5 ANALYSIS OF ALTERNATIVES

The Level 2 alternatives were evaluated based on criteria and performance measures derived from the project's purpose and need as described by the methodology documented in Chapter 3. Criteria to measure how well the alternatives address the North Corridor Transit Project's purpose and need fall into six broad categories:

- Transportation effectiveness in meeting mobility, access, and capacity needs
- Supportive land use and economic development effects
- Preservation of a healthy environment
- Equitable community impacts and benefits
- Cost and constructability
- Consistency with Sound Transit's Long-Range Plan vision

This chapter discusses the detailed findings of the evaluation of the Level 2 alternatives organized by the evaluation criteria. Key findings are provided at the beginning of each subsection to help distinguish between the alternatives and/or provide added insight into the performance of specific alternatives. Chapter 7 contains a comparative summary analysis of the Level 2 evaluation findings organized by the six broad categories. Chapter 8 presents the next steps and recommendations for the development of alternatives to be carried forward into an EIS.

5.1 TRANSPORTATION EFFECTIVENESS

This section summarizes the evaluation results for the transportation effectiveness measures as applied to each of the alternatives. Sound Transit's Regional Forecasting Model was applied to generate 2030 forecasts of transit ridership for the No Build Alternative, TSM/Baseline Alternative, and each of the build alternatives (Sound Transit 2010f, 2010g).

Model results were used to compare each alternative's effectiveness with regard to ridership potential, ability to accommodate demand, travel time changes, and system-wide vehicle miles traveled. Qualitative assessments of transit reliability and transit service accessibility were also included in this evaluation. Key findings and results for each of the evaluated transportation effectiveness measures are described in this section.

5.1.1 Key Findings

Key findings for each of the transportation effectiveness measure categories are summarized in the following section.

RIDERSHIP POTENTIAL

2030 System-Wide and Project Daily Riders

Both year 2030 total system-wide and daily project ridership forecasts are highest for the L1: I-5 Light Rail Alternative, followed by the L3: SR 99 Elevated Light Rail Alternative. Ridership for the L2: SR 99 Mixed Profile Light Rail Alternative would be lower than for L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative, but would be significantly higher than the TSM/Baseline or B2: Multi-Corridor BRT Alternatives. Similar results are seen for year 2030 annual new riders and user benefits in comparison to the No Build Alternative.

One reason that the L2: SR 99 Mixed Profile Light Rail, B2: Multi-Corridor BRT, and TSM/Baseline Alternatives are projected to have substantially fewer new riders than the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives is that the travel time savings would be less. Another key reason is that competitive transit options exist for these alternatives. Because of longer travel times, less frequent service, and lower capacity for the TSM/Baseline, L2: SR 99 Mixed Profile Light Rail and B2: Multi-Corridor BRT Alternatives, I-5 express bus routes serving the University of Washington and downtown Seattle would be maintained in those alternatives. For the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives, many of these routes are truncated at the Lynnwood, Mountlake Terrace, or 185th Street stations.

Transit Trips to Regional Growth Centers

The L1: I-5 Light Rail Alternative would result in the highest increase over No Build in the number of estimated year 2030 daily transit trips made to all four regional growth centers, at more than 10,000 trips. The L3: SR 99 Elevated Light Rail Alternative would result in approximately 20 percent fewer total trips to the selected growth centers compared to the L1: I-5 Light Rail Alternative. The L2: SR 99 Mixed Profile Light Rail Alternative would result in more than double the increase in transit trips to the selected regional growth centers of the B2: Multi-Corridor BRT Alternative, and more than three times the increase of the TSM/Baseline Alternative, but less than the L1: I-5 Light Rail Alternative.

ABILITY TO ACCOMMODATE DEMAND

Person-Carrying Capacity Per Hour

The L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail alternatives would provide the highest peak period carrying capacity among the alternatives. The L2: SR 99 Mixed Profile Light Rail Alternative would provide approximately half the capacity of the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives due to its 8-minute peak headways (the time between successive train movements in a given direction) as compared to 4 minutes for the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives. The two bus based alternatives provide substantially less carrying capacity than any of the light rail alternatives.

Peak-Hour Ridership Demand/Operating Capacity Per Hour

The L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative would accommodate forecasted ridership demand through 2030 and would provide additional capacity for future growth in demand and future extension of the line to Everett. The L2: SR 99 Mixed Profile Light Rail Alternative would also accommodate forecasted ridership demand through 2030, but would provide very little capacity for future growth in demand or extension to Everett. In addition, if I-5 bus service were truncated at any of the rail stations under the L2: SR 99 Mixed Profile Light Rail Alternative, ridership demand would likely exceed the operating capacity of the alternative. The TSM/Baseline Alternative is expected to be at capacity by the year 2030, while the B2: Multi-Corridor BRT Alternative would be approaching capacity, particularly on the highest demand route connecting Lynnwood and Northgate via I-5.

TRAVEL TIME

2030 Transit Travel Time

For year 2030 peak period travel from Lynnwood and Shoreline to the regional rail system at Northgate, all of the alternatives are estimated to provide substantially shorter travel times compared to the No Build Alternative, with the shortest being the L1: I-5 Light Rail Alternative (14 minutes from Lynnwood, 7 minutes from Shoreline). Peak direction travel times from Lynnwood to Northgate for the L3: SR 99 Elevated Light Rail, the L2: SR 99 Mixed Profile Light Rail, and the B2: Multi-Corridor BRT Alternatives would be approximately 4, 7, and 10 minutes longer than for the L1: I-5 Light Rail Alternative, respectively.

2030 Travel Time Comparison—Transit vs. Automobile

Year 2030 automobile travel times from Lynnwood to Northgate are estimated to be slower than transit travel times for the TSM/Baseline and all the build alternatives (4 minutes slower than the TSM/Baseline Alternative, 10 minutes slower than the B2: Multi-Corridor BRT Alternative, and approximately 13 to 20 minutes slower than the light rail alternatives).

TRANSIT RELIABILITY

Substantial portions of the TSM/Baseline and B2: Multi-Corridor BRT Alternatives would use non exclusive guideway (both more than 20 miles), exposing transit service to traffic congestion, while the light rail alternatives would be on exclusive guideway for their entire length, making them more reliable.

The L1: I-5 Light Rail and the L3: Elevated Light Rail Alternatives would exhibit the best travel time reliability of all the alternatives due to the total length of each being in exclusive right of-way, traversing no signalized intersections, and requiring no transfers to reach multiple regional destinations via the regional transit system. The L2: SR 99 Mixed Profile Light Rail Alternative and the SR 99 North Variation would have slightly lower reliability due to potential delays crossing at-grade signalized intersections. The two bus-based alternatives would be much less reliable due to traveling in non-exclusive right-of-way, traversing a high number of congested intersections, and requiring a transfer to the overall regional rail system to reach other regional destinations.

System-wide Vehicle Miles Traveled

The reduction in overall system daily vehicle miles traveled (VMT) with the L1: I-5 Light Rail Alternative is projected to be more than twice the reduction that would result from the L2: SR 99 Mixed Profile Light Rail Alternative, and roughly 19 percent higher than the L3: SR 99 Elevated Light Rail Alternative. The VMT reduction with both the bus-based alternatives is expected to be substantially less than any of the light rail alternatives.

Transit Service Accessibility

The TSM/Baseline and B2: Multi-Corridor BRT Alternatives are estimated to have the highest level of accessibility to transit service in general because they each have almost twice as many points of access as the rail alternatives. However, despite the higher level of access, the projected ridership and user benefits of the two bus-based alternatives are considerably lower than any of the light rail alternatives, indicating that accessibility needs to be coupled with quality service to be effective in attracting riders.

The level of accessibility is similar between the light rail alternatives. For the L1: I-5 Light Rail Alternative, I-5 provides a barrier that limits accessibility. For the L2: SR 99 Mixed Profile Light Rail Alternative and L3: Elevated Light Rail Alternative, a combination of factors including an incomplete street grid, relatively long distances between blocks, and a prevalence of arterials without sidewalks surrounding SR 99 reduces the relative accessibility of these alternatives.

5.1.2 Ridership Potential

Ridership potential is evaluated based on the following four measures: 2030 project daily riders, 2030 annual new riders, 2030 user benefits – annual hours saved, and transit trips to selected regional growth centers. The measures are designed to distinguish the potential for transit ridership, including new riders generated in the North Corridor and new riders and user benefits

of the entire regional transit system due to the addition of the North Corridor alternative to the system. Detailed ridership forecasting methods and underlying assumptions can be found in the Transit Ridership Forecasting Technical Report (Sound Transit 2010e).

TRANSIT RIDERSHIP AND USER BENEFITS

All of the North Corridor Transit Project alternatives would increase system-wide ridership over the Sound Transit model 2030 No Build projection of 508,000 total daily transit trips. As shown in Figure 5-1, the light rail alternatives show the highest increase in total system transit use. The percentage increase in total system daily transit trips with the L1: I-5 Light Rail Alternative as compared to No Build is nearly four times that forecasted for the B2: Multi Corridor BRT Alternative and over seven times that of the TSM/Baseline Alternative.

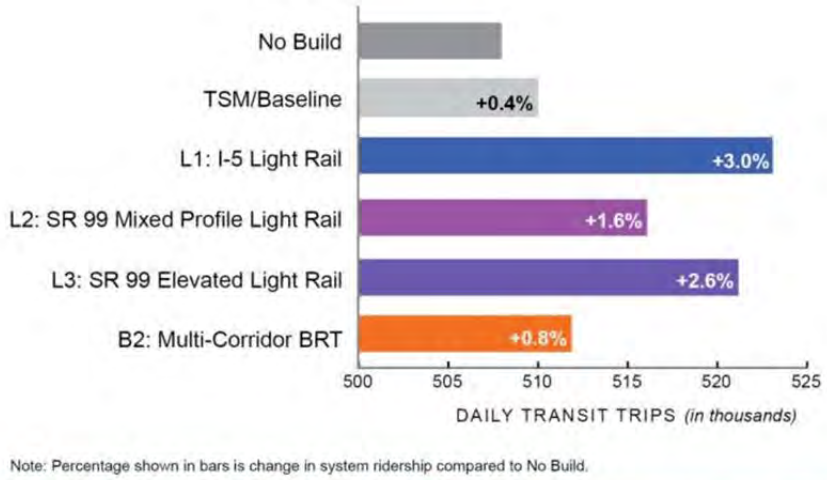


Figure 5-1. 2030 Total System Daily Transit Trips and Percent Change for Alternatives Compared to No Build

A comparison of 2030 user benefits was also made using model output for annual hours of travel time saved system-wide. User benefits are measured based on an economic theorem of consumer surplus that also has been used in the FTA Summit program for estimating user benefits[1]. Similar results, illustrated in Table 5-1, are seen for project daily riders, annual new riders, and user benefits, with the L1: I-5 Light Rail Alternative showing more than double the daily ridership and more than four times the annual new riders and user benefits of the B2: Multi Corridor BRT Alternative. The L3: SR 99 Elevated Light Rail Alternative results in 600,000 fewer annual new riders and 800,000 fewer annual hours saved than the L1: I-5 Light Rail Alternative,

[1] The Summit software program was developed by FTA for preparation of information for evaluation of New Starts applications. The key output from the Summit program is user benefits, which is based on the concept of consumer surplus. People will travel to a destination using their selected mode when the overall cost of travel is less than or equal to the benefit of travel, where the benefit is essentially the maximum cost that they would be willing to incur for that travel. When the cost is less than this "willingness to pay," the difference between the two is referred to as the "consumer surplus." It represents the benefit of travel above and beyond the required cost.

while the L2: SR 99 Mixed Profile Light Rail Alternative shows 2 million fewer annual new riders and 2 million fewer annual hours saved than the L1: I-5 Light Rail Alternative.

Table 5-1. Transit Ridership Forecasting Model Output Summary for 2030

Alternative	Project Daily Riders	Annual New Riders*	User Benefits – Annual Hours Saved*
TSM/Baseline	21,000	0.64 million	0.59 million
L1: I-5 Light Rail	52,000	4.5 million	4.6 million
L2: SR 99 Mixed Profile Light Rail**	41,000	2.5 million	2.4 million
SR 99 North Variation	39,000	2.3 million	2.1 million
L3: SR 99 Elevated Light Rail	48,000	3.9 million	3.8 million
B2: Multi-Corridor BRT	24,000	1.1 million	1 million

*Compared to the No Build Alternative

**The Roosevelt Way Variation was not modeled, but is expected to result in slightly lower values than the L2: SR 99 Mixed Profile Light Rail Alternative for all ridership figures in this table, because it does not include a station at North 130th Street and SR 99.

Year 2030 daily transit ridership by segment is illustrated in Figures 5-2 through 5-7. Similar to other ridership-related measures, the L1: I-5 Light Rail Alternative would have the highest ridership, at more than twice the ridership of the TSM/Baseline and B2: Multi-Corridor BRT Alternatives on the segment north of Northgate. Daily ridership for the L3: SR 99 Elevated Light Rail Alternative would be less than for the L1: I-5 Light Rail Alternative, with approximately 8 percent lower ridership on the highest ridership segment just north of Northgate, and approximately 18 percent higher than the L2: SR 99 Mixed Profile Light Rail Alternative. Daily ridership for the B2: Multi-Corridor BRT Alternative is projected to be higher than the TSM/Baseline Alternative by about 13 percent on the segment north of Northgate. Of the three routes comprising the B2: Multi-Corridor BRT Alternative, the I-5 route would have by far the highest ridership, with the 15th Avenue and SR 99 routes carrying only a small fraction of the overall riders for the alternative.

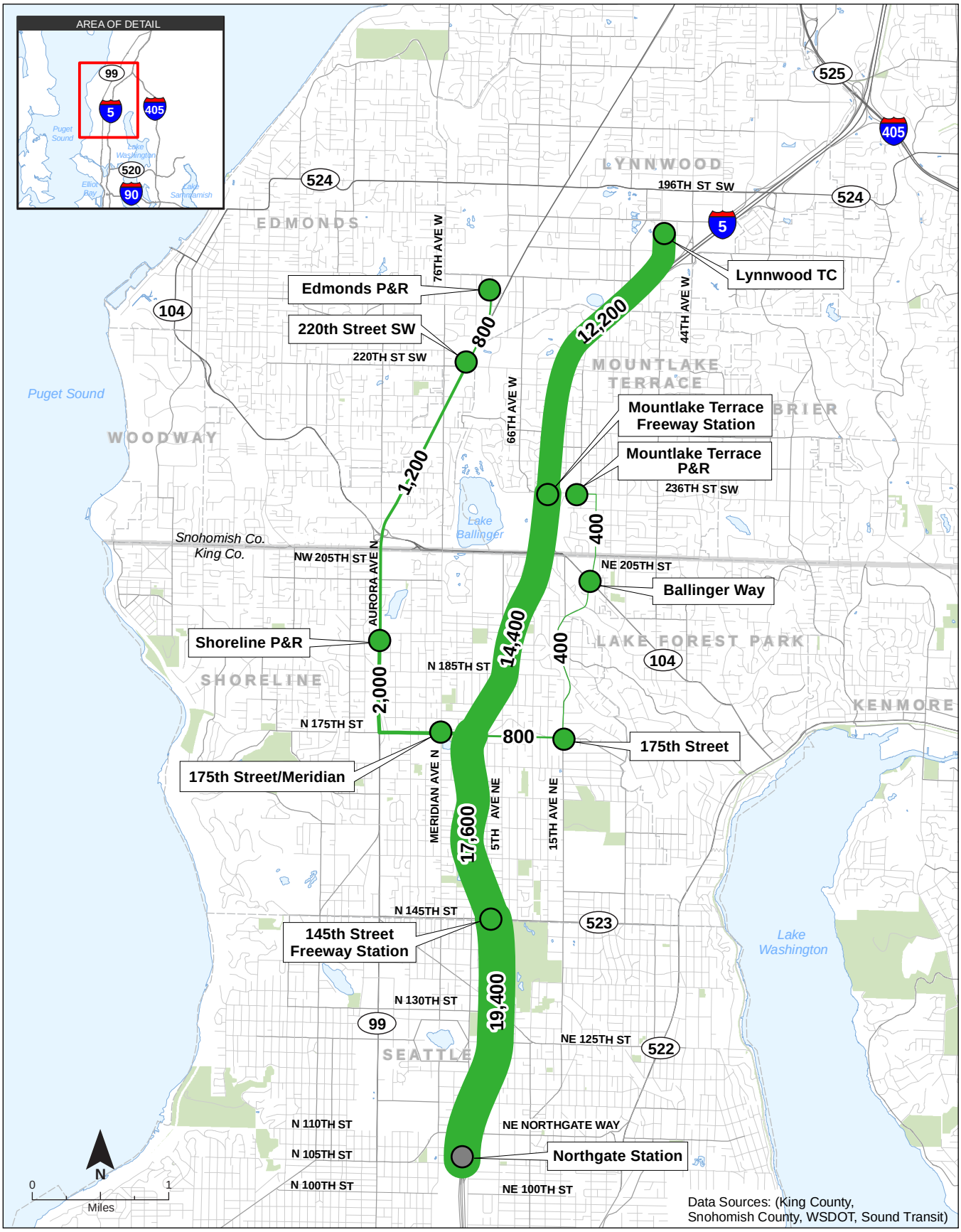
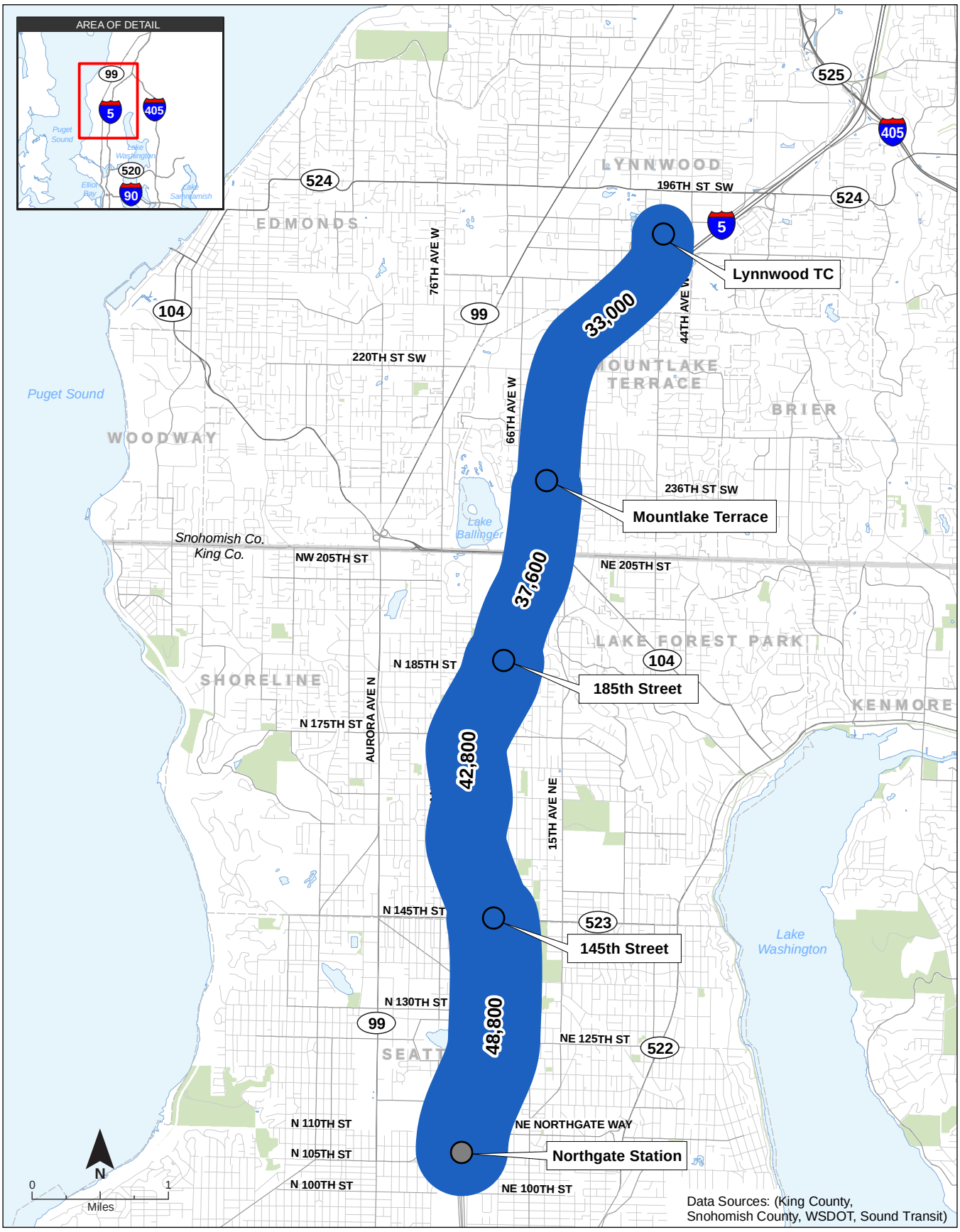


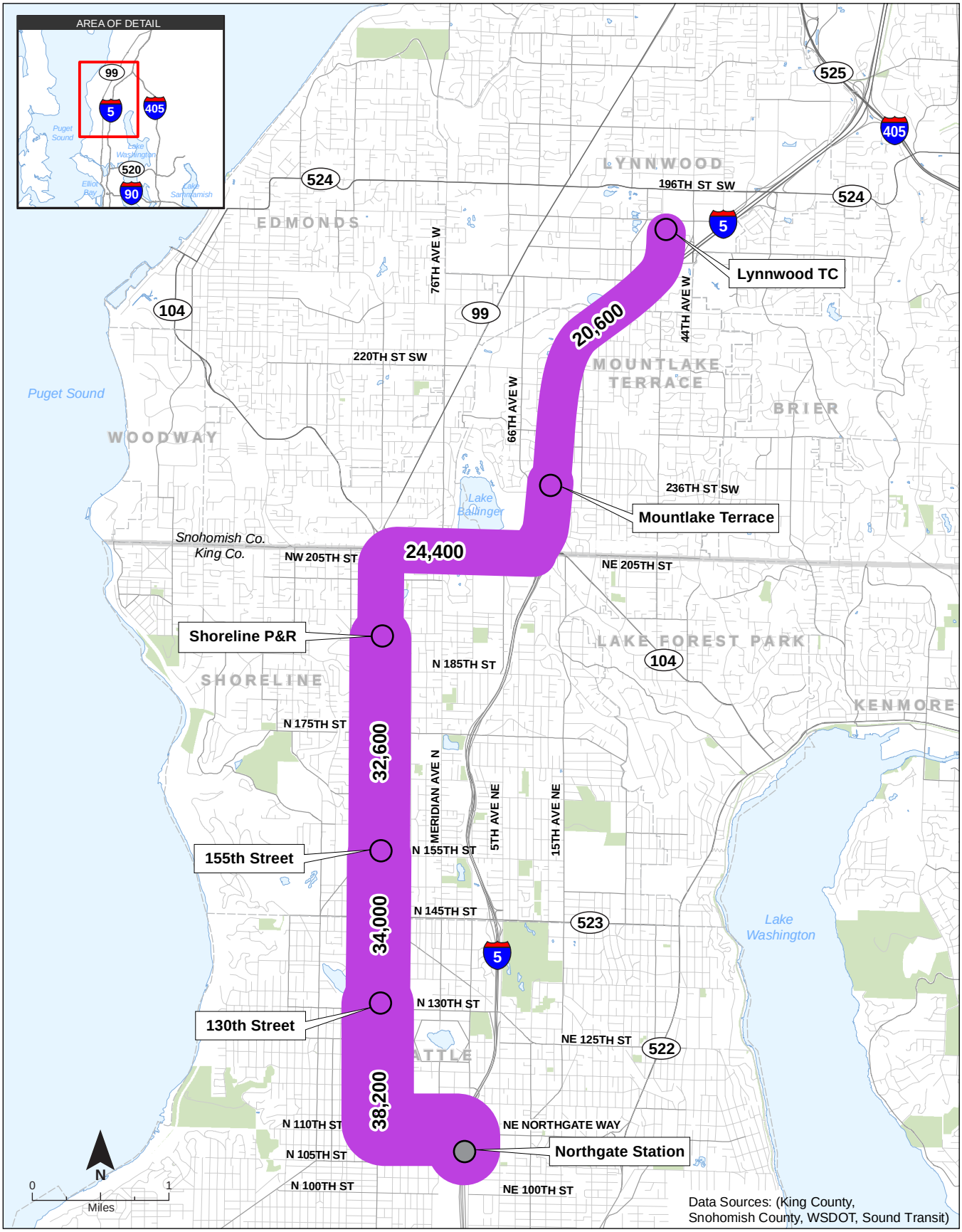
Figure 5-2. 2030 Daily Transit Ridership - TSM/Baseline



2030 Daily Transit Ridership

Note: Transit ridership shown reflects only ridership on the proposed light rail service.

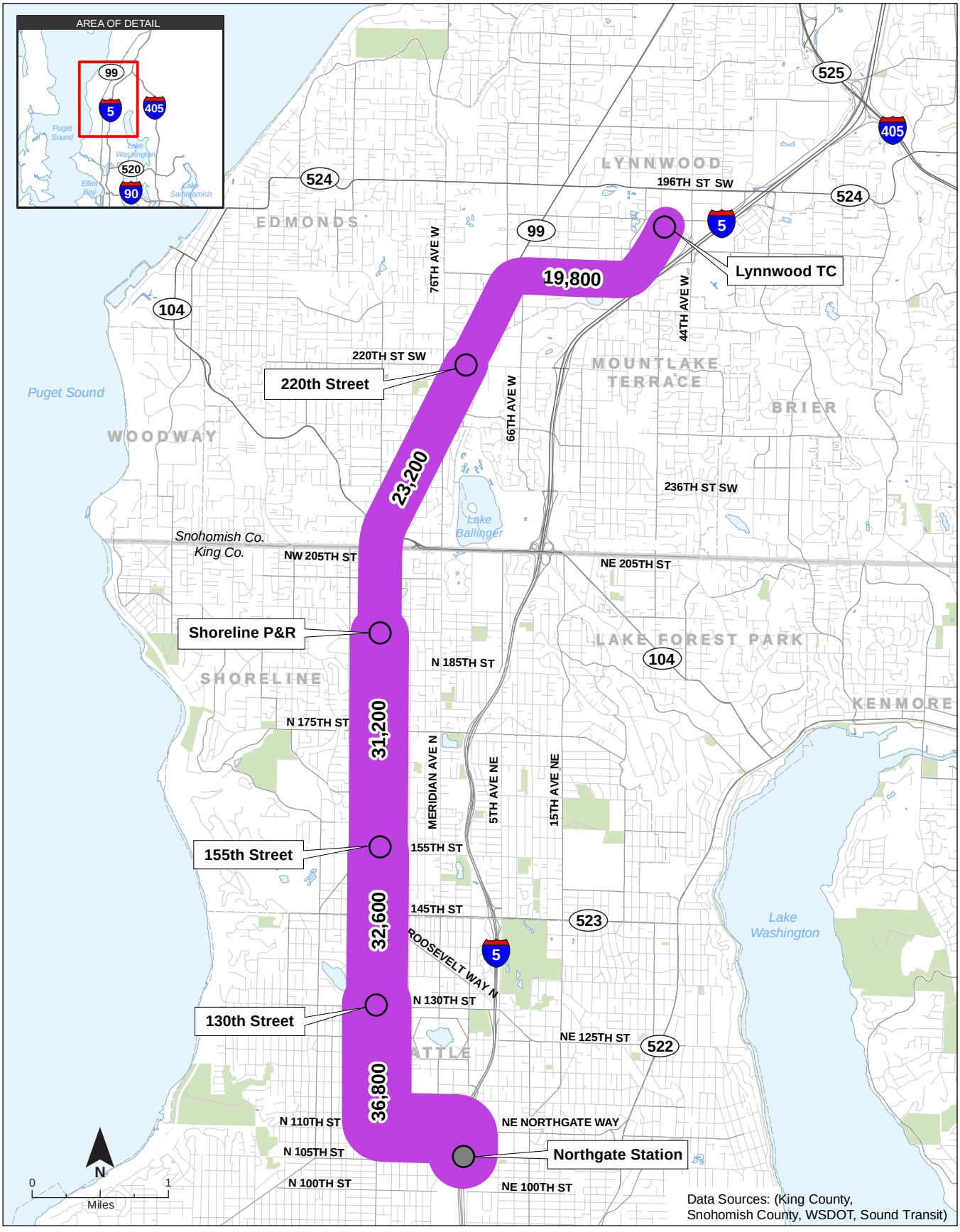
Figure 5-3. 2030 Daily Transit Ridership - L1: I-5 Light Rail



2030 Daily Transit Ridership

Note: Transit ridership shown reflects only ridership on the proposed light rail service.

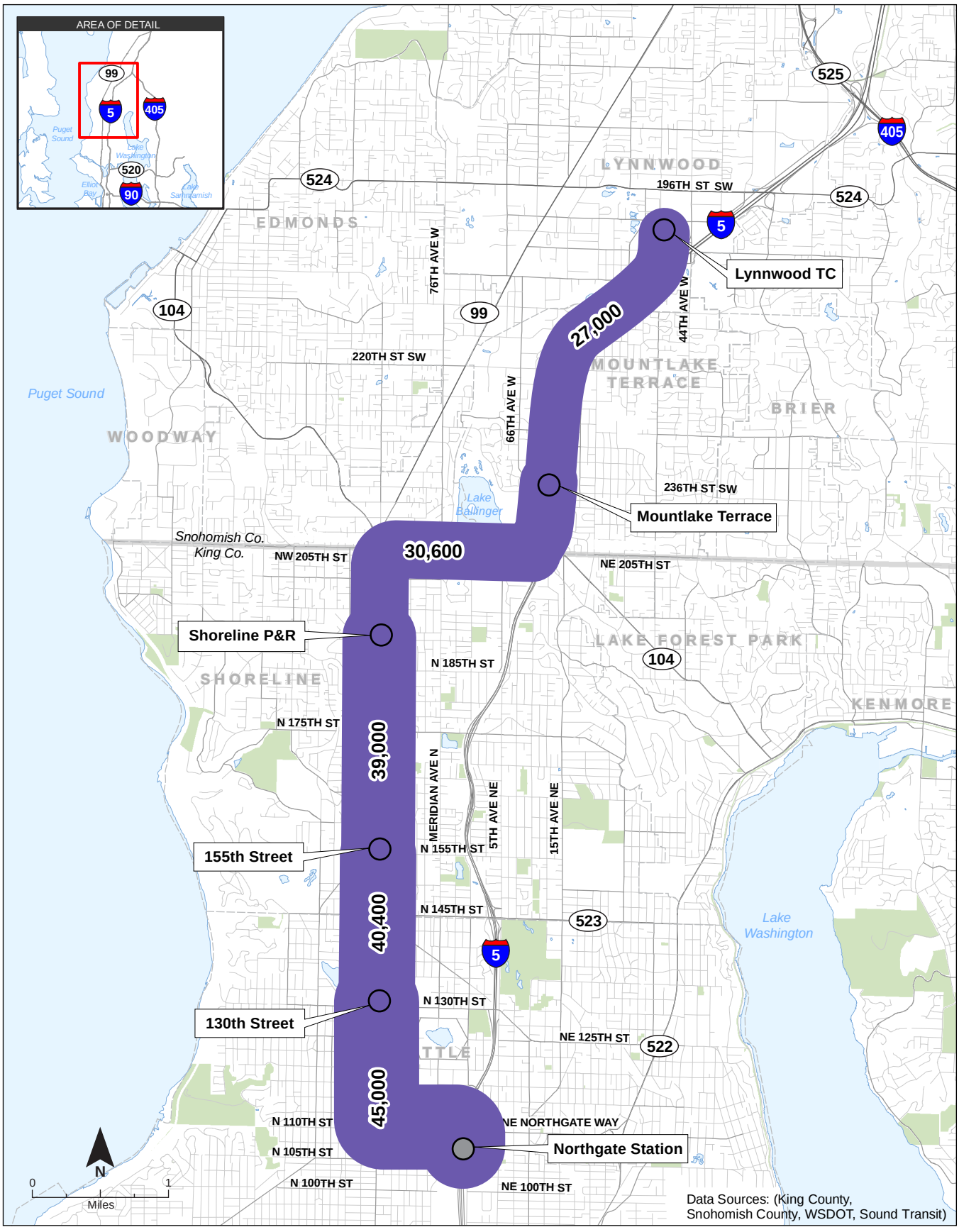
Figure 5-4. 2030 Daily Transit Ridership - L2: SR 99 Mixed Profile Light Rail



2030 Daily Transit Ridership

Note: Transit ridership shown reflects only ridership on the proposed light rail service.

Figure 5-5. 2030 Daily Transit Ridership - L2: SR 99 North Variation



2030 Daily Transit Ridership

Note: Transit ridership shown reflects only ridership on the proposed light rail service.

Figure 5-6. 2030 Daily Transit Ridership - L3: SR 99 Elevated Light Rail

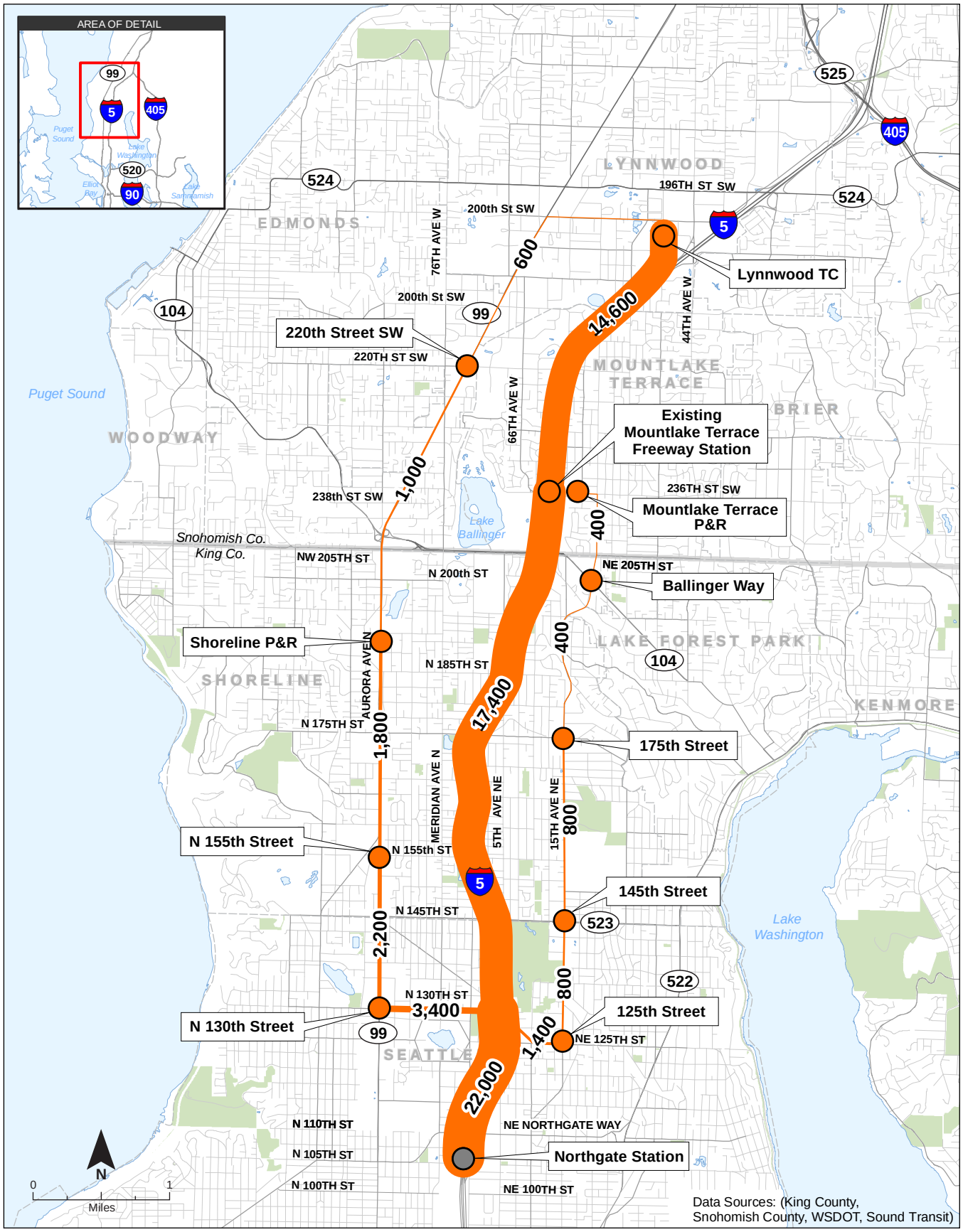


Figure 5-7. 2030 Daily Transit Ridership - B2: Multi-Corridor BRT

TRIPS TO SELECTED REGIONAL GROWTH CENTERS

This measure provides an indicator of how well each alternative connects selected regional destinations via transit by looking at total daily transit trips made to each of the following four PSRC-designated Regional Growth Centers within the North Corridor transit market: Lynnwood, Northgate, University District, and downtown Seattle. (More information on regional growth centers can be found in Section 5.2.)

Table 5-2 provides the changes in daily transit trips to and from the selected regional growth centers.

The L1: I-5 Light Rail Alternative would result in the highest increase in the number of daily transit trips made to all four selected regional growth centers combined, at more than 10,000 trips. The L3: SR 99 Elevated Light Rail Alternative would result in approximately 20 percent fewer total trips to the selected growth centers compared to the L1: I-5 Light Rail Alternative. The L2: SR 99 Mixed Profile Light Rail Alternative would result in more than 30 percent fewer trips than the L3: SR 99 Elevated Light Rail Alternative, but more than double the increase in transit trips to the selected regional growth centers of the B2: Multi Corridor BRT Alternative, and more than three times the increase of the TSM/Baseline Alternative. The regional growth center with the highest increase in transit trips is downtown Seattle, with approximately 3,700 more transit trips for the L1: I-5 Light Rail Alternative.

Table 5-2. 2030 Change in Daily Transit Trips to/from Selected Regional Growth Centers

Alternative	Lynnwood	Northgate	University District	Seattle CBD	Total
TSM/Baseline	500	500	200	300	1,500
L1: I-5 Light Rail	2,300	1,300	3,100	3,700	10,400
L2: SR 99 Mixed Profile Light Rail*	1,400	200	1,900	1,800	5,300
SR 99 North Variation	1,300	200	1,600	1,600	4,700
L3: SR 99 Elevated Light Rail*	1,900	900	2,600	3,000	8,400
B2: Multi-Corridor BRT	900	700	400	500	2,500

*The Roosevelt Way Variation was not modeled, but is expected to result in slightly fewer transit trips between regional growth centers than the primary alternative because the 130th Street Station is not included.

5.1.3 Ability to Accommodate Demand

The ability of each alternative to provide the capacity to accommodate the forecasted demand in the corridor and give an indication of the potential to accommodate growth in ridership beyond the 2030 forecast horizon year is evaluated based on the following measures.

- **Person-carrying capacity per hour:** An estimate of maximum load person-carrying capacity based on infrastructure capacity and anticipated service levels.

- **Peak-hour ridership demand/operating capacity per hour:** A calculation of forecasted peak direction transit ridership demand for the segment north of Northgate divided by the operational person-carrying capacity of the alternative.

The L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative would provide the highest peak-period capacity of passengers per hour per direction, at 4-minute headways. The L2: SR 99 Mixed Profile Light Rail Alternative would provide half the carrying capacity of the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives because it is limited to 8 minute headways[2]. The B2: Multi-Corridor BRT Alternative would provide more than twice the capacity of the TSM/Baseline Alternative, but only about 30 percent of the capacity of the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives and about 60 percent of the capacity of the L2: SR 99 Mixed Profile Light Rail Alternative.

A summary of estimated carrying capacity and the ratio of peak-hour ridership demand to capacity is provided in Table 5-3. The carrying capacity amounts shown in Table 5-3 for the alternatives represent operating capacity assumptions of 148 passengers per car for light rail and 80 passengers per bus for BRT. The ratio provided in the table indicates how much of the operating capacity would be used by the forecasted peak-hour ridership demand in the peak direction for the peak segment of the line (which would be the segment north of Northgate Station). The operating capacity provided by the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives would accommodate the forecasted ridership demand in 2030 and would provide additional capacity for future ridership growth. The capacity provided by the L2: SR 99 Mixed Profile Light Rail Alternative would meet forecasted ridership demand; however, it would provide minimal capacity for future ridership growth or extension beyond Lynnwood. In addition, this alternative assumes that parallel commuter bus service would continue to operate in the I-5 corridor. If that bus service were to be truncated or discontinued, ridership demand would be expected to significantly increase for the L2: SR 99 Mixed Profile Light Rail Alternative, likely beyond the carrying capacity of the line at 8-minute headways. The reason that this bus service is assumed to remain with the L2: SR 99 Mixed Profile Light Rail Alternative is because, with the unreliability of at-grade operations, as well as 8-minute peak headways, it is anticipated that parallel express bus service from south Snohomish County would be as attractive as (if not more attractive than) rail service and would continue to serve a large share of riders. Elimination of that bus service is expected to result in an increase in demand for the light rail line. The variations (SR 99 North Variation and Roosevelt Way Variation) to the L2: SR 99 Mixed Profile Light Rail Alternative are expected to perform similarly to the primary alternative.

The TSM/Baseline Alternative is expected to be at capacity by the year 2030, while the B2: Multi-Corridor BRT Alternative would be approaching capacity, particularly on the highest demand

[2] When operating in an at-grade alignment on SR 99 as compared to the fully grade-separated L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives, which would operate at the 4-minute headways required by the system. As explained in Chapter 4, headways for the L2: SR 99 Mixed Profile Light Rail Alternative would be limited to 8 minutes because of the unreliability of at-grade train operations with 4-minute headways in the heavily congested SR 99 corridor.

route connecting Lynnwood and Northgate via I-5. The primary factor limiting the capacity of these alternatives is the volume of buses that can be accommodated at the expanded Northgate Transit Center. For the TSM/Baseline Alternative, the Lynnwood-to-Northgate route is anticipated to be over capacity, while the other routes would be able to accommodate the forecasted demand. In order to accommodate forecasted demand for the TSM/Baseline Alternative, peak period service frequencies would need to be increased to less than 2-minute headways. This would also be the case for accommodating demand for the B2: Multi-Corridor BRT Alternative beyond 2030, or if service were to be extended north to Everett. These frequencies would be extremely difficult to maintain and would require additional capacity at the Northgate Transit Center. Adding capacity to the Northgate Transit Center beyond the additional deck that is proposed for the B2: Multi-Corridor BRT Alternative may be difficult to accomplish and/or not cost-effective due to the expense of adding additional levels to the transit center or expanding its footprint.

Table 5-3. 2030 Maximum Person-Carrying Capacity

Alternative	Passengers per Hour per Direction*	Ratio of Peak-Hour Peak Direction Ridership to Capacity
TSM/Baseline	1,680	At capacity
L1: I-5 Light Rail	8,880	0.72
L2: SR 99 Mixed Profile Light Rail	4,440	0.95
L3: SR 99 Elevated Light Rail	8,880	0.62
B2: Multi-Corridor BRT	3,600	0.86

*Rail capacity based on an operating capacity of 148 passengers per vehicle. Bus capacity based on an operating capacity of 80 passengers per vehicle.

5.1.4 Travel Time

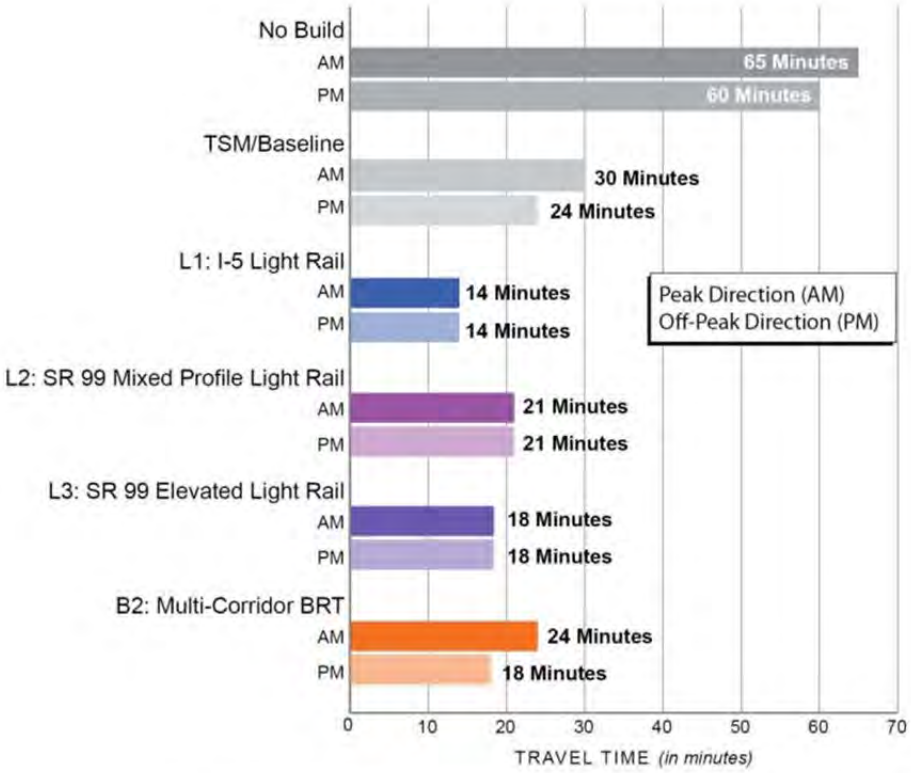
The measures in this category provide a comparison of estimated transit travel times among alternatives as well as a comparison to estimated automobile travel times. Travel times were compared for trips from Lynnwood and Shoreline to the selected regional growth centers of Northgate, University District, downtown Seattle, SeaTac, downtown Bellevue, and Overlake.

TRANSIT TRAVEL TIME

Year 2030 peak period transit travel times were estimated for the peak direction (AM southbound) and off-peak direction (PM southbound) based on estimated travel speeds and distance. Total travel times from Lynnwood and Shoreline to Northgate as well as six other representative regional centers were calculated. Transit travel time calculations assume travel south of Northgate is on the 2030 light rail system unless a faster bus alternative exists. Transit travel time routes from Shoreline begin at the Shoreline Park-and-Ride Station for all alternatives except for the L1: I-5 Light Rail Alternative, which begins at the I-5/185th Street

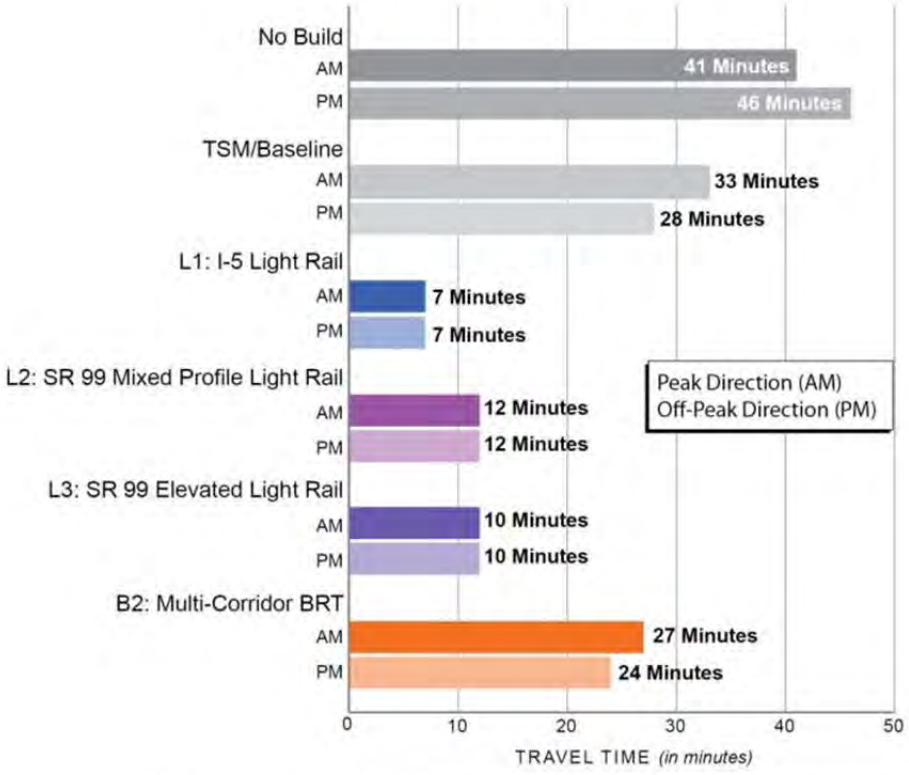
Station. Travel time routes from Lynnwood begin at the Lynnwood Transit Center for all alternatives.

Transit travel times from Lynnwood and Shoreline to Link light rail at Northgate are shown in Figures 5-8 and 5-9. Estimated travel times include dwell times at stations, in-vehicle travel time and, for bus alternatives, transfer time from bus to rail at Northgate. They do not include station access time. All of the alternatives would provide shorter travel times compared to the No Build Alternative, with the shortest being the L1: I-5 Light Rail Alternative.



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate. The SR 99 North Variation would increase travel time by approximately 2 minutes, while the Roosevelt Way Variation would increase travel time by approximately 2 minutes.

Figure 5-8. Estimated 2030 Travel Times from Lynnwood to Northgate



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate. The SR 99 North Variation would not affect travel time from Shoreline, while the Roosevelt Way Variation would decrease travel time by approximately 2 minutes.

Figure 5-9. Estimated 2030 Travel Times from Shoreline to Northgate

Peak direction travel times from Lynnwood to Northgate for the L2: SR 99 Mixed Profile Light Rail, L3: SR 99 Elevated Light Rail, and the B2: Multi-Corridor BRT Alternatives would be approximately 4 to 10 minutes longer than for the L1: I-5 Light Rail Alternative. In the off peak direction, the L1: I-5 Light Rail Alternative would be shorter by 4 to 7 minutes. Peak direction and off-peak direction travel times would differ for the bus alternatives because roadway congestion in the North Corridor varies by direction during peak periods, particularly during the PM peak period (Sound Transit 2010b). The SR 99 North Variation is estimated to be 2 minutes slower than the primary L2: SR 99 Mixed Profile Light Rail Alternative from Lynnwood to Northgate. The Roosevelt Way Variation is estimated to be 2 minutes faster than the primary alternative due to a reduction in the amount of at-grade alignment and elimination of one station (SR 99 at North 130th Street).

For trips from Shoreline to Northgate, the L1: I-5 Light Rail Alternative would provide the shortest travel time. The travel time advantage for the light rail alternatives over the TSM/Baseline and B2: Multi-Corridor BRT Alternatives would be greater for the trips from Shoreline due to bus travel on arterials for a portion of the trip to serve the Shoreline area, as well as a lack of direct access to the I-5 HOV lanes in the TSM/Baseline Alternative. The L2: SR 99 Mixed Profile Light Rail Alternative and SR 99 North Variation alignments and travel times would

be identical between Shoreline and Northgate, while the Roosevelt Way Variation would reduce the travel time by 2 minutes.

Transit travel times from Lynnwood and Shoreline to selected PSRC-designated Regional Growth Centers are shown in Tables 5-4 through 5-7, and illustrated for selected centers in Figures 5-10 and 5-11. Estimated travel times shown in these tables and figures include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate. In cases where the travel time for a build alternative is longer than existing transit service, some users may choose the faster existing service. However, some may choose the slower build alternative due to increased reliability and frequency of service.

Table 5-4. Estimated 2030 Transit Peak Period, Peak Direction, Travel Times (minutes) from Lynnwood to Selected Regional Growth Centers

Alternative	U. Dist.	Cap. Hill	Seattle CBD	SeaTac	Bellevue CBD	Overlake
No Build	25	52	43	88	49	68
TSM/Baseline	35	41	45	77	68	79
L1: I-5 Light Rail	19	25	29	61	52	63
L2: SR 99 Mixed Profile Light Rail	26	32	36	68	59	70
L3: SR 99 Elevated Light Rail	23	29	33	65	56	67
B2: Multi-Corridor BRT	29	35	39	71	62	73

Note: Estimated travel times include dwell times at stations and, for bus alternatives to centers beyond Northgate, transfer time from bus to rail.

Table 5-5. Estimated 2030 Transit Peak Period, Off-Peak Direction, Travel Times (minutes) from Lynnwood to Selected Regional Growth Centers

Alternative	U. Dist.	Cap. Hill	Seattle CBD	SeaTac	Bellevue CBD	Overlake
No Build	43	77	44	89	55	81
TSM/Baseline	29	35	39	71	62	73
L1: I-5 Light Rail	19	25	29	61	52	63
L2: SR 99 Mixed Profile Light Rail	26	32	36	68	59	70
L3: SR 99 Elevated Light Rail	23	29	33	65	56	67
B2: Multi-Corridor BRT	23	29	33	65	56	67

Note: Estimated travel times include dwell times at stations and, for bus alternatives to centers beyond Northgate, transfer time from bus to rail.

Table 5-6. Estimated 2030 Transit Peak Period, Peak Direction, Travel Times (minutes) from Shoreline to Selected Regional Growth Centers

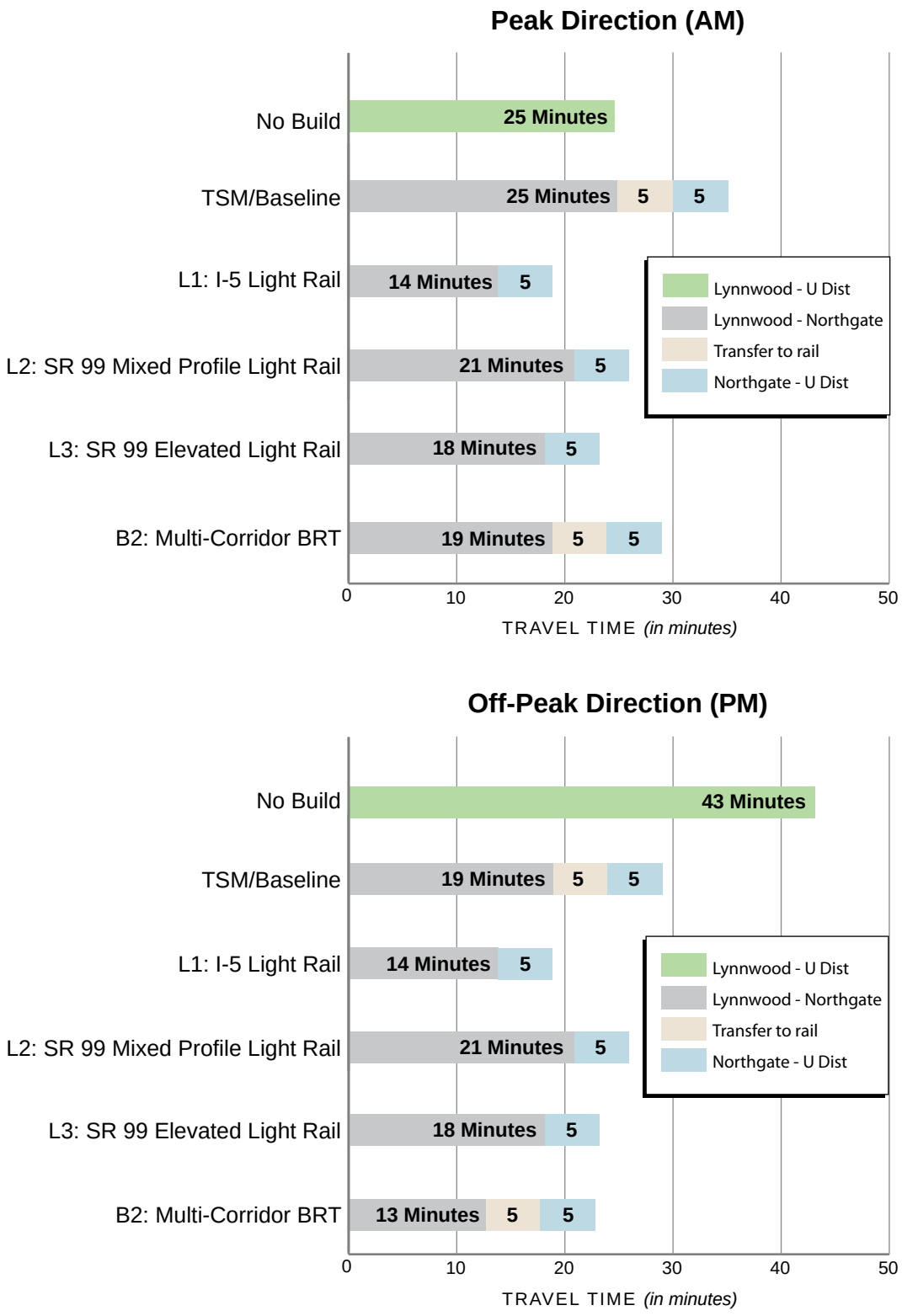
Alternative	U. Dist.	Cap. Hill	Seattle CBD	SeaTac	Bellevue CBD	Overlake
No Build	49	45	33	74	76	89
TSM/Baseline	38	44	48	80	71	82
L1: I-5 Light Rail	12	18	22	54	45	56
L2: SR 99 Mixed Profile Light Rail	17	23	27	59	50	61
L3: SR 99 Elevated Light Rail	15	21	25	57	48	59
B2: Multi-Corridor BRT	32	38	42	74	65	76

Note: Estimated travel times include dwell times at stations and, for bus alternatives to centers beyond Northgate, transfer time from bus to rail.

Table 5-7. Estimated 2030 Transit Peak Period, Off-Peak Direction, Travel Times (minutes) from Shoreline to Selected Regional Growth Centers

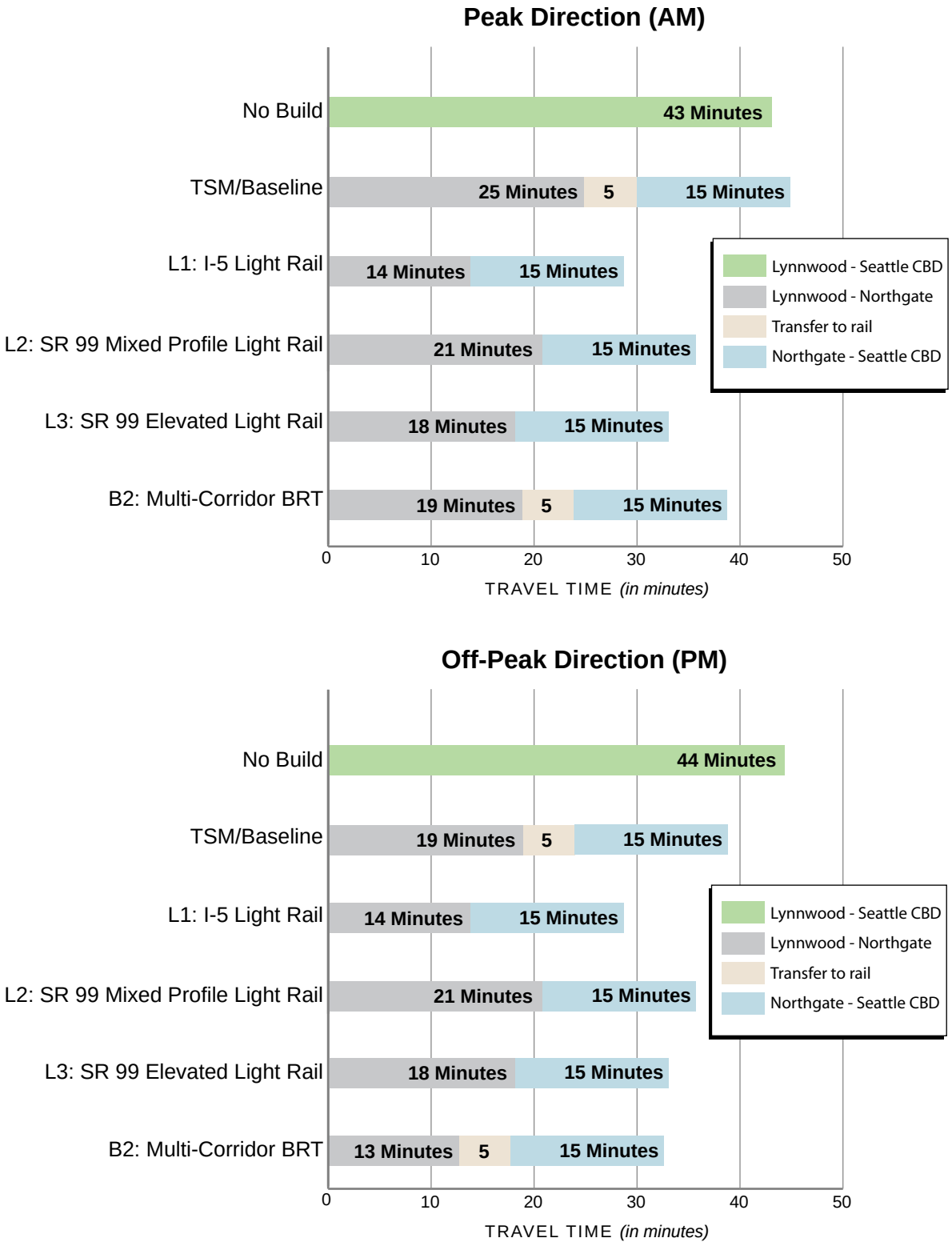
Alternative	U. Dist.	Cap. Hill	Seattle CBD	SeaTac	Bellevue CBD	Overlake
No Build	63	79	42	87	92	81
TSM/Baseline	33	39	43	75	66	77
L1: I-5 Light Rail	12	18	22	54	45	56
L2: SR 99 Mixed Profile Light Rail	17	23	27	59	50	61
L3: SR 99 Elevated Light Rail	15	21	25	57	48	59
B2: Multi-Corridor BRT	29	35	39	71	62	73

Note: Estimated travel times include dwell times at stations and, for bus alternatives to centers beyond Northgate, transfer time from bus to rail.



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate.

Figure 5-10. 2030 Transit Peak Period Travel Times from Lynnwood to University District



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate.

Figure 5-11. 2030 Transit Peak Period Travel Times from Lynnwood to Downtown Seattle

TRAVEL TIME COMPARISON—TRANSIT VS. AUTOMOBILE

A comparison of peak period travel times for key travel time pairs was also made using the same general methodology as for the transit travel time measure. Estimated 2030 transit and automobile travel times from Lynnwood to selected PSRC-designated Regional Growth Centers are illustrated in Figures 5-12 and 5-13. Estimated automobile travel times are based on observed travel times (WSDOT loop detectors, 2008) and speed degradation through 2030 derived from the regional travel demand model.

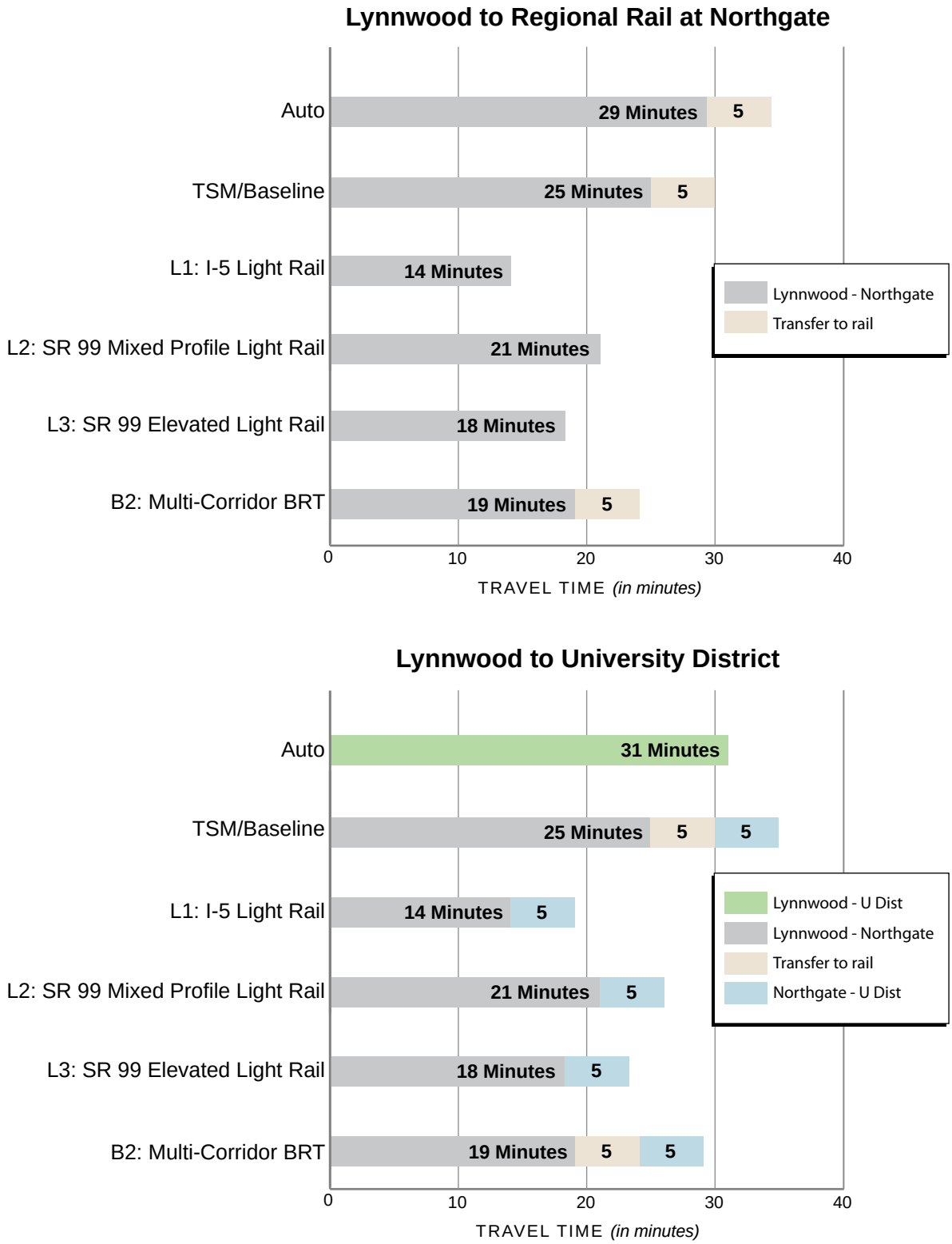
As shown in Figure 5-12, the automobile travel time from Lynnwood to regional light rail at Northgate is expected to be approximately 4 minutes longer than the TSM/Baseline Alternative, at approximately 34 minutes. This is approximately 10 minutes longer than the B2: Multi-Corridor BRT Alternative, and approximately 10 to 16 minutes longer than the light rail alternatives. The automobile travel time to the University District is expected to be 4 minutes shorter than the TSM/Baseline Alternative and 2 to 12 minutes longer than the B2: Multi-Corridor BRT Alternative and light rail alternatives. The automobile travel time to downtown Seattle is expected to be shorter than the TSM/Baseline Alternative, similar to the B2: Multi-Corridor BRT Alternative, and longer than the light rail alternatives. For trips to Sea Tac Airport, automobile travel times are expected to be 8 to 24 minutes shorter than the bus and light rail alternatives.

5.1.5 Transit Reliability

The following measures provide an assessment of the alternatives based on the operational conditions that affect transit travel time reliability: miles of alignment in non-exclusive right of-way, number of at-grade signalized intersections traversed, and number of transfers required to reach major destinations.

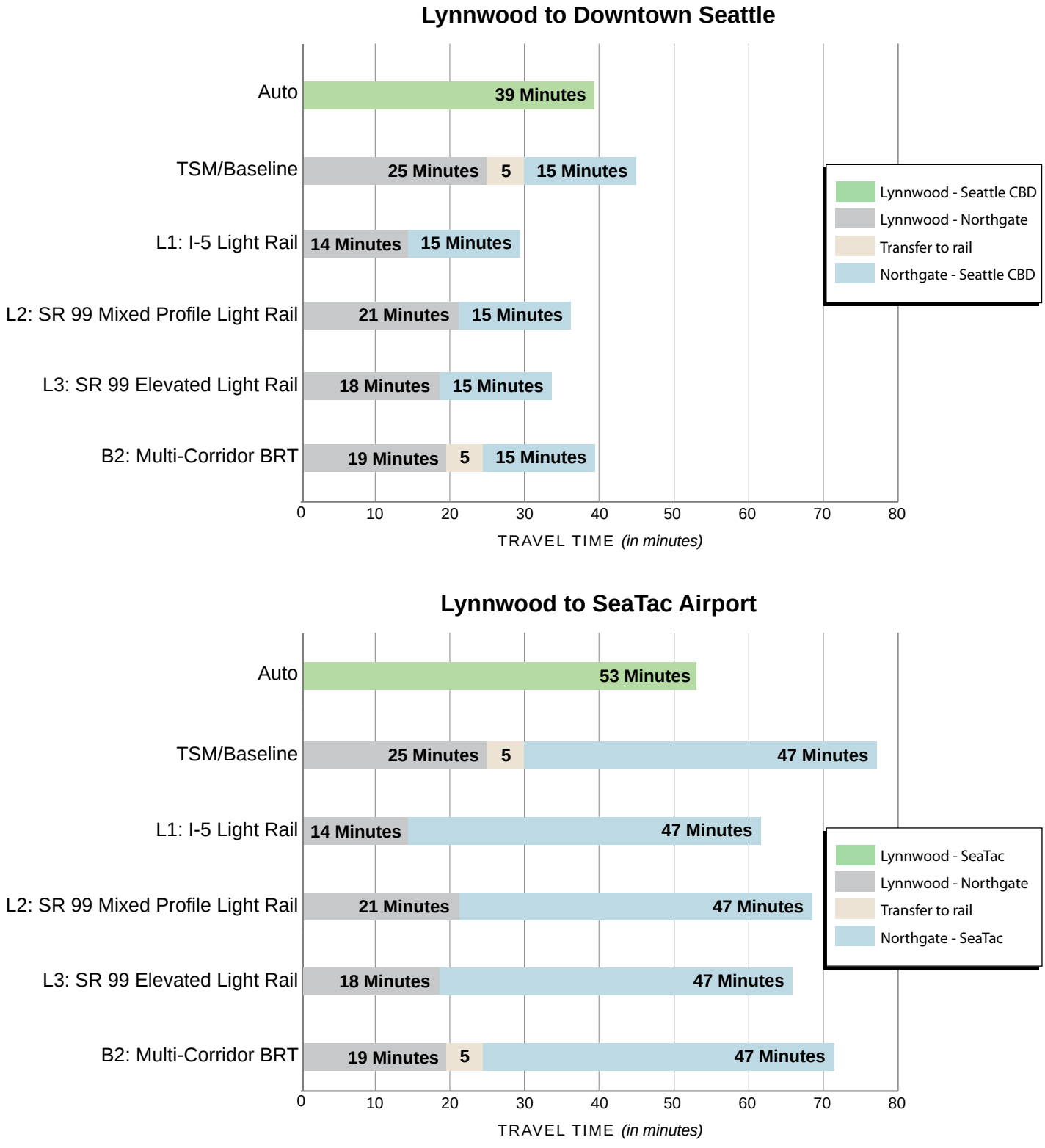
MILES OF NON-EXCLUSIVE GUIDEWAY

Transit travel in non exclusive right-of-way means that the travel time would vary by time of day depending on roadway congestion levels and be subject to the same frequently occurring but unpredictable delays resulting from traffic incidents such as vehicle breakdowns and accidents. The approximate miles of operation on non-exclusive guideway associated with each alternative is presented in Table 5-8 by alternative. For the TSM/Baseline Alternative, buses on the I-5 Lynnwood-to-Northgate route would be required to use the existing general purpose on- and off-ramps at Northgate and navigate on local arterials with general purpose traffic to reach the transit center. (Transit-only lanes would provide some travel time savings for buses using the I-5 southbound off-ramp and northbound on-ramp at Northgate.) The HOV lanes (non-exclusive guideway) on I-5 do not currently meet the WSDOT performance standard of 45-mph travel speed in HOV lanes during peak periods.



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate.

Figure 5-12. 2030 Peak Period, Peak Direction, Travel Times from Lynnwood to Northgate and University District - Transit vs. Automobile



Note: Estimated travel times include dwell times at stations and, for bus alternatives, transfer time from bus to rail at Northgate.

Figure 5-13. 2030 Peak Period, Peak Direction, Travel Times from Lynnwood to Downtown Seattle and SeaTac Airport - Transit vs. Automobile

Table 5-8. Miles of Operation on Non-Exclusive Guideway

Alternative	Miles of Operation on Non-Exclusive Guideway
TSM/Baseline	23.8
L1: I-5 Light Rail	0
L2: SR 99 Mixed Profile Light Rail	0
L3: SR 99 Elevated Light Rail	0
B2: Multi-Corridor BRT	25.8

Transportation 2040 (PSRC 2010a), the region's Long-Range Plan calls for eventual development of managed lanes along this portion of I-5. WSDOT is considering a number of options that could result in major reconstruction and tolling of portions of the freeway to develop one or more managed lanes in each direction of I-5 between Northgate and Lynnwood. If implemented and successfully managed, these improvements should reduce peak period travel times by as much as 5 minutes and provide better reliability for buses operating in this section of I-5. However, at this time, the design, construction costs, right-of-way, transportation system, environmental effects, and funding of these improvements are not known.

The light rail alternatives all would operate on completely exclusive guideway, regardless of whether they are elevated or at-grade. The B2: Multi-Corridor BRT Alternative would operate on the greatest number of miles of non-exclusive guideway due to the combined length of its three routes. Although the I-5 HOV lanes and SR 99 BAT lanes are considered non-exclusive guideway, the lanes would offer a level of priority that provides some reliability benefit over general purpose lanes.

NUMBER OF AT-GRADE SIGNALIZED INTERSECTIONS AND CONGESTION

The number of at-grade signalized intersections traversed and the number of highly congested intersections for each alternative is provided in Table 5-9. The TSM/Baseline Alternative, with three express bus routes, would traverse 30 signalized intersections, with 11 of them highly congested.

Table 5-9. Number of At-Grade Signalized Intersections Traversed and Congestion

Alternative	Number of At-Grade Signalized Intersections Traversed	Highly Congested* Signalized Intersections
TSM/Baseline	30	11
L1: I-5 Light Rail	0	0
L2: SR 99 Mixed Profile Light Rail	5	2
Roosevelt Way Variation	2	0
SR 99 North Variation	11	4
L3: SR 99 Elevated Light Rail	0	0
B2: Multi-Corridor BRT	50	13

*Highly congested signalized intersections are defined as intersections operating at or over capacity (LOS E or F) with heavy to severe delay.

The L1: I-5 Light Rail Alternative and the L3: SR 99 Elevated Alternative would not traverse any at-grade signalized intersections, while the L2: SR 99 Mixed Profile Light Rail Alternative would traverse five at-grade signalized intersections, with two of those being highly congested. The Roosevelt Way Variation would not have the at-grade section between North 125th Street and North 143rd Street; this variation would traverse only two signalized intersections with none of them highly congested. The SR 99 North Variation would follow SR 99 north of SR 104/Ballinger Way rather than travel on Ballinger Way and then turn east of 208th Street SW. The segment north of SR 104 would traverse 6 additional at-grade signalized intersections, with 2 of them highly congested, for a total of 11 intersections, 4 of which are highly congested.

The B2: Multi-Corridor BRT Alternative, with three express bus/BRT routes and direct access into and out of the Northgate Transit Center, as well as direct access to and from the south at North 130th Street, would traverse 50 signalized intersections, with 13 of those highly congested.

NUMBER OF TRANSFERS REQUIRED TO REACH MAJOR DESTINATIONS

Each transfer made to reach a destination introduces another source of travel time unreliability and day-to-day variation. Both the TSM/Baseline and the B2: Multi-Corridor Alternatives would require a transfer to light rail at Northgate in order to reach destinations south of Northgate via the regional light rail system, adding time to those trips. The light rail alternatives would not require a transfer at Northgate to reach the same destinations.

5.1.6 System-Wide Vehicle Miles Traveled

This system-wide measure provides information on travel characteristics relative to each alternative and is used as input for calculation of several environmental measures. Total system VMT can serve as an indicator of mode shift. For example, a reduction in VMT is often due to a shift from automobile to transit. System-wide statistics for reduction in daily VMT are provided in Table 5-10.

The reduction in overall system daily VMT with the L1: I-5 Light Rail Alternative would be more than twice the reduction that would result from the L2: SR 99 Mixed Profile Light Rail Alternative. The VMT reduction with the L3: SR 99 Elevated Light Rail Alternative would be less than that of the L1: I-5 Light Rail Alternative, but still almost double that of the L2: SR 99 Mixed Profile Light Rail Alternative. The VMT reduction with the B2: Multi-Corridor BRT Alternative would be less than half that of the L2: SR 99 Mixed Profile Light Rail Alternative, while the reduction with the TSM/Baseline Alternative would be half that of the B2: Multi-Corridor BRT Alternative. This indicates that the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives would have a greater effect on reducing automobile travel than the other alternatives.

Table 5-10. Year 2030 Highway Performance Measures

Alternative	Reduction in Daily VMT
TSM/Baseline	16,900
L1: I-5 Light Rail	191,500
L2: SR 99 Mixed Profile Light Rail*	85,200
SR 99 North Variation	75,200
L3: SR 99 Elevated Light Rail	160,700
B2: Multi-Corridor BRT	33,100

*The Roosevelt Way Variation was not modeled, but is expected to result in slightly less VMT reduction than the primary alternative

5.1.7 Transit Service Accessibility

Transit service accessibility is measured by the quality of pedestrian, bicycle, feeder bus, and automobile access to the transit stations. Other modes such as automobile access by individuals with disabilities and drop-off passengers will be addressed in the station design and will be defined during the design phase, consistent with Sound Transit policies.

Pedestrian and bicycle accessibility is evaluated for each alternative based on the amount of geographic area accessible within a 15 minute walk and a 15-minute bicycle ride. The following qualitative factors were used to determine how each alternative is rated for pedestrian and bicycle accessibility:

- **Connectivity of local streets**—Greater connectivity means that a greater area is accessible by walking or biking. A closely spaced grid of local streets provides the highest level of connectivity and accessibility.
- **Barriers**—Barriers limit the area accessible by walking and biking. I-5, for example, is a barrier that requires pedestrians and bicycles to cross the freeway at a limited number of locations, potentially resulting in a much smaller area across I-5 that is accessible within a 15-minute walk shed. Streams, open space, and large contiguous land uses (e.g., golf courses and cemeteries) also have a barrier effect, limiting the size of residential or commercial areas that are within a 15 minute walk shed to the transit station.
- **Presence of sidewalks on arterial streets**—Arterial streets provide the primary access to the stations. Many arterials within the North Corridor project area lack sidewalks. Stations located in the vicinity of arterials with sidewalks result in a higher rating for accessibility.

The resulting pedestrian and bicycle accessibility scores were summed for all stations under each alternative and then the alternatives were rated as high, moderate, and low based on these scores.

The accessibility of transit stations by bus is measured by the number of existing bus routes passing within 0.25 mile of a transit station. The number of bus routes that could provide connectivity to the transit alternative was summed for the stations under each alternative, and then the alternatives were rated as high, moderate, and low based on the results.

Because land use patterns in the North Corridor are generally suburban, park-and-ride facilities are needed to bring substantial volumes of passengers to the stations. As the areas surrounding the stations continue to urbanize, the role of park and-ride access to stations would likely diminish. In order to assess the ability for automobiles to access transit stations, the number of park-and-ride stalls by alternative was summed for the stations under each alternative and then the alternative was ranked as high, moderate, and low based on the results.

A detailed evaluation was compiled and the accessibility by mode for each alternative was assigned a relative result with 3 being the highest and 1 the lowest. The priority for providing convenient and direct access to stations was established by the Link Light Rail North Link Design Criteria Manual (Sound Transit 2009).

Modal priority identified in this manual is listed as follows in descending order of importance:

- Pedestrian
- Individual with disability—non-driver (Paratransit)
- Bus or commuter rail
- Individual with disability—self driver (at park-and-ride facilities)
- Bicycle
- Drop-off passengers (including non-driver individual with disability)
- Taxi
- Park-and-ride
- Motorcycle

Accordingly, in the evaluation of various access characteristics at stations, of the four access modes assessed, pedestrian access was given the highest weighting at 2.0 and park-and-ride the lowest at 0.5. A summary of accessibility results by mode is presented in Table 5-11 for each alternative.

Table 5-11. Service Accessibility

Mode	Weight	TSM/Baseline	L1: I-5 Light Rail	L2: SR 99 Mixed Profile Light Rail*	L3: SR 99 Elevated Light Rail	B2: Multi-Corridor BRT
Pedestrian	2.0	3	2	2	2	3
Bus Connectivity	1.5	3	2	2	2	3
Bicycle	1.0	3	2	2	2	3
Park-and-Ride Availability	0.5	3	2	2	2	2
Overall Rating		High	Moderate	Moderate	Moderate	High

Scale: 3 = high, 2 = moderate, and 1 = low.

* The overall rating for the Roosevelt Way Variation and the SR 99 North Variation would be the same as for the primary alternative, "Moderate"

The 15-minute pedestrian and bicycle travel sheds for each station area are presented in Figures 5-14 to 5-17. For pedestrians, the 15-minute walk is based on a 3-mph walking speed, or a distance of 3,960 feet from a station location. For bicycles, the 15 minute travel shed is based on a bicycling speed of 7 mph, or a distance of 1.75 miles. For the purposes of this exercise, neither the pedestrian nor bicycle speeds were adjusted for topography. The travel distance was measured with geographic information system (GIS) mapping along public roadways and walking/cycling paths. The distance was measured from station locations up to a parcel edge. For large parcels, the distance was measured to the known entrance to the property (e.g., the entrance to the Jackson Park Golf Course is on the southeast portion of the parcel). The pedestrian and bicycle travel sheds, when evaluated by station and alternative, do not dramatically distinguish between alternatives.

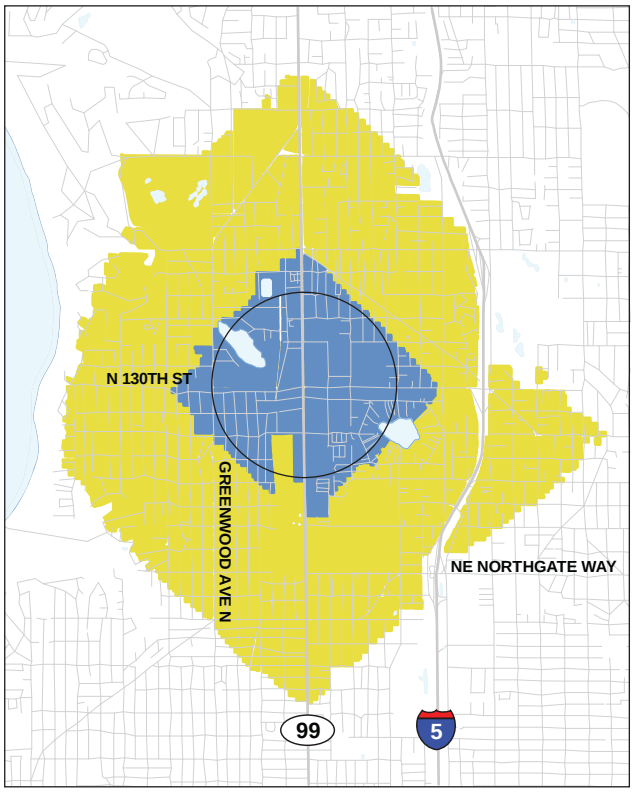
The travel shed diagrams illustrate where the lack of local street connectivity could limit accessibility in the area within a 15 minute walk or bike travel distance of each station. The travel sheds also show physical barriers between the transit station and nearby areas within the 15-minute walk shed, such as open/green space, golf courses, and cemeteries.

Overall, accessibility for all modes would be improved with implementation of any alternative. Facility development would include improvements to the pedestrian and bicycling environment in the immediate vicinity of stations, provision for passengers being dropped off, and taxi facilities, as well as access for individuals with disabilities. These improvements will be further defined during the design phase, consistent with Sound Transit policies.

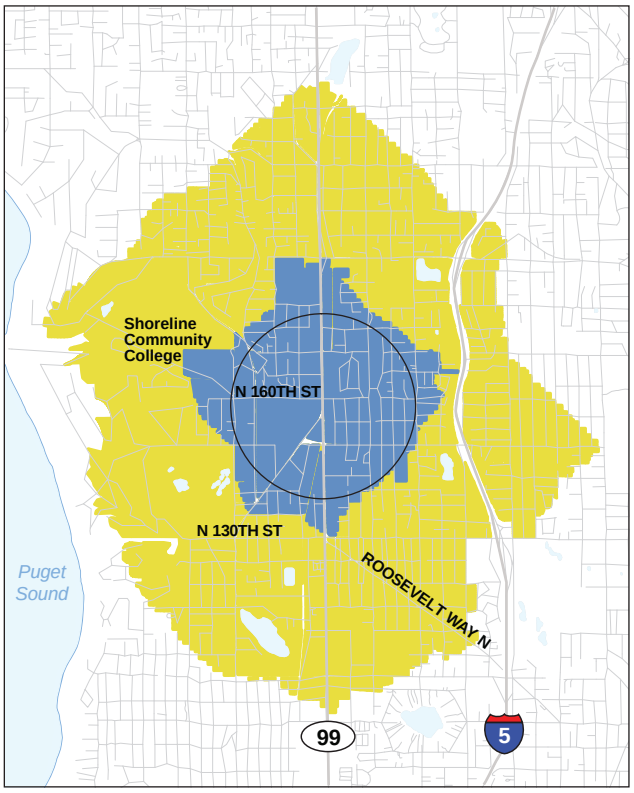
For the TSM/Baseline Alternative, accessibility to bus stops would be equal to the B2: BRT Multi-Corridor Alternative and higher than the light rail alternatives. The Edmonds Park and Ride, 19th Avenue NE/Ballinger Way, and 15th Avenue NE/North 175th Street areas would provide the highest level of pedestrian and bicycle accessibility because of the well developed sidewalk network. Lower levels of accessibility would exist at the other bus stop and station areas due to barriers, limited local street connectivity, and limited sidewalks on arterials.

There are 69 existing bus routes at or near the nine station areas that could provide connectivity to the three TSM/Baseline Alternative bus routes, resulting in a high rating for bus connectivity. The TSM/Baseline Alternative also includes the highest number of planned park-and-ride spaces, at 4,640.

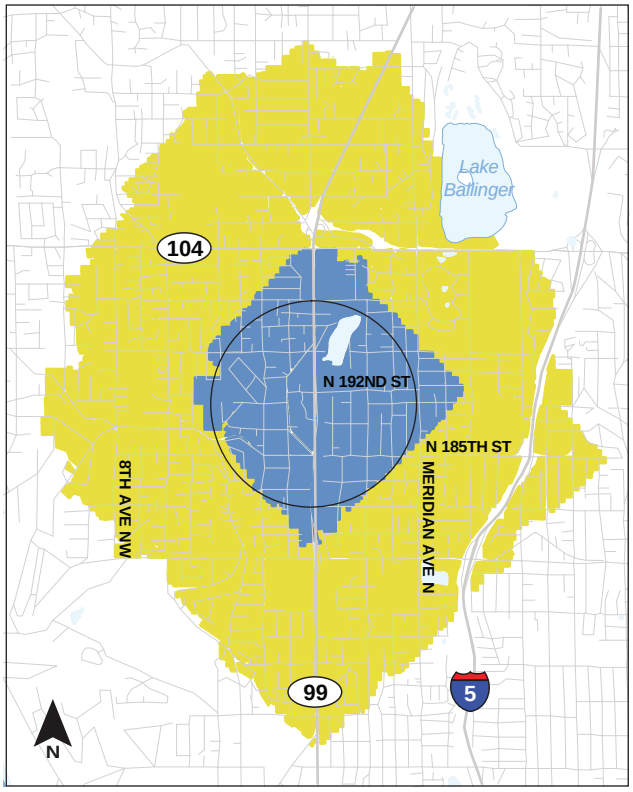
For the L1: I-5 Light Rail Alternative, a high level of accessibility would be provided at the North 185th Street station area, though the current large school district parcel immediately adjacent to the station may present an obstacle for pedestrians and cyclists. The remaining three station areas would provide lower levels of accessibility due to the presence of I-5 and lack of sidewalks on surrounding arterial streets. There are 40 existing bus routes at or near the four station areas that could provide connectivity to the L1: I-5 Light Rail Alternative, resulting in an average rating for bus connectivity. The L1: I-5 Light Rail Alternative includes 3,790 planned park-and-ride spaces, resulting in a moderate rating for this type of accessibility.



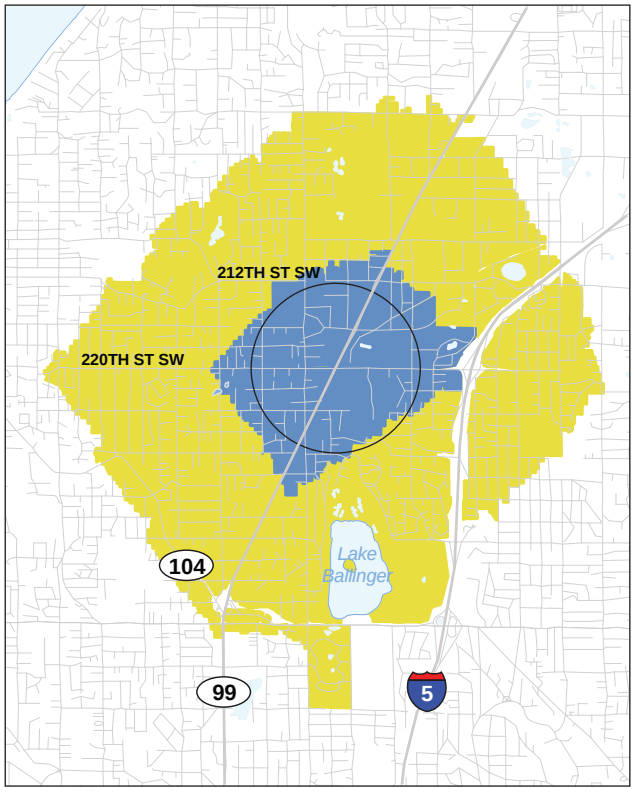
SR 99/130TH STREET



SR 99/160TH STREET



SHORELINE PARK-AND-RIDE



SR 99/220TH STREET

15-minute Walk Shed — Walk speed = 3 Miles per hour

15-minute Bike Shed — Bike speed = 7 Miles per hour

0.5 Mile Radius Station Area

Figure 5-14. 15-Minute Pedestrian and Bicycle Travel Sheds at the SR 99/130th Street, SR 99/160th Street, Shoreline Park-and-Ride and SR 99/220th Street Stations

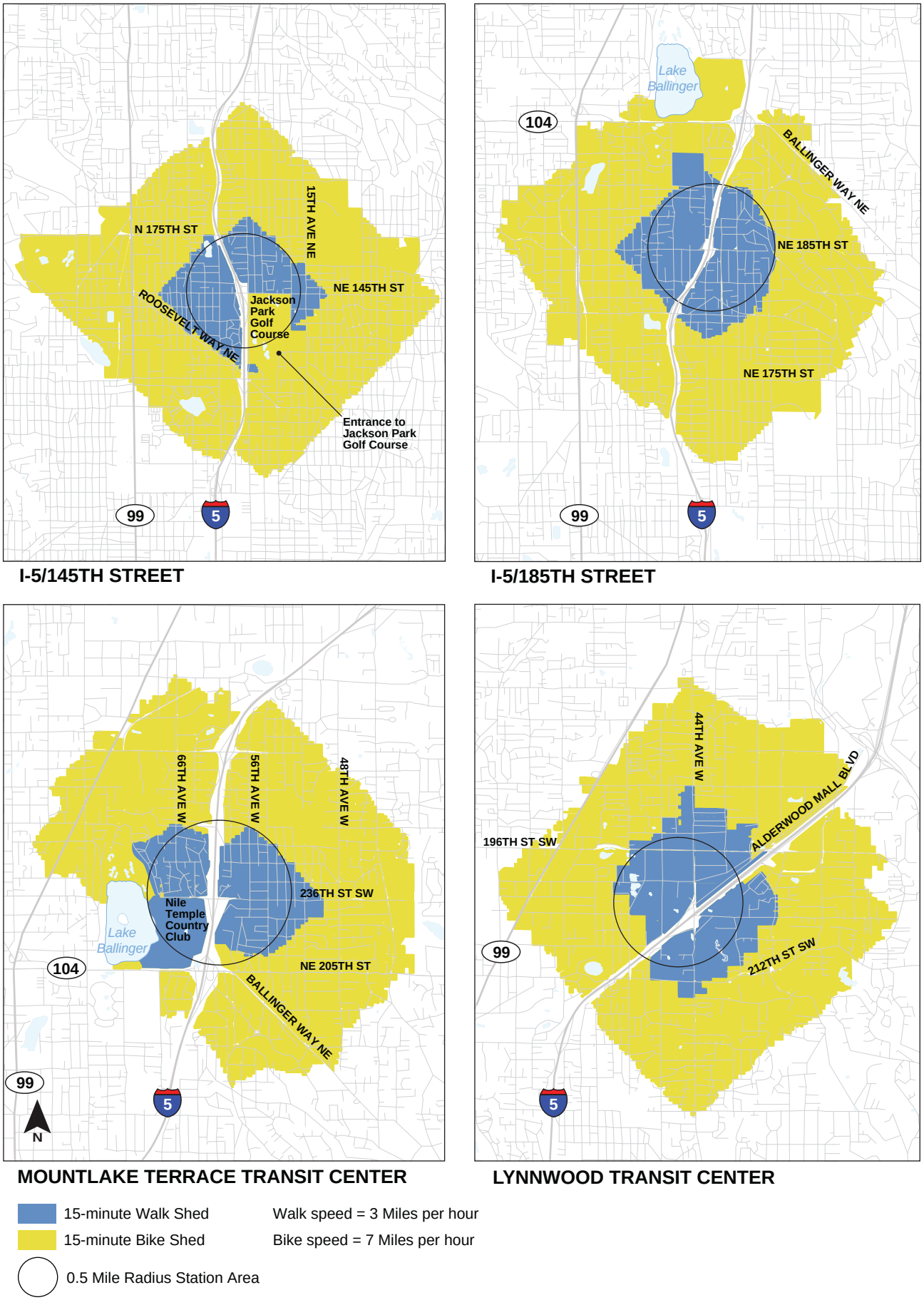


Figure 5-15. 15-Minute Pedestrian and Bicycle Travel Sheds at the I-5/145th Street, I-5/185th Street, Mountlake Terrace and Lynnwood Transit Center Stations

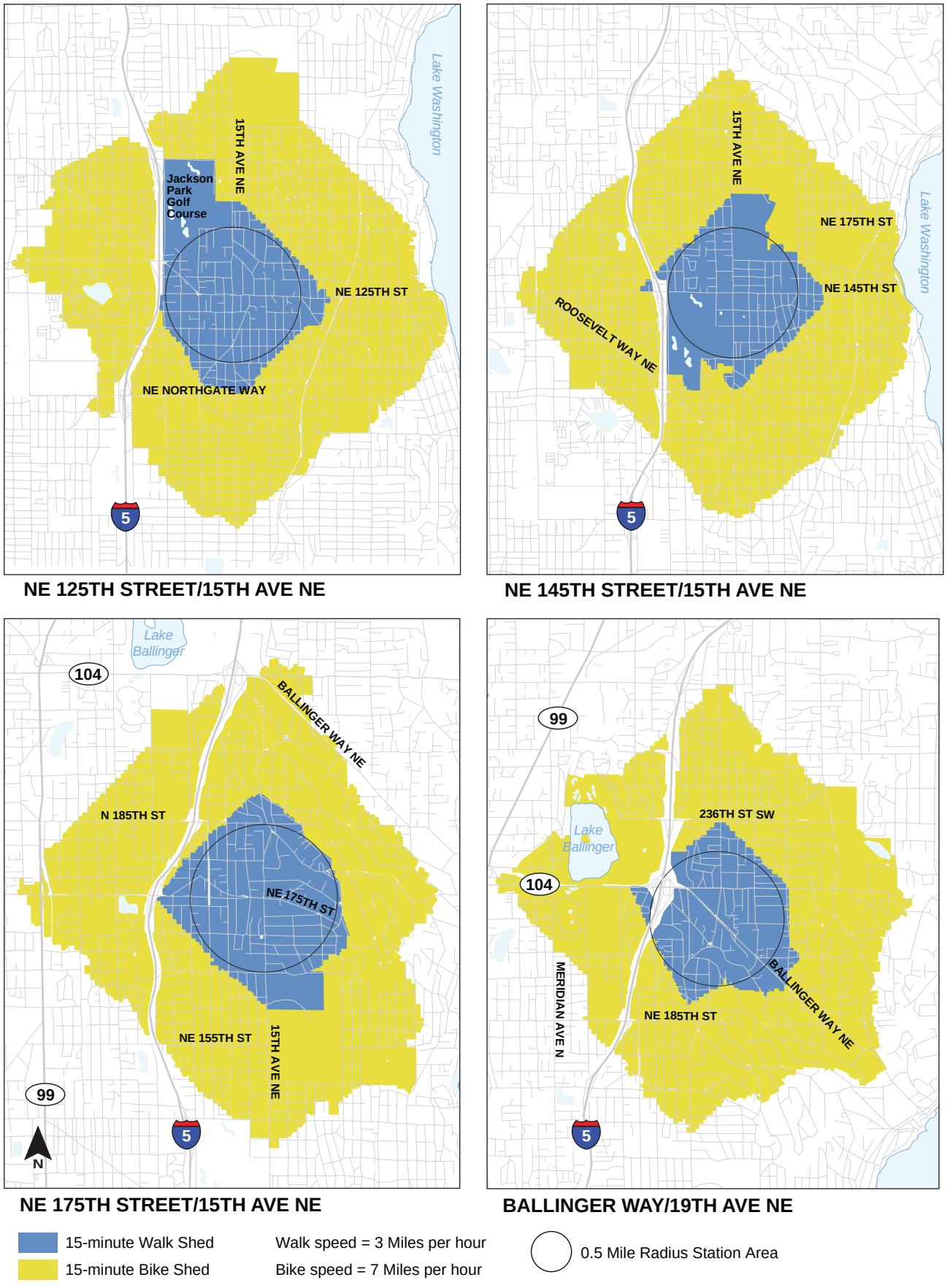


Figure 5-16. 15-Minute Pedestrian and Bicycle Travel Sheds at NE 125th Street/15th Avenue NE, NE 145th Street/15th Avenue NE, NE 175th Street/15th Avenue NE and Ballinger Way/19th Avenue NE Stations

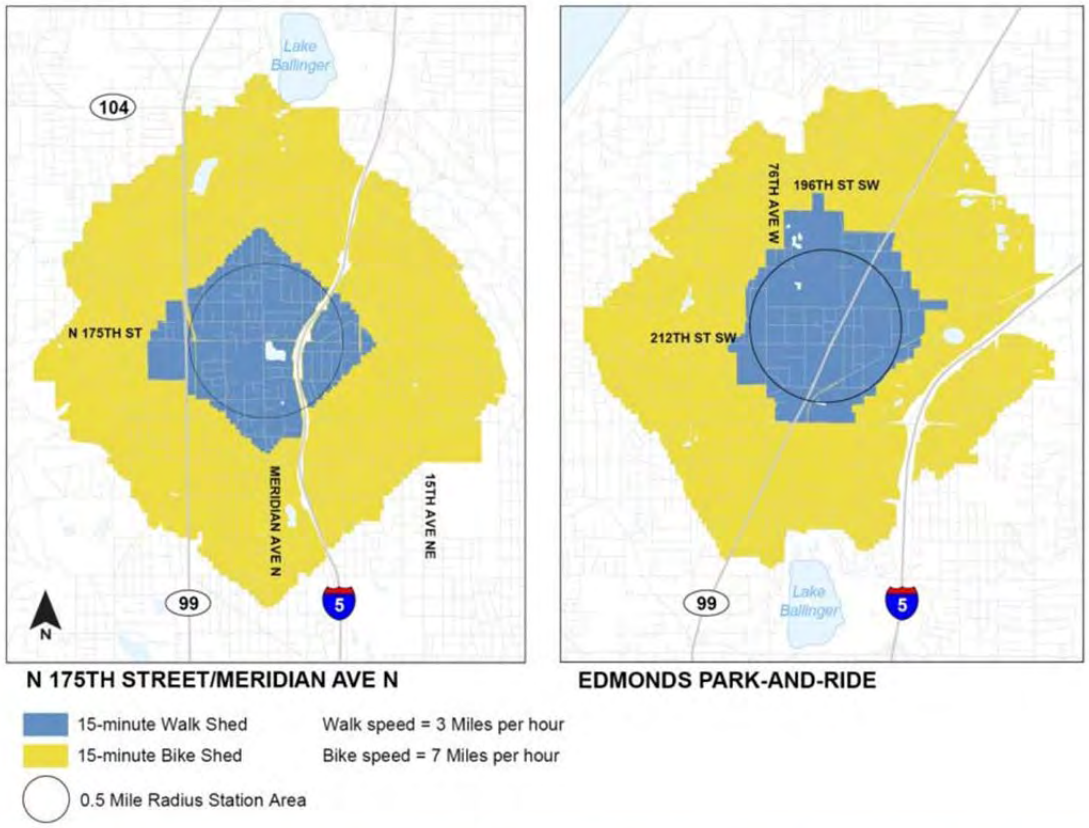


Figure 5-17. 15-Minute Pedestrian and Bicycle Travel Sheds at North 175th Street/Meridian Avenue North and Edmonds Park-and-Ride Stations

For the L2: SR 99 Mixed Profile Light Rail Alternative, the stations at North 160th Street and North 130th Street have average to slightly above average accessibility due to the absence of barriers for pedestrians. However, most station areas lack sidewalks on arterials leading to the stations. Along at-grade sections, pedestrian crossings of SR 99 to access light rail stations can only occur at signalized intersections. Stations located in the median of SR 99, while providing equal distance from either side of road, could require riders to cross as many as five traffic lanes. The Roosevelt Way Variation would result in a slightly lower accessibility rating than the primary alternative because it has one less station (the North 130th Street/SR 99 Station). The SR 99 North Variation includes a station at SR 99/220th Street SW rather than at the Mountlake Terrace Transit Center. The 220th Street SW station area has a slightly lower accessibility rating than the Mountlake Terrace station and would result in a slightly lower accessibility rating for the SR 99 North Variation than for the primary L2: SR 99 Mixed Profile Light Rail Alternative.

There are 45 existing bus routes at or near the five station areas of the L2: SR 99 Mixed Profile Light Rail Alternative, approximately the same as for the L1: I-5 Light Rail Alternative. This results in a moderate rating for bus connectivity. The L2: SR 99 Mixed Profile Light Rail Alternative includes 3,890 planned park-and-ride spaces, slightly more than the L1: I-5 Light Rail Alternative. The Roosevelt Way Variation and the SR 99 North Variation have slightly fewer connecting bus routes. Also, because the Mountlake Terrace Transit Center would not be

served under the latter variation and there are no planned park-and-ride spaces at SR 99/220th Street SW, there would be 890 fewer planned park-and-ride spaces along the SR 99 North Variation compared to the primary alternative. (Some users may choose to park at the Edmonds Park-and-Ride facility and then ride light rail; however, that facility is approximately one-third of a mile away from the 220th Street Station and is therefore not included in the park-and-ride capacity along the SR 99 North Variation.)

For the L3: Elevated Light Rail Alternative, the accessibility evaluation results in the same (moderate) rating as the L2: Mixed Profile Alternative. However, pedestrian crossing distances would change relative to the at-grade median stations of the L2: SR 99 Mixed Profile Light Rail Alternative. An elevated station located on the west side of SR 99 would require pedestrians accessing from the east side to cross the entire width of SR 99.

There are 45 existing bus routes at or near the five station areas of the L3: Elevated Light Rail Alternative, the same as for the L2: SR 99 Mixed Profile Light Rail Alternative. This results in a moderate rating for bus connectivity. The L3: Elevated Light Rail Alternative includes 3,890 planned park-and-ride spaces, which is the same as the L2: SR 99 Mixed Profile Light Rail Alternative.

For the B2: Multi-Corridor BRT Alternative, the pedestrian and bicycle accessibility rating (high) is approximately the same as for the TSM/Baseline Alternative. There are 72 existing bus routes at or near the 11 station areas that could provide connectivity to the B2: Multi Corridor BRT Alternative. This is approximately the same as the TSM/Baseline Alternative, and would result in a high rating for bus connectivity. The B2: Multi-Corridor BRT Alternative includes 4,190 park-and-ride spaces, 450 fewer than the TSM/Baseline Alternative and 300 to 400 more than the light rail alternatives.

5.2 LAND USE AND ECONOMIC DEVELOPMENT POTENTIAL

The land use and economic development evaluation builds on the Level 1 evaluation, and incorporates additional analyses that have been done to determine the extent to which current and planned land use along the candidate corridors and within station areas will support the proposed transit investments.

For the Level 2 evaluation, the following two categories were used to assess the land use and economic development potential of each alternative:

- **Land use and economic development compatibility** - a review of each alternative's consistency with VISION 2040 (PSRC 2009) and Regional Economic Strategy (PSRC 2005); and the types of existing land uses surrounding each station and alternative.
- **Transit-supportive land use** - a review of each alternative's ability to serve existing and future population, employment, and housing; proximity to a balanced mix of uses; station area character; level of connectivity to major trip generators; and existing development strategies near alternatives and stations.

The TSM/Baseline Alternative was not analyzed for development potential because it is not considered a build alternative and is used solely as a basis for comparison in the New Starts process. Station areas along the TSM/Baseline Alternative were included to present other associated analysis.

5.2.1 Key Findings

Key findings related to land use and economic development potential for the alternatives are described in the following section.

LAND USE AND ECONOMIC DEVELOPMENT COMPATIBILITY

Consistency with PSRC VISION 2040 and Regional Economic Strategy

The L1: I-5 Light Rail Alternative is the most consistent with regional planning strategies because it would serve the most riders and deliver the greatest travel time savings at both the regional and major activity center levels, consistent with the region's land use and economic vision that focuses growth into major regional centers such as Northgate and Lynnwood. The L3: SR 99 Elevated Light Rail Alternative also would serve many riders, but fewer than the L1: I-5 Light Rail Alternative; it also would have a longer travel time.

Existing Land Use Assessment

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives have the most transit-compatible existing land uses within their station areas, due to the zoning and development patterns along SR 99.

TRANSIT SUPPORTIVE LAND USE

Population, Employment, and Housing

The bus alternatives, having a much higher number of bus stops and stations, have the highest totals, but their user benefits (i.e., travel time savings times number of riders) are minimal compared to the alternatives with shorter travel times, particularly the L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative. This indicates that even though there is more potential transit access to population and employment with the bus alternatives, less people use them due to the lower quality of service.

Balanced Mix of Uses

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives would have the most balanced mix of uses surrounding their five stations. All five stations would be located in areas with commercial, mixed-use, and multi-family zoning destinations. The L1: I-5 Light Rail Alternative includes four stations, sharing two of the station locations with the other alternatives. The remaining two stations would be located along I-5 and adjacent to single-family neighborhoods. The B2: Multi Corridor BRT Alternative would be less balanced, primarily because it would serve many stations surrounded by a high proportion of single-family housing.

Existing Station Area Assessment

All alternatives were ranked medium or low on this measure. Traditional residential neighborhoods with local businesses rated the highest. Candidate station areas generally lack existing transit-oriented types of development.

Connectivity to Major Trip Generators

None of the alternatives performed well on this measure because of the primarily automobile-oriented commercial development in the project area. Even when walk distances are short, pedestrian access can be challenging due to the poor quality of and/or lack of sidewalks, continuous curb cuts, and other barriers.

Transit-Supportive Plans and Policies

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives outperform the other alternatives. The B2: Multi-Corridor BRT Alternative performs well with "high" and "medium" station areas, but because it would have many more stations overall, it also has the highest number of "low" performing stations.

5.2.2 Land Use and Economic Development Compatibility

CONSISTENCY WITH PSRC VISION 2040 AND REGIONAL ECONOMIC STRATEGY

Each alternative's support for VISION 2040 was measured by three factors: consistency with existing corridor land uses; the number of projected daily riders; and the travel time between the corridor's two regional growth centers—Lynnwood and Northgate. All alternatives support VISION 2040 to varying degrees, but the L1: I-5 Light Rail Alternative is the most supportive. Table 5-12 summarizes the results.

Table 5-12. Summary of Consistency with PSRC VISION 2040 and Regional Economic Strategy

Alternative	Project Daily Riders	2030 Travel Time (minutes) between Lynnwood and Northgate*	Consistency with Existing Land Use	Consistency with PSRC VISION 2040 and Regional Economic Strategy
TSM/Baseline	21,000	30	Moderate, but low along 15th Avenue NE	Low
L1: I-5 Light Rail	52,000	14	Low	High
L2: SR 99 Mixed Profile Light Rail	41,000	21	High	Moderate
L3: SR 99 Elevated Light Rail	48,000	18	High	Moderate-High
B2: Multi-Corridor BRT	24,000	24	Moderate, but low along 15th Avenue NE	Low

*Travel time is in minutes in the 2030 Peak-Period Peak Direction of Flow

The TSM/Baseline Alternative is used as the baseline for the FTA New Starts process and the build alternatives, below, are compared to it.

The L1: I-5 Light Rail Alternative would provide the most support for VISION 2040 and the Regional Economic Strategy. It would connect two PSRC-designated Regional Growth Centers with the shortest travel time over the other alternatives, serve the most riders, and have significant capacity to absorb ridership growth.

The L2: SR 99 Mixed Profile Light Rail Alternative would provide moderate support for VISION 2040 and the Regional Economic Strategy. It would connect two PSRC-designated Regional Growth Centers, with a travel time 7 minutes longer than the L1: I-5 Light Rail Alternative, and serve more people than the TSM/Baseline Alternative or B2: Multi-Corridor Alternative, but far less than the L1: I-5 Light Rail Alternative. It also would have very limited capacity to absorb future travel growth.

The L3: SR 99 Elevated Light Rail Alternative would provide moderate to high support for VISION 2040 and the Regional Economic Strategy. It would connect two PSRC-designated Regional Growth Centers with a travel time 4 minutes longer than the L1: I-5 Light Rail Alternative, and serve more people than the TSM/Baseline Alternative or B2: Multi-Corridor Alternative, but slightly less than the L1: I-5 Light Rail Alternative.

The B2: Multi-Corridor BRT Alternative would provide the second lowest support for VISION 2040 and the Regional Economic Strategy. It would connect two PSRC-designated Regional Growth Centers but with fewer system riders and longer travel times than the light rail alternatives. It also would have virtually no capacity to absorb future travel growth.

EXISTING LAND USE ASSESSMENT

The analysis of existing land use was based on current zoning both along the corridor and within 0.50-mile radius around station and/or bus stop areas. GIS data were collected along the alignments and the local jurisdictions' land use designations were grouped into six general categories: single-family residential, multi-family residential, commercial (retail and business uses), institutional/public, mixed use, and parks and open space.

Table 5-13 summarizes the results of this analysis. The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives have the most transit-compatible existing land uses both along the alignment and within station areas. The more intense uses along SR 99 are concentrated close to the potential stations, transitioning to lower density residential uses toward the periphery, and therefore would provide the greatest compatibility close to the proposed stations. The two bus alternatives also would provide service along SR 99 and include station and bus stop improvements.

As shown by the existing zoning patterns illustrated in Figure 5-18, the greatest concentrations of commercial and mixed uses between Northgate and Lynnwood are located along SR 99.

Table 5-13. Summary of Land Use Compatibility by Alternative

Alternative	Consistency with Existing Land Use
TSM/Baseline	Moderate, but low along 15th Avenue NE
L1: I-5 Light Rail	Low, except near Lynnwood Transit Center
L2: SR 99 Mixed Profile Light Rail	High, except low to moderate along the connecting east/west links to Northgate on the south and Lynnwood on the north.
L3: SR 99 Elevated Light Rail	High, except low to moderate along the connecting east/west links to Northgate on the south and Lynnwood on the north.
B2: Multi-Corridor BRT	Moderate, but low along 15th Avenue NE

All alternatives would serve the Lynnwood Transit Center and Northgate, which are the regional growth centers anticipated to receive the highest percentage of future growth in the project area. In addition, all of the primary alternatives would serve the Mountlake Terrace Transit Center. Only the SR 99 North Variation of the L2: SR 99 Mixed Profile Light Rail Alternative would not serve this station.

Table 5-14 summarizes the differences in existing land uses along alternatives and around station areas for each alternative, not including the stations at Northgate, Mountlake Terrace and Lynnwood, which are common to all alternatives. The *Station Area Development Potential Technical Memorandum* (Sound Transit 2011g) provides more detail about land use for each station area.

Table 5-14. General Existing Land Use by Alternative

Alternative	General Existing Station Area Land Use (between Northgate and Mountlake Terrace only)
TSM/Baseline	SR 99: automobile-oriented, low-density strip commercial development with pockets of higher density residential and commercial uses and single-family residential in areas away from SR 99 I-5: predominantly single-family residential, with some institutional uses 15th Avenue NE: mix of single-family residential with hubs of greater intensity commercial and multi-family uses around arterial intersections
L1: I-5 Light Rail	Predominantly single-family residential, with some institutional uses
L2: SR 99 Mixed Profile Light Rail	Automobile-oriented, low-density strip of commercial development with pockets of higher density residential and commercial uses and single-family residential areas away from SR 99
L3: SR 99 Elevated Light Rail	Automobile-oriented, low-density strip of commercial development with pockets of higher density residential and commercial uses and single-family residential areas away from SR 99
B2: Multi-Corridor BRT	Three corridors generally the same as the TSM/Baseline Alternative

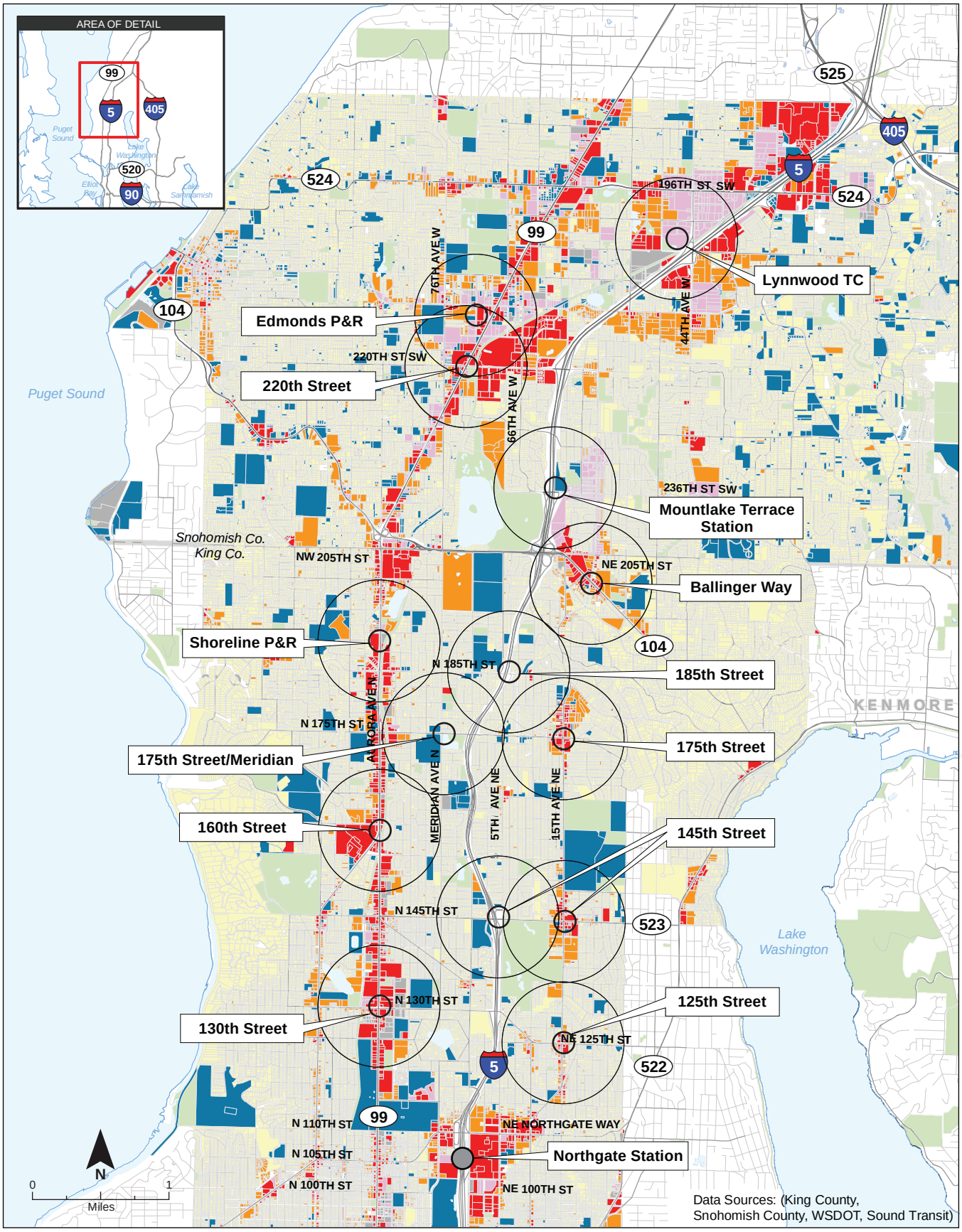


Figure 5-18. General Existing Land Uses