m. to 8:45 a.m., 4:45 p.m. to 7:30 p.m.) every 30 to 60 minutes
KCM 271	Bellevue	Issaquah, Issaquah Transfer Point, Eastgate, Eastgate Park-and-Ride, Bellevue Community College, Bellevue Transit Center, Medina, University District	Weekdays (5:15 a.m. to 10:15 p.m.) every 20 to 30 minutes Saturday (6:30 a.m. to 10:15 p.m.) every 30 minutes Sunday (7:30 a.m. to 10:15 p.m.) every 60 minutes
ST 545	Bellevue, Overlake, Redmond	Bear Creek Park-and-Ride, Redmond Park-and-Ride, Redmond City Hall, Downtown Seattle	Weekdays (5:00 a.m. to 12:00 p.m.) every 10 to 30 minutes Weekends (6:15 a.m. to 11:30 p.m.) every 30 minutes
ST 550	Bellevue, South Bellevue, North Mercer Island, I-90	Bellevue Square, Bellevue Transit Center, South Bellevue Park-and-Ride, North Mercer Island, I-90 and Rainier, Downtown Seattle	Weekdays (4:45 a.m. to 11:45 p.m.) every 15 minutes Weekends (6:00 a.m. to 11:45 p.m.) every 30 minutes
ST 554	North Mercer Island, I-90	South Sammamish Park-and-Ride, Issaquah Highlands Park-and-Ride, Downtown Issaquah, Issaquah Transfer Point, Bellevue Community College, Eastgate Park-and-Ride, Eastgate I-90 Freeway Station, North Mercer Island, I-90 and Rainier, Downtown Seattle	Weekdays (4:30 a.m. to 11:30 p.m.) every 30 minutes Weekends (6:00 a.m. to 11:30 p.m.) every 30 minutes
ST 555	Bellevue	Issaquah Highlands Park-and-Ride, Issaquah Transfer Point, Bellevue Community College, Eastgate Park-and-Ride, Factoria, Bellevue Transit Center, SR 520 Freeway Stations, Northgate Transit Center	Weekdays (5:45 a.m. to 8:00 a.m., 3:30 p.m. to 6:00 p.m.) every 30 minutes
ST 556	Bellevue	Issaquah Highlands Park-and-Ride, Issaquah Transfer Point, Bellevue Community College, Eastgate Park-and-Ride, Bellevue Transit Center, SR 520 Freeway Stations, University District, Northgate Transit Center	Weekdays (5:30 a.m. to 8:00 a.m., 3:15 p.m. to 6:00 p.m.) every 30 minutes
ST 564	Bellevue, Overlake	South Hill Mall Transit Center, South Hill Park-and-Ride, Sumner Station, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Weekdays (4:45 a.m. to 7:30 p.m.) every 30 minutes
ST 565	Bellevue, Overlake	Federal Way Transit Center, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Weekdays (4:45 a.m. to 9:45 p.m.) every 30 minutes

Note: Transit routes are from spring 2007 schedules obtained from King County Metro and Sound Transit web sites: http://www.kingcounty.gov and http://www.soundtransit.org.
Source: King County Metro (2007a); Sound Transit (2007b).
KCM King County Metro
ST Sound Transit

- The **passenger load LOS** is intended to measure passenger comfort and the ability of a rider to find a seat during the on-board portion of the trip during the PM peak hour. Passenger load LOS also measures crowding in the transit vehicle. For buses, passenger load LOS is defined by the number of passengers per seat. For light rail, passenger load LOS is a measurement of square footage available for standing per standing passenger. Passenger load LOS A indicates that riders are able to spread out on the vehicle along with the potential to use empty seats for storing carry-on items. A passenger load LOS at or worse than LOS D may reflect overcrowding, and the transit service provider might consider an increase of service frequency. In addition, a large number of passengers can cause the bus to wait (dwell) longer at stops because of crowded passenger boarding and alighting. The longer dwell time can negatively affect travel time and service reliability. Table 4-3 lists the existing bus routes evaluated for the passenger load LOS at each of the screenlines. Passenger load LOS was calculated at each screenline by averaging the total number of passengers per seat or square feet per standing passenger on transit routes within the PM peak hour.
- **Reliability of service LOS** was analyzed at major transit hubs within the East Link project vicinity. The reliability LOS measures the degree to which a transit vehicle meets or misses its scheduled headway at its arrival station. This includes not only a transit vehicle arriving late, but also a transit vehicle leaving early from a stop. A bus leaving early would mean that some transit users would miss their bus. Two methods were used to determine transit reliability. For transit routes with scheduled headways greater than 10 minutes, on-time reliability was analyzed in terms of on-time performance, defined as being 0 to 5 minutes late. For transit routes operating at scheduled headways of 10 minutes or less, headway adherence (calculated as the coefficient of variation) was used to determine reliability. Headway adherence reliability was calculated using the TCQSM methodology, which compares the standard deviation of actual headways to scheduled headways of transit routes at major transit centers and park-and-ride lots associated with the study area. On-time performance reliability was calculated using weekday automatic vehicle location (AVL) data collected by King County Metro for the selected transit hubs during spring 2007. It was assumed that in the future 2020 and 2030 conditions both Metro and Sound Transit would adjust their bus services according to the demand and congestion levels to maintain existing reliability, although unforeseen conditions may limit what is implemented. The following major transit hubs were used to evaluate service reliability:
  - International District/Chinatown Station
  - Mercer Island Park-and-Ride
  - Bellevue Transit Center
  - Overlake Transit Center
  - Redmond Transit Center

4.2.3 Level of Service for Service Frequency

In the existing condition, the bus routes between the Bel-Red area and Downtown Bellevue, Overlake, and Downtown Redmond operate at average headways of 10 to 15 minutes (LOS C or better). Service frequency between Overlake and Downtown Redmond operates similarly. The Downtown Seattle to Downtown Bellevue and the Downtown Seattle to Downtown Redmond connections have a service frequency of LOS B or better. In general, most direct bus service connecting to Downtown Bellevue operates at headways that average more than 10 minutes (LOS B). However, services between Downtown Bellevue and Northgate and the University District operate at average headways of 30 minutes or less (LOS D). Only one route within the study area provides service between the University District and Mercer Island areas, and service frequency between these areas operates at headways that average over an hour (LOS F).

Direct bus service between many of the service areas is not provided. Direct service from Bel-Red, Overlake, and Downtown Redmond to Northgate and the University District does not exist. In addition, there is no direct service between the Mercer Island and South Bellevue areas and the Bel-Red Overlake and Downtown Redmond areas. Additionally, several routes only offer service in the peak direction during the PM peak hour. Exhibit 4-1 shows the service frequency LOS for existing conditions between areas connected by the bus routes evaluated in the East Link transit analysis.

TABLE 4-3
Existing Bus Routes Evaluated (for Passenger Load Level of Service LOS only) at Screenlines

Screenline 1 (City of Seattle)		Screenline 2 (Lake Washington)		Screenline 3 (I-90)		Screenline 4 (South Bellevue)		Screenline 5 (Bel-Red)		Screenline 6 (Redmond)	
Route	**Location**	**Route**	**Location**	**Route**	**Location**	**Route**	**Location**	**Route**	**Location**	**Route**	**Location**
KCM 111	I-90 D2 Roadway	KCM 111	I-90	KCM 111	I-90	ST 550	Bellevue Way SE	KCM 220	NE 20th Street at 140th Avenue NE	KCM 220	140th Avenue NE at NE 61st Street
KCM 114	I-90 D2 Roadway	KCM 114	I-90	KCM 114	I-90	ST 564	I-405	KCM 230	NE 8th Street at 140th Avenue NE	KCM 230	SR 520 at NE 61st Street
KCM 202	4th Avenue South	KCM 202	I-90	KCM 210	I-90	ST 565	I-405	KCM 232	SR 520 at 140th Avenue	KCM 232	SR 520 at NE 61st Street
KCM 210	I-90 D2 Roadway	KCM 205	I-90	KCM 212	I-90			KCM 233	Bel-Red Road at 140th Avenue NE	KCM 233	SR 520 at NE 61st Street
KCM 212	I-90 D2 Roadway	KCM 210	I-90	KCM 214	I-90			KCM 249	NE 20th Street at 140th Avenue NE	KCM 249	Lake Sammamish Parkway
KCM 214	I-90 D2 Roadway	KCM 212	I-90	KCM 216	I-90			KCM 253	NE 8th Street at 140th Avenue NE	KCM 253	148th Avenue NE at NE 61st Street
KCM 216	I-90 D2 Roadway	KCM 214	I-90	KCM 217	I-90			KCM 268	SR 520 at 140th Avenue NE	KCM 268	SR 520 at NE 61st Street
KCM 217	I-90 D2 Roadway	KCM 216	I-90	KCM 218	I-90			ST 545	SR 520 at 140th Avenue NE	KCM 269	SR 520 at NE 61st Street
KCM 218	I-90 D2 Roadway	KCM 217	I-90	KCM 225	I-90			ST 564	SR 520 at 140th Avenue NE	ST 545	SR 520 at NE 61st Street
KCM 225	I-90 D2 Roadway	KCM 218	I-90	KCM 229	I-90			ST 565	SR 520 at 140th Avenue NE		
KCM 229	I-90 D2 Roadway	KCM 225	I-90	ST 554	I-90						
ST 550	I-90 D2 Roadway	KCM 229	I-90								
ST 554	I-90 D2 Roadway	ST 550	I-90								
		ST 554	I-90								
		KCM 268	SR 520								
		KCM 271	SR 520								
		ST 545	SR 520								
		ST 555	SR 520								
		ST 556	SR 520								

KCM King County Metro
ST Sound Transit

4.2.4 Level of Service for Hours of Service

Under existing conditions, service between Downtown Bellevue and each of the following areas operates an average of 17 to 20 hours during the day (LOS B or better): the University District, Downtown Seattle, Mercer Island, South Bellevue, Overlake, and Downtown Redmond. Service between Downtown Seattle and Downtown Bellevue, as well as between Downtown Seattle and Downtown Redmond, operates over 19 hours during the day (LOS A). Services between the University District and Mercer Island and between Northgate and Downtown Bellevue operate at an average of 3 hours (LOS F) and approximately 7 hours (LOS E), respectively. Service between the Bel-Red area and the Overlake and Downtown Redmond areas operate similarly (LOS D) because most routes that serve these areas operate during peak periods. Bel-Red, Overlake, and Downtown Redmond do not have direct service to Northgate and the University District. In addition, there is no direct service between the Mercer Island and South Bellevue area and the Bel-Red, Overlake, and Downtown Redmond areas. Exhibit 4-2 shows the hours of service LOS for existing conditions between areas connected by the bus routes evaluated in the East Link Project transit analysis.

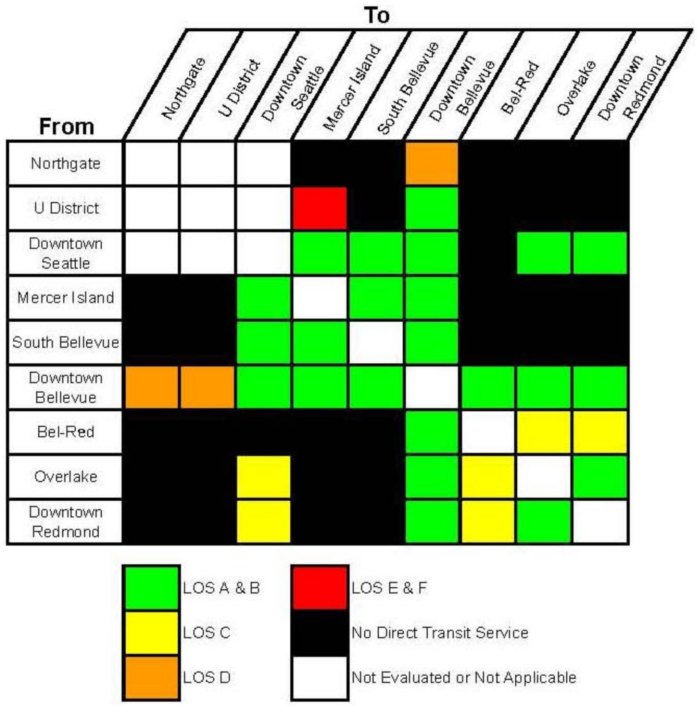


EXHIBIT 4-1
Existing PM Peak-Hour Service Frequency Level of Service

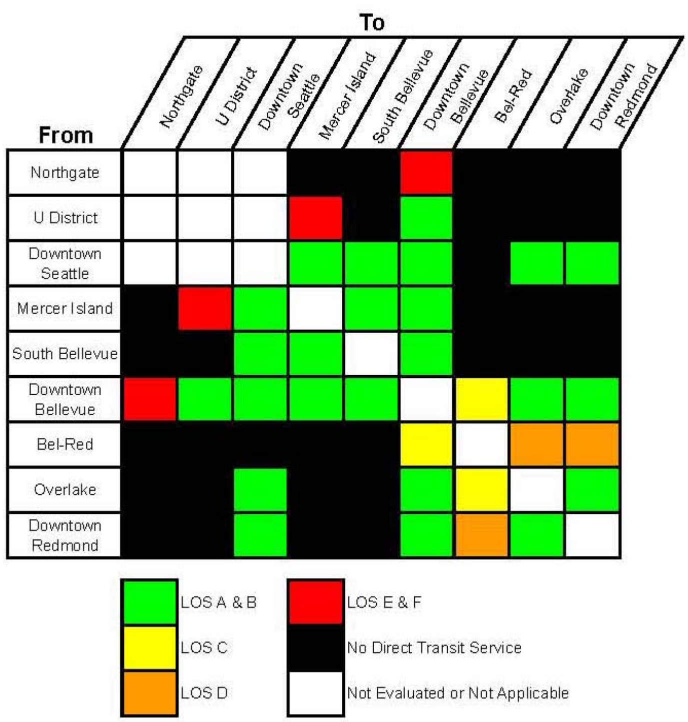


EXHIBIT 4-2
Existing Hours of Service Level of Service

4.2.5 Level of Service for Passenger Load

Passenger load LOS A or B was calculated for all screenlines within the corridor, which indicates that passenger crowding and comfort does not affect delayed dwell times in terms of travel time and service frequency. Transit across Screenline 6 (Redmond) is the least crowded, allowing passengers to stow carry-ons on vacant seats and flexibility for passengers to sit wherever they like on the vehicle. Screenline 2 (Lake Washington) has the highest passenger load, more than 0.50 passengers per seat, at which level passengers can still choose where to sit. Table 4-4 summarizes the existing PM peak-hour passenger load LOS associated with the study area screenlines. Existing bus passenger data were provided by King County Metro (King County Metro, 2007b).

TABLE 4-4
Existing PM Peak-Hour Bus Passenger Loads

Screenline	Existing Routes	Direction	Average Seated Passenger per Seat	LOS
1 (City of Seattle)	11 local, 2 express	Eastbound	0.45	A
		Westbound	0.49	A
2 (Lake Washington)	14 local, 5 express	Eastbound	0.52	B
		Westbound	0.57	B
3 (I-90)	10 local, 1 express	Eastbound	0.49	A
		Westbound	0.33	A
4 (South Bellevue)	0 local, 3 express	Eastbound	0.23	A
		Westbound	0.50	B
5 (Bel-Red)	7 local, 3 express	Eastbound	0.43	A
		Westbound	0.40	A
6 (Redmond)	8 local, 1 express	Eastbound	0.29	A
		Westbound	0.16	A

Source: Sound Transit (2007c).
LOS level of service

4.2.6 Level of Service for On-Time Performance and Reliability

Most transit routes at the International District/Chinatown Station, Mercer Island Park-and-Ride, Bellevue Transit Center, Overlake Transit Center, and Redmond Transit Center operate at LOS E or F for on-time performance and reliability. None of the bus routes at the International District/Chinatown and Mercer Island stations have a reliability LOS better than LOS E. Only three routes at the Bellevue Transit Center operate better than LOS E; one of the bus routes with an LOS better than LOS E is Sound Transit Regional Express Route 550 (ST 550). In the westbound direction, ST 550 is near the beginning of its route at the Bellevue Transit Center; therefore, it is expected to have an acceptable reliability because it has not yet experienced any substantial delays or congestion. Following this route into Seattle along I-90, the ST 550 on-time performance at Mercer Island is only at 50 percent, corresponding to LOS F.

Once ST 550 reaches the International District/Chinatown Station, its on-time performance even further degrades to 30 percent and a continued LOS F reliability. This route is a good example of how roadway congestion can impede transit and restrict it from providing reliable service. Table 4-5 lists the reliability LOS calculated for selected stations in the project corridor in the PM peak hour.

TABLE 4-5
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	On-Time Performance (percent)	Coefficient of Variation	LOS
International District/Chinatown	KCM 210	Eastbound	25	41.7	-	F
	KCM 212	Eastbound	8.7	-	0.56	E
	KCM 214	Eastbound	13	49.2	-	F
	KCM 216	Eastbound	26	40.7	-	F
	KCM 218	Eastbound	9.6	-	0.53	E
	KCM 225	Eastbound	>60	59.4	-	F
	KCM 229	Eastbound	>60	44.8	-	F

TABLE 4-5 CONTINUED
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	On-Time Performance (percent)	Coefficient of Variation	LOS
International District/Chinatown contd.	ST 550	Eastbound	6.6	-	0.68	E
	ST 554	Eastbound	35	51.7	-	F
	KCM 111	Southbound	20	66.0	-	F
	KCM 114	Southbound	27	56.3	-	F
	KCM 202	Southbound	30	43.1	-	F
	KCM 212	Westbound	30	46.0	-	F
	ST 550	Westbound	10.1	30.3	-	F
	ST 554	Westbound	30	56.9	-	F
			Station Average[a]	48.8	0.59	F/E
Mercer Island	ST 550	Eastbound	6.5	-	1.02	F
	ST 554	Eastbound	35	52.8	-	F
	KCM 202	Southbound	11	50.6	-	F
	KCM 216	Southbound	33	34.0	-	F
	KCM 202	Westbound	32	71.4	-	F
	KCM 203	Westbound	32	36.5	-	F
	ST 550	Westbound	10.2	50.0	-	F
	ST 554	Westbound	30	70.0	-	F
			Station Average[a]	52.2	1.02	F/F
Bellevue Transit Center	KCM 233	Eastbound	30	91.0	-	B
	KCM 249	Eastbound	30	84.8	-	D
	KCM 271	Eastbound	15	66.2	-	F
	ST 550	Eastbound	6	-	0.68	E
	ST 556	Eastbound	37	55.9	-	F
	ST 564	Northbound	30	39.0	-	F
	ST 565	Northbound	60	3.3	-	F
	ST 564	Southbound	30	39.0	-	F
	ST 565	Southbound	30	23.8	-	F
	KCM 233	Westbound	30	48.3	-	F
	KCM 249	Westbound	30	41.3	-	F
	KCM 253	Westbound	30	38.2	-	F
	KCM 271	Westbound	22	71.0	-	F
	ST 550	Westbound	11.25	82.4	-	D
	ST 555	Westbound	39	71.0	-	F
	KCM 230	N/A	14.5	59.5	-	F
	KCM 230	N/A	30	61.8	-	F
	KCM 232	N/A	23.5	29.3	-	F
			Station Average[a]	53.3	0.68	F/E

TABLE 4-5 CONTINUED
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	On-Time Performance (percent)	Coefficient of Variation	LOS
Overlake Transit Center	KCM 232	Eastbound	17	35.8	-	F
	KCM 268	Eastbound	36	34.0	-	F
	ST 545	Eastbound	10	-	0.39	C
	KCM 230	Eastbound	29	74.6	-	E
	ST 564	Northbound	60	21.9	-	F
	ST 565	Northbound	60	13.3	-	F
	ST 564	Northbound	60	47.8	-	F
	ST 565	Northbound	60	17.4	-	F
	KCM 245	Northbound	29	87.5	-	C
	ST 564	Southbound	30	77.8	-	E
	ST 565	Southbound	30	89.5	-	C
	KCM 245	Southbound	30	84.8	-	D
	ST 545	Westbound	10	-	0.31	C
	KCM 230	Westbound	32	75.0	-	E
	KCM 232	Westbound	30	50.0	-	F
	ST 545	Westbound	10	-	0.30	D
	KCM 247	N/A	31	21.5	-	F
	KCM 225	N/A	31	46.7	-	F
	KCM 229	N/A	36	33.3	-	F
	KCM 256	N/A	28	95.2	-	A
	KCM 249	N/A	22	36.6	-	F
			Station Average[a]	52.4	0.33	F/C
Redmond Transit Center	KCM 230	N/A	31	32.3	-	F
	KCM 232	Eastbound	20.5	26.3	-	F
	KCM 253	Eastbound	30	40.0	-	F
	ST 545	Eastbound	10.8	27.8	-	F
	KCM 220	Eastbound	29	18.0	-	F
	KCM 220	Westbound	25	100.0	-	A
	KCM 250	N/A	44	29.2	-	F
	KCM 253	Westbound	25	88.7	-	C
	ST 545	Westbound	10	-	0.48	D
			Station Average[a]	45.3	0.48	F/D

Source: Automatic vehicle location data provided by Metro in spring 2007.

Note: While the data used in this analysis were collected during the Downtown Seattle Transit Tunnel closure, data that had been collected before the tunnel closure showed LOS F.

[a] Station average LOS = X/Y, where X= LOS for percent on-time performance station average, Y= LOS for coefficient of variation station average.

KCM King County Metro
LOS level of service
N/A The transit route does not provide service to one specific direction.
ST Sound Transit

4.3 Environmental Impacts

The East Link Project would improve transit service within the regional transportation system in terms of operations and LOS. In addition, the project would provide regional travel benefits by extending transit access and mobility in the growing eastern part of the urban Puget Sound region. Enhancing transit service between the two major business centers of the Puget Sound region—Seattle and the Eastside (Bellevue, Overlake, and Redmond)—with light rail would improve transit usage and provide these communities with more reliable direct transit service. As described in this section, light rail provides improved headways and service frequencies for transit service with longer hours of service throughout the day. East Link would also serve the peak and reverse-peak directions of travel equally. Bus routes would be tailored to feed the light rail system, closing gaps in the existing transit network. Overall, with shorter headways and travel times, light rail would improve the transit LOS for riders and increase the passenger capacity compared to bus services in the same area.

A representative East Link route (the combination of the *Preferred Alternatives A1* and *E2* and Alternatives B3, C4A, and D2A - 120th Station Design Option) was used to assess the transit LOS measures for the project because there would not be a substantial variation in these LOS results among the other project alternatives.

4.3.1 Future Transit Service Coverage and Circulation

As part of the East Link Project, King County Metro and Sound Transit service planners developed a transit integration plan for both the 2020 and 2030 no-build and build conditions (Sound Transit, 2007a). The transit integration plan identified future bus services that included changes to the current bus headways and routes to meet future demand. Although service plans would not be finalized until close to system operation, the plans provide a snapshot of how bus service would look with and without the project. Some of these plans are being implemented now through ST2 and Transit Now, an initiative to expand transit service approved by King County voters in the general election in November 2006. In general, the future bus service frequency and coverage area would increase both with and without the East Link Project in response to changes in travel demand patterns and regional growth. With the project, future express and local bus routes and service would change. For example, bus routes that serve the same markets as light rail and that are far less reliable would be reduced or eliminated. The routes with service changes in the no-build and build conditions are described in Appendix C.

For the no-build condition, several existing routes are proposed to be modified by 2020 and 2030 as part of the future transit integration plan. For example, bus service between Eastgate and Seattle would be improved as the frequency of KCM 212, which serves Eastgate, is expected to increase; however, KCM 217, which has limited service to Eastgate, would be discontinued. The King County route that locally travels on Mercer Island and connects to Downtown Seattle would be deleted. Routes providing service between Mercer Island and Downtown Seattle would have improved frequency. A new Metro RapidRide route with generally the same route and coverage area as the existing KCM 253 (which is deleted in the future) would travel between Redmond and Downtown Bellevue. Even with these changes in future service, the coverage areas would stay relatively constant.

For the build condition, direct light rail service would be created between Downtown Seattle, Mercer Island, Downtown Bellevue, Overlake, and Redmond. Most bus routes that provide parallel service to the light rail service areas would be reduced or eliminated, although some routes would be modified to terminate at light rail stations. Major routes that would see changes are ST 550 and ST 554. Specific circulation changes in transit services are described by segment in the following subsections. It was assumed that future Community Transit service in the area would be unaffected.

4.3.1.1 Segment A, *Preferred Interstate 90 Alternative (A1)*

Along I-90 between Seattle and the Bellevue Way interchange, light rail would use the reversible center roadway. Peak-direction buses would be rerouted from the reversible center roadway to the HOV lanes in the outer roadways that will be constructed as part of the I-90 Two-Way Transit and HOV Operations Project. Bus access to and from Mercer Island and the Rainier Avenue transit flyer stop would be maintained in all directions with a combination of the existing ramps provided on the outer roadways and the future HOV lanes and ramps built as part of the I-90 Two-Way Transit and HOV Operations Project. East of I-405, the I-90 HOV lanes and transit access that currently exists would not change with the East Link project. Changes to key transit routes on I-90 east of I-405 are further described in this section and are included in the transit LOS and ridership forecasts, where applicable.

In Seattle, if the D2 Roadway (the ramp connection between I-90 at Rainier Avenue and the Airport Way 5th Avenue intersection) is not designated as joint-use for bus and light rail, bus routes that use the D2 Roadway would likely be rerouted to 4th Avenue S via SR 519. Sections 4.3.2.4 and 5.3.3 identify the bus reliability and travel times with and without joint-use operations on the D2 Roadway, respectively. Also in Seattle, as evaluated in the *North Link Supplemental Final EIS* (Sound Transit, 2006), buses might not operate in the Downtown Seattle Transit Tunnel once light rail extends to Northgate, which is an assumption for the East Link Project in the no-build and build conditions for both 2020 and 2030 years. Direct service between Mercer Island and the University District would not occur in the No Build Alternative because the bus route that connects these areas would be deleted per the future bus service plan.

With East Link, light rail would reestablish the direct connection between these areas. Additional connections would also be created with light rail between Mercer Island and Northgate, Bel-Red, Overlake, and Downtown Redmond. With the project, Sound Transit Regional Express Route 554 (ST 554) is assumed to terminate at the Mercer Island Station. With this change, bus stops would be relocated on Mercer Island to serve ST 554 when it would arrive from the east. It would travel in a clockwise pattern around the station and would use the HOV ramps on 80th Avenue SE to exit and access I-90. In the build condition, ST 550 would be eliminated because it would provide parallel service to light rail. On Mercer Island, if the future eastbound HOV off-ramp is not connected to 77th Avenue SE (a connection to Island Crest Way is Sound Transit's and WSDOT's preferred eastbound HOV off-ramp location), buses traveling eastbound on I-90 would continue to be able to serve the Mercer Island Park-and-Ride via the general-purpose eastbound off-ramps similar to current eastbound I-90 bus operations when the center roadway is closed to eastbound traffic.

4.3.1.2 Segment B

Under the No Build Alternative, direct transit connections to South Bellevue would not change from existing conditions. However, with light rail, South Bellevue would be directly connected to Bel-Red, Overlake, Downtown Redmond, Northgate, and the University District.

Preferred 112th SE Modified Alternative (B2M)

Under *Preferred Alternative B2M,* the ST 550 route would be eliminated but other bus routes would continue to serve Bellevue Way between the South Bellevue Park-and-Ride and the Bellevue Transit Center. All other modifications to the future transit service coverage and circulation would be similar in the no-build and build conditions.

Other Segment B Alternatives

For the BNSF Alternative (B7) at the 118th Station, bus routes that could be effectively rerouted would begin and end at this station. In the no-build condition, many of these routes would originate and end at the Wilburton Park-and-Ride located on SE 8th Street. Current bus service on Mercer Island would connect to the South Bellevue Park-and-Ride and Downtown Bellevue with Alternative B7. Transit service coverage and circulation would remain similar to the *Preferred Alternative B2M* for all other Segment B alternatives. Closing the eastbound HOV off-ramp at the I-90 and Bellevue Way SE interchange is a design option for all Segment B alternatives, while closing the westbound HOV on-ramp is a design option for only Alternative B1. The potential closure of the HOV direct-access ramps would not affect bus services because the project would eliminate buses currently using these ramps; the exception, however, is Alternative B7, for which one bus route would be rerouted to the general-purpose ramp if the eastbound HOV direct-access off-ramp were to be closed.

4.3.1.3 Segment C

With light rail, there would be more direct transit connections between Downtown Bellevue and the areas served by East Link. In both the no-build and build conditions, a Metro RapidRide route would connect Downtown Bellevue, Overlake, and Redmond.

Preferred 108th NE At-Grade Alternative (C11A)

Under *Preferred Alternative C11A*, routes ST 550 and ST 556 would be eliminated. Other bus routes, such as ST 555 and ST 564/565, would be truncated to end at the Bellevue Transit Center to reduce redundancy with light rail service. All other modifications to the future transit service coverage and circulation for the Segment C area would be similar under the no-build and build conditions.

Preferred 110th NE Tunnel Alternative (C9T)

Under *Preferred Alternative C9T*, transit service coverage and circulation would be similar to *Preferred Alternative C11A*.

Other Segment C Alternatives

Under Alternative C4A, transit that uses 108th and 110th Avenues NE might need to be revised depending on the direction of the one-way vehicle couplet in Downtown Bellevue. All other modifications to the future transit service coverage and circulation under the Alternative C4A would be similar to *Preferred Alternative C11A*. For all other Segment C alternatives, bus service and circulation would be similar to *Preferred Alternative C11A*.

4.3.1.4 Segment D

Without the East Link Project, there would be no direct transit connection between Bel-Red and Downtown Redmond because the bus routes connecting these areas would be deleted or modified. East Link would provide a direct connection between these areas. In addition, light rail would directly connect Bel-Red and Overlake to the South Bellevue, Mercer Island, University District, and Northgate areas. Light rail would also directly connect the Bel-Red area to Downtown Seattle.

Preferred NE 16th At-Grade Alternative (D2A)

Under *Preferred Alternative D2A*, to serve the 120th Station, some bus route circulation patterns would be modified to use 120th Avenue NE instead of 116th Avenue NE between NE Bel-Red Road and NE 20th Street. Some services between the Bellevue Transit Center and the Overlake Transit Center would be reduced or eliminated if light rail extended to the Overlake Transit Center. If light rail terminated at Overlake Village Station, then some bus routes would be changed to serve that station. All other modifications to the future transit service coverage and circulation for the Segment D area would be similar under the no-build and build conditions.

Other Segment D Alternatives

For all other Segment D alternatives, transit service coverage and circulation would be similar to *Preferred Alternative D2A* except for Alternative D5, which does not have a 120th Station and therefore would not have any of the bus route modifications associated with that station.

4.3.1.5 Segment E

Under the No Build Alternative, there would be no direct connection between Downtown Redmond and the Bel-Red area. With light rail, new direct transit connections would be established between Downtown Redmond and the Bel-Red, South Bellevue, Mercer Island, and Northgate areas.

Preferred Marymoor Alternative (E2)

Under *Preferred Alternative E2*, the addition of the SE Redmond Station would change transit service. Some bus routes would be revised to serve the SE Redmond Station. These buses would use NE Redmond Way and NE 70th Street to access the SE Redmond Station. Some bus routes would continue to use the Bear Creek Park-and-Ride as they would in the no-build condition. It was assumed that similar transit services would be provided at either the Redmond Transit Center or Downtown Redmond Station because they are both located in Downtown Redmond. All other modifications to the future transit service coverage and circulation for the Segment E area would be similar under the no-build and build conditions.

Other Segment E Alternatives

For the other Segment E alternatives, transit service coverage and circulation would be similar to *Preferred Alternative E2*.

4.3.2 Transit Level of Service and Operations Impacts

Transit service in the future no-build and build conditions was evaluated using a methodology similar to that used for evaluating the affected environment in Section 4.2. Transit LOS for routes under the no-build and build conditions were evaluated for the weekday PM peak hour. The future LOS was based on the transit integration plan and the forecasted ridership. Table 4-6 lists the future transit routes at each of the six screenlines used in calculating the passenger load LOS, and the following subsections present the results for each of the measures used to evaluate transit LOS performance. Because the transit integration plan did not alter the transit service frequencies and hours of service measures enough to cause an LOS shift between years 2020 and 2030, the analysis is the same for both future years.

TABLE 4-6
Future No-Build and Build Transit Route Changes at Screenlines in Study Area

Service Change	Screenline 1 (Seattle)	Screenline 2 (Lake Washington)	Screenline 3 (I-90)	Screenline 4 (South Bellevue)	Screenline 5 (Bel-Red)	Screenline 6 (Redmond)
No change at Screenline[a]	KCM 212, 214, 216, 218	KCM 212, 214, 216, 218, 271	KCM 111, 114, 210, 212, 214, 216, 218 ST 554	ST 564, 565	KCM 233, 249	KCM 232, 269
Routes added to the screenline in all future conditions	KCM 214.5	KCM 214.5	KCM 214.5	KCM 234	KCM RapidRide	KCM 239, RapidRide
Routes eliminated from the screenline in build conditions only	KCM 111, 114, 210 ST 550, 554	KCM 111, 114, 210, 268 ST 550, 554, 545, 555, 556		ST 550	KCM 232, 268 ST 545, 564, 565	KCM 268 ST 545
Routes added to the screenline in build conditions	Light rail	Light rail		KCM 111, 114 ST 532, 535 Light rail	Light rail	Light rail
Routes eliminated from the screenline in all future conditions	KCM 202, 217, 225, 229	KCM 202, 205, 217, 225, 229	KCM 217, 225, 229		KCM 220, 230, 253	KCM 220, 230, 233, 249, 253

[a] East Link route crosses screenline under existing conditions.
KCM King County Metro
ST Sound Transit

4.3.2.1 Service Frequency Level of Service

Overall, the transit integration plans for 2020 and 2030 propose redeploying or truncating several routes to increase transit service frequency among the local routes that would feed and serve light rail stations, resulting in more frequent bus service by 2020 and 2030 with the project. The left-side chart in Exhibit 4-3 shows the service frequency LOS during the PM peak hour for the No Build Alternative and the chart on the right side shows the service frequency LOS during the PM peak hour with the project. Because the transit integration plan did not alter the transit service frequencies enough to cause an LOS shift between years 2020 and 2030, Exhibit 4-3 shows the analysis for both years in a single set of charts. Table C-3 in Appendix C provides the service frequency LOS between the service areas.

In the no-build condition, some areas would be connected by frequent service, but many other areas would not have direct transit connections. Service frequency in the reverse-peak direction (eastbound in the morning [AM] and westbound in the afternoon [PM]) between Overlake and Downtown Seattle and between Downtown Redmond and Downtown Seattle would improve from the existing LOS C to LOS A. This service frequency improvement would be due to plans for more frequent headways of route ST 545. Between Downtown Seattle and Downtown Bellevue, the service frequency would remain at an LOS B or better. With a few exceptions, the University District, Northgate, Mercer Island, South Bellevue, Bel-Red, Overlake, and Downtown Redmond areas would not have direct bus service between them. Planned modifications of some routes (i.e., elimination, truncation, rerouting) would also decrease the service frequency LOS with some of the connections to and from the Bel-Red area. Service frequency would improve from LOS D to LOS C between Downtown Bellevue and the University District because headways would improve from 25 minutes to 15 minutes. Even though many of the bus routes are planned to have more frequent headways, buses would likely be unable to meet their scheduled headways in the future due to additional congestion on roadways. Refer to Section 4.3.2.4 Transit Reliability Level of Service for a discussion of future bus reliability. In years 2020 and 2030, East Link would connect all the areas with more frequent service. East Link trains would have peak headways between 7 and 8 minutes, resulting in LOS A. The Eastside areas would be directly connected by light rail service, with frequent direct connections with the Bel-Red, Overlake, and Downtown Redmond areas.

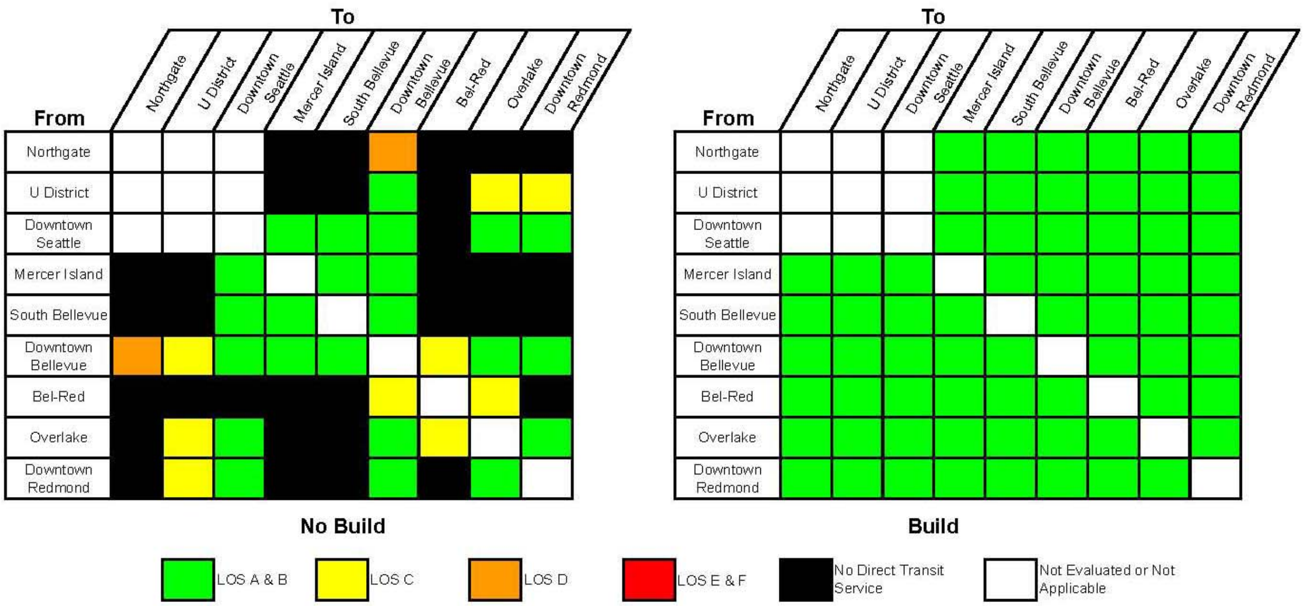


EXHIBIT 4-3
2020 and 2030 PM Peak-Hour Service Frequency Level of Service

Compared to bus service in the no-build condition, light rail would provide a substantial improvement in the frequency of service not only in the peak periods but also throughout the day. Outside of the morning and afternoon peak periods, bus service would generally operate with frequencies of LOS D or worse. By contrast, light rail would operate with headways of LOS C or better and headways of 15 minutes or less throughout the day.

4.3.2.2 Hours of Service Level of Service

Hours of service LOS represents the number of hours that a transit service is available throughout the day. Existing routes that continue in the future, without major changes, were assumed to have the same existing hours of service as they do currently. New routes that are comparable to an existing route were assigned the existing route's hours of service. Exhibit 4-4 shows the hours of service LOS with the project between areas connected by transit. Because the transit integration plan did not alter the hours of transit service enough to cause an LOS shift between years 2020 and 2030 conditions, Exhibit 4-4 shows the analysis for both years.

In the no-build condition, with a few exceptions, direct service would not exist between the Northgate, University District, Mercer Island, South Bellevue, Bel-Red, Overlake, and Downtown Redmond areas. Bus service in the no-build condition between Downtown Bellevue and Downtown Seattle, the University District, Mercer Island, South Bellevue, Overlake, and Downtown Redmond would operate at LOS B or better. The hours of service LOS between the service areas is provided in Table C-4 in Appendix C.

With light rail, the hours of service would be LOS A between all areas directly connected by light rail as East Link would either introduce new direct connections among them or provide substantial improvements to existing service areas. East Link would operate for 20 hours each day, a longer operating duration than most future bus routes. The Eastside areas would be directly connected with light rail service, with most noticeable hours of service improvements in the connections with Bel-Red, Overlake, and Downtown Redmond. Downtown Seattle to Downtown Bellevue, and Downtown Seattle to Downtown Redmond would continue to have hours of service LOS A. With light rail, Northgate and the University District would have direct connections with Mercer Island and all the Eastside areas (i.e., South Bellevue, Downtown Bellevue, Bel-Red, Overlake, and Downtown Redmond).

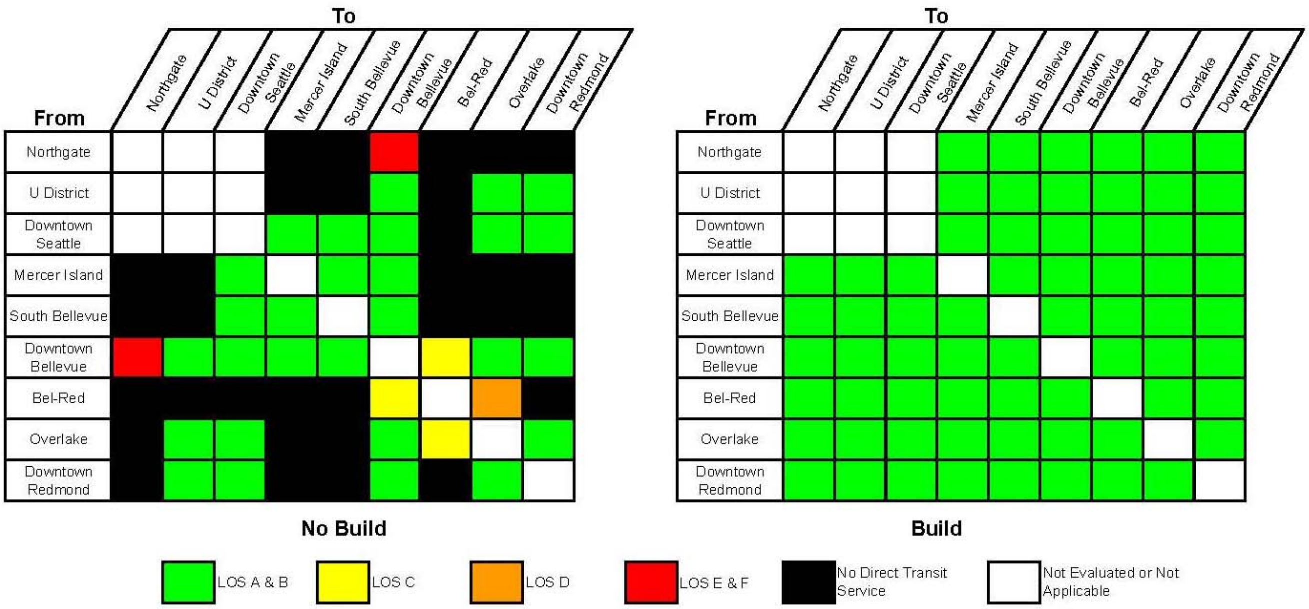


EXHIBIT 4-4
2020 and 2030 Hours of Service Level of Service

4.3.2.3 Passenger Load Level of Service

Passenger load measures a rider's ability to find a seat on a transit vehicle. Although intended to measure passenger comfort from the rider's perspective, it is an important factor in measuring transit LOS because the ease of passengers in finding a seat or space on the transit vehicle can influence the transit vehicle's dwell time and reliability at the transit stop or station. Future passenger load LOS relied on the Sound Transit ridership model, which predicts passenger usage for each transit route. Bus sizes were assumed the same as the current buses unless bus sizes for new routes were specified. The calculation to determine the passenger load for buses and light rail is different based on the calculation of transit capacity per the TCQSM (TRB, 2003). The bus passenger load calculations include the number of bus seats as the capacity. Bus passenger load is calculated in this way because buses are intended to provide mostly seated transit service. Light rail is intended to provide both seated and standing transit service. Therefore, it is assumed that when the number of passengers exceeds the number of available seats, some passengers must stand. Passenger load for light rail was calculated as square footage available per standing passenger. As the available square footage decreases, the LOS worsens. Because of the different passenger load LOS for bus and rail, the passenger load LOS values were not combined at the screenlines in the build condition. Table 4-7 and Table C-5 in Appendix C summarize the screenline passenger load LOS.

Compared to existing conditions, the 2020 no-build conditions showed fluctuations in the passenger loads on buses. A greater number of passengers per bus would occur at Screenlines 1 (Seattle) and 2 (Lake Washington). Across Screenline 2, the passenger load for the Seattle-to-Bellevue bus routes would be LOS D, indicating all bus seats are used by passengers. Even though the total number of transit passengers across the other screenlines would increase in the future No Build Alternative, depending on the bus service modifications (i.e., more frequent service or larger capacity buses), the passenger load LOS would increase or decrease compared to existing conditions. Overall, the 2020 no-build passenger load LOS would be no worse than LOS C. In the 2020 build condition, passenger load LOS across all screenlines would be LOS A. The improvement to LOS A is notable across Screenline 2, where the bus passenger load would operate at LOS C in the eastbound direction and LOS B in the westbound direction without light rail. Even though the passenger load LOS would improve, the number of transit users would increase over no-build conditions. The reason for the improved LOS is that light rail provides a higher capacity service than buses. Overall, the number of passengers per bus would decrease from the no-build to build conditions as more people would choose to ride light rail because of its more frequent and reliable service; therefore, improved bus passenger load LOS would be expected in the build condition.

TABLE 4-7
No-Build and Build PM Peak-Hour Passenger Load Level of Service

Screenline	Direction	2020 No-Build	2020 Build		2030 No-Build	2030 Build	
		Bus	Bus	Light Rail	Bus	Bus	Light Rail
1 (City of Seattle)	Southbound	B	A	B	B	A	B
	Northbound	A	A	A	B	A	A
2 (Lake Washington)	Eastbound	C	A	A	C	A	A
	Westbound	B	A	A	C	A	A
3 (I-90)	Eastbound	A	A	N/A	B	A	N/A
	Westbound	B	A	N/A	B	A	N/A
4 (South Bellevue)	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	B	A	A
5 (Bel-Red)	Eastbound	B	A	A	C	A	A
	Westbound	A	A	A	B	A	A
6 (Redmond)	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A

N/A Not applicable because light rail would not cross this screenline.

By 2030, the passenger load LOS reflects an increase in transit usage with or without East Link. Passenger load LOS with East Link would operate at LOS B or better across all screenlines in comparison to no-build bus service that would operate at LOS C or better. While the passenger load LOS would improve with light rail as it provides a higher capacity service than buses, the number of transit (bus and light rail combined) riders would increase by about 25 percent across Lake Washington (Screenline 2) compared with the No Build Alternative. In the future, if the light rail passenger load LOS becomes unacceptable, the transit service provider might consider increasing service frequency or train length to improve the passenger load LOS and passenger comfort. In Segment A, if in the future the D2 Roadway did not operate as joint-use for bus and light rail, the buses that use the D2 roadway would be rerouted to other roadways, such as SR 519, to access downtown Seattle. This rerouting would slightly increase bus travel time, which could affect the passenger load on these buses.

4.3.2.4 Transit Reliability Level of Service

Measuring on-time performance and reliability LOS for transit included analysis of deviations of transit routes from their scheduled headways. Analysis of future on-time performance and reliability LOS in the no-build and build conditions used data from existing conditions because future headway deviations cannot be predicted. It was assumed that in the future both King County Metro and Sound Transit would adjust their bus services according to the demand and congestion levels, although unforeseen conditions could limit what is implemented. A summary of transit reliability LOS by transit station is provided in Table 4-8, but specific route transit reliability LOS can be viewed in Appendix C, Table C-6.

In the 2020 and 2030 no-build conditions, most bus routes at the International District/Chinatown Station, Mercer Island Park-and–Ride, Bellevue Transit Center, Overlake Transit Center, and Redmond Transit Center would be expected to operate at LOS E or F. None of the 23 bus routes at either the International District/Chinatown Station or Mercer Island Park-and-Ride would be expected to have a reliability LOS better than LOS E. Only 3 of the 18 evaluated routes at the Bellevue Transit Center operate better than LOS E. ST 550, a key transit route in the study area that follows a route similar to the light rail alternatives between Seattle and Downtown Bellevue, would be expected to operate at LOS F in both directions at the Mercer Island Park-and-Ride, which indicates that this route would almost always be "bunched" and would arrive on time only about 50 percent of the time.

TABLE 4-8
Transit Reliability Level of Service at Stations

Station	Existing Bus		Future Light Rail[a] LOS[b]
	On-Time Performance (percent)	LOS[b]	
International District/ Chinatown	48.8	F/E	A
Mercer Island	52.2	F/F	A
Bellevue Transit Center	53.3	F/E	A
Overlake Transit Center	52.4	F/C	A
Redmond Transit Center	45.3	F/D	A

Note: While the data used in this analysis were gathered during Downtown Seattle Transit Tunnel closure, data collected before the tunnel closure showed similar reliabilities (i.e., LOS E/F).
[a] Light rail reliability performance was projected using St. Louis light rail data (Sound Transit, 2006).
[b] LOS values are station averages; existing bus average LOS X/Y, where X = LOS for percent on-time performance station average, Y = LOS for coefficient of variation station average (definitions provided in the *Transportation Technical Report* [Appendix H1]).

LOS level of service

Bus Reliability

The continuation of existing poor reliability between Downtown Seattle and Downtown Bellevue would be expected in the future because bus speeds between these two major urban centers are predicted to decrease slightly more than 30 percent by year 2030, even with improvements to I-90. This would occur because there are no improvements planned to roadways connecting I-90 to these urban centers, especially to and from Bellevue. On average, bus routes operate with an LOS E or F at all six of the major transit hubs evaluated as indicated in Table 4-8. Only a few bus routes at the Overlake Transit Center and Redmond Transit Center would operate with a reliability LOS better than LOS D. In Segment A, with light rail using the center roadway, buses would use the HOV lanes in the outer roadway during both construction and light rail operation. If performance of these HOV lanes degraded and did not meet WSDOT's HOV Speed and Reliability Standard of 45-mile-per-hour (mph) speeds for 90 percent of the peak-period duration, buses would likely not be able to maintain acceptable reliability.

If light rail and buses jointly use the D2 Roadway in Seattle, buses would gain up to a 2-minute savings inbound in the AM peak period to Downtown Seattle and up to a 6-minute savings outbound in the PM peak period from Downtown Seattle on I-90 compared to the operational option where buses would not be eligible to use the D2 Roadway. However, some of the savings would be reduced when buses travel along 5th Avenue South to and from the D2 Roadway. It would take up to 2 additional minutes to travel along 5th Avenue South compared to 4th Avenue South. Additionally, depending on the joint-use operating policy of the D2 Roadway, up to 3 additional minutes of average delay, in either direction, could be incurred by buses while waiting for clearance to enter the D2 Roadway. However, during evening events at the stadiums, bus routes along 4th Avenue South would incur additional travel time due to increased congestion along this street. With an interim terminus station at the Ashwood/Hospital or Hospital station in Bellevue, current bus service would continue to serve the Bel-Red and Overlake areas with poor reliability. With an interim terminus farther east, the transit reliability in the Bel-Red and Overlake areas would improve with the direct service from light rail.

Light Rail Reliability

The poor bus reliability discussed in the previous section indicates that buses would frequently arrive close together (bunched) rather than at their desired intervals, and that buses would be unable to meet their scheduled arrival times. This poor performance is indicative of a highly congested transportation network that would not serve bus transit well. Furthermore, poor reliability would not create an attractive mode for potential users and would be a major deterrent to bus transit use. Light rail would not experience the same disruptions in transit reliability because light rail would operate in its own dedicated right-of-way, separate from vehicle congestion, and therefore it would be better able to accommodate higher demand through more frequent and reliable service. For at-grade routes with dedicated right-of-way allowing vehicles to cross traffic, such as Alternatives B1, B2A, and C9A and *Preferred Alternatives C11A, D2A,* and *E2* alternatives, light rail would have some priority at traffic signals. Only with Alternative C4A in downtown Bellevue would light rail operate with vehicles as a joint bus-use lane on 108th Avenue NE between NE 4th Street and NE 8th to provide bus access to the Bellevue Transit Center from all directions.

The Puget Sound region's light rail system (Central Link) is in its first years of operation. The 2010 third quarter year-to-date service reliability indicates that the year-to-date adherence to schedule is around 80 percent and the headway adherence is above 90 percent. These service reliability measures are calculated by Sound Transit in a way slightly different than the TCQSM. For schedule adherence, a train is considered late if "a.) it departs a terminal station more than one minute late, or b.) it arrives at a terminal station three or more minutes late and is unable to make its departure time" (Sound Transit, 2010a). The headway adherence service reliability standard is considered the "percentage of time that the scheduled headway is maintained or a more frequent headway than scheduled is maintained (up to three minutes)" (Sound Transit, 2010a).

Because the current Sound Transit light rail system has different characteristics than assumed with the East Link Project (for example, current joint bus and rail operations in the Downtown Seattle Transit Tunnel are not assumed during East Link operations) and because Central Link is continuing to adjust operations to improve its reliability, East Link's expected light rail reliability was estimated using the St. Louis light rail system's on-time performance data. St. Louis light rail includes features similar to East Link (such as at-grade crossings and tunnels) and is reported to be 93 percent on time; however, their method considers any vehicle arriving more than 1 minute early not to have arrived on time. This differs from the conservative method that was used for the bus on-time performance, which considered only vehicles arriving 0 to 5 minutes late to have arrived on time. For the St. Louis light rail system, only 1 percent of trips arrive late, and just over 6 percent arrive early. Other light rail lines in the United States report between 92 and 98 percent on-time performance. Table C-7 in Appendix C provides Saint Louis light rail data supporting these findings.

4.3.2.5 Transit Travel Time Savings

Door-to-door (from the beginning to the end of a trip—for example, when you leave your place of work, ride transit, and then reach your destination, such as entering your home) travel time is a key factor in estimating transit ridership. For some potential transit riders, especially riders who have other travel mode choices available to make a trip, the ability of a transit service to save them time is an important factor in their decision-making process. These travel times were forecasted by the Sound Transit ridership model and include the following factors:

- Bicycle or walk time to stop or station
- Wait time
- Transfer wait time(s), if any
- In-vehicle time (in bus and/or light rail)
- Drive, bicycle, or walk time to destination

Table 4-9 provides average transit time comparisons for the area around the stations in each segment in the years 2020 and 2030. The comparisons reflect each person's travel time weighted by the number of trips (buses and rail) at each of the stations in the PM peak period. Compared to the no-build condition, East Link riders would save between 5 and 15 minutes during the PM peak in 2020 and between 4 and 16 minutes in 2030. The travel-time savings average over all the station areas would be 9 minutes in both 2020 and 2030. While the values presented in Table 4-9 represent a travel time for any transit rider in the region connecting to transit at the East Link stations, transit riders making trips where their origin and destination areas are both served by East Link would have the greatest travel-time benefits. This is due to shorter waits, no transfer times, and high in-vehicle speeds.

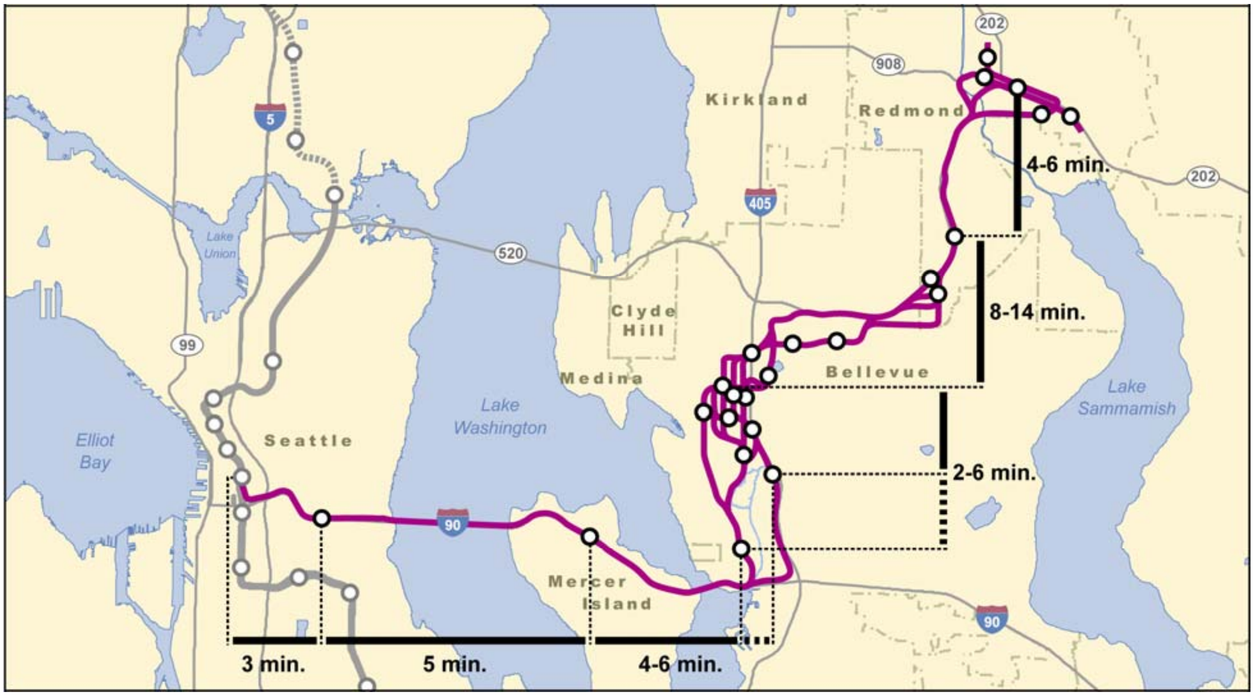
An important component of the overall transit travel time is the actual time a train takes to travel between stations. With the East Link Project, a passenger's travel time between Downtown Seattle and Downtown Redmond would be between 29 and 39 minutes. Light rail travel time between Downtown Seattle and Downtown Bellevue would be less than 20 minutes. This is a savings of up to 25 minutes compared to an automobile currently traveling between these locations, as in the afternoon peak period it currently takes up to 45 minutes to travel between Seattle and Bellevue (via I-90) and up to 55 minutes to travel between Seattle and Redmond (via SR 520) (WSDOT, 2011). In the future, automobile travel times are expected to worsen; therefore, light rail would provide an even greater travel time savings. Exhibit 4-5 shows light rail travel times between key stations.

TABLE 4-9
Year 2020 and 2030 Comparative Analysis of Average Door-to-Door PM Peak Transit Travel Times[a]

Station	Travel Time (minutes)			
	Year 2020		Year 2030	
	No Build	Build	No Build	Build
Segment A, Interstate 90				
Rainier	52	43	52	45
Mercer Island	49	41	50	41
Segment B, South Bellevue				
South Bellevue	51	43	50	43
SE 8th[b]	57	48	58	47
118th[b]	58	47	60	48
Segment C, Downtown Bellevue				
Old Bellevue[b]	59	50	60	51
Bellevue Transit Center	59	51	60	52
108th[b]	60	51	62	52
East Main	61	51	64	52
Hospital[b]	63	54	64	55
Ashwood/Hospital	59	52	60	52
Segment D, Bel-Red/Overlake				
120th	62	53	62	54
130th	63	55	64	58
Overlake Village	66	56	63	56
Overlake Transit Center	63	55	60	56
Segment E, Downtown Redmond				
Redmond Town Center	69	54	70	56
Downtown Redmond	69	56	71	58
SE Redmond	64	59	66	50
Redmond Transit Center[b]	69	58	71	61
Weighted average for all stations	**60**	**51**	**61**	**52**

[a] Door-to-door means from the beginning to the end of a trip, for instance from when a commuter leaves his or her place of work to when that commuter enters his or her home.

[b] Travel times for these stations were derived from the alternative in which the station is included, which is not among the alternatives used in the representative alternative combination described in section 4.3. These alternatives are Alternative B1 (connecting with Alternative C1T), Alternative B7, *Preferred Alternatives C11A* and *C9T (connected with Preferred Alternative B2M),* and E2 - Redmond Transit Center Design Option).



Note: Estimated East Link travel time between the Mercer Island Station and the South Bellevue Station is about 4 minutes (solid line), between the Mercer Island Station and the 118th Station it is about 6 minutes (solid plus dashed line), between the South Bellevue Station and Bellevue Transit Center it is between 4 and 6 minutes (solid plus dashed line), and between the 118th Station and the Bellevue Transit Center it is about 2 to 4 minutes (solid line).

EXHIBIT 4-5
East Link Travel Times between Key Stations

4.3.2.6 Transfers

The requirement for transit riders to transfer is often perceived as a negative attribute of transit systems and an impediment to transit use. However, the quality of transfers, whether between buses or between bus and rail, has a dramatic impact on how negatively transfers are perceived. Factors determining quality of transfers include proximity of transfer location, wait time, waiting area conditions, and service reliability.

Wait time is a function of the service frequency on the route to which a transit user is transferring and/or the ability to provide reliable "timed transfer" connections. There is evidence that quality transfers are acceptable and can be only a minor impediment. For example, King County Metro, which historically has been one of the strongest advocates of the "one-seat ride," has been implementing a new "multi-centered" route structure focused on a series of transit "hubs" where convenient transfers can be made to multiple destinations. Key to the acceptance and success of these systems are safe, appealing, and protected transfer facilities and a combination of more frequent service and/or timed transfer, resulting in negligible impacts on ridership.

Transfers can be measured by a systemwide transfer rate, which is the average number of transit boardings per transit trip. The transfer rate in the study area was 1.29 in 2006. Table 4-10 provides the projected transfer rates for 2020 and 2030 no-build and build conditions. The transfer rates are expected to stay relatively similar between no-build and build conditions. A slight reduction in transfer rate is predicted in the build condition because East Link is assumed to connect with the planned North Link light rail line and provide a one-seat transit trip between north Seattle and the Eastside. Traveling between these two points would then not require a transfer between rail and bus, as it would under the no-build condition.

Passengers transferring from bus to light rail would have shorter wait times compared to bus-to-bus transfers because the East Link operating plan, as noted earlier, assumes East Link trains in the peak periods will arrive every 8 minutes in 2020 and every 7 minutes in 2030. Even during off-peak (midday) hours, East Link would operate with 12-minute headways in 2020 and 10-minute headways in 2030. Transfer wait times from East Link to a bus would sometimes be longer, particularly when the buses would run less frequently than East Link, although bus route frequencies are generally planned to improve over time with implementation of the light rail system. Some bus services supplanted by East Link could be redeployed to improve bus feeder system frequencies.

TABLE 4-10
Transit Transfer Rates

	2006[a]	2020 No-Build	2020 Build	2030 No-Build	2030 Build
Transfer rate	1.29	1.50	1.48	1.55	1.52
Daily (24 hours) transit trips	329,000	445,400	453,800	526,300	536,700
Daily transit boardings	424,000	667,900	670,900	814,900	816,500

[a] Source: Sound Transit (2007b).

4.3.2.7 Station Parking

With the No Build Alternative, no expansion or changes would occur to the existing park-and-ride capacities in the study area. With East Link, parking provided at the Mercer Island, Overlake Village, and Redmond Transit Center stations would remain unchanged. Depending on the alternative, the other park-and-ride lots in the study area would be expanded, e.g., at the South Bellevue (approximately 1,400 stalls), 118th (proposed 1,030 stalls), and Overlake Transit Center (proposed 320 stalls) stations, to better accommodate the expected ridership. New park-and-ride lots would be constructed at the 130th Station or 120th Station (proposed 300 stalls) with *Preferred Alternative D2A* and at SE Redmond Station (proposed 1,400 stalls). Section 6.2 provides further details on parking and parking utilization at East Link stations.

4.3.3 Light Rail Ridership

To forecast transit ridership, Sound Transit uses an incremental model that was developed in the early 1990s. The model is structured so that transit ridership results are based on observed origins and designations of transit users and observed transit line volumes that provide a realistic depiction of observed transit service characteristics. External changes in demographics, highway travel time, and costs are distinctly incorporated into the process in phases, prior to estimating the impacts of incremental changes in transit service. The Sound Transit model relies on the PSRC model for data on external changes, for example PSRC's projected year 2020 and 2030 land use forecasts. The transit ridership model also accounts for the voter-approved ST2 program and recent changes to project schedules assumed in the no-build condition. The ridership forecasts and analysis also include the City of Bellevue's adopted Bel-Red Subarea Plan and the City of Redmond's Overlake Village Plan Update. Refer to Attachment 3 of Appendix A for a further description of the Sound Transit ridership model.

The Sound Transit ridership forecasting model was used to develop the 2020 and 2030 daily light rail system ridership estimates associated with the project alternatives. For the segment alternative and projectwide ridership tables (Tables 4-11 through 4-17), a representative alternative was created to provide a baseline forecast for the East Link Project. This representative alternative generally follows a combination of *Preferred Alternatives A1* and *E2* and Alternatives B3, C4A, and D2A - NE 24th Design Option. To assess each of the alternatives within a segment, the alternatives outside that segment being analyzed reflected the representative alternative, and, within the segment, each alternative was coded and ridership forecasts were prepared. This method provides a common baseline to compare the alternatives within each of the segments. Some alternatives require exception to this method, such as with Alternatives B1 and C1T and various Alternative B7-to-Segment C alternatives (such as B7-C14E). These alternatives are specifically connected to each other, and therefore the ridership forecasts prepared for each of these alternatives included its "counterpart" alternative. Further information on the methodology used to forecast light rail ridership is described in Appendix A, Attachment 3.

The ridership for each project alternative is the sum of the daily boardings at the stations in that alternative. Because the route, profile, and station locations vary for each alternative, changes are expected not only in the station boardings but also in the segment and projectwide ridership. The projectwide ridership is the total number of daily riders that would use East Link. Daily ridership differences would be considered substantial if the forecasted variation for total East Link ridership among alternatives exceeded about 2,000 daily boardings. In general, the projected variation among East Link segment alternatives is not be considered substantial because many of the segments would include a similar number of stations serving the same areas and the projected travel times are not different enough to cause a dramatic change in ridership. Station mode of access information is discussed in Section 6.2. Year 2020 ridership estimates assume light rail service between Northgate and South 200th Street, and Seattle to Redmond (East Link). By 2030, ridership estimates assume light rail will extend between Lynnwood and Redondo/Star Lake, and Seattle to Redmond (East Link).

Although not included in these ridership results, ridership between the Eastside and Seattle would be expected to be higher on days with special events at Safeco Field, Qwest Field, or other venues near the light rail system (e.g., for concerts, trade shows, other sporting events). East Link ridership is anticipated to increase more than 8 percent on days with special events.

4.3.3.1 Preferred Alternative Ridership

Table 4-11 lists the 2020 and 2030 projectwide ridership and boardings for the East Link *Preferred Alternative* (*A1, B2M, C11A* and *C9T*, *D2A,* and *E2*) in all five segments. The ridership forecasts presented in this table use a different approach from the forecasts that compare segment alternatives. Because the *Preferred Alternative* spans all five project segments, a "representative alternative" was not required to create a consistent ridership comparison for individual segments. Therefore, the forecasts provided in Table 4-11 are defined differently than the forecasts presented in Tables 4-12 through 4-17. For each year, two forecasts are provided in Table 4-11 because of the two preferred alternatives (*Preferred Alternatives C11A* and *C9T*) in Segment C.

TABLE 4-11
Year 2020 and 2030 Daily Ridership Forecasts for the Preferred Alternatives

Station	2020		2030	
	Preferred Alternative* with *C11A* (and *Preferred Alternatives A1, B2M, D2A*, and *E2)	***Preferred Alternative* with *C9T* (and *Preferred Alternatives A1, B2M, D2A*, and *E2)***	***Preferred Alternative* with *C11A* (and *Preferred Alternatives A1, B2M, D2A*, and *E2)***	***Preferred Alternative* with *C9T* (and *Preferred Alternatives A1, B2M, D2A*, and *E2)***
	Preferred Alternative A1			
Rainier	3,000	3,000	3,000	3,000
Mercer Island	1,500	1,500	2,000	2,000
Segment A totals	**4,500**	**4,500**	**5,000**	**5,000**
	Preferred Alternative B2M			
South Bellevue	4,000	4,000	4,500	4,500
SE 8th	-	500	-	500
Segment B totals	**4,000**	**4,500**	**4,500**	**5,500**
	Preferred C11A [a]	***Preferred C9T***	***Preferred C11A*** [a]	***Preferred C9T***
108th	1,500	-	2,000	-
Bellevue Transit Center	4,000	5,000	5,000	6,000
Hospital	500	500	1,000	1,000
Segment C totals	**6,500**	**5,500**	**8,000**	**7,000**
	Preferred Alternative D2A			
120th Station	500	500	1,000	1,000
130th Station	1,000	1,000	1,000	1,500
Overlake Village	1,000	1,000	1,000	1,500
Overlake Transit Center	2,500	2,500	3,500	4,000
Segment D totals	**5,000**	**5,500**	**6,500**	**7,000**
	Preferred Alternative E2			
Downtown Redmond	1,000	1,000	1,500	1,500
SE Redmond	1,500	1,500	2,000	2,000
Segment E totals	**3,000**	**3,000**	**3,500**	**3,500**
Projectwide ridership	39,500	40,500	49,000	50,000

[a] A low level of transit signal priority is assumed to ensure key east-west arterials in downtown Bellevue are not affected. This assumption is consistent with the traffic analysis presented in this report.

- = Station not included in alternative.

Note: Due to rounding, station ridership might not sum exactly to segment totals.

Overall, projectwide ridership is very similar between the two preferred alternative forecasts with 49,000 riders for *Preferred Alternative C11A* and 50,000 for *Preferred Alternative C9T*. The two alternatives have very similar station and segment boardings within Segments A, D, and E. In Segment B, *Preferred Alternative C9T* would have 1,000 more boardings (5,500 compared to C11A with 4,500). The opposite is true in Segment C, where *Preferred Alternative C11A* has 1,000 more boardings than C9T (8,000 versus 7,000). One reason for the boarding differences between these two segments is the station locations. *Preferred Alternative C11A* has a 108th Station in Segment C and *Preferred Alternative C9T* has a SE 8th Station in Segment B.

4.3.3.2 Segment A Alternative and Projectwide Ridership

Although there is only one project alternative in Segment A (the *Preferred Alternative A1*), the adjacent Segment B alternatives would affect its daily boardings due to the proximity of the stations in Segment B to Segment A. The Segment A ridership forecasts are similar for Alternatives B1, B2A, B2E, and B3 and *Preferred Alternative B2M* because they would include a station at the South Bellevue Park-and-Ride. Alternative B7 would have a station at 118th Avenue NE, not at South Bellevue, and it would cause a shift in travel patterns to the surrounding stations. The 2020 daily boardings at the Mercer Island Station are expected to increase by about 1,000 under Alternative B7 and in 2030 to increase by about 1,500 to a total of 3,000. Although this boarding information suggests a potential increase in the number of riders at the Mercer Island Station, the park-and-ride lot would only accommodate 447 vehicles; therefore, potential riders exceeding this parking capacity would either use another station or alter their mode of transportation to access the station. Table 4-12 lists 2020 and 2030 daily station boardings and East Link projectwide ridership. Projectwide ridership would be about 40,000 riders in 2020 and up to 49,500 riders in 2030. If the D2 Roadway that connects I-90 and the Downtown Seattle Transit Tunnel operated with exclusive LRT service, transit (bus and rail) ridership along I-90 in the peak periods would not noticeably change because the anticipated slight increase in rail ridership would be offset by the slight decrease in bus ridership.

TABLE 4-12
Year 2020 and 2030 Ridership Forecasts in Segment A

Station	2020		2030	
	A1	*A1* (combined with B7)	*A1*	*A1* (combined with B7)
Rainier	3,000	3,000	3,000	3,000
Mercer Island	1,500	2,500	1,500	3,000
Segment A totals	4,500	5,500	5,000	6,000
Projectwide ridership	40,000	39,000	49,500	48,000

Note: Due to rounding, station ridership might not sum exactly to segment totals.

4.3.3.3 Segment B Alternative and Projectwide Ridership

Within Segment B there are six alternatives, and as part of these six alternatives, there are three proposed stations: South Bellevue, SE 8th, and 118th. The 118th and South Bellevue stations would be park-and-ride facilities. Table 4-13 provides the 2020 and 2030 daily boardings forecasted for each station in Segment B as well as projectwide ridership forecasts.

TABLE 4-13
Year 2020 and 2030 Ridership Forecasts in Segment B

Station	2020						2030					
	B2M	B1	B2E	B2A	B3[a]	B7	*B2M*	B1	B2E	B2A	B3[a]	B7
South Bellevue	4,000	4,000	4,000	4,000	4,000	-	4,500	4,500	4,500	4,500	4,500	-
SE 8th	500	-	500	500	-	-	500	-	500	500	-	-
118th	-	-	-	-	-	1,500	-	-	-	-	-	1,500
Segment B totals	4,500	4,000	4,500	4,500	4,000	1,500	5,000	4,500	5,000	5,000	4,500	1,500
Projectwide ridership	39,500	42,500	40,500	39,500	40,000	39,000	49,000	52,500	50,000	49,000	49,500	48,000

Notes: All Segment B alternatives are connected to Alternative C4A in Segment C to create a consistent ridership comparison except Alternative B1, which is connected to Alternative C1T.
Due to rounding, station ridership might not sum exactly to segment totals.

[a] Alternative B3 and the B3 - 114th Extension Design Option would produce similar ridership forecasts.

\- Station not included in alternative.

Preferred 112th SE Modified Alternative (B2M)

In Segment B, *Preferred Alternative B2M* is in the middle of the range in daily projectwide ridership in 2020 and 2030 with 39,500 and 49,000 riders, respectively. In terms of segment boardings, *Preferred Alternative B2M* has similar ridership as the other Segment B alternatives, other than Alternative B7, with 4,500 in 2020 and 5,000 in 2030. The ridership varies between Alternatives B2M and B7 because the locations and numbers of Segment B stations are different. With Alternative B7, riders may choose to access East Link in another segment (such as Segments A or C) due to the relative ease of accessing those stations rather than the stations in Segment B. This is reflected in the East Link projectwide ridership, which varies less between these alternatives compared to the segment boarding forecasts because riders are choosing to access East Link in a different segment.

Other Segment B Alternatives

Of all the Segment B alternatives, Alternative B1 forecasts the highest projectwide ridership: 42,500 daily riders in 2020 and 52,500 daily riders in 2030. The additional station, the Old Bellevue Station immediately north of the Segment B boundary, contributes to the higher ridership in this alternative. The Old Bellevue Station is surrounded by a high concentration of medium- to high-density mixed-use neighborhoods and it is close to commercial, retail, and office properties. Alternative B7 would result in the lowest projectwide ridership in both 2020 and 2030, with 39,000 daily riders in 2020 and 48,000 daily riders in 2030. Alternative B7 would travel along the BNSF Railway/I-405 route and would not stop at the South Bellevue Station.

In the year 2020, Segment B ridership for each alternative would range from a low of 1,500 daily boardings under Alternative B7 to a high of 4,500 daily boardings generated by alternatives *Preferred B2M*, B2E, and B2A. By 2030, total Segment B ridership for each alternative would range from a low of 1,500 daily boardings in Alternative B7 to a high of 5,000 daily boardings generated by alternatives *Preferred B2M*, B2E, and B2A.

The South Bellevue Station ridership would be similar for all alternatives that include this station. The year 2020 daily boardings at this station would be 4,000. In year 2030, this station would generate 4,500 daily boardings. In both years 2020 and 2030, the SE 8th Station would generate 500 daily boardings for all alternatives with this station. Alternative B7 is the only route that would stop at the 118th Station, which would produce 1,500 daily boardings in both years 2020 and 2030. Boardings at the 118th Station are lower than South Bellevue because it would have less convenient auto and transit access to I-90.

Alternatives B3 and B7 would have an East Main Station immediately north of the Segment B boundary. Under Alternative B3, this station is expected to generate 2,000 and 2,500 daily boardings in years 2020 and 2030, while under Alternative B7, the station would generate 2,500 and 3,000 daily boardings in these same forecast years, respectively.

4.3.3.4 Segment C Alternative and Projectwide Ridership

There are ten alternatives in Segment C. As part of these ten alternatives, there are seven proposed stations: East Main, 108th, Old Bellevue, Bellevue Transit Center, Ashwood/Hospital, and Hospital. None of these stations would be park-and-ride facilities because they are located within the general Downtown Bellevue area.
Tables 4-14 and 4-15 show the 2020 and 2030 daily boardings expected at each station in Segment C for the project alternatives. Table 4-14 provides Segment C ridership forecasts with a connection to Alternatives B3 and B7, while Table 4-15 provides Segment C ridership forecasts with a connection to *Preferred Alternative B2M* or B2A.

Preferred 108th NE At-Grade Alternative (C11A)

By year 2030, projectwide daily ridership for *Preferred Alternative C11A* would be 49,000 with a connection to Alternative B3. This would be near the lower end of the range for Segment C alternatives. *Preferred Alternative C11A* is the only Segment C alternative that provides the 108th Station, which would be in lieu of an East Main Station or a SE 8th Station. *Preferred Alternative C11A* is forecasted to be in the middle of the range for segment boardings, with 6,500 in 2020 and 8,000 in 2030 with a connection to Alternative B3.

With a connection to Alternative B7, projectwide ridership decreases to 47,000, but segment boardings increase to 9,000 in year 2030 compared to Alternative B3. The reasons for the change in ridership with Alternative B7 are discussed in section 4.3.3.2. With a connection to *Preferred Alternative B2M* or Alternative B2A, projectwide ridership and segment boardings would remain similar to a connection with Alternative B3 due to a similar number of stations and location for these Segment B Alternatives.

Preferred 110th NE Tunnel Alternative (C9T)

By the year 2030, daily projectwide ridership for *Preferred Alternative C9T*, with a connection to Alternative B3, would be 51,000. This would be in the middle of the range for segment C alternatives. *Preferred Alternative C9T* is forecasted to have 6,500 boardings in 2020 and 8,000 boardings in 2030.

With a connection to Alternative B7, projectwide ridership would decrease to 49,000, but segment boardings increase to 9,000 in year 2030 compared to Alternative B3. The reasons for the change in ridership with Alternative B7 are discussed in section 4.3.3.2. With a connection to *Preferred Alternative B2M* or Alternative B2A, projectwide ridership, compared to Alternative B3, would decrease to 50,000 and segment boardings to 7,000. This is due to a change in the station locations as a SE 8th Street station is provided with *Preferred Alternative B2M* or Alternative B2A instead of an East Main Station with Alternative B3.

Other Segment C Alternatives

In 2020, the projectwide ridership under the Segment C alternatives would range from 39,000 to 43,000 with a connection to Alternative B3 and range from 37,000 to 41,500 with a connection to Alternative B7. By 2030, the projectwide ridership under the Segment C alternatives would increase from 48,500 to 52,500 with a connection to Alternative B3 and range from 46,000 to 51,000 with a connection to Alternative B7. With a connection to *Preferred Alternative B2M* or Alternative B2A, projectwide ridership for Segment C alternative would range from 39,000 to 42,500 in year 2020 and by year 2030 would range from 48,500 to 52,000.

The following discussion of Segment C ridership assumes a connection to Alternative B3; refer to Tables 4-14 and 4-15 for the comparison to Alternative B7 and *Preferred Alternative B2M* and Alternative B2A, respectively. In general, with a connection to *Preferred Alternative B2M* or Alternative B2A, projectwide ridership would either remain similar or be slightly reduced compared with a connection to Alternative B3, but would be higher than with a connection to Alternative B7.

Alternatives C1T and C3T would result in the highest East Link projectwide ridership by connecting to the center of the commercial, retail, and office core of Downtown Bellevue and the Bellevue Transit Center. Alternatives C1T and C3T are also expected to have shorter Segment C travel times because they would be inside a tunnel with a relatively direct route. The projectwide ridership under Alternative C1T would be 42,500 daily boardings in year 2020 and 52,500 daily boardings in year 2030. The projectwide ridership under Alternative C3T would be 43,000 daily boardings in year 2020 and 52,500 daily boardings in year 2030.

In year 2020, Alternatives C9A and C14E would result in the lowest East Link ridership among the Segment C alternatives, with 39,000 daily riders. By year 2030, both of these two alternatives would continue to have the lowest East Link ridership, 48,500 riders. Alternative C14E has a lower ridership compared to other Segment C alternatives because it would be located on the edge of downtown Bellevue.

TABLE 4-14
Year 2020 and 2030 Ridership Forecasts in Segment C (connecting from Alternative B3 or B7)

Station	2020										2030									
	C11A[a]	*C9T*	C1T	C2T	C3T	C4A[a]	C7E	C8E	C9A[a]	C14E	*C11A*[a]	*C9T*	C1T	C2T	C3T	C4A[a]	C7E	C8E	C9A[a]	C14E
Old Bellevue	-	-	1,500	-	-	-	-	-	-	-	-	-	2,500	-	-	-	-	-	-	-
East Main	-	2,000 (2,500)	-	2,000 (2,500)	2,000 (2,500)	2,000 (2,500)	2,000 (2,500)	2,000 (2,500)	2,000 (2,500)	-	-	2,500 (3,000)	-	2,500 (3,000)	2,500 (3,000)	2,500 (3,000)	2,500 (3,500)	2,500 (3,000)	2,500 (3,000)	-
108th	1,500 (2,000)	-	-	-	-	-	-	-	-	-	2,000 (2,500)	-	-	-	-	-	-	-	-	-
Bellevue Transit Center	4,000 (4,500)	4,000 (4,000)	5,000	4,500 (5,000)	4,500 (5,000)	4,000 (4,500)	3,500 (3,500)	4,000 (4,000)	3,500 (3,500)	3,500 (3,500)	5,000 (5,500)	4,500 (5,000)	6,000	5,500 (6,000)	5,500 (6,000)	5,000 (5,000)	3,500 (4,000)	4,500 (5,000)	4,000 (4,500)	4,000 (4,000)
Ashwood/ Hospital	-	-	-	-	500 (500)	500 (500)	500 (500)	500 (500)	-	-	-	-	-	-	1,000 (1,000)	1,000 (1,000)	1,000 (1,000)	1,000 (1,000)	-	-
Hospital	500 (500)	500 (500)	500	500 (500)	-	-	-	-	500 (500)	1,000 (1,000)	1,000 (1,000)	1,000 (1,000)	1,000	1,000 (1,000)	-	-	-	-	1,000 (1,000)	1,500 (1,500)
Segment C totals	6,500 (7,500)	6,500 (7,000)	7,000	7,000 (7,500)	7,000 (8,000)	6,500 (7,000)	6,000 (7,000)	6,500 (7,000)	6,000 (6,500)	4,500 (4,500)	8,000 (9,000)	8,000 (9,000)	9,000	8,500 (9,500)	9,000 (10,000)	8,000 (9,000)	7,000 (8,000)	8,000 (9,000)	7,500 (8,500)	5,500 (5,500)
Projectwide ridership	39,500 (38,000)	41,000 (39,500)	42,500	42,000 (40,500)	43,000 (41,500)	40,000 (39,000)	41,500 (40,000)	41,500 (40,500)	39,000 (38,500)	39,000 (37,000)	49,000 (47,000)	51,000 (49,000)	52,500	52,000 (50,000)	52,500 (51,000)	49,500 (48,000)	50,500 (48,500)	51,500 (49,500)	48,500 (46,500)	48,500 (46,000)

Notes: Ridership forecasts outside the parentheses are when Segment C alternatives are connected to Alternative B3. Forecasts within the parentheses are when Segment C alternatives are connected to Alternative B7. The exception to this is Alternative C1T, which is connected to Alternative B1.
Due to rounding, station ridership might not sum exactly to segment totals.

[a] A low level of transit signal priority is assumed to ensure key east-west arterials in downtown Bellevue are not affected. This assumption is consistent with the traffic analysis presented in this report.

\- Station not included in alternative.

TABLE 4-15
Year 2020 and 2030 Ridership Forecasts in Segment C (connecting from *Preferred Alternative B2M* or Alternative B2A)

Station	2020										2030									
	C11A[a]	***C9T***	**C1T**	**C2T**	**C3T**	**C4A**[a]	**C7E**	**C8E**	**C9A**[a]	**C14E**	***C11A***[a]	***C9T***	**C1T**	**C2T**	**C3T**	**C4A**[a]	**C7E**	**C8E**	**C9A**[a]	**C14E**
Old Bellevue	-	-		-	-	-	-		-		-	-		-	-	-	-		-	
East Main	-	-		-	-	-	-		-		-	-		-	-	-	-		-	
108th	1,500	-		-	-	-	-		-		2,000	-		-	-	-	-		-	
Bellevue Transit Center	4,000	5,000		6,000	6,000	5,000	4,500		4,500		5,000	6,000		7,000	7,000	6,500	5,500		6,000	
Ashwood/ Hospital	-	-		-	500	500	500		-		-	-		-	1,000	1,000	1,000		-	
Hospital	500	500		500	-	-	-		500		1,000	1,000		1,000	-	-	-		1,000	
Segment C totals	6,500	5,500	N/A	6,500	6,500	5,500	5,500	N/A	5,000	N/A	8,000	7,000	N/A	8,000	8,000	7,000	6,000	N/A	7,000	N/A
Projectwide ridership	39,500	40,500	N/A	41,500	42,500	39,500	41,000	N/A	39,000	N/A	49,000	50,000	N/A	51,500	52,000	49,000	50,000	N/A	48,500	N/A

Notes: Ridership forecasts provided in this table are based on Segment C Alternatives connected to *Preferred Alternative B2M* or Alternative B2A. The exceptions to this (noted with N/A) are Alternatives C1T, C8E, and C14E; which can only be connected to Alternative B1 or Alternatives B3/B7, respectively.

Due to rounding, station ridership might not sum exactly to segment totals.

[a] A low level of transit signal priority is assumed to ensure key east-west arterials in downtown Bellevue are not affected. This assumption is consistent with the traffic analysis presented in this report.

- Station not included in alternative.

N/A not applicable

In year 2020, total Segment C ridership for each alternative would range from a low of 4,500 daily boardings for Alternative C14E to a high of 7,000 daily boardings for Alternatives C1T, C2T, and C3T. By 2030, Segment C total ridership is expected to increase from a low of 5,500 daily boardings for Alternative C14E to a high of 9,000 daily boardings for Alternatives C1 and C3T. The Old Bellevue Station, which is only included with C1T, would generate 1,500 and 2,500 daily boardings in years 2020 and 2030, respectively.

The East Main station would have ridership of 2,000 daily boardings in 2020 and 2,500 daily boardings in 2030. Ridership at the East Main Station Design Option under *Preferred Alternative C9T* would be similar to the East Main Station. The 108th Street Station, which would only be included in *Preferred Alternative C11A*, would generate 1,500 daily boardings in 2020 and 2,000 daily boardings in 2030.

The Bellevue Transit Center station would have a range of ridership between 3,500 and 5,000 daily boardings in 2020 and between 3,500 and 6,000 daily boardings in 2030. Alternative C1T would generate the highest daily boardings at the Bellevue Transit Center, with 5,000 daily boardings in year 2020 and 6,000 daily boardings in year 2030. In contrast, Alternatives C7E, C9A, and C14E would generate the lowest daily boardings of 3,500 in 2020. Alternative C7E would generate 3,500 daily boardings at the Bellevue Transit Center, the lowest daily boardings in 2030.

The Ashwood/Hospital Station is projected to generate 500 daily boardings in 2020 and 1,000 in 2030 for all alternatives. The Hospital Station is expected to generate 500 daily boardings in 2020 for all alternatives except Alternative C14E, which would produce 1,000 in 2020. The same pattern is expected in 2030, with 1,000 daily boardings for all alternatives except Alternative C14E, which would produce 1,500 daily boardings in 2030. This slight increase in boardings under Alternative C14E is due in part to a decrease in the accessibility at the Bellevue Transit Center and slightly faster travel times as the alternative is located along the eastern edge of downtown Bellevue.

4.3.3.5 Segment D Alternative and Projectwide Ridership

There are four alternatives in Segment D. As part of these four alternatives, there are four proposed stations: 120th, 130th, Overlake Village at 151st Avenue or 152nd Avenue, and Overlake Transit Center. All four of these stations could be park-and-ride facilities, but with any alternative only three stations would have a park-and-ride facility. Table 4-16 lists the 2020 and 2030 daily boardings expected at each station in Segment D for the project alternatives.

TABLE 4-16
Year 2020 and 2030 Ridership Forecasts in Segment D

Station	2020					2030				
	D2A[a]	**D2A - NE 24th Design Option**	**D2E**	**D3**	**D5**	***D2A***[a]	**D2A - NE 24th Design Option**	**D2E**	**D3**	**D5**
120th	500	500	500	500	-	1,000	1,000	500	1,000	-
130th	1,000	1,000	1,000	1,000	-	1,000	1,000	1,000	1,000	-
Overlake Village	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,500	1,000	1,500
Overlake Transit Center	3,000	2,500	2,500	2,500	3,000	4,000	3,500	3,500	3,500	4,500
Segment D totals	5,500	5,000	5,000	5,000	4,500	7,000	7,000	7,000	6,500	6,000
Projectwide ridership	41,500	40,000	40,500	40,000	40,000	51,000	49,500	50,000	49,000	49,500

[a] D2A - 120th Design Option would have the same ridership as *Preferred Alternative D2A*.

\- Station not included in alternative.

Note: Due to rounding, station ridership may not sum exactly to segment totals.

Preferred NE 16th At-Grade Alternative (D2A)

By year 2030, daily projectwide ridership for *Preferred Alternative D2A* would be 51,000, which would be the highest for Segment D alternatives. *Preferred Alternative D2A* would have the highest segment boardings in both 2020 and 2030 with 5,500 and 7,000 boardings, respectively. This would be due in part to the alternative having a shorter route in this segment than most of the other Segment D alternatives while serving the key retail, commercial, and employment areas proposed as part of the *Bel-Red Corridor Project Environmental Impact Statement* by the City of Bellevue (2007a). The D2A – 120th Station Design Option would be expected to have a similar ridership forecast as the *Preferred Alternative D2A*.

Other Segment D Alternatives

In year 2020, *Preferred Alternative D2A* has the highest daily projectwide ridership with 41,500 in 2020. Alternative D2A - NE 24th Design Option and Alternatives D3 and D5 would result in the lowest daily projectwide ridership with 40,000 in 2020. In 2030, *Preferred Alternative D2A* would result in the highest number of projectwide riders, 51,000, and Alternative D3 would result in the lowest projectwide ridership of 49,000. These differences do not constitute a substantial difference in ridership between the Segment D alternatives. In forecast year 2020, ridership for Segment D alternatives would range from 4,500 to 5,500 daily boardings. By 2030, Segment D total ridership for Segment D alternatives would be expected to range from 6,000 to 7,000 daily boardings.

The 120th Station, which would be included in all alternatives except Alternative D5, would generate 500 daily boardings in year 2020. In 2030, daily boardings at the 120th Station would range between 500 and 1,000. The 130th Station, which is also included in all alternatives except Alternative D5, would generate 1,000 daily boardings in both years 2020 and 2030. If parking were provided at the 120th Station instead of the 130th Station, the station boarding forecasts would switch between the two stations.

The Overlake Village Station would have 1,000 daily boardings for all alternatives in year 2020 and between 1,000 and 1,500 daily boardings in 2030. *Preferred Alternative D2A*, Alternative D2A - NE 24th Design Option, and Alternative D3 are expected to generate 1,000 daily boardings at this station in 2030, whereas Alternatives D2E and D5 are expected to generate 1,500 daily boardings at this station.

In year 2020, Overlake Transit Center would be expected to generate 2,500 daily boardings for all alternatives except *Preferred Alternative D2A* and Alternative D5, for which they would generate 3,000 daily boardings. In year 2030, the daily boardings would range from a low of 3,500 with Alternatives D2A - NE 24th Design Option, D2E and D3 to a high of 4,500 under Alternative D5. Because only two stations would serve the Bel-Red and Overlake areas under Alternative D5, this alternative would generate slightly higher station ridership at the Overlake Village and Overlake Transit Center stations than the other alternatives. Nearby stations in adjacent segments would also have slightly higher ridership because Alternative D5 would require less travel time than the other alternatives. If a pedestrian/bicycle bridge were constructed connecting Overlake Transit Center Station to the land uses west of SR 520, transit ridership would be expected to increase at this station.

Although both the 120th and 130th stations were analyzed for the *Preferred Alternative D2A,* Alternative D2A - NE 24th Design Option, Alternative D2E, and Alternative D3, only one station may ultimately be constructed. If this were to occur, ridership would not substantially change from what is presented in Table 4-16 as these stations' coverage areas overlap. Riders would likely consolidate to the one station.

Sound Transit's ridership model uses population and employment growth for future forecast years that have been adopted by the regional planning agency, PSRC. The future growth projections from the City of Bellevue and City of Redmond studies (*Bel-Red Corridor Project Final Environmental Impact Statement* [City of Bellevue, 2007a] and *Overlake Neighborhood Plan Update and Implementation Project Final Supplemental Environmental Impact Statement* [City of Redmond, 2007]) have yet to be fully adopted by the PSRC. However, these two studies are included in both cities' long-range development and economic goals. Therefore, growth in these areas was adjusted in these ridership forecasts with assistance from PSRC, City of Bellevue, and City of Redmond. Based on ridership forecasts included in the *Bel-Red Corridor Project Final Environmental Impact Statement* (City of Bellevue, 2007a), if the land uses surrounding the stations were developed to be oriented toward transit use, then the projected East Link ridership could be higher. Any increase in ridership caused by this type of development would be pedestrian or bicycle trips from the areas immediately surrounding the stations.

4.3.3.6 Segment E Alternative and Projectwide Ridership

There are three alternatives in Segment E. As part of these three alternatives, there are four proposed stations: SE Redmond, Redmond Transit Center, Downtown Redmond, and Redmond Town Center. The SE Redmond Station would be a park-and-ride station and the Redmond Transit Center Station would have a park-and-ride facility nearby.

Preferred Marymoor Alternative (E2)

By year 2030, projectwide daily ridership for *Preferred Alternative E2* would be 49,500. *Preferred Alternative E2* would have segment boardings of 3,000 in 2020 and 3,500 in 2030.

Other Segment E Alternatives

All Segment E alternatives would generate very similar daily projectwide ridership, varying by 500 in both 2020 and 2030. These differences would not constitute a substantial difference in ridership between the Segment E alternatives. In forecast year 2020, total Segment E ridership for all alternatives would be 3,000 daily boardings. By 2030, Segment E total ridership would be expected to increase to 3,500 and 4,000 daily boardings, as shown in Table 4-17.

TABLE 4-17
Year 2020 and 2030 Ridership Forecasts In Segment E

	2020				2030			
Station	***E2***	**E2 – Redmond Transit Center Design Option**	**E1**	**E4**	***E2***	**E2 – Redmond Transit Center Design Option**	**E1**	**E4**
Redmond Town Center	-	1,000	1,500	1,500	-	1,500	2,000	2,000
Downtown Redmond	1,000	-	-	-	1,500	-	-	-
Redmond Transit Center	-	500	-	-	-	500	-	-
SE Redmond	1,500	1,500	1,500	1,500	2,000	1,500	1,500	2,000
Segment E totals	3,000	3,000	3,000	3,000	3,500	4,000	3,500	3,500
Projectwide ridership	40,000	40,500	40,000	40,500	49,500	50,000	49,500	50,000

- Station not included in alternative.

Note: Due to rounding, station ridership might not sum exactly to segment totals.

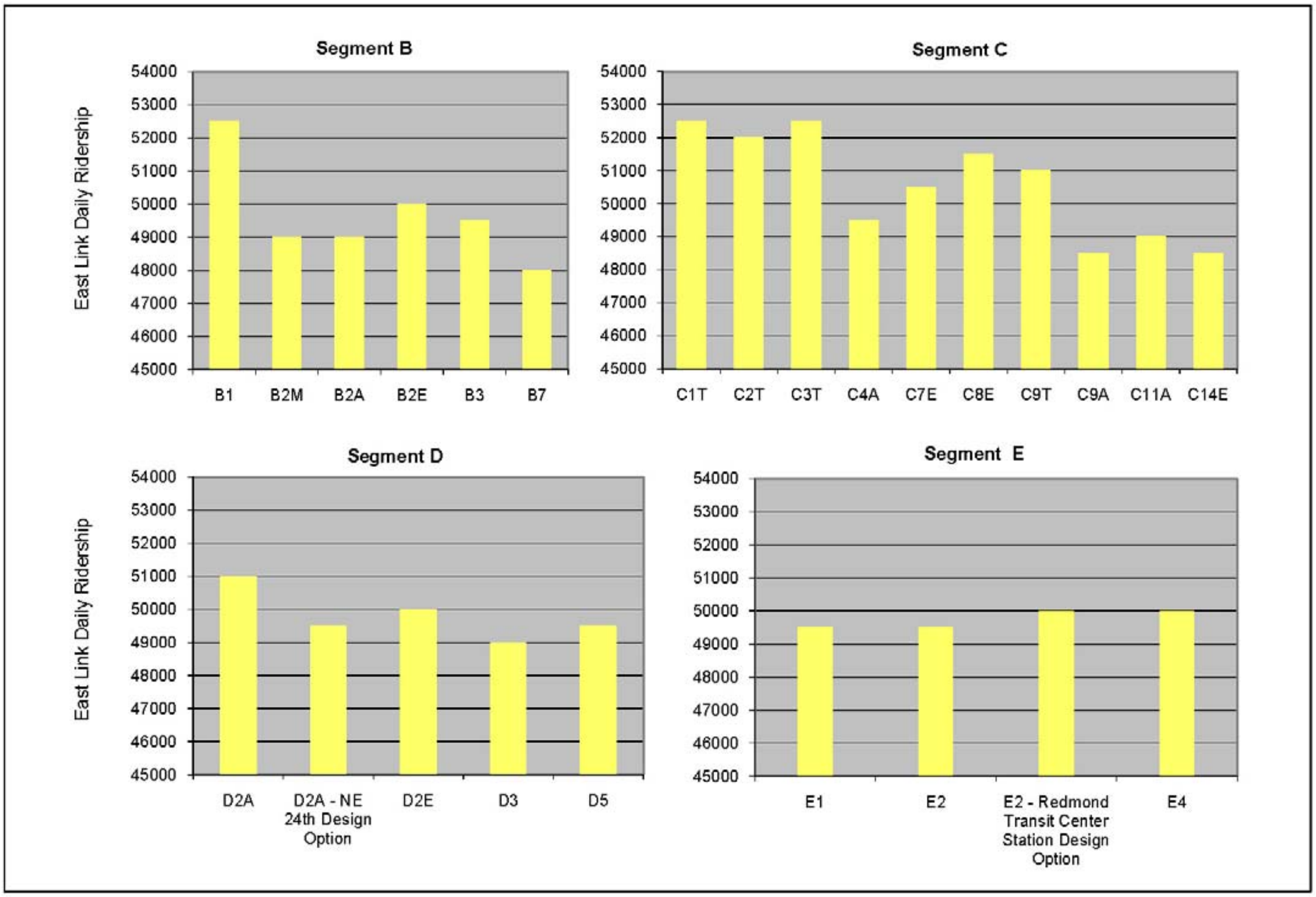
The SE Redmond Station, under all alternatives, is expected to generate 1,500 daily boardings in 2020 and between 1,500 and 2,000 in 2030. The Redmond Town Center Station, under all alternatives, is expected to generate between 1,000 and 1,500 daily boardings in 2020 and between 1,500 and 2,000 in 2030. The Downtown Redmond Station, which would only be included under *Preferred Alternative E2*, is expected to generate 1,000 daily boardings in 2020 and 1,500 in 2030. The Redmond Transit Center Station, which would only be included in E2 – Redmond Transit Center Design Option, would generate 500 daily boardings in both 2020 and 2030.

4.3.3.7 East Link Ridership Comparison Summary

Based on the segment ridership forecasts discussed in the previous sections, the East Link representative alternative would generate 40,000 riders in 2020 and up to 49,500 in 2030. In terms of new transit riders (i.e., people who do not use transit under the No Build Alternative), there would be about 8,500 new daily riders in 2020 and 10,500 by 2030.

In year 2030, alternatives that would produce the highest projectwide ridership in their segments are Alternatives B1, C1T, C3T, E4, and E2 - Redmond Transit Center Station Design Option and *Preferred Alternative D2A*, ranging between 50,000 to 52,500 daily riders. The lowest ridership among the alternatives would be under Alternatives B7, C14E, D3, and E1 or *Preferred Alternative E2*, resulting in a projectwide ridership ranging between 48,000 and 49,500 daily riders. Daily ridership differences would be considered substantial if the forecasted variation for total East Link ridership among alternatives exceeded about 2,000 daily boardings.

There are several reasons for the variation in ridership among the alternatives. Alternatives C1T and C3T would generate the highest ridership among Segment C alternatives by connecting the commercial, retail, and office core of Downtown Bellevue through a tunnel profile that would provide a relatively fast travel time. Alternatives generating lower projectwide ridership are Alternatives B7 and C14E. Alternative B7, which would travel along the BNSF Railway/I-405 route, would not stop at the South Bellevue Park-and-Ride nor provide as convenient bus transfer opportunities as other Segment B alternatives. Alternative C14E would also generate a low projectwide ridership because it would not enter the business and retail core of Downtown Bellevue as much as the other Segment C alternatives, and, therefore, would require a longer walk to access the station from Downtown Bellevue. Exhibit 4-6 displays the 2030 projectwide ridership.



Note: In Segment A, *Preferred Alternative A1* is forecasted to have a 2030 daily projectwide ridership of 49,500.

EXHIBIT 4-6
2030 Projectwide Daily Ridership

4.3.3.8 Interim Terminus Ridership

The Hospital, Ashwood/Hospital, 120th, 130th, Overlake Village, Overlake Transit Center, Redmond Town Center, and SE Redmond stations could all potentially serve as interim terminus stations, even though the East Link Project is funded to extend as far as the Overlake Transit Center. The Overlake Transit Center is therefore considered the most reasonable interim terminus. Table 4-18 compares the projected year 2020 and 2030 daily system boardings, by station, for the full-length representative alternative to the possible interim terminus stations.

TABLE 4-18
Year 2020 and 2030 Daily Station Ridership (Boardings) Forecasts for Interim Terminus Stations

Station	Representative Alternative	2020 Interim Terminus Station								Representative Alternative	2030 Interim Terminus Station							
		Ashwood/ Hospital	Hospital	120th	130th	Overlake Village	Overlake Transit Center	SE Redmond	Redmond Town Center		Ashwood/ Hospital	Hospital	120th	130th	Overlake Village	Overlake Transit Center	SE Redmond	Redmond Town Center
Rainier	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Mercer Island	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	1,500	1,500	1,500
South Bellevue	4,000	3,500	3,500	3,500	3,500	4,000	4,000	4,000	4,000	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
East Main	2,000	1,500	-	1,500	1,500	1,500	2,000	2,000	2,000	2,500	2,000	-	2,000	2,000	2,000	2,500	2,500	2,500
Bellevue Transit Center	4,000	6,000	4,000	5,000	5,000	4,000	4,000	4,000	4,500	5,000	7,000	5,000	7,000	7,000	5,500	5,000	5,000	5,000
Ashwood/ Hospital	500	1,000	-	500	500	500	500	500	500	1,000	1,000	-	500	500	1,000	1,000	1,000	1,000
Hospital	-	-	2,000	-	-	-	-	-		-	-	3,000	-	-	-	-	-	-
120th	500	-	-	1,000	500	-	-	500	500	1,000	-	-	1,500	1,000	-	-	1,000	1,000
130th	1,000	-	-	-	1,000	-	-	1,000	1,000	1,000	-	-	-	1,500	-	-	1,000	1,000
Overlake Village	1,000	-	-	-	-	2,500	1,000	1,000	1,000	1,000	-	-	-	-	3,500	1,500	1,000	1,000
Overlake Transit Center	2,500	-	-	-	-	-	4,500	2,500	2,500	3,500	-	-	-	-	-	6,000	4,000	4,000
SE Redmond	1,500	-	-	-	-	-	-	2,000	-	2,000	-	-	-	-	-	-	2,500	-
Redmond Town Center	-	-	-	-	-	-	-	-	2,000	1,500	-	-	-	-	-	-	-	2,500
Projectwide ridership	40,000	31,000	27,000	30,500	31,500	32,500	37,500	39,000	39,500	49,500	37,500	33,000	37,000	38,500	39,500	46,500	48,000	49,000
Compared with full-length system		(9,000)	(13,000)	(9,500)	(8,500)	(7,500)	(2,500)	(1,000)	(500)		(12,000)	(16,500)	(12,500)	(11,000)	(10,000)	(3,000)	(1,500)	(500)

Notes: Representative Alternative includes a combination of the *Preferred Alternatives A1* and *E2* and Alternatives B3, C4A, D2A - NE 24th Design Option.
Due to rounding, station ridership might not sum exactly to segment totals.
Results show only the interim stations with the project alternative having the highest full-length ridership; Alternative D5 at the Overlake Transit Center does not stop at the 120th and 130th Stations.
Station and projectwide ridership might vary depending on which alternative connects to the terminus station.

An interim terminus at either the Redmond Town Center or SE Redmond stations would slightly reduce the East Link projectwide ridership from the full-length project by up to 1,000 in 2020 and up to 1,500 in 2030. With an interim terminus at the Overlake Transit Center, the East Link projectwide boardings would decrease by 2,500 in the year 2020 and by 3,000 in year 2030. At the station though, the daily boardings would increase by as much as 2,000 and 3,000 in years 2020 and 2030, respectively when compared to the full-length ridership forecasts. With an interim terminus at Overlake Village, East Link's projectwide ridership would decrease by 7,500 and 10,000 in the years 2020 and 2030, respectively. However, there would be an increase in the Overlake Village station's daily boardings. The Overlake Village station's daily boardings would increase by 1,500 in year 2020 and up to 2,500 in year 2030. The increase in ridership at these stations would be mainly due to the changes in bus service and the increase in riders transferring between rail and bus. This expected increase in transit ridership at these two stations is further discussed in Section 6.2.

East Link projectwide ridership with an Ashwood/Hospital, Hospital, 120th, or 130th interim terminus station would decrease from the full-length project by between 8,500 and 13,000 daily boardings in year 2020 and between 11,000 and 16,500 daily boardings in year 2030. At each of these four potential interim terminus stations, the individual station daily boardings would be similar to their station ridership in the full-length project. The substantial decrease in projectwide ridership with these three interim terminus stations would occur because light rail service would not extend into the Overlake and Redmond areas.

4.4 Construction Impacts

During construction of East Link, current bus routes would be affected at some locations along the corridor. Bus reliability could potentially degrade along arterials with ongoing construction for East Link due to lane closures and other construction-related activity. For areas with construction in the roadway right-of-way, arterials may be reduced to one lane in each direction, which would affect roadway operations and bus service along those arterials. Constructing outside the roadway right-of-way would have minimal impacts on bus routes.

4.4.1 Segment A, *Preferred Interstate 90 Alternative (A1)*

East Link construction impacts on Central Link operations in Seattle would be minimal. Impacts would occur with the connection of East Link to the Central Link in the Downtown Seattle Transit Tunnel. Most Downtown Seattle Transit Tunnel construction activities would be scheduled to occur over a limited number of full weekend closures. Minor additional evening closures could be required for other technical work. When possible, the evening closures would be outside of revenue service hours. These impacts would affect Central Link service only, as bus service would have previously shifted from the tunnel to surface streets.

Along I-90, construction would affect the bus routes stopping at Rainier Avenue South and at Mercer Island. Bus service would continue at these locations during the D2 Roadway construction, but buses would use the outer I-90 mainline roadways to access the Rainier Avenue South and Mercer Island stops. During light rail construction on the D2 Roadway, buses would be rerouted to the I-90 mainline and use the HOV lanes completed as part of the I-90 Two-Way Transit and HOV project. These HOV lanes would be completed before East Link construction begins on I-90.

4.4.2 Segment B

At the South Bellevue Park-and-Ride, the entire parking lot would be closed due to construction of the parking garage and the station, but bus service and bus stops would remain on Bellevue Way SE. For *Preferred Alternative B2M*, it is likely that less disruption would affect bus service than Alternatives B1, B2A, B2E, B3, and B3 - 114th Design Option alternatives as one lane of Bellevue Way SE would likely be closed for most of the civil construction period rather than multiple lanes. *Preferred Alternative B2M*, and Alternatives B2A, B2E, and B3 would reconstruct the roadway on 112th Avenue SE. This at-grade construction would require lane closures that would reduce the reliability of buses that travel along these roads during periods when lanes are closed. For Alternative B7, bus service at the Wilburton Park-and-Ride would continue, but all or some parking would be removed.

4.4.3 Segment C

The construction of *Preferred Alternative C11A* and *Preferred Alternative C9T* would either consist of a full closure or a staged partial closure of the Bellevue Transit Center. In either scenario, impacted bus routes and stops would be rerouted along 106th, 108th, and 110th Avenues NE. Bus routes and stops may also be relocated to a nearby off-street location. One potential location is to acquire the properties along the west side of 108th Avenue NE, near NE 6th Street. This site would be able to accommodate some of the existing Bellevue Transit Center routes and stops. For Alternatives C1T, C2T, and C3T, buses would not be able to access the transit center during construction. The Bellevue Transit Center would be closed for over a year for the construction of the new station for these three alternatives. Therefore, bus service and stops associated with these alternatives would be rerouted and relocated along 106th, 108th, and 110th Avenues NE.

The remaining Segment C alternatives would likely be able to retain current bus service within the Bellevue Transit Center during the construction period. The construction of the at-grade track along 108th Avenue NE (*Preferred Alternative C11A*) would affect bus routes along this road. Cut-and-cover construction on Bellevue Way (for Alternative C1T) between SE and NE 6th Street, on 106th Avenue NE (for Alternative C2T) between Main Street and NE 6th Street, and on 110th Avenue NE (for *Preferred Alternative C9T*) would affect bus routes along these roadways. Alternative C4A would reconstruct 108th and 110th Avenues NE, which would affect bus service. Constructing Alternatives C8E and C9A would affect bus routes traveling on 110th Avenue NE. Construction activities surrounding NE 6th Street between 110th Avenue NE and the I-405 direct access ramps (*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C3T, C9A, and C14E) could affect bus routes. All of these potential construction impacts could increase bus travel times.

4.4.4 Segment D

During construction at the Overlake Transit Center station, bus service and stops could be rerouted along 156th Avenue NE and/or other nearby arterials because the parking lot is expected to be closed for construction of the parking garage and station. For Alternative D3, buses traveling on 152nd Avenue NE north of NE 24th Street would be affected by the at-grade station construction in the median, and on NE 20th Street between 136th Avenue NE and 152nd Avenue NE due to median trench construction. These effects could increase bus travel times.

4.4.5 Segment E

Buses traveling along 161st Avenue NE between Cleveland Street (SR 202) and NE 87th Street would be affected by at-grade construction of Alternative E2 - Redmond Transit Center Design Option and would likely need to be rerouted. Under the *Preferred Alternative* E2, which would terminate at the Downtown Redmond Station, and all other Segment E alternatives, potential impacts along 161st Avenue NE would be avoided.

4.5 Potential Mitigation

If the D2 Roadway is not designated for joint-use operations for bus and light rail in the future, then bus routes that use the D2 Roadway would be expected to be rerouted to 4th Avenue South to access Downtown Seattle via SR 519. Transit signal priority could be implemented on 4th Avenue South at the I-90 western terminus at Airport Way South to improve bus reliability for these affected routes. During East Link operations, bus routes on I-90 would not require any mitigation because the I-90 Two-Way Transit and HOV Project would be completed prior to East Link construction. The I-90 Two-Way Transit and HOV Project would provide HOV lanes in both directions on I-90 between Mercer Island and the Rainier Avenue South interchange. Consistent with the WSDOT's HOV Speed and Reliability Standard of a vehicle able to travel at least 45 mph during the peak commuting hour 90 percent of the time, bus reliability would remain similar to that of the No Build Alternative. No other transit mitigation during East Link operations would be required for the East Link Project because the project would have a beneficial impact on transit service. The transit integration plan provides coordinated bus service with the light rail system, and major park-and-ride lots in the study area would be expanded to better accommodate the increase in transit ridership with the project.

During construction, the existing South Bellevue (associated with all Segment B alternatives, except B7) and Overlake Transit Center (associated with all Segment D alternatives) park-and-ride lots would either be partially or fully closed. Measures to mitigate the loss of parking at these locations could include the following:

- Route transit riders that use these locations to available spaces at nearby park-and-ride lots, such as the Eastgate or Overlake Village Park-and-Rides.
- Lease parking lots and/or new parking areas within the vicinity of the closed park-and-ride lots.

During construction, transit service mitigation measures for the South Bellevue, Bellevue Transit Center (associated with *Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, and C3T) and Overlake Transit Center partial or full closure could include the following:

- Relocate transit stops to adjacent streets.
- Provide a temporary transit center at a nearby off-street location.
- Revise transit services. For example, at South Bellevue and Overlake Transit Center, bus routes that stop within the park-and-ride would be rerouted, to the extent possible, to on-street stops (for example along Bellevue Way SE and 156th Avenue NE) to ensure service during construction.

During construction of alternatives within street rights-of-way, buses would be rerouted to nearby arterials, where appropriate, to maintain transit service. For example in Downtown Bellevue, transit could be rerouted to parallel streets. In other areas, such as Bellevue Way SE, buses would continue to operate along this arterial due to lack of alternative routes. Transit service modifications would be coordinated with King County Metro and private transit service providers to minimize construction impacts and disruptions to bus facilities and service. This could include posting informative signage before construction at existing transit stops that would be affected by construction activities. Refer to Section 5.0 for mitigation regarding future I-90 operations and Section 6.0 for mitigation regarding arterial and local street traffic operations.

5.0 Highway Operations and Safety

5.1 Section Overview

This section describes the highway operations within the study area and the potential impacts on highways from the East Link Project. I-90 is the only regional highway that would be directly affected during East Link operations. Direct impacts that would occur during East Link operations to SR 520 and I-405 would be limited to light rail transit overpasses, parallel routes, and construction. (For discussion of regional travel, including VMT, VHT, v/c ratio, and mode share at the six project screenline locations, refer to Section 3.0.) Key analyses in this section are vehicle and person throughput and capacity, travel time, congestion and LOS data, and safety. Analysis was conducted for the AM and PM peak periods in the existing conditions, the East Link Project's opening year (2020), and the horizon year (2030), consistent with the regional and local agency planning period.

Consistent with long-standing regional objectives of connecting the urban communities in the Puget Sound region, the I-90 center roadway has always been intended to be an HCT connection between Bellevue and Seattle to support higher-density employment and residential land uses on both sides of Lake Washington. The East Link Project would provide a reliable and safe transportation mode between the region's dense commercial and residential centers, while connecting major employers, businesses, and people across Lake Washington. During the peak hour, East Link could carry a total of 18,000 to 24,000 people (9,000 to 12,000 per direction), which would more than double the person-carrying capacity of I-90. This is equivalent to about seven to ten freeway lanes of traffic.

Without the project, congestion on I-90 would increase in the future and I-90 would reach its vehicular capacity in the near future (WSDOT, 2004). With congestion expected to worsen in the future, travel times would lengthen and in some cases would double what they are today. More congestion and longer travel times would further disconnect the key employment and population centers of Puget Sound: Seattle and the Eastside. Congestion would also extend for longer periods because the peak period would exceed 3 hours. Without light rail's ability to move more people, the imbalance in vehicle capacity on I-90 would not provide an efficient and reliable transportation system to the growing residential and commercial areas on the Eastside. This is highlighted by travel in the reverse-peak direction on I-90, which is projected to have the longest travel times in the no-build condition.

The analysis presented in this section indicates that East Link would move more people, serve a greater percentage of the forecasted demand, and improve vehicle travel times compared with the no-build conditions, especially in the reverse-peak direction, which would provide a benefit not only to the overall performance and mobility of I-90 but also to the key urban centers—Seattle, Bellevue, Overlake, and Redmond. Overall, by 2030, the number of people crossing the lake during the peak periods would increase with the East Link Project by 30 percent compared with the no-build condition that does not complete the I-90 Two-Way Transit and HOV Operations Project and by about 15 percent compared with the no-build condition with the I-90 Two-Way Transit and HOV Operations Project completed.

Although transit total ridership across the lake (i.e., combined transit use on both SR 520 and I-90) would increase by up to 25 percent with the project, I-90 itself would experience almost three times as many transit riders with the project than in the no-build condition. The result of this would be a more balanced mode share across the lake. Specifically to I-90, the total transit demand would be about 21 percent of the total number of people traveling across the lake, and almost 50 percent of the people would either be in an HOV or riding transit on I-90.

Because light rail would operate in an exclusive, fixed trackway separate from other vehicles traveling along I-90 vehicle accidents that would occur in the center roadway are eliminated. The shift from people driving to riding East Link would reduce the potential for accidents per person traveling along I-90 and improve traveler safety in the corridor.

5.2 Affected Environment

Segment A is the only East Link Project segment that would directly affect a regional highway (I-90) during project operations. Potential direct impacts on SR 520, I-5, and I-405 are not considered substantial (see Section 3.0); therefore, traffic operations on SR 520 (which crosses Screenline 2 [Lake Washington]), I-5, and I-405 were not evaluated further during East Link operation. However, this section does address SR 520 and I-405 when describing travel demand across the lake (Section 5.3.2) and potential construction impacts (Section 5.3.4). No other highways would be affected by this project.

5.2.1 Affected Regional Highway Facilities

Segment A spans approximately 7 miles, originating at the International District/Chinatown Station in Seattle and terminating near the east side of Lake Washington where I-90 reaches South Bellevue. Within the portion of Segment A that crosses Lake Washington, I-90 consists of two "outer" roadways that are the westbound and eastbound mainline lanes, as well as a two-lane reversible center roadway that has peak-directional reversible lanes for use by transit, HOVs and Mercer Island residents driving between Seattle and Mercer Island, per the 1976 Memorandum Agreement. During the morning peak period, the reversible roadway operates in the westbound direction; during the afternoon peak period, the roadway operates in the eastbound direction. A 1.4-mile corridor for buses and HOVs, called the D2 Roadway, connects the reversible center roadway to the DSTT and the intersection of 5th Avenue South and Airport Way South. East Link would traverse across Lake Washington within the I-90 reversible center roadway.

Consistent with long-standing regional objectives of connecting the urban communities in the Puget Sound region, the center roadway has always been intended to be an HCT connection between Bellevue and Seattle to support higher-density employment and residential land uses on both sides of Lake Washington. As documented in Appendix H, the 2004 Amendment to the 1976 I-90 Memorandum Agreement states that "the ultimate configuration for I-90 between Bellevue, Mercer Island, and Seattle should be defined as high-capacity transit in the center roadway and HOV lanes in the outer roadways; and further agree that high-capacity transit for this purpose is defined as a transit system operating in dedicated right-of-way such as light rail, monorail, or a substantially equivalent system" (WSDOT, 2004). In 1996, with voter approval of Sound Move and with the formation of Sound Transit, the *Long-Range Vision* (1996**)** identified the development of HCT across I-90 with future rail. Implementing this objective and the *2004 Amendment to the 1976 I-90 Memorandum Agreement* (City of Seattle et al, 2004). has led to three operational analysis studies:

- *I-90 Two-Way Transit and HOV Operations Final Environmental Impact Statement* (WSDOT, 2004)
- *I-90 Center Roadway Study* (WSDOT, 2006)
- *East Link Project Final Environmental Impact Statement* (Sound Transit, July 2011) and *Interchange Justification Report* (Sound Transit, May 2011). The Interchange Justification Report received a finding of engineering and operational acceptability from FHWA on June 22nd, 2011.

Appendix H describes these three studies, their assumptions, performance measures and, if applicable, approvals.

5.2.2 Highway Operations

Freeway traffic operational performance is described in terms of person and vehicle throughput, travel times by mode of transportation, and LOS (refer to Appendix A for freeway LOS description). Traffic volumes during the AM and PM peak periods were analyzed on freeway lanes and ramps using VISSIM software, which is compatible with the methodologies of the *Highway Capacity Manual* (HCM) (TRB, 2000). Current freeway traffic volumes, geometry, vehicle occupancy, and base and ramp free flow speed (FFS) were obtained from existing traffic data and as-built drawings. These data were used to calibrate the simulation to represent current operating conditions on I-90. Appendix A provides greater detail on the assumptions and VISSIM results associated with the freeway analysis.

The three key operating measures used to evaluate operating conditions on I-90 are vehicle and person throughput, travel time, and LOS (with congestion maps). Vehicle and person throughput is an indicator of the number of vehicles and people in vehicles that cross a screenline. Compared with vehicle throughput, person throughput is a more appropriate assessment measure for analysis of a transit project because it illustrates the overall efficiency of the system through number of people moved instead of vehicles. Throughput information is presented at Screenlines 2 (Lake Washington) to explain changes in travel patterns across the lake, while the Mercer Slough screenline (Screenline 3) is intended to be used to understand I-90 conditions east of the study area. Travel times provide information on how long it would take to travel through the corridor or certain paths within the corridor. LOS descriptions (with congestion maps as a visual aid) indicate when, how long, and how severely congestion occurs. LOS is useful to understand where poorly operating (i.e., LOS E and F) sections are located. Although LOS is based on vehicle density and the congestion maps are based on speed, the two measurements are generally related to one another.

The safety conditions on I-90 also were assessed to evaluate how the project influences the potential for accidents on I-90. For analysis of intersection operations at or near I-90 ramp terminals, refer to Section 6, Arterials and Local Streets.

5.2.2.1 Vehicle and Person Throughput

In the existing conditions, 56 to 57 percent of the total number of vehicles on I-90 travel in the peak direction (westbound in the AM peak period and eastbound in the PM peak period). In the AM peak hour, slightly fewer than 13,000 vehicles travel on I-90, while in the PM peak hour, about 13,500 vehicles travel on I-90. In both AM and PM peak hours, the center roadway accommodates less than 15 percent of the total vehicles on I-90, due to its limited access. Access is provided by slip ramps from the outer mainline roadways at either Rainier Avenue South interchange or at the East Channel Bridge and the signalized intersection of 5th Avenue South and South Dearborn Street, none of which provides enough capacity to use the reversible center roadway effectively (WSDOT, 2004). Table 5-1 provides the I-90 vehicle and person throughput data for Screenlines 2 and 3 in the AM and PM peak hours.

TABLE 5-1
Existing (2007) I-90 AM and PM Peak-Hour Vehicles and Persons

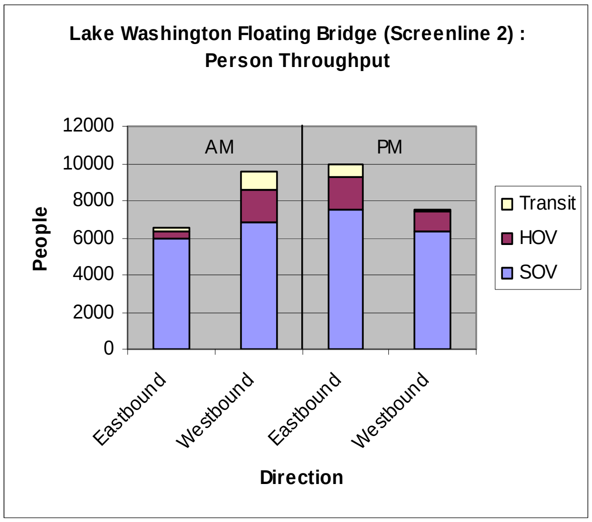
	AM Peak Hour				PM Peak Hour			
Direction	Vehicles	Persons	Vehicle Percentage of Total	Person Percentage of Total	Vehicles	Persons	Vehicle Percentage of Total	Person Percentage of Total
Screenline 2 (Lake Washington: I-90 only)								
Westbound outer roadway	5,450	6,250	43	39	6,000	7,500	44	43
Reversible center roadway	1,750	3,350	14	21	1,850	3,450	14	20
Eastbound outer roadway	5,500	6,500	43	40	5,650	6,500	42	37
Screenline 2 total (for I-90)	12,700	16,100	100	100	13,500	17,450	100	100
Screenline 3 (I-90 at Mercer Slough)								
Westbound outer roadway	7,200	9,550	58	61	6,000	6,500	45	45
Eastbound outer roadway	5,300	6,000	42	39	7,250	7,950	55	55
Screenline 3 total	12,500	15,550	100	100	13,250	14,450	100	100

Source: Sound Transit (2010c).

In terms of person throughput, in the AM peak hour on the I-90 floating bridge (Screenline 2), the westbound outer roadway throughput approaches 6,300 persons and the reversible center roadway (westbound direction in the AM peak period) person throughput is approximately 3,300 persons (of which about 25 percent are in buses). The eastbound outer roadway throughput is about 6,500 persons. Overall, about 16,100 people travel I-90 in both directions during the AM peak hour.

In the PM peak hour on the I-90 floating bridge, the westbound outer roadway throughput is about 7,500 persons. The eastbound outer roadway throughput approaches 6,500 persons, and the reversible center roadway (eastbound direction in the PM peak period) throughput is about 3,500 persons (of which about 20 percent are in buses). Overall, about 17,500 people travel I-90 in both directions during PM peak hour.

Similar person throughput trends occur at Screenline 3, except in the eastbound direction during the PM peak hour. Transit usage decreases at Screenline 3 compared with Screenline 2 because some passengers disembark at Mercer Island and some buses exit I-90 at Bellevue Way, and therefore, they do not cross Screenline 3. The mode share at two screenline locations indicate that the proportion of HOV and transit users compared with SOVs is generally between 25 and 35 percent in the peak direction and less than 20 percent in the off-peak direction. Exhibit 5-1 provides the existing AM and PM peak-hour person throughput by direction and travel mode at Screenlines 2 and 3. The person and vehicle throughput in the reversible center roadway is included in the direction in which it operates, depending on the time period.



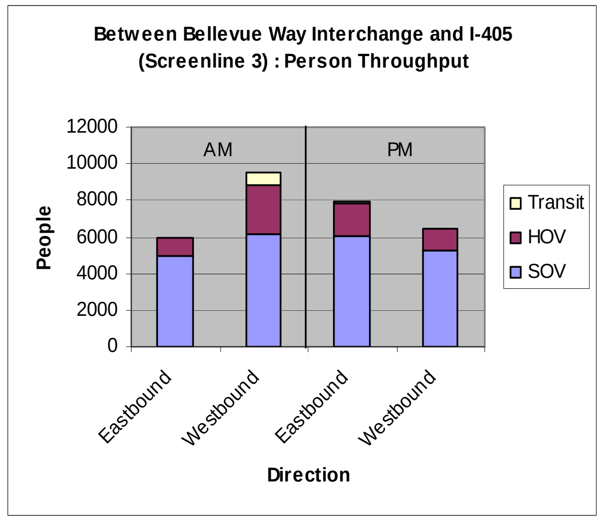


EXHIBIT 5-1
I-90 Existing AM and PM Peak-Hour Person Throughput at Screenlines 2 and 3

5.2.2.2 Travel Time

Existing travel time paths between Seattle and Mercer Island, Bellevue Way, and I-405 were established to understand regional and shorter-distance trips. Specifically, the I-90 travel times were computed to and from three locations in the study area:

- Island Crest Way to and from I-5 in Downtown Seattle
- Bellevue Way SE to and from I-5 in Downtown Seattle
- East of I-405 to and from I-5 in Downtown Seattle

Travel times were computed assuming that buses destined to or originating from Seattle do not use I-5, but rather the I-90 D2 Roadway, which is exclusive to transit and HOV vehicles. Depending on the travel direction in the reversible center roadway (westbound in the morning period and eastbound in the afternoon period), vehicles might connect between the D2 Roadway and the reversible center roadway or merge/diverge with the westbound and eastbound mainline roadways. Table 5-2 lists the existing AM and PM travel times for SOV, HOV, and transit modes along the three beginning and ending points listed above.

As shown in the table, AM peak-period travel times for SOVs traveling westbound to Seattle from I-405 and from Island Crest Way were calculated at 12.4 and 7.2 minutes, respectively. Travel times for buses traveling westbound from I-405 and from 77th Avenue SE to Seattle were 13.2 and 6.4 minutes, respectively. Travel times for SOVs traveling eastbound from Seattle to I-405 and to Island Crest Way were 14.5 and 7.7 minutes, respectively. Travel times for buses (that stop on Mercer Island) traveling eastbound from Seattle to I-405 and to Island Crest Way were 25.4 and 9.7 minutes, respectively. PM peak-period travel times for SOVs traveling westbound to Seattle from I-405 and from Island Crest Way were 18.5 and 9.1 minutes, respectively.

TABLE 5-2
I-90 Existing AM and PM Peak-Period Travel Times by Mode

Travel Time Path Endpoints		Travel Time (minutes)					
		AM			PM		
End Point	End Point	SOV	HOV	Transit[a]	SOV	HOV	Transit[a]
Westbound Outer Roadway							
Mercer Island (Island Crest Way)	I-5 to Downtown Seattle[b]	7.2	7.2[c]	-/-	9.1	9.1	10.7/7.7
Bellevue Way[d]	I-5 to Downtown Seattle[b]	10.0	10.0[c]	-/-	16.7	16.8	18.7/-
I-405	I-5 to Downtown Seattle[b]	12.4	12.4[c]	-/-	18.5	17.5	20.8/17.7
Reversible Center Roadway[e]							
Mercer Island (77th Avenue SE)	I-5 to Downtown Seattle[f]	6.8	N/A	-/-	8.0	N/A	-/-
Mercer Island (77th Avenue SE)	Seattle (5th Avenue South[g])	N/A	5.0	6.4/6.3	N/A	5.3	6.3/6.0
Bellevue Way	Seattle (5th Avenue South[g])	N/A	7.5	11.3/-	N/A	8.0	11.3/-
I-405	Seattle (5th Avenue South[g])	N/A	9.8	13.2/11.2	N/A	9.9	13.3/10.8
Eastbound Outer Roadway							
I-5 from Downtown Seattle[h]	Mercer Island (Island Crest Way)	7.7	7.5	9.7/8.9	11.9	11.9[c]	-/-
I-5 from Downtown Seattle[h]	Bellevue Way[d]	12.1	11.7	20.0/-	15.0	15.0[c]	-/-
I-5 from Downtown Seattle[h]	I-405	14.5	14.2	25.4/16.9	16.9	16.9[c]	-/-

[a] The two values in the transit column indicate transit routes with stops on Mercer Island/transit routes with no stops on Mercer Island.
[b] All vehicles end at I-5 northbound ramp, except transit vehicles, which use the I-90 D2 Roadway.
[c] Travel time for HOV is the same as for SOVs for comparable route.
[d] Buses and HOV use the reversible center roadway Bellevue Way ramp.
[e] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak.
[f] SOV vehicles are required to exit/enter reversible center roadway at Rainier Avenue S interchange.
[g] Travel time is to and from 5th Avenue S via the I-90 D2 Roadway.
[h] All vehicles start at I-5 southbound ramps to I-90.

HOV high-occupancy vehicle
N/A Travel time for this path was not prepared because either there is no transit route on this path or the route's travel time by this mode is not applicable.
\- Buses do not travel on this roadway during this period and/or do not travel between these points.
SOV single-occupant vehicle

Travel times for buses traveling westbound from I-405 and Island Crest Way to Seattle were 20.8 and 10.7 minutes, respectively. Travel times for SOVs traveling eastbound from Seattle to I-405 and to Island Crest Way were 16.9 and 11.9 minutes, respectively. Travel times for buses (that stop on Mercer Island) traveling eastbound from Seattle to I-405 and to 77th Avenue SE were 13.3 and 6.3 minutes, respectively.

5.2.2.3 Level of Service

The LOS on I-90 varies throughout the study area. Substantial congestion and/or bottlenecks occur when vehicles travel at stop-and-go conditions (LOS F), and vehicle queues are observed throughout most of the peak periods, especially in the PM peak period. The congestion maps in Exhibit 5-2 illustrate the I-90 mainline LOS. These congestion maps indicate vehicle travel speeds over time (vertical axis) and distance (horizontal axis). The time indicated on these maps is a 2.5-hour duration in both the AM (6:30 to 9:00 a.m.) and PM (3:30 to 6:00 p.m.) peak periods. The distance covers I-90 from the western terminus at SR 519 to east of the I-405 interchange. Although LOS is based on vehicle density and the congestion maps are based on speed, the two measurements are generally related to one another. In Exhibit 5-2, LOS E or F conditions (speeds at or below 55 mph) are indicated where areas of yellow, red, or black occur. LOS D (vehicle speeds over 55 mph) or better are portrayed where areas of green occur.

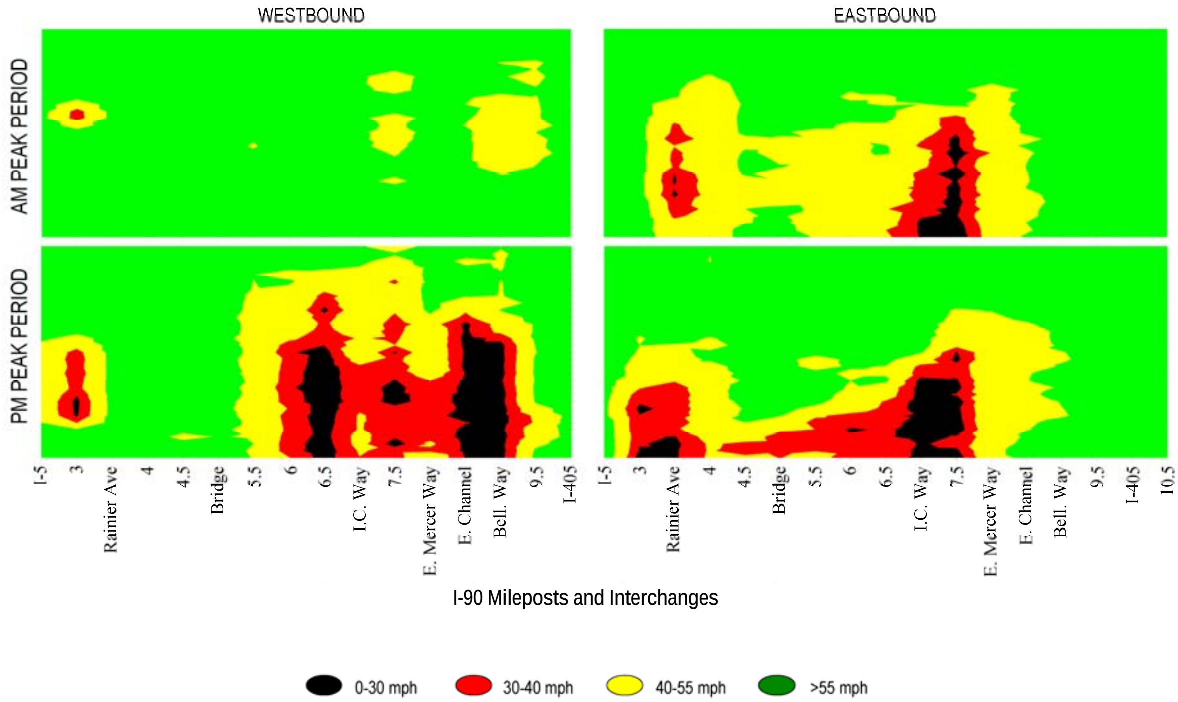


EXHIBIT 5-2
I-90 Existing Year AM and PM Peak-Period Vehicle Speeds in General-Purpose Lanes

AM Peak Period

For travel in the westbound direction from east of I-405 during the AM peak period, all I-90 sections operate at LOS E or better until the area between the Rainier Avenue South southbound off-ramp and the I-5 interchange, which operates at LOS F.

For travel in the eastbound direction, I-90 west of I-5, during the AM peak period, I-90 operates better than LOS E until the Rainier Avenue South interchange. East of the Rainier Avenue South interchange to the East Mercer interchange, I-90 operates at LOS E or worse. Within this section, LOS F conditions occur near the Rainier Avenue South interchange through the Mount Baker Tunnel and across Mercer Island. All other sections to the east of the East Mercer off-ramp operate at LOS D or better.

In the AM peak period, the reversible center roadway operates in the westbound direction and all sections operate at LOS B or better, with the worst operating conditions at the western terminus of the reversible roadway near the Rainier Avenue South interchange where vehicles in the center roadway merge with the traffic onto the I-90 mainline.

PM Peak Period

For travel in the westbound direction, I-90 operates at LOS D or better west of the I-405 on-ramp. I-90 west of the I-405 on-ramp until the First Hill Tunnel on Mercer Island operates at LOS E or worse. Across the I-90 floating bridge and into Seattle, I-90 operates at LOS D or better, except between Rainier Avenue South and the I-5 interchanges, where I-90 operates at LOS F due to vehicles merging with I-5.

For travel in the eastbound direction, I-90 west of I-5 operates at LOS D or better. East of the I-5 interchange, I-90 operates at LOS F until the section between the East Mercer Way interchange. Across the East Channel Bridge, I-90 operates at LOS E. At the Bellevue Way interchange, I-90 conditions degrade and operate at LOS F. East of the Bellevue Way off-ramp, I-90 operates at LOS D or better.

In the PM peak period, the reversible center roadway operates in the eastbound direction and all sections operate at LOS B or better, with the worst operating conditions at the western origin of the reversible center roadway near the Rainier Avenue South interchange where vehicles from the D2 Roadway and from the I-90 mainline merge together into the center roadway.

5.2.2.4 Freeway Safety

Existing accident data along the study corridor were collected from WSDOT for the 5-year period from 2004 to 2008 (WSDOT, 2009a). The accident study corridors included the westbound, eastbound, and reversible center roadways. The extent of the analysis was between the I-90 western terminus with SR 519 to just east of I-405, which is slightly more than 8 miles.

In the westbound direction, the overall I-90 corridor accident rate for I-90 is 1.04 accidents/million vehicle miles (acc./MVM). In the eastbound direction, the rate is 0.80 acc./MVM. The reversible center roadway accident rate is 0.61 acc./MVM. These accident rates are well below the average accident rate for urban interstate facilities (1.44 acc./MVM) in the Northwest Region of WSDOT.

Accident rates are also calculated by freeway sections. Two I-90 sections in the westbound direction, one I-90 section in the eastbound direction, and three I-90 sections in the reversible center roadway have accidents rates higher than the average accident rate for urban interstate facilities in the Northwest Region of WSDOT. These sections and their accident rates are discussed in the following paragraphs.

I-90 Westbound

The I-90 westbound section near the western terminus of the westbound mainline from the I-5 northbound off-ramp to SR 519 (0.85-mile length) has an accident rate of 1.70 acc./MVM. The second westbound mainline section is near the eastern end of the study area between the off-ramp to I-405 and the on-ramp from I-405 (1.08-mile length), and it has an accident rate of 2.56 acc./MVM.

I-90 Eastbound

The I-90 eastbound section from Atlantic Street to the I-5 northbound and southbound on-ramp (0.64-mile length) has an accident rate of 1.62 acc./MVM.

I-90 Reversible Center Roadway

The first freeway section of the I-90 reversible center roadway that has an accident rate above the average for urban interstate facilities in the Northwest Region of WSDOT is from the western terminus to immediately west of the Rainier Avenue South transit flyer stop (1.10 miles), with the highest accident rate in the reversible center roadway, at 3.11 acc./MVM. The second section is from immediately west of the Rainier Avenue South transit flyer stop to the eastern edge of the Mount Baker Tunnel (0.78 mile). This section of road has an accident rate of 2.59 acc./MVM. The last section is located between the I-90 on/off-ramp at East Mercer Way and the beginning and ending point of the reversible center roadway at Bellevue Way SE (1.03 miles). This section has an accident rate of 1.93 acc./MVM.

Comparing injury accident rates among each of the three roadway sections, the I-90 westbound roadway injury accident rate is 0.33 injury acc./MVM, the injury accident rate for the I-90 eastbound roadway is 0.26 injury acc./MVM, and the reversible center roadway injury accident rate is 0.28 injury acc./MVM. All roadways are below the urban interstate average for injury accident rate in the WSDOT Northwest Region, which is 0.46 injury acc./MVM. Three sections in the westbound roadway, three in the eastbound roadway, and one in the reversible center roadway exceed the statewide average for injury accident rate. All of the I-90 westbound and eastbound roadway sections mentioned previously regarding the total accident rate have an injury accident rate higher than the average injury rate. The one westbound roadway section that does have an injury accident rate higher than the statewide average is the section from the I-5 northbound off-ramp to the Rainier Avenue South northbound off-ramp.

The accident analysis also identified collision analysis locations (CAL) and collision analysis corridors (CAC), as defined by WSDOT. A CAL is defined as a spot location, determined to have a clustering of severe accidents during the previous 5 years. A CAC is defined as a 5-mile-long corridor with a 5-year history of at least 11 fatal or serious collisions. No CACs were identified in the study area, and the only CAL was from milepost (MP) 8.90 to MP 9.26, which is essentially I-90 between the Bellevue Way and I-405 ramps, near the eastern edge of the project study area.

5.3 Environmental Impacts

This section describes the differences in I-90 operations between the no-build and build conditions for years 2020 and 2030. Consistent with the *SR 520 Bridge Replacement and HOV Project: I-5 to Medina Supplemental Draft EIS*

(WSDOT and FHWA, 2010**)**, SR 520 improvements and tolling strategies are assumed to be in place by year 2020. Therefore, the East Link Project assumed these improvements in both future year conditions.

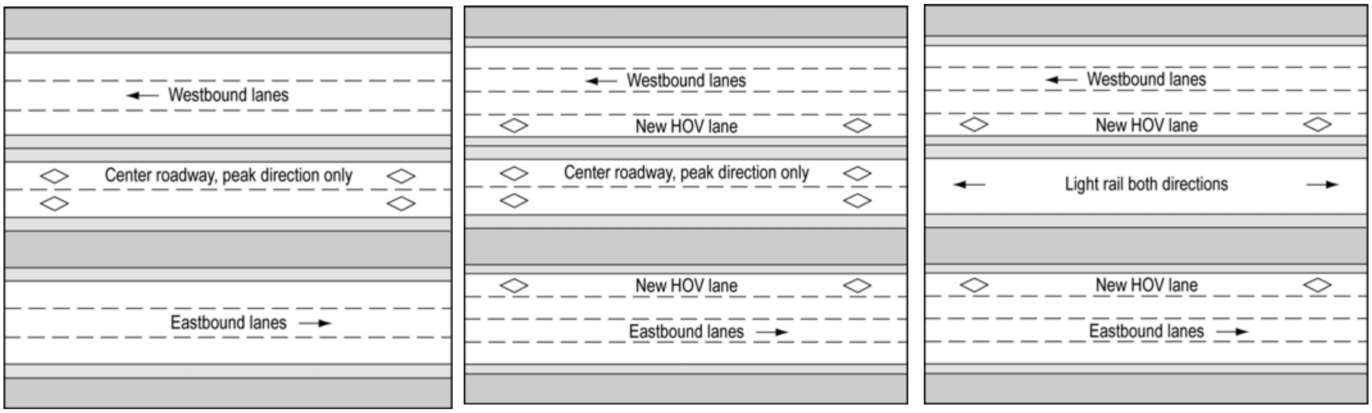
Although the entire I-90 Two-Way Transit and HOV Operations Project is expected to be completed before East Link construction begins, allowing HOV traffic to be moved from the center roadway to the outer roadways, the East Link Project was compared with two different No Build Alternatives along I-90. Stage 1 of the I-90 Two-Way Transit and HOV Operations Project was recently completed, and Stage 2 is being constructed but Stage 3 might not be completed until just before East Link construction on I-90 begins. If the entire I-90 Two-Way Transit and HOV Operations Project is completed well before East Link construction begins, then the reversible center HOV lanes would be available for bus transit, HOVs, and Mercer Island drivers in conjunction with the new HOV lanes. Because the HOV lanes in the outer roadway might not be completed until just before East Link construction, the following two No Build Alternatives were analyzed:

1. **One with the Stage 3 HOV lanes completed immediately before East Link construction begins on I-90, so HOV and transit can shift from the center roadway to the outer roadway HOV lanes:** In this No Build Alternative, the new HOV lanes in the outer roadway would never operate in conjunction with the center roadway. This no-build condition would continue to provide a total of eight lanes across the I-90 floating bridge (three GP lanes in the westbound direction and three in eastbound direction, and two HOV lanes in the reversible center roadway). This condition is referred to as the No Build Alternative with Stages 1 and 2 only. The floating bridge section of I-90 would remain unchanged from existing conditions.
2. **One with the Stage 3 HOV lanes completed and the center roadway available for transit, HOV, and Mercer Island drivers:** In this No Build Alternative, both the center roadway and outer HOV lanes are open the entire distance between Seattle and Bellevue. This is referred to as the No Build Alternative with Stages 1 through 3. This condition would provide a total of ten lanes across the I-90 floating bridge (three GP, one HOV lane in each direction, and two HOV lanes in the reversible center roadway).

Both of these no-build conditions were evaluated for years 2020 and 2030. In all conditions (build and no-build), an HOV vehicle on I-90 is defined as a vehicles with two or more people. Exhibit 5-3 provides a schematic of the three stages of the I-90 Two-Way Transit and HOV Operations Project.

EXHIBIT 5-3
I-90 Two-Way Transit and HOV Operations Project Stages

The build condition would provide light rail along I-90 in the reversible center roadway and close all vehicle access to the center roadway. Therefore, the new HOV lanes in the outer roadway would continue to provide a total of eight traffic lanes along I-90 (three GP lanes and one HOV lane in both the westbound and eastbound directions). Exhibit 5-4 provides the I-90 lane configurations between Seattle and Mercer Island for the No Build Alternative and with the East Link Project. These access changes are further discussed in Section 5.3.1.



I-90 Existing Conditions *I-90 Two-Way Transit and HOV Project* *I-90 with Alternative A-1*

EXHIBIT 5-4
I-90 Configuration Before and After East Link

5.3.1 Access and Circulation Impacts

The I-90 Two-Way Transit and HOV Operations Project will modify access and circulation along the I-90 corridor in the no-build condition. With the East Link Project, access and circulation modifications would affect the D2 Roadway, center reversible roadway, eastbound HOV access near Mercer Island, and potentially the HOV ramps connecting to Bellevue Way SE. Exhibit 5-5 and Table 5-3 describe in detail the access modifications of the SR 519 Intermodal Access Project, the I-90 Two-Way Transit and HOV Operations Project, and the East Link Project.

With the East Link Project, *Preferred Alternative A1* includes joint operations of buses and light rail for the D2 Roadway that connects the south area of downtown Seattle with the I-90 center roadway. An operational option is also evaluated that has exclusive light rail operations in the D2 Roadway. HOVs would not be allowed to use this roadway for either option with the East Link Project. For the operational option that has exclusive light rail in the D2 Roadway, buses would be rerouted to other roadways to access I-90 from the south area of downtown Seattle (such as 4th Avenue South via SR 519).

Preferred Alternative A1 also provides an eastbound HOV off-ramp at Island Crest Way. In lieu of providing this HOV off-ramp at Island Crest Way, a design option to construct the eastbound HOV off-ramp at 77th Avenue SE was considered. A second design option that would construct neither of these eastbound HOV off-ramp options was also evaluated. With this design option, all HOV and buses would utilize the eastbound GP off-ramps at 77th Avenue SE and Island Crest Way to access Mercer Island. With either the preferred alternative or the design options, the existing eastbound GP off-ramps at Island Crest Way and 77th Avenue SE would remain.

During East Link construction and operations, access to and from the I-90 reversible center roadway would be removed along with its ramps connecting to Mercer Island (77th Avenue SE and Island Crest Way). With the access modifications from the I-90 Two-Way Transit and HOV Operations Project and the changes in access with the East Link Project, the traffic analysis assumed Mercer Island single-occupant vehicles would be able to use the HOV lanes in both directions of I-90 between Seattle and Island Crest Way to demonstrate that it does not affect the results of the East Link analysis and represents a worst-case condition. This assumption does not represent allowing SOVs to use the outer roadway HOV lanes or the eastbound left-side off-ramp to Island Crest Way. Any changes to the HOV lane eligibility, such as tolling, managed lanes, or Mercer Island single-occupant vehicle use, would be addressed in a future analysis, approval, and agreement.

In Segment B, *Preferred Alternative B2M* would preserve both the westbound HOV on-ramp and eastbound HOV off-ramp at the I-90 and Bellevue Way SE interchange by exiting light rail on a new elevated structure over the westbound I-90 mainline. With *Preferred Alternative B2M* and Alternatives B2A, B2E, B3, B3 – 114th Design Option, and B7, a design option is considered that would preserve only the westbound HOV on-ramp. Specific to Alternative B1, another design option is considered that would close both eastbound and westbound HOV ramps as light rail would use the space currently used by both ramps beneath the westbound mainline roadway.

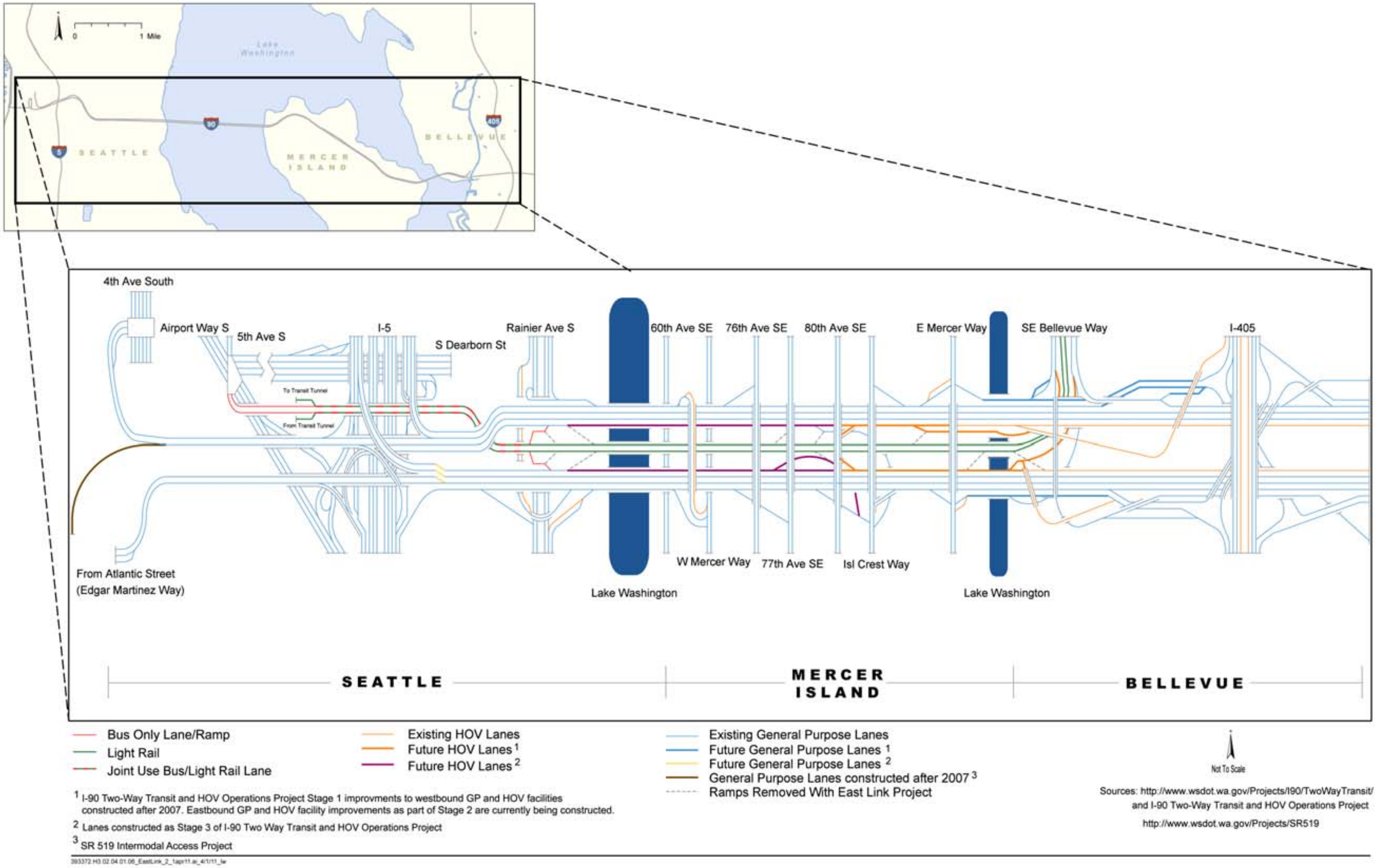


EXHIBIT 5-5
I-90 Future Channelization and Ramps with the Preferred Alternative East Link Project

TABLE 5-3
I-90 Future Channelization and Access Modifications

Modification/Ramp	No Build		Build
	No Build[a]	No Build[b]	
SR 519 Intermodal Access Project			
• Revise westbound access to Seattle via new ramp connection with South Atlantic Street, and maintain existing ramp to 4th Avenue South.	X	X	
I-90 Two-Way Transit and HOV Operations Project			
• Construct I-90 westbound and eastbound HOV lane to outer roadway from East Mercer Way to 80th Avenue SE.	X	X	
• Construct an 80th Avenue SE westbound HOV direct-access off-ramp.	X	X	
• Modify Bellevue Way interchange for two-way continuous HOV operations to and from the west.	X	X	
• Modify the eastbound on-ramp at 80th Avenue SE to connect from the reversible center roadway to the new eastbound HOV lane in the outer roadway.	X	X	
• Add an eastbound I-90 GP lane between East Mercer Way and I-405 interchanges.	X	X	
• Restripe the I-405 westbound on-ramp to provide an additional I-90 lane to the Bellevue Way westbound on-ramp; this modification extends the auxiliary lane across the East Channel Bridge to the I-405 westbound on-ramp.	X	X	
• Convert the HOV bypass lane on the Bellevue Way westbound on-ramp to a GP lane.	X	X	
• Add a westbound and eastbound HOV lane to the outer roadways between 80th Avenue SE and Rainier Avenue South.		X	
• Construct an eastbound HOV direct-access off-ramp at 77th Avenue SE.		X	
East Link Project			
• Restrict HOVs from using the I-90 D2 Roadway between Seattle and the Rainier Avenue South interchange.			X
• Close vehicle access to and from the reversible center roadway at Rainier Avenue South and East Mercer Way.			X
• Close the Island Crest Way access to and from the reversible center roadway.			X
• Close the 77th Avenue SE westbound on-ramp and eastbound off-ramp access to the reversible center roadway.			X
• Either continue to provide the eastbound HOV direct-access off-ramp at 77th Avenue SE, relocate this HOV direct access to Island Crest Way, or provide neither eastbound HOV direct access ramp.			X
• Option to close or keep open the eastbound direct-access HOV off-ramp to Bellevue Way.[c]			X
• Close the eastbound direct-access HOV off-ramp and westbound direct-access HOV on-ramp to and from Bellevue Way.[d]			X

[a] With SR 519 Project and Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With SR 519 Project and Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
[c] Applies to Alternatives B2A, B2E, B3, B3 – 114th Design Option, B7 and *Preferred Alternative B2M*.
[d] Applies to Alternative B1 only.

However, WSDOT’s preference is to maintain both the westbound HOV on-ramp and the eastbound HOV off-ramp at this interchange. To do so would require modifying the design for all nonpreferred alternatives that use Bellevue Way SE. Section 5.3.3 analyzes these access modifications. Unless specifically mentioned in this section (Section 5.3), the analysis and results presented for the build condition reflect *Preferred Alternatives A1* and *B2M*, which maintains both the westbound and eastbound Bellevue Way SE HOV direct-access ramps, provides an eastbound HOV direct-access off-ramp to Island Crest Way, and would maintain current bus routes between Seattle and I-90. Section 5.3.3 presents the analyses of the design options to close the Bellevue Way SE westbound and eastbound HOV direct-access ramps, the design options for eastbound Mercer Island off-ramp, and the operational option of exclusive light rail use in the D2 Roadway.

5.3.2 Travel Demand Forecasts

Vehicle and transit demand forecasts were prepared using the PSRC and Sound Transit travel demand models, as described in Section 3.3.1. Although it is likely that roadway capacity on I-90 would be reached before year 2030, in the auto demand would continue to increase up through year 2030. A slightly lower traffic growth rate was predicted on I-90 in the AM peak period than in the PM peak period. In the AM peak period, a traffic growth rate of approximately 1.4 percent per year was projected, and in the PM peak period, a traffic growth rate of approximately 1.8 percent per year was projected. By direction, the higher growth is forecasted in the non-peak direction (eastbound in the morning and westbound in the afternoon). By year 2030, the peak period demand in each direction would become more balanced than today as the population and employment density on the Eastside increases. The overall traffic growth rates are similar in both of the two future no-build conditions. Table 5-4 provides the existing, 2020 and 2030 3-hour vehicle demand forecasts for Screenline 2, I-90 at Lake Washington.

TABLE 5-4
Peak-Period Vehicle Demand Forecasts for I-90

Direction	Vehicles						
		2020			2030		
	Existing	No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	35,100	43,800	43,900	42,500	46,500	46,600	45,800
Eastbound	28,600	39,000	38,800	35,400	41,300	41,100	38,300
PM Peak Period							
Westbound	33,900	49,500	50,200	49,100	55,000	55,600	53,900
Eastbound	40,900	53,900	54,300	53,000	57,500	58,400	55,400

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

Source: PSRC (2010b).

With the project, slightly less traffic growth was predicted compared with the no-build conditions as the model predicts people would shift from driving to riding light rail. This is because East Link would provide a more reliable mode of travel with substantial travel-time savings compared with a vehicle travelling in a congested roadway system especially between the urban centers of the Seattle and Bellevue. Section 6.3 discusses the East Link Project overall demand forecasting process.

As part of the travel demand forecasts, the demand mode shares for SOV, HOV, and transit were calculated for the no-build and build conditions. Although this information is also presented in Section 3.3, more detailed information for I-90 is provided in this section. With more congestion expected in the future, the forecasts suggest a slight shift towards people using HOV and transit in the no-build condition and from the no-build to build conditions the forecasts suggest an even more substantial shift to transit.

Analysis of Screenline 2 (Lake Washington), which includes both I-90 and SR 520 forecasts, indicates a noticeable shift to transit with the East Link Project. Compared with the no-build condition, the AM peak period transit mode share percentage with the project is predicted to increase by 5 percentage points in the westbound direction and 3 percentage points in the eastbound direction, which would be a 26 and 23 percent increase, respectively. In the PM peak period, transit mode share percentage with the project is predicted to increase by 3 percentage points in the westbound direction and 4 percentage points in the eastbound direction, which would be 33 and 25 percent increases, respectively, from the no-build condition. Table 5-5 shows the mode share at Screenline 2 with both SR 520 and I-90.

TABLE 5-5
Screenline 2 (Lake Washington) Mode Share Percentages with I-90 and SR 520

Direction	Mode Share Percentages[1]						
	Existing	2020			2030		
		No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	65/20/15	59/23/18	59/24/17	56/22/22	58/23/19	57/24/19	55/21/24
Eastbound	76/18/6	74/15/11	74/16/10	72/14/14	70/17/13	69/18/13	68/16/16
PM Peak Period							
Westbound	62/33/5	58/35/7	58/35/7	58/33/9	47/42/11	54/37/9	53/35/12
Eastbound	57/30/13	55/30/15	53/32/15	52/30/18	52/32/16	50/34/16	49/31/20

[1] Mode share percentages are for SOV/ HOV/transit

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

Source: PSRC (2010b); Sound Transit (2010a).

Although Screenline 2 includes both I-90 and SR 520, analyzing only I-90 at Screenline 2 indicates a more substantial mode shift to transit in the build condition. The pie charts in Exhibit 5-6 provide a mode share comparison between the no-build and build conditions on I-90 in year 2030. By 2030, the transit share would close to triple from no-build conditions as people adjust their mode choice and choose to ride light rail because of faster travel times compared with bus or auto modes. The overall transit mode share (combined eastbound and westbound) in 2030 on I-90 would increase from about a 10 percent and 7 percent share (AM and PM peak, respectively) in the no-build condition to more than 20 percent in both the AM and PM peak build conditions. In conjunction with the transit mode share increase, the SOV and HOV mode share would decrease as people choose to ride light rail.

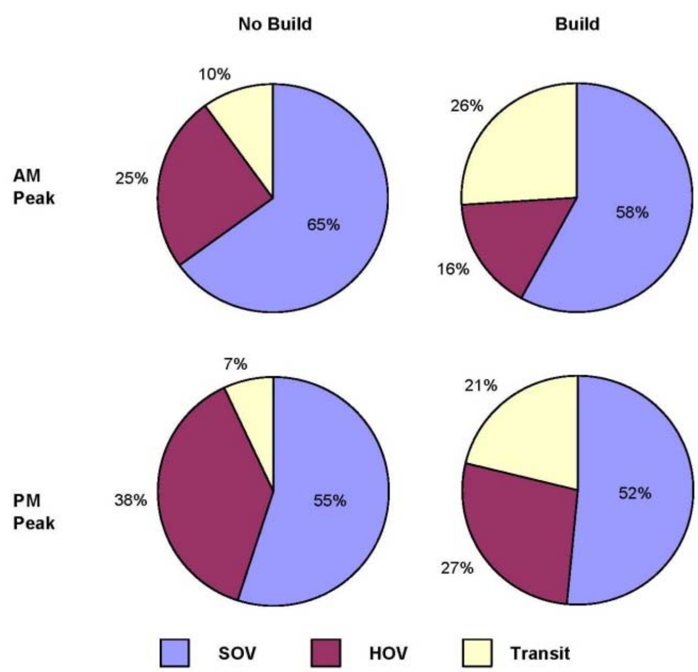


EXHIBIT 5-6
Screenline 2 (I-90 only) 2030 Mode Share

Source: PSRC (2010b); Sound Transit (2010a)

At Screenline 3 (I-90 at Mercer Slough) (Table 5-6), the shifts between the transit, HOV and SOV mode shares would be less pronounced with the project as light rail would not cross the screenline. Only slight changes to mode share are forecast at Screenline 3 in 2020 and 2030 with East Link. For a further discussion of the mode share at all six screenlines in the study area, refer to Section 3.0, Regional Travel.

TABLE 5-6
Screenline 3 (I-90 at Mercer Slough) Mode Share Percentages

Direction	Mode Share Percentages[1]						
		2020			2030		
	Existing	No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	70/24/6	61/32/7	60/33/7	71/23/6	59/33/8	59/33/8	68/25/7
Eastbound	76/21/3	81/14/5	75/20/5	77/17/6	78/16/6	72/23/5	77/17/6
PM Peak Period							
Westbound	59/39/2	58/39/3	54/43/3	59/37/4	50/47/3	48/48/3	55/41/4
Eastbound	58/38/4	51/43/6	50/44/6	65/30/5	47/48/5	46/48/6	63/32/5

[1] Mode share percentages are for single occupant vehicles (SOV)/high occupancy vehicles (HOV)/and transit
[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

Source: PSRC (2010b); Sound Transit (2010a).

5.3.3 Highway Operational and Safety Impacts

Based on the forecasts described in Section 5.3.2, freeway operations during the AM and PM peak periods were analyzed using the VISSIM simulation software package for years 2020 and 2030. Appendix A provides information on the assumptions for the future conditions analysis. The following measures were used to assess potential project impacts on I-90:

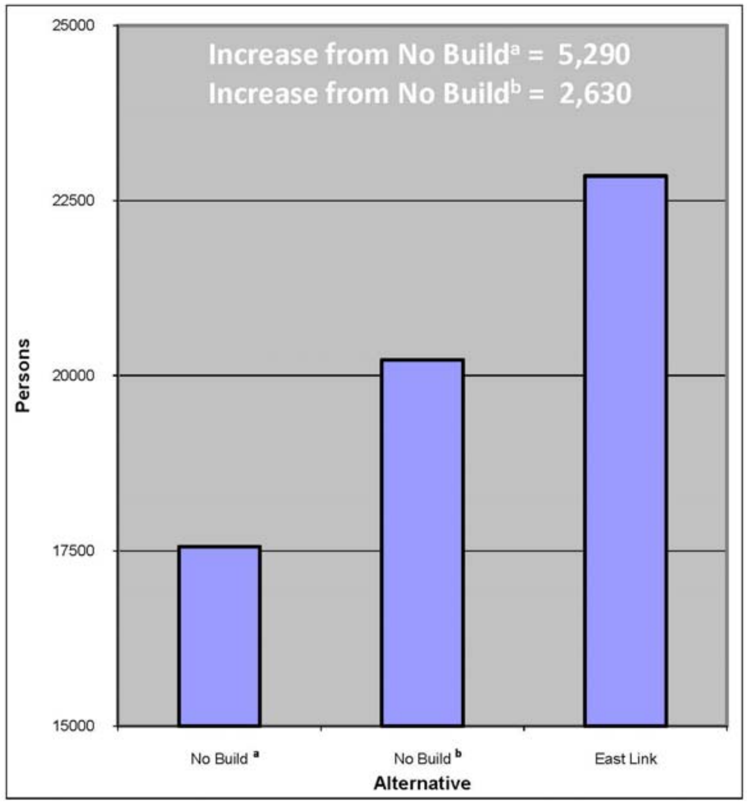
- Vehicle and person throughput and capacity
- Vehicle and person demand served
- Travel time
- LOS, including congestion diagrams
- Safety

This section presents vehicle and person throughput results at Screenlines 2 and 3. Travel times are provided along the full length of the corridor (between Seattle and I-405) and at specific intermediate locations along the corridor. Congestion diagrams are presented as a visual tool to help identify the I-90 LOS, including when, how long, and how severely congestion occurs. A safety comparison between the no-build and build conditions is provided to show how the project might affect the number of accidents on I-90.

5.3.3.1 Vehicle and Person Throughput and Capacity

Vehicle and person throughput on I-90 were tabulated at the two screenlines that intersect I-90, Screenlines 2 and 3. Throughput is summarized for the SOV, HOV, and transit modes. For the build condition, transit includes both bus and light rail passengers at Screenline 2 but only bus passengers at Screenline 3 because light rail does not cross Screenline 3. With East Link, the overall person throughput on I-90 across Lake Washington (Screenline 2) in the AM and PM peak hours in 2030 would increase by about 5,300 people (about 30 percent) compared with the No Build Alternative with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project. Throughput would increase by about 2,600 people (about 15 percent) compared with the No Build Alternative with Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project (Exhibit 5-7). One of the key reasons the East Link Project would transport more people across I-90 is because bi-directional light rail would be a more efficient use of the center roadway space than the current reversible one-directional vehicle operations. The roadway's restricted access and egress also limit vehicle capacity and throughput.

Although throughput describes the number of people forecasted to travel across Screenline 2 in 2020 and 2030, the total person capacity of I-90 across Lake Washington would substantially improve with East Link compared to the No Build Alternative. Light rail in the center roadway would not only serve both directions at all times, but it would also provide a substantial increase in capacity than the existing reversible center roadway. The project would use dedicated right-of-way, allowing East Link to operate reliably, independent of congested roadway conditions. The project is planned to operate during the peak periods with a train-arrival frequency (i.e. headway) of every 7 minutes by 2030. The project has the capacity to carry 600 persons per 4-car train comfortably and 800 persons during crowded conditions, operated with 4-minute headways. This would more than double the person carrying capacity of I-90 as East Link could carry a total of 18,000 to 24,000 people (9,000 to 12,000 per direction) during the peak hour. This is the equivalent of about seven to ten freeway lanes of traffic (assuming that automobiles in the Puget Sound region average 1.17 persons per vehicle during commute hours, or about 2,300 persons per hour per freeway lane). The following subsections present the vehicle and person throughput results at Screenlines 2 and 3.



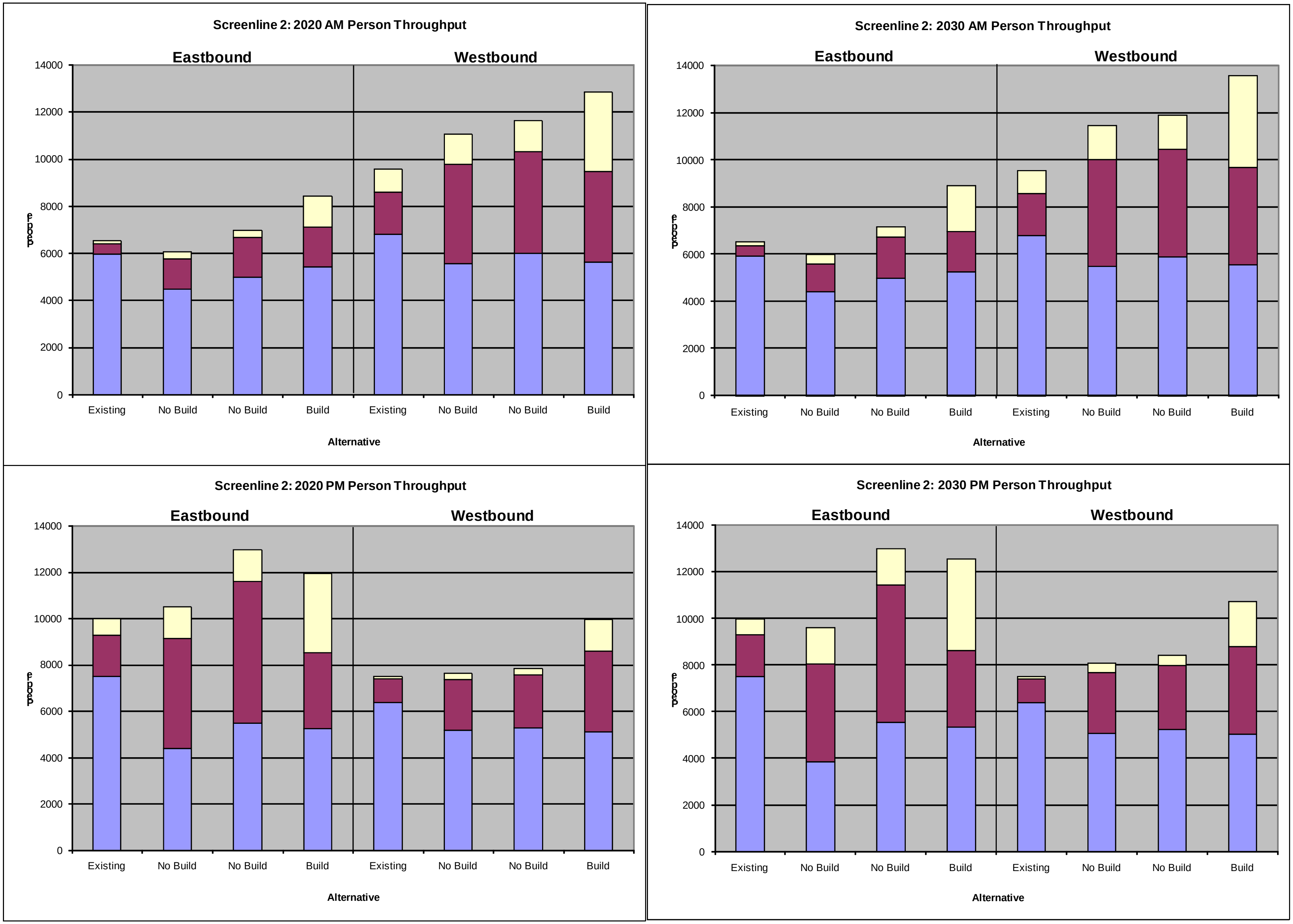
[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project

EXHIBIT 5-7
Average AM and PM Peak-Hour I-90 Person Throughput with Light Rail in 2030

Screenline 2 (Lake Washington for I-90 only)

At Screenline 2, the person throughput in the build condition would be higher in every direction in both years 2020 and 2030 when compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project. Compared with the no-build condition assuming Stage 3 of the I-90 Two-Way Transit and HOV Operations Project is complete, person throughput would be higher with the project in the westbound direction in years 2020 and 2030, higher in the eastbound direction in the AM peak hour, and slightly lower (less than 4 percent in year 2030) for the eastbound direction in the PM peak hour, as indicated in Exhibit 5-8. The overall increase in person throughput is due to the project providing a reliable transportation option for crossing the lake, which would improve the mobility on I-90. However, some users would be adversely affected, and these circumstances are described in this section.

In the 2020 AM peak hour, there would be close to a 25 percent increase in total person throughput with the build condition compared with the no-build condition where only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project are completed. Compared with the no-build condition, assuming Stage 3 of the I-90 Two-Way Transit and HOV Operations Project is completed, the project would have about a 14-percent increase in person throughput in the AM peak hour. In the PM peak hour, the project would have about a 21-percent increase in the total person throughput compared with the no-build condition that includes only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project. Person throughput is expected to increase about 5 percent when comparing the build condition to the no-build condition that assumes Stage 3 of the I-90 Two-Way Transit and HOV Operations Project is completed.



[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project

■ SOV ■ HOV □ Transit

EXHIBIT 5-8
2020 and 2030 I-90 Peak-Hour Person Throughput by Mode at Lake Washington (Screenline 2)

In 2030, similar trends are expected. There would be close to a 29 percent increase in total person throughput in the AM peak hour comparing the build condition to the no-build condition (with Stages 1 and 2 only) and an 18 percent increase when comparing the build condition to the no-build condition with Stage 3 completed. In the PM peak hour, total person throughput would increase by 31 percent compared with the no-build condition that includes only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project. Person throughput is expected to increase by 9 percent when comparing the build condition to the no-build condition that assumes the completion of Stage 3 of the I-90 Two-Way Transit and HOV Operations Project. Compared with the no-build condition, if Stage 3 is completed, a slight reduction (less than 4 percent) in person throughput is predicted in the eastbound direction for the 2030 build condition. The lower eastbound PM person throughput is because of a relatively low throughput in the eastbound HOV lane that crosses the screenline. Lane changing associated with the transition of the GP lane to an HOV lane near the Rainier Avenue South interchange and the additional vehicles involved in the lane changing due to the center roadway closure result in reduced throughput in the HOV lane. If the lane were managed to accommodate more people, the throughput should be comparable for the no-build and build conditions.

By direction, the greatest increase in person throughput would occur in the reverse-peak directions on I-90 (eastbound in the AM peak hour and westbound in the PM peak hour), because light rail would provide another transportation option (i.e. additional person capacity) in the direction opposite of vehicle travel in the reversible center roadway (when compared with the no-build conditions). In 2020 and 2030, East Link would increase person throughput between 31 and 48 percent in the reverse-peak directions compared with the no-build condition where only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project are completed. For the same reverse-peak directions, East Link would provide an increase of 21 to 27 percent in person throughput compared with the no-build condition were the I-90 Two-Way Transit and HOV Operations Project is fully completed.

In terms of vehicle throughput, the build condition would have a higher vehicle throughput in the reverse-peak directions (i.e., eastbound AM peak and westbound PM peak) compared with either of the two no-build conditions because the roadway capacity would be unaffected in combination with people adjusting their mode choice and riding light rail. People deciding not to drive and ride light rail would cause a slight reduction in congestion and increase vehicle throughput. Vehicle throughput would increase with the project between 7 to 22 percent compared with the no-build condition that assumes only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project is completed and would increase between 4 to 7 percent compared with the no-build condition that assumes the completion of Stage 3 of the I-90 Two-Way Transit and HOV Operations Project.

Although in most cases the East Link Project would increase the person throughput in the peak direction, the vehicle throughput in the peak direction would be similar to slightly reduced compared with the No Build Alternative. The vehicle throughput in the westbound direction in the AM peak hour would be similar to the no-build condition that includes only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project, but would decrease by less than 8 percent when compared with the no-build condition that includes Stage 3. In the eastbound direction for the PM peak hour, year 2030 vehicle throughput in the build condition would be higher than the no-build condition that includes only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project, but would decrease by about 1,200 when compared with the no-build condition that includes only Stage 3. This decrease is due to a relatively low throughput in the eastbound HOV lane that crosses the screenline, as previously discussed. Table 5-7 lists Screenline 2 vehicle and person throughput.

Eastbound person and vehicle throughput at Screenline 2 for both the 77th Avenue SE eastbound HOV off-ramp design option and the design option without an HOV eastbound off-ramp to Mercer Island are expected to be similar (within 3 percent) to the *Preferred Alternative A1* with the eastbound HOV off-ramp at Island Crest Way. These access modifications are not expected to substantially affect I-90 mainline operations because connections in this area for Mercer Island residents currently exist. The operational option at the D2 Roadway and design options at the I-90 at Bellevue Way interchange would have person and vehicle throughput across Screenline 2 similar to the *Preferred Alternative A1*.

TABLE 5-7
2020 and 2030 Vehicle and Person Peak-Hour Throughput for I-90 at Lake Washington (Screenline 2)

	2020 Vehicle and Person Throughput						2030 Vehicle and Person Throughput					
	Vehicles					Persons	Vehicles					Persons
Direction	SOV	HOV[a]	Transit	LRT	Total	Total	SOV	HOV[a]	Transit	LRT	Total	Total
AM Westbound												
No Build[b]	5,550	2,000	32	N/A	7,600	11,050	5,500	2,150	34	N/A	7,700	11,450
No Build[c]	6,000	2,050	33	N/A	8,100	11,600	5,900	2,200	35	N/A	8,100	11,900
Build	5,600	1,850	17	7	7,450	12,850	5,550	1,950	17	8	7,550	13,600
AM Eastbound												
No Build[b]	4,450	600	12	N/A	5,050	6,050	4,400	550	12	N/A	4,950	6,000
No Build[c]	4,950	750	13	N/A	5,750	6,950	5,000	800	13	N/A	5,800	7,150
Build	5,400	750	4	7	6,150	8,400	5,250	750	4	8	6,050	8,900
AM Total												
No Build[b]	10,000	2,600	44	N/A	12,650	17,100	9,900	2,700	46	N/A	12,650	17,450
No Build[c]	10,950	2,800	46	N/A	13,800	18,600	10,900	2,950	48	N/A	13,900	19,050
Build	11,000	2,600	21	14	13,600	21,250	10,800	2,750	21	16	13,550	22,500
PM Westbound												
No Build[b]	5,200	950	11	N/A	6,150	7,600	5,050	1,150	13	N/A	6,200	8,050
No Build[c]	5,300	1,000	13	N/A	6,300	7,850	5,200	1,200	14	N/A	6,400	8,400
Build	5,100	1,550	4	7	6,650	9,950	5,000	1,650	4	8	6,650	10,700
PM Eastbound												
No Build[b]	4,400	2,200	34	N/A	6,650	10,500	3,850	1,950	37	N/A	5,850	9,600
No Build[c]	5,500	2,850	34	N/A	8,350	12,950	5,250	2,750	37	N/A	8,050	13,000
Build	5,200	1,550	20	7	6,750	11,950	5,300	1,550	18	8	6,850	12,500
PM Total												
No Build[b]	9,550	3,150	45	N/A	12,750	18,100	8,900	3,100	50	N/A	12,050	17,650
No Build[c]	10,750	3,850	47	N/A	14,650	20,800	10,450	3,950	51	N/A	14,450	21,350
Build	10,350	3,050	24	14	13,400	21,900	10,350	3,150	22	16	13,550	23,200

[a] HOV values are the total number of HOVs crossing the screenline, not the number of vehicles only in the HOV lanes.

[b] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.

[c] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

Note: Due to rounding, values might not sum correctly.

LRT light rail transit
SOV single-occupant vehicle
HOV high-occupancy vehicle
N/A not applicable

Screenline 3 (Mercer Slough)

At Screenline 3 (Mercer Slough), the total person throughput would show less change than at Screenline 2 for the no-build and build conditions because light rail would not cross this screenline, as indicated in Exhibit 5-9. In years 2020 and 2030, the total person throughput in the build condition would increase by 7 to 12 percent compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed. In the build condition, total person throughput would be similar to slightly lower (less than 4 percent) than the no-build condition if Stage 3 of the I-90 Two-Way Transit and HOV Operations Project is completed.

In the 2020 and 2030 AM peak hours, the eastbound person throughput in the build condition would increase by 4 to 12 percent compared with either of the two no-build conditions; in the westbound direction, it would be similar (4 percent decrease to a 4 percent increase) compared with either of the two no-build conditions. During the 2020 and 2030 PM peak hours, the build condition person throughput in the westbound direction would exhibit the greatest increase (14 to 28 percent) compared with either of the two no-build conditions.

In the eastbound direction, the build condition person throughput would be similar to the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project; compared with the no-build condition with Stage 3 completed, person throughput would decrease by about 15 percent. As noted in the Screenline 2 (Lake Washington for I-90 only) discussion, the reduced eastbound (PM peak) HOV throughput would cause a reduction in the HOV throughput at Screenline 3.

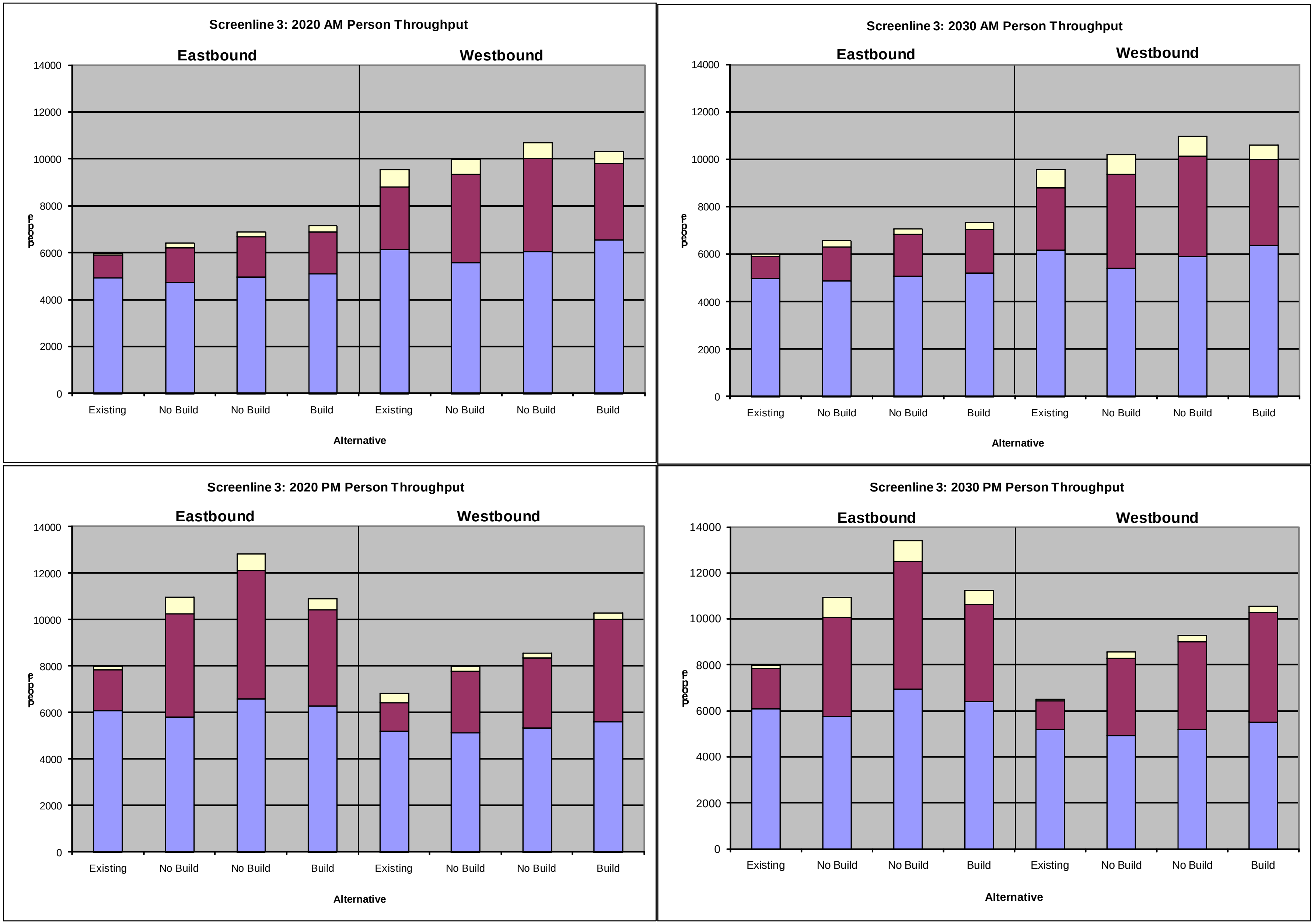
In the 2020 and 2030 reverse-peak directions (eastbound in the AM and westbound in the PM) the vehicle throughput in the build condition would increase (3 to 10 percent in the AM and 11 to 20 percent in the PM) compared with either of the two no-build conditions. Reasons for this increase are discussed earlier in this section. In the peak directions (westbound in the AM and eastbound in the PM), vehicle throughput would increase in the build condition (about 11 percent in the AM and between 4 to 8 percent in the PM) compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed. Compared with the no-build condition assuming Stage 3 is also completed, the vehicle throughput in the build condition during the AM peak hour would increase by about 2 percent and during the PM peak hour the vehicle throughput in the build condition would be less; about a 10 to 12 percent decrease. The reasons for the decrease in PM peak-hour vehicle throughput are noted earlier in this section. Table 5-8 summarizes Screenline 3 vehicle and person throughputs.

Vehicle and Person Demand Served

In conjunction with person and vehicle throughput, the percentage of the forecasted travel demand that can be accommodated was evaluated. This measure compares the person and vehicle throughput to the expected demand across each screenline. A percent served value less than 100 indicates congested conditions that limit the number of vehicles (or people) crossing the screenline. The ability to serve more of the demand indicates that congestion patterns might not be as substantial and that congestion might not occur for as long of a period. Table 5-9 provides the vehicle and person demand served across screenlines 2 and 3 for year 2030 conditions.

At Screenline 2, the AM and PM peak-hour total (combined eastbound and westbound directions) vehicle- and person-demand served percentage would increase in the build condition compared with both no-build conditions. Total vehicle percent demand served would increase between 14 and 22 percent in the build condition compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed; the increase would be between 2 and 4 percent with Stage 3 completed. Total person percent demand served would increase between 19 and 24 percent in the build condition compared with the no-build conditions with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed; the increase would be between 6 and 9 percent with Stage 3 completed.

At Screenline 3, the build condition total (eastbound and westbound directions) vehicle and person demand served would increase between 9 and 17 percent compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed. Compared with the no-build condition when Stage 3 is completed, the vehicle and person demand served would increase up to 4 percent.



[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project

SOV HOV Transit

EXHIBIT 5-9
2020 and 2030 I-90 Peak-Hour Person Throughput by Mode at Mercer Slough (Screenline 3)

TABLE 5-8
2020 and 2030 Vehicle and Person Peak-Hour Throughput for I-90 at Mercer Slough (Screenline 3)

	2020 Vehicle and Person Throughput					2030 Vehicle and Person Throughput				
	Vehicles				Persons	Vehicles				Persons
Direction	SOV	HOV[d]	Transit	Total	Total	SOV	HOV[d]	Transit	Total	Total
AM Westbound										
No Build[a]	5,500	1,800	30	7,300	9,900	5,400	1,900	33	7,300	10,200
No Build[b]	6,050	1,900	30	7,950	10,700	5,900	2,000	33	7,950	10,950
Build[c]	6,550	1,550	31	8,150	10,300	6,350	1,700	32	8,100	10,600
AM Eastbound										
No Build[a]	4,700	650	12	5,400	6,400	4,850	650	12	5,500	6,550
No Build[b]	4,950	750	12	5,750	6,900	5,050	800	10	5,850	7,050
Build[c]	5,100	800	13	5,900	7,150	5,200	800	12	6,000	7,300
AM Total										
No Build[a]	10,200	2,450	42	12,700	16,350	10,250	2,500	45	12,850	16,700
No Build[b]	11,000	2,650	42	13,700	17,550	10,950	2,800	43	13,800	18,000
Build[c]	11,650	2,350	44	14,050	17,450	11,550	2,550	44	14,150	17,900
PM Westbound										
No Build[a]	5,150	1,150	13	6,300	8,000	4,950	1,450	13	6,400	8,550
No Build[b]	5,350	1,300	13	6,650	8,550	5,200	1,650	13	6,850	9,250
Build[c]	5,600	1,950	12	7,550	10,250	5,500	2,100	11	7,600	10,550
PM Eastbound										
No Build[a]	5,800	2,050	32	7,900	10,950	5,750	2,000	35	7,800	10,950
No Build[b]	6,600	2,600	32	9,200	12,800	6,950	2,600	35	9,600	13,400
Build[c]	6,300	1,950	30	8,250	10,900	6,400	1,950	33	8,400	11,250
PM Total										
No Build[a]	10,950	3,200	45	14,200	18,950	10,700	3,450	48	14,200	19,500
No Build[b]	11,950	3,900	45	15,850	21,400	12,150	4,250	48	16,450	22,650
Build[c]	11,900	3,850	42	15,800	21,200	11,900	4,050	44	16,000	21,800

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
[c] Light rail vehicle and its person throughput is not included in the build condition data because no light rail alternative crosses Screenline 3.
[d] HOV values are the total number of HOVs crossing the screenline, not the number of vehicles only in the HOV lanes.
Note: Due to rounding, values might not sum correctly.
SOV single-occupant vehicle
HOV high-occupancy vehicle

TABLE 5-9
2030 Vehicle and Person Peak-Hour Demand Served for I-90 at Lake Washington (Screenlines 2 and 3)

Direction	Screenline 2						Screenline 3					
	Vehicles			Persons			Vehicles			Persons		
	Demand	Throughput	Percent Served	Demand	Throughput	Percent Served	Demand	Throughput	Percent Served	Demand	Throughput	Percent Served
AM Westbound												
No Build[a]	11,700	7,700	65.5	15,700	11,500	72.8	11,800	7,300	62.1	14,900	10,200	68.2
No Build[b]	11,700	8,100	69.0	15,700	11,900	75.7	11,800	7,900	67.2	15,100	11,000	72.7
Build	10,800	7,500	69.5	17,000	13,600	79.7	11,700	8,100	69.5	14,300	10,600	73.9
AM Eastbound												
No Build[a]	9,300	5,000	53.4	11,300	6,000	53.0	8,500	5,500	64.9	10,100	6,500	64.7
No Build[b]	9,200	5,800	63.2	11,200	7,200	63.7	8,500	5,900	68.9	10,300	7,000	68.7
Build	8,900	6,000	68.0	12,200	8,900	73.0	8,400	6,000	71.9	10,200	7,300	71.8
AM Total												
No Build[a]	21,000	12,600	60.2	27,100	17,500	64.5	20,300	12,800	63.3	25,000	16,700	66.8
No Build[b]	20,900	13,900	66.4	27,000	19,100	70.7	20,300	13,800	67.9	25,300	18,000	71.0
Build	19,700	13,600	68.8	29,200	22,500	76.9	20,000	14,100	70.5	24,500	17,900	73.0
PM Westbound												
No Build[a]	10,500	6,200	59.0	13,100	8,100	61.4	10,100	6,400	63.6	12,900	8,600	66.4
No Build[b]	10,500	6,400	61.1	13,200	8,400	63.4	10,200	6,900	67.1	13,300	9,300	69.7
Build	9,600	6,700	69.5	14,500	10,700	73.7	9,500	7,600	80.1	13,300	10,600	79.7
PM Eastbound												
No Build[a]	11,600	5,800	50.1	16,900	9,600	56.9	12,200	7,800	63.9	16,300	10,900	66.9
No Build[b]	11,800	8,000	68.0	17,300	12,700	73.7	12,400	9,600	77.0	16,800	13,400	79.9
Build	10,900	6,900	63.2	17,200	12,500	72.6	12,000	8,400	70.0	15,500	11,200	72.4
PM Total												
No Build[a]	22,200	12,000	54.3	30,000	17,700	58.9	22,300	14,200	63.8	29,200	19,500	66.7
No Build[b]	22,300	14,500	64.7	30,500	21,100	69.2	22,700	16,400	72.5	30,100	22,700	75.4
Build	20,500	13,500	66.1	31,800	23,200	73.1	21,500	16,000	74.4	28,800	21,800	75.8

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

5.3.3.2 Travel Time

In the 2020 and 2030 no-build conditions, travel times would continue to get longer as congestion would increase in the future. Tables 5-10 and 5-11 list the years 2020 and 2030, respectively, I-90 travel times for the no-build and build conditions. By year 2030, SOV travel in the westbound direction from I-405 to Seattle during the AM peak period in the no-build condition could take close to 28 minutes, which is more than double the duration under existing conditions. In the eastbound direction, SOV travel times could increase by approximately 50 percent and be close to 21 minutes. In the PM peak period, a similar increase in SOV travel time is expected. In the westbound direction to go from I-405 to Seattle, the trip would take close to 30 minutes - an increase of about 60 percent from existing conditions. In the eastbound direction, an SOV going from Seattle to I-405 could take close to 19 minutes. The following subsections provide travel-time comparisons for each of the three modes (SOV, HOV, and transit) between the no-build conditions and the East Link Project. For trucks, a travel time comparison between the no-build conditions and the East Link Project is provided in Section 8.0.

Single-Occupant Vehicle

With light rail in 2020 and 2030, SOV travel times between I-405 and Seattle in the AM peak period are expected to decrease by approximately 5 minutes in the westbound direction and increase by up to 4 minutes in the eastbound direction compared with the No Build Alternative (with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project). In the 2020 PM peak period, SOV travel times between I-405 and Seattle are expected to be similar (eastbound direction) or improve by up to 8 minutes (westbound direction) compared with the No Build Alternative with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.

By 2030, smaller travel time improvements in the PM peak period are expected as congestion worsens. In the 2030 PM peak period, SOV travel times between I-405 and Seattle with East Link would improve by 6 minutes in the westbound direction; in the eastbound direction, travel times would be similar to the No Build Alternative with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project. Westbound travel time improvements would be attributed to a shift from people driving their automobiles to riding light rail and the additional capacity provided with the outer roadway HOV lanes.

In year 2020, SOV travel times with East Link would be similar (eastbound direction) or improve by up to 3 minutes (westbound direction) in the AM peak period compared with the No Build Alternative with I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 completed. The SOV travel time comparisons between East Link and the No Build Alternative that assumes the I-90 Two-Way Transit and HOV Project Stages 1 through 3 in the year 2020 PM peak period would be similar to the comparison between East Link and the No Build Alternative that only assumes Stages 1 and 2 of the I-90 Two-Way Transit and HOV Project. In year 2030, SOV travel time comparisons in the AM peak period between East Link and the No Build Alternative that assumes the I-90 Two-Way Transit and HOV Project Stages 1 through 3 would be similar to those in year 2020. In the PM peak period, westbound travel times with light rail are expected to improve by approximately 6 minutes and eastbound travel times are expected to improve by about 2 minutes compared with the No Build Alternative with I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 completed.

Single-occupant vehicle travel times between Seattle and Mercer Island would remain similar to or improve by as much as 2 minutes with East Link compared with the No Build Alternative, except in the PM eastbound direction. In the eastbound direction, travel times from Seattle to Mercer Island could range from 6 minutes in the reversible roadway to 12 minutes in the eastbound mainline roadway with the No Build Alternative; it would take about 11 minutes with East Link.

For trucks, a similar travel time comparison between the no-build conditions and the East Link Project would be expected because they also travel in the GP lanes. Refer to Table 5-10 and Table 5-11 for further travel time information between Seattle, Mercer Island, and the Bellevue Way interchange, and between Seattle and I-405.

TABLE 5-10
I-90 2020 No-Build and Build Travel Times by Mode (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[d]			SOV			HOV			Transit[d]		
End Point	**End Point**	**No-Build[a]**	**No-Build[b]**	**Build[c]**	**No-Build[a]**	**No-Build[b]**	**Build[c]**	**No-Build[a]**	**No-Build[b]**	**Build[c]**	**No-Build[a]**	**No-Build[b]**	**Build[c]**	**No-Build[a]**	**No-Build[b]**	**Build[c]**	**No-Build[a]**	**No-Build[b]**	**Build[c]**
Westbound outer roadway																			
Mercer Island (Island Crest Way)	I-5 to Downtown Seattle[e]	8.5	9.0	7.2	8.5	7.0	5.7	-/-	-/-	7.6/6.7	6.7	8.4	8.8	6.7	6.5	7.0	8.8/7.7	9.8/6.7	-/6.6
Bellevue Way[f]	I-5 to Downtown Seattle[e]	24.3	22.5	19.1	11.1	9.8	8.4	-/-	-/-	-/-	22.2	23.3	20.0	11.1	9.2	9.5	13.8/-	14.8/-	-/-
I-405	I-5 to Downtown Seattle[e]	26.7	24.3	21.6	13.8	12.2	10.7	-/-	-/-	13.2/11.8	28.7	27.8	20.8	13.4	11.6	11.9	16.0/14.6	16.8/11.9	-/11.8
Reversible center roadway[g]																			
Mercer Island (77th Avenue SE)	I-5 to Downtown Seattle[h]	6.1	8.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.6	5.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercer Island (77th Avenue SE)	Seattle (5th Avenue South)[i]	N/A	N/A	N/A	5.1	5.9	N/A	6.5/6.4	7.5/7.3	8.0	N/A	N/A	N/A	5.4	5.5	N/A	6.2/6.2	6.2/6.2	8.0
Bellevue Way[f]	Seattle (5th Avenue South)[i]	N/A	N/A	N/A	8.1	8.9	N/A	10.7/-	11.8/-	12.0	N/A	N/A	N/A	8.0	8.1	N/A	11.0/-	11.2/-	12.0
I-405	Seattle (5th Avenue South)[i]	N/A	N/A	N/A	10.4	11.1	N/A	13.2/11.4	13.9/12.4	-/-	N/A	N/A	N/A	9.7	9.9	N/A	13.5/11.0	13.6/11.1	-/-
Eastbound outer roadway																			
I-5 from Downtown Seattle[j]	Mercer Island (Island Crest Way)	11.6	13.6	13.9	11.2	12.9	9.9	9.6/9.5	8.1/9.6	-/9.6	11.8	11.3	11.3	10.8	6.4	7.9	-/-	-/-	10.7/9.7
I-5 from Downtown Seattle[j]	Bellevue Way[h]	13.6	16.9	16.7	13.0	14.4	12.4	14.1/-	12.6/-	-/-	14.0	14.6	14.7	12.9	8.4	10.0	-/-	-/-	-/-
I-5 from Downtown Seattle[j]	I-405	15.4	18.7	18.6	15.0	16.6	14.1	15.6/13.7	14.1/12.7	-/14.3	16.0	16.8	16.9	14.3	10.4	12.3	-/-	-/-	16.7/14.0

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
[c] "Build is defined as the East Link Project with joint bus and light rail operations in the D2 Roadway, an eastbound HOV direct-access off-ramp at Island Crest Way, and both eastbound and westbound HOV direct-access ramps preserved at Bellevue Way.
[d] Transit routes with stops on Mercer Island/transit routes with no stops on Mercer Island.
[e] In no-build condition, all vehicles end at the I-5 northbound ramp except transit, which utilizes D2 Roadway.
[f] In no-build and build conditions, HOVs and transit would use the westbound Bellevue Way HOV on-ramp.
[g] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak. It would be used by light rail in the build condition.
[h] SOVs are required to exit and/or enter reversible center roadway at Rainier Avenue South interchange.
[i] Travel time is to and/or from 5th Avenue South via the D2 Roadway.
[j] In no-build condition, all SOVs and HOVs start at I-5 southbound ramps to I-90 except PM HOV vehicles, which use the D2 Roadway; in the build condition, all SOVs and HOV vehicles would start at I-5 southbound ramps; and transit would use the D2 Roadway in both the no-build and build conditions.
[k] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps; in build, all vehicles use the Bellevue Way outer roadway ramps.
Buses do not travel on this roadway during this period and/or do not travel between these points.
HOV high occupancy vehicle
N/A not applicable because the mode is not eligible to travel this path or the path is restricted
SOV single-occupant vehicle
Note: Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; Bellevue Way means at the South Bellevue Station.

TABLE 5-11
I-90 2030 No-Build and Build Travel Times by Mode (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[d]			SOV			HOV			Transit[d]		
End Point	End Point	No-Build[a]	No-Build[b]	Build[c]	No-Build[a]	No-Build[b]	Build[c]	No-Build[a]	No-Build[b]	Build[c]	No-Build[a]	No-Build[b]	Build[c]	No-Build[a]	No-Build[b]	Build[c]	No-Build[a]	No-Build[b]	Build[c]
Westbound outer roadway																			
Mercer Island (Island Crest Way)	I-5 to Downtown Seattle[e]	8.6	9.2	7.3	8.5	7.3	5.7	-/-	-/-	9.4/6.7	6.4	8.6	9.2	6.3	6.8	7.2	8.9/7.7	10.2/6.7	-/6.8
Bellevue Way[f]	I-5 to Downtown Seattle[e]	24.4	22.4	19.9	10.9	10.0	8.5	-/-	-/-	-/-	23.1	24.0	20.9	10.9	9.5	9.8	14.5/-	15.2/-	-/-
I-405	I-5 to Downtown Seattle[e]	27.5	25.1	22.4	13.8	12.9	10.8	-/-	-/-	16.2/11.9	28.9	29.2	23.2	13.5	11.7	12.0	16.7/15.1	17.5/11.8	-/12.3
Reversible center roadway[g]																			
Mercer Island (77th Avenue SE)	I-5 to Downtown Seattle[h]	6.2	9.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.3	6.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercer Island (77th Avenue SE)	Seattle (5th Avenue South)[i]	N/A	N/A	N/A	5.1	6.3	N/A	6.5/6.4	7.6/7.5	8.0	N/A	N/A	N/A	5.4	5.5	N/A	6.2/6.2	6.2/6.2	8.0
Bellevue Way[f]	Seattle (5th Avenue South)[i]	N/A	N/A	N/A	8.1	9.2	N/A	10.7/-	11.7/-	12.0	N/A	N/A	N/A	8.1	8.1	N/A	10.9/-	11.2/-	12.0
I-405	Seattle (5th Avenue South)i	N/A	N/A	N/A	10.4	11.5	N/A	13.0/11.4	13.4/12.6	-/-	N/A	N/A	N/A	9.8	10.0	N/A	13.4/11.0	13.6/11.1	-/-
Eastbound outer roadway																			
I-5 from Downtown Seattle[j]	Mercer Island (Island Crest Way)	11.7	15.0	14.9	11.4	13.2	10.3	10.0/9.5	8.2/8.9	-/9.8	12.0	12.4	11.5	9.6	7.0	7.6	-/-	-/-	10.2/9.1
I-5 from Downtown Seattle[j]	Bellevue Way[k]	13.7	18.7	18.1	13.5	14.7	13.9	14.4/-	12.6/-	-/-	13.9	16.0	14.8	11.5	9.5	9.9	-/-	-/-	-/-
I-5 from Downtown Seattle[j]	I-405	15.6	20.8	20.0	15.2	16.8	14.7	15.9/13.7	14.5/13.2	-/14.7	16.1	18.5	17.0	13.3	11.0	12.0	-/-	-/-	15.6/13.8

[a] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
[c] Build is defined as the East Link Project with joint bus and light rail operations in the D2 Roadway, an eastbound HOV direct-access off-ramp at Island Crest Way, and both eastbound and westbound HOV direct-access ramps preserved at Bellevue Way.
[d] Transit routes with stops on Mercer Island/transit routes with no stops on Mercer Island.
[e] In no-build condition, all vehicles end at I-5 northbound ramp except transit, which uses D2 Roadway.
[f] In no-build and build conditions, HOV vehicles and transit would use the westbound Bellevue Way HOV on-ramp.
[g] Reversible center roadway operates westbound in the AM peak period and eastbound in the PM peak period; it would be used by light rail in the build condition.
[h] SOVs are required to exit and/or enter reversible center roadway at the Rainier Avenue South interchange.
[i] Travel time is to and/or from 5th Avenue South via the D2 Roadway.
[j] In no-build condition, all SOVs and HOVs start at I-5 southbound ramps to I-90, except PM HOVs, which use the D2 Roadway; in the build condition, all SOVs and HOVs would start at I-5 southbound ramps; and transit would use the D2 Roadway in both the no-build and build conditions.
[k] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps; in the build condition, all vehicles would use the Bellevue Way outer roadway ramps.
\- Buses do not travel on this roadway during this period and/or do not travel between these points.
HOV high-occupancy vehicle
N/A Not applicable because the mode is not eligible to travel this path or the path is restricted
SOV single-occupant vehicle
Note: Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; Bellevue Way means at the South Bellevue Station.

HOV and Transit

HOV and bus travel times on I-90 in years 2020 and 2030 under the No Build Alternative (with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project) would remain similar to or get longer than existing conditions as congestion would increase in the future. HOV and bus travel times would general be similar in the peak direction and either be similar or improve in the reverse-peak directions for East Link and for the No Build Alternative that assumes the I-90 Two-Way Transit and HOV Operations Project is completed (Stages 1 through 3) compared with the existing conditions. In the AM and PM peak periods, it could take between 10 and 15 minutes for an HOV to travel between Seattle and I-405 for the No Build Alternative (with only Stages 1 and 2). For the No Build Alternative (with Stages 1 through 3), HOV travel between Seattle and I-405 could take between 10 to 17 minutes. With East Link, it would take between 11 to 15 minutes.

Buses traveling along I-90 in the reverse-peak direction would be expected to have similar or improved travel times because the outer roadway HOV lane would provide buses with a faster lane than the GP lanes they would be required to use when the reversible center roadway is operating in the opposite direction. In the peak directions, buses travelling between Seattle and I-405 would have a similar to up to a 3 minutes longer travel time with the East Link Project than in either of the no-build conditions.

The *Preferred Alternative A1* assumes joint use of the D2 Roadway. For the operational option that has exclusive light rail use in the D2 Roadway, buses would be rerouted to other roadways to access I-90 from South Seattle (such as 4th Avenue South), and the bus travel time would increase. With the *Preferred Alternative A1*, buses would experience up to a 2-minute savings inbound in the AM peak period to Downtown Seattle and experience up to a 6-minute savings outbound in the PM peak period from Downtown Seattle on I-90 compared with the operational option in which buses are not eligible to use the D2 Roadway. Some of this savings would be reduced when buses travel along 5th Avenue South to and from D2 Roadway. It would take up to 2 additional minutes of time to travel along 5th Avenue South compared with 4th Avenue South. Additionally, depending on the joint-use operating policy of the D2 Roadway, up to 3 additional minutes of average delay, in either direction, could be incurred by buses while waiting for clearance to enter the D2 Roadway. However, during evening events at the stadiums, bus routes along 4th Avenue South would incur additional travel time due to increased congestion along this street.

For the design option with an HOV off-ramp to 77th Avenue SE, eastbound HOV and bus travel times to Mercer Island are expected to be up to 2 minutes faster in both the AM and the PM peak hours when compared with the Island Crest Way off-ramp in the *Preferred Alternative A1*. Compared with the *Preferred Alternative A1,* HOV and bus travel times are similar in both AM and PM peak hours for the design option that does not include an eastbound HOV off-ramp and uses the 77th Avenue SE GP ramp only.

Preferred Alternative A1 preserves both the eastbound and westbound HOV ramps from I-90 to Bellevue Way SE as preferred by WSDOT. For the design option at I-90 and Bellevue Way interchange that would close the eastbound HOV off-ramp to Bellevue Way, HOVs using this ramp would reroute to use the GP Bellevue Way off-ramp. Closing the eastbound HOV ramp would have a negligible effect on travel time for HOVs, as minimal congestion is expected between Mercer Island and the Bellevue Way interchange. This is a result of the I-90 Two-Way Transit and HOV Operations Project improvements, which include an auxiliary lane between East Mercer Way and I-405 ramps.

For Alternative B1, which closes the westbound direct-access HOV on-ramp from Bellevue Way, HOVs traveling between Bellevue and Seattle would use the GP Bellevue Way on-ramp and weave across the GP lanes to enter the HOV lane. This maneuver would increase the westbound HOV travel time from Bellevue Way to Seattle by approximately 8 to 12 minutes, depending on the peak period. In the year 2030, 660 HOV vehicles are forecasted to use this ramp during the 3-hour AM peak period; approximately 1,070 vehicles would use the ramp in the PM peak period, as indicated in Table 5-12.

With the operational option at the D2 Roadway or design option at the eastbound Mercer Island HOV off-ramp or HOV ramps at the Bellevue Way interchange, the travel times for the other vehicles (SOV and trucks) on I-90 would not be expected to change from the travel times already described.

Light rail travel between Seattle and Mercer Island and between Seattle and Bellevue Way would take 8 and 12 minutes, respectively. This would be a substantial improvement compared with a SOV trip, which could take up to 15 minutes between Seattle and Mercer Island and up to 24 minutes between Seattle and Bellevue Way in the No Build Alternative.

TABLE 5-12
2020 and 2030 AM and PM Peak Travel Times with and without Bellevue Way/I-90 HOV Ramps

From/To	2020				2030			
	Peak-Period HOV Demand	With Eastbound and Westbound HOV Ramps[a] (minutes)	Without Eastbound and Westbound HOV Ramps[b] (minutes)	Difference	Peak-Period HOV Demand	With Eastbound and Westbound HOV Ramps[a] (minutes)	Without Eastbound and Westbound HOV Ramps[b] (minutes)	Difference
AM Peak								
Westbound: Bellevue Way to I-5 Downtown Seattle[c]	630	8.4	19.9	11.5	660	8.5	20.7	12.2
Eastbound: I-5 from Downtown Seattle to Bellevue Way[d]	210	12.4	12.8	0.4	230	13.9	14.1	0.2
PM Peak								
Westbound: Bellevue Way to I-5 to Downtown Seattle[c]	980	9.5	17.5	8.0	1070	9.8	17.8	8.0
Eastbound: I-5 from Downtown Seattle to Bellevue Way[d]	360	10.0	10.4	0.4	380	9.9	9.7	-0.2

[a] Retaining both eastbound and westbound HOV ramps are included in the preferred alternative.
[b] With Alternative B1 only.
[c] Travel path terminates at I-5 northbound ramp.
[d] Travel path begins at I-5 southbound ramp.
HOV high-occupancy vehicle

5.3.3.3 Congestion and Level of Service

Congestion on I-90 is expected to worsen in the future, as indicated by longer travel times described in the previous section. Therefore, the I-90 LOS would continue to degrade and generally operate at LOS E or F conditions throughout the peak periods with the no-build conditions. Without light rail, congestion on I-90 is expected to occur for longer distances and longer periods each day in the no-build conditions. More congestion and longer travel times would make travel more difficult between Seattle and Bellevue, two of the key employment and population centers of the Puget Sound region. Congestion and resulting vehicle travel hours would likely extend to longer periods, exceeding 3 hours for each peak period. Without light rail's ability to move more people, an imbalance in vehicle capacity with the reversible center roadway across I-90 would impede efficient and reliable transit service to the growing residential and commercial areas on the Eastside.

The congestion maps in Exhibit 5-10 indicate vehicle speeds over time (vertical axis) and distance (horizontal axis) for the year 2030. The time indicated on these maps is for a 2.5-hour duration in both the AM (6:30 to 9:00 a.m.) and PM (3:30 to 6:00 p.m.) peak periods. The distance covers I-90 from the western terminus at SR 519 to east of the I-405 interchange. On the maps, areas with yellow, red, and black are generally considered LOS E or F conditions with vehicle speeds at or under 55 mph. Green areas are generally considered LOS A through D and indicate vehicle speeds over 55 mph. This section focuses on year 2030 conditions, as the comparison between no-build and build conditions in year 2020 is similar to year 2030.

In addition to the general I-90 operating conditions, HOV lane performance was evaluated to identify where they would fail to meet WSDOT's HOV Speed and Reliability Standard of vehicles travelling at least 45 mph during the peak commuting hour 90 percent of the time. It was assumed in the traffic analysis that, in the no-build conditions, Mercer Island SOVs would not be allowed in the outer roadway HOV lanes but would have access to the center roadway. However, in the build condition, the traffic analysis assumed that vehicles traveling to and from Mercer Island were able to use the outer roadway HOV lanes as described in Section 5.3.1. This assumption does not represent allowing SOVs to use the outer roadway HOV lanes. Any changes to the HOV lane eligibility, such as tolling, managed lanes, or Mercer Island SOV use, would be addressed in a future analysis, approval, and agreement.

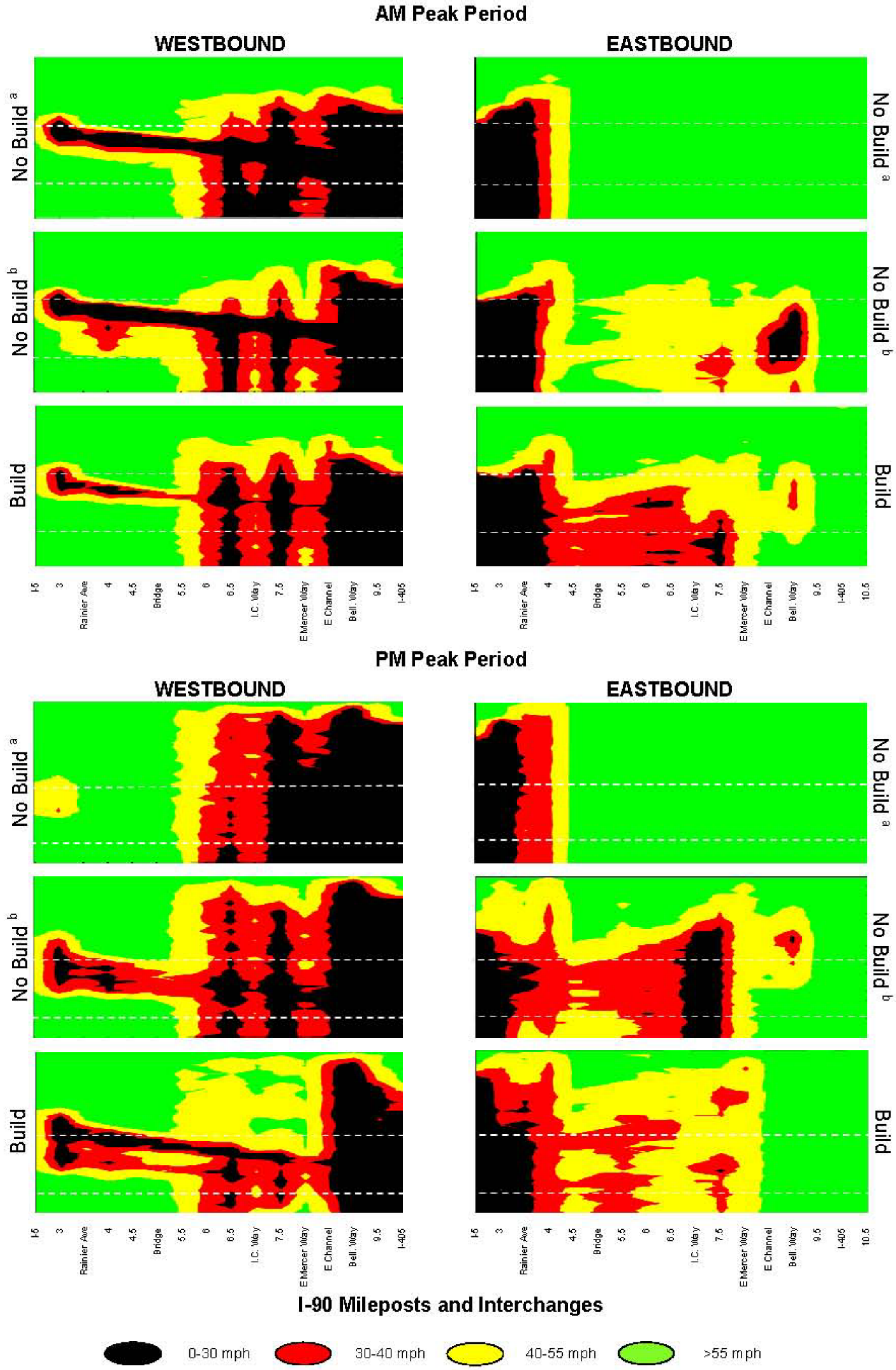
AM Peak Period

In the AM peak period, congestion in the westbound direction would slightly improve in the no-build condition (I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3) after the HOV lanes are completed (left middle congestion map in Exhibit 5-10) compared with the no-build condition, where the HOV lanes are not completed (left upper congestion map in Exhibit 5-10). In the build condition, congestion in the westbound direction shows traits similar to those of the no-build condition with the I-90 Two-Way Transit and HOV Project Stages 1 and 3, although less congestion would occur across the I-90 bridge. In the eastbound direction, the build condition would have less congestion between I-5 and the Mt. Baker Tunnel than either of the two no-build conditions as people shift to ride light rail; therefore, more vehicles can travel through this area. As a result, additional congestion would form around Mercer Island. Although this occurs, vehicle travel times are faster and person throughput is higher in the build condition than the no-build condition.

With the operational option to have exclusive light rail in the D2 Roadway, eastbound or westbound congestion on I-90 in the AM peak period would not change when compared with the *Preferred Alternative A1*. AM peak period congestion on I-90 would also be comparable between the *Preferred Alternative A1* and either of the two eastbound Mercer Island HOV off-ramp design options. If either of the Bellevue Way HOV direct-access ramps (westbound on-ramp and eastbound off-ramp) were closed, then the impact on I-90 congestion would be nearly negligible. Minor variations would occur, but they would not be noticeable enough to affect overall congestion in the GP lanes.

During the AM peak period in the 2030 no-build condition, the westbound HOV lane would meet WSDOT's HOV Speed and Reliability Standard except near the Rainier Avenue South interchange as the lane transitions from an HOV lane to a GP lane, and therefore, vehicles begin to slow due to the congestion in the GP lanes. In the 2030 build condition, the westbound HOV lane would meet WSDOT's HOV Speed and Reliability Standard at all locations in the westbound direction. The eastbound HOV lane in the 2030 no-build and build conditions would meet WSDOT's HOV Speed and Reliability Standard, except near the Rainier Avenue South interchange where the GP lane would transition to an HOV lane.

With the project, under the design option where the westbound HOV direct-access on-ramp from Bellevue Way would be closed (Alternative B1), HOVs would use the GP ramp and weave across the GP lanes to enter the HOV lane. The weave into the HOV lane would likely occur between East Mercer Way and Island Crest Way and would affect the HOV lane performance because vehicles would travel at slower speeds as they enter the HOV lane from a GP lane.



[a] The No Build Alternative with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] The No Build Alternative with Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.

EXHIBIT 5-10
I-90 Year 2030 AM and PM Peak-Period Vehicle Speeds in General-Purpose Lanes

PM Peak Period

In the PM peak period, freeway LOS would generally operate at LOS E or F conditions throughout the peak period. The center roadway would continue to be underutilized because access to the center roadway is constrained by congested roadways and traffic signals; these constraints reduce the ability to move high volumes of people to and from key urban centers across the lake. This is highlighted in Exhibit 5-11, which indicates the operating conditions for the no-build condition in the 2030 PM peak hour for each lane type (i.e., GP, HOV, and center roadway). The imbalance in roadway capacity across Lake Washington (six eastbound lanes and four westbound lanes) in conjunction with an evenly split eastbound and westbound demand (Table 5-4) creates more congestion in the reverse-peak direction (westbound) than in the peak direction (eastbound). Although the eastbound center roadway and HOV lanes operate mainly in free-flow conditions, the lanes in the opposite direction operate in slower conditions and have substantial congestion, especially in the GP lanes.

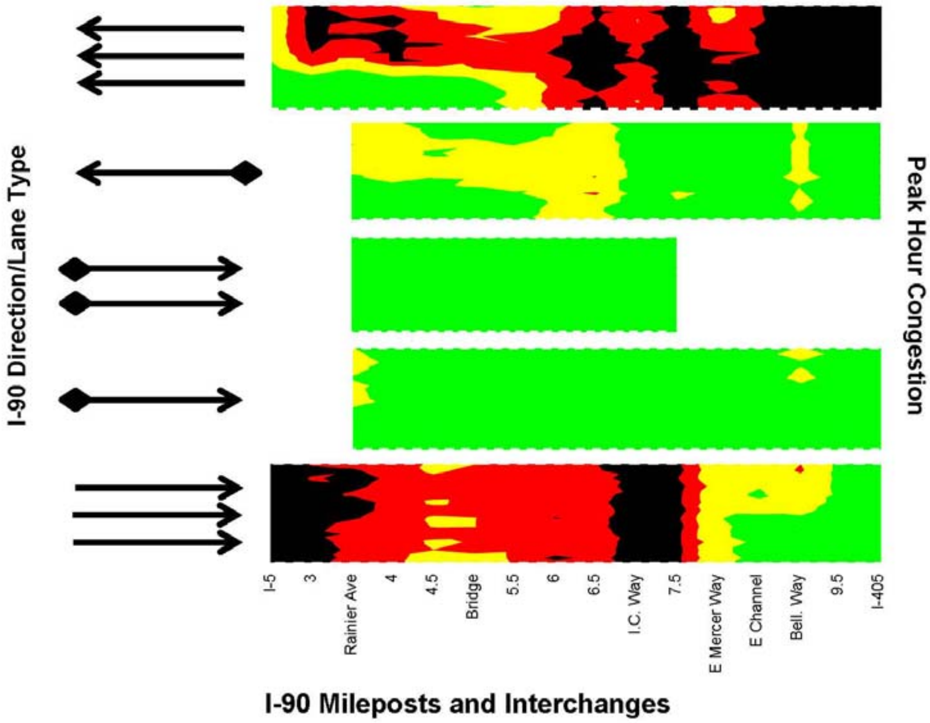


EXHIBIT 5-11
2030 PM Peak-Hour No-Build I-90 Congestion by Lane Type

Congestion would noticeably decrease in the westbound direction (left lower congestion map in Exhibit 5-10) with the project compared with either no-build condition as people shift to light rail. In the eastbound direction, congestion would be heavier near the Rainier Avenue South interchange and Mount Baker Tunnel area because the reversible center roadway would be closed, but there would be less downstream congestion near Mercer Island because slightly less vehicle throughput would occur at the Rainier Avenue South and Mount Baker Tunnel section. (This was previously described in Section 5.3.3.1.)

During the PM peak period, the westbound HOV lane in the 2030 no-build condition would have some congestion between Island Crest Way and Rainier Avenue South. In the 2030 build condition, the westbound HOV lane would meet WSDOT's HOV Speed and Reliability Standard in all areas except near Rainier Avenue South where some congestion would occur as the lane transitions from an HOV lane to a GP lane. In the 2030 no-build condition, the eastbound HOV lane would meet WSDOT's HOV Speed and Reliability Standard. In the 2030 build condition, the HOV lane would perform similar to the no-build condition except that it would operate worse at the transition from a GP lane to an HOV lane near Rainier Avenue South due to vehicles weaving.

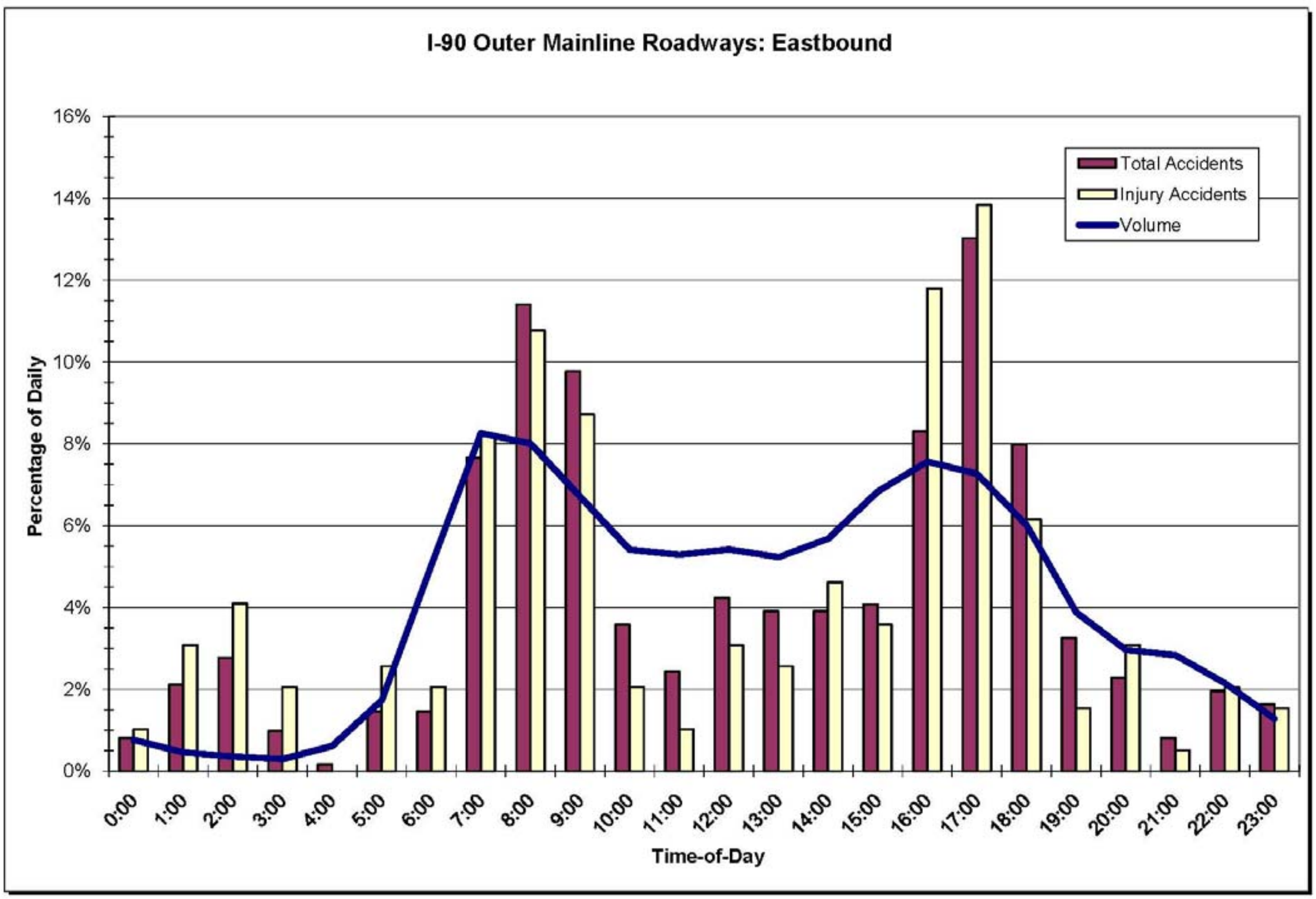
With either design option to close the Bellevue Way HOV westbound on-ramp or eastbound off-ramp, the impact on the I-90 mainline LOS would be nearly negligible compared with the *Preferred Alternative A1*. Minor variations in congestion would occur, but they would not noticeably affect the freeway performance. Under the operational option of exclusive light rail in the D2 Roadway, there would, again, be no change in the congestion levels in both the eastbound and westbound direction on I-90 compared with the *Preferred Alternative A1*. Last, vehicle congestion patterns would be expected to be similar between the *Preferred Alternative A1*, the design option of providing an eastbound HOV off-ramp at 77th Avenue SE, or the design option without an eastbound HOV off-ramp to Mercer Island.

5.3.3.4 Highway Safety Conditions

Implementing the East Link Project would not increase the total number of accidents in the corridor. Overall, with more people moving across Lake Washington with East Link and a similar number of accidents predicted between the no-build and East Link conditions, the overall collision rates (i.e., accidents per person-mile traveled) on I-90 would improve with the project.

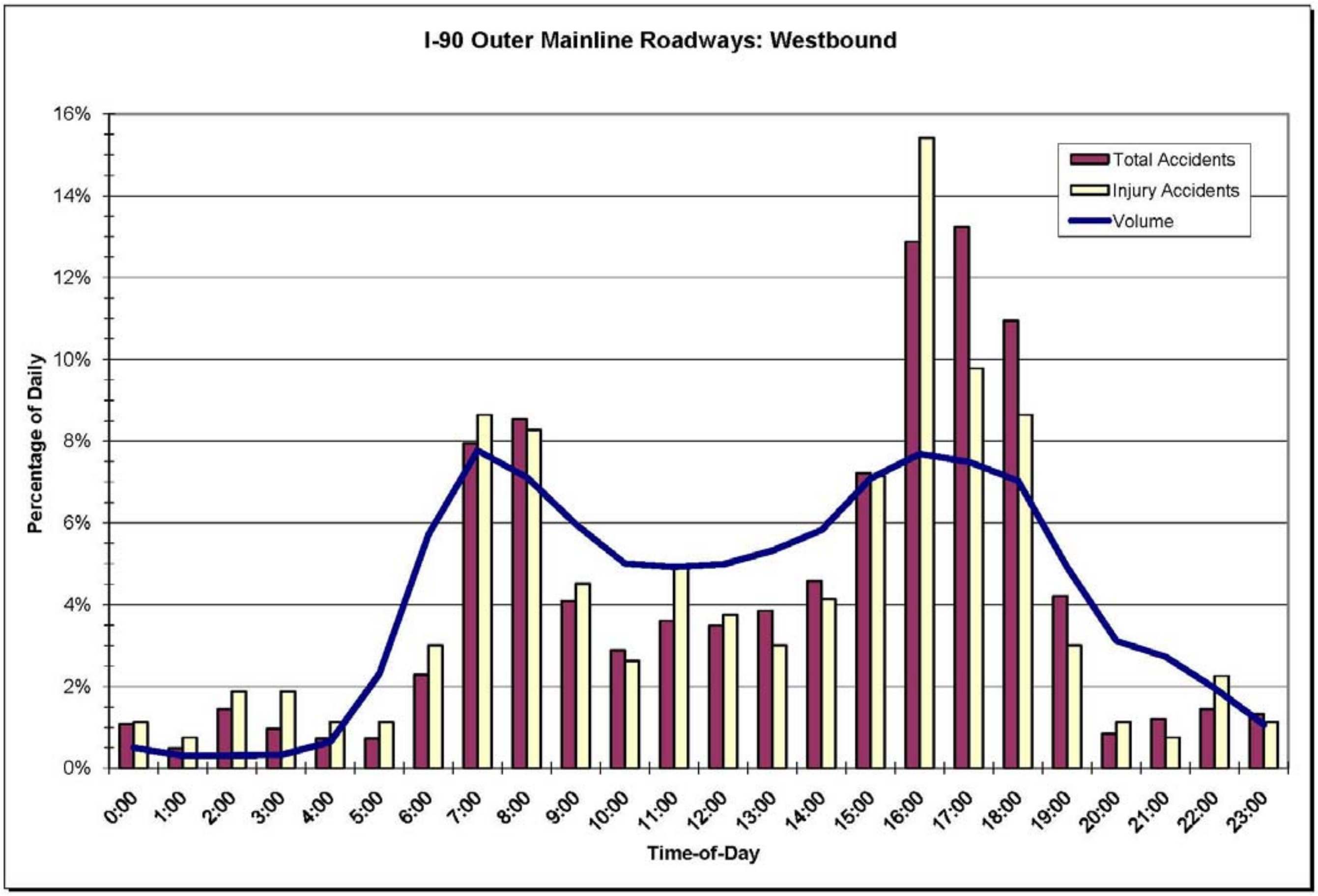
The analysis evaluated the expected safety conditions on I-90 in the westbound and eastbound mainline roadways in order to predict the percent change in the number of accidents on I-90 for the no-build and build conditions. The methodology used to predict future accident frequency for I-90 recognizes that accident rates for this high-volume freeway facility are not uniform throughout the day. As volumes increase and congestion worsens, the accident frequency are known to increase at a pace faster than the VMT (see Exhibits 5-12 and 5-13), resulting in higher peak-period accident rates. Where the percentage of the daily accidents exceeds the percentage of daily volumes in the peak periods, the accident rates are higher. Based on the patterns observed on I-90, existing accident rates (using 2004 to 2008 accident data) were calculated for the following four time periods:

- AM peak period (7:00 a.m. to 9:59 a.m.)
- PM peak period (4:00 p.m. to 6:59 p.m.)
- Midday (10:00 a.m. to 3:59 p.m.)
- Evening and early morning (7:00 p.m. to 6:59 a.m.)



Note: Traffic volume curve represents data from Screenline 2, while accident distribution represents all accidents within the corridor.

EXHIBIT 5-12
Time-of-Day Distribution for Existing Traffic Volume and Accidents on Eastbound I-90



Note: Traffic volume curve represents data from Screenline 2, while accident distribution represents all accidents within the corridor.

EXHIBIT 5-13
Time-of-Day Distribution for Existing Traffic Volume and Accidents on Westbound I-90

Table 5-13 summarizes the existing accident rates (accidents per million vehicle miles traveled [MVMT]) for the identified time periods. Additionally, an assessment was completed to provide a qualitative safety review regarding the proposed changes to the center roadway, specifically changes that might influence lane changes from a GP on-ramp to the center roadway or outer roadway HOV lane and from the center roadway or outer roadway HOV lane to a GP off-ramp. This assessment only compared the build condition with the no-build condition with the I-90 Two-Way Transit and HOV Operations Project with Stages 1 through 3 completed, because these two conditions include the completed outer roadway HOV lane.

TABLE 5-13
Existing Accident Rate Distribution on I-90

Time Period	Accident Rate (accidents per MVMT) [a]	
	Eastbound	Westbound
AM peak period	1.01 (0.31)	1.03 (0.34)
PM peak period	1.13 (0.39)	1.74 (0.51)
Midday	0.53 (0.13)	0.81 (0.26)
Evening and early morning	0.71 (0.27)	0.73 (0.27)

[a] Values in parentheses indicate the injury accident rate.
Accident rates were determined by using data from 2004 to 2008.
MVMT million vehicle miles traveled

Safety Prediction Methodology and Expected Percent Change in Accident Frequency

The accident rates calculated for the four time periods were applied to the estimated VMT in the future conditions where it is expected that volumes would increase, lengthening the periods of congested travel. To estimate the amount of travel that occurred in the extended peak periods, a VISSIM model estimated the number of vehicles that were able to cross Lake Washington on I-90 during the peak periods. The number of vehicles unable to cross Lake Washington due to congestion provides guidance on how many hours congestion would extend beyond the peak periods. The higher peak-period accident rates were applied to the travel that would occur during the peak period and during the times of extended congestion. This process resulted in estimating that in 2030 the build condition would experience a 1.4-percent increase in the accident frequency in the I-90 outer mainline roadways when compared with the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3. Although the accident frequency would slightly increase in the eastbound and westbound mainline roadways, the vehicle accidents occurring in the reversible center roadway would be eliminated. In summary, the eliminating accidents in the reversible center roadway with the project would offset the predicted increase in accidents in the eastbound and westbound mainline roadways. The no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2 would have 6.3 percent fewer accidents than the full the I-90 Two-Way Transit and HOV Operations Project no-build condition because the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 would likely have more VMT; thus, an increase in accidents, in the outer mainline roadways than the other no-build condition. Similarly, the build condition would have a few more accidents in the outer mainline roadways than the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2 because light rail in the reversible center roadway would shift traffic to the outer mainline roadways.

Future Accident Prediction by Vehicle and Person Miles Traveled

The analysis from the I-90 Two-Way Transit and HOV Operations Project EIS formed the basis for predicting accident frequency on the I-90 outer roadways. The limits of the future accident prediction for this project and those used in the I-90 Two-Way Transit and HOV Operations Project do not match exactly, but they are similar; therefore, the percent change in the predicted accident frequency was applied to the results from the I-90 Two-Way Transit and HOV Operations Project instead of the absolute changes in accident frequency. The methodology estimates the percent change in accidents expected in the westbound and eastbound mainline roadways that would occur when vehicle demand is shifted to the outer roadways with light rail operating in the reversible center roadway (no-build to build). Previous analyses estimated that, by 2025, the I-90 outer mainline roadways would have 360 to 390 accidents per year by implementing accident mitigation measures (shown in Table 6-12 of *I-90 Two-Way Transit and HOV Operations Project Transportation Discipline Report* [WSDOT, 2002]). These mitigation measures include the following:

- Speed management, such as posted or variable speed changes, west of Island Crest Way
- Shoulder rumble strips
- Enhanced delineation
- Static and variable signing
- Roadway and tunnel illumination
- Incident management

Congestion in year 2025 is expected to resemble congestion in year 2030; therefore, the percentage changes computed for the 2030 conditions were used to estimate the expected change in accident frequency. Furthermore, the scenario analyzed in the Two-Way Transit and HOV Operations Project matches the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3, which was used as the baseline in comparing changes in accident frequency.

Considering the results of this analysis with the mitigation measures incorporated in the I-90 Two-Way Transit and HOV Operations Project (Table 5-14), the accident frequency of the I-90 westbound and eastbound mainline roadways in the build condition could increase by up to five accidents per year more than the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3. Furthermore, the no-build condition with only the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2 could have up to 25 fewer accidents per year than the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3. This would be primarily due to lower VMT (i.e., vehicle throughput) in the no-build condition with only the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2.

TABLE 5-14
2030 Accident Frequency Predictions for I-90 Outer Mainline Roadways

Condition	Eastbound and Westbound Outer Roadways		Total (includes reversible center roadway)	
	Percent Change	2030 Accident Frequency	Percent Change	2030 Accident Frequency
Base Condition: 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project with mitigation measures (Stages 1 through 3)	N/A	360 to 390[a]	N/A	366 to 397[a]
2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2	- 6.3	337 to 365	- 6.3	343 to 372
2030 build	+ 1.4	365 to 395	- 0.3	365 to 395

[a] These values are from the 2025 analysis conducted as part of the I-90 Two-Way Transit and HOV Operations Project (WSDOT, 2002).
HOV high-occupancy vehicle
N/A not applicable

Although East Link would shift more demand to the outer roadways and likely result in a slightly greater accident frequency in these lanes (approximately five accidents per year in 2030), several safety benefits linked to the light rail operations can be expected. For instance, vehicle accidents occurring in the reversible center roadway would be eliminated once light rail replaces vehicle access in the reversible center roadway.

In the existing study period (2004 to 2008), the reversible center roadway averaged 11 accidents per year, which are expected to be prevented when light rail replaces the vehicle usage. Furthermore, the Two-Way Transit and HOV Operations Project Report predicted that the reversible facility would have six to seven accidents in 2025. This means that, overall, East Link, when combining all three roadway facilities (eastbound, westbound, and reversible center), is expected to have no effect on I-90 safety conditions, and a nearly identical accident frequency between the no-build and build conditions is expected (see Table 5-14). It should be noted that accidents occurring on the ramps (including ramp terminal intersections) that connect the reversible lanes to local streets were assumed to redistribute to the ramps that connect to the outer mainline roadways.

Measuring the accident prediction in million person miles traveled (MPMT) instead of MVMT shows a safety benefit from developing the light rail system**.** The accident rates based on daily VMT are somewhat similar for all three conditions (Table 5-15); however, there would be a noticeable increase in PMT with the build condition, and therefore, a safety benefit is expected because people using light rail would be passengers in a travel mode substantially safer than auto. Because more people would be traveling through the corridor in the build condition and the expected accident frequency is expected to be similar between the no-build and build conditions, the accident frequency in terms of moving people would be lower.

TABLE 5-15
2030 Accident Rates as a Function of Vehicle and Person Miles Traveled (All I-90 Roadways)

Condition	Annual Accident Frequency Prediction	Daily VMT (estimated)	Accidents per MVMT	Daily PMT (estimated)	Accidents per MPMT
Base Condition: 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project with mitigation measures (Stages 1 through 3)	366 to 397	1,313,969	0.76 to 0.83	1,875,465	0.53 to 0.58
2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2	343 to 372	1,216,245	0.77 to 0.84	1,570,320	0.60 to 0.65
2030 Build	365 to 395	1,302,968	0.77 to 0.83	1,948,756	0.51 to 0.56

Note: Results include predictions for eastbound and westbound travel as well as outer roadways and reversible center roadways combined.
HOV high-occupancy vehicle
MVMT million vehicle miles traveled
PMT person miles traveled
VMT vehicle miles traveled

In Seattle, if the D2 Roadway were designated for joint-use with buses, there would be about 30 vehicles (including light rail) per hour during the peak periods, or a vehicle every 1.5 to 2 minutes using this roadway. This number of light rail and bus vehicles would be substantially less than the maximum number of vehicles for safe operations that was determined for Central Link and the bus/light rail joint operations in the Downtown Seattle Transit Tunnel. The findings from the *Central Link Initial Segment Environmental Assessment* (Sound Transit, 2002) established that 60 buses and up to 10 trains would operate jointly. To more safely separate vehicles and manage bus and light rail vehicle movements on the D2 Roadway, a vehicle identification and signal system would be installed. In addition, bus on-ramps to the D2 Roadway would be equipped with gates to prevent auto and truck traffic from entering this roadway. These gates would be raised when buses entering the D2 Roadway are detected.

Injury Accident Analysis

The analytical process that was performed to predict the total number of accidents was repeated to assess the project's potential impact on injury-only accidents. In summary, by applying the existing injury accident rates to future conditions, it was estimated that by 2030, the build condition would have a 1.9 percent increase in the accident frequency in the I-90 outer mainline roadways when compared with the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 though 3. Comparing the two no-build conditions, the no-build condition with only the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2 would have 6.0 percent fewer accidents than the full the I-90 Two-Way Transit and HOV Operations Project no-build condition. This previous analysis estimated that, by 2025, the I-90 outer mainline roadways would have from 130 to 180 injury accidents per year if accident-reduction measures were implemented and from 205 to 275 with no mitigation measures. Considering the results of this analysis with the assumed mitigation measures (Table 5-16), the injury accident frequency of the I-90 westbound and eastbound mainline roadways in the build condition could have up to three injury accidents per year more than the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3.

TABLE 5-16
2030 Injury Accident Frequency Predictions for I-90 Outer Mainline Roadways

Condition	Eastbound and Westbound Outer Roadways		Total (includes reversible center roadway)	
	Percent Change	2030 Injury Accident Frequency	Percent Change	2030 Injury Accident Frequency
Base Condition: 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project with mitigation measures (Stages 1 through 3)	N/A	130 to 180[a]	N/A	132 to 184[a]
2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2	- 6.0	122 to 169	- 6.0	124 to 173
2030 Build	+ 1.9	132 to 183	0	132 to 183

[a] These values are from the 2025 analysis conducted as part of the Two-Way Transit and HOV Operations Project (WSDOT, 2002).
HOV high-occupancy vehicle
N/A not applicable

Furthermore, the no-build condition with only the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2 could have 11 fewer injury accidents per year than the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3. Similar to the analysis for total accidents, this decrease is primarily due to lower VMT (i.e., vehicle throughput) in the no-build condition with only the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2.

In the existing study period (2004–2008), the reversible center roadway averaged nearly five injury accidents per year, which are eliminated when light rail operates in the reversible center roadway. By year 2025, the Two-Way Transit and HOV Operations Project predicts that the reversible center roadway would have two to four injury accidents, meaning that East Link Project, when combining all three roadway facilities (eastbound, westbound, and reversible center), would likely have no impact on the number of I-90 injury accidents and, likewise, a similar injury accident frequency between the no-build and build conditions is expected (see Table 5-16).

A review of the injury accident rates based on PMT for the three conditions considered shows that the build condition would have a similar or slightly lower injury accident rate when compared with the two no-build conditions (Table 5-17). The similar expected frequency of injury accidents combined with the additional PMT that accompanies light rail results in similar or slightly lower injury rates based on person travel.

TABLE 5-17
2030 Injury Accident Rates as a Function of Vehicle and Person Miles Traveled (All I-90 Roadways)

Condition	Annual Injury Accident Frequency Prediction	Daily VMT (Estimated)	Injury Accident per MVMT	Daily PMT (Estimated)	Injury Accident per MPMT
Base Condition: 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project with mitigation measures (Stages 1 through 3)	132 to 184 [a]	1,313,969	0.28 to 0.38	1,875,465	0.19 to 0.27
2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 and 2	124 to 173	1,216,245	0.28 to 0.39	1,570,320	0.22 to 0.30
2030 Build	132 to 183	1,302,968	0.28 to 0.38	1,948,756	0.19 to 0.26

Note: Results include predictions for eastbound and westbound travel as well as outer roadways and reversible center roadways combined.
HOV high-occupancy vehicle
MVMT million vehicle miles traveled
PMT person miles traveled
VMT vehicle miles traveled

Qualitative Safety Review of Interchange Specific Weaving

An assessment was completed to provide a qualitative safety review regarding the proposed changes to the center roadway, specifically changes that might influence lane changes from a GP on-ramp to the center roadway or outer roadway HOV lane and from the center roadway or outer roadway HOV lane to a GP off-ramp. This assessment only compared the build condition with the no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 completed because these two conditions include the completed outer roadway HOV lanes.

In the no-build condition, the reversible center roadway is open to westbound HOV and Mercer Island traffic in the AM peak hour and eastbound HOV and Mercer Island traffic in the PM peak hour; therefore, the East Link Project would result in no physical differences in weaving between the HOV lanes and the outside GP lanes in the off-peak direction, except for eastbound I-90 through downtown Mercer Island, where the proposed ramp options with the project result in slight weaving volume differences during both time periods. Thus, the review of weaving volumes focuses on the following movements:

- Westbound I-90 weaving from the center roadway exit or the HOV lane to the ramp to I-5 northbound (AM peak hour)
- Northbound I-5 to eastbound I-90 ramp weaving from the ramp to the entrance to the center roadway or the HOV lane (PM peak hour)
- 76th Avenue SE westbound on-ramp weaving to the HOV lane (AM peak hour)
- Eastbound I-90 weaving from the HOV lane to 77th Avenue SE off-ramp (AM and PM peak hours)
- Eastbound I-90 weaving from the HOV lane to Island Crest Way off-ramp (AM and PM peak hours)

The weaving volumes considered in this review are based on the 2030 peak-hour throughput (Table 5-18). Specific to the Mercer Island weaves, the volumes represent the number of vehicles that complete or begin the weave within 2,500 feet of the on- or off-ramp. This distance is based on the weaving definition provided in the *Highway Capacity Manual* (TRB, 2000); the manual also provides the number of weaves that might occur in a relatively short distance. The weavers identified within this distance are assumed to have the highest potential to contribute to an accident because they might select smaller gaps in traffic, they might slow down or come to a stop while waiting for a gap, or performing the maneuver might result in increased levels of driver frustration and aggressive behavior. It is important to note that the weaving volume does not represent the total number of vehicles that would complete the maneuver.

TABLE 5-18
2030 Expected Weave and Mainline Volumes at Select Locations

Weave Location	Peak Hour	No Build		Build	
		Weave Volume	GP Mainline	Weave Volume	GP Mainline
I-90 westbound center roadway and HOV lane to I-5 northbound	2030 AM	680	5,480	520	6,240
I-5 northbound to I-90 eastbound center roadway and HOV lane	2030 PM	710	4,560	330	4,760
76th Avenue SE on-ramp to I-90 westbound HOV lane	2030 AM	0	5,020	20	5,430
I-90 eastbound to Downtown Mercer Island off-ramps	2030 AM	30	5,080	180[a] 150[b] 170[c]	5,260[a] 4,930[b] 4,800[c]
I-90 eastbound to Downtown Mercer Island off-ramps	2030 PM	Less than 10	5,000	190[a] 90[b] 90[c]	5,090[a] 5,400[b] 5,460[c]

[a] Provide a 77th Avenue SE HOV direct-access eastbound off-ramp.
[b] Provide the preferred Island Crest Way HOV direct-access eastbound off-ramp.
[c] Provide no HOV direct-access eastbound off-ramp.
GP general purpose
HOV high-occupancy vehicle

I-90 Westbound Center Roadway and HOV Lane to I-5 Northbound (AM Peak Period Only)
Weave volumes in the no-build condition are from the inside HOV lane and the center reversible roadway to I-5 northbound (approximately 3,800 feet); weave volumes in the build condition are only from the HOV lane (at the same distance). In the 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 completed, approximately 680 vehicles are expected to complete the weave from the HOV lane or center roadway. In comparison, 520 vehicles are expected to complete a similar weave from the inside HOV lane in the 2030 build condition. Even though the build condition would have slightly lower weaving volumes, these vehicles would cross a higher number of vehicles in the GP lanes (6,240 vehicles in comparison with 5,480 vehicles in the no-build condition). Overall, the total potential vehicle conflicts in the build condition should be similar to the no-build condition.

I-5 Northbound to I-90 Eastbound Center Roadway and HOV Lane (PM Peak Period Only)
Weave volumes in the no-build condition are from I-5 northbound to the inside HOV lane or to the center reversible roadway (approximately 4,700 feet); weave volumes in the build condition are only to the HOV lane. In the 2030 no-build condition with the I-90 Two-Way Transit and HOV Operations Project Stages 1 through 3 completed, approximately 710 vehicles are expected to weave to the HOV lane or center roadway. In comparison, this is more than double the number expected in the build condition because approximately 330 vehicles would perform the weave. Within this weaving area, the 2030 build condition is expected to have about 200 additional vehicles in the GP lanes compared with the no-build condition. Even so, the potential number of vehicle conflicts in the build condition is less than the no-build condition.

76th Avenue SE On-Ramp to I-90 Westbound HOV Lane (AM peak period only)
The East Link project would eliminate the westbound direct access in the morning to the center roadway, resulting in the potential for more weaving maneuvers from the 76th Avenue SE westbound on-ramp to the westbound HOV lane. Even so, only 20 vehicles would complete the weave to the inside HOV lane at a distance of 2,500 feet or less. The low frequency of expected weave vehicles in the build condition is expected to have a minimal impact on the safety performance of westbound I-90 in the area of the 76th Avenue SE on-ramp.

I-90 Eastbound to Downtown Mercer Island Off-Ramps
Three options in the build condition are assessed for eastbound I-90 through downtown Mercer Island. *Preferred Alternative A1* provides an HOV direct-access off-ramp to southbound Island Crest Way. One design option would provide a HOV direct-access off-ramp to 77th Avenue SE, while the second design option would not

provide an HOV direct access off-ramp, requiring all exiting vehicles to use either the 77th Avenue SE or Island Crest Way GP off-ramps. In Table 5-17, the ramp and weaving volumes to 77th Avenue SE and Island Crest Way are combined to reflect the total weaving in the area. In the AM peak hour, I-90 eastbound is the off-peak direction, with the mainline typically not operating at congested conditions in this area. With similar expected operations for all three options, the weaving volumes with any of the options are relatively uniform, between 150 to 180 vehicles in the AM peak hour. In comparison, the no-build condition has 30 vehicles forecasted to complete a similar weave from the inside HOV lane to the GP off-ramps. Higher weaving volumes crossing similar GP volumes in the build condition could result in a greater number of weaving conflicts in the area.

In the PM peak hour, the no-build condition is expected to have fewer weaves to the off-ramps because vehicles can use the center roadway. With the design option to provide the HOV direct-access off-ramp at 77th Avenue SE, there is an estimated 190 weaving volumes; the other two ramp configurations have approximately 90 weaving vehicles. The higher weaving volume (at or within 2,500 feet) associated with the 77th Avenue SE HOV direct-access eastbound off-ramp is expected to be related to the slightly less congested mainline operations in this area, allowing vehicles in the HOV lane to wait and make the lane changes closer to the off-ramp. In comparison with the no-build condition, all three options could result in a greater number of weaving conflicts.

5.3.4 Construction Impacts

This section discusses potential impacts on I-90 and other regional freeways.

5.3.4.1 Interstate 90

The impacts due to light rail construction on I-90 were analyzed assuming a 2020 construction year. Before light rail construction on I-90, the I-90 Two-Way Transit and HOV Operations Project would be completed (Stages 1 through 3) and the reversible center roadway and D2 Roadway would be closed. As a result, all bus routes, HOVs, and Mercer Island drivers would be rerouted to the outer roadways. Year 2020 person and vehicle throughput and travel-time information for the two no-build conditions and the East Link construction condition are presented in Tables 5-19 and 5-20. The amount of vehicle congestion on the outer roadways during East Link construction would be similar to East Link operations because the reversible center roadway would be removed in both conditions. Therefore, the vehicle travel times during construction would be similar to the travel times during East Link operations. Although the number of vehicles able to travel across Lake Washington on I-90 would be similar in both conditions, the vehicle demand to use the outer roadway would be greater during construction because light rail would not be operating. The person throughput would be less during construction because the reversible center roadway would not be operational for vehicles or light rail; therefore fewer people would cross Lake Washington.

Compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project completed, the SOV travel times in the East Link construction period would generally be similar or improved because the outer roadway HOV lanes would be completed before East Link construction. Vehicle throughput during the construction period compared with the no-build condition with only Stages 1 and 2 of the I-90 Two-Way Transit and HOV Project would be similar in the peak directions and higher in the reverse-peak directions because outer roadway HOV lanes would be completed. Person throughput, with the same comparison, would be less in the peak directions and higher in the reverse-peak directions. Similar to the previous comparison, when East Link construction is compared with the no-build condition when all three stages of the I-90 Two-Way Transit and HOV Operations Project are completed, the SOV travel times during East Link construction would generally be similar or better. One reason for this is the lower number of lane changes near the closed center roadway ramps creating less congestion.

TABLE 5-19
2020 East Link Construction (Build) and No-Build Vehicle and Person Peak-Hour Throughput for I-90 at Lake Washington (Screenline 2)

Direction	AM Vehicle and Person Throughput					PM Vehicle and Person Throughput				
	Vehicles				Persons	Vehicles				Persons
	SOV	HOV[a]	Transit	Total	Total	SOV	HOV[a]	Transit	Total	Total
Westbound										
No Build[b]	5,550	2,000	32	7,600	11,050	5,200	950	11	6,150	7,600
No Build[c]	6,000	2,050	33	8,100	11,600	5,300	1,000	13	6,300	7,850
Build	5,700	1,850	32	7,550	10,300	5,200	1,550	13	6,750	8,950
Eastbound										
No Build[b]	4,450	600	12	5,050	6,050	4,400	2,200	34	6,650	10,500
No Build[c]	4,950	750	13	5,750	6,950	5,500	2,850	34	8,350	12,950
Build	5,600	750	10	6,350	7,450	5,100	1,500	28	6,650	9,000

[a] HOV values are the total number of HOVs crossing the screenline, not the amount only in the HOV lanes.
[b] With Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[c] With Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
Note: Due to rounding, values might not sum correctly.
SOV single-occupant vehicle
HOV high-occupancy vehicle

Person throughput in the reverse-peak directions (eastbound in the AM period and westbound in the PM period), at Screenline 2 (I-90 Floating Bridge) would be higher during East Link construction than it would be for the no-build condition when all three stages of the I-90 Two-Way Transit and HOV Operations Project are completed. This is partly because the traffic analysis assumed Mercer Island drivers would be eligible to use the outer roadway HOV lanes when the center roadway is closed. In the peak directions (westbound in the AM peak period and eastbound in the PM peak period), person throughput at Screenline 2 (Lake Washington) is expected to be higher under the no-build condition when all three stages of the I-90 Two-Way Transit and HOV Operations Project are completed than it would be in during East Link construction; this is because the outer roadway HOV lanes would be operating in conjunction with the center roadway in this No Build Alternative and project construction would close the center roadway. Although more people would cross Lake Washington in this no-build condition, the outer roadway HOV lanes during East Link construction would accommodate a substantial portion of the vehicles displaced from the center roadway as the center roadway is underutilized because its accesses do not provide enough capacity to effectively use the two lanes in the center roadway.

The reversible center roadway and D2 roadway would be affected by East Link construction. Constructing light rail tracks on these facilities would require their full closure. Therefore, buses that currently travel on the D2 roadway would be detoured to adjacent I-90 accesses, either the SR 519/South Atlantic Street or Rainier Avenue South interchanges. While the majority of construction activities would be on the reversible center roadway, activities might occur for short periods along the I-90 shoulder and outer roadway HOV lanes near the East Channel Bridge and Rainier Avenue interchange. At the Bellevue Way interchange the westbound mainline, HOV direct-access ramps, and ramps to and from I-90 to the east would experience short-term partial (likely nighttime) closures to construct the elevated structures for *Preferred Alternative B2M* or Alternatives B2A, B2E, B3, and B7. Alternative B1 would not require these closures because it would be at-grade underneath the mainline roadway. If applicable, vehicles would be detoured to the corresponding GP or HOV ramp but vehicles could also be detoured to another interchange.

TABLE 5-20
I-90 2020 No-Build and East Link Construction (Build) Peak-Period Travel Times (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[c]			SOV			HOV			Transit[c]		
End Point	**End Point**	**No-Build[a]**	**No-Build[b]**	**Build**	**No-Build[a]**	**No-Build[b]**	**Build**	**No-Build[a]**	**No-Build[b]**	**Build**	**No-Build[a]**	**No-Build[b]**	**Build**	**No-Build[a]**	**No-Build[b]**	**Build**	**No-Build[a]**	**No-Build[b]**	**Build**
Westbound outer roadway																			
Mercer Island (Island Crest Way)	I-5 to Downtown. Seattle[d]	8.5	9.0	7.5	8.5	7.0	5.8	-/-	-/-	15.1/12.2	6.7	8.4	8.9	6.7	6.5	7.1	8.8/7.7	9.8/6.7	9.8/7.7
Bellevue Way[e]	I-5 to Downtown Seattle[d]	24.3	22.5	19.3	11.1	9.8	8.4	-/-	-/-	25.5/-	22.2	23.3	20.1	11.1	9.2	9.5	13.8/-	14.8/-	22.3/-
I-405	I-5 to Downtown Seattle[d]	26.7	24.3	21.6	13.8	12.2	10.8	-/-	-/-	21.2/16.1	28.7	27.8	21.5	13.4	11.6	12.0	16.0/14.6	16.8/11.9	16.7/12.8
Reversible center roadway[f]																			
Mercer Island (77th Avenue SE)	I-5 to Downtown Seattle[g]	6.1	8.7	N/A	N/A	N/A	N/A	N/A	N/A	-/-	8.6	5.7	N/A	N/A	N/A	N/A	N/A	N/A	-/-
Mercer Island (77th Avenue SE)	Seattle (5th Avenue South[h])	N/A	N/A	N/A	5.1	5.9	N/A	6.5/6.4	7.5/7.3	-/-	N/A	N/A	N/A	5.4	5.5	N/A	6.2/6.2	6.2/6.2	-/-
Bellevue Way[e]	Seattle (5th Avenue South[h])	N/A	N/A	N/A	8.1	8.9	N/A	10.7/-	11.8/-	-/-	N/A	N/A	N/A	8.0	8.1	N/A	11.0/-	11.2/-	-/-
I-405	Seattle (5th Avenue South[h])	N/A	N/A	N/A	10.4	11.1	N/A	13.2/11.4	13.9/12.4	-/-	N/A	N/A	N/A	9.7	9.9	N/A	13.5/11.0	13.6/11.1	-/-
Eastbound outer roadway																			
I-5 from Downtown Seattle[i]	Mercer Island (Island Crest Way)	11.6	13.6	12.9	11.2	12.9	9.5	9.6/9.5	8.1/9.6	13.8/13.2	11.8	11.3	11.8	10.8	6.4	9.8	-/-	-/-	10.9/10.5
I-5 from Downtown Seattle[i]	Bellevue Way[j]	13.6	16.9	16.0	13.0	14.4	11.7	14.1/-	12.6/-	17.3/-	14.0	14.6	14.4	12.9	8.4	12.2	-/-	-/-	14.6/-
I-5 from Downtown Seattle[i]	I-405	15.4	18.7	18.0	15.0	16.6	13.6	15.6/13.7	14.1/12.7	20.1/17.2	16.0	16.8	16.6	14.3	10.4	14.1	-/-	-/-	17.6/14.9

[a] No-build condition with Stages 1 and 2 of the I-90 Two-Way Transit and HOV Operations Project.
[b] No-build condition with Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project.
[c] Transit routes with stops on Mercer Island/transit routes with no stops on Mercer Island.
[d] In no-build condition, all vehicles end at I-5 northbound ramp except transit, which uses D2 Roadway.
[e] In no-build conditions, HOVs and transit use the westbound Bellevue Way HOV on-ramp.
[f] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak; the center roadway would be closed to traffic in the construction condition.
[g] SOVs are required to exit and/or enter center roadway at Rainier Avenue South interchange.
[h] Travel time is to and/or from 5th Avenue South via the D2 Roadway.
[i] In no-build condition, all SOVs start at I-5 southbound ramps to I-90, except PM HOVs, which use the D2 Roadway; transit would use the D2 Roadway in the no-build condition.
[j] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps.

- Buses that do not travel on this roadway during this period or do not travel between these points.
HOV high-occupancy vehicle
N/A not applicable because the mode is not eligible to travel this path or the path is restricted
SOV single-occupant vehicle
Note: Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; and Bellevue Way means at the South Bellevue Park-and-Ride.

5.3.4.2 Other Regional Freeways

Short-term East Link construction impacts on I-405 and SR 520 are expected. All Segment C alternatives would close multiple lanes of I-405, likely at night or on weekends—depending on the construction method to build the elevated structure over I-405—potentially causing drivers to detour and take alternative routes. I-405 impacts due to the *Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E would occur adjacent to the NE 6th Street direct-access ramps and NE 8th Street ramps to and from the south of NE 8th Street. Impacts associated with the Alternatives C3T, C4A, C7E, and C8E would occur immediately north of the NE 12th Street overpass across I-405.

Along the SR 520 mainline, impacts would be limited to short-term shoulder or lane closures. SR 520 eastbound on- and off-ramps from 148th Avenue NE to West Lake Sammamish Parkway would experience shoulder or lane closures and temporary lane shifts for all Segment D and E alternatives; except Alternative D3 which would not have any impacts to the 148th Avenue NE interchange, and when the elevated portions of Alternatives E1 and E4 cross SR 520 near the Lake Sammamish Parkway interchange and when the elevated portion of Alternative E1 that crosses SR 520 near the SR 202 interchange. These elevated crossings would result in each direction of SR 520 being closed at night, causing drivers to detour and take alternative routes. The westbound on-ramp and eastbound off-ramp at the SR 520 and SR 202 intersection would be reconstructed to provide clearance for the light rail structure that would be constructed for *Preferred Alternative E2* and Alternative E4.

5.4 Potential Mitigation

No mitigation would be necessary along the I-90 mainline with during project operations because the project would have either similar or improved vehicle travel times and increased person throughput across Lake Washington in both the AM and PM peak periods compared with the No Build Alternative and the overall safety on I-90 would improve with the project. In addition, before I-90 East Link construction, the I-90 Two-Way Transit and HOV Operations Project would be completed to provide HOV lanes on I-90 west to Seattle that replace the reversible center roadway used by East Link.

During East Link construction, Sound Transit would coordinate with WSDOT on incident management, construction staging, and traffic control where the light rail construction might affect freeway traffic. Sound Transit would also coordinate with WSDOT to disseminate construction closure information to the public as needed.

For potential mitigation regarding transit on I-90, including mitigation for transit when the D2 Roadway is closed, refer to Section 4.0; for potential mitigation regarding trucks on I-90, refer to Section 8.0; and for potential intersection mitigation at or near I-90 ramp terminals, refer to Section 6.5.

6.0 Arterials and Local Streets

6.1 Section Overview

As described in this section, the following analysis of arterials and local streets indicates that the East Link Project would positively affect and connect the growing Eastside neighborhoods and impacts on roadway operations, safety, and parking on arterials and local streets would generally be minimal or, if there were impacts, could be mitigated. For the future no-build conditions, intersection operations would continue to degrade to congested levels (LOS E and LOS F) throughout the study area, hindering vehicular mobility within the study area. This would occur especially in Downtown Bellevue, where intersections are already operating at or near capacity. Light rail would not necessarily improve the intersection operations, but would provide a reliable and faster transportation mode for traveling through the study area.

Along streets where a light rail alternative travels at-grade, intersections would typically operate at an LOS similar to that of the no-build condition. This is because the East Link Project would restore, in most cases, roadway capacity similar to capacity under the no-build conditions. Additionally, light rail is usually able to travel safely through the intersections without substantial signal adjustments as light rail would receive some level of priority at the traffic signals. However, changes to the signal coordination are expected to be minimal because light rail detection would occur in advance of the train arriving, similarly to the operations along Martin Luther King Jr. Way in Seattle. In Downtown Bellevue, at-grade alternatives would receive some signal priority at the signals, but maintain east-west vehicle progression along key arterials. For alternatives with either elevated or tunneled sections, intersections are expected to operate similarly to the no-build condition because the alternative would operate outside the roadway right-of-way. Near the light rail stations, roadways and intersections are expected to operate in most cases at an LOS similar to the LOS under no-build conditions. Stations that include park-and-ride facilities are expected to generate more vehicle trips than would be generated by other stations; therefore, a few intersections immediately adjacent to some of the stations might operate slightly worse under the build condition than under the no-build condition. Potential intersection mitigation improvements generally consist of turn pockets or new traffic signals.

In addition to the analysis in this Final EIS, Sound Transit, and the City of Bellevue cooperatively explored at-grade and grade-separated alternatives in Segment C and analyzed their effects on traffic operations using models that are different from those applied in this Final EIS for the *Downtown Bellevue Light Rail Alternatives Concept Design Report* (Sound Transit, 2010b). To validate these results, a peer review of the study by traffic engineering and transit operations professionals from Seattle, Portland, Denver, and San Diego was organized. This group concluded that the traffic modeling, simulation, and operational analysis were sufficient to compare build alternatives. Based on their extensive experience in all four cities, the panel concluded that the surface alternatives studied would have impacts on traffic operations in Bellevue that are similar to the impacts of the surface light rail systems in the comparable environments of Downtown Portland, Downtown Denver, and Downtown San Diego. The panel noted that most of the changes in forecasted future traffic operating conditions in Downtown Bellevue are the result of traffic volume growth and not the introduction of surface light rail.

The interaction of the light rail alternatives with vehicles is expected to be minimal as many of the alternatives have portions, or completely, grade-separated outside the roadway system. For alternatives that would operate within a roadway, vehicle conflict points would be minimized as vehicle movements would be restricted across the tracks at unsignalized locations and would be protected at signalized intersections so that safety is not compromised. This would create some traffic recirculation for properties adjacent to the build alternatives because access would generally be restricted to right-in, right-out movements. Project-generated trips are not expected to increase the vehicle accident rates, as the roadway conditions would remain similar to or would improve compared with those of the No Build Alternative.

With the East Link Project, parking capacity would increase at some existing park-and-ride lots as well as through the construction of new park-and-ride facilities. The potential for spillover parking might increase near stations and park-and-ride facilities because of limited available on-street parking and increased parking demand related to transit usage. However, the potential for "hide-and-ride" parking activity is expected to be minimal at most stations because the park–and-ride lots are expected to accommodate the forecasted parking demand, and available on-street parking is limited near many stations. The following section describes the existing conditions, impacts, and potential mitigation on arterial and local street transportation elements, including roadway characteristics, intersection levels of service, intersection safety, and parking.

6.2 Affected Environment

Existing PM peak-hour turning movement counts were collected from local and state agencies (WSDOT, City of Seattle, City of Mercer Island, City of Bellevue, and City of Redmond) for the study intersections listed in Appendix A. AM and PM data were collected within the City of Seattle and the City of Mercer Island. For intersections with turning movement count data collected before 2005, new counts were taken. Turning movements were calibrated to a consistent existing conditions year of 2007. Additional information used in the operational analysis includes identifying the roadway's functional use, lane geometry, traffic signal timing and phasing patterns, on-street parking, proximity to bus stops, and speed limits.

The quality of traffic operations is described in terms of level of service (LOS). Traffic volumes were analyzed using the Highway Capacity Manual methodology to calculate peak-hour LOS at signalized and unsignalized intersections. Intersection results at signalized intersections are provided for the average delays of all vehicles as they approach the intersection. Intersection results at unsignalized intersections are provided for the average delays for all vehicles at all-way stop-controlled (AWSC) intersections, and the leg that would experience the greatest delay, or worst LOS, for two-way stop-controlled (TWSC) intersections. LOS grades range from LOS A to LOS F; LOS A represents the best operation, where most vehicles do not stop at all, and LOS F the poorest operation, where most of the drivers stop and wait more than a minute until proceeding through the intersection. A more detailed discussion of intersection LOS is provided in Appendix B.

Parking surveys were conducted during spring 2007 to inventory the availability of on-street parking within 0.25 mile of the stations. The survey included a space occupancy count, taken once during the morning and once during the afternoon on a weekday, to calculate the percent parking utilization. These calculations were used to identify where potential light rail impacts might require parking mitigation. On-street parking supply and demand were inventoried for two types: unrestricted and restricted. Restricted on-street parking includes all on-street parking that is restricted by meters, time limit signs, parking zones, or other restrictions. Off-street parking was not inventoried, but general observations are provided about the location and usage of these facilities.

Generally, parking supply and costs vary throughout the corridor, with higher parking demand and costs in the Downtown Seattle and Bellevue areas. On the Eastside, parking availability varies widely, depending on the area. For instance, many private garages are located in the Downtown Bellevue area, while private garages are limited in other areas, such as South Bellevue. Demand for parking also varies, with relatively high demand in Downtown Bellevue, more moderate demand in the Bel-Red and Overlake areas, and relatively low demand in South Bellevue.

Because the Affected Environment (existing conditions) section was based on the year 2007, a few projects (such as some of the projects in the I-405 program, the NE 10th Street extension in Downtown Bellevue and minor intersection improvements) that have been constructed are included in the future no-build conditions. Refer to Appendix A for the list of these already completed projects.

6.2.1 Segment A

Segment A spans approximately 7 miles, originating in Seattle at the International District/Chinatown Station and terminating near the Bellevue Way interchange with I-90 in Bellevue. This segment crosses Lake Washington on the I-90 reversible center roadway.

6.2.1.1 Existing Operations and Level of Service

Major arterials or roadways in Segment A potentially affected by the project are identified in Table 6-1. Generally, the identified roadways vary from two- to four-lane cross-sections with posted speed limits of 25 or 30 mph. I-90 is an eight-lane freeway with three lanes in each direction and a two-lane reversible roadway. Currently, I-90 carries approximately 140,000 vehicles per day.

TABLE 6-1
Segment A Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)	ADT [a]
5th Avenue South	Principal arterial	2	30	N/A
4th Avenue South	Principal arterial	6	30	15,890
Airport Way South	Principal arterial	4	30	3,540
Rainier Avenue South	Principal arterial	5	30	14,050
North Mercer Way	Minor arterial	2	25	9,600
Island Crest Way	Principal arterial	4	25	9,110
77th Avenue SE	Collector arterial	3	25	5,900
76th Avenue SE	Collector arterial	3	25	7,550
80th Avenue SE	Collector arterial	3	25	5,250
East Mercer Way	Collector arterial	2	25	9,600
West Mercer Way	Collector arterial	2	25	4,900
I-90	Interstate freeway	8	60	140,000

[a] ADT based on the latest available traffic count information
ADT average daily traffic
mph miles per hour
N/A not applicable

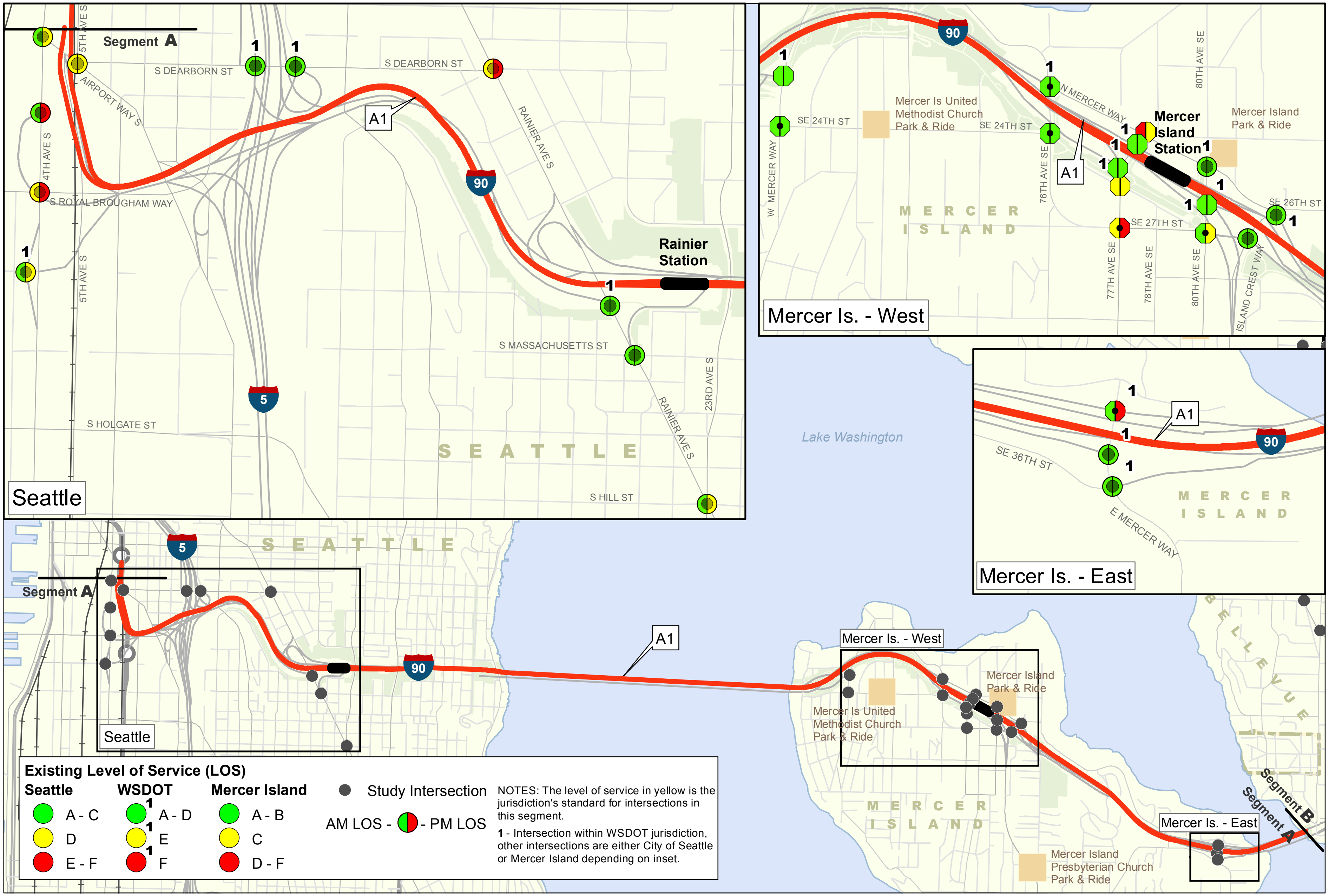
Intersection analysis for Segment A was prepared for 11 intersections in Seattle and 20 intersections on Mercer Island in the existing AM and PM peak-hour conditions. Five of the intersections in Seattle are within WSDOT jurisdiction because the intersection either is a ramp terminal or is located near a ramp terminal. Similarly, on Mercer Island, 13 of the 20 intersections evaluated are within WSDOT jurisdiction. The existing intersection analysis was completed and then compared with the relevant jurisdiction's adopted LOS standard to gauge whether the intersection operates at an acceptable LOS. The relevant agencies within Segment A and their LOS standards are:

- WSDOT: LOS E
- City of Seattle: LOS D
- City of Mercer Island: LOS C

In Segment A, six intersections would not meet agency standards in the existing condition, the following five occurring in the PM peak hour as they either operate at LOS E or F:

- Rainier Avenue S and S Dearborn Street
- I-90 and 4th Avenue S
- S Royal Brougham Way and 4th Avenue S
- 77th Avenue SE and SE 27th Street
- E Mercer Way and I-90 westbound ramps

In the AM peak hour on Mercer Island, 77th Avenue SE and N Mercer Way also would not meet Mercer Island's LOS standards because it operates at LOS D. High volumes in the westbound left-turning movement cause poor operations at the E Mercer Way and I-90 westbound ramps. AM and PM peak-hour intersection LOS results within Segment A are summarized in Exhibit 6-1 and presented in Table D-1 in Appendix D.



Source: Data from King County (2006) modified by CH2M HILL.

Intersection Type

- Signalized
- Two-Way Stop Controlled
- All-Way Stop Controlled

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Central Link Alignment and Station

Exhibit 6-1 **Existing AM and PM Level of Service at Intersections Segment A**
East Link Project

6.2.1.2 Traffic Safety

Accident data for study intersections was collected from each jurisdiction within the study area and reviewed. Accident rates were calculated as the number of accidents per million entering vehicles (MEV). The City of Seattle uses a system in which a high accident location (HALs) is identified for future safety improvements. A signalized intersection is considered an HAL if it experiences an average of more than 10 collisions per year. An unsignalized intersection is considered an HAL if it experiences an average of more than five collisions per year. Intersections within the City of Mercer Island with an accident rate near or above 1.0 are considered intersections with high accident rates. In the City of Seattle, there are no HALs at any of the study intersections. In the City of Mercer Island, there are no study intersections with a high accident rate. Accident rates were also compared to the yearly average accident rate at the study intersections, as shown in Table 6-2.

TABLE 6-2
Segment A Local Intersection Accident Rates

Jurisdiction/Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Seattle						
Rainier Avenue South and South Dearborn Street	40,140	1.00	1.33	0	2.33	0.16
Rainier Avenue South and South Massachusetts Street	35,980	3.67	3.33	0	7.00	0.53
Rainier Avenue South and 23rd Avenue South	39,650	2.67	1.67	0	4.33	0.30
Rainier Avenue South and I-90 eastbound off-ramp	33,580	0.33	0	0	0.33	0.03
Dearborn Street and I-5 southbound ramp	16,950	1.33	2.33	0	3.67	0.60
Dearborn Street and I-5 northbound ramp	19,820	1.00	0.33	0	1.33	0.18
I-90 and 4th Avenue South	31,270	1.00	0.33	0	1.33	0.12
South Royal Brougham Way and 4th Avenue South	37,780	2.67	1.00	0	3.67	0.27
Airport Way South and 4th Avenue South	25,940	1.33	0.33	0	1.67	0.18
Airport Way South and South Dearborn Street	17,610	1.33	0.67	0	2.00	0.31
4th Avenue South northbound off-ramp and Edgar Martinez Drive South	41,290	2.33	3.00	0	5.33	0.35
City of Mercer Island						
West Mercer Way and I-90 ramps	5,620	0.33	0.33	0	0.67	0.32
West Mercer Way and 24th Avenue SE	6,840	0.67	0.33	0	1.00	0.40
80th Avenue SE and SE 27th Street	12,890	0.33	1.67	0	2.00	0.43
80th Avenue SE and I-90 eastbound express lanes ramp	6,130	0	0.33	0	0.33	0.15
80th Avenue SE and North Mercer Way	10,680	0.33	0.33	0	0.67	0.17
77th Avenue SE and Sunset Highway	7,490	0.33	0.33	0	0.67	0.24
77th Avenue SE and I-90 westbound express lanes ramp	7,370	0	0	0	0	N/A
77th Avenue SE and I-90 eastbound off-ramp	660	0.67	0.3	0	1.00	0.42
77th Avenue SE and North Mercer Way	11,320	1.00	0.67	0	1.67	0.40
77th Avenue SE and SE 27th Street	16,100	1.33	1.33	0	2.67	0.45
76th Avenue SE and North Mercer Way and I-90 westbound on-ramp	9,920	1.33	0.3	0	1.67	0.46
76th Avenue SE and 24th Avenue SE	9,920	0.67	0	0	0.67	0.18
Island Crest Way and I-90 eastbound on-ramp	18,320	2.67	2.33	0	5.00	0.75

TABLE 6-2 CONTINUED
Segment A Local Intersection Accident Rates

Jurisdiction/Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
Island Crest Way and I-90 westbound off-ramp	13,030	1.33	1.33	0	2.67	0.56
East Mercer Way and I-90 eastbound off-ramp	10,270	0.30	0	0	0.33	0.09
East Mercer Way and I-90 eastbound on-ramp	17,500	0	0	0	0	N/A
East Mercer Way and I-90 westbound ramps	10,290	0.30	0	0	0.33	0.09

acc./MEV accidents per million entering vehicles
ADT average daily traffic (entering only)
FAT fatality
INJ injury
N/A not applicable; no recorded accidents during study period
PDO property damage only

6.2.1.3 Parking

Parking supply and demand was inventoried for on-street restricted and unrestricted spaces; however, few on-street restricted areas exist within the cities of Seattle and Mercer Island in Segment A. Operation of existing on-street parking is governed by each jurisdiction. Table 6-3 provides parking utilization and supply information near Segment A stations. The only park-and-ride within Segment A is maintained by Sound Transit and located on N Mercer Way in the City of Mercer Island. This facility has recently been expanded and was closed in year 2007 because of construction and expansion activity on the site. Parking data was collected after it re-opened in 2008.

TABLE 6-3
Segment A Existing Parking Supply and Utilization

Parking Type	AM Period			PM Period		
	Supply	Demand	Utilization (percent)	Supply	Demand	Utilization (percent)
Rainier						
On-street unrestricted	879	363	41	879	335	38
On-street restricted	–	–	–	–	–	–
Subtotal	879	363	41	879	335	38
Mercer Island [a, b]						
On-street unrestricted	108	73	68	108	67	62
On-street restricted	26	23	88	26	21	81
Subtotal	134	96	72	134	88	66

Parking near the Rainier Station was collected in spring 2007 on all roads within a 0.25-mile radius of the stations.

[a] Parking near the Mercer Island Station was collected in Spring 2008 on all roads within a 0.25-mile radius of the stations because the park-and-ride was closed during spring 2007.

[b] A restricted parking zone (RPZ) near the proposed station has been implemented since the 2007 parking survey. These RPZs would reduce the available on-street unrestricted parking.

The Rainier Station parking survey area is centered on I-90 near the eastern opening of the Mount Baker Tunnel. In general, the area is bounded by S Charles Street to the north and S Grand Street to the south. Martin Luther King Jr. Way S and Rainier Avenue S form the approximate eastern and western boundaries, respectively. Land use in the area is primarily residential. On-street parking in this area is generally unrestricted by meters, loading zones, or other restrictive use. Of 879 available on-street parking spaces, 363 spaces, or 41 percent, were occupied during the AM peak period. Slightly fewer spaces, 335 spaces or 38 percent, were occupied during the PM peak period. Much of the private parking surrounding the Rainier Station is located on commercial and light industrial properties along Rainier Avenue S; parking regulations are enforced by private property owners at their discretion.

The Mercer Island Station parking area is centered on I-90 and is generally bound by SE 22nd Street to the north, SE 29th Street to the south, 76th Avenue SE to the west, and 84th Avenue SE to the east. Land use is primarily residential north of I-90 and primarily commercial south of I-90. During the AM and PM peak periods, 108 unrestricted on-street parking spaces are available. Demand reached 73 spaces, or a utilization of 68 percent, during the AM peak period and 67 spaces, or a utilization of 62 percent, during the PM peak period. Only 26 additional restricted on-street parking spaces are available. Demand reached 23 spaces, or a utilization of 88 percent, during the AM peak period and 21 spaces, or 81 percent, during the PM peak period. Private off-street parking garages are located throughout Mercer Island Town Center, and cost and validation policies vary among property owners. Regulations for private parking are enforced by property owners at their discretion. Parking located in the residential neighborhoods north of I-90, surrounding the Mercer Island Park-and-Ride Lot, is restricted parking designated as residential parking zones (RPZs). It was implemented to reduce impacts of park-and-ride spillover parking into residential neighborhoods and the Town Center. The Mercer Island Park-and-Ride has approximately 450 parking spaces, of which 435 are used currently, for a utilization rate of 97 percent each weekday (King County Metro, 2008a).

6.2.2 Segment B

Segment B spans approximately 1.8 miles from the I-90 on- and off-ramps at Bellevue Way SE to SE 6th Street. The segment is oriented primarily north and south, south of the Bellevue Central Business District. Appendix A lists the study area intersections in Segment B.

6.2.2.1 Existing Operations and Level of Service

The project corridor within Segment B consists of roadways that are listed in Table 6-4. These roadways vary from two to four lanes, with posted speeds between 30 and 40 mph. Current daily volumes on Bellevue Way are near 39,000, while all other roadways in Segment B have daily volumes between 7,000 and 15,000.

TABLE 6-4
Segment B Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)	ADT[a]
Bellevue Way SE	Principal arterial	4	30 to 40	38,800
112th Avenue SE	Principal arterial	4	35	15,200
SE 8th Street	Principal arterial	4	35	10,560
118th Avenue SE	Collector arterial	2	35	7,125
I-90	Interstate freeway	8	60	140,000
Former BNSF Railway	Railroad	N/A	55	N/A

[a] ADT based on the latest available traffic count information.
ADT average daily traffic
mph miles per hour
N/A not applicable

Intersection analysis was prepared for 19 intersections in Segment B; 13 intersections are within the City of Bellevue's jurisdiction, and 6 are in WSDOT jurisdiction. Intersection analysis was prepared for existing conditions and compared with the relevant jurisdiction's adopted LOS standard to gauge whether the intersection operates at an acceptable LOS. The relevant agencies within Segment B and their LOS standards are as follows:

- City of Bellevue: LOS D (Mobility Management Area 7)
- WSDOT: LOS E

Within Segment B, four intersections (118th Avenue SE and SE 8th Street, 112th Avenue SE and SE 15th Street, Bellevue Way SE and SE 30th Street, and Bellevue Way SE and South Bellevue Park-and-Ride) operate at LOS F in the PM peak hour. All other intersections within Segment B operate at LOS D or better. During the AM peak hour, only two intersections were analyzed because they are located close to I-90: Bellevue Way SE and South Bellevue Park-and-Ride and Bellevue Way SE and SE 30th Street. Of these two intersections, the Bellevue Way SE and SE 30th Street intersection operates at LOS F. AM and PM peak-hour intersection LOS results for Segment B are summarized in Exhibit 6-2 and presented in Table D-2 in Appendix D.

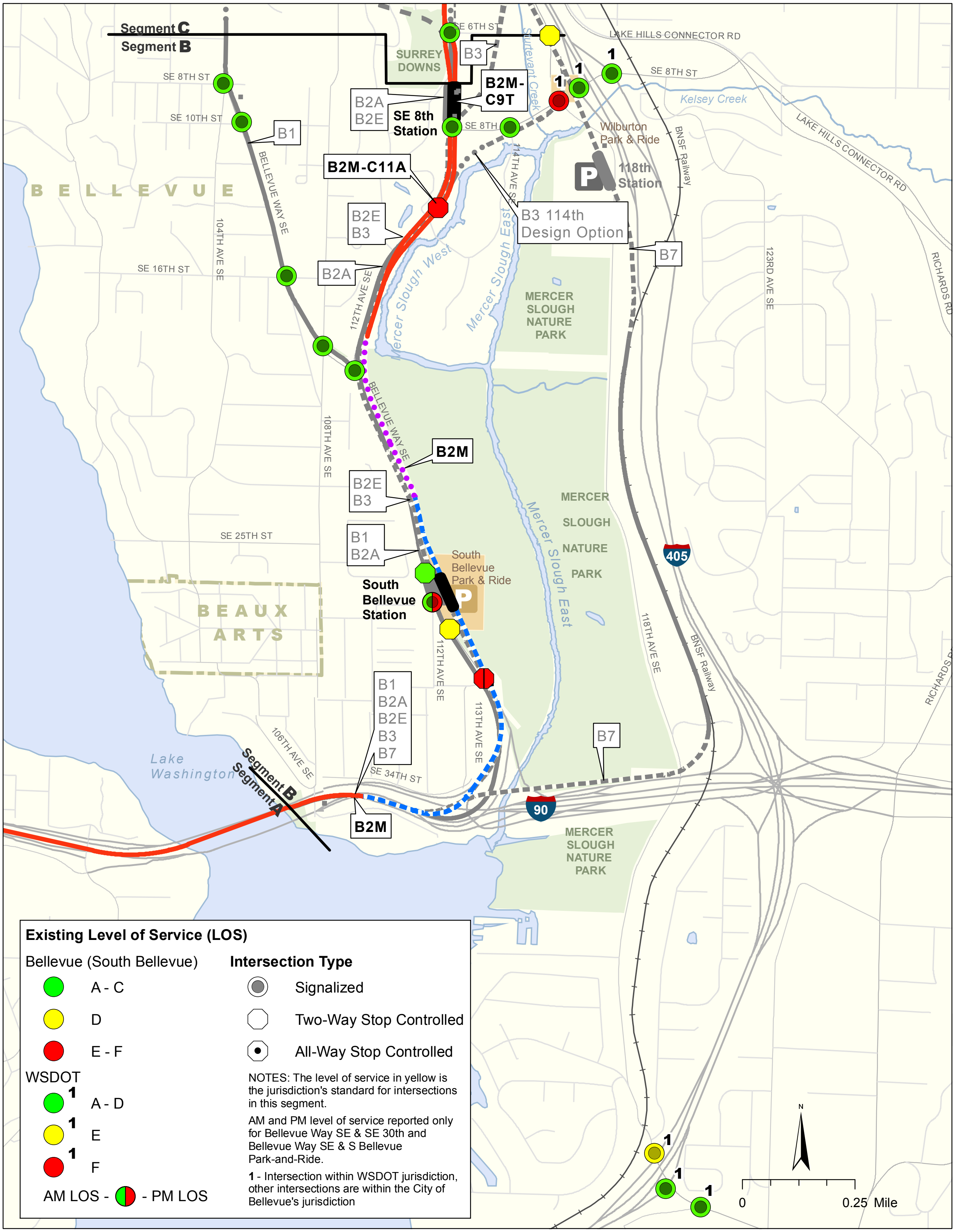
6.2.2.2 Traffic Safety

Accident data for study intersections was collected from each jurisdiction within the study area and reviewed. Accident rates were calculated as the number of accidents per MEV. Intersections within the City of Bellevue with an accident rate near or above 1.0 are considered intersections with high accident rate. In **S**egment B**,** there are no intersections with high accident rates. Accident rates were also compared with the yearly average accident rate at the study intersections, as shown in Table 6-5.

TABLE 6-5
Segment B Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average.			Yearly Accident Average	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
112th Avenue SE and Bellevue Way SE (MMA 7)	30,440	1.67	1.33	0	3.00	0.27
112th Avenue SE and SE 8th Street (MMA 7)	18,020	1.00	0.33	0	1.33	0.20
118th Avenue SE and SE 8th Street (MMA 7)	19,380	1.33	1.00	0	2.33	0.33
1-405 Northbound Ramps and SE 8th Street (MMA 7)	18,170	0.67	0	0	0.67	0.10
I-405 SB Ramps and SE 8th Street (MMA 7)	20,510	0.33	1.33	0	1.67	0.22
Bellevue Way SE and SE 30th Street	31,430	0.67	0	0	0.67	0.06
Bellevue Way SE and South Bellevue Park-and-Ride	32,590	1.00	0	0	1.00	0.08
112th Avenue SE and SE 6th Street	20,770	1.00	1.00	0	2.00	0.26
114th Avenue SE and SE 6th Street	9,420	0.33	0	0	0.33	0.10
SE 8th Street and 114th Avenue SE (Bellefield Business Park)	13,220	0.33	0	0	0.33	0.07
Bellevue Way SE and 108th Avenue SE	23,540	1.67	0.33	0	2.00	0.23
Bellevue Way SE and SE 16th Street	20,830	0.67	1.00	0	1.67	0.22
Bellevue Way SE and 104th Avenue SE	19,390	0.33	0.67	0	1.00	0.14
Bellevue Way SE and SE 10th Street	21,620	1.33	0.67	0	2.00	0.25
Coal Creek Parkway and I-405 southbound ramp	21,470	1	0.33	0	1.33	0.17
Coal Creek Parkway and I-405 northbound ramp	26,660	1.67	0.33	0	2.0	0.21
Coal Creek Parkway and 119th Ave SE	27,430	3.67	1	0	4.67	0.47

acc./MEV accidents per million entering vehicles
ADT average daily traffic (entering only)
FAT fatality
INJ injury
N/A not applicable; no recorded accidents during study period
PDO property damage only



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-2 **Existing AM and PM Level of Service at Intersections Segment B**
East Link Project

6.2.2.3 Parking

Parking surveys were conducted to inventory the available on-street parking within 0.25 mile of the South Bellevue, SE 8th, and 118th stations located in Segment B. No restricted on-street parking exists in any of the areas surrounding the stations in Segment B. Table 6-6 summarizes the results of the surveys.

TABLE 6-6
Segment B Existing Parking Supply and Utilization by Station

Parking Type	AM Period			PM Period		
	Supply	Demand	Utilization (percent)	Supply	Demand	Utilization (percent)
South Bellevue						
On-street unrestricted	438	51	12	438	31	7
On-street restricted	–	–	–	–	–	–
Subtotal	438	51	12	438	31	7
SE 8th [a]						
On-street unrestricted	301	24	8	301	27	9
On-street restricted	–	–	–	–	–	–
Subtotal	301	24	8	301	27	9
118th						
On-street unrestricted	127	5	4	127	5	4
On-street restricted	–	–	–	–	–	–
Subtotal	127	5	4	127	5	4

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

[a] A restricted parking zone (RPZ) near the proposed station has been implemented since the 2007 parking survey. These RPZs would reduce the available on-street unrestricted parking.

The parking survey area surrounding the South Bellevue Station is approximately bounded by 108th Avenue SE on the western side, SE 23rd Street on the northern side, and SE 31st Street on the southern side. The station is adjacent to Mercer Slough Nature Park, which forms the parking survey area’s eastern side. Land use surrounding the station is primarily residential. Parking utilization rates are relatively low compared with utilization rates in other segments. Of an available 438 unrestricted on-street parking spaces, only 51 spaces, or 12 percent, were occupied during the AM peak period; 31 spaces, or 7 percent, were occupied during the PM peak period.

The SE 8th Street Station is located near the intersection of SE 8th Street and 112th Avenue SE. The parking survey area is approximately bounded by SE 4th Street, 109th Avenue SE, SE 15th Street, and 118th Avenue SE. Land use is split between commercial office buildings and residential. Of 301 available unrestricted on-street parking spaces, only 24 spaces, or 8 percent, are occupied during the AM peak period; and only 27 spaces, or 9 percent, are occupied during the PM peak period.

The parking survey area surrounding the proposed location of the 118th Station is approximately bounded by SE 6th Street to the north, 112th Avenue SE to the west, and SE 12th Street to the east. Land use in this area is split between commercial office buildings and residential. Existing on-street parking utilization in this survey area is also low compared with the utilization in other study segments. Of 127 available unrestricted on-street parking spaces, only 5 spaces, or 4 percent, are occupied during both the AM and PM peak periods. Most of the available on-street parking conducted for the 118th Station is east of I-405.

The two park-and-ride lots in Segment B, South Bellevue Park-and-Ride and Wilburton Park-and-Ride, are both currently used at or near capacity on weekdays. With each of the park-and-rides near or at capacity in conjunction with the low on-street parking indicates that people do not appear to be parking on-street in the nearby neighborhoods and walking to these lots. South Bellevue has 519 parking spaces, and Wilburton has

186 parking spaces. The majority of off-street private parking within Segment B comprises parking lots surrounding office and commercial areas adjacent to SE 8th Street.

6.2.3 Segment C

Segment C is the area bounded by SE 6th Street to the south, Bellevue Way to the west, NE 12th Street to the north, and 116th Avenue to the east. The area includes the central business district of Bellevue. Appendix A lists the study area intersections in this segment.

6.2.3.1 Existing Operations and Level of Service

The project corridor within Segment C consists of roadways that are listed in Table 6-7. Roadways within Segment C vary between three and seven lanes, with the majority providing at least four lanes. All the roadways identified in Table 6-7 are posted for 30 mph.

TABLE 6-7
Segment C Existing Roadway Facilities

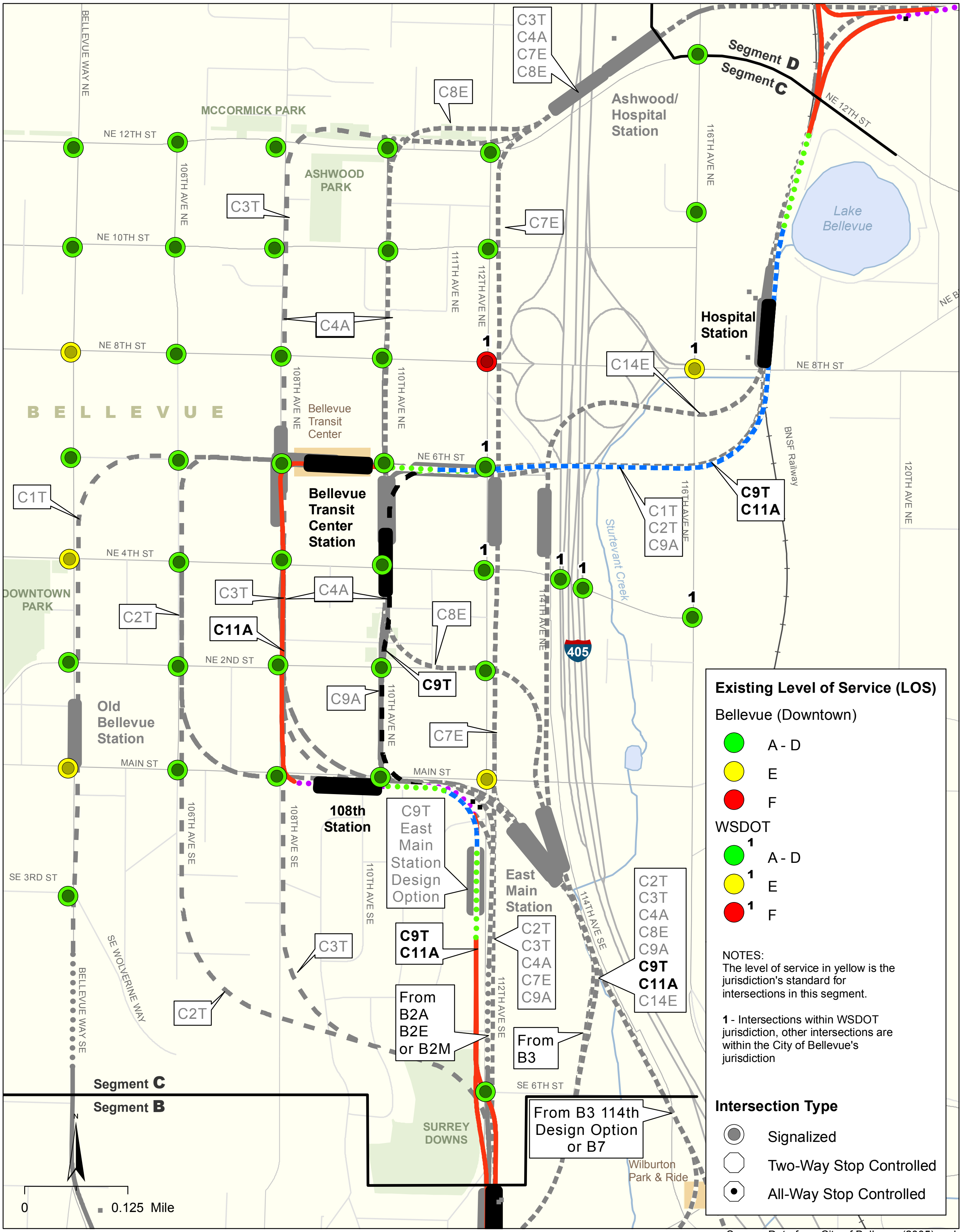
Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)	ADT [a]
112th Avenue SE	Principal arterial	4	35	15,200
Bellevue Way SE	Principal arterial	4	30	27,000
106th Avenue NE	Local arterial	3	30	19,080
108th Avenue NE	Minor arterial	2	30	4,300
110th Avenue NE	Minor arterial	2	30	7,700
112th Avenue NE	Principal arterial	4	30	20,600
116th Avenue NE	Principal arterial	4	30	18,845
Main Street	Minor arterial	4	30	8,400
NE 2nd Street	Minor arterial	3	30	6,900
NE 4th Street	Principal arterial	5	30	11,730
NE 6th Street	Local arterial	4	30	2,650
NE 8th Street	Principal arterial	7	30	42,780
NE 10th Street	Minor arterial	5	30	9,100
NE 12th Street	Principal arterial	5	30	19,490

[a] ADT based on the latest available traffic count information
ADT average daily traffic
mph miles per hour

An existing PM peak-hour intersection analysis was prepared for 43 intersections in Segment C, 7 in WSDOT's jurisdiction and the remaining 36 in the City of Bellevue's jurisdiction. Intersection analysis was prepared for the existing conditions and was compared with the relevant jurisdiction's adopted LOS standard to gauge whether the intersections operate at an acceptable LOS. The relevant agencies within Segment C and their LOS standards are:

- City of Bellevue: LOS E (Mobility Management Area 3)
- WSDOT: LOS E

Of the 43 study intersections in Segment C, only the intersection of NE 8th Street and 112th Avenue NE operates at LOS F. Even though LOS D and E meet the LOS standards in this segment; 12 intersections operate at these conditions in Segment C, indicating that operations are near or at capacity. PM peak-hour intersection LOS results for Segment C are summarized in Exhibit 6-3 and presented in Table D-3 in Appendix D.



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2005) and King County (2006) modified by CH2M HILL.

Exhibit 6-3 **Existing PM Level of Service at Intersections Segment C**
East Link Project

6.2.3.2 Traffic Safety

Accident data for study intersections were collected from each jurisdiction and reviewed within the project corridor. Accident rates were calculated as the number of accidents per MEV. Two intersections within Segment C have accident rates near or above 1.0 accident per MEV: 112th Avenue NE at NE 8th Street/I-405, and 110th Avenue NE at NE 10th Street. The reason why these intersections exhibit a higher accident rate was not evaluated but the 112th Avenue NE and NE 8th Street intersection is a high-volume intersection with an additional fifth approach. At 110th Avenue NE and NE 10th Street intersection, the traffic signal operates in two phases with all left-turn movements permitted. Accident rates were also compared with the yearly average accident rate at the study intersections, as shown in Table 6-8.

TABLE 6-8
Segment C Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
Bellevue Way SE and SE Kilmarnock Street	23,950	1.33	1.00	0	2.33	0.27
Bellevue Way and Main Street (MMA 3)	35,850	4.67	1.67	0	6.33	0.48
Bellevue Way NE and NE 2nd Street	25,430	3.00	0.33	0	3.33	0.36
Bellevue Way NE and NE 4th Street	34,650	3.67	1	0	4.67	0.37
Bellevue Way NE and NE 6th Street	18,700	0	0	0	0	N/A
Bellevue Way NE and NE 8th Street	40,730	5.33	4	0	9.33	0.63
Bellevue Way NE and NE 10th Street	30,860	4	2.67	0	6.67	0.59
Bellevue Way NE and NE 12th Street	34,890	3	1.33	0	4.33	0.34
112th Avenue NE and NE 12th Street (MMA 3)	35,260	1.67	1.00	0	2.67	0.21
112th Avenue NE and NE 10th Street	20,590	1.33	0.33	0	1.67	0.22
112th Avenue NE and NE 8th Street/I-405 southbound ramp (MMA 3)	**52,330**	**14.00**	**5.00**	**0**	**19.00**	**0.99**
112th Avenue NE and NE 6th Street	21,740	0.67	0	0	0.67	0.08
112th Avenue NE and NE 4th Street (MMA 3)	37,210	4.67	2.33	0	7.00	0.52
112th Avenue NE and NE 2nd Street	20,510	0.67	0.33	0	1.00	0.13
112th Avenue and Main Street (MMA 3)	34,700	2.33	0.33	0	2.67	0.21
110th Avenue NE and NE 12th Street	21,250	0.67	0.33	0	1.00	0.13
110th Avenue NE and NE 10th Street	**7,060**	**1.00**	**1.67**	**0**	**2.67**	**1.04**
110th Avenue NE and NE 8th Street	33,390	4.33	2.33	0	6.67	0.55
110th Avenue NE and NE 6th Street	8,510	0	0	0	0	N/A
110th Avenue NE and NE 4th Street	22,860	1.00	1.00	0	2.00	0.24
110th Avenue NE and NE 2nd Street	10,750	1.33	0.33	0	1.67	0.42
110th Avenue and Main Street	19,960	1.33	0	0	1.33	0.18
108th Avenue NE and NE 12th Street (MMA 3)	21,570	1.67	0.67	0	2.33	0.30
108th Avenue NE and NE 10th Street	13,150	0.33	1.67	0	2.00	0.42
108th Avenue NE and NE 8th Street (MMA 3)	33,910	5.67	1.33	0	7.00	0.57

TABLE 6-8 CONTINUED
Segment C Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
108th Avenue NE and NE 6th Street	9,180	0.33	0.33	0	0.67	0.20
108th Avenue NE and NE 4th Street (MMA 3)	28,390	1.67	0.67	0	2.33	0.23
108th Avenue NE and NE 2nd Street	15,240	0.67	0.67	0	1.33	0.24
108th Avenue and Main Street (MMA 3)	22,560	4.67	1.67	0	6.33	0.48
106th Avenue NE and NE 12th Street	17,740	0.67	0.67	0	1.33	0.21
106th Avenue NE and NE 10th Street	16,210	0.67	0.67	0	1.33	0.23
106th Avenue NE and NE 8th Street	31,580	5.33	2.00	0	7.33	0.64
106th Avenue NE and NE 6th Street	9,150	0	0	0	0	N/A
106th Avenue NE and NE 4th Street	21,270	0.33	0.67	0	1.00	0.13
106th Avenue NE and NE 2nd Street	11,830	0.67	1.00	0	1.67	0.39
106th Avenue NE and Main Street	20,310	1.00	0	0	1.00	0.13
NE 4th Street and I-405 SB Ramp	25,470	3.33	1.67	0	5.00	0.54
NE 4th Street and I-405 NB Ramp	15,490	2.33	0.67	0	3.00	0.53
116th Avenue NE and NE 12th Street (MMA 4)	35,130	4.00	2.33	0	6.33	0.49
116th Avenue NE and NE 10th Street	21,550	1.00	0	0	1.00	0.13
116th Avenue NE and NE 8th Street (MMA 4)	56,130	9.33	3.33	0	12.67	0.62
116th Avenue NE and NE 4th Street (MMA 4)	26,350	3.67	0.33	0	4.00	0.42

Note: Intersections with an accident rate at or above 1.0 are highlighted in bold text.
acc./MEV accidents per million entering vehicles
ADT average daily traffic (entering only)
FAT fatality
INJ injury
N/A not applicable; no recorded accidents during study period
PDO property damage only

6.2.3.3 Parking

Parking surveys were conducted to inventory the availability of on-street parking within 0.25 mile of the Old Bellevue, East Main, 108th Avenue, Bellevue Transit Center, Ashwood/Hospital, and Hospital Stations in Segment C. Table 6-9 summarizes the survey results.

The Old Bellevue Station would be located near the intersection of Bellevue Way NE and Main Street. The parking survey area is bounded by NE 4th Street, 108th Avenue, SE 4th Street, and 100th Avenue. Land use is split between residential to the south of Main Street and commercial north of Main Street. During the AM and PM peak periods, 20 to 22 spaces—a utilization rate between 53 to 58 percent—of the available on-street parking spaces are occupied.

The proposed East Main Station is located on the southeast corner of 112th Avenue SE and Main Street. The parking survey area is bounded by 108th Avenue on the western side, SE 4th Street on the southern side, NE 4th Street on the northern side, and 116th Avenue on the eastern side. Land use is primarily commercial, with residential use to the southwest. Of an available 50 unrestricted on-street parking spaces, only 5 spaces, or 10 percent, are occupied during the AM survey period; 4 spaces, or 8 percent, are occupied during the PM survey period.

TABLE 6-9
Segment C Existing Parking Supply and Utilization by Station

Parking Type	AM Period			PM Period		
	Supply	Demand	Utilization (percent)	Supply	Demand	Utilization (percent)
Old Bellevue						
On-street unrestricted	38	22	58	38	20	53
On-street restricted	160	94	59	160	96	60
Subtotal	198	116	59	198	116	59
East Main						
On-street unrestricted	50	5	10	50	4	8
On-street restricted	–	–	–	–	–	–
Subtotal	50	5	10	50	4	8
108th [a]						
On-street unrestricted	29	19	66	29	13	45
On-street restricted	397	82	21	397	96	24
Subtotal	426	101	24	426	109	26
Bellevue Transit Center						
On-street unrestricted	–	–	–	–	–	–
On-street restricted	141	88	62	141	61	43
Subtotal	141	88	62	141	61	43
Ashwood/Hospital						
On-street unrestricted	–	–	–	–	–	–
On-street restricted	138	38	28	138	44	32
Subtotal	138	38	28	138	44	32
Hospital						
On-street unrestricted	26	8	31	26	8	31
On-street restricted	12	1	8	12	8	67
Subtotal	38	9	24	38	16	42

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.
[a] Parking survey was conducted in spring of 2010 after initiation of Surrey Downs Residential Parking Zone.

The proposed 108th Station is location on the south side of Main Street between 108th and 110th Avenue NE. The parking survey area is bounded by NE 4th Street, 105th Avenue SE, SE 4th Street, and 112th Avenue. Land use is split between residential south of Main Street and commercial north of Main Street. During the AM and PM peak periods, 19 and 13 of the 29 available spaces are utilized, a 66 and 45 percent utilization rate, respectively.

The Bellevue Transit Center Station is located along NE 6th Street between 108th and 110th avenues NE. The parking area surveyed is approximately bound by NE 10th Street, 106th Avenue NE, NE 2nd Street, and I-405. Land use surrounding this station is dominated by high-rise commercial offices and retail that are typical of central business districts. All of the on-street parking in this area is restricted. During the AM peak period, 88 spaces, or 62 percent, are occupied. During the PM peak period, 61 spaces, or 43 percent, are occupied.

The Ashwood/Hospital Station would be constructed over I-405, north of NE 12th Street. The parking survey area was bounded by 110th Avenue NE, NE 8th Street, and 116th Avenue NE. Similar to the parking survey surrounding the Bellevue Transit Center, all of the on-street parking, 138 stalls, within this area is restricted. Only 38—a utilization of 28 percent—of these spaces were occupied during the AM peak period; 44—a utilization of 32 percent—were occupied during the PM peak period.

The Hospital Station is located east of the intersection of NE 8th Street and 116th Avenue NE, along the former BNSF Railway rail line. The area studied by the parking survey is bounded approximately by I-405, NE 8th Street, and 124th Avenue NE. A total of 26 unrestricted on-street spaces and 12 restricted on-street spaces were identified. During the AM and PM peak periods, 8 spaces, or 31 percent, of the unrestricted spaces were occupied. Private off-street parking is provided by most of the commercial and employment centers in Segment C. Hourly parking rates, monthly permits, and validation policies are typically enforced at these private facilities. Demand for private parking is highest in the day during traditional business hours. In the downtown area bound by Main Street, 100th Avenue NE, NE 12th Street, and 116th Avenue NE, there are close to 28,700 parking stalls (private and public) with a PM peak-period utilization rate of about 63 percent (City of Bellevue, 2003).

6.2.4 Segment D

Segment D is the Bel-Red corridor and is generally bounded by SR 520 to the north and NE Bel-Red Road to the south. Appendix A lists the study area intersections in Segment D.

6.2.4.1 Existing Operations and Level of Service

The project corridor within Segment D consists of roadway facilities included in Table 6-10. Roadways in Segment D typically vary between two and five lanes. Collector classified roadways have either two or three lanes, while arterials have three to six lanes. All arterials identified in the table are posted for 25 to 35 mph.

TABLE 6-10
Segment D Existing Roadway Facilities

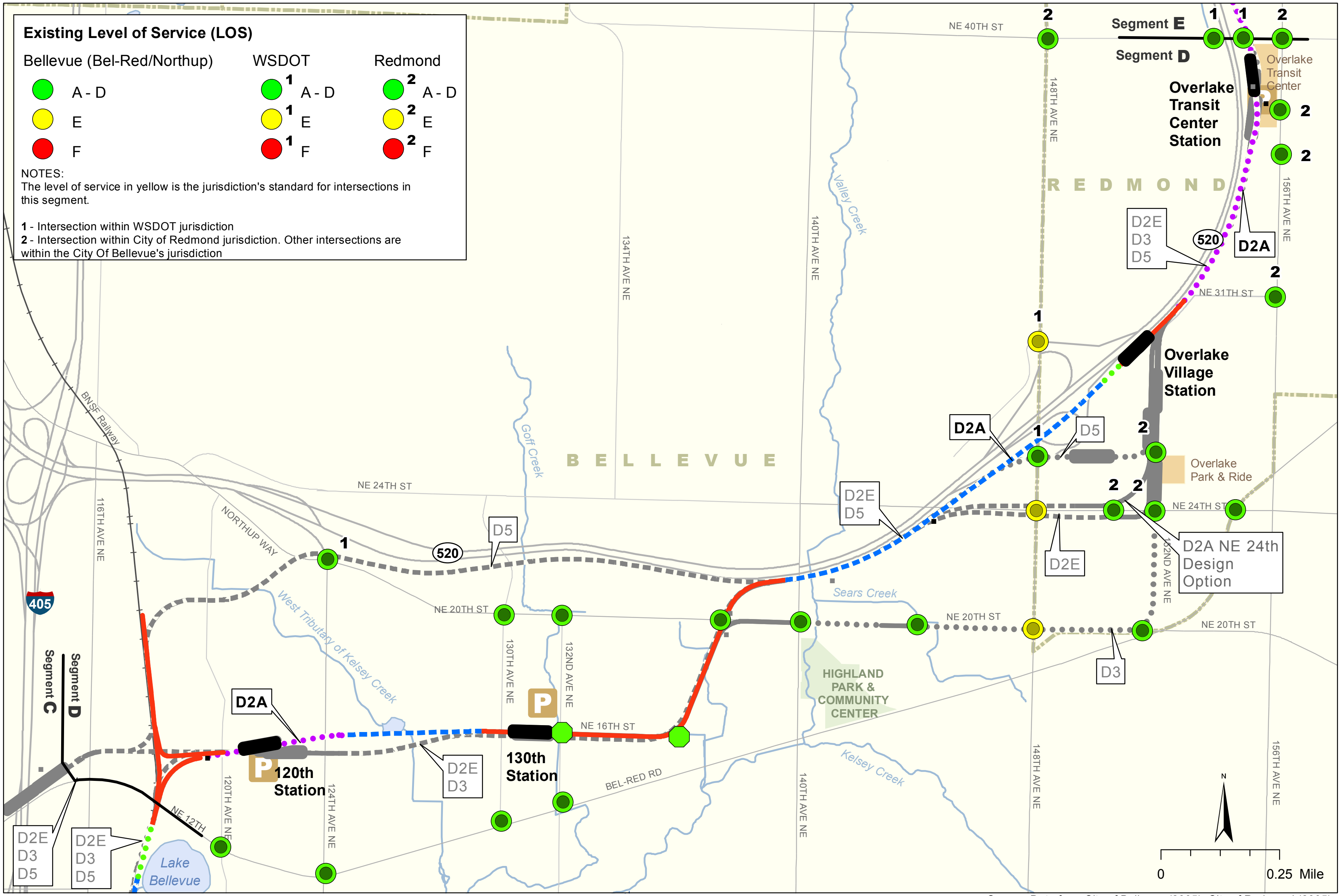
Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)	ADT [a]
124th Avenue NE	Minor arterial	3	30	24,310
130th Avenue NE	Collector arterial	2	30	24,310
132nd Avenue NE	Collector arterial	3	30	3,940
136th Place NE	Collector arterial	2	25	8,780
140th Avenue NE	Minor arterial	5	30	23,820
148th Avenue NE	Principal arterial	6	35	33,140
152nd Avenue NE	Local arterial	4	30	22,490
NE 16th Street	Local arterial	2	25	2,350
NE 20th Street	Minor arterial	4	35	5,820
NE 24th Street	Minor arterial	4	30	13,450

[a] ADT based on the latest available traffic count information.
ADT average daily traffic
mph miles per hour

A PM peak-hour intersection analysis was prepared for 28 intersections in Segment D. Sixteen of these intersections are in the City of Bellevue and 12 are in the City of Redmond. Of the 28 intersections studied in Segment D, five are in WSDOT jurisdiction. Intersection analysis was prepared for the existing conditions and compared with the relevant jurisdiction's adopted LOS standard to gauge whether the intersection operates at an acceptable LOS. The relevant agencies within Segment D and their LOS standards are as follows:

- City of Bellevue: LOS E (Mobility Management Areas 4 and 14)
- City of Redmond: LOS E
- WSDOT: LOS E

None of the intersections in Segment D currently operates at LOS F. Three intersections along 148th Avenue NE operate at LOS E: SR 520 westbound ramp, NE 24th Street, and 20th Avenue NE. All other intersections operate at LOS D or better. Generally, the worst-operating intersections are located along the higher volume (and most congested) arterials: 140th Avenue NE, 148th Avenue NE, 20th Avenue, and 156th Avenue NE. PM peak-hour intersection LOS results are summarized in Exhibit 6-4 and presented in Table D-4 in Appendix D.



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

Intersection Type
- Signalized
- Two-Way Stop Controlled
- All-Way Stop Controlled

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

Exhibit 6-4 **Existing PM Level of Service at Intersections Segment D**
East Link Project

The AM peak hour along 156th Avenue NE and NE 40th Street was analyzed because of the unique travel patterns created by the surrounding land uses. This analysis included five intersections and all those intersections met agency LOS standards. AM peak-hour intersection LOS results are presented in Table D-15 in Appendix D.

6.2.4.2 Traffic Safety

Accident data for study area intersections was collected from each jurisdiction and reviewed within the project corridor. Accident rates were calculated as the number of accidents per MEV. Intersections within **S**egment D with an accident rate near or above 1.0 are considered intersections with high accident rates. Because many of the arterials include either median two-way left-turn lanes or curbed medians restricting turns to signalized intersections, none of the Segment D intersections have an accident rate higher than 0.72 per MEV. This provides an indication that the accident conditions within Segment D are relatively acceptable. Accident rates were also compared with the yearly average accident rate at the study intersections, as shown in Table 6-11.

TABLE 6-11
Segment D Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
120th Avenue NE and NE 12th Street (MMA 4)	24,085	1.33	0.33	0	1.67	0.19
124th Avenue NE and Northup Way (MMA 4)	30,244	4.33	0.67	0	5.00	0.45
124th Avenue NE and Bel-Red Road (MMA 4)	33,450	2.33	0.33	0	2.67	0.22
130th Avenue NE and Bel-Red Road (MMA 4)	29,841	2.00	1.33	0	3.33	0.31
130th Avenue NE and NE 16th Street	7,097	0	0	0	0	N/A
130th Avenue NE and NE 20th Street (MMA 4)	31,757	5.33	3.00	0	8.33	0.72
132nd Avenue NE and Bel-Red Road	25,667	1.67	1.00	0	2.67	0.28
132nd Avenue NE and NE 16th Street	5,152	0	0	0	0	N/A
132nd Avenue NE and NE 20th Street	24,064	0.67	1.33	0	2.00	0.23
136th Place NE and NE 16th Street	5,031	1.00	0	0	1.00	0.54
136th Place NE and NE 20th Street	24,145	1.33	0.33	0	1.67	0.19
140th Avenue NE and 20th Avenue	45,286	4.33	1.00	0	5.33	0.32
NE 20th Street and mall entrance	23,167	1.67	0.67	0	2.33	0.32
City of Redmond						
148th Avenue NE and SR 520 westbound ramps	37,833	2.00	0	0	2.00	0.15
148th Avenue NE and SR 520 eastbound ramps	56,610	0.33	0.33	0	0.67	0.03
NE 24th Street and 148th Avenue NE	102,912	8.00	2.33	0	10.33	0.28
NE 24th Street and 151st Place NE	34,169	1.67	1.33	0	3.00	0.24
NE 20th Street and 152nd Avenue NE	22,301	4.00	1.00	0	5.00	0.61
NE 24th Street and 152nd Avenue NE	37,313	7.67	2.00	0	9.67	0.71
NE 26th Street and 152nd Avenue NE	14,263	0.00	0.33	0	0.33	0.06
NE 24th Street and Bel-Red Road	35,906	2.67	0.67	0	3.33	0.25
NE 40th Street and 148th Avenue NE	40,115	3.67	0.67	0	4.33	0.30
NE 40th Street and SR 520 westbound ramps	36,502	3.00	1.67	0	4.67	0.35

TABLE 6-11 CONTINUED
Segment D Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
NE 40th Street and SR 520 eastbound ramps	42,524	2.33	1.00	0	3.33	0.22
NE 40th Street and 156th Avenue NE	62,911	6.67	1.67	0	8.33	0.36
Overlake Park-and-Ride entrance and 156th Avenue NE	31,798	0	0	0	0	N/A
NE 36th Street and 156th Avenue NE	37,262	4.67	1.33	0	6.00	0.44
NE 31st Street and 156th Avenue NE	30,581	3.00	0.67	0	1.67	0.33
148th Avenue NE and NE 20th Street	61,338	5.33	0.67	0	6.00	0.28

acc./MEV accidents per million entering vehicles
ADT average daily traffic (entering only)
FAT fatality
INJ injury
N/A not applicable; no recorded accidents during study period
PDO property damage only

6.2.4.3 Parking

Parking surveys were conducted to inventory the on-street parking availability within 0.25 mile of the Segment D 120th, 130th, Overlake Village, and Overlake Transit Center Stations. Table 6-12 summarizes the survey results.

TABLE 6-12
Segment D Existing Parking Supply and Utilization by Station

Parking Type	AM Period			PM Period		
	Supply	Demand	Utilization (percent)	Supply	Demand	Utilization (percent)
120th						
On-street unrestricted	177	44	25	177	55	31
On-street restricted	–	–	–	–	–	–
Subtotal	177	44	25	177	55	31
130th						
On-street unrestricted	152	63	41	152	59	39
On-street restricted	1	0	0	1	0	0
Subtotal	153	63	41	153	59	39
Overlake Village						
On-street unrestricted	42	21	50	42	18	43
On-street restricted	–	–	–	–	–	–
Subtotal	42	21	50	42	18	43
Overlake Transit Center						
On-street unrestricted	21	14	67	21	14	67
On-street restricted	–	–	–	–	–	–
Subtotal	21	14	67	21	14	67

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

The proposed location for the 120th Station is between 120th Avenue NE and 124th Avenue NE, near NE 14th Street. The current land use in this area is mainly light to heavy industrial. The area studied by the parking surveys is approximately bounded by 120th Avenue NE, NE 12th Street, 124th Avenue NE, and NE 18th Street. A total of 177 unrestricted on-street parking spaces were identified in this area. Between 25 and 30 percent of these spaces are occupied during the AM and PM peak periods.

The parking survey area surrounding the proposed location of the 130th Station at the intersection of NE 16th Street and 132nd Avenue NE is approximately bounded by 130th Avenue NE, Bel-Red Road, 136th Place NE, and NE 20th Street. A total of 152 unrestricted on-street parking spaces and one restricted on-street parking space were identified in this area. Approximately 40 percent of the unrestricted spaces are occupied during the AM and PM peak periods.

The Overlake Village Station would be constructed north of the NE 24th Street and 152nd Avenue NE intersection. This area is dominated by commercial retail outlets and office buildings. The area that was inventoried is approximately bounded by 148th Avenue NE, NE 20th Street, 156th Avenue NE, and NE 28th Street. A total of 42 unrestricted on-street parking spaces were identified in this area. During the AM peak period, half of these spaces were used. The utilization rate was slightly lower for the PM peak period, when 18 spaces, or 43 percent, were used. The proposed location for the Overlake Transit Center Station is on the southwest corner of the intersection of NE 40th Street and 156th Avenue NE. The surrounding area is primarily used as commercial office space. The parking survey area for this station was bounded by 150th Avenue NE, NE 36th Street, 159th Avenue NE, and NE 45th Street. A total of 21 unrestricted on-street parking spaces were identified in this area. During the AM and PM peak periods, 14 of these spaces, or 67 percent, were used. The Overlake Village Park-and-Ride has 203 parking spaces, of which 33 percent are used each weekday. The Overlake Transit Center has 170 parking spaces, all of which are used each weekday (King County Metro, 2007b).

Within Segment D, the majority of off-street parking occurs on private property throughout the Bel-Red Corridor in Bellevue and the Overlake area in Redmond. Private parking lots along Bel-Red Road typically do not enforce hourly parking policies; however, parking policies and enforcement vary among properties. Demand among private parking lots in Segment D is highest in the day during typical business hours.

6.2.5 Segment E

Segment E extends north of NE 40th Street along SR 520 to Downtown Redmond. Appendix A lists the study area intersections in Segment E.

6.2.5.1 Existing Operations and Level of Service

The project corridor within Segment E consists of roadway facilities that are listed in Table 6-13. Excluding SR 202, the number of lanes on the listed roadways are between two and four lanes. Both local arterial roadways (NE 76th Street and NE 70th Street) and the collector arterial (161st Avenue NE) are two-lane roads that have posted speeds of 25 mph. All other roadways identified in this segment are posted for either 30 or 35 mph. Except on SR 202 (Redmond Way and Cleveland Street) and Union Hill Road and Avondale Road NE, ADT volumes range between 6,000 and 16,000 vehicles. Daily traffic volumes on Redmond Way and Cleveland Street are between 27,000 and 29,000; Union Hill Road and Avondale Road NE have about 26,000 and 33,000 ADT, respectively.

Intersection analysis was prepared for 25 intersections in Segment E. Twenty-two of these intersections are in City of Redmond jurisdiction and the other three are in WSDOT jurisdiction. Intersection analysis was prepared for the existing conditions and reviewed against the relevant jurisdiction’s adopted LOS standard to gauge whether the intersections operate at an acceptable LOS. The relevant agencies within Segment E and their LOS standards are as follows:

- City of Redmond: LOS E
- WSDOT: LOS E

The intersections of NE Leary Way and West Lake Sammamish Parkway, Avondale Road NE and NE Union Hill Road, and SR 202 and East Lake Sammamish Parkway operate at LOS F, which is lower than the standard LOS. The intersection of SR 202 and SR 520 westbound ramps operates at LOS E, while all other intersections operate at or better than LOS D. PM peak-hour intersection LOS results are summarized in Exhibit 6-5 and presented in Table D-5 in Appendix D.

TABLE 6-13
Segment E Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed Limit (mph)	ADT[a]
NE 40th Street	Collector arterial	4	35	10,740
NE 51st Street	Minor arterial	4	30	14,120
NE 76th Street	Local arterial	2	25	2,350
NE 70th Street	Local arterial	2	25	5,920
Leary Way NE	Principal arterial	4	30	15,850
West Lake Sammamish Parkway	Principal arterial	4	30	7,985
Redmond Way (couplet)	Principal arterial	3	30	27,010
Cleveland Street (couplet)	Principal arterial	2	30	29,460
Avondale Road NE	Principal arterial	5	35	33,000
NE Union Hill Road	Minor arterial	4	30	26,000
180th Avenue NE and 178th Place NE	Collector arterial	3	30	12,400
161st Avenue NE	Collector arterial	2	25	8,550
SR 202	Principal arterial	6	45	50,000

[a] ADT based on the latest available traffic count information from City of Redmond (http://www.redmond.gov/connectingredmond/resources/pdfs/redmondmachinecounts.pdf)
ADT average daily traffic
mph miles per hour

6.2.5.2 Traffic Safety

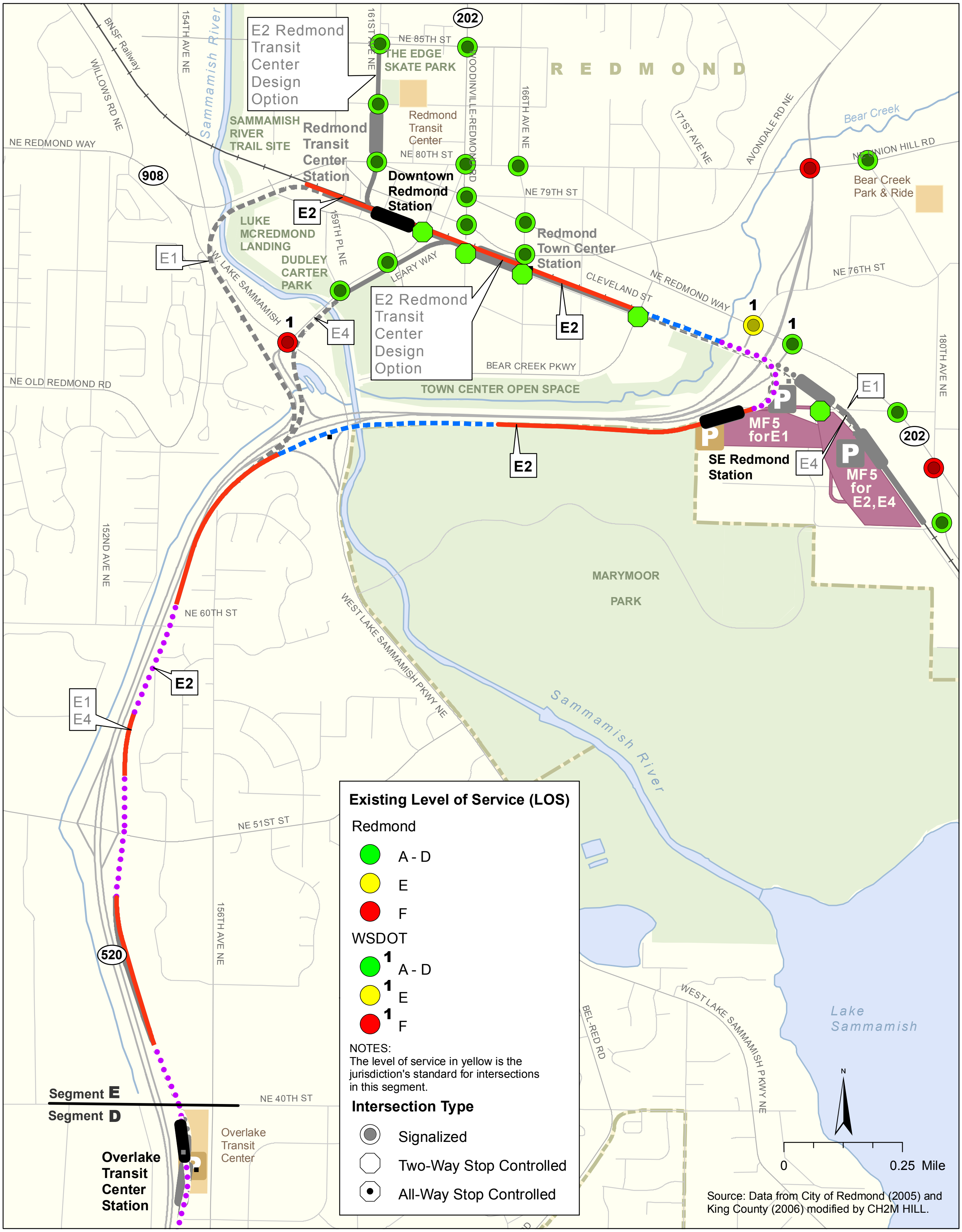
Accident data for study area intersections was collected from each jurisdiction within the project corridor and reviewed. Accident rates were calculated as the number of accidents per MEV. Four intersections within Segment E have accident rates near or above 1.0: 164th Avenue NE and NE 76th Street, 166th Avenue NE and SR 202, SR 202, and SR 520 westbound ramps, and 164th Avenue NE and NE 85th Street. Intersection accident rates were compared with the average number of yearly accidents, as shown in Table 6-14.

6.2.5.3 Parking

Parking surveys were conducted to inventory the availability of on-street parking within 0.25 mile of the Redmond Town Center, SE Redmond, and Redmond Transit Center stations in Segment E. Table 6-15 summarizes the results of the surveys.

The proposed location for Redmond Town Center Station is along NE 76th Street between 164th Avenue NE and 166th Avenue NE. Commercial and retail businesses surround this location. A total of 393 unrestricted and 31 restricted on-street parking spaces were identified within a 0.25-mile radius of the proposed station. During the AM peak period, 179 of these spaces, or 41 percent, were occupied. During the PM peak period, 187 of these spaces, or 45 percent, were occupied.

SE Redmond Station would be located near the intersection of SR 520 and SR 202. Light industry occupies the surrounding area. Within 0.25 mile of the station, a total of 41 unrestricted on-street parking spaces were identified. During the AM and PM peak periods, 29 of these spaces, or 71 percent, were occupied.



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

NOTE:
The intersection at Cleveland St. and 161st Ave NE does not exist in existing (2007) conditions, as roadway projects were not completed by then.

Exhibit 6-5 **Existing PM Level of Service at Intersections Segment E**
East Link Project

Redmond Transit Center Station would be located along 161st Avenue NE between NE 80th Street and NE 83rd Street. Land use consists mainly of multifamily residences and light commercial. A total of 485 unrestricted and 52 restricted on-street parking spaces were identified within a 0.25-mile radius of this location. At least 60 percent of the unrestricted spaces were occupied during the AM and PM peak periods.

TABLE 6-14
Segment E Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Average			Yearly Accident Average	Accident Rate (Acc./MEV)
		PDO	INJ	FAT		
City of Redmond						
NE Leary Way and West Lake Sammamish Parkway	61,732	5.00	0.67	0	5.67	0.25
NE Leary Way and 159th Place NE	36,895	1.33	0.67	0	2.00	0.14
NE Leary Way and Bear Creek Parkway	35,944	1.67	0.33	0	2.00	0.15
NE Leary Way and NE 76th Street	15,721	0	0	0	0	N/A
Redmond Way at 161st Avenue NE	22,682	3.00	0.67	0	3.67	0.44
NE 83rd Street at 161st Avenue NE	12,476	2.67	1.00	0	3.67	0.81
NE 85th Street and 161st Avenue NE	2,112	3.00	0.67	0	3.67	0.47
164th Avenue NE and SR 202/Redmond Way	21,731	2.33	0.33	0	2.67	0.34
164th Avenue NE and NE 76th Street	**3,017**	**0**	**1.67**	**0**	**1.67**	**1.51**
164th Avenue NE and Cleveland Street	18,523	1.33	0.33	0	1.67	0.25
164th Avenue NE and NE 80th Street	20,818	4.33	0.67	0	5.00	0.66
164th Avenue NE and NE 85th Street	**29,109**	**8.00**	**2.33**	**0.33**	**10.67**	**1.00**
166th Avenue NE and SR 202/Redmond Way	**24,901**	**10.67**	**1.33**	**0**	**12.00**	**1.32**
166th Avenue NE and NE 76th Street	10,980	0.67	0	0	0.67	0.17
166th Avenue NE and NE Cleveland Street	29,388	2.33	0.67	0	3.00	0.28
166th Avenue NE and NE 80th Street	23,620	2.33	1.00	0	3.33	0.39
NE 76th Street and Bear Creek Parkway	16,507	1.00	1.00	0	2.00	0.33
SR 202/Redmond Way and SR 520 westbound ramps	**51,564**	**15.33**	**3.00**	**0**	**18.33**	**0.97**
SR 202/Redmond Way and SR 520 eastbound ramps	51,564	5.33	1.33	0	6.67	0.35
SR 202/Redmond Way and NE 70th Street	46,163	4.67	0.67	0	5.33	0.32
NE 70th Street and 176th Avenue NE	5,882	0	0	0	0	N/A
178th Place NE and Union Hill Road	35,652	2.67	1.00	0	3.67	0.28
Avondale Road NE and NE Union Hill Road	53,858	6.00	0	0	6.00	0.31
East Lake Sammamish Parkway and NE 65th Street	29,160	1.33	0	0	1.33	0.13
SR 202/Redmond Way and East Lake Sammamish Parkway (180th Avenue NE)	49,814	12.67	2.00	0	14.67	0.81

Note: Intersections with an accident rate at or above 1.0 are highlighted in bold text.
acc./MEV accidents per million entering vehicles
ADT average daily traffic (entering only)
FAT fatality
INJ injury
N/A not applicable; no recorded accidents during study period
PDO property damage only

TABLE 6-15
Segment E Existing Parking Supply and Utilization by Station

Parking Type	AM Period			PM Period		
	Supply	Demand	Utilization (percent)	Supply	Demand	Utilization (percent)
Redmond Town Center [a]						
On-street unrestricted	393	162	41	393	175	45
On-street restricted	31	17	55	31	12	39
Subtotal	424	179	42	424	187	44
Downtown Redmond [a]						
On-street unrestricted	253	121	48	253	120	47
On-street restricted	13	9	69	13	12	92
Subtotal	266	130	49	266	132	50
SE Redmond						
On-street unrestricted	41	29	71	41	29	71
On-street restricted	–	–	–	–	–	–
Subtotal	41	29	71	41	29	71
Redmond Transit Center [a]						
On-street unrestricted	485	303	62	485	303	62
On-street restricted	52	27	52	52	21	40
Subtotal	537	330	61	537	324	60

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

[a] A restricted parking zone (RPZ) near the proposed station has been implemented since the 2007 parking survey. These RPZs would reduce the available on-street unrestricted parking.

Redmond Transit Center Park-and-Ride Lot has 377 parking spaces, 80 percent of which are used each weekday. The Bear Creek Park–and-Ride Lot, located about 1 mile east of Redmond Transit Center, has 273 parking spaces, more than 100 percent of which are used each weekday (King County Metro, 2007b). Private off-street parking is located at major employment and commercial centers within Segment E. A majority of the private parking is located at Redmond Town Center, and demand varies through the day and evening hours.

6.3 Environmental Impacts

This section analyzes the impacts of the no-build condition and build alternatives in two subsections. Section 6.3.1 presents regional and local travel demand forecasts and each station's vehicle trip generation. The vehicle trip generation is based on the light rail ridership estimates presented in Section 4.3.3. Section 6.3.2 describes the impacts on the local and arterial street system. The analysis on the local and arterial street system includes the future 2020 and 2030 intersection LOS, safety assessment, parking impacts, and property access and circulation patterns. The focus of the analysis in this section is near the proposed stations and along the alternative routes.

6.3.1 Travel Demand Forecasts

Future-year analysis was performed for years 2020 and 2030 and based on the PSRC's current population and land uses forecasts (spring 2007). In the future conditions (no-build and build), numerous highway and arterial improvements were assumed to have been implemented. Section 3.3 provides a more detailed discussion of the travel demand forecasts and summarizes the list of programs and/or projects and the future year(s) when they were assumed to occur. Appendix A provides a complete list of future projects assumed to have been implemented by 2020 and 2030.

Overall, by year 2030, no-build traffic volumes in Segment A are predicted to grow at an average annual growth rate of 2.1 percent and 1.8 percent in the AM and PM, respectively. The highest no-build vehicle growth would occur in Segments A and D, at approximately 2.5 percent per year until 2020, and about 2.0 percent annually up to 2030. Traffic volumes in Segment B are expected to annually grow at a rate of about 1.0 percent through year 2030. Traffic volumes in Segments C and E are expected to annually grow at approximately 1.5 percent through year 2030.

For the build condition, two methods were used to forecast the future vehicular demand. The first method focuses on the impacts of station demand in the South Bellevue (Segment B), Bel-Red (Segment D), and Redmond (Segment E) areas. The second method applies to the I-90 freeway (including Seattle and Mercer Island) and the Downtown Bellevue area (Segment C).

The first method relies on the future no-build forecasts and the station's trip generation information developed from the Sound Transit ridership model. The mode of travel information generated by the Sound Transit ridership model was refined based on the Portland Banfield LRT Station Mode of Access Survey (Tri-Met, 1996) and the *2008 Bay Area Rapid Transit (BART) Station Profile Study* (BART, 2008). The Banfield and BART studies provided mode of access and egress data of Portland and BART light rail riders. These surveys characterize the different modes people choose to use to access and egress the stations, such as walk, drive alone, drive with others, drop off, transit transfer, or other. The light rail station's vehicle and nonmotorized trips associated with the light rail station ridership forecasts for the highest ridership alternative were assigned to the transportation system around the stations. The station's vehicle and nonmotorized forecasts were incorporated into the 2020 and 2030 no-build forecasts to yield a vehicle and nonmotorized forecast for the build condition. This approach yields a conservative forecast for the project alternatives because it does not reflect the shift to transit as people choose to ride light rail rather than drive.

The second method to develop future forecasts of the build condition relies on a forecast of the build condition from the PSRC model and the transit station trip generation information developed from the Sound Transit ridership model. This method was used to identify the shift in traffic demand and patterns within a congested transportation system. The transit ridership associated with the light rail alternatives and the transit service modifications (based on the 2020 and 2030 Transit Service Integration Plan, Sound Transit, 2007) were used to understand demand and travel pattern changes with the build condition compared with the no-build condition.

This method was used to estimate the regional and screenline changes in modal shares and to estimate the vehicular demand for the I-90 and Downtown Bellevue areas. Specifically, the PSRC model was used to develop I-90 freeway mainline and ramps volumes and intersection turn movement volumes in Seattle, Mercer Island (Segment A), and downtown Bellevue (Segment C) for the no-build and build conditions. In these segments, the station's vehicle forecasts from the PSRC demand model were compared with the station's vehicle trip forecasts from the Sound Transit ridership model to ensure a similar forecast between the two models. Volume adjustments were made where necessary to provide a consistent analysis approach for the stations throughout the study area.

In the build condition, there would be a slight reduction in auto use compared with the no-build condition as people adjust their mode of transportation and ride light rail. For 2020, the forecasts for the build condition estimate a reduction of between 2 and 3 percent in the vehicle demand compared with the no-build condition. By 2030, the reduction in vehicle demand between the build and no-build conditions is estimated to be up to 4 percent. A slightly larger reduction would occur in 2030 because congestion is expected to be higher and therefore more people would choose to ride light rail as it is a more reliable transportation mode and would provide a considerable travel time savings compared with driving.

Station trip generation was calculated based on the highest PM peak-period (3-hour) ridership forecasts for each station and included the PM peak bus service levels provided by the transit integration plan prepared for this project (Sound Transit, 2007a). Net increases in bus volumes over existing and no-build conditions were added to the transportation network for each station. Year 2020 and 2030 daily and PM peak-period ridership for the highest ridership alternatives at each station are summarized by mode of travel in Tables 6-16 and 6-17.

TABLE 6-16
2020 3-Hour PM Peak-Period and Daily Station Ridership

Station	Alternative	Daily Station Light Rail Boardings[a]	3–Hour PM Peak Light Rail Ridership[a,d]						
			Walk-and/or Bike-On[c]	Walk-and/or Bike-Off[c]	Bus Access	Bus Egress	Vehicle Person Demand[b]	Person Total[e]	Kiss-and-Ride and Park-and-Ride Vehicle Trips[b]
Rainier	*Preferred Alternative A1*	3,000	290	420	390	390	N/A	1,490	220/0
Mercer Island	*Preferred Alternative A1*	2,500	190	170	280	130	520	1,280	70/390
South Bellevue	*Preferred Alternative B2M* and Alternatives B1, B2A, B2E, B3, and B3 – 114th Extension Design Option	4,000	20	80	500	470	1,710	2,780	250/1,310
SE 8th	*Preferred Alternative B2M (from C9T)* and Alternatives B2A and B2E	500	220	70	30	0	N/A	310	50/0
118th	Alternative B7	2,000	210	60	110	250	750	1,390	110/580
Old Bellevue	Alternative C1	1,500	630	420	10	0	N/A	1,070	160/0
East Main	Segment C alternatives (except C14E) from Alternatives B3, B3 – 114th Extension Design Option, and B7 [g]	2,500	710	450	230	50	N/A	1,440	210/0
108th	*Preferred Alternative C11A*	2,000	670	480	160	50	N/A	1,360	200/0
Bellevue Transit Center	All Segment C alternatives	6,000	2,530	930	500	1,700	N/A	5,650	460/0
Ashwood/ Hospital	Alternatives C3T, C4A, C7E, and C8E	1,000	520	170	50	0	N/A	740	110/0
Hospital	*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E	1,000	300	150	200	30	N/A	680	100/0
120th[f]	*Preferred Alternative D2A* and Alternatives D2E and D3	500	150	280	30	10	N/A	460	70/0
130th[f]	*Preferred Alternative D2A* and Alternatives D2E and D3	1,000	270	60	0	0	360	680	50/270
Overlake Village	All Segment D alternatives	1,000	160	60	80	100	340	740	50 /260
Overlake Transit Center	All Segment D alternatives	3,000	440	280	190	620	600	2,140	90/460
SE Redmond	All Segment E alternatives	2,000	50	20	50	0	1,350	1,470	200/1,030
Redmond Town Center	All Segment E alternatives	1,500	190	140	250	210	N/A	790	120/0
Downtown Redmond	*Preferred Alternative E2*	1,500	270	120	350	250	N/A	980	140/0
Redmond Transit Center	E2 – Redmond Transit Center Design Option	500	50	60	10	0	190	310	30/150

Note: Because of rounding, ridership might not sum exactly to totals.
Source: Sound Transit ridership model.
[a] The forecasts provided in this table represent the highest ridership at that station from any East Link alternative.
[b] The unconstrained demand forecasts are shown and are not constrained by the available parking supply.
[c] Walk-on and walk-off station forecasts include bicyclist riders.
[d] 3-hour PM peak period closely represents daily park-and-ride demand.
[e] PM peak person trips include people boarding and alighting from bus and light rail.
[f] Instead of providing a park-and-ride at the 130th Station, this lot could be relocated to 120th Station with the *Preferred Alternative D2A*.
[g] C9T – East Main Station Design Option connecting with *Preferred Alternative B2M* would have no change in forecast information .
N/A This station does not have a park-and-ride.

TABLE 6-17
2030 3-Hour PM Peak-Period and Daily Station Ridership

Station	Alternative	Daily Station Light Rail Boardings[a]	3–Hour PM Peak Light Rail Ridership[a,d]						
			Walk-on[c]	Walk-off[c]	Bus Access	Bus Egress	Vehicle Person Demand[b]	Person Total[e]	Kiss-and-Ride and Park-and-Ride Vehicle Trips[b]
Rainier	*Preferred Alternative A1*	3,000	390	400	370	380	N/A	1,550	220/0
Mercer Island	*Preferred Alternative A1*	3,000	240	250	390	200	610	1,670	90/460
South Bellevue	*Preferred Alternative B2M* and Alternatives B1, B2A, B2E, B3, and B3 – 114th Extension Design Option	5,000	20	100	750	680	2,040	3,600	300/1,560
SE 8th	*Preferred Alternative B2M (from C9T)* and Alternatives B2A and B2E	500	260	90	30	0	N/A	380	60/0
118th	Alternative B7	2,500	320	100	200	390	990	2,010	140/760
Old Bellevue	Alternative C1	2,500	930	500	20	0	N/A	1,450	210/0
East Main	Segment C alternatives (except C14E) from Alternatives B3, B3 – 114th Extension Design Option, and B7[g]	3,500	1,140	580	320	80	N/A	2,120	310/0
108th	*Preferred Alternative C11A*	2,500	920	520	190	70	N/A	1,700	250/0
Bellevue Transit Center	All Segment C alternatives	7,000	3,180	960	530	1,570	N/A	6,240	510/0
Ashwood/ Hospital	Alternatives C3T, C4A, C7E, and C8E	1,000	520	170	50	0	N/A	740	110/0
Hospital	*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E	1,500	800	280	440	90	N/A	1,610	230/0
120th[f]	*Preferred Alternative D2A* and Alternatives D2E and D3	1,000	210	300	40	10	N/A	560	80/0
130th[f]	*Preferred Alternative D2A* and Alternatives D2E and D3	1,500	560	170	0	0	500	1,230	70/380
Overlake Village	All Segment D alternatives	1,500	350	150	160	210	630	1,510	90/480
Overlake Transit Center	All Segment D alternatives	4,500	640	480	310	930	880	3,230	130/670
SE Redmond	All Segment E alternatives	2,000	50	20	50	0	1,350	1,470	200/1,030
Redmond Town Center	All Segment E alternatives	2,000	260	120	300	270	N/A	950	140/0
Downtown Redmond	*Preferred Alternative E2*	2,000	320	130	380	310	N/A	1,130	160/0
Redmond Transit Center	E2 – Redmond Transit Center Design Option	500	70	80	10	0	240	390	30/180

Note: Because of rounding, ridership might not sum exactly to totals.
Source: Sound Transit ridership model.
[a] The forecasts provided in this table represent the highest ridership at that station from any East Link alternative
[b] The unconstrained demand forecasts are shown and are not constrained by the available parking supply.
[c] Walk-on and walk-off station forecasts include bicyclist riders.
[d] 3-hour PM peak period is a close representation of daily park-and-ride demand
[e] PM peak person trips include people boarding and alighting from bus and light rail.
[f] Instead of providing a park and ride at the 130th Station, this lot could be relocated to 120th Station with the *Preferred Alternative D2A*.
[g] C9T – East Main Station Design Option connecting with *Preferred Alternative B2M* would have no change in forecast information.
N/A This station does not have a park-and-ride lot.

Total ridership at each station was separated into three categories: walk/bike, bus transfer, and auto-related person demand for stations with proposed park-and-ride lots. Walk/bike and bus transfer trips were divided into walk/bike trips on and off light rail and bus access onto and egress with light rail. Vehicle trips were calculated by applying an average vehicle occupancy factor to the auto person demand. The vehicle data in these tables includes park-and-ride and passenger drop-off and pick-up trips but do not include bus vehicles. The PM peak-period park-and-ride demand is considered to be the daily demand at the park-and-ride lot as vehicles typically arrive in the AM peak period and leave in the PM peak period, with limited activity outside these periods. A percentage of the total PM peak period ridership at a proposed station was used to calculate the passenger drop-off/pick-up volumes and is discussed in further detail later in this section. These percentages are provided in Table 6-18.

TABLE 6-18
Light Rail Station Passenger Drop-Off and Pick-Up (Kiss-and-Ride) Assumptions

Station Type	Applicable Stations	Passenger Drop-Off and Pick-Up (percent)
Station with park-and-ride facilities	Mercer Island, South Bellevue, 118th, 130th, Overlake Village, SE Redmond, Redmond Transit Center	16
Station only	Rainier, SE 8th, Old Bellevue, 108th, East Main, Ashwood/Hospital, Hospital, 120th, Redmond Town Center	16
Major transit center with park-and-ride facilities	Overlake Transit Center	16
Major transit center only	Bellevue Transit Center	9

Source: Tri-Met (1996); BART (2008).

In 2020, the highest nonmotorized accessed station would be the Bellevue Transit Center, with about 6,000 people accessing (entering or leaving) this station in the PM peak period. This high number is expected because of the dense urban environment surrounding the station. In more suburban stations, the nonmotorized access trips would be substantially lower. The highest transit access/egress person forecasts are at the Rainier, Mercer Island, South Bellevue, Bellevue Transit Center, Overlake Transit Center, Downtown Redmond, and Redmond Town Center stations. All of these stations are expected to have more than 400 people either accessing or exiting buses. The largest park-and-ride person demand forecasts are for the South Bellevue, SE Redmond, and Overlake Transit Center stations.

In general, ridership by year 2030 would be higher than year 2020 although the characteristics a station's modes of access would be similar to the patterns exhibited in year 2020. As shown in Table 6-17, the highest number of people accessing (entering or leaving) the Bellevue Transit Center Station is over 7,000 people in the PM peak period. Many of these riders would originate from businesses in Downtown Bellevue and would be bound for cross-lake and surrounding destinations. Alternatively, in terms of bus transfer ridership, the highest number of trips originating from transferring transit modes (that is, bus to light rail and vice versa) would occur at transit centers or stations with park-and-ride facilities. In generally, during the PM peak period, a higher number of transit riders would board (rather than exit) a bus or light rail at stations (SE 8th Street, Old Bellevue, East Main, 108th, Bellevue Transit Center, Ashwood/Hospital, Hospital, Redmond Town Center and Downtown Redmond stations) within or adjacent to a downtown core that have a concentration of commercial and office land uses, as shown in Table 6-17.

For proposed park-and-ride stations, regardless of the vehicle demand predicted from the ridership model, it was assumed that the number of new park-and-ride vehicle trips generated would be equal to the total number of proposed park-and-ride stalls. If the park-and-ride facility is an existing lot, the total number of new park-and-ride trips is the difference between the total number of proposed stalls and the existing utilization of the park-and-ride lot. This assumption is applied to all park-and-rides in the study area and provides a conservative assessment of traffic impacts near the stations.

Within the study area, five of the proposed park-and-ride stations already exist as park-and-ride facilities. These are the Mercer Island, South Bellevue, Overlake Transit Center, Overlake Village, and Redmond Transit Center stations. With the project, the total number of parking stalls at the South Bellevue and Overlake Transit Center stations would increase. The 118th Avenue, 130th Avenue, and SE Redmond stations would include new park-and-ride facilities. Instead of providing a park and ride at the 130th Station, this lot could be relocated to 120th Station with the *Preferred Alternative D2A*. The number of parking stalls at the Mercer Island, Overlake Village, and Redmond Transit Center would not be increased. For the traffic analysis, all these park-and-ride lots were assumed to be at full capacity. Section 6.3.2 compares the existing and, if applicable, proposed number parking stalls at each park-and-ride station to the number of vehicles forecasted to park there.

Bus vehicle trips were estimates from the transit integration plan (Sound Transit, 2007a). This integration plan developed a bus service plan for the no-build and build conditions. At stations with a park-and-ride, the passenger drop-off and pick-up trips were assumed to be a percentage of the unconstrained auto person demand. For non-park-and-ride stations, the passenger drop-off and pick-up trips were assumed to be a percentage of the total peak-hour ridership. The passenger drop-off and pick-up percentages (see Table 6-18) were developed based on information provided by Tri-Met (1996) for stations in the Portland area and BART (2008) for stations in the San Francisco area that have characteristics similar to the proposed East Link stations.

Using the 3-hour station ridership information and the passenger drop-off/pick-up assumptions, year 2020 and 2030 vehicle trip generation numbers were prepared for each station. To generate PM peak-hour vehicle trips, it was assumed 43 percent of the PM peak-period (3-hour) activity would occur during the PM peak hour. This 43 percent estimate was based on survey data from Sound Transit's commuter rail stations, Central Link's light rail park-and-ride, and trip generation from light rail transit park-and-ride lots in other U.S. rail systems. Year 2020 and 2030 vehicle trip generation for each East Link station is summarized in Table 6-19.

TABLE 6-19
2020 and 2030 Station PM Peak-Hour Vehicle Trip Generation Summary

Station	Alternatives	Type of Trips	2020			2030		
			In	Out	Total	In	Out	Total
Rainier	*Preferred Alternative A1*	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	93	93	186	97	97	194
		Buses	-19 (53)	-19 (53)	-38 (106)	-20 (54)	-20 (54)	-40 (108)
		Total	74	74	148	77	77	154
Mercer Island	*Preferred Alternative A1*	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	32	32	64	38	38	76
		Buses	-17 (17)	-17 (18)	-34 (35)	-18 (17)	-18 (18)	-36 (35)
		Total	15	15	30	20	20	40
South Bellevue	*Preferred Alternative B2M* and Alternatives B1, B2A, B2E, B3, and B3 – 114th Extension Design Option	Park-and-ride	0	367	367	0	367	367
		Drop-off/pick-up	107	107	214	128	128	256
		Buses	-3 (30)	0 (33)	-3 (63)	-1 (33)	1 (35)	0 (68)
		Total	104	474	578	127	496	623
SE 8th	*Preferred Alternative B2M (from C9T)* and Alternatives B2A and B2E	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	20	20	40	24	24	48
		Buses	4 (20)	4 (20)	8	5 (21)	5 (21)	10 (42)
		Total	24	24	48	29	29	58
Old Bellevue	Alternative C1	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	67	67	134	91	91	182
		Buses	2 (24)	2 (24)	4 (48)	2 (24)	2 (24)	4 (48)
		Total	69	69	138	93	93	186
118th	Alternative B7	Park-and-ride	0	353	353	0	353	353
		Drop-off/pick-up	47	47	94	62	62	124
		Buses	0 (11)	0 (11)	0 (22)	0 (11)	0 (11)	0 (22)
		Total	47	400	447	62	415	477

TABLE 6-19 CONTINUED
2020 and 2030 Station PM Peak-Hour Vehicle Trip Generation Summary

Station	Alternatives	Type of Trips	2020			2030		
			In	Out	Total	In	Out	Total
East Main	All Segment C alternatives (except C14E) with Alternatives B3, B3 – 114th Extension Design Option, and B7	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	90	90	180	133	133	266
		Buses	0 (12)	0 (12)	0 (24)	0 (12)	0 (12)	0 (24)
		Total	90	90	180	133	133	266
108th	*Preferred Alternative C11A*	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	85	85	170	106	106	212
		Buses	0	0	0	0	0	0
		Total	85	85	170	106	106	212
Bellevue Transit Center	All Segment C Alternatives	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	199	199	398	219	219	438
		Buses	-12 (72)	-12 (78)	-24 (150)	-12 (70)	-11 (77)	-23 (147)
		Total	187	187	374	207	208	415
Ashwood/ Hospital	Alternatives C3T, C4A, C7E, and C8E	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	46	46	92	46	46	92
		Buses	0 (8)	0 (8)	0 (16)	0 (8)	0 (8)	0 (16)
		Total	46	46	92	46	46	92
Hospital	*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	42	42	84	101	101	202
		Buses	0	0	0	0	0	0
		Total	42	42	84	101	101	202
120th	*Preferred Alternative D2A* and Alternative D2E and D3	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	29	29	58	35	35	70
		Buses	4 (8)	4 (8)	8 (16)	4 (8)	4 (8)	8 (16)
		Total	33	33	66	39	39	78
130th	*Preferred Alternative D2A* and Alternative D2E and D3	Park-and-ride	0	129	129	0	129	129
		Drop-off/pick-up	22	22	44	31	31	62
		Buses	0	0	0	0	0	0
		Total	22	151	173	31	160	191
Overlake Village	All Segment D Alternatives	Park-and-ride	0	58 (203)	58 (203)	0	58 (203)	58 (203)
		Drop-off/pick-up	21	21	42	39	39	78
		Buses	-2 (12)	-2 (15)	-4 (27)	-2 (12)	-2 (15)	-4 (27)
		Total	19	77	96	37	95	132
Overlake Transit Center	All Segment D Alternatives	Park-and-ride	0	60	60	0	60	60
		Drop-off/pick-up	38	38	76	55	55	110
		Buses	-20 (51)	-20 (53)	-40 (104)	-20 (51)	-20 (53)	-40 (104)
		Total	18	78	96	35	95	130
Redmond Town Center	All Segment E Alternatives	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	50	50	100	59	59	118
		Buses	-14 (26)	-14 (26)	-28 (52)	-14 (26)	-14 (26)	-28 (52)
		Total	36	36	72	45	45	90
SE Redmond	All Segment E Alternatives	Park-and-ride	0	602	602	0	602	602
		Drop-off/pick-up	85	85	170	85	85	170
		Buses	6 (6)	6 (6)	12 (12)	6 (6)	6 (6)	12 (12)
		Total	91	693	784	91	693	784

TABLE 6-19 CONTINUED
2020 and 2030 Station PM Peak-Hour Vehicle Trip Generation Summary

Station	Alternatives	Type of Trips	2020			2030		
			In	Out	Total	In	Out	Total
Downtown Redmond	*Preferred Alternative E2*	Park-and-ride	0	0	0	0	0	0
		Drop-off/pick-up	61	61	122	71	71	142
		Buses	0	0	0	0	0	0
		Total	61	61	122	71	71	142
Redmond Transit Center	E2 – Redmond Transit Center Design Option	Park-and-ride	0	33	33	0	33	33
		Drop-off/pick-up	12	12	24	15	15	30
		Buses	-14 (39)	-14 (37)	-28(76)	-14 (39)	-14 (37)	-28(76)
		Total	-2	31	29	1	34	35

Notes: The highest ridership alternative is shown for reach station.

For bus trips, the total build bus volumes are noted in parentheses. Outside the parentheses are the net changes to the bus volumes in the build compared with the no-build condition.

Overall, the highest trip-generating stations are those with expanded or new park-and-ride facilities. The three highest trip generating park-and-ride stations are South Bellevue, 118th, and SE Redmond. These locations are expected to generate between 400 and 800 new PM peak-hour vehicle trips. Bellevue Transit Center, while generating the highest station ridership, would produce a low percentage of vehicle trips because most of the transit riders would be walking or bicycling between the station and the surrounding office, commercial, retail, and residential areas of Downtown Bellevue.

The PM peak-hour vehicle trips generated at each proposed station were allocated throughout the study area based on existing and future travel patterns, station access plans, and bus route assumptions as part of the transit integration plan (Sound Transit, 2007a). Only the net increases in bus volume over existing and no-build conditions were added to the transportation network for each station.

Ridership forecasts were also prepared for each of the potential interim terminus stations. The alternative generating the highest station ridership was used to forecast the potential increase in trip activity if that station were to be an interim terminus. Table 6-20 provides mode of access ridership information for each potential interim terminus station including the increases in each station's daily boardings, peak-period vehicle-trips, and peak-period total person-trips over the values shown in Tables 6-16 and 6-17 for the full-length East Link alternatives.

The interim terminus station ridership forecasts at the Hospital, Overlake Village, and Overlake Transit Center stations indicate a noticeable increase in daily boardings; however the majority of these trips are either walk/bike or bus transfer trips. Similar to the process used to create Table 6-19, Table 6-21 provides PM peak hour vehicle trip information converted from the ridership forecast information in Table 6-20. From Table 6-21, the Hospital, Overlake Village, and Redmond Town Center stations would generate the largest increases in PM peak hour vehicle activity as interim terminus stations in either year 2020 or 2030. No other stations would have a noticeable trip generation impact as an interim terminus station.

Because the vehicle data in Table 6-21 was adjusted based on the traffic analysis methodology (described earlier in this section) there are differences between the increases in vehicle-trips in Tables 6-20 and 6-21. Since the park-and-ride stations are already conservatively estimated to be fully utilized in the peak periods under the full-length alternatives, there would be no change between the park-and-ride trip generation for the full-length alternative analysis and the interim terminus analysis.

TABLE 6-20
2020 and 2030 3-Hour PM Peak-Period and Daily Interim Terminus Station Ridership

Interim Terminus Station	Daily Station Boardings[a]	Increase in Daily Boardings[d]	3–Hour PM Peak Light Rail Ridership[a]								
			Light Rail Walk-on[c]	Light Rail Walk-off[c]	Bus Access	Bus Egress	Vehicle Person Demand[b]	Person Total	Increase in Person Totals[c]	Kiss-and-Ride/Park-and-Ride Vehicle Trips[b]	Increase in Vehicle Trips[c]
2020 Condition											
Hospital	2,000	1,000	330	170	370	290	N/A	1160	480	170/0	70
Ashwood/Hospital	1,000	0	320	160	60	0	N/A	530	-210	80/0	0[d]
120th	1,000	500	250	330	50	20	N/A	660	200	100/0	30
130th	1,000	0	240	50	0	0	590	880	200	90/450	210
Overlake Village	2,500	1,500	220	140	180	180	1,000	1,720	980	150/770	600
Overlake Transit Center	4,500	1,500	370	240	410	1,330	580	2,940	800	80/440	0[d]
SE Redmond	2,000	0	70	30	100	0	1,260	1,460	-10	180/960	0[d]
Redmond Town Center	2,000	500	200	540	260	350	N/A	1,350	560	200/0	80
2030 Condition											
Hospital	3,000	1,500	590	230	550	370	N/A	1,740	130	250/0	20
Ashwood/Hospital	1,000	0	540	200	110	0	N/A	850	110	120/0	10
120th	1,500	500	370	410	70	30	N/A	880	320	130/0	50
130th	1,500	0	350	110	0	0	660	1,120	-110	100/510	150
Overlake Village	3,500	2,000	310	180	250	310	1,260	2,310	800	180/960	570
Overlake Transit Center	6,000	1,500	500	390	650	1,690	730	3,960	730	110/560	0[d]
SE Redmond	2,500	500	90	30	140	0	1,370	1,630	160	200/1,050	20
Redmond Town Center	2,500	500	280	610	310	430	N/A	1,630	680	240/0	100

Source: Sound Transit ridership model.
[a] The highest ridership alternative is shown for each interim terminus station
[b] The unconstrained demand forecasts are shown and are not constrained by the available parking supply.
[c] Ridership increases are determined by comparing to the forecasts in Tables 6-16 and 6-17. Due to rounding, the increases might not sum exactly to totals.
[d] These interim terminus stations are conservatively projected to have a zero net increase in vehicle trips even though the forecasts suggested a potential decrease due to changes in the mode of access when the station is an interim terminus.

TABLE 6-21
2020 and 2030 Interim Terminus Station PM Peak-Hour Vehicle Trip Generation Summary

Interim Terminus Station	Type of Trips	2020			2030		
		In	Out	Total	In	Out	Total
Hospital	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	30	30	60	8	8	16
	Buses	0	0	0	0	0	0
	Total	30	30	60	8	8	16
Ashwood/Hospital[a]	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	-13	-13	-26	7	7	14
	Buses	4 (12)	4 (12)	8 (24)	4 (12)	4 (12)	8 (24)
	Total	-9	-9	-18	11	11	22
120th	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	12	12	24	20	20	40
	Buses	0	0	0	0	0	0
	Total	12	12	24	20	20	40
130th	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	15	15	30	11	11	22
	Buses	0	0	0	0	0	0
	Total	15	15	30	11	11	22
Overlake Village	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	42	42	84	40	40	80
	Buses	24 (36)	24 (39)	48 (75)	24 (36)	24 (39)	48 (75)
	Total	66	66	132	64	64	128
Overlake Transit Center	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	-2	-2	-4	-9	-9	-18
	Buses	0	0	0	0	0	0
	Total	-2	-2	-4	-9	-9	-18
Redmond Town Center	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	34	34	68	43	43	86
	Buses	0	0	0	0	0	0
	Total	34	34	68	43	43	86
SE Redmond	Park-and-ride	0	0	0	0	0	0
	Drop-off/pick-up	-6	-6	-12	1	1	2
	Buses	0	0	0	0	0	0
	Total	-6	-6	-12	1	1	2

Notes: The highest ridership alternative is shown for reach interim terminus station.

The number of trips reported is the net increase over the build condition traffic estimate. For bus trips, the total anticipated volumes are noted in parentheses.

6.3.2 Arterials and Local Streets

The arterials and local streets analysis compares the 2020 and 2030 no-build and build conditions in the study area. In total, more than 150 intersections were analyzed for the five segments. Individual station impacts are described by segment in the following subsections. Each Segment section discusses the traffic control (traffic signals, rail gates, access control), property access and circulation impacts, operations and intersection LOS, traffic safety impacts, parking and if applicable interim terminus stations and maintenance facilities for each alternative.

Traffic control treatments are proposed to maintain traffic flow while providing protected vehicle crossings that ensure safe traffic operations. Generally, for median at-grade or elevated profile, driveways and other mid-block accesses that do not prohibit movements would be modified for safety reasons (visibility/sight distance, and exposure to increased accidents) to allow only turns that do not conflict with the light rail track. The only locations where left turns would be allowed for these profiles are at protected crossings (gates or traffic signals). The installation of these traffic controls would be coordinated with WSDOT, local jurisdictions, and King County Metro throughout the design phase of the project.

As further detailed in the following subsections, the intersection LOS results for the build condition where an at-grade profile is proposed to operate through an intersection was analyzed under two operating plans: when light rail is not present at the intersection, and when light rail is present. The two analyses were combined based on the signal cycle length and light rail headways. Intersections adjacent to the light rail alternatives in these situations were also included in this analysis because they could be influenced by the light rail operations.

Overall, intersections near potential stations are expected to operate in most cases at an LOS similar to the LOS under the no-build condition. Potential stations that include park-and-ride facilities are expected to generate more vehicles trips than stations without a park-and-ride. Therefore, at a few of these locations, the intersections immediately adjacent to the stations might operate at a lower LOS in the build condition than in the no-build condition. Potential intersection mitigation improvements generally consist of turn pockets or new traffic signals.

Where light rail is located within an existing street, intersection operations are generally predicted to operate with an intersection LOS similar to the LOS under no-build conditions, although a few intersections in the study area might have a lower LOS, depending on the alternative and intersection movements. A similar LOS occurs between these two conditions, partly because the project would restore the roadway to a similar capacity as compared with the no-build condition. Additionally, the light rail trains, operating in at-grade profiles, would generally be able to travel safely through the intersection within the established intersection signal phasing. This is because the time required for a light rail train to proceed through the intersection usually is accommodated within the time needed for the vehicle or pedestrian movements. Intersections that require a new signal phase just for light rail are generally on lower-volume streets, therefore the intersection would continue to maintain acceptable operations. Finally, even though at-grade alternatives would likely receive some level of signal priority, disturbances to the signal coordination are expected to be minimized because light rail train detection would occur in advance of the train arriving at the intersection, thereby allowing non-light-rail signal phases to be served without substantial adjustments to the signal timing. Within Downtown Bellevue, at-grade alternatives would likely receive some form of priority, although east-west traffic signal coordination on key arterials would be maintained. For alternatives with either elevated or tunneled profile, intersection operations are generally expected to operate similar to the no-build condition because the alternative would be outside the roadway right-of-way.

A safety assessment is provided for each alternative and based on the Integration of *Light Rail Transit into City Streets* (TRB, 1996), *Light Rail Service, Vehicular, and Pedestrian Safety* (TRB, 1999) and *Light Rail Vehicle Collisions with Vehicles at Signalized Intersections* (TRB, 2009) research reports. Overall, the project-generated trips created by the East Link alternatives are not expected to increase the vehicle accident rates because roadway operations would remain similar to or would improve compared with the No Build Alternative. Additionally, many of the at-grade alignments resemble the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), accidents involving the light rail train and vehicle or pedestrian constitute about 6 percent of the total number of accidents along the corridor, and the corridor total was reduced by close to 60 percent once the LRT revenue service began. The median barrier and restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor.

The parking assessment is based on the current level of design completed for each alternative and the potential for hide-and-ride opportunities near light rail stations. In subsequent design refinements, the on- and off-street parking impacts might be modified. Parking impacts were quantified by overlaying a map of existing property boundaries on the alternatives. The number of on-street and off-street parking spaces that would be affected by each alternative was determined by identifying the number of existing parking spaces that fall within the proposed limits of improvements. Parking spaces within properties that are entirely taken by the alternative are not included because there would be no demand for these spaces when the existing use is displaced.

Lastly, construction activities and impacts are discussed, as is any mitigation required during construction or operation. Appendix A provides further discussion of the arterial and local street impact analysis assumptions. Discussion of the impacts on transit service and facilities and on pedestrian and bicycle access is provided in Sections 4.0 and 7.0, respectively.

6.3.2.1 Segment A, Preferred Interstate 90 Alternative (A1)

I-90 is the only major roadway within Segment A where the no-build and build conditions would alter the physical characteristics of the road.

In the no-build condition, an additional HOV lane would be added to the eastbound and westbound mainline roadways as part of the I-90 Two Way Transit and HOV Operations Project. Section 5.3.1 provides a detailed description of that project and its effect on the freeway. Regarding local access modifications as part of the I-90 Two Way Transit and HOV Operations Project, improvements to the HOV direct access to and from the Bellevue Way SE interchange would be provided to allow direct access to and from eastbound and westbound HOV lanes throughout the day. At Mercer Island, the I-90 Two Way Transit and HOV Operations Project would provide additional access to and from the island via an 80th Avenue SE westbound HOV direct-access off-ramp and an eastbound HOV direct-access on-ramp. At 77th Avenue SE, an eastbound HOV direct access off-ramp would be built. Access to the reversible center roadway would continue to vary, depending on time of day.

In the build condition, the I-90 reversible center roadway would be converted for exclusive light rail use, as discussed in Section 5.0, Highway Operations and Safety. Local access changes related to the reversible center roadway closure would consist of eliminating the 77th Avenue SE and Island Crest Way reversible center roadway accesses. This would require rerouting vehicles to other I-90 access points, specifically, the West Mercer Way on- and off-ramps, 76th Avenue SE on-ramp, 77th Avenue SE off-ramp, and Island Crest Way on- and off-ramps. On Mercer Island, as part of Stage 3 of the I-90 Two Way Transit and HOV Operations Project, the current proposal would build the eastbound HOV off-ramp proposed at 77th Avenue SE. This location of the HOV off-ramp is not preferred in conjunction with the East Link project because bus use of 77th Avenue SE ramp would be partially or wholly replaced by light rail service. Therefore *Preferred Alternative A1* assumes this HOV off-ramp connects to the Island Crest Way eastbound off-ramp from the center roadway. Even so, these two ramp locations and another design option, that would build neither of these eastbound HOV off-ramps, are analyzed.

Traffic Control, Property Access, and Circulation

The *Preferred Alternative A1* and any of the design options are not expected to affect private property access and changes to vehicular circulation on arterial streets is minimal, except near the I-90 ramps on Mercer Island which is discussed in the next section. Both of the proposed stations would be located near or at existing transit stations therefore the impacts on vehicle circulation and access are not expected.

In terms of traffic controls within Segment A, there are no new traffic control measures that are proposed for Segment A along the local street system because *Preferred Alternative A1* and any of its design options would be exclusively in the reversible center roadway and do not cross or merge with general-purpose vehicles. Gates would be installed at the D2 roadway ramps to ensure general-purpose vehicles do not enter this facility.

If light rail operated exclusively in the D2 Roadway, buses would need to modify their route and use another access location with I-90 (such as Rainier or SR 519 interchanges). This would not affect general vehicles and is discussed in more depth in Sections 4.0 and 5.0.

Operations and Level of Service

Intersection operations under the no-build condition are expected to degrade as traffic volumes increase in the study area. In the AM peak hour all intersections in Seattle and Mercer Island would operate at an acceptable LOS in both 2020 and 2030. However, in the 2020 PM peak hour two intersections in Seattle and two intersections in Mercer Island would fail to operate at an acceptable level. By 2030, two additional intersections (for a total of four intersections) in Seattle and one additional intersection (for a total of three intersections) in Mercer Island would fail to operate at an acceptable LOS. The Seattle intersections that fail to operate acceptably in the 2030 PM peak hour are Rainier Avenue South and South Dearborn, Rainier Avenue South and 23rd Avenue South, South Royal Brougham Way and 4th Avenue South, and Airport Way South and South Dearborn Street. The Mercer Island intersections the fail to operate acceptably in the 2030 PM peak hour are 80th Avenue SE and SE 27th Street, 77th Avenue SE and N Mercer Way, and 76th Avenue SE and North Mercer Way/I-90 westbound on-ramp.

In Segment A, light rail would operate in an exclusive right-of-way, except if joint bus and light rail operations are implemented in the I-90 D2 Roadway. The operational option to have light rail exclusive in the D2 Roadway would result in minimal direct impact on the local streets.

During the AM and PM peak hours, intersection operations within the City of Seattle would vary slightly when comparing the no-build to the build conditions. In the AM peak hour, intersection operations would improve near the I-90 D2 Roadway terminus at 5th Avenue S and Airport Way S/ S Dearborn Street because the D2 Roadway is, at a minimum, restricted to buses only and would not be accessible by other vehicles. If the D2 Roadway was only exclusive light rail operations, AM and PM peak-hour intersection operations would further improve at the D2 Roadway terminus and could slightly degrade at the I-90 terminus on 4th Avenue.

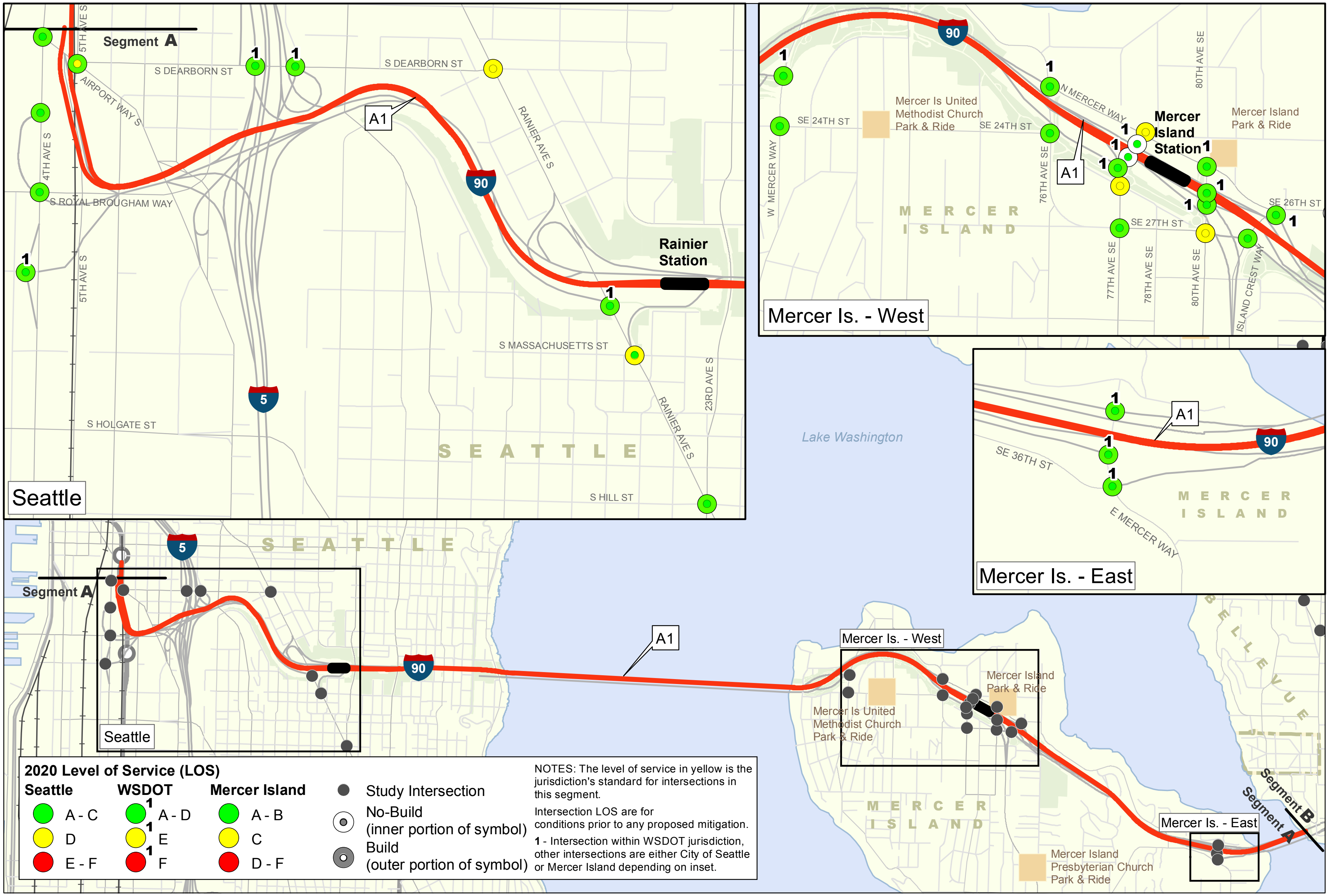
On Mercer Island in the AM peak hour some intersections that provide access to or are adjacent to I-90 in the build condition might experience some degradation in operations because of the changes in I-90 access between the no-build and build conditions. At 77th Avenue SE and Island Crest Way, the reversible center roadway westbound access would be eliminated, thereby rerouting vehicles to other I-90 access locations. Under *Preferred Alternative A1* and the design option that provides neither eastbound HOV off-ramp all intersections would meet agency standards in the 2020 and 2030 AM peak hours. With the design option to provide a 77th HOV eastbound off-ramp the intersection of 77th Avenue SE and Sunset Highway would not meet agency standards in the 2020 and 2030 AM peak hours.

Similarly, in the PM peak hour some intersections on Mercer Island that provide access to or are adjacent to I-90 in the build condition might experience some degradation in operations because of changes in access between the no-build and build conditions. Because access to Mercer Island from the reversible center roadway would be eliminated, eastbound vehicles destined for Mercer Island would shift to the other access locations: such as the West Mercer Way and Island Crest Way eastbound off-ramps.

In *Preferred Alternative A1*, and the design option that provides neither eastbound HOV off-ramp, three intersections in the 2020 PM peak hour would not meet agency standards. These intersections are North Mercer Way and 77th Avenue SE, SE 24th Street and West Mercer Way, and SE 27th Street and 80th Avenue SE. These intersections are expected to operate at LOS D or E conditions. In addition, the I-90 eastbound off-ramp and 77th Avenue SE would exhibit vehicle queue lengths that extend onto the I-90 mainline. With the design option to provide a 77th eastbound HOV off-ramp the intersection of 77th Avenue SE and I-90 eastbound HOV off-ramp would fail to meet agency standards in addition to those identified above, except the I-90 eastbound off-ramp at 77th Avenue SE which would not exhibit queues extending onto the I-90 mainline. By 2030, under *Preferred Alternative A1* and both HOV off-ramp design options the 76th Avenue SE and I-90 westbound on-ramp intersection would fail to meet agency standards, in addition to those identified for the 2020 PM peak hour under these options. The intersection of 77th Avenue SE and Sunset Highway would also fail to meet agency standards under the design option to provide a 77th eastbound HOV off-ramp.

Overall, with the *Preferred Alternative A1* and the design option that provides neither eastbound HOV off-ramp five intersections would fail to meet agency standards by year 2030, all in the PM peak hour. With the design option to provide a 77th eastbound HOV off-ramp six intersections would fail to meet agency standards by year 2030, five in the PM peak hour and one in both the AM and PM peak hours.

Exhibits 6-6 through 6-9 and Tables D-6 and D-7 in Appendix D show 2020 and 2030 intersection LOS results in the no-build and build conditions for the AM and PM peak hours, respectively. The intersection LOS results are included in exhibits to provide a visual indication of the intersection operations between no-build and build conditions. This presentation provides the intersection location relative to the other intersections and/or alternatives and illustrates whether the intersection LOS would be positively or negatively affected.



Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Central Link Alignment and Station

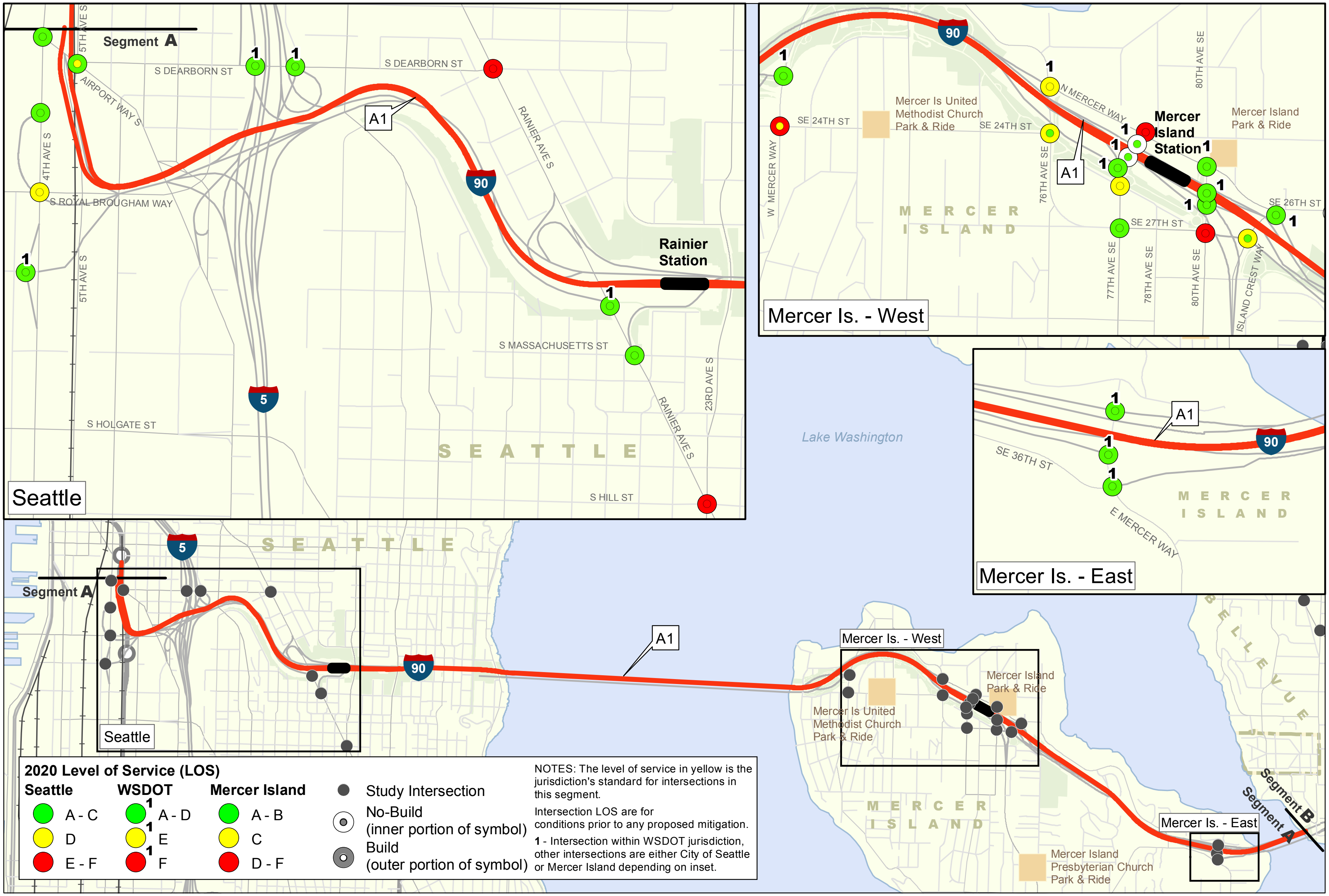
N

0 0.5 Mile

NOTES: The level of service in white indicates that this intersection does not exist for the build condition.

Intersection LOS indicated in the Mercer Island - West inset map is for the Preferred Alternative (A1) which provides an eastbound HOV direct-access off-ramp at Island Crest Way. For the intersection LOS results of the two eastbound off-ramp design options refer to Appendix D.

Exhibit 6-6 **2020 AM No Build and Build Level of Service at Intersections Segment A**
East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Central Link Alignment and Station

N

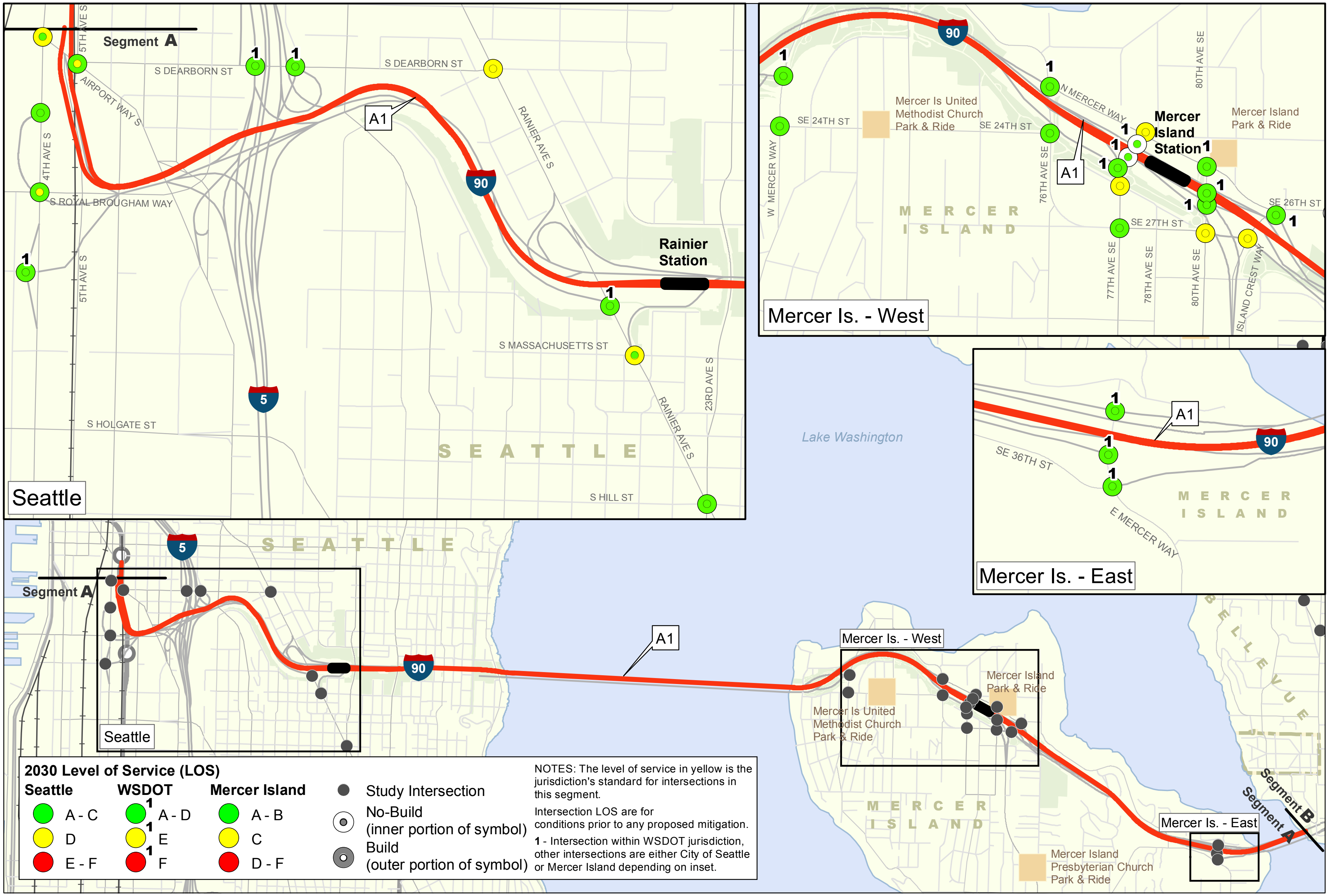
0 — 0.5 Mile

NOTES: The level of service in white indicates that this intersection does not exist for the build condition.

Intersection LOS indicated in the Mercer Island - West inset map is for the Preferred Alternative (A1) which provides an eastbound HOV direct-access off-ramp at Island Crest Way. For the intersection LOS results of the two eastbound off-ramp design options refer to Appendix D.

Exhibit 6-7 **2020 PM No Build and Build Level of Service at Intersections Segment A**

East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Proposed Station
Central Link Alignment and Station

N

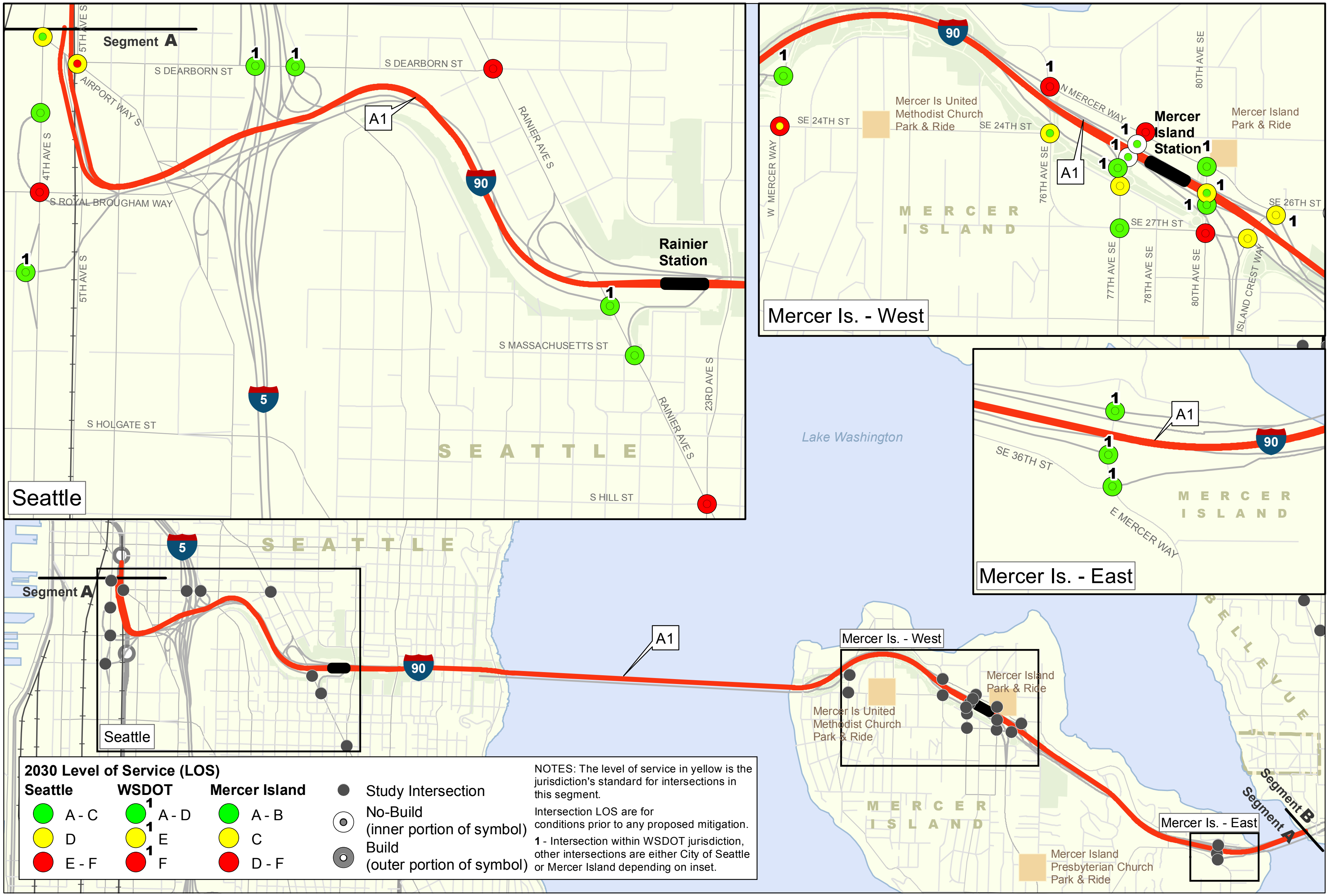
0 0.5 Mile

NOTES: The level of service in white indicates that this intersection does not exist for the build condition.

Intersection LOS indicated in the Mercer Island - West inset map is for the Preferred Alternative (A1) which provides an eastbound HOV direct-access off-ramp at Island Crest Way. For the intersection LOS results of the two eastbound off-ramp design options refer to Appendix D.

Exhibit 6-8 **2030 AM No Build and Build Level of Service at Intersections Segment A**

East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Central Link Alignment and Station

N

0 0.5 Mile

NOTES: The level of service in white indicates that this intersection does not exist for the build condition.

Intersection LOS indicated in the Mercer Island - West inset map is for the Preferred Alternative (A1) which provides an eastbound HOV direct-access off-ramp at Island Crest Way. For the intersection LOS results of the two eastbound off-ramp design options refer to Appendix D.

Exhibit 6-9 **2030 PM No Build and Build Level of Service at Intersections Segment A**

East Link Project

Traffic Safety

The safety of light rail operations and the roadway and vehicle conditions associated with each of the build alternatives was assessed based on national research and safety guidelines. Because *Preferred Alternative A1* consists of an at-grade profile exclusively located in dedicated I-90 right-of-way, there would be no traffic safety impacts to the arterials and local streets in Seattle or on Mercer Island with the project.

Parking

This section discusses the parking impacts associated with the light rail route and stations in Segment A. Table 6-22 summarizes the impacts by alternative, and Table 6-23 summarizes the impacts associated each station. There would be no anticipated direct permanent impacts on public on-street parking or private off-street parking associated with I-90 alternative and its stations (*Preferred Alternative A1* and any design options).

TABLE 6-22
Segment A Parking Impacts Summary for *Preferred Alternative A1*

Alternative	Parking Spaces Removed	
	On-Street	Off-Street[a]
Preferred Alternative A1	0	0

Note: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

[a] Includes parking spaces removed at the station areas.

TABLE 6-23
Segment A Parking Impacts Summary by Station

Station	Associated Alternative	Spaces Removed	Area Affected by Development
Rainier Station	*Preferred Alternative A1*	0	None
Mercer Island Station	*Preferred Alternative A1*	0	None

Note: Parking impacts shown are permanent displacements; parking losses associated with construction staging are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.

The potential for hide-and-ride parking impacts at the Rainier Station is expected to be high because there is a substantial amount of surrounding on-street parking available to accommodate riders (Table 6-3).

At the Mercer Island Station, there would be low potential for impacts with alternatives that include the South Bellevue Station. The location of the South Bellevue Station, which is proposed to provide approximately 1,400 stalls, would provide riders with a higher-parking capacity option along I-90. Additionally, although the current demand for the Mercer Island Park-and-Ride Lot is near capacity, there is minimal parking spillover into the surrounding areas, further indicating that the future potential for hide-and-ride impacts is low.

With a connection to the BNSF Alternative (B7), there could be a slightly greater potential for spillover impacts at the Mercer Island Station because the forecast auto demand is slightly higher than the parking capacity. With the current park-and-ride almost at full capacity and this alternative not providing a nearby light rail station with a park-and-ride, there might be a potential for parking spillover surrounding Mercer Island Station (Table 6-3). However with the City of Mercer Island recently implementing restricted (time-limited) parking in selected areas surrounding the Town Center, in addition to the already implemented RPZs in the residential neighborhoods north of I-90, hide-and-ride parking opportunities would be limited.

Table 6-24 shows the existing and proposed parking stalls and forecast park-and-ride vehicle demand at Mercer Island Station. Section 6.5 discusses possible parking mitigation strategies to reduce hide-and-ride potential.

TABLE 6-24
Segment A Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Vehicle Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Vehicle Demand[a]	2030 Park-and-Ride Vehicle Demand[a]
Mercer Island[b]	*Preferred Alternative A1*	447	447	390	460

[a] 3-hour PM peak-period park-and-ride vehicle demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

[b] The park-and-ride vehicle demand is associated with Alternative B7. With any Segment B alternative that includes a South Bellevue Station, the park-and-ride forecast is less than the proposed number of parking stalls.

6.3.2.2 Segment B

With the No Build Alternative, the physical characteristics of the arterials and local roadways in 2020 and 2030 would remain the same as in the existing conditions, except for modifications to the SE 8th Street interchange as part of the I-405 Program.

With any Segment B alternative, roadway channelization generally remains similar to the No Build Alternative, except near the South Bellevue Station (described in the following section), as the alternatives are either outside the roadway right-of-way or, when the alternative is within the roadway, channelization is restored to no-build conditions. Appendix A provides the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment B.

Traffic Control, Property Access, and Circulation

For all alternatives, with the exception of B7, traffic control, property access, and circulation near the South Bellevue Station to I-90 would be the same as described in *Preferred Alternative B2M.* Alternative B1 would have the highest number of traffic control revisions because it travels in the median along Bellevue Way SE, while Alternatives B7 would have the fewest. Table 6-25 presents the traffic control modifications for each Segment B alternative.

Preferred 112th SE Modified Alternative (B2M)

Preferred Alternative B2M (with either the *Preferred Alternative C11A* or *Preferred Alternative C9T* connection) would operate in exclusive right-of-way along the eastside of Bellevue Way SE. Two roadway modification options are proposed to improve the station and neighborhood access along Bellevue Way SE near the South Bellevue Station. Of the two options, the option that does not include a signal at SE 30th Street or provide a southbound HOV lane is more consistent with the City of Bellevue's adopted long-range plans.

The first option would install two new traffic signals along Bellevue Way SE; one signal at the south driveway to the South Bellevue Station and the other signal at SE 30th Street. This option would also convert the center two-way left-turn lane into a southbound HOV lane between the South Bellevue Station and I-90. With the signal at the south driveway, westbound left turns exiting the South Bellevue Station would be allowed. Right-in and right-out access would be provided to residences south of the South Bellevue Station and northbound and southbound u-turn movements would be allowed at the Bellevue Way SE/112th Avenue SE/South Bellevue Station intersection. At the SE 30th Street intersection, northbound traffic from I-90 would not be stopped by the signal. At SE 30th Street, access to the Sweylochen Boat Ramp would be right-in and right-out, and the northbound left-turn into the Enatai neighborhood would be provided. The eastbound left-turn exiting the Enatai neighborhood would be prohibited requiring vehicles turning left and exiting the neighborhood to use the signal at Bellevue Way SE/112th Avenue SE/South Bellevue Station or at another location.

The second option would also install a traffic signal at Bellevue Way SE and the south driveway to the South Bellevue Station. With this signal, northbound u-turn movements would be allowed at this intersection and southbound u-turns would be allowed at the Bellevue Way SE/112th Avenue SE/South Bellevue Station intersection. No changes to property access and circulation along Bellevue Way would occur south of the south driveway and the current movements allowed at SE 30th Street and Bellevue Way SE would remain.

TABLE 6-25
Segment B Intersection Traffic Control

Control Location	Existing Control	Proposed Control
Preferred Alternative B2M* to *Preferred Alternative C9T		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Install new signal[1]
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
112th Avenue SE and SE 15th Street	Minor street stop-controlled	Install new signal and light rail gates
112th Avenue SE and SE 8th Street	Signal	Replace signal and install light rail gates
Preferred Alternative B2M* to *Preferred Alternative C11A		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Install new signal[1]
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
112th Avenue SE, south of SE 15th Street	None	Install light rail gates for northbound traffic
112th Avenue SE and SE 15th Street	Minor street stop-controlled	Right-in/right-out
112th Avenue SE and SE 8th Street	Signal	Replace signal
Alternative B1		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Right-in/right-out
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
Bellevue Way and South Bellevue Park-and-Ride north entrance	Minor street stop-controlled	Install new signal
Bellevue Way and 112th Avenue SE	Signal	Replace signal
Bellevue Way and 108th Avenue SE	Signal	Replace signal
Bellevue Way and SE 16th Street	Signal	Replace signal
Bellevue Way and SE 14th Street	Minor street stop-controlled	Right-in/right-out
Bellevue Way and SE 13th Street	Minor street stop-controlled	Right-in/right-out
Bellevue Way and SE 11th Street	Minor street stop-controlled	Right-in/right-out
Bellevue Way and SE 10th Street	Signal	Replace signal
Bellevue Way and SE 8th Street	Signal	Replace signal
Bellevue Way and SE 6th Street	Minor street stop-controlled	Right-in/right-out
Alternative B2A		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Install new signal[1]
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
Bellevue Way and 112th Avenue SE	Signal	Replace signal

TABLE 6-25 CONTINUED
Segment B Intersection Traffic Control

Control Location	Existing Control	Proposed Control
112th Avenue SE and SE 15th Street	SE 15th Street stop-controlled, two-way left-turn median	Right-in/right-out
112th Avenue SE and SE 8th Street	Signal	Replace signal
Alternative B2E		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Install new signal[1]
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
Alternative B3 and B3 - 114th Extension Design Option		
Bellevue Way and SE 30th Street	Minor street stop-controlled	Install new signal[1]
Bellevue Way and South Bellevue Park-and-Ride south entrance	Minor street stop-controlled	Install new signal
Bellevue Way and South Bellevue Park-and-Ride	Signal	Replace signal
Bellevue Way and 112th Avenue SE	Signal	Replace signal
112th Avenue SE and SE 15th Street	SE 15th Street stop-controlled, two-way left-turn median	Right-in/right-out
112th Avenue SE, south of SE 8th Street[2]	None	Install light rail gates for northbound traffic
Alternative B7		
No intersection traffic control modifications		

[1] Two options are being considered at this location; the second option does not change the control from existing conditions.

[2] Only with the Alternative B3 – 114th Extension Design Option.

For the connection to *Preferred Alternative C11A*, *Preferred Alternative B2M* along 112th Avenue SE would transition to at-grade center-running south of SE 15th Street. The light rail train would cross the northbound lanes and be controlled by gates. A signalized crossing would be provided at the SE 8th Street intersection. This variation of *Preferred Alternative B2M* would provide right-in/right-out access along 112th Avenue SE from Bellevue Way to SE 6th Street except at SE 8th Street where left-turn and u-turn movements would be allowed. The emergency access driveway to Lincoln Plaza from 112th Avenue SE just south of SE 6th Street would be maintained, but the pedestrian, bicycle, and maintenance driveway would be closed. Access to this property would be maintained on SE 6th Street, minimizing the impact.

Along 112th Avenue SE, the connection from *Preferred Alternative B2M* to *Preferred Alternative C9T* would operate on the east side of 112th Avenue SE and cross SE 15th Street and SE 8th Street as signalized gated crossings. A northbound right-turn pocket would be provided at the SE 8th Street and 112th Avenue SE intersection and at SE 15th and 112th. The emergency access driveway to Lincoln Plaza from 112th Avenue SE just south of SE 6th Street would be maintained, but the pedestrian, bicycle, and maintenance driveway would be closed. Access to this property is maintained on SE 6th Street, which would minimize the impact.

An option with the *Preferred Alternative B2M* connection to *Preferred Alternative C9T* would close the east approach at SE 15th Street to Bellefield Office Park. Closing SE 15th Street would eliminate the conflict between light rail and vehicles, pedestrians, and bicyclists at this location. This closure would recirculate vehicles in the office park to the intersection of 114th Avenue SE and SE 8th Street. During emergencies, SE 15th Street might need to be opened allowing for a secondary access into and out of the Bellefield Office Park.

Other Segment B Alternatives

For all alternatives, with the exception of Alternatives B1 and B7, traffic control, property access, and circulation near the South Bellevue Station to I-90 would be the same as described in *Preferred Alternative B2M.* The Bellevue Way Alternative (B1) proposes new signal installations at two intersections and signal replacements at six intersections along Bellevue Way SE. To provide safe light rail operations, Alternative B1 would modify property access along Bellevue Way north of the 112th Avenue SE intersection and between the South Bellevue Station and I-90 to right-in/right- out because of the at-grade median profile. Between the 112th Avenue SE intersection and the South Bellevue Station an existing median is already in place; therefore, no change in property access would occur for this section. Where feasible, u-turn movements would be provided at signalized intersections along Bellevue Way to minimize circulation impacts.

The 112th SE At-Grade (B2A) and 112th SE Bypass (B3) and 112th SE Bypass (B3) – 114th Extension Design Option alternatives would have fewer modifications to traffic control compared with Alternative B1. With these alternatives, property access and circulation along Bellevue Way SE, south of the 112th Avenue SE intersection, would be similar to property access and circulation under Alternative B1. Along 112th Avenue SE, right-turn-in, right-turn-out access would replace the stop-controlled and two-way left turn median at the 112th Ave SE and SE 15th Street intersection. With the 112th SE Bypass (B3) – 114th Extension Design Option an at-grade gated crossing of the northbound lanes on 112th Avenue SE, south of SE 8th Street, would be provided. East of this gated crossing, Alternative B3 and B3 – 114th Extension Design Option would be similar. With Alternative B2A, U-turn movements at the intersection of SE 8th Street and 112th Avenue SE would be allowed from the southbound approach only.

The 112th SE Elevated Alternative (B2E) would be elevated and have no additional traffic control, property access and circulation modifications beyond those already described near the South Bellevue Station with *Preferred Alternative B2M.*

The BNSF Alternative (B7) would follow the BNSF corridor within an exclusive right-of-way and, consequently, would have no traffic control, property access and circulation impacts.

Operations and Level of Service

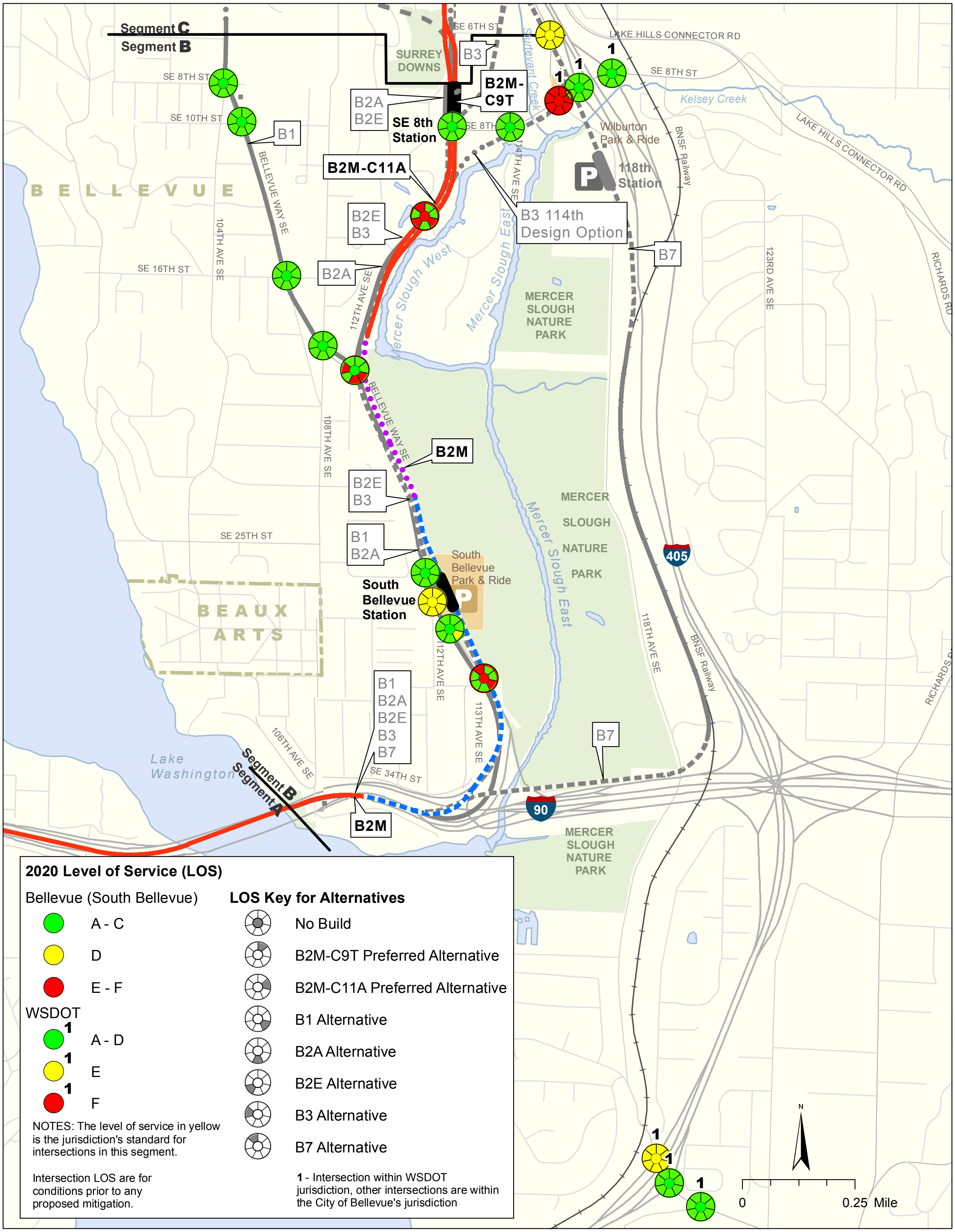
PM peak-hour intersection LOS for the 2020 and 2030 no-build conditions is expected to degrade as traffic volumes increase in the study area. Three intersections are expected to operate at LOS F during the PM peak hour in 2020: 118th Avenue SE and SE 8th Street, Bellevue Way SE at SE 30th Street, and 112th Avenue SE and SE 15th Street. The unsignalized intersections at Bellevue Way SE at SE 30th Street and at 112th Avenue SE and SE 15th Street intersections would not meet agency LOS standards because the vehicles on the cross street would have difficulty finding gaps in the major street's traffic. By 2030, the 114th Avenue SE and SE 6th Street and I-405 Southbound ramps and Coal Creek Parkway intersections would operate at a failing LOS. All other intersections that would not meet agency standards in 2020 are expected to not meet agency standards in 2030 no-build conditions.

Exhibits 6-10 and 6-11 and Tables D-8 and D-9 in Appendix D show 2020 and 2030 intersection PM peak-hour LOS results for the no-build and build conditions.

Preferred 112th SE Modified Alternative (B2M)

Within Segment B, some level of signal priority would be provided at the at-grade light rail crossings. Even so, most intersections within Segment B with *Preferred Alterative B2M* would operate similarly to the no-build conditions. With either of the two roadway modification options along Bellevue Way SE, a traffic signal would be install at the southern driveway of the South Bellevue Station and Bellevue Way SE. In one of the roadway modification options, a traffic signal is proposed at SE 30th Street and Bellevue Way SE. In either of these options, the southern driveway of the South Bellevue Station and SE 30th Street intersection with Bellevue Way SE would meet City LOS standards. These improvements are proposed with either of the connections to Segment C: *Preferred Alternative C11A* or *Preferred Alternative C9T.*

For the *Preferred Alternative B2M* connection to *Preferred Alternative C11A,* when the gated crossing south of SE 15th Street is activated, a northbound queue would form but would not extend into the Bellevue Way SE and 112th Avenue SE intersection.



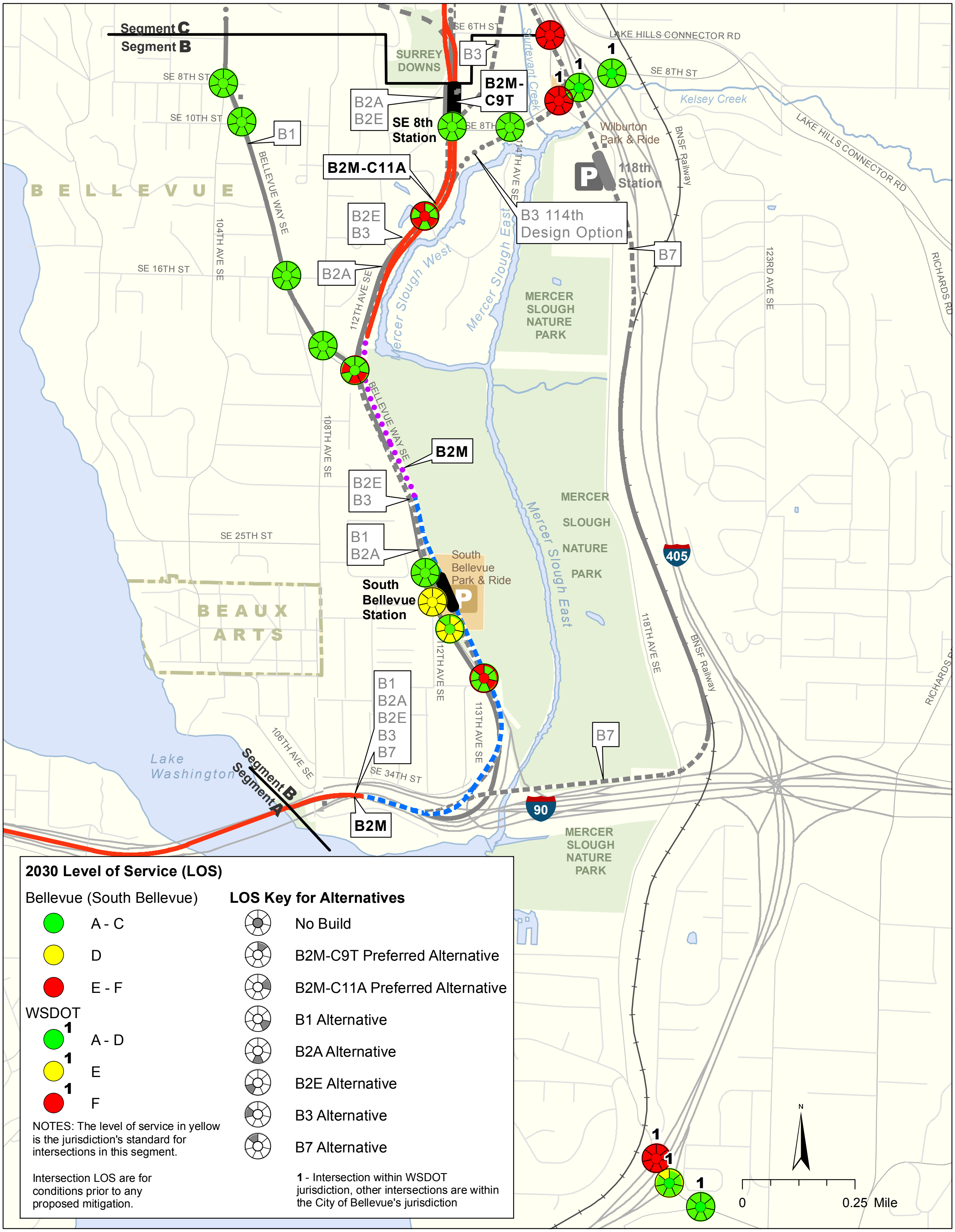
Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-10 **2020 PM No Build and Build Level of Service at Intersections Segment B**
East Link Project



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-11 **2030 PM No Build and Build Level of Service at Intersections Segment B**
East Link Project

For the *Preferred Alternative B2M* connection to *Preferred Alternative C9T,* vehicle queuing would be similar at the intersection of SE 8th Street and 112th Avenue SE compared with the no-build condition due to the provided northbound right-turn pocket. An option with the *Preferred Alternative B2M* connection to *Preferred Alternative C9T* would close the east approach at SE 15th Street to the Bellefield Office Park. This closure would recirculate vehicles in the office park to the intersection of 114th Avenue SE and SE 8th Street. The resulting intersection LOS along SE 8th Street at 112th Avenue SE and at 114th Avenue SE would still meet City of Bellevue LOS standards, but there would be an increase in the northbound queuing at SE 8th Street and 114th Avenue SE. This increase could impede driveway accesses within the Bellefield office park.

Other Segment B Alternatives

The Bellevue Way Alternative (B1) would have an at-grade profile throughout Segment B. The TWSC intersection of 112th Avenue SE and SE 15th Street would degrade because of an increase in the number of vehicles along 112th Avenue SE associated with the South Bellevue Station, limiting vehicles on SE 15th Street from finding gaps to turn onto 112th Avenue SE. In 2020 and 2030, the Bellevue Way SE and 112th Avenue SE intersection is also expected to operate at LOS F because of the at-grade profile and increase in the number of vehicles associated with the South Bellevue Station which is expected to create additional vehicle delay at this intersection.

Bellevue Way SE, south of the South Bellevue Station, would operate similar to *Preferred Alternative B2M.* At the South Bellevue Station and 112th Avenue SE intersection, pedestrians would access the South Bellevue Station light rail platform in one pedestrian crossings cycle, while pedestrians completely crossing Bellevue Way SE, would require two pedestrian crossing cycles. This change in pedestrian crossing time would allow for improved intersection operations. All other intersections along Bellevue Way are not expected to experience worse intersection operations because the number of roadway lanes being provided would remain the same as in the no-build condition and the light rail train would travel concurrently with the major flow of traffic (northbound and southbound directions). Additionally, disturbances in signal coordination are expected to be minimized with Alternative B1 or any at-grade profile because train detection would occur prior to the train arriving at the intersection, thereby allowing non-light-rail signal phases to be served without substantial adjustments to the signal timing.

B2A would be at-grade between the South Bellevue Station and the northern boundary of Segment B. Intersection operations would degrade at Bellevue Way SE at 112th Avenue SE as the at-grade profile and increase in the number of vehicles associated with the South Bellevue Station is expected to create additional vehicle delay at this location causing it to operate at LOS E in 2020 and LOS F in 2030 conditions. Similar to Alternative B1, all other intersections on Bellevue Way and 112th Avenue NE where Alternative B2A operates at-grade through are not expected to experience worse intersection operations. The reasons for this are the same as those described for Alternative B1.

Because Alternative B2E would be elevated throughout Segment B, intersection operations would degrade only at the TWSC intersection of 112th Avenue SE and SE 15th Street because of an increase in trips along 112th Avenue SE associated with the South Bellevue Station, limiting vehicles on SE 15th Street from finding gaps to turn onto 112th Avenue SE.

Alternative B3 would be at-grade between the South Bellevue Station to south of the intersection of SE 8th Street and 112th Avenue SE. North of this intersection the profile would become elevated. Intersection operations would degrade at Bellevue Way SE at 112th Avenue SE because the at-grade light rail operations and increase in the number of vehicles associated with the South Bellevue Station would produce additional vehicle delay. This intersection is expected to operate at LOS E in 2020 and LOS F in 2030 build conditions. With the B3 - 114th Design Option, traffic operations would be the similar to those under Alternative B3.

The 118th Avenue SE and SE 8th Street intersection would operate at LOS F with the no-build condition and all Segment B alternatives. In BNSF Alternative (B7), however, this intersection would operate with a worse delay than in the no-build conditions in both 2020 and 2030. This would be caused by the increase in vehicle traffic from the new park-and-ride lot at the 118th Station, located just south of this intersection. The TWSC intersection of 112th Avenue SE and SE 15th Street would also degrade because of an increase in trips along 112th Avenue SE associated with the 118th Station limiting vehicles on SE 15th Street from finding gaps to turn onto 112th Avenue SE. The intersection of Coal Creek Parkway and I-405 southbound ramps would also operate with a higher delay under Alternative B7.

Traffic Safety

Table 6-26 discusses the expected safety impacts of the Segment B alternatives on the local roadway system. The safety assessments were based on each alternative's design and national research and safety guidelines relevant to East Link Project. Appendix E provides information about findings from national research projects for the various design types assessed for the East Link Project.

TABLE 6-26
Segment B Alternative Safety Assessment

Alternative	Section	Safety Assessment
Preferred 112th SE Modified Alternative (B2M) (connecting to *Preferred Alternative C9T)*	Bellevue Way SE from I-90 connection to 112th Avenue SE	The alternative is an elevated profile as it exits I-90, with grade-separated crossings over Bellevue Way interchange ramps, SE 30th Street, and the South Bellevue Station. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—including piers located near any ramps for the Bellevue Way interchange. However, relatively low travel speeds (less than or equal to 40 mph) and 6-inch curbs should provide adequate protection for the arterials. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, low-profile median barrier, or guardrail could be used to minimize safety risks. Piers located near the Bellevue Way interchange ramps should be adequately protected with guardrail or crash cushions to reduce the likelihood of a severe accident. Near the Bill Pace Fruit and Produce Farm, the alternative transitions to an open-cut section with grade-separated street and driveway crossings over the track. An important safety feature would be barriers to prevent vehicles and pedestrians from falling onto the tracks. For the bridges over the track, a potential traffic safety issue would be motor vehicle collisions with guardrails or bridge rails. Crashworthy-end treatments and lateral offset to the railings—combined with relatively low travel speeds (less than or equal to 35 mph)—should provide adequate protection, especially against severe collisions.
	112th Avenue SE from Bellevue Way SE to SE 6th Street	The alternative is at-grade, side-aligned on the east side of 112th Avenue SE with at-grade, gated crossings at SE 15th and SE 8th Streets. Both intersections are signalized to assign right-of-way to trains and vehicles. Gates should reduce the potential for a vehicle to be on the tracks when a train approaches the intersections. A pedestrian crossing is also provided approximately 250 feet south of SE 6th Street. Refer to *Preferred Alternative C9T* for more information regarding the operation of the pedestrian crossing with the intersection of 112th Avenue SE and SE 6th Street. An option to close the approach at SE 15th Street exists and would result in only one crossing at SE 8th Street.
Preferred 112th SE Modified Alternative (B2M) (connecting to *Preferred Alternative C11A)*	Bellevue Way SE from I-90 Connection to 112th Avenue SE	Refer to the *Preferred Alternative B2M* (to C9T) safety assessment for the same road section.
	112th Avenue SE from Bellevue Way SE to SE 6th Street	The alternative remains side-aligned rising from an open-cut section to at-grade approximately 500 feet north of Bellevue Way. This section would have no vehicle crossings over the tracks. At approximately 1,400 feet north of Bellevue Way SE, the track crosses the northbound lanes of 112th Avenue SE at-grade to become a median-aligned, at-grade alignment. The transition from side-aligned to median-aligned includes gates and signals for northbound traffic as well as a gated pedestrian crossing. The gates are intended to maintain separation between the different travel modes and reduce the collision potential. Following, SE 8th Street is a signalized intersection and all remaining cross streets (SE 15th Street), and driveways have right-in/right-out access. Relative to alternatives that operate outside the roadway, this low-speed median alignment would have more potential vehicle conflicts and, therefore, would have a higher expected accident exposure, but it might also have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal-controlled to assign right-of-way to trains and vehicles. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersections is believed to be a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening, and all of the LRT-vehicle accidents involved vehicles illegally turning. Of the existing midblock accidents, there were two rear-end and one right-angle accidents that could be prevented by the light rail median prohibiting midblock turns if any of the accidents involved a vehicle turning left into or out of a driveway.

TABLE 6-26 CONTINUED
Segment B Alternative Safety Assessment

Alternative	Section	Safety Assessment
Bellevue Way Alternative (B1)	Bellevue Way from SE 30th Street to SE 6th Street	Relative to alternatives that operate outside the roadway this low-speed median alignment would have more potential vehicle conflicts and, therefore, would have a higher expected accident exposure, but it might have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal-controlled to assign right-of-way to trains and vehicles. Most signalized intersections would provide a left-turn pocket for traffic on Bellevue Way; however, the current continuous left-turn median would be removed. This is not expected to be a substantial safety concern because light rail would prevent mid-block left turns and allow left turns only at signalized intersections. The conversions of some full-access intersections into right-in/right-out access would reduce the number of conflict points and should be expected to reduce accidents at these intersections. Left-turn traffic will redistribute to full-access signalized intersections, but the volumes might not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersections is believed to be a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening, and all of the LRT-vehicle accidents involved vehicles illegally turning. Of the existing mid-block accidents, a few (for example, rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns if any of the accidents involved a vehicle turning left into or out of a driveway.
112th SE At-Grade Alternative (B2A)	Bellevue Way from north park-and-ride entrance to approximately 500 feet further north	The elevated median alignment would separate vehicular traffic from light rail operations, which would prevent any vehicle-train accidents. Appropriate use of curb, low-profile median barrier, wide median to provide offset, or guardrail (if needed) would minimize the risk of a vehicle striking the pier. Overall, this short section is expected to have no substantial effect on the number of accidents.
	Bellevue Way and 112th Avenue SE from approximately 500 feet north of north park-and-ride entrance to SE 8th Street	Relative to alternatives that operate outside the roadway this low-speed median alignment would have a greater potential vehicle conflicts and, therefore, would have a higher expected accident exposure, but it might have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal-controlled to assign right-of-way to trains and vehicles. The conversion of some full-access intersections into right in/right out access reduces the number of conflict points and should be expected to reduce accidents at these intersections. Left-turn traffic will redistribute to full-access signalized intersections, but the volumes might not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersections is believed to be a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents were considered life-threatening and all of the LRT-vehicle accidents involved vehicles illegally turning. Of the existing mid-block accidents, a few (for example, rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns. As such, there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents.

TABLE 6-26 CONTINUED
Segment B Alternative Safety Assessment

Alternative	Section	Safety Assessment
112th SE Elevated Alternative (B2E)	Segment A boundary to Segment C boundary	This elevated alternative would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes. The largest apparent traffic safety issue is the relatively close location of some of the piers to the roadway — as little as 3 feet in some locations. However, relatively low travel speeds (35 mph or less) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barriers, or guardrail would minimize safety risks. Overall, no substantial effect on the number of accidents is expected.
112th SE Bypass Alternative (B3)	Bellevue Way from north park-and-ride entrance to approximately 500 feet further north	The elevated median profile would separate vehicular traffic from light rail operations, which would prevent any vehicle-train accidents. Use of curb, low-profile median barrier, wide median to provide offset, and guardrail (if needed) would minimize the risk of a vehicle striking the pier. Overall, this short section is expected to have no substantial effect on the number of accidents.
	Bellevue Way and 112th Avenue SE from approximately 500 feet north of north park-and-ride entrance to SE 15th Street	Relative to alternatives that operate outside the roadway this low-speed median alignment would have the most potential vehicle conflicts and, therefore, would have the highest expected accident exposure, but it might have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal-controlled to assign right-of-way to trains and vehicles. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersections is believed to be a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening and all of the LRT-vehicle accidents involved vehicles illegally turning. The conversions of some full-access intersections into right in/right out access would reduce the number of conflict points and would be expected to reduce accidents at these intersections. Left-turn traffic would redistribute to full-access signalized intersections, but the volumes might not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. Of the existing mid-block accidents, a few (for example, rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns. As such, there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents.
	112th Avenue SE from SE 15th Street to SE 8th Street	The elevated median profile would separate vehicular traffic from light rail operations, which would prevent any vehicle-train accidents. Use of curb, low-profile median barrier, wide median to provide offset, and guardrail (if needed) would minimize the risk of a vehicle striking the pier. Overall, this short section is expected to have no substantial effect on the number of accidents.
BNSF Alternative (B7)	Segment A boundary to Segment C boundary	The alternative is elevated or at-grade, generally paralleling I-90 and I-405. There would be no interaction with streets and therefore no substantial effect on the number of accidents is expected.

Parking

The number of off-street parking spaces that are expected to be removed with any of the alternatives in Segment B ranges from 3 to 73 spaces. None of the Segment B alternatives would remove on-street parking spaces. Table 6-27 summarizes the impacts by alternative.

TABLE 6-27
Segment B Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed	
	On-Street	Off-Street[a]
Preferred 112th SE Modified Alternative (B2M)	0	20
Bellevue Way Alternative (B1)	0	57
112th SE At-Grade Alternative (B2A)	0	7
112th SE Elevated Alternative (B2E)	0	18
112th SE Bypass Alternative (B3)	0	3
B3 – 114th Extension Design Option	0	73
BNSF Alternative (B7)	0	18

Note: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

[a] Includes parking spaces removed at the station areas.

Preferred 112th SE Modified Alternative (B2M)

Preferred Alternative B2M would remove 20 off-street parking spaces in properties along Bellevue Way SE and 112th Avenue SE and zero on-street parking spaces.

Other Segment B Alternatives

The B3 – 114th Extension Design Option is expected to require removing the most parking spaces of the Segment B alternatives. Most of these spaces are located in the Wilburton Park-and-Ride lot. Alternative B3 would require the removal of the fewest parking spaces (three spaces), which are located in the Mercer Slough Nature Park.

As shown in Table 6-28, none of the stations located in Segment B would result in a parking supply reduction. The South Bellevue Station would occupy space currently occupied by the South Bellevue Park-and-Ride Lot. The proposed location of the SE 8th Street Station would not interfere with any existing off-street parking. The 118th Station, however, would require several properties to be taken for the construction and operations of the proposed park-and-ride lot. Because the entire parcels would be taken, the parking demand would be removed.

TABLE 6-28
Segment B Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
South Bellevue	*Preferred Alternative B2M* and Alternatives B1, B2A, B2E, and B3	0	None.
SE 8th	*Preferred Alternative B2M* to *Preferred Alternative C9T* and Alternatives B2A and B2E	0	None.
118th	Alternative B7	0	Several entire parcels would be acquired along the west side of 118th Avenue SE, south of SE 8th Street.

Notes: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.

There is some potential for parking spillover to occur at the South Bellevue Station by year 2030, when the vehicle demand of 1,560 would exceed the proposed parking (approximately 1,400 stalls), as shown in Table 6-29. Even though there could be a potential for spillover by year 2030, the potential for hide-and-ride parking is expected to be low. Even though the South Bellevue park-and-ride lot is currently at capacity there is minimal parking spillover in the nearby residential areas because most of the parking in the area is not easily identifiable or accessible from Bellevue Way. This is illustrated by the low on-street parking utilization in the Enatai neighborhood (Table 6-6). Additionally, the City of Bellevue constructed a sidewalk and eliminated on-street parking on 112th Avenue SE south of the South Bellevue park-and-ride to remove the potential for spillover near the station.

TABLE 6-29
Segment B Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Vehicle Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Vehicle Demand[a]	2030 Park-and-Ride Vehicle Demand[a]
South Bellevue	*Preferred Alternative B2M* and Alternatives B1, B2A, B2E, and B3	519	1,400	1,310	1,560
118th	Alternative B7	--	1,030	580	760

[a] 3-hour PM peak-period park-and-ride vehicle demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

At SE 8th Street Station, there would be a low potential for hide-and-ride activity because of the residential parking zone for the Surrey Downs neighborhood recently established by the City of Bellevue. Additionally, this parking is not easily accessible to the SE 8th Street Station. At the 118th Avenue Station, there is a low potential for hide-and-ride impacts because the park-and-ride lot is expected to accommodate 2020 and 2030 vehicle demand (Table 6-29).

6.3.2.3 Segment C

Within Segment C, multiple projects are planned to be built by the City of Bellevue and WSDOT under the no-build condition would change the physical characteristics of major roadways from their existing conditions. This includes; widening 110th Avenue NE from a three- or four-lane cross section to a five-lane cross-section between NE 4th Street and NE 8th Street. Extending NE 4th Street from 116th Avenue NE to 120th Avenue NE and by year 2030 widening NE 2nd Street from three lanes with on-street parking to five lanes between 112th Avenue NE and Bellevue Way NE. Appendix A provides the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment C.

Traffic Control, Property Access, and Circulation

Within Segment C, traffic-control treatments proposed with the project alternatives include signal replacements and modifications, right (or left)-in, right (or left)-out restrictions, light rail gates and access closures. Table 6-30 identifies locations and types of control measures for each Segment C alternative. Alternative C4A would have the highest number of traffic control revisions because it travels at-grade along the side of 108th and 110th avenues NE. The tunnel alternatives (*Preferred Alternative C9T* and Alternatives C1T, C2T, C3T) and elevated alternatives along or east of 112th Avenue NE (C7E andC14E) would have the fewest revisions.

TABLE 6-30
Segment C Intersection Traffic Control

Control Location[a]	Existing Control	Proposed Control
Preferred 108th At-Grade Alternative (C11A)		
112th Avenue SE and SE 6th Street	Signal	Replace signal
112th Avenue SE and SE 4th Street	Minor street stop-controlled	Close
110th Avenue NE and Main Street	Signal	Replace signal
108th Avenue NE and Main Street	Signal	Replace signal
108th Avenue NE and NE 2nd Street	Signal	Replace signal
108th Avenue NE and NE 4th Street	Signal	Replace signal
108th Avenue NE and NE 6th Street	Signal	Replace signal
110th Avenue NE and NE 6th Street	Signal	Replace signal
112th Avenue NE and NE 6th Street	Signal	Replace signal

TABLE 6-30 CONTINUED
Segment C Intersection Traffic Control

Control Location[a]	Existing Control	Proposed Control
Preferred 110th NE Tunnel Alternative (C9T)		
112th Avenue SE and SE 6th Street	Signal	Replace signal
112th Avenue SE and SE 4th Street	Minor street stop-controlled	Relocate approach to SE 6th Street
112th Avenue SE and SE 1st Place	Minor street stop-controlled	Close
110th Avenue NE and NE 6th Street	Signal	Replace signal
112th Avenue NE and NE 6th Street	Signal	Replace signal
Bellevue Way Tunnel Alternative (C1T)		
Bellevue Way and SE Kilmarnock Street	Signal	Replace signal
110th Avenue NE and NE 6th Street	Signal	Replace signal
112th Avenue NE and NE 6th Street	Signal	Replace signal
106th NE Tunnel Alternative (C2T)		
110th Avenue NE and NE 6th Street	Signal	Replace signal
112th Avenue NE and NE 6th Street	Signal	Replace signal
108th NE Tunnel Alternative (C3T)		
116th Avenue NE, north of NE 12th Street	None	Install light rail gates
Couplet Alternative (C4A) (eastbound/northbound)		
SE 6th Street and 112th Avenue SE	Signal	Replace signal
Main Street and 110th Avenue NE	Signal	Replace signal
NE 2nd Street and 110th Avenue NE	Signal	Replace signal
NE 4th Street and 110th Avenue NE	Signal	Replace signal
NE 6th Street and 110th Avenue NE	Signal	Replace signal
NE 8th Street and 110th Avenue NE	Signal	Replace signal
NE 10th Street and 110th Avenue NE	Signal	Replace signal
NE 12th Street and 110th Avenue NE	Signal	Replace signal
NE 12th Street driveway and mid-block access on the north side	None	Close access
116th Avenue NE, north of NE 12th Street	None	Install light rail gates
Couple Alternative (C4A) (westbound/southbound)		
Main Street and 110th Avenue NE	Signal	Install light rail gates
Main Street and 108th Avenue NE	Signal	Replace signal
NE 2nd Street and 108th Avenue NE	Signal	Replace signal
NE 4th Street and 108th Avenue NE	Signal	Replace signal
NE 6th Street and 108th Avenue NE	Signal	Replace signal
NE 8th Street and 108th Avenue NE	Signal	Replace signal
NE 10th Street and 108th Avenue NE	Signal	Replace signal
NE 12th Street and 108th Avenue NE	Signal	Replace signal
NE 12th Street driveway and midblock access on the north side	None	Close access

TABLE 6-30 CONTINUED
Segment C Intersection Traffic Control

Control Location[a]	Existing Control	Proposed Control
NE 12th Street and 110th Avenue NE	Signal	Light rail gate
116th Avenue NE, north of NE 12th Street	None	Install light rail gates
112th NE Elevated Alternative (C7E)		
SE 6th Street and 112th Avenue SE	Signal	Replace signal
NE 6th Street and 112th Avenue NE	Signal	Replace signal
116th Avenue NE, north of NE 12th Street	None	Install light rail gates
110th NE Elevated Alternative (C8E)		
NE 4th Street and 110th Avenue NE	Signal	Replace signal
NE 6th Street and 110th Avenue NE	Signal	Replace signal
NE 8th Street and 110th Avenue NE	Signal	Replace signal
NE 10th Street and 110th Avenue NE	Signal	Replace signal
NE 12th Street and 110th Avenue NE	Signal	Replace signal
116th Avenue NE, north of NE 12th Street	None	Install light rail gates
110th NE At-Grade Alternative (C9A)		
SE 6th Street and 112th Avenue SE	Signal	Replace signal
SE 4th Street and 112th Avenue SE	Minor street stop controlled	Right-in/right-out
SE 1st Place and 112th Avenue SE	Minor street stop controlled	Right-in/right-out
Main Street and 110th Place SE	Minor street stop controlled	Install light rail gates
Main Street and 110th Avenue NE	Signal	Replace signal
NE 2nd Street and 110th Avenue NE	Signal	Replace signal
NE 4th Street and 110th Avenue NE	Signal	Replace signal
NE 6th Street and 110th Avenue NE	Signal	Replace signal
NE 6th Street and 112th Avenue NE	Signal	Replace signal
114th NE Elevated Alternative (C14E)		
No intersection traffic control modifications		

[a] With connectors to Segment B Alternatives B3 and B7 no change to the existing intersection control on 112th Avenue SE would occur.

Preferred 108th NE At-Grade Alternative (C11A)

Preferred Alternative C11A has signalized crossings along 108th Avenue NE at Main, NE 2nd, NE 4th, and NE 6th streets, a mid-block pedestrian crossing north of NE 2nd Place and signalized crossings at 112th Avenue SE and SE 6th Street and 110th Avenue NE and NE 6th Street intersections. A southbound left-turn pocket would be provided at the SE 6th Street and 112th Avenue SE intersection. As *Preferred Alternative C11A* operates along portions of 108th Avenue NE and NE 6th Street in the median, property access and circulation is right-in/ right-out except at signalized intersections where all movements are allowed (including u-turn movements where appropriate); except the northbound left-turns along 108th Avenue NE at NE 2nd Street and NE 4th Street. SE 4th Street would be closed to 112th Avenue SE. Access to SE 4th Street would be maintained via 111th Avenue SE. 110th Place SE and 110th Avenue SE would not have access to Main Street, but would have a new connection to one another. At Surrey Downs Park, the north driveway would be closed and the south driveway would allow right-in and right-out movements. No gates would be required. Due to the roadway realignment, the driveway might need to be rebuilt to the appropriate standards with this alternative.

With a connection to Alternatives B3, B3 - 114th Design Option, or B7, no traffic control, property access or circulation changes would occur along 112th Avenue SE because *Preferred Alternative C11A* would operate grade-separated east of 112th Avenue SE before transitioning to at-grade south of Main Street, west of 112th Avenue SE.

Preferred 110th NE Tunnel Alternative (C9T)

Preferred Alternative C9T has one signalized crossing at 112th Avenue SE and SE 6th Street. *Preferred Alternative C9T* would not affect roadway and property access and circulation except along 112th Avenue SE and NE 6th Street. SE 1st Street would be closed and not have access with 112th Avenue SE. Access to SE 1st Place would be maintained via 111th Avenue SE. SE 4th Street would be realigned to the intersection of 112th Avenue SE and SE 6th Street. With this realignment northbound and southbound left turn pockets would be provided at SE 6th and 112th Avenue SE. Along NE 6th Street, property access would be similar to property access under *Preferred Alternative C11A*. With a connection to Alternatives B3, B3 114th - Design Option, or B7, *Preferred Alternative C9T* would operate in the same manner as *Preferred Alternative C11A* with no traffic control, property access or circulation changes along 112th Avenue SE.

Other Segment C Alternatives

Because the Bellevue Way Tunnel (C1T), 106th NE Tunnel (C2T), and 108th NE Tunnel (C3T) alternatives are mainly underground, minimal traffic control, property access and circulation changes are expected and only at the beginning and end of the tunnels near the portal areas. Alternative C1T would restrict driveway access on Bellevue Way between the short segment of SE 6th Street and SE Kilmarnock Street by allowing only right-turn-in, right-turn-out movements and a new signal would be installed at the Bellevue Way SE and SE Kilmarnock Street intersection. Alternatives C2T and C3T would restrict driveway access on 112th Avenue SE south of SE 6th Street when connected to Alternative B2A. All other Segment B connections to alternatives C2T and C3T would not result in additional traffic control, property access and circulation impacts on 112th Avenue SE. Alternatives C1T and C2T are similar to *Preferred Alternative C11A* once they exits their tunnel profiles east of the Bellevue Transit Center Station. Alternative C3T would require two road modifications north of NE 12th Street to serve the residential properties. New connections to 110th Avenue NE would be constructed to the north and connect with 110th Avenue NE.

Because the At-Grade Couplet Alternative (C4A) would consist of track side-aligned along 108th Avenue NE and 110th Avenue NE, both of the roadways would be converted to one-way streets, with 108th Avenue NE in the northbound direction and 110th Avenue NE in the southbound direction. These directions are opposite of the light rail train. At each intersection along 110th Avenue NE, there would be a left-turn lane, a through lane, and a shared through/right lane. On 108th Avenue NE, three vehicle lanes would be provided with an exclusive left-turn lane at the intersections.

In situations where a vehicle would cross the light rail tracks to access a driveway along 108th Avenue NE and 110th Avenue NE, that driveway would be closed if access is available at another location. For driveways that remain open on the west side and east side of the streets, respectively, they would be signed to alert the drivers crossing the tracks when a light rail train is approaching. Because the train would approach a driveway from the left side of the street, its operation follows standards to which drivers are accustomed. The proposed Bellevue Transit Center Station location would close the City Hall visitor parking entrance on 110th Avenue NE, parking access would remain on NE 6th Street.

Light rail gates would be installed on the southern leg of the 110th Avenue NE and Main Street intersection and on the northern leg of the 110th Avenue NE and NE 12th Street intersection. The intersection at Main Street and 110th Avenue NE would be reconfigured to accommodate the realignment of 110th Avenue SE and 110th Place SE. Minor impacts on traffic circulation at the NE 12th Street and 110th Avenue NE intersection are expected as a result of realigning 111th Avenue NE to connect to 110th Avenue NE. Private driveway access from existing properties on 111th Avenue NE would be maintained, and impacts on circulation are expected to be minimal.

If Alternative C4A connects with Alternative B2A, there would be some additional property access and circulation impacts between SE 6th Street and just south of Main Street because the profile is at-grade and elevated in the median. Therefore, turning movements into and out of driveways would be restricted to allow only right-turn-in and right-turn-out movements. U-turn movements would be provided at the SE 6th Street and Main Street intersections along 112th Avenue NE to minimize any impacts. All other Segment B connections would not result in traffic control, property access or circulation impacts.

The 112th NE Elevated Alternative (C7E) would have minor traffic control, property access, and circulation impacts because the alternative is elevated along the east side of 112th Avenue NE. The signal at NE 6th Street and 112th Avenue NE would be modified because of column placement. With a connection to Alternative B2A, traffic control, property access, and circulation along 112th Avenue SE between Main Street and SE 6th Street would be similar to that in Alternative C4A. No other Segment B connections would result in additional traffic controls, property access or circulation impacts.

The 110th NE Elevated Alternative (C8E) would have some traffic control, property access and circulation impacts. Due to column placements along 110th Avenue NE between NE 2nd and NE 12th streets one through lane in each direction would be provided and turning movements into and out of driveways would be restricted to right-turn-in and right–turn-out only. Northbound and southbound left turn lanes would be provided at each intersection along 110th Avenue NE with the exception at NE 8th Street and 110th Avenue NE, where the northbound left turn would not be allowed due to right-of-way constraints. Vehicles in this direction would need to turn left at either at NE 4th Street or NE 10th Street. To minimize circulation impacts, U-turn movements would be provided at signalized intersections along this roadway section, where appropriate. Because this alternative connects only with Alternative B3 or Alternative B7, there would be no traffic control, property access or circulation impacts along 112th Avenue SE, south of Main Street.

Alternative C9A, with a connection to Alternative B2A, would have traffic control, property access, and circulation impacts along 112th Avenue SE between Main Street and SE 6th Street similar to those under Alternative C4A. A gated crossing would be provided to the properties south of Main Street at 110th Place SE. Alternative C9A would have signalized crossings along 110th Avenue NE at Main, NE 2nd, NE 4th, and NE 6th streets. Because Alternative C9A operates along 110th Avenue SE in the center median, property access and circulation would be right-in/right-out. The alternative would be similar to *Preferred Alternative C11A* once it becomes elevated on NE 6th Street. With the other Segment B connections, there would be no traffic control, property access, or circulation impacts.

Alternative C14E would have no signalized crossings or access and circulation impacts.

Within Segment C, gated vehicle crossings would occur under the C3T, C4A, C7E, C8E and C9A alternatives and are listed in Table 6-30.

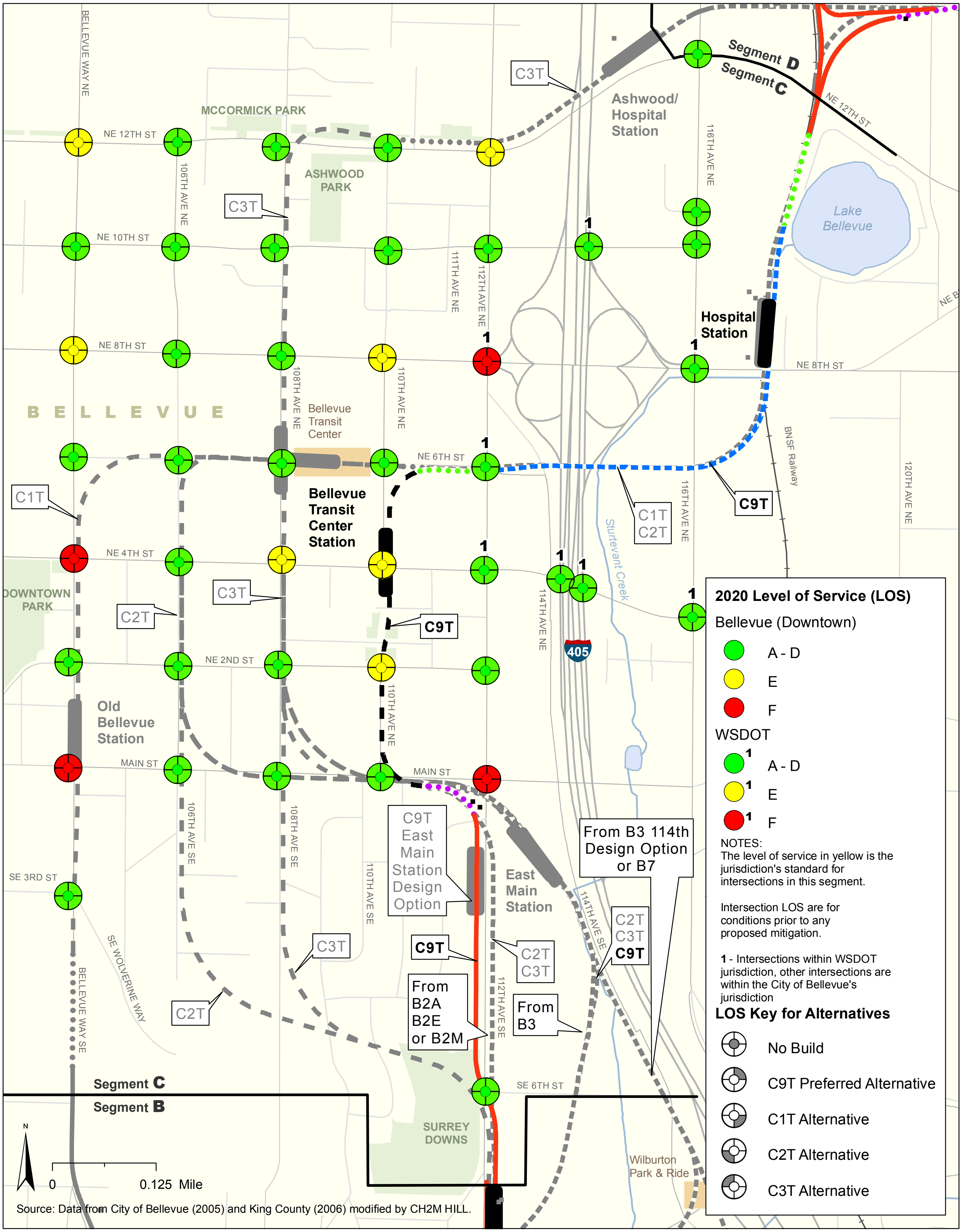
Operations and Level of Service

In the future, several roadway projects in Downtown Bellevue are assumed to be completed under the No Build Alternative. Four intersections in the study area would likely operate at LOS F under the No Build Alternative in 2020, and by 2030, four additional intersections would likely operate at LOS F, totaling eight intersections in 2030 that are expected to operate at LOS F with the No Build Alternative. These eight intersections are as follows:

- Bellevue Way and Main Street
- Bellevue Way and NE 4th Street
- Bellevue Way and NE 12th Street
- 112th Avenue NE and NE 8th Street (I-405 southbound off-ramp)
- 112th Avenue NE and Main Street
- 110th Avenue NE and NE 8th Street
- 112th Avenue NE and NE 12th Street
- 108th Avenue NE and NE 4th Street

The majority of intersections with the project in the year 2020 and 2030 PM peak-hour analysis are expected to operate similarly to the no-build conditions. This is because of the roadway modifications incorporated into each alternative and modified travel patterns related to a shift to transit. As stated previously, within Downtown Bellevue, the at-grade alternatives, such as *Preferred Alternative C11A*, would likely receive some form of priority although east-west traffic signal coordination on key arterials would be maintained for vehicle progression.

Exhibits 6-12 through 6-15 and Tables D-10 and D-11 in Appendix D provide 2020 and 2030 intersection PM peak-hour LOS results for the no-build and build conditions.

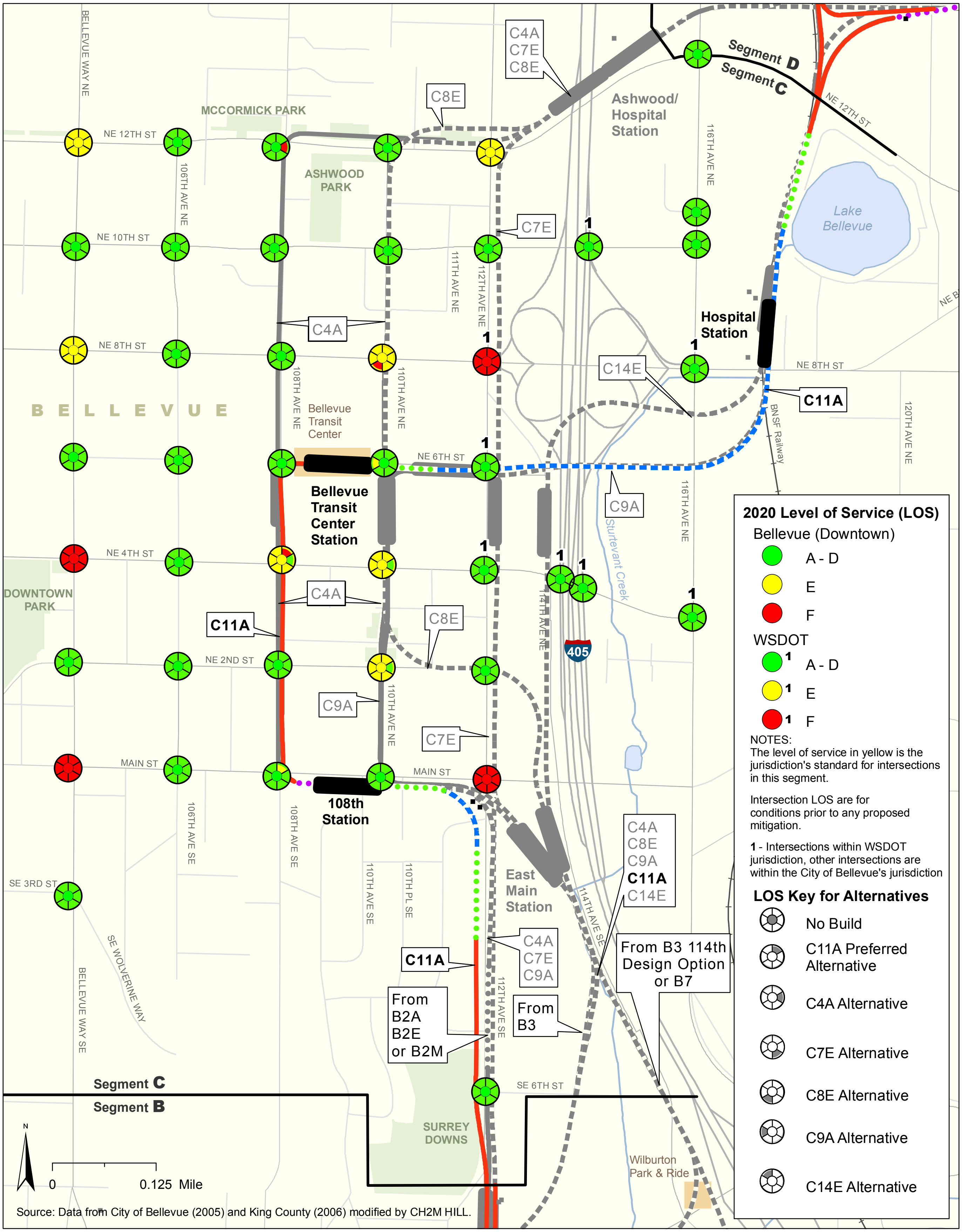


Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- P New and/or Expanded Park-and-Ride Lot

Exhibit 6-12 **2020 PM No Build and Build Level of Service at Intersections, Tunneled Alignments**
Segment C
East Link Project



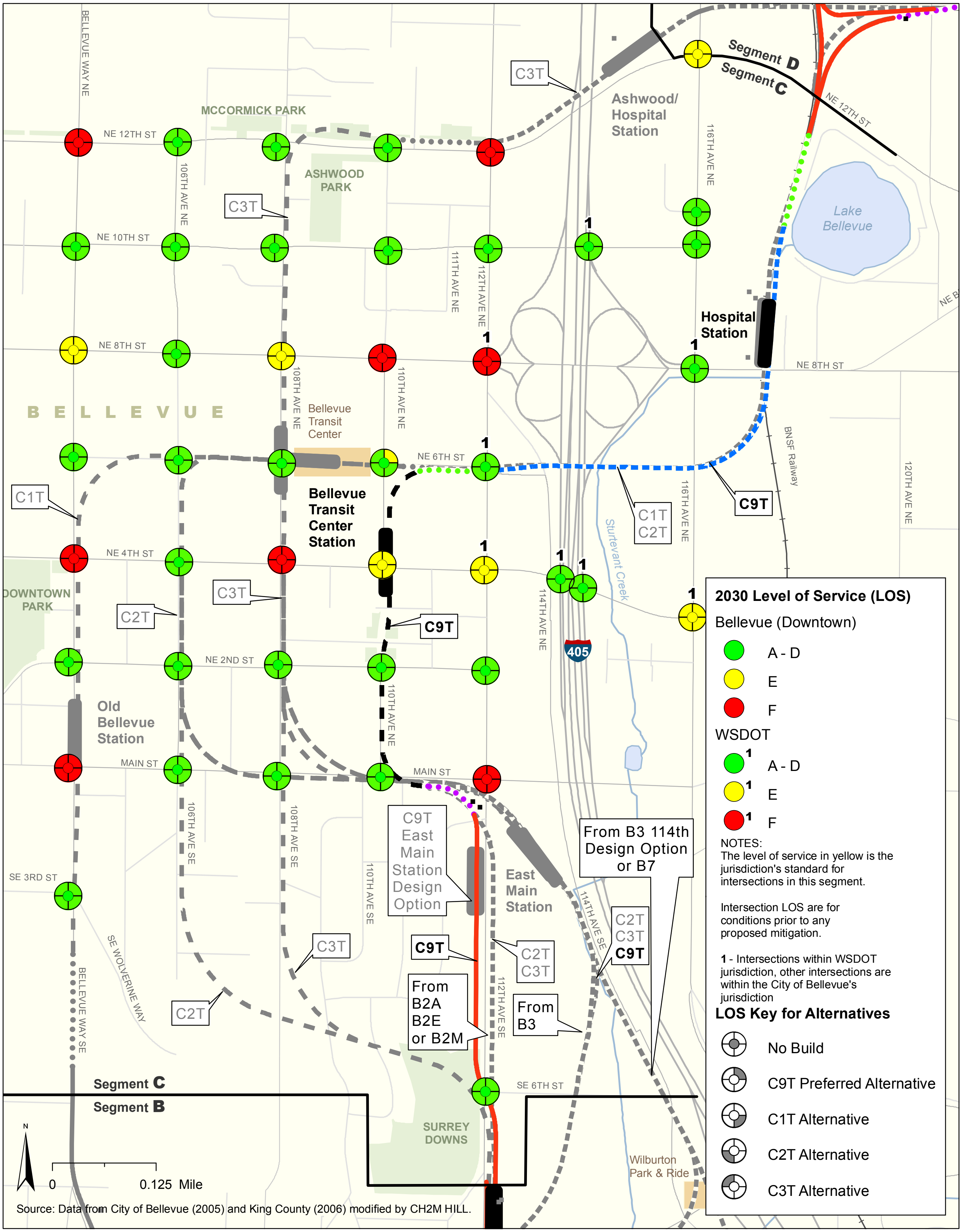
Source: Data from City of Bellevue (2005) and King County (2006) modified by CH2M HILL.

Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- P New and/or Expanded Park-and-Ride Lot

Exhibit 6-13 **2020 PM No Build and Build Level of Service at Intersections, Non-Tunneled Alignments Segment C**
East Link Project

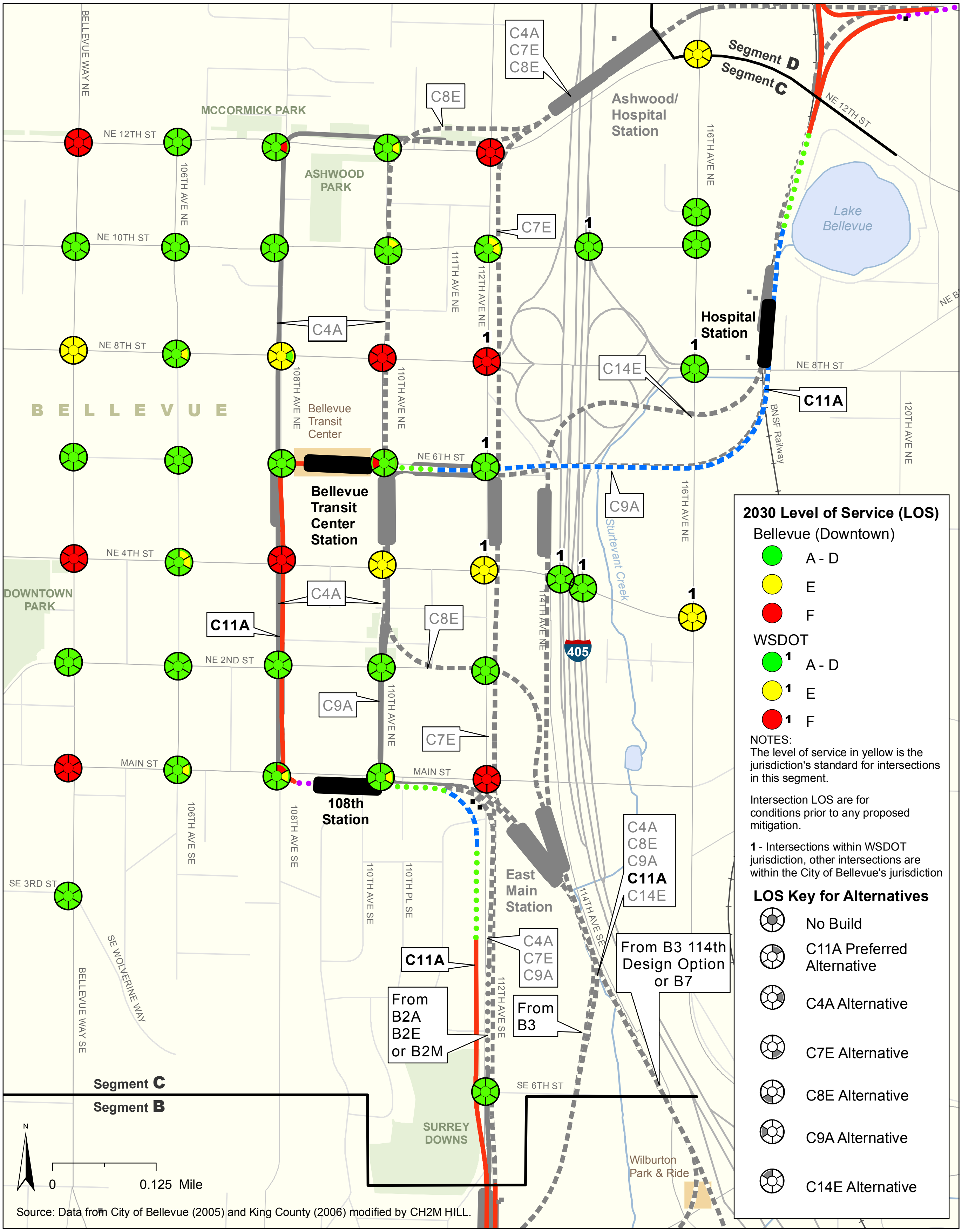


Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- P New and/or Expanded Park-and-Ride Lot

Exhibit 6-14 **2030 PM No Build and Build Level of Service at Intersections, Tunneled Alignments**
Segment C
East Link Project



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-15 **2030 PM No Build and Build Level of Service at Intersections, Non-Tunneled Alignments Segment C**
East Link Project

Preferred 108th NE At-Grade Alternative (C11A)
Most intersections in downtown Bellevue under *Preferred Alternative C11A* would operate similar to the No Build Alternative. The intersections of Main Street and 112th Avenue NE, Main Street and 108th Avenue NE, and NE 4th Street and 108th Avenue NE would not meet the City of Bellevue LOS standards and operate worse than the No Build Alternative. These impacts are due to the roadway modifications and signal adjustments along 108th Avenue NE and because of the passenger drop-off and pick-up traffic at the 108th Station and Bellevue Transit Center Station. With a connection to Alternative B3, B3 - 114th Extension Design Option, or B7, operations along 112th Avenue SE would be similar to a connection with *Preferred Alternative B2M*.

Preferred 110th NE Tunnel Alternative (C9T)
Most intersections under the *Preferred Alternative C9T* would operate similar to the No Build Alternative because this alternative is mostly grade-separated from the roadway system. The intersection of NE 4th Street and 108th Avenue NE would not meet City of Bellevue LOS standards and would operate slightly worse than the No Build Alternative because of the passenger drop-off and pick-up traffic at the Bellevue Transit Center Station.

A design option under the *Preferred Alternative C9T* is to provide a Bellevue Transit Center Station exit/entrance on the west side of 110th Avenue NE. This would result in improved intersection operations at the intersection of 110th Avenue NE and NE 6th Street as the pedestrian-only signal phase would no longer be proposed to provide convenient pedestrian access to the station exit/entrance on the east side of 110th Avenue NE.

With a connection to alternatives B3, B3 - 114th Design Option, or B7, operations along 112th Avenue SE would be similar to a connection with *Preferred Alternative B2M.* Intersection LOS results for the East Main Station design option under *Preferred Alternative C9T* would be similar to a connection with Alternative B3, B3 - 114th Extension Design Option, or B7 that have an East Main Station.

Other Segment C Alternatives
The Bellevue Way Tunnel Alternative (C1T) would be grade-separated throughout most of Segment C except on Bellevue Way SE south of SE Kilmarnock Street, where the profile transitions between at-grade and a tunnel. The intersection operations at the Bellevue Way and Main Street intersection in 2020 and 2030 are expected to get slightly worse when compared with no-build condition because of the vehicle traffic associated with the Old Bellevue Station. Overall, however, C1T is expected to cause little to no impact on the intersections LOS compared with the No Build Alternative.

The 106th NE Tunnel (C2T) and 108th NE Tunnel (C3T) alternatives would be grade-separated through most of Segment C. The intersection operations in both of these alternatives are expected to cause minimal change in the intersection LOS compared with the 2020 and 2030 no-build conditions except at the intersection of 108th Avenue NE and NE 4th Street under both alternatives and at the intersection of 112th Avenue NE and NE 12th Street under Alternative C3T. At both intersections, an increase in delay is caused by additional drop-off and pick-up traffic associated with nearby stations.

The Couplet Alternative (C4A) would be an at-grade profile throughout Segment C except when connecting to an elevated Segment B alternative - 112th SE Bypass (B3), BNSF (B7), or 112th NE Elevated (B2E). With these connections, Alternative C4A south of Main Street would be elevated. Alternative C4A would operate as a light rail track couplet along 110th Avenue NE and 108th Avenue NE. Light rail would operate northbound along the east side of 110th Avenue NE and southbound along the west side of 108th Avenue NE between Main Street and NE 12th Street. To improve vehicle safety, 108th and 110th avenues NE would be converted to one-way vehicle traffic in the southbound direction on 110th Avenue NE and northbound direction on 108th Avenue NE. Left-turn lanes would be provided at each signalized intersection along 108th and 110th avenues NE.

The light rail operations associated with Alternative C4A would affect some north-south vehicle operations because of the one-way vehicle couplet proposed with this alternative. Therefore, intersection operations are expected to experience changes compared with 2020 and 2030 no-build conditions. Three intersections would fail to meet standards and operate worse than under no-build conditions: 108th Avenue NE and NE 12th Street, 110th Avenue NE and NE 8th Street and 112th Avenue NE and NE 8th Street. These impacts are associated with the changes in trip patterns and recirculation that would occur with a one-way couplet except at 108th Avenue NE and NE 12th Street, which is caused by the at-grade light rail operations.

The 112th NE Elevated (C7E) Alternative would be elevated throughout Segment C and, therefore, is expected to have little to no change in intersection LOS compared with the no-build condition except at the intersection of

112th Avenue NE and NE 12th Street because of additional vehicle trips associated with the Ashwood/Hospital Station. In Alternative C7E, the Bellevue Transit Center Station would be located on 112th Avenue NE between NE 4th Street and NE 6th Street. The resulting shift in passenger drop-off/pick-up traffic is not expected to create additional delays at the intersections near this station.

The 110th NE Elevated Alternative (C8E) would be elevated throughout Segment C. Along 110th Avenue NE, between NE 2nd Street and NE 12th Street, the number of lanes would be reduced from a three- to five-lane section (planned by the City of Bellevue) to a two- to four-lane section. This is due to column placements and right-of-way constraints. In 2020 and 2030, the intersections of NE 8th Street at 110th Avenue NE, NE 8th Street at 112th Avenue NE, NE 12th Street at 112th Avenue NE, and 108th Avenue NE and NE 4th Street would operate at LOS F and worse than the no-build condition. This is a result of the shift in travel patterns associated with the reduction in travel lanes because of the median column placement and the additional vehicle trips associated with the Bellevue Transit Center and Ashwood/Hospital stations. All other intersections are expected to have little to no change in intersection LOS compared with the no-build condition.

Most intersections in Alternative C9A would operate similar to No Build Alternative. Along 112th Avenue SE, intersection impacts would be similar to those described for Alternative C4A. The intersections of NE 4th Street and 108th Avenue NE and NE 8th Street and 110th Avenue NE would not meet City of Bellevue's LOS standards and would operate worse than the No Build Alternative. Intersection delays along 110th Avenue NE would be higher with Alternative C9A than under the No Build Alternative, but would operate within City of Bellevue's LOS standards unless where noted.

Intersection operations with Alternative C14E would operate similar to the No Build Alternative because of the elevated alignment on the eastern edge of downtown Bellevue. If a parking garage were provided to support the Bellevue Transit Center Station with Alternative C14E, the stalls would need to be managed to prohibit use by non-transit passengers. It is also expected congestion along NE 6th Street and 112th Avenue NE would likely become slightly worse and possibly require mitigation with the additional traffic associated with a parking garage.

With any of the non-preferred Segment C alternatives, a connection to Alternative B3, B3 - 114th Extension Design Option, or B7 would not impact operations along 112th Avenue SE and intersection LOS results would be similar to the No Build Alternative.

With alternatives C3T, C4A, C7E, and C8E, the gated crossing of 116th Avenue NE would be coordinated with the traffic signal at NE 12th Street and 116th Avenue NE to allow enough clearance for southbound vehicles potentially queued between NE 12th Street and the gated crossing. Intersection operations at NE 12th Street and 116th Avenue NE would meet the City of Bellevue intersection LOS standard.

As stated in the Section Overview, Sound Transit and the City of Bellevue cooperatively explored at-grade and grade-separated alternatives in Segment C and analyzed their effects on traffic operations using different models than those applied in this FEIS for the *Downtown Bellevue Light Rail Alternatives Concept Design Report* (Sound Transit, 2010b). A peer review of the study by traffic engineering and transit operations professionals from Seattle, Portland, Denver, and San Diego concluded that the traffic modeling, simulation, and operational analysis were sufficient to compare build alternatives. Based upon their experience in all four cities, the panel concluded that the surface alternatives studied would have impacts on traffic operations in Bellevue that are similar to the surface light rail systems in the comparable environments of Downtown Portland, Downtown Denver, and Downtown San Diego. The panel noted that most of the changes in forecasted future traffic operating conditions in Downtown Bellevue are the result of traffic volume growth and not the introduction of surface light rail.

This analysis is not included in the Final EIS because the methodology is not consistent with the EIS approach reviewed by all cooperating agencies, a no-build condition was not analyzed, and some of the Segment C alternatives were not included. Even so, some of the key findings of the Downtown Study are important to note. Specifically, two criteria (average vehicle delay for all downtown intersections and average vehicle delay for intersections adjacent to the at-grade light rail alignments) produced conclusions similar to those of the EIS analysis when comparing the grade-separated (C9T and C14E) and at-grade (C9A and C11A) alternatives. In both analyses, the difference between the grade-separated and the at-grade alternative for the average downtown vehicle delay was within 10 percent. The analysis in the Final EIS also projected percentage differences in vehicle delay for the key affected intersections similar to those presented in the *Downtown Bellevue Light Rail Alternatives Concept Design Report* (Sound Transit, 2010b).

Traffic Safety

Table 6-31 discusses the expected safety impacts of the Segment C alternatives on the local roadway system. The safety assessments were based on each alternative's design and national research and safety guidelines relevant to East Link Project. Appendix E provides information about findings from national research projects for the various design types assessed for the East Link Project.

TABLE 6-31
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
Preferred 108th NE At-Grade Alternative (C11A)	112th Avenue SE near Segment B boundary at SE 6th Street (connecting from *Preferred Alternative B2M*)	Approximately 300 feet south of SE 6th Street, *Preferred Alternative C11A* transitions from median at-grade to at-grade side-aligned by crossing the southbound lanes of 112th Avenue SE. The transition does not include gates because the traffic signal at SE 6th Street controls the vehicle, pedestrian, and train movements. When a train crosses the intersection, northbound vehicle movements would be allowed to proceed. This approach also uses an appropriate clearance interval to allow vehicles to clear the tracks before permitting the train to cross. Sufficient lighting should be provided so that drivers can clearly see the trains throughout the day. The clearance interval should consider the possibility of vehicles travelling through the intersection during their red-light phase. Adjacent to the signalized intersection, the tracks cross the sidewalk at a gated crossing to reduce the potential conflict with pedestrians and bicyclists.
	112th Avenue SE from SE 6th Street to 108th Avenue NE (connecting from *Preferred Alternative B2M*)	The segment is side-aligned with no crossings. South of SE 1st Place, the alignment transitions to elevated and back to at-grade after the crossing. With driveway and street crossings eliminated, no substantial effect on the number of accidents would be expected.
	Segment B boundary to 108th Avenue NE (connecting from Alternative B3 or B7)	*Preferred Alternative C11A* is elevated with a grade-separated crossing over 112th Avenue SE. The alignment transitions to at-grade, south of Main Street, west of 112th Avenue SE. With driveway and street crossings eliminated, no substantial effect on the number of accidents would be expected.
	108th Avenue NE and NE 6th Street from Main Street to 110th Avenue NE	This section is a low-speed median alignment, which would likely have highest higher expected accident exposure than grade-separated alignments; however, it might have less severe accidents because of slower travel speeds. Train crossings through major intersections are signal-controlled to assign right-of-way between the trains, vehicles, pedestrians, and bicyclists. On 108th Avenue NE, southbound vehicles are provided with left-turn pockets for turning across the tracks, while northbound left turns across the tracks would not be permitted. Southbound left turns would have a protected signal phase that would prohibit drivers from turning when a train is approaching. Additionally, driveways are right-in/right-out, eliminating vehicle-train conflicts between intersections. Along NE 6th Street, the train remains at-grade, median-aligned with buses operating on the outside the platform. To reach the platform, pedestrians would have to cross the bus lanes; however, this would not be different from the current design of the Bellevue Transit Center, which has pedestrians crossing to the median for loading and unloading. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr., Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 through June 2010), seven light rail train and vehicle accidents and one light rail train and pedestrian accident occurred, and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the light rail train revenue service began. The light rail train median barrier restricting vehicle turns to signalized intersections likely contributes to the overall accident reduction along the corridor. None of the light rail train-related accidents was considered life-threatening, and all of the light rail train-vehicle accidents involved vehicles illegally turning. Of the existing midblock accidents, there were two side-swipe and one right-angle accidents that could be prevented by the light rail median prohibiting midblock turns if any of the accidents involved a vehicle turning left into or out of a driveway.

TABLE 6-31 CONTINUED
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
	NE 6th Street from 110th Avenue NE to end of Segment C	This section transitions to a median-elevated and eventually to a side-elevated as the alternative crosses over I-405. After crossing I-405, the alternative has grade-separated crossings over 116th Avenue NE and NE 8th Street. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—including piers located near any ramps for the NE 8th Street interchange. However, relatively low travel speeds (less than or equal to 35 mph) and 6-inch curbs should adequately protect the arterials. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, low-profile median barrier, or guardrail could be used to minimize safety risks. Piers located near the NE 8th Street interchange ramps should be adequately protected with guardrail or crash cushions to reduce the likelihood of a severe accident.
Preferred 110th NE Tunnel Alternative (C9T)	112th Avenue SE and Main Street from Segment B boundary to tunnel portal (connecting from *Preferred Alternative B2M*)	This section crosses from the east side of 112th Avenue SE to the west side through the intersection at SE 6th Street. The intersection is signalized to control vehicle, train, pedestrian, and bicycle movements but does not include gates. Active devices could be used where necessary to inform drivers of an approach train while waiting at the intersection. Approximately 400 feet north of SE 6th Street, the sidewalk paralleling 112th Avenue NE on the west side crosses the track at a gate-controlled crossing. (Note: In Segment B, approximately 250 feet south of SE 6th Street, a similar pedestrian and bicycle crossing, is provided on the east side of 112th Avenue SE.) Pedestrians would have to walk a longer distance to cross 112th Avenue SE, especially pedestrians that want to cross east-west north of SE 6th Street. To keep pedestrians and bicyclists from cutting-crossing the tracks to avoid the additional distance to the crossings, directional signing to inform pedestrians and bicyclists where to cross and fencing might be needed. The remaining section is at-grade side-aligned with no driveway or street crossings until it portals into the tunnel next to Main Street. This portion of the section would likely have no substantial effect on the number of accidents.
	Segment B boundary to tunnel portal (connecting from Alternative B3 or B7)	This section is elevated with a grade-separated crossing over 112th Avenue SE. The alternative transitions to the tunnel portal after the crossing south of Main Street. This portion of the alternative would have no substantial change in the number of accidents.
	NE 6th Street from tunnel portal to end of Segment C	See *Preferred Alternative C11A* for the same section.
Bellevue Way Tunnel Alternative (C1T)	Bellevue Way from north of SE 6th Street to south of SE Kilmarnock Street	The alternative transitions from median at-grade to a median retained cut. The retained-cut design would eliminate the opportunity for train-vehicle collisions. Furthermore, the median alignment would prohibit mid-block turning movements, providing some expected safety benefit. Overall, this short section is expected to cause no substantial change in the number of accidents.
	NE 6th Street from tunnel portal to end of Segment C	See *Preferred Alternative C11A* for the same section.
106th NE Tunnel Alternative (C2T)	112th Avenue SE from Segment B boundary to SE 1st Place	The connection from Alternative B2E would be an elevated profile and, therefore, have no light rail interaction with vehicles, pedestrians, or bicycles. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with piers are of concern, taller curbs (9-inch), low-profile median barrier, or guardrail could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected.
	112th Avenue SE from Segment B boundary to SE 1st Place (connecting to Alternative B2A)	The connection from Alternative B2A is a retained cut and transitions for approximately 200 feet to tunnel, minimizing the potential for a light rail accident with other modes.
	112th Avenue SE from Segment B boundary to SE 1st Place (connecting to Alternative B3 or B7)	The connections from Alternative B3 or B7 would be an elevated profile and, therefore, have no light rail interactions with vehicles, pedestrians, or bicycles.

TABLE 6-31 CONTINUED
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
	NE 6th Street from tunnel portal to end of Segment C	See *Preferred Alternative C11A* for the same section.
108th NE Tunnel Alternative (C3T)	112th Avenue SE from SE 6th Street to SE 1st Place	The connection with Alternative B2E would be an elevated profile and, therefore, have no light rail interactions with vehicles, pedestrians, or bicycles. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile median barrier, or guardrail could be used to minimize safety risks. No substantial change in the number of accidents is expected.
	112th Avenue SE from SE 6th Street to SE 1st Place (connecting to Alternative B2A)	The connection from Alternative B2A is an open trench and transitions for approximately 200 feet to tunnel, minimizing the potential of a light rail accident with other modes.
	112th Avenue SE from SE 6th Street to SE 1st Place (connecting to Alternative B3 or B7)	The connections from Alternative B3 or B7 would be an elevated profile and, therefore, have no light rail interactions with vehicles, pedestrians, or bicycles.
	NE 12th Street from 110th to 116th Avenues NE	The alternative transitions from a tunnel profile to a side-elevated, and this design would eliminate the opportunity for train-vehicle collisions. Furthermore, several cross streets to NE 12th Street are be closed, and alternative access is provided. The only conflict point with vehicles would be the at-grade crossing at 116th Avenue NE. Using gates at this intersection is expected to minimize safety concerns. The largest potential traffic safety issue would occur if any piers for the elevated track are placed close to the roadway. At locations where collisions with piers are of concern, taller curbs (9-inch), low-profile median barrier, or guardrail could be used to minimize safety risks. No substantial change in the number of accidents is expected.
Couplet Alternative (C4A)	Along 112th Avenue SE and Main Street from Segment B boundary to 108th Avenue NE	The elevated connection from Alternative B2E would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barrier, or guardrail could be used to minimize safety risks.
	Along 112th Avenue SE and Main Street from Segment B boundary to 108th Avenue NE (connecting to Alternative B2A)	The connection from Alternative B2A transitions from median at-grade to median elevated to side elevated. The greatest potential for vehicle-train collisions is at SE 6th Street, where the track is median at-grade. The transition does not include gates as the traffic signal at SE 6th Street controls the vehicle, pedestrian, and train movements. This design type typically has less severe accidents because of slower vehicle speeds. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway and where there are piers for the structures that straddle the roadway when the track transitions from median elevated to side elevated. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barrier, or guardrail could be used to minimize safety risks.
	Along 112th Avenue SE and Main Street from Segment B boundary to 108th Avenue NE (connecting to Alternative B3 or B7)	The connections from Alternative B3 or B7 would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes.

TABLE 6-31 CONTINUED
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
	108th and 110th Avenues NE from Main to NE 12th Streets (westbound and eastbound tracks of one-way couplet) to NE 12th Street	Using a side-aligned profile adjacent to vehicle travel could have greater potential for accident exposure than other track profiles. Converting both 108th and 110th Avenues NE to one-way vehicle streets would reduce the number of locations where vehicles interact with light rail by removing possible movements that would cross the light rail tracks. With the configuration of vehicles traveling in the direction opposite from light rail, drivers can see the light rail train coming toward them. To avoid accidents at intersections, only protected movements (with turn pockets) would be allowed to cross the light rail tracks. To keep vehicles from using the counterflow lanes, pavement marking messages or signs could be used to inform drivers the lane is for transit use only. At driveways, signs and other messages also could be used to remind drivers to look in the direction opposite of the approaching vehicles for transit approaching in the counter-flow lane. Additionally, the counterflow lane will be a joint-use lane for buses in the four-block section between NE 4th Street and NE 8th Street. At the entrance points to the joint-use lanes, the turning movements would be signed for buses only. Furthermore, these turn movements will be at signalized intersections and the signal phasing would minimize the risk of a collision from a bus and light rail from entering the lane at the same time. Operations within the joint-use lanes is expected to have little risk of a collision because of the short four-block segment, relatively low bus and train volumes, and train speeds of 25 mph or less.
	NE 12th Street from 108th to 116th Avenues NE	The section transitions from at-grade median aligned to at-grade side-aligned. The only conflicts with vehicles would be the at-grade crossings at 110th and 116th Avenues NE. The gates at these intersections are expected to minimize traffic safety concerns.
112th NE Elevated Alternative (C7E)	112th Avenue SE from Segment B boundary to Main Street	The elevated connection from Alternative B2E would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barrier, or guardrail could be used to minimize safety risks. Overall, this section is expected to cause no substantial change in the number of accidents.
	112th Avenue SE from Segment B boundary to Main Street (connecting to B2A)	The connection from Alternative B2A transitions from median at-grade to median elevated to side elevated. The greatest potential for vehicle-train collisions is up to SE 6th Street, when light rail is median at-grade. The transition does not include gates because the traffic signal at SE 6th Street controls the vehicle, pedestrian, and train movements; however, this design type typically has less severe accidents because of slower vehicle speeds. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway and where the piers for the structures straddle the roadway when the track transitions from median elevated to side elevated. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barrier, or guardrail could be used to further minimize traffic safety risks.
	112th Avenue SE from Segment B boundary to Main Street (connecting to Alternative B3 or B7)	The elevated connections from Alternative B3 or B7 would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes.
	112th Avenue SE from Main to NE 12th Streets	The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch) or low-profile barrier could be used to minimize safety risks. No substantial change in the number of accidents is expected.
	NE 12th Street from 112th to 116th Avenues NE	The only conflict with vehicles would be the at-grade crossing at 116th Avenue NE. Using gates at this intersection is expected to minimize safety concerns.

TABLE 6-31 CONTINUED
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
110th NE Elevated Alternative (C8E)	112th Avenue SE from Segment B boundary to Main Street	This section would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of an at-grade light rail accident with these travel modes.
	112th Avenue SE from Main to NE 2nd Streets	This section would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of an at-grade light rail accident with these travel modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway (as little as 3 feet in some locations). However, relatively low travel speeds (less than 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch) or low-profile barrier could be used to minimize safety risks. No substantial change in the number of accidents is expected.
	110th Avenue from NE 2nd to NE 12th Streets	The elevated median profile separates vehicle traffic from light rail operations, which would prevent any vehicle-train accidents. Track piers would be close to the vehicle travel way, but low speeds should reduce the potential for a vehicle collision with a track pier to cause severe or fatal injury. Furthermore, using curb or low-profile median barrier can reduce the likelihood a vehicle colliding with a pier. This section currently has few midblock accidents related to midblock turning movements; therefore, light rail track in the median is unlikely to substantially reduce mid-block accidents Overall, this section is expected to cause no substantial change in the number of accidents.
	NE 12th Street from 112th to 116th Avenues NE	The only conflict with vehicles would be the at-grade crossing at 116th Avenue NE. Using gates at this intersection is expected to minimize traffic safety concerns.
110th NE At-Grade Alternative (C9A)	Connection from *Preferred Alternative B2M* to Main Street at 110th Avenue NE	The alternative is a low-speed median alignment, which would have a higher accident exposure than other profiles but would also have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal-controlled to assign right-of-way to trains and vehicles. At SE 6th Street, vehicles are provided with left-turn pockets for turning across the tracks. Left turns would have a protected signal phase to prohibit drivers from turning when a train is approaching. Additionally, SE 4th Street, SE 1st Street, and driveways are right-in/right-out, eliminating vehicle-train conflicts between intersections. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr., Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 through June 2010), seven light rail train and vehicle accidents and one light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the light rail train revenue service began. The light rail train median barrier restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor. None of the light rail train-related accidents was considered life-threatening, and all of the light rail train-vehicle accidents involved vehicles illegally turning. The alternative south of Main Street becomes elevated and crosses over 112th Avenue SE and transitions to at-grade side aligned on the south side of Main Street with a gated crossing at 110th Place SE. At this crossing, there is minimal distance between the track and Main Street for a vehicle turning onto Main Street to wait without having to stop on the tracks. Although 110th Place SE is a low-volume road, a vehicle could be waiting on the tracks to turn onto Main Street when a train approaches. This would require the train to come to a stop to avoid a collision, possibly having to stop in the intersection of Main Street and 110th Avenue SE. While right-out access for 110th Place SE would eliminate the left-turn onto Main Street and should minimize the time spent waiting on the tracks, it would not eliminate the possibility of a vehicle waiting on the tracks when a train approaches. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, a low-profile barrier, or guardrail could be used to minimize safety risks.

TABLE 6-31 CONTINUED
Segment C Alternative Safety Assessment

Alternative	Section[a]	Safety Assessment
	Connection from Alternative B3 or B7 to Main Street at 110th Avenue NE	The section of the alternative is elevated with a grade-separated crossing over 112th Avenue SE. The alternative transitions to at-grade side aligned with a gated crossing at 110th Place SE. At this crossing, there is minimal distance between the track and Main Street for a vehicle turning onto Main Street to wait without having to stop on the tracks. Although 110th Place SE is a low-volume road, a vehicle could be waiting on the tracks to turn onto Main Street when a train approaches. This would require the train to come to a stop to avoid a collision, possibly having to stop in the intersection of Main Street and 110th Avenue SE. While right-out access for 110th Place SE would eliminate the left-turn onto Main Street and should minimize the time spent waiting on the tracks, it would not eliminate the possibility of a vehicle waiting on the tracks when a train approaches. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, a low-profile barrier, or guardrail could be used to minimize safety risks.
	110th Avenue NE from Main to NE 6th Streets	The alternative is a low-speed median alignment and would likely have highest higher accident exposure than other profiles but would also have less severe accidents because of slower travel speeds. The train crossing through major intersections is signal controlled to assign right-of-way to trains and vehicles. On 110th Avenue NE, southbound vehicles are provided with left-turn pockets for turning across the tracks while northbound left turns across the tracks are not permitted at NE 2nd and NE 4th Streets. Southbound left turns have a protected signal phase to prohibit drivers from determining when to turn when a train is approaching. Additionally, driveways are right-in/right-out, thereby eliminating vehicle-train conflicts between intersections. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 through June 2010), seven light rail train and vehicle accidents and one light rail train and pedestrian accident occurred and overall corridor accidents changed from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the light rail train revenue service began. The light rail train median barrier restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor. None of the light rail train-related accidents was considered life-threatening, and all of the light rail train-vehicle accidents involved vehicles illegally turning. Of the existing midblock accidents, there was one rear-end accident that could be prevented by the light rail median prohibiting midblock turns if the accident involved a vehicle turning left into or out of a driveway.
	NE 6th Street from 110th Avenue NE to end of Segment C	The section of the alternative is a retained fill that transitions to a median-elevated and eventually to a side-elevated as the alternative crosses over I-405. After crossing I-405, the alternative has grade-separated crossings over 116th Avenue NE and NE 8th Street. The largest apparent traffic safety issue would be the relatively close location of some piers to the roadway—including piers located near any ramps for the NE 8th Street interchange. However, relatively low travel speeds (less than or equal to 35 mph) and 6-inch curbs should adequately protect the arterials. At locations where collisions with piers would be of concern, taller (9-inch) curbs, low-profile median barrier, or guardrail could be used to further minimize traffic safety risks. Piers located near the NE 8th Street interchange ramps should be adequately protected with guardrail or crash cushions to reduce the likelihood of a severe accident. At the Bellevue Transit Center Station, a pedestrian scramble phase is used at the west end of the platform to allow for pedestrian movements across NE 6th Street, 110th Avenue NE, and to and from the station platform in the median of NE 6th Street. Clearly, signing and enforcing no right turns on red are important to safely operating the pedestrian scramble. No substantial change in the number of accidents would be expected.
114th NE Elevated Alternative (C14E)	Connection from Alternative B7 from Segment B connection to Segment D connection	Alternative C14E is elevated, predominately paralleling I-405 on the west side from just north of SE 6th to NE 6th Street. The alternative crosses I-405 over the NE 8th Street interchange and then crosses over 116th Avenue NE and NE 8th Street before connecting to the former BNSF Railway. Elevated crossings occur at Main, NE 2nd, NE 4th, NE 6th, and NE 8th Streets; 116th Avenue NE; and the NE 8th Street interchange with I-405. The largest possible traffic safety issue would be if piers are located close to the roadway — whether obstructing driver sight lines at intersections or driveways or as a fixed-object collision if a vehicle leaves the roadway. However, relatively low travel speeds (less than or equal to 35 mph) and 6-inch curbs should adequately protect the arterial crossings. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, low-profile barriers, or guardrail could be used to further minimize traffic safety risks. Regarding the NE 8th Street interchange, piers located close to the roadway, especially located on the outside a horizontal curve, should have adequate protection, such as guardrail or crash cushions, should a vehicle leaves the ramp or roadway.

[a] Sections that are within a tunnel profile are not included as there would be no conflicts with vehicles, pedestrians or bicycles.

Parking

The parking impacts associated with the light rail alternatives and stations in Segment C are discussed in this section. Table 6-32 summarizes the impacts by alternative. Table 6-33 summarizes the impacts associated with each of the proposed station. The parking impacts associated with each alternative in Segment C depend on which Segment B connection.

TABLE 6-32
Segment C Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed		
	Unrestricted On-Street	Restricted On-Street[a]	Off-Street[b]
Preferred 108th NE At-Grade Alternative (C11A)	0	10	340 to 360
Preferred 110th NE Tunnel Alternative (C9T)	0	0	385 to 410
Bellevue Way Tunnel Alternative (C1T)	0	0	158
106th NE Tunnel Alternative (C2T)	0	0	82 to 172
108th NE Tunnel Alternative (C3T)	0	0	26 to 106
Couplet Alternative (C4A)	7	4	39 to 94
112th NE Elevated Alternative (C7E)	0	0	198 to 226
110th NE Elevated Alternative (C8E)	0	0	92 to 125
110th At-Grade Alternative (C9A)	0	20	315 to 345
114th NE Elevated Alternative (C14E)	0	0	220

Note: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.
[a] Restricted parking includes all parking spaces with special-use restrictions, such as drop-off/loading zones.
[b] The range of off-street parking removal is due to the Segment B connectors and includes parking spaces removed at the station areas.

TABLE 6-33
Segment C Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
Old Bellevue	Alternative C1T	0	None
East Main	All Segment C Alternatives except C1 and C14E[a]	0	Several entire parcels to be acquired on the southern side of Main Street near intersection with 112th Avenue SE
108th	*Preferred Alternative C11A*	0	None
Bellevue Transit Center	*Preferred Alternative C11A*	0	None
	Preferred Alternative C9T	105	Private off-street parking lot on the southeast corner of the intersection of NE 6th Street and 110th Avenue NE
	Alternatives C1T and C2T	0	None
	Alternative C3T	24	Private off-street parking lot on the northeast corner of the intersection of NE 6th Street and 108th Avenue NE
	Alternative C4A	0	None
	Alternative C7E	18	Private off-street parking lots on the southeast corner of the intersection of NE 6th Street and 112th Avenue NE
	Alternative C8E	0	None
	Alternative C9A	35	Private off-street parking lot on the southeast corner of the intersection of NE 6th Street and 110th Avenue NE
	Alternative C14E	0	None

TABLE 6-33 CONTINUED
Segment C Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
Ashwood/Hospital	Alternatives C3T, C4A, and C8E, C7E	0	None
Hospital	*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E	0	Private off-street parking lot on northeast corner of the intersection of NE 8th Street and 116th Avenue NE

Notes: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.

[a] C9T – East Main Station Design Option connecting from *Preferred Alternative B2M* would have no change in impacts to Preferred Alternative C9T or B2M.

Preferred 108th NE At-Grade Alternative (C11A)

Preferred Alternative C11A would remove approximately 10 on-street and 340 off-street parking spaces. The on-street parking spaces are located along 108th Avenue NE. The off-street parking spaces are parcels along 112th Avenue SE, Main Street, NE 2nd Street, 108th Avenue NE, 112th Avenue NE, Lake Bellevue Drive, and 116th Avenue NE. *Preferred Alternative C11A* (and the other at-grade alternatives, C4A and C9A) are the only alternatives in Segment C that are expected to result in the removal of on-street parking. With a connection to Alternatives B3, B3 - 114th Design Option, or B7, 10 on-street and 360 off-street parking spaces would be removed with *Preferred Alternative C11A*.

Preferred 110th NE Tunnel Alternative (C9T)

With *Preferred Alternative C9T*, no on-street parking spaces would be removed, but this alternative would remove the greatest amount of off-street parking spaces, 385 stalls, among Segment C alternatives. These off-street parking removals would be associated with parcels along 112th Avenue SE/NE, Lake Bellevue Drive, and 116th Avenue NE and would include parking spaces for approximately 105 vehicles and 20 motorcycles at the Bellevue City Hall parking garage. With a connection to alternatives B3, B3 - 114th Design Option, or B7, no on-street parking spaces would be removed, but 410 off-street parking spaces would be removed with *Preferred Alternative C9T*.

Other Segment C Alternatives

Alternative C1T would remove 158 off-street parking spaces. Approximately two-thirds of these parking spaces are located on commercial properties located in Downtown Bellevue. The remaining third is composed of parking spaces located at various residential apartment buildings on the west side of Bellevue Way between SE 3rd Street and SE 6th Street.

Alternative C2T with a connection to Alternative B3 (or Alternative B3 – 114th Design Option) is expected to result in the greatest number of lost off-street parking spaces (172 spaces) of all the Segment B connections with Alternative C2T. Fifty parking spaces are expected to be removed at a commercial building located at the intersection of SE 6th Street and 112th Avenue SE with the Alternative B3 (or Alternative B3 – 114th Design Option) connection. The Alternative C2T connection that is expected to require the removal of the fewest parking spaces (82 spaces) is with Alternative B2A. No on-street parking spaces will be taken under Alternative C2T for any segment B alternative.

Alternative C3T with a connection to Alternative B3 (or Alternative B3 – 114th Design Option) is expected to result in the greatest number of lost off-street parking spaces (82 spaces) of all the Segment B connections with Alternative C3T. Forty parking spaces are expected to be removed at a commercial building located at the intersection of SE 6th Street and 112th Avenue SE with the Alternative B3 (or Alternative B3 – 114th Design Option) connection. The Alternative C3T connection that is expected to require the removal of the fewest parking spaces (2 spaces) is with Alternative B2A. No on-street parking spaces will be taken under Alternative C3T for any segment B alternative.

Alternative C4A is expected to affect 39 and 94 off-street parking spaces, respectively, if Alternative B2E, Alternative B3 (or B3 – 114th Design Option) is constructed in Segment B. The expected numbers of affected off-street parking spaces associated with Alternatives B7 and B2A are 66 and 77, respectively. The largest single contributor to the 94 affected off-street spaces associated with Alternative C4A (connection with Alternative B3 or B3 – 114th Design Option) is a commercial office building located on the corner of the SE 6th Street and 112th

Avenue SE intersection. Forty off-street parking spaces are expected to be taken at this location. Alternative C4A with a connection to Alternative B2E has the lowest number of affected off-street parking spaces, but would have the greatest impact on a property at the intersection of Main Street and 112th Avenue SE, where 25 off-street spaces are expected to be lost. Implementation of the couplet under Alternative C4A between 108th Avenue NE and 110th Avenue NE might require the removal of additional on-street parking spaces.

For Alternative C7E, between 198 and 226 off-street parking spaces would be removed, depending on its Segment B connection. A connection to Alternative B3 (or B3 – 114th Design Option) would remove 226 stalls, while a connection to Alternative B7 would remove 198 stalls. A total of 201 stalls would be removed with either the Alternative B2E or Alternative B2A connection. These parking stalls removals would occur throughout the corridor, but the property with the most stalls removed (slightly more than 50) is a commercial property in the northeast corner of 112th Avenue NE and Main Street.

Between 92 and 125 stalls are expected to be removed under Alternative C8E. With a connection to Alternative B7, 92 off-street stalls would be removed. With a connection to Alternative B3 (or Alternative B3 – 114th Design Option), 125 parking stalls would be removed. Similar to Alternative C7E, the property with the most parking removed is a commercial property in the northeast corner of 112th Avenue NE and Main Street. Slightly more than 50 stalls are expected to be removed at this location.

Alternative C9A would remove approximately 20 on-street parking spaces and 345 off street parking spaces. Impacts on the Bellevue City Hall parking garage would be less than those described above under *Preferred Alterative C9T*. With any Segment B connection the number of on-street parking spaces removed would be the same.

Alternative C14E would remove no on-street parking spaces and approximately 220 off-street parking spaces. The off-street parking space removals would be associated with parcels along 114th Avenue and 116th Avenue NE. Under Alternative C14E, a 200-space underground parking structure could be implemented as part of a larger development project on nearby property.

As shown in Table 6-33, only the Bellevue Transit Center Station would result in the removal of parking spaces. The design of the Bellevue Transit Center Station would not affect any on-street or off-street parking spaces for *Preferred Alternative C11A* and Alternatives C1T, C2T, C4A, C8E, and C14E. The design for the Bellevue Transit Center Station for *Preferred Alternative C9T* and Alternative C9A would remove 105 and 35 stalls respectively at the City of Bellevue parking garage. The design of Alternative C3T would require the removal of approximately 24 off-street parking spaces in a private parking lot on the northeast corner of the intersection of NE 6th Street and 108th Avenue NE. The design of Bellevue Transit Center Station for Alternative C7E is expected to require the removal of 18 parking spaces in a private off-street parking lot on the southeast corner of the intersection of NE 6th Street and 112th Avenue NE.

In general, the stations in Segment C are designed to accommodate bus transfers, pedestrians, and bicyclists. These stations would not be attractive stations for auto access (and the potential for hide-and-ride parking) due to the surrounding congestion and restricted public parking opportunities. At the Old Bellevue, Ashwood/Hospital, and Bellevue Transit Center stations, there is available on-street parking (Table 6-9); however, there is only low potential for hide-and-ride parking at these stations because most of the on-street parking provided in this area is either restricted or in private lots that are monitored. At the 108th Avenue Station, hide-and-ride parking would be unlikely because the City of Bellevue has established a residential parking zone in the Surrey Downs neighborhood. There is also a low potential for hide-and-ride parking at the East Main and Hospital stations because there is a minimal amount of available on-street parking surrounding the station areas.

Interim Terminus Stations

The Ashwood/Hospital and Hospital stations are potential interim termini. The ridership at the Ashwood/Hospital station would not substantially increase as an interim terminus. The ridership at the Hospital Station would increase as an interim terminus. With a Hospital Station interim terminus, most of the additional ridership would be the result from transfers to and from buses. Therefore, no transportation impacts would be expected beyond what is described in the alternative route analysis. Table D-12 in Appendix D provides the intersection LOS and delay results at the Hospital interim terminus station.

6.3.2.4 Segment D

Multiple roadway projects are planned by the cities of Bellevue and Redmond that will change the characteristics of major roadways in Segment D. Many of these projects are scheduled as part of the Bel-Red redevelopment. Principal among these projects is a phased extension and widening of NE 15th and NE 16th Streets to widths varying between three and five lanes between 116th Avenue NE and 132nd Avenue NE. Other roadway widening projects include widening 120th and 124th avenues NE to five lanes, 130th Avenue NE to provide a center, two-way left-turn lane and along Northup Way to accommodate an additional eastbound lane between 120th Avenue NE and 124th Avenue NE. NE 36th Street is also extended across SR 520 connecting to NE 31st Street. Along 152nd Avenue NE a multi-modal pedestrian corridor will be implemented with a vehicle lane in each direction, left turn lanes, bike lanes, parking and sidewalks. Appendix A provides the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment D.

Traffic Control, Property Access, and Circulation

Overall, *Preferred Alternative D2A* would have the second least amount of traffic controls modifications to Alternative D5. Alternative D5 would have the fewest because it travels along the SR 520 corridor outside traffic conditions for a majority of the segment. Alternative D3 would have the highest number of traffic control and property access and circulation modifications because it would operate in the median along NE 16th Street, NE 20th Street and 152nd Avenue NE. Table 6-34 presents the traffic control modifications for each Segment D alternative.

TABLE 6-34
Segment D Intersection Traffic Control

Control Location	Existing Control	Proposed Control
Preferred NE 16th At-Grade Alternative (D2A)		
130th Avenue NE	None	Install light rail gates
NE 16th Street and 132nd Avenue NE	Minor street stop-controlled	Install new signal
NE 16th Street and 134th Avenue NE	Minor street stop-controlled	Right-in/right-out
NE 16th Street and 136th Place NE	Minor street stop-controlled	Install new signal
NE 20th Street and 136th Place NE	Signal	Replace signal
156th Avenue NE and NE 36th Street	Signal	Replace signal
156th Avenue NE and NE 38th Street	Signal	Replace signal
D2A – 120th and NE 24th Design Options		
120th Avenue NE	None	Light rail gates[a]
130th Avenue NE	None	Light rail gates
NE 16th Street and 132nd Avenue NE	Minor street stop-controlled	Install new signal
NE 16th Street and 134th Avenue NE	Minor street stop-controlled	Right-in/right-out
NE 16th Street and 136th Place NE	Minor street stop-controlled	Install new signal
NE 24th Street and 151st Place NE	Signal	Replace signal and light rail gates
156th Avenue NE and NE 36th Street	Signal	Replace signal
156th Avenue NE and NE 38th Street	Signal	Replace signal
NE 16th Elevated Alternative (D2E)		
NE 24th Street and 151st Place NE	Signal	Replace signal and light rail gates
NE 24th Street at 152nd Avenue NE	Signal	Replace signal and light rail gates
156th Avenue NE and NE 36th Street	Signal	Replace signal
156th Avenue NE and NE 38th Street	Signal	Replace signal
NE 20th Alternative (D3)		

TABLE 6-34 CONTINUED
Segment D Intersection Traffic Control

Control Location	Existing Control	Proposed Control
120th Avenue NE	None	Install light rail gates
124th Avenue NE	None	Install light rail gates
130th Avenue NE	None	Install light rail gates
NE 16th Street and 132nd Avenue NE	Minor street stop-controlled	Install new signal
NE 16th Street and 134th Avenue NE	Minor street stop-controlled	Right-in/right-out
NE 16th Street and 136th Place NE	Minor street stop-controlled	Install new signal
NE 20th Street and 136th Place NE	Signal	Replace signal
NE 20th Street and 140th Avenue NE	Signal	Replace signal
NE 20th Street and Ross Plaza (143rd Avenue NE)	Signal	Replace signal
NE20th and 148th Avenue NE	Signal	Replace signal
NE 20th and 152nd Avenue NE	Signal	Replace signal
NE 21st Street and 152nd Avenue NE	Minor street stop-controlled	Right-in/right-out
NE 24th Street and 152nd Avenue NE	Signal	Replace signal
NE 26th Street and 152nd Avenue NE	Signal	Replace signal
152nd Avenue NE	None	Install light rail gates
156th Avenue NE and NE 36th Street	Signal	Replace signal
156th Avenue NE and NE 38th Street	Signal	Replace signal
SR 520Alternative (D5)		
151st Place NE	None	Install light rail gates
NE 26th Street and 152nd Avenue NE	Signal	Replace signal
156th Avenue NE and NE 36th Street	Signal	Replace signal
156th Avenue NE and NE 38th Street	Signal	Replace signal

[a] – Proposed control associated with the D2A – 120th Station Design Option only.

Preferred NE 16th At-Grade Alternative (D2A)

Preferred Alternative D2A would be located north of the planned NE 15th Street extension and would be grade-separated from 120th and 124th avenues NE, with minimal impacts on property access and circulation in this area. *Preferred Alternative D2A* would then transition to at-grade center-running on NE 16th Street and 136th Place NE, with signalized crossings at 130th Avenue NE, 132nd Avenue NE, 136th Place NE, and NE 20th Street. Where *Preferred Alternative D2A* would operate center-running along NE 16th Street and 136th Place NE, property access and circulation would be right-in/right-out except at signalized intersections where u-turn movements are provided.

The D2A - 120th Design Option provides a gated at-grade crossing at 120th Avenue NE. The D2A - NE 24th Design Option provides a gated crossing at 151st Place NE as driveways along the west side of 152nd Avenue NE are closed. Access to these properties is provided at the 151st Place NE and NE 24th Street intersection. Two driveways on the north side of NE 24th Street are closed, but vehicle access would remain at one driveway and at the NE 24th Street and 151st Place NE intersection. Because there are up to two remaining access locations along NE 24th Street, no substantial impacts would be anticipated.

Other Segment D Alternatives

Alternative D2E would travel outside the roadway right-of-way through most of Segment D, and therefore traffic control modifications would be minimal. At the intersections of 151st and 152nd avenues NE with NE 24th Street, light rail crossing signals and gates would be provided. Driveway access on the south side of NE 24th Street between 148th Avenue NE and 151st Place NE would be eliminated to prevent vehicles from crossing the at-grade track. Internal circulation within properties would be modified to allow access via 148th Avenue NE and/or 151st Place NE. Similarly, driveways on the west side of 152nd Avenue NE between NE 24th Street and NE 28th Street would be closed. Vehicle circulation within surrounding office park would be route to 151st Place NE.

With the NE 20th Alternative (D3), signalized crossings would be provided along the planned NE 15th Street extension at 120th Avenue NE, 124th Avenue NE, 130th Avenue NE and along NE 16th Street at 132nd Avenue NE, and 136th Place NE. Property access and circulation along the NE 15th Street extension and NE 16th Street would be right-turn-in/right-turn-out only except at signalized intersections. Alternative D3, east of 136th Place NE, would operate at-grade in the median along NE 20th Street with at-grade crossings at 140th Avenue NE and Ross Plaza (approximately 143rd Avenue NE). At the 148th Avenue NE and 152nd Avenue intersections along NE 20th Street, it would transition to a retained cut with a covered lid to maintain intersection movements and channelization. The retained cut would prohibit all mid-block left-turn movements (unsignalized locations) along this arterial between 136th Place NE and 152nd Avenue NE. Drivers would either adjust their travel patterns or be rerouted to the nearest signalized intersections and perform a u-turn movement; such as at 140th Avenue NE, Ross Plaza (approximately 143rd Avenue NE), and at 148th Avenue NE intersections.

Lastly, Alternative D3 along 152nd Avenue NE between NE 20th Street and Microsoft Road is also at-grade in the median of the road. The number of lanes on these roadways would be maintained. Exclusive northbound and southbound left-turn pockets would be provided at the signalized intersection of NE 24th Street and 152nd Avenue NE. This alternative would prohibit mid-block left-turn movements and potentially provide U-turn movements at the signalized intersections of NE 24th Street and NE 26th Street. Unlike Alternative D2E, the western property access along 152nd Avenue NE, between NE 24th Street and NE 28th Street, would remain and allow right-in/right-out movements.

The SR 520 Alternative (D5) would operate mainly outside the roadway system and would only affect the western driveway access along 152nd Avenue NE between NE 26th Street and NE 28th Street. This access would be closed and vehicle circulation would be rerouted to 151st Place NE. For all Segment D alternatives, vehicle access to the park-and-ride at the Overlake Transit Center would be reconfigured to the NE 36th Street and 156th Avenue NE intersection.

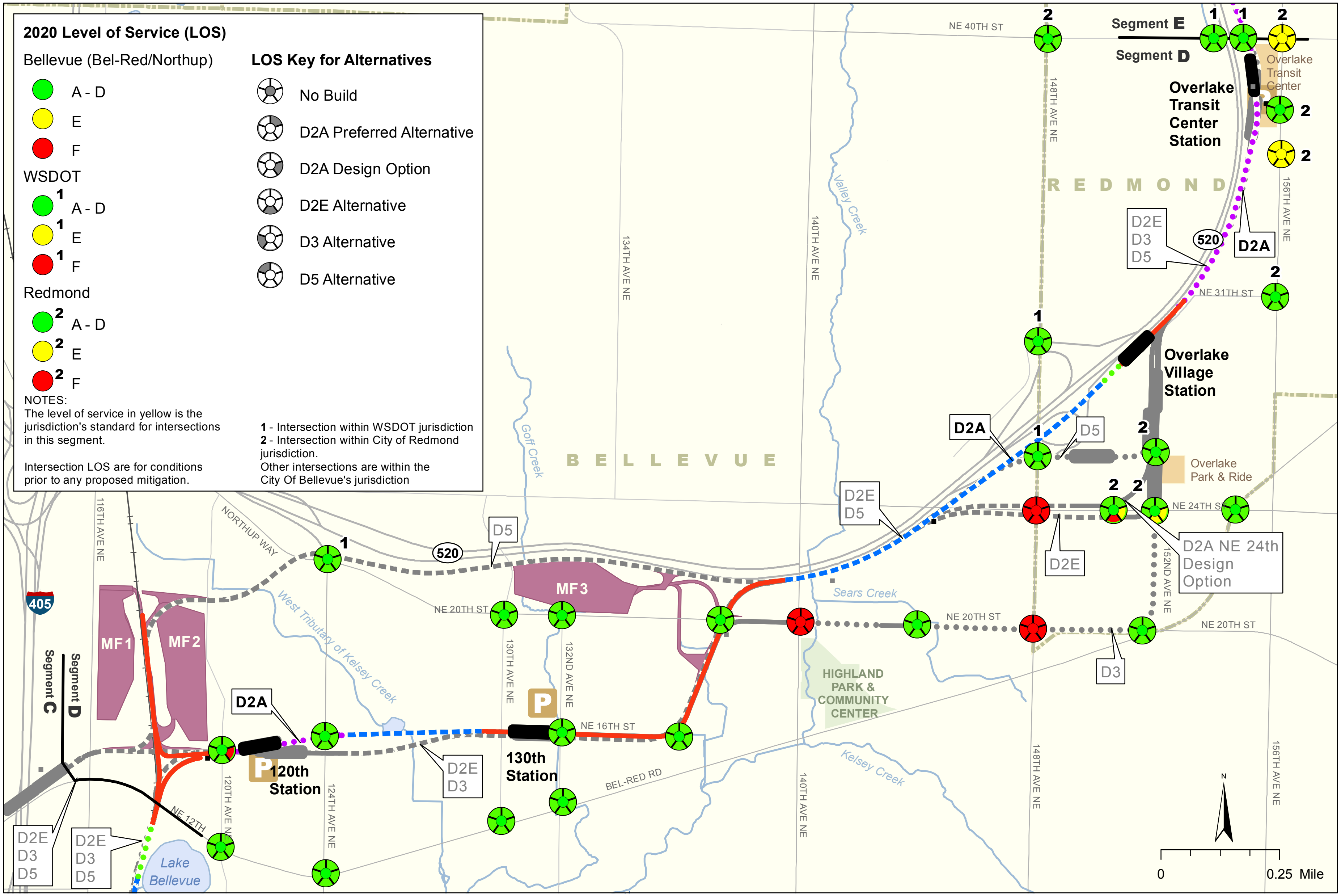
Operations and Level of Service

Year 2020 and 2030 PM peak-hour no-build intersection operations in Segment D are expected to worsen as traffic volumes increase on the roadways. Under the No Build Alternative in 2020, three intersections would operate at LOS F: NE 20th Street and 140th Avenue NE, NE 20th Street and 148th Avenue NE, and NE 24th Street and 148th Avenue NE. By 2030, NE 20th Street and 148th Avenue NE would no longer operate at LOS F because of background improvements planned by year 2030 but four additional intersections would operate at LOS F: NE 24th Street and 152nd Avenue NE, NE 36th Street and 156th Avenue NE, NE 40th Street and 156th Avenue NE, and NE 40th Street and 148th Avenue NE.

By 2020 and 2030, morning peak-hour operations along 156th Avenue NE and NE 40th Street would remain similar to the existing condition as all intersections would continue to meet the City of Redmond's LOS standards. AM peak-hour intersection LOS results for the 2020 and 2030 no-build condition are presented in Table D-15 in Appendix D. Exhibits 6-16 and 6-17 and Tables D-13 and D-14 in Appendix D provide 2020 and 2030 intersection PM peak-hour LOS results for the no-build and build conditions.

Preferred NE 16th At-Grade Alternative (D2A)

Intersection operations with *Preferred Alternative D2A* would operate similar to the No Build Alternative because this alternative would be either grade-separated from the roadway or, when at-grade, it would generally operate parallel to the major traffic movements, and the number of roadway lanes provided would remain the same as in the no-build condition.



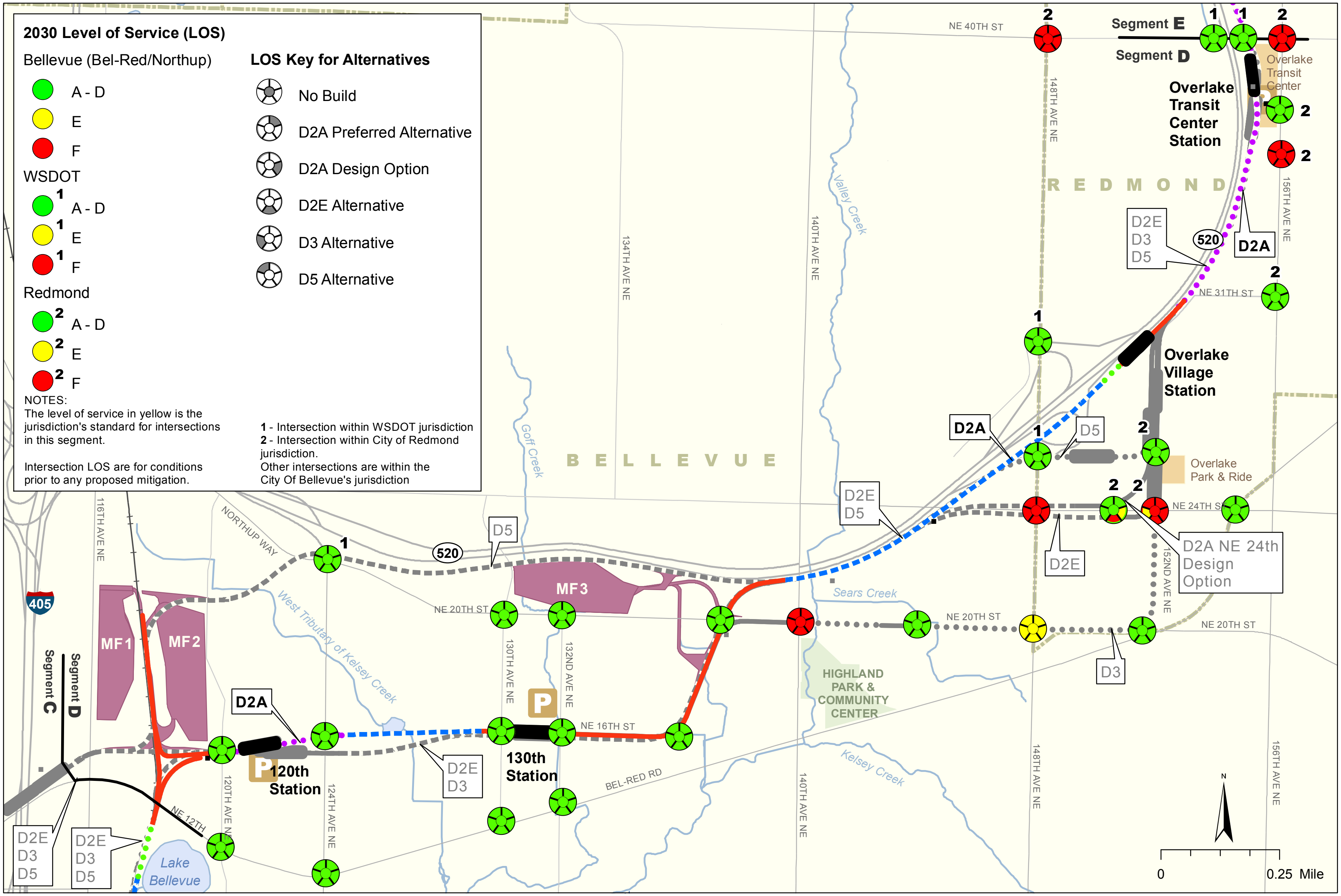
Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

Exhibit 6-16 **2020 PM No Build and Build Level of Service at Intersections Segment D**
East Link Project



Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

Exhibit 6-17 **2030 PM No Build and Build Level of Service at Intersections Segment D**
East Link Project

Although the at-grade light rail crossings in Segment D would likely receive some level of signal priority for the light rail train, disturbances to the traffic signal coordination are expected to be minimized with *Preferred Alternative D2A* or any at-grade profile because train detection would occur prior to the train arriving at the intersection. This allows non-light-rail signal phases to be served without substantial adjustments to the signal timing. At the NE 20th Street and 136th Place NE intersection, the light rail train would travel at-grade through the intersection and perpendicular to the major east-west traffic movements but the intersection would continue to meet City of Bellevue intersection LOS standards as some vehicle movements would be allowed to go when the train crosses the intersection.

With the D2A - 120th Design Option, the intersection of NE 15th Street and 120th Avenue NE would not meet City intersection LOS standards and would operate worse than the No Build Alternative condition in 2020. By 2030, the intersection would meet City LOS standards as a result of planned City of Bellevue improvements along 120th Avenue NE.

Although both the *Preferred Alternative D2A* and the D2A - NE 24th Design Option would not cross the intersection of NE 24th Street and 152nd Avenue NE this intersection would not meet City of Redmond intersection LOS standards because of additional trips associated with the Overlake Village Station. The intersection of NE 24th Street and 151st Place NE would also not meet City intersection LOS standards because of driveway closures along the west side of 152nd Avenue NE and train operations associated with the D2A - NE 24th Design Option.

With the *Preferred Alternative D2A* there is the potential to locate the park-and-ride lot at either the 130th Station or the 120th Station. With either location, traffic operations, including the number of intersections failing to meet the intersection LOS standards, would be similar to the previously described analysis for the *Preferred Alternative D2A*.

Other Segment D Alternatives

Because Alternative D2E generally shares a similar route as *Preferred Alternative D2A*, except along NE 16th Street between 120th Avenue NE and NE 124th Street and near NE 24th Street and 152nd Avenue NE, the intersection results are similar. Intersection operations would degrade at the intersections of NE 24th Street and 151st Place NE and NE 24th Street and 152nd Avenue NE due to signal adjustments necessary for safe operations of the light rail train as it travels through this short block between the two intersections. The cause of this impact is the signal phasing required to clear the potential queued vehicles along NE 24th Street, allowing a clear path for the train to travel through. In addition, changes are required in the signal phasing to restrict the northbound left and southbound right-turn movements at 152nd Avenue NE and NE 24th Street when the train crosses NE 24th Street and trips associated with Overlake Village Station, would cause impacts to the intersection operations.

The NE 20th Alternative (D3) would be at-grade or in a trench throughout most of Segment D. Alternative D3 would operate along 152nd Avenue NE at-grade in the median until it becomes side aligned to the north of Microsoft Road. By operating in the median on 152nd Avenue NE, light rail trains would be able to travel through the NE 24th Street intersection with the north-south through traffic, minimizing the impacts at this intersection. Otherwise, intersection operations would be similar to the no-build condition.

Alternative D5 would be elevated throughout most of Segment D, until west of 152nd Avenue NE where Alternative D5 would become at-grade and side aligned along 152nd Avenue NE. There would be little variation in intersection operations compared with the no-build condition except at NE 24th Street and 152nd Avenue NE, where trips associated with Overlake Village Station would cause intersection operations to fail and be worse than under the no-build condition.

Under any Segment D alternative, AM peak hour intersection operations along 156th Avenue NE and NE 40th Street would vary only slightly when compared with the no-build condition. In 2030, no intersections would fail to meet intersection operating standards in the build condition and none would operate worse than the no-build condition. AM peak-hour intersection LOS results are presented in Table D-15 in Appendix D.

Traffic Safety

Table 6-35 discusses the expected safety impacts of the Segment D alternatives on the local roadway system. The safety assessments were based on each alternative’s design and national research and safety guidelines relevant to East Link Project. Appendix E provides information about findings from national research projects for the various design types assessed for the East Link Project. No substantial changes are expected in the accident frequency along the roadways surrounding the maintenance facilities in Segment D. The only maintenance facility in Segment D that would have track that crosses roadway is the SR 520 Maintenance Facility (MF3). The track access spurs off the main light rail track and crosses NE 20th Street. Light rail trains would not cross the road frequently and it would be protected with gates, so there would be no change to the roadway safety conditions.

TABLE 6-35
Segment D Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
Preferred NE 16th At-Grade Alternative (D2A)	Connecting from former BNSF Railway to 124th Avenue NE to intersection with proposed NE 15th Street extension	This section is outside the road with grade-separated crossings with NE 12th Street, proposed NE 15th Street extension, 120th Avenue NE, and 124th Avenue NE. A potential traffic safety issue would be motor vehicle collisions with guardrails or bridge rails on the bridges over the light rail. Crash treatments and lateral offset to the railings—combined with relatively low travel speeds (less than or equal to 35 mph)—should provide adequate protection, especially against severe collisions. Additionally, pedestrian accommodations, such as a raised sidewalk or a sidewalk behind a guardrail, should reduce the potential for a pedestrian to be struck by a vehicle when crossing the bridge. Overall, no substantial effect on the number of accidents would be expected.
	Intersection with proposed NE 15th Street extension to 130th Avenue NE	The elevated to transitioning at-grade median alignment is generally separated from vehicular traffic, thereby preventing any vehicle-train accidents. Appropriate use of curb, low-profile median barrier, wide median (to provide offset), or guardrail (if needed) would minimize the risk of a vehicle striking the pier. The only conflict would be the at-grade crossing with 130th Avenue NE. Use of gates (prior to signal installation with the NE 16th Street extension project) at this intersection is expected to minimize safety impacts. Overall, no substantial change in the number of accidents is expected.
	NE 16th Street and 136th Place NE from 130th Avenue NE to NE 20th Street	The existing roadway has no midblock accidents that would be expected to be prevented by adding light rail tracks that prevents midblock turns. Low-speed median alignments would likely have highest higher accident exposure than other track profiles but would also have less severe accidents. As such, total accident frequency in the track section could increase. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening, and all of the LRT-vehicle accidents involved vehicles illegally turning. The 130th Station is located in the center of the planned roadway, and passengers cross two lanes of traffic to reach the platform. Directing pedestrians to high-visibility crossings (signs and markings) or to crossings controlled by a traffic signal could increase driver awareness and might reduce the risk to pedestrians.
	Along SR 520 from NE 20th Street to Overlake Transit Center Station	This section is outside the roadway system and primarily within WSDOT right-of-way. The section includes grade-separated crossings at 140th Avenue NE, NE 24th Street, SR 520 ramps at 148th Avenue NE, and NE 36th Street. The largest possible traffic safety issue would be if piers are located close to the roadway. WSDOT sightline and clearzone requirements for the highway and interchanges will be met. Additionally, relatively low travel speeds (less than or equal to 35 mph) and 6-inch curbs should provide adequate protection for the arterial crossings. At locations where collisions with a pier would be of concern, taller (9-inch) curbs, low-profile barriers, or guardrail could be used to minimize safety risks. Regarding the SR 520 ramps, piers located close to the roadway should have adequate protection, such as guardrail or crash cushions, should a vehicle leaves the ramp. Near intersections or driveways, locating the piers to minimize blocking sight lines is important. Overall, no substantial effect on the number of accidents would be expected.

TABLE 6-35 CONTINUED
Segment D Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
D2A - 120th Station Design Option and D2A - NE 24th Design Option	Connecting from former BNSF Railway to 124th Avenue to intersection with proposed NE 15th Street extension	D2A - 120th Station Design Option would have a similar safety assessment as *Preferred Alternative D2A*, except the grade separated crossing at 124th Avenue NE would be elevated and the D2A - 120th Station Design Option operates at-grade through 120th Avenue NE just north of NE 16th Street. The crossing at 120th Avenue NE is gated, and the intersection of NE 16th Street and 120th Avenue NE is signalized to assign right-of-way to trains and vehicles. The gates should reduce the potential for a vehicle to be on the tracks when a train approaches the intersection.
	NE 16th Street to approximately 150 feet west of 151st Place NE	D2A - NE 24th Design Option would have similar safety conclusions as the *Preferred Alternative D2A* section from the existing NE 16th Street, along SR 520 to 151st Place NE. Therefore, no substantial effect on the number of accidents would be expected.
	NE 24th Street and 152nd Avenue NE from approximately 150 feet west of 151st Place NE to SR 520	This section is side-aligned with NE 24th Street, with the only crossing at the gated, signalized intersection of NE 24th Street and 151st Place NE. While gates and a traffic signal should help separate traffic and assign right-of-way through the area, the crossing of 151st Place NE is in a horizontal curve. This results in the track crossing 151st Place NE at a slight skew and curving away from the intersection, creating additional separation from the NE 24th Street and the intersection. This crossing is not typical to most side-aligned crossings. As a result, approaching trains might not be as easily visible for vehicles turning from NE 24th Street onto 151st Place NE. Highly visible and clear signs and markings would minimize conflicts and potential collisions.
	Along SR 520 from 152nd Avenue to Overlake Transit Center Station	D2A - NE 24th Design Option would have similar safety conclusions as the *Preferred Alternative D2A* section along SR 520 from NE 20th Street to Overlake Transit Center Station. Therefore, no substantial effect on the number of accidents would be expected.
NE 16th Elevated Alternative (D2E)	Connecting from Alternatives C3T, C4A, C7E, and C8E at 116th Avenue NE	This connection would not have at-grade crossings with existing roadways because the track would be in a separate right-of-way. Therefore, no conflicts with vehicles, pedestrians, or bicyclists are expected.
	Connecting from *Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E from 120th to 124th Avenues NE	This connection would not have at-grade crossings with existing roadways because the track would be in a separate right-of-way. Therefore, no conflicts with vehicles, pedestrians, or bicyclists are expected.
	NE 24th Street and 152nd Avenue from 151st Place NE to SR 520	The use of side alignment within the right-of-way but outside the vehicle travel way would reduce the risk of collisions by separating the travel modes. Providing gates at the vehicle-train crossings would reduce the risk of collisions at these conflict points. No substantial change in the number of accidents is expected.
NE 20th Alternative (D3)	Connecting from Alternatives C3T, C4A, C7E, and C8E from 120th to 124th Avenues NE	The only conflict would be at-grade crossings with existing roadways at 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize safety concerns. No substantial change in the number of accidents is expected.
	Connecting from *Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E from 120th to 124th Avenues NE	The only conflict would be at-grade crossings with existing roadways at 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize safety concerns. No substantial change in the number of accidents is expected.
	NE 16th Street, 136th Place NE, and NE 20th Street from 130th to 143rd Avenues NE	Although low-speed median alignments are expected to have highest higher accident frequency than other track profiles (but less severe accidents), there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents. Three to four mid-block accidents that have occurred in this section over the last 5 years are expected to be prevented by the elimination of mid-block turns with the addition of light rail tracks. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening, and all of the LRT-vehicle accidents involved vehicles illegally turning.

TABLE 6-35 CONTINUED
Segment D Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
	NE 20th Street and 152nd Avenue NE from 143rd Avenue NE to NE 24th Street	Adding the light rail in a retained cut would prevent midblock left turn movements. Using a retained cut would eliminate some existing conflicts between motorists, pedestrians, and bicycles. Accident frequencies are expected to decrease in this section because 2 to 3 mid-block accidents over the last 5 years could be prevented. Portions of this median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 – June 2010), 7 light rail train and vehicle accidents and 1 light rail train and pedestrian accident occurred and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor and the corridor total reduced by close to 60 percent once the LRT revenue service began. The LRT median barrier restricting vehicle turns to signalized intersection was a contributing factor in the overall accident reduction along the corridor. None of the LRT-related accidents was considered life-threatening, and all of the LRT-vehicle accidents involved vehicles illegally turning.
	152nd Avenue from NE 24th Street to SR 520	Although low-speed median alignments are expected to have highest higher exposure to accidents than other track profiles (but less severe accidents), the overall accident frequency could be reduced by eliminating midblock rear-end and turning accidents. Over the last 5 years three to four midblock accidents that have occurred in this section are expected to be prevented by eliminating midblock turns and adding light rail tracks. This median alignment resembles the current light rail train operations along the 4-mile track in the center median of Martin Luther King Jr. Way in Seattle. During the first year of revenue service of the Central Link system (July 2009 through June 2010), seven light rail train and vehicle accidents and one light rail train and pedestrian accident occurred, and overall corridor accidents per year reduced from 327 (before light rail) to 134 (after light rail). The light rail train and vehicle or pedestrian accidents constitute about 6 percent of the total number of accidents along the corridor, and the corridor total reduced by close to 60 percent once the light rail train revenue service began. The light rail train median barrier restricting vehicle turns to signalized intersection was a contributing factor in overall reducing accidents along the corridor. None of the light rail train-related accidents was considered life-threatening, and all of the light rail train-vehicle accidents involved vehicles illegally turning.
SR 520 Alternative (D5)	Connecting from Alternatives C3T, C4A, C7E, and C8E at 116th Avenue NE	The only conflict point is the at-grade crossing with the existing roadway at 116th Avenue NE. Using gates at this intersection is expected to minimize safety concerns.
	Connecting from *Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, C9A, and C14E through proposed maintenance facilities	This connection does not have at-grade crossings with the roadway system because the track is in a separate right-of-way; therefore, no conflicts with vehicle, pedestrians, or bicycles are expected.
	From 151st Place NE to SR 520	The only conflict is the at-grade crossing with the 151st Place NE. Using gates at this intersection would minimize traffic safety concerns. Otherwise, the side alignment along 152nd Avenue NE is outside the vehicle travel and would reduce the risk of collisions as travel modes are separated.

Note: Sections outside the roadway network are not included as there would be no conflicts with vehicles, pedestrians, or bicycles.

Parking

The parking impacts associated with the proposed alternatives and stations in Segment D are discussed in this section. Table 6-36 summarizes the impacts by alternative. Table 6-37 summarizes the impacts associated with the area covered by each station. The number of parking spaces that are expected to be removed with any of the alternatives in Segment D ranges from 0 to 30 on-street parking spaces and 239 to 816 off-street parking spaces.

TABLE 6-36
Segment D Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed	
	On-Street	Off-Street [a]
Preferred Alternative D2A and D2A – 120th Station Design Option	30	376
D2A – NE 24th Design Option	30	382
Alternative D2E	0	348 to 356
Alternative D3	30	808 to 816
Alternative D5	0	239

Note: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.

[a] The range of off-street parking removals is due to the Segment C connectors and includes parking spaces removed at the station areas.

Preferred NE 16th At-Grade Alternative (D2A)

Preferred Alternative D2A parking impacts would remove approximately 376 off-street parking spaces. *Preferred Alternative D2A* is also expected to require the removal of 30 on-street parking spaces located on the north side of NE 16th Street between 132nd Avenue NE and 134th Avenue NE, and on the east side of 136th Place NE between NE 16th Street and NE 20th Street. The largest off-street parking impacts with the *Preferred Alternative D2A* would occur at the light industrial properties on the southwest end of Segment D near 120th Avenue NE between NE 14th Street and NE 15th Street.

With the D2A - NE 24th Design Option, approximately 60 additional off-street stalls would be affected along the north side of NE 24th Street and the west side of 152nd Avenue NE and 60 fewer off-street stalls at the Overlake Village Station, totaling 382. With the D2A – 120th Design Option, parking impacts would be similar to Preferred Alternative D2A.

Other Segment D Alternatives

Alternative D5 is expected to affect the fewest off-street parking spaces of the Segment D alternatives. This alternative would require the removal of 239 off-street parking spaces and no on-street parking spaces. The alternative affecting the most parking spaces is Alternative D3, which would require the removal of up to 816 off-street parking spaces. The largest impacted property with Alternative D3 is a commercial space on the northwest corner of the NE 20th Street and 152nd Avenue NE intersection, which would lose approximately 100 parking spaces. An adjacent shopping center, on the northeast corner of the intersection of NE 20th Street and 148th Avenue NE, is expected to lose 55 parking spaces with Alternative D3. Alternative D3 also would require the removal of off-street parking spaces on multiple properties located along 152nd Avenue NE between NE 20th Street and NE 24th Street. Similar to *Preferred Alternative D2A*, D2E and D3 would also affect the parking provided at the light industrial properties on the southwest end of Segment D near 120th Avenue NE between NE 14th Street and NE 15th Street. D2E would require the removal of up to 356 off-street parking spaces and no on-street parking spaces. Regarding on-street parking impacts, Alternative D3 is expected to have similar impacts as *Preferred Alternative D2A*. No impacts on on-street parking are anticipated with alternatives D2E and D5.

As shown in Table 6-37, the only station designs that are expected to have no impact on parking spaces are the 120th and Overlake Transit Center Stations. The 120th Station, however, would require the removal of several buildings located between 120th Avenue NE and 124th Avenue NE, near NE 15th Street. The 130th Station would affect 20 parking spaces for *Preferred Alternative D2A*, both D2A design options, Alternative D2E, or Alternative D3. All affected parking spaces would be located within private off-street parking lots between 130th Avenue NE and 132nd Avenue NE, near NE 16th Street.

TABLE 6-37
Segment D Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
120th	*Preferred Alternative D2A,* D2A - 120th Station Design Option, D2A - NE 24th Design Option, and Alternatives D2E and D3	0	Businesses between 120th and 124th Avenues NE near NE 14th Street
130th	*Preferred Alternative D2A*, D2A - 120th Station Design Option, D2A - NE 24th Design Option, Alternative D2E , and Alternative D3	20	Private off-street parking lots between 130th and 132nd Avenues NE near NE 16th Street
Overlake Village	*Preferred Alternative D2A*	100	Private off-street lots adjacent to SR 520 and west of 152nd Ave NE
	D2A - NE 24th Design Option and Alternative D2E	40	Private off-street lots on the northwest corner of the intersection of NE 24th Street and 152nd Avenue NE
	Alternative D3	100	Private off-street lots along 152nd Avenue NE, north of NE 24th Street
	Alternative D5	20 to 40	Private off-street parking lots northwest of the intersection of NE 24th Street and 152nd Avenue NE
Overlake Transit Center	*Preferred Alternative D2A*, D2A Design Options, and Alternatives D2E, D3, and D5	0	None

Notes: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.

For *Preferred Alternative D2A,* the Overlake Village Station is located approximately 450 feet further north on the west side of 152nd Avenue NE from the existing Overlake Village Park-and-Ride. The design of the Overlake Village Station with this alternative would require the removal of 100 parking spaces located in private off-street parking lots adjacent to SR 520 right-of-way and west of 152nd Avenue NE. With Alternative D2A - NE 24th Design Option and Alternative D2E, 40 parking spaces located in private off-street parking lots on the northwest corner of the intersection of NE 24th Street and 152nd Avenue NE would be removed. Alternative D5 would affect the same private parking lots, but the number of affected parking spaces would vary between 20 and 40 stalls depending on the two proposed station locations. The design of the Overlake Village Station associated with D3 requires the removal of approximately 100 parking spaces located in private lots along 152nd Avenue NE north of NE 24th Street.

At the 130th, Overlake Village, and Overlake Transit Center stations, there is a potential for parking spillover because the future parking forecast is higher than the station's parking capacity, as shown in Table 6-38. However, because there is a minimal amount of available on-street parking surrounding these stations (see Table 6-12), there is a low potential for hide-and-ride impacts. Potential spillover from the Overlake Transit Center could infringe into nearby private businesses; however, these parking lots are currently monitored. Therefore, hide-and-ride activity is expected to be low at the Overlake Transit Center Station.

Although there is currently available on-street parking that surrounds the 120th Station, planned land use and transportation changes surrounding the Bel-Red area could result in a decrease of available on-street parking and therefore a lower potential for hide-and-ride impacts. In Segment D, because there are numerous private parking lots surrounding the stations, measures such as security enforcement or time-limited parking by private owners would minimize the potential for hide-and-ride activities.

Maintenance Facilities

The three maintenance facility sites and the storage track in the BNSF Railway, north of NE 12th Street crossing, in Segment D are not expected to substantially affect intersection operations, property access, or traffic or nonmotorized circulation. Vehicular access to the 116th Maintenance Facility (MF1) and BNSF Maintenance Facility (MF2) would be located off 120th Avenue NE by way of an access road.

TABLE 6-38
Segment D Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Vehicle Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Vehicle Demand[a]	2030 Park-and-Ride Vehicle Demand[a]
130th[b]	*Preferred Alternative D2A*, D2A - 120th Station Design Option, D2A - NE 24th Design Option, and Alternatives D2E and D3	--	300	270	380
Overlake Village	All Segment D Alternatives	203	203	260	480
Overlake Transit Center	All Segment D Alternatives	170	320	460	670

[a] 3-hour PM peak-period park-and-ride vehicle demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

[b] With *Preferred Alternative D2A*, there is the potential to locate the park-and-ride lot at either the 130th Station or 120th Station. With either location, park-and-ride auto demand would be similar.

The access road also would provide connectivity to the maintenance facility parking. Vehicular access to the SR 520 Maintenance Facility (MF3) would be located on NE 20th Street, and track access would spur off the main light rail track route running parallel to 136th Place NE. For *Preferred Alternative D2A*, vehicles traveling southbound on 136th Place NE and eastbound and westbound on NE 20th would be gate-controlled when light rail train vehicles access MF3. Existing driveway access on NE 20th Street between 132nd Avenue NE and 136th Place NE would be limited or signalized at specific locations.

The alternative maintenance facilities in Segment D would have approximately 60 parking stalls for the employees and visitors. Maintenance facility staff shift hours would be similar to Central Link operation and maintenance facilities: 6:00 a.m. to 2:00 p.m. and 2:00 p.m. to 10:00 p.m. These shift hours occur outside the peak periods, so little shift in traffic is expected to occur during the peak hour. Less than 10 vehicle trips would occur to and from the maintenance facility in peak periods. These trips would include visitors and deliveries to and from the maintenance facility.

Light rail vehicle storage track would be located along the former BNSF railway right-of-way within Segment D. Light rail vehicles entering or exiting this vehicle storage track would have no impact on traffic operations as this activity would occur outside of vehicle roadways. Parking and limited office space for vehicle maintenance, such as cleaning, would occur at this location but no impacts on traffic operations are anticipated.

Interim Terminus Stations

The 120th, 130th, Overlake Village, and Overlake Transit Center stations are potential interim termini. While increases in ridership at these interim termini stations ranged from 0 to 2,000 (Table 6-20), only Overlake Village Station warranted further traffic analysis as it is expected to generate an additional 130 vehicles trips as an interim terminus station by 2030. Table 6-21 shows the PM peak-hour interim terminus trip generation for each of these potential interim termini.

Because the additional ridership at the Overlake Village Station would be largely composed of people transferring between light rail and buses, bus services would be increased to accommodate this additional ridership. The increase in bus service at the Overlake Village Station would be mainly routes to and from the north along 156th Avenue NE. Overall, increases in vehicle delay under interim terminus conditions compared with the full-length alternative analysis would be negligible, and no change in intersection LOS is expected. Table D-16 in Appendix D provides the build and build interim terminus intersection LOS and delay results at the Overlake Village interim terminus station.

6.3.2.5 Segment E

In Downtown Redmond, Cleveland Street and Redmond Way currently operate as a one-way couplet with traffic operating eastbound and westbound, respectively, in existing conditions. In the future no-build conditions, these two streets are planned to be converted to two-way operations with Redmond Way providing one through lane and a left-turn pocket in both directions at intersections and Cleveland Street providing one lane in each directions. In addition, right-turn pockets would be provided for the eastbound and westbound approach at the intersection of Redmond Way and 164th Avenue NE. 164th Avenue NE would be extended between NE 76th

Street and Cleveland Street. Bear Creek Parkway and 161st Avenue NE would be extended to intersect south of the BNSF Railway right-of-way. Appendix A presents the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment E.

Traffic Control, Property Access, and Circulation

Impacts on access are expected to be minimal for all Segment E alternatives except along 161st Avenue NE for the E2 – Redmond Transit Center Design Option. The E2 – Redmond Transit Center Design Option would have the highest number of traffic control revision because it travels at-grade in the median of 161st Avenue NE, while the other Segment E alternatives would have a similar number of traffic control modifications. Table 6-39 presents the traffic control modifications for each Segment E alternative.

TABLE 6-39
Segment E Intersection Traffic Control

Control Location	Existing Control	Proposed Control
Preferred Marymoor Alternative (E2)		
Former BNSF Railway and 170th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway and 166th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway and 164th Avenue NE	None	Install light rail gates
Former BNSF Railway and NE Leary Way	Railroad gates	Install light rail gates
Former BNSF Railway and 161st Avenue NE	None	Install light rail gates
Redmond Way Alternative (E1)		
Former BNSF Railway and 161st Avenue NE	None	Install light rail gates
Former BNSF Railway and NE Leary Way	Railroad gates	Install light rail gates
Former BNSF Railway and 164th Avenue NE	None	Install light rail gates
Former BNSF Railway and 166th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway and 170th Avenue NE	Railroad gates	Install light rail gates
E2 – Redmond Transit Center Design Option		
Former BNSF Railway and 170th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway and 166th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway and 164th Avenue NE	None	Install light rail gates
Former BNSF Railway and NE Leary Way	Railroad gates	Install light rail gates
Former BNSF Railway and 161st Avenue NE	None	Install light rail gates
SR 202 and 161st Avenue NE	Signal	Replace signal
NE 80th Street and 161st Avenue NE	Signal	Replace signal
NE 83rd Street and 161st Avenue NE	Signal	Replace signal
NE 85th Street and 161st Avenue NE	Signal	Replace signal
Leary Way Alternative (E4)		
Bear Creek Parkway and Leary Way	Signal	Install light rail gates, replace signal
NE 76th Street	None	Install light rail gates
Former BNSF Railway and 164th Avenue NE	None	Install light rail gates
Former BNSF Railway and 166th Avenue NE	Railroad gates	Install light rail gates
Former BNSF Railway BNSF and 170th Avenue NE	Railroad gates	Install light rail gates

Preferred Marymoor Alternative (E2)

For *Preferred Alternative E2*, light rail crossing gates would replace the existing railroad gates and serve as traffic controls along the former BNSF Railway corridor (at the 161st Avenue NE, Leary Way, 164th Avenue NE, 166th Avenue NE, and 170th Avenue NE crossings). *Preferred Alternative E2* would not affect the roadway channelization. There would be no property access or circulation impacts with *Preferred Alternative E2*.

The E2 – Redmond Transit Center Design Option would extend from *Preferred Alternative E2* and travel into Downtown Redmond along 161st Avenue NE between Cleveland Street and NE 85th Street. The E2 – Redmond Transit Center Design Option would have more impact on property access and circulation because this design option would be at-grade in the median of 161st Avenue NE. Mid-block property access would be restricted to allow only right-turns in and out of the driveways. To minimize vehicle recirculation, NE 83rd Street and 161st Avenue NE would be signalized, and u-turn movements would be allowed at the intersection of NE 85th Street and 161st Avenue NE.

Other Segment E Alternatives

Similar to *Preferred Alternative E2*, both the Redmond Way Alternative (E1) and the Leary Way Alternative (E4) would have light rail crossing gates along the former BNSF Railway corridor (at the 164th Avenue NE, 166th Avenue NE, and 170th Avenue NE crossings). Alternative E1 would have additional crossings at 161st Avenue NE and NE Leary Way, while Alternative E4 would have additional crossings at the intersection of Bear Creek Parkway and NE Leary Way and along NE 76th Street between NE Leary Way and 164th Avenue NE. With Alternative (E1), properties with access on the south side of Redmond Way near the 159th Place NE intersection might have their access altered to accommodate the light rail track. West Lake Sammamish Parkway and the former BNSF Railway corridor would be modified to accommodate the tracks. With Alternative E4, potentially one access to a residential property along the south side of Leary Way, just west of the Sammamish River, would be modified to accommodate the tracks along the road. Both the Redmond Way (E1) and Leary Way (E4) alternatives would not affect the roadway channelization in Segment E.

A service access road would be constructed near the SR 520 eastbound on-ramp and West Lake Sammamish Parkway to allow access to a traction power substation. However, only service vehicles would use this access point, and it is not expected to affect circulation or property access near the on-ramp.

Operations and Level of Service

As traffic volumes increase in 2020 and 2030, the no-build intersection LOS results for the PM peak hour would be worse than in the existing conditions. In the year 2020, three intersections are expected to operate at LOS F during the PM peak hour and by year 2030 two additional intersections would operate at LOS F. These intersections are:

- NE Leary Way and West Lake Sammamish Parkway
- NE 76th Street and 170th Avenue NE
- Avondale Road NE and Union Hill Road
- NE 85th Street and 164th Avenue NE
- SR 202 and E Lake Sammamish Parkway (180th Avenue NE)

The intersections of NE Leary Way and West Lake Sammamish Parkway, Avondale Road NE and Union Hill Road, and SR 202 and East Lake Sammamish Parkway already operate at LOS F in the existing conditions. The NE 76th Street and 170th Avenue NE intersection is unsignalized in the existing and future conditions.

Preferred Marymoor Alternative (E2)

Intersection operations with the *Preferred Alternative E2* would be similar to the no-build condition except at four intersections where operations would be worse and the intersection would fail to meet the City of Redmond’s LOS standards: NE 76th Street and 170th Avenue NE, SR 202 and NE 70th Street, NE 70th Street and 176th Avenue NE, and SR 202 and E Lake Sammamish Parkway (180th Avenue NE). These impacts are due to the increased traffic associated with the SE Redmond Station and at the at-grade light rail crossings adjacent to the NE 76th Street and 170th Avenue NE intersection.

For the E2 – Redmond Transit Center Design Option, the intersection operations would be similar to those of *Preferred Alternative E2*, except at the Redmond Way and 161st Avenue NE intersection. This intersection is expected to operate at LOS F in year 2030 because of the roadway modifications along 161st Avenue NE as part of the median track alignment.

Independent of the *Preferred Alternative E2* alignment adjacent to NE 76th Street, the intersection signal phasing and operations along NE 76th Street would be similar as discussed under the *Preferred Alternative E2* and E2 – Redmond Transit Center Design Option.

Other Segment E Alternatives

Within Segment E, the light rail train along the former BNSF Railway corridor would likely receive full signal priority. With the E2 – Redmond Transit Center Design Option route, it is likely some signal priority would be given to the light rail train along 161st Avenue NE through Downtown Redmond. Intersection operations with Alternatives E1 and E4 would be similar to the *Preferred Alternative E2*, except at the intersection of NE 70th Street and 176th Avenue NE where intersection operations would be similar to the no-build condition. This intersection would not degrade under these two alternatives because a different intersection channelization associated with the station access and circulation at the SE Redmond Station.

Because a substantial number of transit users would relocate from the Bear Creek Park-and-Ride Lot to the SE Redmond Station, the intersection operations are expected to improve near the Beak Creek Park-and-Ride Lot. This though was not included in the traffic analysis results as the analysis did not consider a reduction in vehicle traffic at the beak Creek Park-and-Ride.

Exhibits 6-18 and 6-19 and Table D-17 in Appendix D provide 2020 and 2030 intersection LOS results for the PM peak hour in the no-build and build conditions.

Traffic Safety

Table 6-40 discusses the expected safety impacts of the Segment E alternatives on the local roadway system. The safety assessments were based on each alternative's design and national research and safety guidelines relevant to East Link Project. Appendix E provides information about findings from national research projects for the various design types assessed for the East Link Project. No substantial changes are expected in the accident frequency along the roadways surrounding the maintenance facility in Segment E. The SE Redmond Maintenance Facility (MF5), the only maintenance facility in Segment E, would have track crossing NE 70th Street. The light rail train would not cross this road frequently, and it would be protected with gates, so there would be no change in the roadway safety conditions.

TABLE 6-40
Segment E Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
Preferred Marymoor Alternative (E2)	NE 76th Street from 170th Avenue NE to 161st Avenue NE	Track within the former BNSF Railway corridor and outside of vehicle travel would reduce the risk of collisions by separating traffic types. Also, gates at vehicle-train crossings would reduce collision risk at these points. No substantial change in the number of accidents is expected.
E2 – Redmond Transit Center Design Option	NE 76th Street from 170th Avenue NE to 161st Avenue NE	Track within the former BNSF Railway corridor and outside of vehicle travel would reduce the risk of collisions by separating traffic types. Also, gates at vehicle-train crossings would reduce collision risk at these points. No substantial change in the number of accidents is expected.
	161st Avenue from Bear Creek Parkway to NE 85th Street	This section would not likely have many midblock accidents that could be prevented by adding light rail tracks in the median preventing midblock left-turn movements. Low-speed median alignments would likely have a higher exposure to accidents but less severe accidents than other track profiles.
Redmond Way Alternative (E1)	NE 76th Street from Redmond Way to 170th Avenue NE	Track within the former BNSF Railway corridor and outside of vehicle travel would reduce the risk of collisions by separating traffic types. Also, gates at vehicle-train crossings would reduce collision risk at these points. No substantial change in the number of accidents is expected.
Leary Way Alternative (E4)	NE Leary Way and NE 76th Street from Bear Creek Parkway to 170th Avenue NE	Track within the former BNSF Railway corridor and outside of vehicle travel would reduce the risk of collisions by separating traffic types. Also, gates at vehicle-train crossings would reduce collision risk at these points. No substantial change in the number of accidents is expected.

Note: Sections outside the roadway network are not included as there would be no conflicts with vehicles, pedestrians or bicycles.

Parking

The parking impacts associated with the alternative routes and stations in Segment E are summarized in Table 6-41 by alternative. Table 6-42 summarizes the impacts associated with the area covered by each station.

TABLE 6-41
Segment E Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed		
	Unrestricted On-Street	Restricted On-Street[a]	Off-Street[b]
Preferred Marymoor Alternative (E2)	0	0	20
E2 – Redmond Transit Center Design Option	14	2	94
Redmond Way Alternative (E1)	0	0	37
Northeast Leary Way Alternative (E4)	0	0	45

Note: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.

[a] Restricted parking includes all parking spaces with special-use restrictions, such as drop-off/loading zones.

[b] Includes parking spaces removed at the station areas.

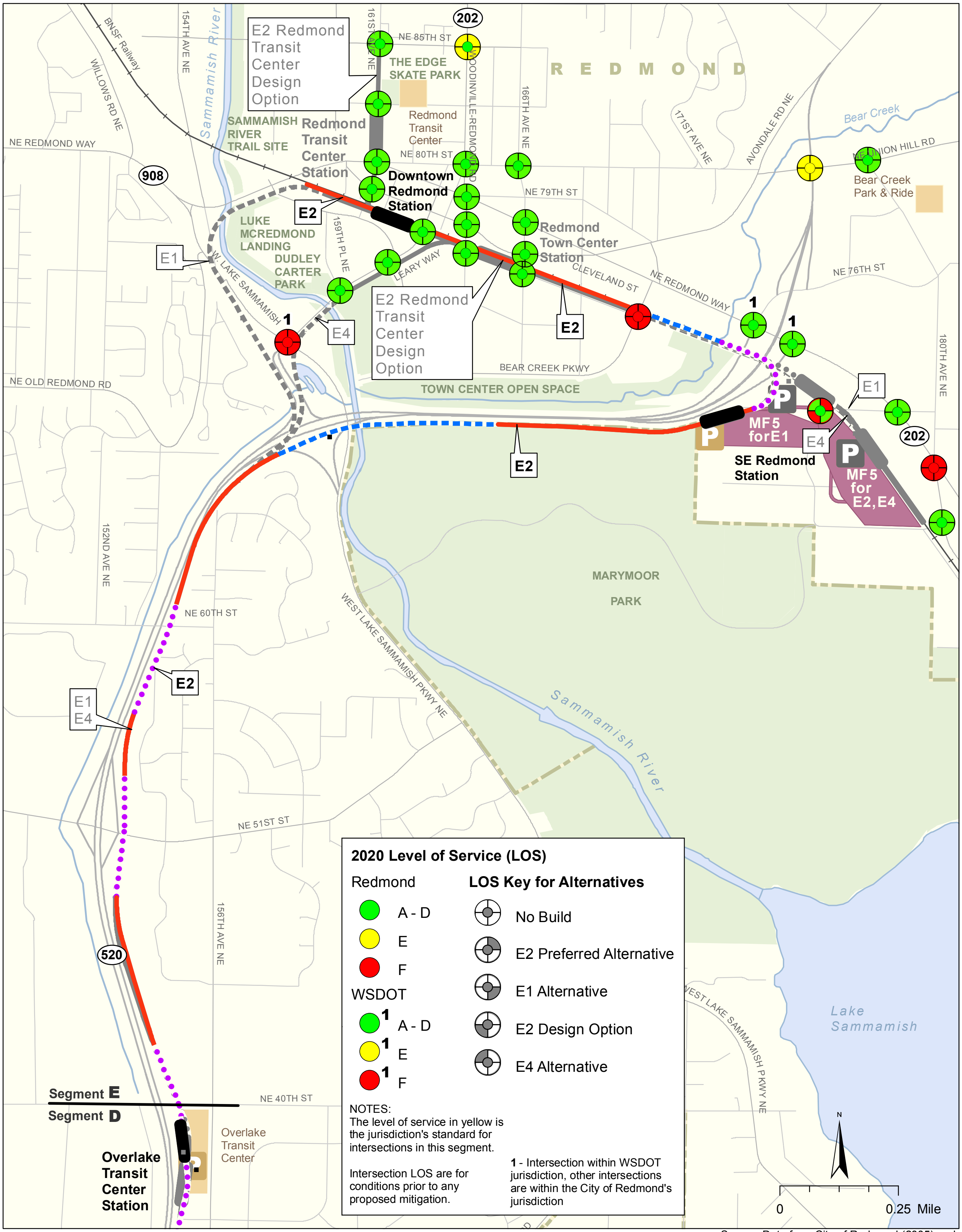
TABLE 6-42
Segment E Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
Downtown Redmond	*Preferred Alternative E2*	0	None
Redmond Town Center	E2 - Redmond Transit Center Design Option and Alternatives E1 and E4	0	None
SE Redmond	*Preferred Alternative E2,* Alternative E1, and E2 – Redmond Transit Center Design Option	0	Several entire parcels will be acquired near the intersection of NE 70th Street and 176th Avenue NE
	Alternative E4	0	None
Redmond Transit Center	E2 – Redmond Transit Center Design Option	30	Private off-street parking lots along the west side of 161st Avenue NE, between NE 80th and NE 83rd Streets

Notes: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.

Preferred Marymoor Alternative (E2)

Preferred Alternative E2 would have the least impact on parking of the four Segment E alternatives. A total of 20 off-street private parking spaces and zero on-street public parking spaces would be removed. The E2 – Redmond Transit Center Design Option would have the greatest impact on parking of the four Segment E alternatives due to impacts along 161st Avenue NE. A total of 94 off-street private parking spaces and 16 on-street public parking spaces would be removed. All the removed on-street public parking spaces would be located along 161st Avenue NE between NE 83rd Street and NE 85th Street. Two of the parking spaces prohibit parking longer than 15 minutes. If the *Preferred Alternative E2* alignment adjacent to NE 76th Street requires the roadway to be reconstructed its on-street parking might be removed.



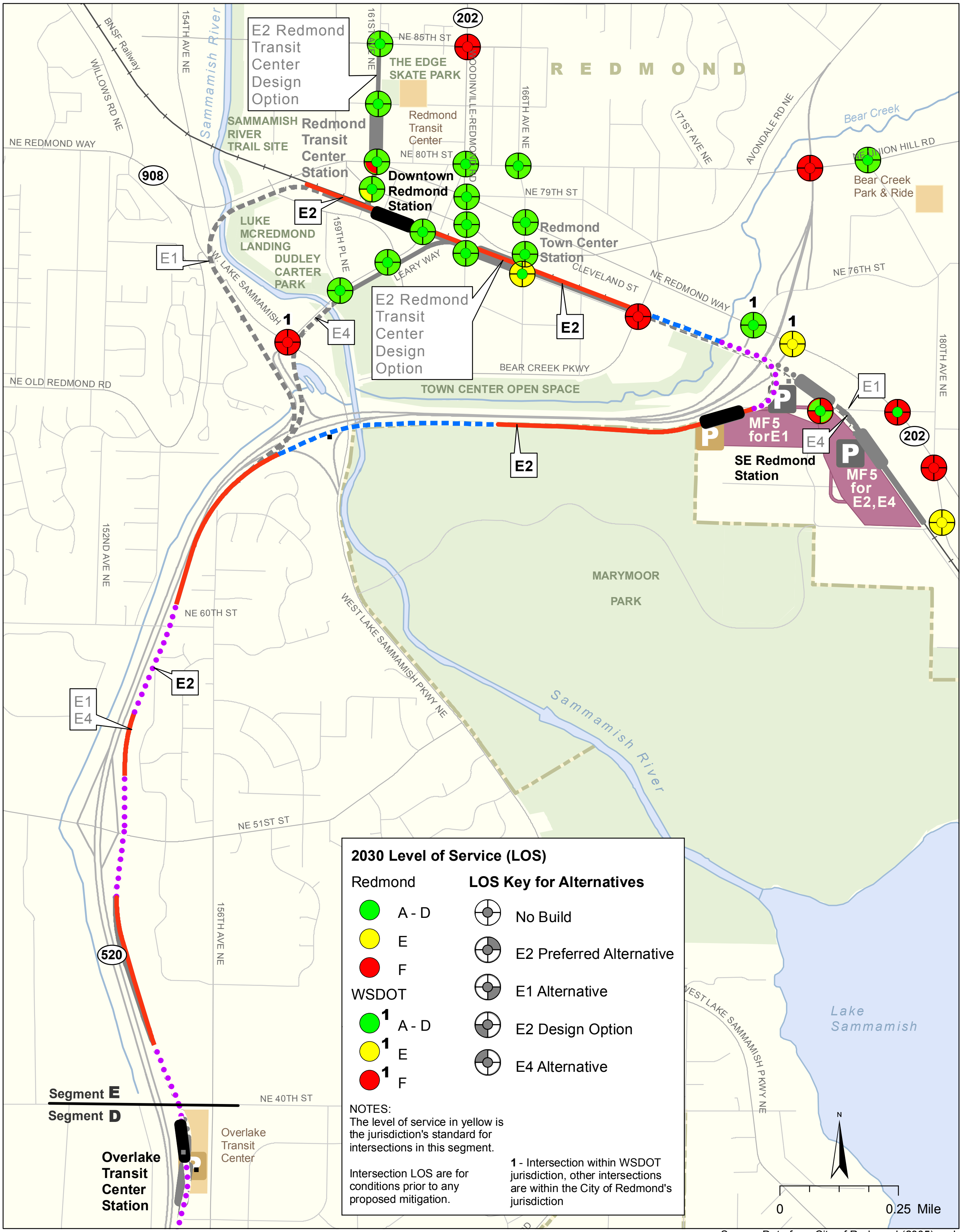
Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Redmond (2005) and King County (2006) modified by CH2M HILL.

Exhibit 6-18 **2020 PM No Build and Build Level of Service at Intersections Segment E**
East Link Project



2030 Level of Service (LOS)

Redmond
- A - D
- E
- F

WSDOT
- 1 A - D
- 1 E
- 1 F

LOS Key for Alternatives
- No Build
- E2 Preferred Alternative
- E1 Alternative
- E2 Design Option
- E4 Alternative

NOTES:
The level of service in yellow is the jurisdiction's standard for intersections in this segment.

Intersection LOS are for conditions prior to any proposed mitigation.

1 - Intersection within WSDOT jurisdiction, other intersections are within the City of Redmond's jurisdiction

Preferred Alternative
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Retained-Fill Route
- Tunnel Route

Other Alternatives
- At-Grade Route
- Elevated Route
- Retained-Cut or Retained-Fill Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Source: Data from City of Redmond (2005) and King County (2006) modified by CH2M HILL.

Exhibit 6-19 **2030 PM No Build and Build Level of Service at Intersections Segment E**

East Link Project

Other Segment E Alternatives

E1 and E4 are expected to have no impact on on-street parking but would affect between 37 and 45 off-street parking spaces, respectively. As shown in Table 6-42, the only station that would require the removal of parking spaces in Segment E is the Redmond Transit Center Station with the E2 – Redmond Transit Center Design Option. This station would require the removal of 30 off-street parking spaces in lots located on the west side of 161st Avenue NE between NE 80th Street and NE 83rd Street. The design for the SE Redmond Station in *Preferred Alternative E2,* E2 – Redmond Transit Center Design Option, and Alternative E1 would require the acquisition of several entire parcels near the intersection of Northeast 70th Street and 176th Avenue NE.

At the two stations with park-and-ride lots, Redmond Transit Center and SE Redmond, the expected park-and-ride demand is less than the available parking capacity, as shown in Table 6-43; therefore, there is a low potential for parking spillover to occur. Additionally, because of the low amount of on-street parking near the SE Redmond Station, there likely would not be a substantial hide-and-ride impact at this station if the parking demand exceeded the park-and-ride capacity.

TABLE 6-43
Segment E Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Vehicle Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Vehicle Demand[a]	2030 Park-and-Ride Vehicle Demand[a]
SE Redmond	All Segment E Alternatives	--	1,400	1,030	1,030
Redmond Transit Center	*Preferred Alternative E2*	377	377	150	180

[a] 3-hour PM peak-period park-and-ride vehicle demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

Even though a park-and-ride lot at the Downtown Redmond Station and Redmond Town Center Station (with the E2 – Redmond Transit Center Design Option) is not proposed, a substantial amount of available on-street parking surrounds both stations. Therefore there is a potential for hide-and-ride impacts. However, the City of Redmond has recently implemented a restricted (time-limited) parking policy for much of their downtown area. This would limit opportunities for hide-and-ride parking. Hide-and-ride parking also could occur in the neighboring retail center but this development has already implemented security enforcement, which minimizes the potential for hide-and-ride activities. Owners of other private parking lots near the stations could implement measures such as security enforcement or time-limited parking that would minimize the potential for hide-and-ride activities in their parking lots.

6.3.2.6 Maintenance Facilities

The SE Redmond Maintenance Facility (MF5) would be located adjacent to the SE Redmond Station and would be connected to the station by tail track. The position of MF5 would differ for E1, *Preferred Alternative E2* and E4, but the traffic circulation surrounding this area is not expected to differ between these alternatives. Vehicular access to MF5 in E1 would be located off NE 70th Street between Redmond Way and the SR 520 eastbound off-ramp. Vehicular access to MF5 in *Preferred Alternative E2* and Alternative E4 would be located off NE 65th Street between 176th Avenue NE and East Lake Sammamish Parkway. The additional access into MF5 is not expected to affect business, residential, or nonmotorized circulation and access on either of these streets. For *Preferred Alternative E2* and E4 vehicles traveling along NE 70th Street, there would be a gate controlling the crossing when the light rail trains access MF5.

MF5 in Segment E would have approximately 60 parking stalls for the employees and visitors. Maintenance facility staff shift hours would be similar to Central Link operation and maintenance facilities: 6:00 a.m. to 2:00 p.m. and 2:00 p.m. to 10:00 p.m. These shift hours occur outside the peak periods, so little shift in traffic is expected to occur during the peak hour. Fewer than 10 vehicle trips would occur to and from the maintenance facility in peak periods. These trips would include visitors and deliveries to and from the maintenance facility.

6.3.2.7 Interim Terminus Stations

The SE Redmond and Redmond Town Center stations are potential interim termini. The SE Redmond Station is not expected to generate enough auto trips beyond the full-length alternative to warrant further traffic analysis because the analysis of the full-length alternative assumed the park-and-ride lot at the SE Redmond Station would be at capacity. The Redmond Town Center Station would generate an additional 85 total vehicle trips as an interim terminus by year 2030, which warranted further traffic analysis. Table 6-21 shows the PM peak-hour interim terminus trip generation for each of these potential interim termini.

Intersections near the Redmond Town Center Station are expected to operate acceptably compared with the City of Redmond's LOS standards except the intersection of NE 76th Street and 170th Avenue NE. The increase in delay at this intersection is attributed to the at-grade light rail crossing adjacent to the intersection, similar to all Segment E alternatives. Table D-18 in Appendix D provides the build and build interim terminus intersection LOS and delay results at the Redmond Town Center interim terminus station.

6.4 Construction Impacts

Construction impacts are estimated based on the level of design completed to date and the known construction activities. Constructing the East Link Project would result in temporary impacts to local and regional automobile, transit, truck, and pedestrian or bicycle activities. Construction activities analyzed include construction operations, truck routes, and staging schemes, and their related effects, including the following:

- Potential roadway or lane closure requirements, alignment shifts, areas of construction activity adjacent to travel lanes, or other reductions in street capacity associated with construction activities
- Major construction activities with complete roadway closures requiring construction of interim detour facilities or identification of available detour routes
- Areas that would require extensive construction coordination between Sound Transit and local jurisdictions, affected neighborhoods, adjacent businesses, and other affected agencies
- Locations where existing on- or off-street parking supply would be affected by construction activity or staging

Construction traffic impacts could also occur where construction site access routes require using streets not typically used by or designated for use by trucks. The closure of roadway lanes (especially arterials) during peak periods could create substantial transportation impacts (congestion, increased potential for cut-through traffic, disconnected bicycle/sidewalk facilities), especially if alternate routes would be congested or lengthy. Impacts could also result from property access restrictions. During construction, some roads immediately adjacent to or within the construction areas would have to be temporarily closed or narrowed. This includes the following:

- Full closure: road closed to all traffic
- Partial closure: individual lane closures could be expected, but at least one travel lane in each direction would be maintained
- Short-term closure: closed up to 12 months
- Long-term closure: closed more than 12 months
- Peak closures: closures scheduled for periods of highest traffic (typically mornings and late afternoons/early evenings on weekdays)
- Off-peak closures: closures scheduled for periods of lowest traffic (typically weekends and nights)
- 24-hour closures: all day closures for both weekdays and weekends

Even with careful preparation of the traffic maintenance and construction plans, access to construction areas could require using collector or local designated streets in certain areas. Coordination with local jurisdictions and WSDOT would take place as part of final engineering and permitting stages of this project so that streets and highways are provided with the necessary signage and traffic control measures.

Linear projects such as East Link are typically divided into various segments or line sections for construction. Segments include construction of retained cut-and-fill trackway, elevated structures, tunnels and underground stations, park-and-ride facilities, station platforms, transit centers, substation and control facilities, and other related improvements. A work-specific construction approach would be developed during the final design effort to establish the limits for the various construction phases and construction contracts, their estimated schedule and duration, and appropriate sequencing. Where possible, construction activities would be coordinated with other capital improvement projects to help minimize construction impacts.

Typical construction for surface and elevated guideways and stations would occur on a 6-day-per-week work schedule, although in some locations (such as when street detours are involved and/or construction periods need to be abbreviated to reduce impacts), additional shifts, all-week, or 24-hour construction activities could be necessary. While underground construction activities could occur on a 24-hour basis, truck activity at the surface staging area could be limited to a shorter period daily.

The overall construction duration would be about seven years. A period of civil construction during which site preparation, primary construction, and finish construction takes place would have duration of approximately two to five years in any given portion of the corridor. A typically shorter period of system installation, integration, and testing would then follow. The initial and final construction periods would have minimal construction impacts compared with the primary construction period.

The civil construction work at each site would normally begin with site preparation, including property acquisition, demolition and clearing, and utilities rerouting. In some areas, it would be necessary to demolish existing buildings or structures before starting construction of light rail facilities. Demolition would involve implementing stormwater and erosion control measures, tearing down buildings and structures, relocating utilities, removing debris, and containing and disposing of hazardous materials. Demolition work would create noise and dust, and there would be truck traffic for debris removal.

Staging areas are also needed before, during, and for a short time after construction work occurs. The staging areas for tunnel boring and mining would be located at or near tunnel portals, stations, or construction shafts. Staging areas for cut-and-cover stations would be located at or near the station site. At-grade, elevated, and retained cut-and-fill line sections would have construction staging areas all along the routes. Staging areas for the stations (both at-grade and elevated) would generally need to be larger than for the guideway/trackway segments (line sections). For the line sections, contractors would generally use as the staging area the property in which the facility is being constructed and adjacent properties, although larger areas could be required.

Staging areas could be used for construction, equipment storage, construction materials delivery and storage, demolition or spoils handling (in accordance with applicable regulations), contractor trailers, and parking. Section 5.3.4 discusses construction impacts on the regional highways in the project vicinity, (I-90, I-405, and SR 520); Section 4.4 discusses construction impacts on transit.

6.4.1 Truck Volumes and Haul Routes

The exact number of truck trips that would be needed for each alternative is dependent on many variables that cannot be fully determined or finalized at this time. An estimate, based on the engineering and design information available at this time, was prepared to understand the impact of constructing the East Link Project would have on the transportation system. A range of truck trips is shown in Table 6-44, based on known quantities for the main trip-generation activities, including imported fill material, concrete, asphalt concrete pavement, and excavated waste material that would be generated for the construction of each alternative. The variation between the minimum and maximum number of truck trips per day or hour is also shown in Table 6-44. Truck trips associated with activities such as miscellaneous deliveries have not yet been quantified and are excluded from this estimate.

Preliminary haul routes are provided in Table 6-44 and in Appendix G1 of the Final EIS. Truck haul routes were identified by using the classified truck routes from WSDOT, King County, and the cities of Seattle, Bellevue, and Redmond. Final truck routes would be determined in conjunction with affected jurisdictions through the project’s permitting process. The truck routes for each alternative have been split into several sections based on the access to and from the alternative and the classified truck routes. Trucks were assumed to arrive from I-90, I-405, or SR 520; they were also assumed to be capable of turning around in staging areas and maintenance facility sites. When an alternative includes a tunnel, haul routes were assumed to end and begin at the tunnel portals.

TABLE 6-44
Average Truck Trips for Construction of Alternatives

Alternative	Average Truck Trips To and From Location[c] Per Day[a]	Per Hour[b]	Haul Origin/Destination	Suggested Haul Route Streets
Segment A, Interstate 90				
Preferred Alternative A1	12 to 14	1 to 2	West of I-5	I-90 to Airport Way to 4th Avenue South to Jackson Street to 5th Avenue South to I-90
			East of I-5	I-90 center HOV lanes, turnaround at 76th Avenue NE and Island Crest Way in Mercer Island
Segment B, South Bellevue				
Preferred Alternative B2M connecting to *Preferred Alternative C9T*	60 to 70	6 to 7	South of SE 8th Street	I-90 to Bellevue Way SE to 112th Avenue SE to SE 8th Street to I-405
			North of SE 8th Street	I-405 to SE 8th Street to 112th Avenue SE to NE 4th Street to I-405
Preferred Alternative B2M connecting to *Preferred Alternative C11A*	80 to 90	8 to 9	South of SE 8th Street	I-90 to Bellevue Way SE to 112th Avenue SE to SE 8th Street to I-405
			North of SE 8th Street	I-405 to SE 8th Street to 112th Avenue SE to NE 4th Street to I-405
Alternative B1	54 to 66	5 to 7	South of 112th Avenue SE	I-90 to Bellevue Way SE to 112th Avenue SE to SE 8th Street to I-405
			North of112th Avenue SE	I-405 to SE 8th Street to 112th Avenue SE to Bellevue Way SE
Alternative B2A	35 to 42	3 to 4	South of SE 8th Street	Same as *Preferred Alternative B2M*
			North of SE 8th Street	Same as *Preferred Alternative B2M*
Alternative B2E	18 to 23	2	Entire alternative	Same as *Preferred Alternative B2M*
Alternative B3 and B3 – 114th Extension Design Option	26 to 32	3	South of SE 8th Street	Same as *Preferred Alternative B2M*
			North of SE 8th Street	I-405 to SE 8th Street to 114th Avenue SE to SE 6th Street to 112th Avenue SE to I-405
Alternative B7	24 to 30	2 to 3	South of SE 8th Street	I-405 to 118th Avenue SE to I-405
			North of SE 8th Street	Same as Alternative B3
Segment C, Downtown Bellevue				
Preferred Alternative C11A	35 to 40	3 to 4	South of NE 4th Street	I-405 to SE 8th Street to 112th Avenue NE to NE 4th Street to I-405
			North of NE 4th Street	I-405 to NE 6th Street to 110th Avenue NE to NE 4th Street to 112th Avenue NE to I-405
			East of I-405	I-405 to NE 8th Street to former BNSF Railway; return via same route or I-405 to NE 4th Street to 116th Avenue NE to NE 8th Street I-405
Preferred Alternative C9T	75 to 85	7 to 9	South of NE 4th Street	I-405 to SE 8th Street to 112th Avenue NE to NE 4th Street to I-405
			North of NE 4th Street	I-405 to NE 6th Street to 108th Avenue NE to NE 4th Street to 112th Avenue NE to I-405
			East of I-405	I-405 to NE 8th Street to former BNSF Railway; return via same route or I-405 to NE 4th Street to 116th Avenue NE to NE 8th Street I-405

TABLE 6-44 CONTINUED
Average Truck Trips for Construction of Alternatives

Alternative	Average Truck Trips To and From Location[c]		Haul Origin/Destination	Suggested Haul Route Streets
	Per Day[a]	Per Hour[b]		
Alternative C1T	135 to 165	13 to 17	Southern tunnel portal	I-405 to SE 8th Street to 112th Ave SE to Bellevue Way SE to NE 8th Street to I-405
			Northern tunnel portal	I-405 to NE 8th Street to 108th Avenue NE to NE 4th Street to 112th Avenue NE to I-405
			East of I-405	Same as *Preferred Alternative C11A*
Alternative C2T	100 to 120	10 to 12	Southern tunnel portal	I-405 to SE 8th Street to 112th Avenue NE (or to SE 6th Street) to NE 8th Street to I-405
			Remainder	Same as Alternative C1T
Alternative C3T	140 to 170	14 to 17	Southern tunnel portal	Same as Alternative C2T
			Remainder	I-405 to NE 8th Street to 112th Avenue NE or 108th Avenue NE to NE 12th Street to 116th Avenue NE to I-405
Alternative C4A	105 to 130	10 to 13	South of Main Street	Same as Alternative C2T (“southern tunnel portal”)
			Along 108th Avenue NE	I-405 to SE 8th Street to 112th Avenue SE to Main Street to 108th Avenue NE to NE 12th Street to 116th Avenue NE to I-405
			Along 110th Avenue NE	I-405 to SE 8th Street to 112th Avenue NE to Main Street to 110th Avenue NE to NE 12th Street to 116th Avenue NE to I-405
			Along NE 12th Street	I-405 to NE 8th Street to 112th Avenue NE to NE 12th Street; return via same route
Alternative C7E	20 to 30	2 to 3	South of NE 8th Street	Same as Alternative C2T (“southern tunnel portal”)
			North of NE 8th Street	Same as Alternative C4A (“Along NE 12th Street”)
Alternative C8E	100 to 125	10 to 13	South of NE 8th Street	I-405 to SE 8th Street to 112th Avenue SE to NE 2nd Street to 110th Avenue NE to NE 8th Street to I-405
			Between NE 8th and NE 12th Streets	I-405 to NE 8th Street to 110th Avenue NE to NE 12th Street to 112th Avenue NE to I-405
			Along NE 12th Street	Same as Alternative C4A
Alternative C9A	25 to 30	2 to 3	South of NE 4th Street	Same as *Preferred Alternative C9T*
			North of NE 4th Street; NE 6th Street	Same as *Preferred Alternative C9T*
			East of I-405	Same as *Preferred Alternative C9T*
Alternative C14E	40 to 45	4 to 5	West of I-405	I-405 to SE 8th Street to 118th and 114th Avenue NE to NE 2nd Street to 112th Avenue NE to NE 4th Street to I-405
			East of I-405	Same as *Preferred Alternative C11A*

TABLE 6-44 CONTINUED
Average Truck Trips for Construction of Alternatives

Alternative	Average Truck Trips To and From Location[c]		Haul Origin/Destination	Suggested Haul Route Streets
	Per Day[a]	Per Hour[b]		
Segment D, Bel-Red/Overlake				
Preferred Alternative D2A and D2A - 120th Station Design Option	85 to 95	8 to 10	West of 140th Avenue NE	I-405 to NE 8th Street to former BNSF Railway; 120th, 124th, 130th Avenues NE; and NE 16th Street and Bel-Red Road. SR 520 to Northup Way and NE 20th Street to former BNSF Railway; 120th, 124th, and 130th Avenues NE; and 136th Place NE.
			East of 140th Avenue NE	SR 520 to 148th Avenue NE to NE 24th Street and 152nd Avenue NE to Microsoft Road to 156th Avenue NE to NE 40th Street and SR 520 to 148th Avenue NE to NE 20th Street
D2A – NE 24th Design Option	95 to 105	9 to 11	West of 140th Avenue NE	Same as *Preferred Alternative D2A*
			East of 140th Avenue NE	Same as *Preferred Alternative D2A*
Alternative D2E	25 to 30	2 to 3	Entire alternative	Same as *Preferred Alternative D2A*
Alternative D3	50 to 60	5 to 6	West of140th Avenue NE	Same as *Preferred Alternative D2A*
			East of 140th Avenue NE	SR 520 to 148th Avenue NE to NE 20th Street and 152nd Avenue NE to Microsoft Road to 156th Avenue NE to NE 40th Street to SR 520
Alternative D5	20 to 30	2 to 3	West of 140th Avenue NE	I-405 to NE 8th Street to 116th Avenue NE, along alignment, to Northup Way and SR 520.
			East of 140th Avenue NE	Same as *Preferred Alternative D2A*
Segment E, Downtown Redmond				
Preferred Alternative E2	55 to 65	5 to 7	West of West Lake Sammamish Parkway	SR 520 and NE 51st Street interchange to access SR 520 roadside and alternative
			East of West Lake Sammamish Parkway	SR 520 to West Lake Sammamish Parkway to Leary Way or to SR 202 to access alternative along Redmond Way, NE 76th Street, and NE 70th Street
E2 – Redmond Transit Center Design Option	55 to 70	5 to 7	West of West Lake Sammamish Parkway	Same as *Preferred Alternative E2*
			East of West Lake Sammamish Parkway	Same as *Preferred Alternative E2* with 161st Avenue NE to NE 85th Street to 164th Avenue NE.
Alternative E1	50 to 65	5 to 7	West of West Lake Sammamish Parkway	Same as *Preferred Alternative E2*
			East of West Lake Sammamish Parkway	Same as *Preferred Alternative E2*
Alternative E4	50 to 60	5 to 6	West of West Lake Sammamish Parkway	Same as *Preferred Alternative E2*
			East of West Lake Sammamish Parkway	Same as *Preferred Alternative E2*

[a] Truck trips presented are for connections to alternatives in adjacent segments that would produce the highest truck volumes.
[b] Assuming a minimum of 10 construction hours per day.
[c] A range of truck trips has been provided in this table, based on known quantities of imported fill material, concrete, asphalt concrete pavement, and excavated waste material that would be needed for the construction of each alternative.

In Segment A, a relatively low amount of truck activity (fewer than 20 trucks per day) is expected because the alternative requires minimal excavation and import of loose materials. Trucks would access and use I-90 as a haul route. Trucks might also access a potential construction staging site within I-90 right-of-way along Dearborn Street. In Segment A, the most intensive period of truck trips would last approximately 2 years.

Of the alternatives in Segment B, *Preferred Alternative B2M* connecting to *Preferred Alternative C11A* would likely require the most truck trips because of the amount of excavation and asphalt concrete pavement required. With this alternative, between 80 and 90 truck trips per day are estimated. Access to the construction areas would be along Bellevue Way SE, SE 8th Street, 112th Avenue SE, and 118th Avenue SE from I-90 and I-405. For all the Segment B alternatives, the trucks would access construction areas from these same streets. In Segment B, the most intensive period of truck trips would last approximately 2 to 3 years.

In Segment C, the 108th NE Tunnel Alternative (C3T) would likely result in the greatest number of truck trips per day. Between 140 and 170 haul truck trips per day would be required to access 108th Avenue NE and 112th Avenue NE between SE 8th Street and NE 12th Street. There is substantial variability in the number of trucks expected in Segment C because the tunnel alternatives are expected to generate a large amount of excavated material while alternatives C7E, C9A, C11A, and C14E are expected to generate a relatively smaller number of trucks as they do not require an extensive amount of excavation. In Segment C, the most intensive period of truck trips would last approximately 3 years for surface and elevated alternatives and approximately 4 years for tunneled alternatives. Generally, truck trips would access Segment C construction areas from I-405 via SE 8th, NE 4th, and NE 8th streets.

The D2A – NE 24th Design Option would require the most truck trips of the alternatives in Segment D because of the amount of fill and elevated structure. Between 95 and 105 truck trips per day could be expected with this alternative. Generally, truck trips would access Segment D construction areas from SR 520 via 124th and 148th avenues NE and NE 40th Street. In Segment D, the most intensive period of truck trips would last approximately 3 to 4 years.

In Segment E, each alternative would require about the same number of truck trips: between 50 and 70 trips per day. These trips would likely be routed on a frontage road along SR 520 and along SR 202, West Lake Sammamish Parkway NE, and other streets. Generally, truck trips would access the Segment E construction areas from West Lake Sammamish Parkway and SR 202. In Segment E, the most intensive period of truck trips would last approximately 2 to 3 years.

Of the maintenance facilities proposed within Segment D, the 116th Maintenance Facility (MF1) is expected to require the greatest number of truck trips: up to 140 trucks per day. MF1 would be located between 116th Avenue NE and the BNSF Railway with auto access from 120th Avenue NE. Truck trips are assumed to use the SR 520 at 124th Avenue NE interchange to make deliveries and haul materials. The maintenance facilities proposed in Segment E would require up to 25 trips per day. The suggested truck route for all three of these facilities would use the SR 520 interchange with SR 202. The most intensive period of truck trips would last approximately 2 years. The average number of truck trips per day and per hour for the construction of maintenance facilities is provided in Table 6-45. Similar to Table 6-44 these truck trips are based on known quantities at this time, including imported fill material, concrete, asphalt concrete pavement, and excavated waste material that would be generated for the construction of each maintenance facility.

6.4.2 Roadway and Parking Impacts

Construction impacts are estimated based on the level of design completed to date and the known construction activities. The construction impacts by segment are detailed in Table 6-46 and include construction truck traffic level, type and duration of road closure, availability of detour routes, and potential for neighborhood traffic intrusion. Detour routes are available near most alternatives, but for detour routes that require longer out-of-direction travel, potential detour routes are identified. For roadways classified as collector or local arterials, these roads could be signed to only provide local access. This section also discusses potential impacts for each maintenance facility. Maintenance of traffic and construction plans would continue to be refined through the final design and permitting stages of this project and subject to approval by WSDOT and the Cities of Bellevue, Redmond, Seattle and Mercer Island where appropriate.

TABLE 6-45
Average Truck Trips for Construction of Maintenance Facilities

Maintenance Facility	Associated Alternatives	Average Haul Truck Trips To and From Location[a]		Suggested Haul Route
		Per Day	Per Hour	
116th Avenue Maintenance Facility (MF1)	*Preferred Alternative D2A*, D2A – 120th Station Design Option, D2A – 24th NE Design Option, and Alternatives D2E and D3	115 to 141	12 to 14	SR 520 to 124th Avenue NE to 120th Avenue NE; return via same route
	AlternativeD5	111 to 135	11 to 14	Same as above
BNSF Maintenance Facility (MF2)	*Preferred Alternative D2A,* D2A – 120th Station Design Option, D2A - 24th NE Design Option, and Alternatives D2E and D3	21 to 26	2 to 3	Same as MF1
	Alternative D5	34 to 42	3 to 4	Same as MF1
SR 520 Maintenance Facility (MF3)	*Preferred Alternative D2A,* D2A – 120th Station Design Option, D2A - 24th NE Design Option, and Alternative D2E	49 to 60	5 to 6	SR 520 to 124th Avenue NE to Northup Way; return via same route
	Alternative D3	50 to 62	5 to 6	Same as above
	Alternative D5	25 to 31	3	Same as above
SE Redmond Maintenance Facility (MF5)	Alternative E1	17 to 21	2	SR 520 to SR 202 to NE 70th Street; return via same route
	Preferred Alternative E2 and E2 – Redmond Transit Center Design Option	20 to 24	2	SR 520 to SR 202 to East Lake Sammamish Parkway NE to NE 65th Street; return via same route
	AlternativeE4	16 to 19	2	Same as above

[a] A range of truck trips has been provided in this table, based on known quantities of imported fill material, concrete, asphalt concrete pavement, and excavated waste material that will be needed for the construction of each maintenance facility.

For the preferred alternatives in Segments B and C, a PM peak-hour traffic analysis on the local streets and arterials is provided assuming the preliminary lane closures and possible detour routes described during the civil construction period. This was not performed for the preferred alternatives in Segments D and E because any roadway impacts would be on relatively low-volume local and collector streets; therefore, impacts to traffic would be less. This analysis is compared with the 2020 no-build condition, which indicates how the roadway conditions would change during the construction period. For nonpreferred alternatives, relative comparisons with the impacts described for the preferred alternatives are provided, where applicable.

In all segments, construction of the project would affect roads, close lanes, require detours and therefore alter the traffic patterns. Cross streets that intersect the alternatives would be closed for short durations to build the track or other associated features through the intersection. These closures would most likely occur during off-peak hours to avoid traffic disruptions, and would generally occur for a short duration. Temporary closures of private driveways and any roads that need to be paved would also occur. If driveway closures are required, then property access to residences and businesses would be maintained to the extent possible. If alternative access is not available, then the specific construction activity would be reviewed to determine if it could occur during nonbusiness hours or if parking could be provided at an alternative location.

TABLE 6-46
Roadway Construction Impacts by Segment

Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b]	Detour of Traffic		On-Street Parking Loss?[c]	Bus Route Impact?
					Detour Route Available?[e]	Neighborhood Traffic Intrusion		
Segment A, Interstate 90[d]								
Rainier Avenue South	*Preferred Alternative A1*	Principal arterial	Low	Partial, short-term	Yes	Low	No	Yes
23rd Avenue South	*Preferred Alternative A1*	Principal arterial	Low	Partial, short-term	Yes	Low	No	Yes
77th Avenue SE	*Preferred Alternative A1*	Principal arterial	Low	Partial, short-term	Yes	Low	No	Yes
80th Avenue SE	*Preferred Alternative A1*	Principal arterial	Low	Partial, short-term	Yes	Low	No	Yes
Segment B, South Bellevue								
Bellevue Way (south of 112th Avenue SE)	*Preferred Alternative B2M*	Principal arterial	Moderate	Partial, long-term	Yes, via I-405	Low	No	Yes
	Alternative B1	Principal arterial	Moderate	Partial, long-term	Yes, via I-405	Moderate	No	Yes
	Alternative B2A	Principal arterial	Low	Partial, long-term	Yes, via I-405	Moderate	No	Yes
	Alternative B2E	Principal arterial	Low	Partial, long-term	Yes, via I-405	Moderate	No	Yes
	Alternative B3	Principal arterial	Low	Partial, long-term	Yes, via I-405	Moderate	No	Yes
Bellevue Way (north of 112th Avenue SE)	Alternative B1	Principal arterial	Moderate	Partial, long-term	Yes	Moderate	No	Yes
112th Avenue SE	*Preferred Alternative B2M* connecting to *Preferred Alternative C9T*	Principal arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
	Preferred Alternative B2M connecting to *Preferred Alternative C11A*	Principal arterial	Moderate	Partial, long-term	Yes	Moderate	No	Yes
	Alternative B2A	Principal arterial	Low	Partial, long-term	Yes	Moderate	No	Yes
	Alternative B2E	Principal arterial	Low	Partial, short-term	Yes	Moderate	No	Yes
	Alternative B3	Principal arterial	Low	Partial, long-term	Yes	Moderate	No	Yes
118th Avenue SE	Alternative B7	Collector arterial	Low	Partial, long-term	Yes	Low	No	No
Segment C, Downtown Bellevue								
Bellevue Way	Alternative C1T	Principal arterial	High	Partial, long-term	Yes	Moderate	No	Yes
106th Avenue NE	Alternative C2T	Local arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
108th Avenue NE	Alternative C3T	Minor arterial	High	Partial, short-term, with possible full, short-term	Yes	Low	No	No

TABLE 6-46 CONTINUED
Roadway Construction Impacts by Segment

Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b]	Detour of Traffic		On-Street Parking Loss?[c]	Bus Route Impact?
					Detour Route Available?[e]	Neighborhood Traffic Intrusion		
108th Avenue NE (Main to NE 6th Street)	*Preferred Alternative C11A*	Minor arterial	Moderate	Partial, long-term	Yes	Low	Yes	Yes
108th Avenue NE (Main to NE 12th Street)	Alternative C4A	Minor arterial	High	Partial, long-term, with possible full, short-term	Yes	Low	Yes	No
110th Avenue NE (Main to NE 6th Street)	*Preferred Alternative C9T* and Alternative C9A	Minor arterial	High	Partial, long-term, with possible full, short-term	Yes	Low	Yes	Yes
110th Avenue NE (Main Street to NE 12th Street)	Alternative C4A	Minor arterial	High	Partial, long-term, with possible full, short-term	Yes	Low	Yes	Yes
110th Avenue NE (NE 2nd Street to NE 12th Street)	Alternative C8E	Minor arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
112th Avenue SE (south of Main Street)	*Preferred Alternatives C11A* and *C9T* [f]	Principal arterial	Moderate	Partial, short-term	Yes	Low	No	Yes
112th Avenue SE (south of Main Street)	Alternatives C2T, C3T, C4A, C7E and C9A (connecting from *Preferred Alternative B2M* and B2A or B2E)	Principal arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
112th Avenue NE (north of Main Street)	Alternative C7E	Principal arterial	Low	Partial, short-term	Yes	Low	No	No
Main Street	*Preferred Alternative C11A* and *C9T* and Alternatives C4A and C9A	Minor arterial	Moderate	Partial, short-term	Yes	Low	No	Yes
NE 2nd Street (110th to 112th Avenue NE)	Alternative C8E	Minor arterial	Moderate	Partial, short-term	Yes	Low	No	No
NE 12th Street	Alternatives C4A, C3T, and C8E	Principal arterial	Moderate	Partial, short-term	Yes	Low	No	No
NE 6th Street (between Bellevue Way and 106th Avenue NE)	Alternative C1T	Local arterial	High	Full, long-term	Yes	Low	No	Yes
NE 6th Street (between 110th Avenue NE and I-405)	*Preferred Alternatives C11A* and *C9T* and Alternatives C1T, C2T, and C9A	Minor arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
114th Avenue NE	Alternatives C8E and C14E	Minor arterial	Low	Partial, long-term	Yes	Low	No	No
Segment D, Bel-Red/Overlake								
NE 16th Street (between 120th and 124th Avenues NE)	Alternatives D2E and D3	Local arterial	Low	Partial, long-term	Yes	Low	No	No

TABLE 6-46 CONTINUED
Roadway Construction Impacts by Segment

Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b]	Detour of Traffic		On-Street Parking Loss?[c]	Bus Route Impact?
					Detour Route Available?[e]	Neighborhood Traffic Intrusion		
NE 16th Street (between 132nd Avenue NE and 136th Place NE)	*Preferred Alternative D2A*, D2A – 120th Station Design Option, D2A - 24th NE Design Option, and Alternatives D2E and D3	Local arterial	Low	Partial, long-term and full, short-term	Yes	Low	Yes	Yes
136th Place NE (between NE16th and NE 20th Streets)	*Preferred Alternative D2A*, D2A – 120th Station Design Option, D2A - 24th NE Design Option, and Alternatives D2E and D3	Collector arterial	Low	Partial, long-term and full, short-term	Yes	Low	Yes	Yes
NE 20th Street (between 136th and 152nd Avenues NE)	Alternative D3	Minor arterial	Moderate	Partial, long-term	Yes	Moderate	No	Yes
NE 24th Street (between 148th and 152nd Avenues NE)	D2A - 24th NE Design Option and Alternative D2E	Minor arterial	Low	Partial, long-term	Yes	Low	No	Yes
151st Place NE at NE 24th Street	D2A - 24th NE Design Option and Alternative D2E	Minor arterial	Low	Full, short-term	Yes	Low	No	No
152nd Avenue NE (north of NE 24th Street)	D2A - 24th NE Design Option and Alternative D2E	Local arterial	Low	Partial, long-term	Yes	Low	No	Yes
152nd Avenue NE (between NE 20th Street and SR 520)	Alternative D3	Local arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
Microsoft Road	All Segment D Alternatives	Local arterial	Low	Partial, short-term	Yes	Low	No	No
Segment E, Downtown Redmond								
NE 40th, NE 51st, and NE 60th Streets overcrossings	All Segment E Alternatives	Collector arterial	Moderate	Partial, short-term	Yes, via nearest overcrossing	Moderate	No	No
Leary Way, 164th, 166th and 170th Avenues NE crossings	All Segment E Alternatives	Local arterials	Moderate	Partial, short-term	Yes	Low	No	Yes
NE Leary Way	Alternative E4	Principal arterial	Moderate	Partial, long-term	Yes	Low	No	Yes
NE 70th Street	All Segment E Alternatives	Local arterial	Moderate	Full, short-term	Yes	Low	Yes	No
161st Avenue NE (between Redmond Way and NE 85th Street)	E2 – Redmond Transit Center Design Option	Collector arterial	Moderate	Full, long-term	Yes	Moderate	Yes	Yes

TABLE 6-46 CONTINUED
Roadway Construction Impacts by Segment

Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b]	Detour of Traffic		On-Street Parking Loss?[c]	Bus Route Impact?
					Detour Route Available?[e]	Neighborhood Traffic Intrusion		
SR 520 on- and off-ramps at SR 202	*Preferred Alternative E2,* E2 – Redmond Transit Center Design Option, and Alternative E4	State highway	Moderate	Partial, long-term	Yes, via West Lake Sammamish Parkway or the SR 520 terminus	Low	No	No

[a] Low truck traffic is associated with alternatives that would have minimal fill, excavation, and concrete work; high truck traffic is associated with major fill, excavation, and concrete work. Moderate is between these two boundaries.

[b] Partial road closure assumes some lanes are open to traffic. Short- and long-term duration was determined to be less or more than 1 year. Full short-term closures would be required for specific activities like station construction, retained cut and fill construction, column drilling or girder placement, and can be as short as 1 night/day closure to less than 1 year.

[c] On-street parking loss is characterized for street parking only and does not consider that some off-street parking might be lost because of the location of construction and staging areas.

[d] Refer to Section 5.3.4 for I-90 mainline construction impacts

[e] Roadways classified as collector or local arterial could be signed to only provide local access. Additionally, if detour routes within the immediate vicinity are not available possible routes are suggested.

[F] C9T – East Main Station Design Option connecting from *Preferred Alternative B2M* would have no change in impacts on either *Preferred Alternative B2M* or *Preferred Alternative C9T.*

A relatively high number of construction workers (producing traffic and requiring parking) would be needed to construct the project. The largest number of workers at any given site is anticipated during two periods: excavation for tunnel or retained-cut activities, and construction of the guideway and stations, especially if grade separated. Contractors and construction workers parking near designated construction staging areas could affect area parking supply during heavy construction periods by using unrestricted on-street parking in residential or other areas near the construction site. The contractor is generally responsible for providing parking for construction workers where necessary. It is expected that some worker parking could be accommodated at the staging areas and along the route. Sound Transit or its contractors might lease parking for construction workers near construction sites. Sound Transit might acquire additional properties for temporary use for contractor parking.

For the discussion of the East Link construction impacts on transit service and facilities and on regional highways (I-90, I-405 and SR 520), refer to Sections 4.4 and 5.3.4, respectively.

6.4.2.1 Segment A, Preferred Interstate 90 Alternative (A1)

Short-term roadway shoulder and/or lane closures due station construction might occur on Rainier Avenue S, 23rd Avenue S, 77th Avenue SE, and 80th Avenue SE.

6.4.2.2 Segment B

Primarily arterials would be affected by construction, mostly by partial road closures for long-term durations during construction.

Preferred 112th SE Modified Alternative (B2M)

Preferred Alternative B2M, connecting to either the *Preferred Alternative C9T or C11A,* would result in construction impacts would be along Bellevue Way, south of 112th Avenue SE, and along 112th Avenue SE, north of Bellevue Way. Along Bellevue Way SE, between the South Bellevue Park-and-Ride and 112th Avenue SE, it is likely one lane would be closed for most of the civil construction period, and additional lane closures could be required at certain times depending on the construction activity. To construct the improvements on Bellevue Way SE, south of the South Bellevue Park-and-Ride, it would require lanes to be closed on Bellevue Way SE for short periods to install the traffic signals and perform the necessary roadwork.

Civil construction activities would likely close one northbound lane along Bellevue Way SE for the *Preferred Alternative B2M* with additional lane closures possible at times. Motorist information and advanced signing would be provided to encourage usage of parallel routes, such as I-405. Even with signed detour routes, congestion would likely increase for northbound traffic on Bellevue Way SE between I-90 and 112th Avenue SE, and therefore up to two intersections would operate at LOS F compared with one intersection in the no-build condition during the civil construction period. Additionally, increase congestion would be expected along the signed alternate routes. The potential for traffic to cut through the Enatai neighborhood and travel along 108th Avenue SE to bypass the construction zone in the northbound direction along Bellevue Way SE during the afternoon peak would be low because cut-through routes in this area are limited and circuitous – access to 108th Avenue SE from Bellevue Way SE would be via SE 30th Street/113th Avenue SE or 112th Avenue SE and traveling south. Congestion in the northbound direction on Bellevue Way SE is also not considered to be as substantial in the afternoon peak period as in the southbound direction.

For *Preferred Alternative B2M* that connects to *Preferred Alternative C11A*, one northbound and one southbound lane of 112th Avenue SE from Bellevue Way SE to SE 6th Street could be closed. For *Preferred Alternative B2M* that connects to *Preferred Alternative C9T*, one northbound lane on 112th Avenue SE from Bellevue Way SE to SE 6th Street could be closed for some of the civil construction period. Similar to the construction impacts on Bellevue Way SE, depending on the construction activity, more or fewer lanes could be closed along 112th Avenue SE for short periods.

During construction along 112th Avenue SE for *Preferred Alternative B2M* connecting to *Preferred Alternative C11A*, traffic diversions (motorists information and advanced signing) to other parallel arterials, such as Bellevue Way SE and SE 8th Street, and regional facilities, such as I-405, would be likely. Although congestion would likely increase in the northbound and southbound directions on 112th Avenue SE, the number of intersections along 112th Avenue SE not meeting the City of Bellevue LOS threshold would be similar of the no-build condition. The probability of traffic using 108th Avenue SE between Bellevue Way SE and Main Street to bypass the construction zones along 112th Avenue SE would be discouraged by the existing traffic-calming devices (slow speeds and speed bumps) and information and signs directing vehicles to other arterials and regional facilities.

For Preferred *Alternative B2M* connecting to *Preferred Alternative C9T,* some increase in congestion for the northbound traffic during the afternoon peak is expected with a northbound lane closed, but it would have lower impacts compared with *Preferred Alternative B2M* connecting to *Preferred Alternative C11A*.

Other Segment B Alternatives

The Bellevue Way Alternative (B1), construction impacts would affect Bellevue Way SE throughout the segment and would likely close multiple lanes (one northbound and one southbound lane) for some of the civil construction period. Additional lane closures on Bellevue Way SE could be required at certain times depending on the construction activity. Under the 112th SE At-Grade (B2A), 112th SE Elevated (B2E), 112th SE Bypass (B3) and 112th SE Bypass (B3) 114th Design Option alternatives, construction impacts would occur along Bellevue Way SE, south of 112th Avenue SE, and along 112th Avenue SE, north of Bellevue Way SE. Alternatives B2A, B3 and D3 - 114th Design Option alternatives would have roadway impacts similar to Alternative B1 and Alternative B2E would have roadway impacts similar to *Preferred Alternative B2M* along Bellevue Way SE, south of 112th Avenue SE. Along 112th Avenue SE, these four alternatives (B2A, B3, B3 – 114th Design Option and B2E) would likely have impacts similar to those under *Preferred Alternative B2M*. The BNSF Alternative (B7) would result in construction impacts on 118th Avenue SE with short term lane closures at certain times depending on the construction activity.

Detour routes for the Segment B alternatives along Bellevue Way SE and/or 112th Avenue SE (B1, B2A, B2E, B3 and B3 – 114th Design Option) would be similar to *Preferred Alternative B2M*. Detour routes for Alternative B7 construction activities could include I-405, Bellevue Way SE and 112th Avenue SE, but would likely not be required because the traffic volumes on 118th Avenue SE are relatively low compared with volumes on Bellevue Way and 112th Avenue SE.

Traffic congestion for all alternatives along Bellevue Way SE or 112th Avenue SE is expected to be similar to or worse than the *Preferred Alternative B2M* depending on the number of lane closures. Traffic congestion with any lane closures proposed for Alternative B7 would likely be limited to along 118th Avenue SE.

6.4.2.3 Segment C

Local, minor, and principal arterials would be affected by construction. Road closures would range from none at staging areas and partial road closures for short-term durations to potentially full road closures for long-term durations. For at-grade and cut-and-cover tunnel alternatives, cross-streets along alignments would have short-term full or partial closures.

Preferred 108th NE At-Grade Alternative (C11A)

Preferred Alternative C11A would affect 112th Avenue SE near SE 6th Street, 108th Avenue NE between Main Street and NE 6th Street, and NE 6th Street between 108th Avenue NE and 112th Avenue NE. One or more lanes along 112th Avenue SE south of SE 6th Street will be closed for a short time to construct the rail crossing from the median to the west side. For some of the *Preferred Alternative C11A* civil construction period, one eastbound lane on Main Street between 108th and 112th avenues NE would likely be closed, but there is a possibility that more or fewer lanes could be closed for short periods, depending on construction activities. Construction activities would close lanes along 108th Avenue NE. Property access to the residences and businesses along 108th Avenue NE between Main and NE 6th Streets would be maintained to the extent possible, either through access on 108th avenue NE or alternative routes. Changes in property access would be coordinated with the appropriate residences and businesses. With any of the lane closures in downtown Bellevue, motorist information and advanced signing would be provided that could encourage travel on parallel streets and signal operations could be modified to optimize vehicle flow during construction.

Even with vehicles detoured to parallel streets, increased congestion would likely occur on 108th Avenue NE and one intersection would operate at LOS F with the lane closures. In addition to 108th Avenue NE, 106th and 110th Avenues NE would likely also experience some increase in congestion as vehicles are detoured to avoid 108th Avenue NE. Up to two additional intersections on these parallel streets between Main Street and NE 8th Street would operate at LOS F compared with the no-build condition.

With a connection to alternatives B3, B3 - 114th Design Option, or B7, *Preferred Alternative C11A* would result in temporary lane closures on 112th Avenue SE south of Main Street during the construction of the elevated track across 112th Avenue SE.

Preferred 110th NE Tunnel Alternative (C9T)

Preferred Alternative C9T would affect 112th Avenue SE near SE 6th Street, 110th Avenue NE between Main Street and NE 6th Street and NE 6th Street between 110th Avenue and I-405. One or more lanes along 112th Avenue SE south of SE 6th Street would be closed for the short-term construction of the at-grade crossing through the intersection of 112th Avenue SE and SE 6th Street. *Preferred Alternative C9T* would likely close one eastbound lane on Main Street between 110th and 112th avenues NE, but there is a possibility that more or fewer lanes could be closed for short periods, depending on the construction approach. Construction activities would close some and possibly all lanes at times along 110th Avenue NE between Main and NE 6th streets. Property access to the residences and businesses along 110th Avenue NE between Main and NE 6th streets would be maintained to the extent possible either through access on 110th Avenue NE or alternative routes. Changes in property access would be coordinated with the appropriate residences and businesses. With any of the lane closures in downtown Bellevue, motorist information and advanced signing would be provided that could encourage travel on parallel streets and signal operations could be modified to optimize vehicle flow during construction.

Even with vehicles diverted to parallel streets, congestion would likely increase on 110th Avenue NE In addition to 110th Avenue NE, 108th and 112th Avenues NE would likely also experience some increase in congestion as vehicles are detoured to avoid 110th Avenue NE. Up to three additional intersections, compared with the no-build condition, along these parallel streets between Main Street and NE 8th Street would operate at LOS F.

With a connection to alternatives B3, B3 - 114th Design Option, or B7, *Preferred Alternative C9T* would have similar impacts as *Preferred Alternative C11A* crossing 112th Avenue SE.

Other Segment C Alternatives

The Bellevue Way Tunnel Alternative (C1T) would affect Bellevue Way and NE 6th Street along the alignment. The 106th NE Tunnel Alternative (C2T) would have impacts along 112th Avenue SE, 106th Avenue NE, and NE 6th Street along the alignment. Construction activities under Alternatives C1T and C2T would close lanes on the affected roadways. Property access to the residences and businesses along affected roadways would be maintained to the extent possible on those roadways or through alternative routes. Increased congestion would likely occur along Bellevue Way under Alternative C1T and 106th Avenue NE under Alternative C2T. Adjacent roads would also likely experience increased congestion due to the lane closures. The 108th NE Tunnel alternative (C3T) would have impacts along the alignment on 112th Avenue SE, 108th Avenue NE, and NE 12th Street, but because of its tunnel construction methods, there would be fewer impacts along 108th Avenue NE relative to the roadway impacts due to the tunnel construction methods under Alternative C1T and Alternative C2T. For Alternative C3T, one or more lanes along 112th Avenue SE might be closed for a short time to construct the light rail crossing of 112th Avenue SE. One westbound lane on NE 12th Street between 108th and 112th Avenues NE would likely be closed, but more or fewer lanes could be closed for short periods, depending on construction activities.

The At-Grade Couplet Alternative (C4A) would have impacts along the alignment on 112th Avenue SE, Main Street, 108th Avenue NE, 110th Avenue NE, and NE 12th Street. Along 112th Avenue SE and NE 12th Street impacts would be similar to those of Alternative C3T. Along Main Street, impacts would be similar to those under *Preferred Alternative C11A*. Along 108th Avenue NE and 110th Avenue NE, multiple lanes would be closed for the conversion from two-way to one-way couplet traffic operations and construction of light rail. Increased congestion would likely occur along both of these streets during the road modification and light rail construction periods. With a connection to alternatives B3, B3 - 114th Design Option, or B7, Alternative C4A impacts would be similar to those under *Preferred Alternative C11A* crossing 112th Avenue SE.

The 112th NE Elevated Alternative (C7E) would have impacts along 112th Avenue between SE 6th Street to NE 12th Street. Likely one northbound lane on 112th Avenue from the southern Segment C boundary to NE 12th Street would be closed during construction activities. With a connection to Alternatives B3, B3 - 114th Design Option, or B7, no additional roadway impacts would be experienced.

The 110th NE Elevated Alternative (C8E) would have impacts along the alignment on 114th Avenue, NE 2nd Street, 110th Avenue NE, and NE 12th Street. One lane on 114th Avenue between SE 6th Street and NE 2nd Street and one or more lanes on 110th Avenue NE between NE 2nd Street and NE 12th Street would likely be closed during construction activities. Alternative C8E would also result in temporary lane closures on NE 2nd Street and NE 12th Street (both closures between 110th and 112th Avenues NE) during overhead light rail track construction.

Alternative C9A would have impacts along the alignment on 112th Avenue SE, 110th Avenue NE between Main and NE 6th Street and along NE 6th Street between 110th Avenue NE and 112th Avenue NE. With a connection to alternatives B3, B3 - 114th Design Option, or B7, Alternative C9A would result in temporary lane closures on 112th Avenue SE south of Main Street during overhead light rail track construction similar to *Preferred Alternative C11A*.

Alternative C14E would have impacts along 114th Avenue NE. Property and emergency access along 114th Avenue NE between Main and NE 6th streets would be maintained either through access on 114th Avenue NE or alternate routes. This is not expected to create traffic impacts beyond this roadway.

Detour routes would be determined through final design and construction permitting. Because of the gridded street network in Downtown Bellevue, detour routes would likely be provided via adjacent parallel streets. Neighborhood traffic intrusion would range from low to moderate depending on whether the construction activity occurs near residential areas to the north and south of downtown but for most construction period neighborhood traffic intrusion would be minimal. Where partial and full closures occur increased congestion can be expected at adjacent intersections as vehicles avoid construction areas.

Within Segment C where tunneled alternatives cross roadways, short-term street closures would occur. These closures are necessary for material excavation at these locations, such as the intersections of Main, NE 2nd, and NE 4th Streets with 110th Avenue NE under *Preferred Alternative C9T.*

6.4.2.4 Segment D

Local, collector, minor, and principal arterials would be affected by construction. Road closures range from partial road closures for short-term durations to full road closures for long-term durations.

Preferred NE 16th At-Grade Alternative (D2A)

Preferred Alternative D2A would have roadway impacts along NE 16th Street (between 132nd Avenue NE and 136th Place NE), 136th Place NE, and Microsoft Road. At-grade crossings would occur at 130th Avenue NE, 132nd Avenue NE, 136th Place NE, and NE 20th Street. Property accesses along NE 16th Street and 136th Place NE would be maintained to the extent possible through access either on these streets or on an alternate route, depending on the construction activity. However, short-periods of full closure might occur along NE 16th Street and 136th Place NE. Increases in congestion are expected to remain isolated to these low-volume roadways and not extend into surrounding arterials.

The D2A – 120th Design Option would have impacts similar to the *Preferred Alternative D2A* with an additional at-grade crossing at 120th Avenue NE. The D2A – NE 24th Design Option would have roadway impacts similar to those under *Preferred Alternative D2A*, except that one lane along NE 24th Street and 152nd Avenue NE could be closed for most of the civil construction period and additional lane closures could be required at certain times, depending on the construction activity.

Detours would be available through many of the parallel arterial routes available in Segment D. The potential for detoured traffic and construction vehicles in neighborhood areas would be low because there is not a substantial amount of residential development in the area, and the construction would occur on or near designated truck routes. There would be some on-street parking loss associated with construction impacts within Segment D.

Other Segment D Alternatives

The NE 16th Elevated Alternative (D2E) would have impacts along NE 16th Street, 136th Place NE, NE 24th Street, 152nd Avenue NE, and Microsoft Road. The NE 20th Alternative (D3) would have impacts along NE 16th Street, 136th Place NE, NE 20th Street, 152nd Avenue NE, and Microsoft Road with at-grade crossings of 120th Avenue NE, 124th Avenue NE, 130th Avenue NE, 132nd Avenue NE, 136th Place NE, NE 20th Street, 140th Avenue NE, Ross Plaza entrance (14300 block), and NE 24th Street.

With alternatives D2E and D3, impacts along the existing NE 16th Street and 136th Place NE would be similar to those under *Preferred Alternative D2A.* Along NE 24th Street and 152nd Avenue NE, Alternative D2E impacts would be similar to those under D2A – 24th Design Option. Alternative D3 could have multiple lanes closed along NE 20th Street and 152nd Avenue NE for most of the civil construction period, and additional lane closures could be required at certain times depending on the construction activity. During periods of multiple lane closures, increased traffic congestion and poor intersection operations would likely occur along NE 20th Street. The SR 520 Alternative (D5) would have impacts along Microsoft Road similar to the *Preferred Alternative D2A*.

Traffic detours would be available under Alternative D3 during the construction along NE 20th Street and 152nd Avenue NE. Motorist information and signs directing vehicles to other arterials (NE 24th Street, Bel-Red Road, and 156th Avenue NE) would be provided. All other alternatives would have detours similar to those under *Preferred Alternative* D2A, with the exception of Alternative D5, which would have no detours.

6.4.2.5 Segment E

Local, collector, and arterials would be affected by construction. Road closures would range from partial closures for short-term durations to full closures for long-term durations.

Preferred Marymoor Alternative (E2)

Preferred Alternative E2 would have impacts at the SR 520 on- and off-ramps at SR 202 and with the at-grade crossings at Leary Way, 164th Avenue NE, 166th Avenue NE and 170th Avenue NE. All Segment E alternatives would have grade-separated crossings of NE 40th Street, NE 51st Street, and NE 60th Street. At these crossings multiple lanes would be closed for most of the civil construction period and additional lane closures could be required at certain times depending on the construction activity. Increased traffic congestion would likely occur during multiple lane closures on the NE 40th Street overpass during civil construction activities. Detours to adjacent SR 520 crossings and interchanges would be provided. NE 70th Street would be a full closure for all Segment E alternatives.

The E2 – Redmond Transit Center Design Option would have the same impacts as *Preferred Alternative E2,* in addition to impacts along 161st Avenue NE between Redmond Way and NE 85th Street. 161st Avenue NE would likely be closed for most of the civil construction period. Property access along 161st Avenue NE between Redmond Way and NE 85th Street would be maintained to the extent possible either through access on 161st Avenue NE or alternative routes.

Detours through the commercial areas would occur along parallel routes (160th or 164th Avenues NE if 161st Avenue NE is closed). Throughout Segment E for all Segment E alternatives, the potential for traffic to detour through residential neighborhoods is low as most of the construction activities occur along SR 520 and in downtown Redmond. There would be some on-street parking loss associated with construction impacts within Segment E. If the *Preferred Alternative E2* alignment adjacent to NE 76th Street requires the roadway to be reconstructed it would be constructed prior to the East Link construction along this section of roadway.

Other Segment E Alternatives

The Redmond Way Alternative (E1) would have impacts at the Leary Way, 164th Avenue NE, 166th Avenue NE, 170th Avenue NE crossings and NE 70th Street. The Leary Way Alternative (E4) would have impacts along Leary Way, 164th Avenue NE, 166th Avenue NE, 170th Avenue N, and NE 70th Street, and at the SR 520 on- and off-ramps at SR 202. Many of the construction impacts and potential detours under alternatives E1 and E4 would be similar to *Preferred Alternative E2*.

6.4.2.6 Maintenance Facilities

Constructing the maintenance facilities would temporarily close streets that intersect the track leading to and from the maintenance facility. These closures would most likely occur during off-peak hours to avoid traffic disruptions and would generally last for less than a week. Also, private driveways and any roads that need to be paved could be temporarily closed. Otherwise, there would be no impacts from construction of the maintenance facilities.

6.5 Potential Mitigation

This section describes the potential mitigation required to operate and build the East Link Project. This includes any construction mitigation and arterial and local street mitigation where the intersection LOS with the East Link Project, compared with the no-build condition, would degrade to levels that do not meet the LOS standards of the jurisdiction. In addition, mitigation might be required where there are potential impacts on parking around stations. Final mitigation would be determined in coordination with WSDOT, City of Bellevue, City of Mercer Island, City of Redmond, and City of Seattle through subsequent phases of this project.

6.5.1 Potential Operational Impact Mitigation

For impacts during project operation, arterial and local street mitigation is potentially required at intersections where the intersection LOS in the build condition, compared with the no-build condition, would degrade to levels that do not meet the LOS standards of the jurisdiction and where there are potential impacts on the parking surrounding potential stations. Intersection and parking impact mitigation are discussed in the following subsections.

6.5.1.1 Segment A Intersections

In Segment A, no mitigation would be required in the City of Seattle. However, several intersections in Mercer Island might potentially require turn pockets or traffic signal improvements to adjust for the change in travel patterns to and from the island:

Improvements at intersections within the City of Mercer Island's jurisdiction would include:

- West Mercer Way and 24th Avenue SE: Provide southbound left-turn pocket (*Preferred Alternative A1* and both design options).
- 80th Avenue SE and SE 27th Street: Install a traffic signal (*Preferred Alternative A1* and both design options).
- 77th Avenue SE and Sunset Highway: Install a traffic signal (design option that provides a 77th HOV ramp).
- 77th Avenue SE and North Mercer Way: Install a traffic signal (*Preferred Alternative A1* and both design options).

Improvements at intersections within WSDOT's jurisdiction include:

- 77th Avenue SE and I-90 eastbound HOV off-ramp: Install a traffic signal (design option that provides a 77th HOV ramp).
- 77th Avenue SE and I-90 eastbound off-ramp: Install a traffic signal (*Preferred Alternative A1* and design option that provides neither eastbound off-ramp).
- 76th Avenue SE/North Mercer Way and I-90 Westbound on-ramp: Modify the westbound channelization to provide left-turn pocket and through/right shared lane (*Preferred Alternative A1* and both design options).

All of these improvements would improve the AM and PM peak hour intersection delay to the same or better than the no-build conditions. Sound Transit would be responsible for implementing improvements at the WSDOT controlled intersections prior to East Link opening service. Sound Transit would contribute a proportionate share of costs to improve project-affected intersections controlled by Mercer Island. Sound Transit's contribution would be determined by the project's ratio of trips at the intersection or another equitable method. Through this contribution, the City of Mercer Island might determine other improvements than the intersection modifications listed that are more compatible with Downtown Mercer Island. Tables D-19 and D-20 in Appendix D show the intersection results with these proposed intersection treatments for the AM and PM peak hours.

6.5.1.2 Segment B Intersections

Depending on the Segment B alternative, the project would potentially require improvements at the following intersections. With *Preferred Alternative B2M*, no intersection mitigation is required.

- 112th Avenue SE and Bellevue Way SE: Provide a northbound right-turn pocket (Alternatives B1, B2A, B3 and B3 – 114th Extension Design Option).
- 112th Avenue SE and SE 15th Street: Install a traffic signal (Alternatives B1, B2E, and B7).
- Coal Creek Parkway and I-405 Southbound Ramps: Provide an additional westbound left-turn pocket (Alternative B7).

- 118th Avenue SE and SE 8th Street/I-405 southbound Ramps: Provide a northbound right-turn pocket (Alternative B7).

While not considered mitigation, as part of the East Link Project, two roadway options that modify Bellevue Way SE near the South Bellevue Station are proposed for alternatives that include this station. These modifications are proposed to improve the station and neighborhood access and are described in Section 6.3.2.2. Table D-21 in Appendix D provides the intersection results for each intersection with and without the proposed mitigation.

6.5.1.3 Segment C Intersections

Depending on which Segment C alternative is selected, the project would potentially require mitigation at the following intersections:

- Bellevue Way and Main Street: Provide a northbound right-turn pocket (Alternative C1T).
- 112th Avenue NE and NE 12th Street: Provide a westbound right-turn pocket (alternatives C3T, C7E, and C8E).
- 112th Avenue NE and Main Street: Provide an eastbound right-turn pocket (*Preferred Alternative C11A*).
- 110th Avenue NE and NE 8th Street: Provide an eastbound right-turn pocket (alternatives C4A and C9A). Provide a northbound right-turn pocket (C8E)
- 108th Avenue NE and NE 12th Street: Provide a northbound right-turn pocket (Alternative C4A).

Additionally, at the intersections listed below, mitigation to better use the roadway capacity could be implemented, such as providing active traffic management strategies. For example, active signing could be installed to more effectively route vehicles to less congested streets, turn movements could be restricted during congested periods, or adaptive signal controllers could be installed to better respond to changing traffic conditions:

- Main Street and 108th Avenue NE (*Preferred Alternative C11A)*
- NE 4th Street and 108th Avenue NE (*Preferred Alternatives C11A* and *C9T*, and Alternatives C1T, C2T, C3T, C8E, and C9A)
- NE 6th Street and 110th Avenue NE (Alternative C9A)
- NE 8th Street and 112th Avenue NE (Alternatives C4A and C8E)

Table D-21 in Appendix D provides the intersection results for each intersection with and without the proposed mitigation.

6.5.1.4 Segment D Intersections

Depending on which Segment D alternative is selected, the project would potentially require mitigation at the following intersections:

- 120th Avenue NE and NE 16th Street: Provide a southbound right-turn pocket (D2A – 120th Station Design Option, year 2020 only. Once background improvements along 120th Avenue NE are completed by year 2030, this intersection will operate acceptably with the project).
- 152nd Avenue NE and NE 24th Street: Provide a southbound right-turn pocket (All Segment D alternatives except D3). This or a similar intersection improvement would be coordinated with the City of Redmond.
- 148th Avenue NE and NE 20th Street: Accelerate planned eastbound and westbound left-turn improvements by year 2020 (D3).

Table D-21 in Appendix D provides the intersection results for each intersection with and without the proposed mitigation.

Alternative D2E would require mitigation at the intersections of 151st Place NE and 152nd Avenue NE on NE 24th Street. The increase in delay is caused by the two intersections being closely spaced and the intersection phasing and timing needed so that the light rail vehicle can safely travel across NE 24th Street. Prior to the light rail vehicle arriving at this street crossing, both of the adjacent traffic signals would only serve the westbound approach at 151st Place NE and the eastbound approach at 152nd Avenue NE to release any stopped or queued vehicles in this section of roadway. Once the section is clear, the light rail vehicle could then proceed. While this might not create substantial delay for the light rail vehicle, it might create unacceptable vehicle operations on NE 24th Street. If the track were to be realigned through the NE 24th Street and NE 152nd Avenue NE intersection, it would remove the need to provide a vehicle clearance phase prior to the train arriving. With this realignment the alternative would be similar to Alternative D3, north of the intersection of 152nd Avenue NE and NE 24th Street.

6.5.1.5 Segment E Intersections

Depending on which Segment E alternative is selected, the project would potentially require mitigation at the following intersections:

- NE 76th Street and 170th Avenue NE: Install a traffic signal (all Segment E alternatives and Redmond Town Center Station interim terminus).
- SR 202 and NE 70th Street: Provide a southbound right-turn pocket (all Segment E alternatives).
- Redmond Way and 161st Avenue NE: Provide a westbound right-turn pocket (E2 – Redmond Transit Center Design Option only). This improvement might be included as part of the City’s future roadway improvements, but has yet to be designed.
- SR 202 and East Lake Sammamish Parkway: Re-channelize southbound approach to provide additional through lane (all Segment E alternatives).
- NE 70th and 176th Avenue NE: Install a traffic signal (*Preferred Alternative E2* and E2 – Redmond Transit Center Design Option).

Table D-21 in Appendix D lists the Segment E intersection results for the PM peak hour with the proposed mitigation.

6.5.1.6 Parking

Mitigation might be required where there are potential impacts on parking around stations. The potential for hide-and-ride activities near stations and the best ways to mitigate such activities is specific to each area surrounding a station. Stations that might generate hide-and-ride users are locations where the auto forecast is higher than the available parking at the station, or the station does not provide parking, and there is a substantial amount of on-street parking available surrounding the station. The station most likely to generate hide-and-ride impacts is the Rainier Station. At the Mercer Island and South Bellevue stations, the parking analysis determined a low potential for hide–and-ride impacts. However, given the locations of these stations Sound Transit will evaluate hide-and-ride impacts within one year of East Link operations. If impacts are determined, Sound Transit would implement appropriate mitigation measures as discussed in this section.

Prior to implementing any parking mitigation measures, Sound Transit would inventory on-street parking around each of the three stations listed up to 1 year prior to the start of light rail revenue service. These inventories would document the current on-street parking supply within a 0.25-mile radius of the stations. Based on the inventory results, Sound Transit and the local jurisdiction would work with the affected stakeholders to identify and implement appropriate mitigation measures, if necessary. Parking control measures could consist of parking meters, restricted parking signage, passenger and truck load zones, and RPZ signage. Other parking mitigation strategies could include promotion of alternative transportation services (for example, encourage use of buses, vanpool or carpool services, walking, or bicycling).

For parking controls agreed to with the local jurisdiction and community, Sound Transit would be responsible for the cost of installing the signage or other parking controls and any expansion of the parking controls for 1 year after opening the light rail system. The local jurisdictions would be responsible for monitoring the parking controls and providing all enforcement and maintenance of the parking controls. The local residents would be responsible for any RPZ-related costs imposed by the local jurisdiction.

6.5.2 Potential Construction Impact Mitigation

All mitigation measures associated with constructing the East Link Project would comply with local regulations governing construction traffic control and construction truck routing. Sound Transit would finalize detailed construction mitigation plans in coordination with local jurisdictions and WSDOT during the final design and permitting phase of the project. Mitigation measures for traffic impacts due to light rail construction could include the following:

- Follow standard construction safety measures, such as installing advance warning signs, installing highly visible construction barriers, and using flaggers.
- Use lighted or reflective signage to direct drivers to truck haul routes and enhance visibility during nighttime work hours.
- Use temporary reflective truck prohibition signs on streets with a high likelihood of cut-through truck traffic.
- In areas with high levels of traffic congestion, schedule traffic lane closures and high volumes of construction traffic during off-peak hours to minimize delays where practical.
- Communicate public information through tools such as print, radio, posted signs, websites and e-mail to provide information regarding street closures, hours of construction, business access, and parking impacts.
- Coordinate access closures in person 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 is not able to 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 (for example deliveries) could be provided at an alternative location.
- Where necessary, the contractor could be responsible for providing parking areas for construction workers.

For potential transit (and associated park-and-ride) and regional highway (I-90, I-405 and SR 520) mitigation during East Link Project construction, refer to Sections 4.5 and 5.4, respectively.