

Transportation

This chapter documents the existing transportation system characteristics in the Bel-Red Corridor and identifies the potential impacts of the proposed land use alternatives on the supporting transportation system.

Methodology

Roadways

Existing and Future Traffic Volumes

Existing and future daily and peak-hour traffic volumes are provided for key roadway locations in the Bel-Red Corridor. Existing (year 2005) traffic volumes were provided by the City of Bellevue.

Traffic volumes for the No-Action Alternative and each action alternative were forecast using the Bellevue, Kirkland, and Redmond (BKR) Travel Demand Model, which includes planned land uses for the cities of Bellevue, Redmond, and Kirkland in 2030 and accounts for growth citywide and in surrounding areas, as well as the central Puget Sound Region.

To evaluate the alternatives, land uses in the Bel-Red Corridor were changed to reflect the different land use, growth, and transportation network assumptions associated with each alternative. The following regional and local transportation network improvements were assumed to be implemented by 2030 under all alternatives, including the No-Action Alternative:

- **I-405:** Provide one additional lane in each direction on I-405 through Downtown Bellevue and two additional lanes north of NE 10th Street and south of NE 2nd Street. Two new half-interchanges at NE 2nd Street (to and from the south) and NE 10th Street (to and from the north), and grade-separated braided ramps between SR 520 and NE 8th Street to physically separate the entering and exiting vehicles and eliminate the existing weave; this improvement is known as the *I-405 Master Plan* (WSDOT, 2005).
- **SR 520:** Provide a six-lane, tolled facility across Lake Washington (four general-purpose lanes and two HOV lanes) and one additional general-purpose lane in each direction east of I-405. The HOV lanes were not assumed to be tolled in the forecasting modeling.
- **Northup Way:** Provide nonmotorized facilities along the corridor; a center, two-way, left-turn lane west of 120th Avenue NE; and an additional eastbound through lane and turn lanes between 120th and 124th Avenues NE.
- **BNSF railroad right-of-way.** Provide a multiuse pathway for nonmotorized travel. The BNSF railroad right-of-way would likely be “rail-banked” under federal law, which allows the whole or a substantial part of a former railroad right-of-way corridor to be converted

back or shared with future railroad or transportation facilities, even after a nonmotorized facility is constructed.

- **NE 24th Street.** Provide nonmotorized facilities between Northup Way and 130th Avenue NE.
- **NE 10th Street.** Construct a five-lane extension from 112th Avenue NE across I-405 to 116th Avenue NE.
- **148th Avenue NE and NE 20th Street intersection:** Widen for turn lanes.
- **148th Avenue NE and Bel-Red Road intersection:** Widen for turn lanes.

Intersection Traffic Operations

The quality of traffic operations on roadway facilities is often described in terms of LOS, a measure of operational conditions and motorists' perceptions. The *Highway Capacity Manual* (HCM) methodology is typically used for calculating LOS at signal- and stop-controlled intersections. For signalized intersections, the LOS is related to the average delay experienced by all vehicles as they approach the intersection.

LOS ratings range from "A" to "F" and are associated with ranges in delay experienced, as shown below in Table 10-1. LOS A represents the best operation and LOS F the poorest operation. LOS D or E is usually considered the minimum acceptable standard in urban areas. With this LOS, some delays are expected for certain traffic movements.

TABLE 10-1
Levels of Service
Bel-Red Corridor Draft Environmental Impact Statement

LOS	Control Delay (seconds) Signalized
A	Less than 10
B	More than 10 to 20
C	More than 20 to 35
D	More than 35 to 55
E	More than 55 to 80
F	More than 80

Source: Transportation Research Board, 2000.

Under the GMA, local governments are required to set acceptable operational standards for their transportation systems. Each jurisdiction decides what level of traffic congestion, is acceptable. This standard is then adopted as part of the transportation element of the local government's comprehensive plan.

Operational standards required by the GMA are closely related to the concept of concurrency; the GMA requires transportation improvements to be made concurrent with development, or land use adjustments should be made if transportation improvements cannot be identified. When a proposed project causes a component of the affected transportation system to exceed

the accepted standard, then the local government has the responsibility either to prohibit the project's approval or to require the developer to commit to – or pay for – transportation improvements or strategies to mitigate the impacts in a time frame concurrent with (defined as within six years of) the development.

The *Comprehensive Plan* establishes operational (traffic concurrency) standards for each of a set of geographic areas, referred to as Mobility Management Areas (MMAs); the Bel-Red/Northrup mixed commercial/residential area is in MMA 4. This area has an operational standard approximately corresponding to a LOS D determined by averaging individual intersection volume-to-capacity (V/C) ratios. This methodology compares the volume of traffic demand at an intersection with the amount of traffic the intersection can physically accommodate, which is also known as capacity. Volume-to-capacity ratios less than 1.0 mean the intersection operates below capacity, while ratios greater than 1.0 mean the intersection would be congested beyond capacity limits. The City monitors concurrency annually and adjusts programs and resources as necessary to maintain standards. The City has never had to deny development requests to maintain concurrency. The V/C methodology is described here as background regarding City of Bellevue process for short-term, project-level review and analysis of proposed development.

Forty-seven intersections within and surrounding the Bel-Red Corridor were evaluated to determine the project's effect on traffic operations. The City of Bellevue's 2005 intersection LOS results are reported later in the Existing Conditions section of this chapter. These results were obtained by using the UFOSNET model and the methodology outlined in the HCM Special Report 209, which is a delay-based calculation, not the V/C concurrency methodology described above. The average hourly traffic volumes from the two-hour PM peak monitoring period were used for evaluating existing conditions.

The 2030 No-Action Alternative and the action alternatives were evaluated for their effects on intersection LOS using the delay methodology based on the Synchro® software program. Synchro® is a macroscopic intersection capacity analysis and signal-timing optimization model that uses the methods described in the HCM to measure intersection LOS. The LOS analysis for all alternatives was conducted using PM peak one-hour traffic volumes because that is a worst-case analysis. Although the existing conditions and future conditions methodologies are different, it was necessary to change methodologies for the future conditions analysis because the action being analyzed in this EIS is not a short-term, project-level development; rather it is a long-term, planning analysis. In addition, the different methodology allowed for needed transportation improvements to be more readily identified. As a result, comparing intersection operations between existing and future conditions cannot and should not be made; however, the important comparison between future No-Action and action alternatives can and should be made.

As mentioned previously, it is the City's concurrency policy that poor operations at any one intersection is not necessarily cause for denial of a project or action; rather, the operations of signalized intersections within each MMA are averaged and compared with the adopted LOS standard, such that the system as a whole must operate according to standard. Furthermore, intersection operations are measured over a two-hour period, as defined by the City's Traffic Standards Code as between 4:00 and 6:00 PM. The City's policy allows for some individual intersection "failures" – as long as other intersections operate well enough to offset the individual intersection failure – and recognizes that congestion in urban areas often takes more than one hour to dissipate. This chapter uses a different methodology, and it reports *individual*

and *one-hour* intersection LOS because a one-hour analysis is a worst-case scenario. The intersection LOS standards are not averaged by MMA. As a result, this chapter does not provide a direct comparison with the City's adopted LOS standard. However, because this is a programmatic analysis, the intersection LOS results do provide a useful basis for comparing transportation performance among the alternatives.

The intersection operational analysis performed for this planning effort did not evaluate the effect of LRT passing through the corridor. It is unknown at this time the exact location of the LRT or whether it will be at-grade or elevated. These are decisions to be studied through a separate environmental process conducted by Sound Transit for the planned LRT. Because LRT is not a City action, but a Sound Transit action, the impacts of LRT on arterial street operations will be studied through Sound Transit's environmental process.

Effects on Adjacent Neighborhoods

A concern expressed during project scoping was the potential for increased traffic from Bel-Red Corridor redevelopment to intrude into surrounding residential neighborhoods. The potential for neighborhood traffic intrusion was evaluated for each alternative based on forecasts of 2030 PM peak-hour traffic volumes. These traffic volumes were used to estimate traffic volumes that cross specifically mapped lines—known as screenlines—located just north, south, west, and east of the Bel-Red Corridor. Traffic volumes for roadways that cross these mapped screenlines are totaled for each alternative so that changes in traffic volumes entering and leaving the Bel-Red Corridor can be compared. The 2030 PM peak-hour screenline traffic volumes for the action alternatives were then compared with the No-Action Alternative to identify the potential for neighborhood traffic intrusion based on the development level and proposed transportation system improvements included in each alternative.

Traffic Safety

The City of Bellevue tracks accident information at all intersections. The City's 2005 State of Mobility Report includes a list of the top 30 high accident intersections and the top 15 high accident midblock corridors within City limits.

Accident rates are used to determine the relative number of accidents that occur at any given location. Accident rates allow intersections or midblock corridors serving high volume of cars to be compared with those that serve a lower volume. The intersection accident rate describes the number of accidents for every million vehicles entering the intersection. The midblock accident rate describes the number of accidents occurring midblock in relation to every million vehicle miles traveled within the corridor segment. As a result, the midblock accident rate is a function of the segment length in addition to the number of vehicles traveling the corridor.

For all alternatives, locations currently on the City of Bellevue's list of high accident intersections and midblock locations were reviewed in light of the proposed transportation network improvements are assumed for the Bel-Red Corridor.

The City of Bellevue's accident records for the period between January 2001 and July 2006 were also reviewed to identify locations where pedestrian and bicycle accidents have occurred.

Transit

As described in Chapter 2, Sound Transit is proposing to build an LRT line through the Bel-Red Corridor – known as the East Link Project – as part of its recently adopted *ST2 Plan*. The LRT line, therefore, became a part of all 2030 alternatives. The City’s BKR model forecasts transit ridership for the AM peak hour. As a result, 2030 AM peak-hour ridership forecasts for the proposed LRT stations were developed. Separate transit networks, as described below, were developed for each alternative. As appropriate, transit lines, stations, headways, auto and pedestrian access links, and other transit attributes were adjusted to reflect the updated regional, long-range transit plan. Key changes to background transit network assumptions that were made to the BKR model for this project are listed below.

- Regional transit network changes:
 - Seattle Monorail Project lines were removed.
 - Link LRT lines were modified according to the *Sound Transit Long-Range Plan* as follows:
 - LRT 7001 (Everett-to-Kent) line was removed.
 - LRT 7002 was shortened from Tacoma-to-Northgate to Seattle-Tacoma International (Sea-Tac) Airport-to-Northgate.
 - LRT 7003 was shortened from Everett-to-Redmond to Northgate-to-Bellevue-to-Redmond.
 - LRT 7004 (Lynnwood-to-Issaquah) line was removed.
- LRT East Link Project assumptions:
 - LRT 9003 assumed to extend from Northgate-to-Downtown Seattle to Bellevue-to-Redmond.
 - LRT headways assumed to be 7.5 minutes between trains.
- LRT stations for the No-Action Alternatives and all action alternatives:
 - Two to three LRT stations are coded in the study area for all alternatives.
 - Stations for all alternatives were assumed to be connected to the Downtown Bellevue Transit Center to the west and Overlake Transit Center station to the east.
- Local bus connections:
 - Local buses were rerouted in the BKR model to provide sufficient transit coverage under different land use scenarios and to provide the best connections to the different station locations among the alternatives.
 - Forecasted three-hour AM peak-period boardings and alightings for each station were extracted from the transit assignment results. The resulting ridership projections were reviewed and the potential impacts to transit facilities and service were identified for the No-Action Alternative and all action alternatives.

Nonmotorized Transportation

Existing pedestrian and bicycle facilities are described based on City of Bellevue documentation. Nonmotorized facilities in the *1999 Pedestrian and Bicycle Transportation Plan Update* are assumed to be in place by 2030. Nonmotorized transportation facilities for the action alternatives are generally shown in Appendix F. Because the specifics of each proposed facility have not yet been developed, the discussion of future nonmotorized transportation facilities focuses on the intended LOS standards and degree of quality for future facilities. A toolkit of features that can be used to achieve the intended LOS is also described. The characteristics of the different land use designations and accessibility issues associated with these land use patterns (i.e., high-density housing and mixed-use areas versus medium-intensity office areas) are generally described along with possible design solutions.

Existing Conditions

Roadways

Figure 10-1 illustrates the roadway network within the Bel-Red Corridor. SR 520 marks the edge of the study area to the north, while I-405 marks the western edge separating the corridor from Downtown Bellevue north of NE 12th Street.

Road Designations

In Bellevue's *Comprehensive Plan*, Bel-Red Road is designated as a major arterial, as are two main north-south routes: 116th Avenue NE (south of NE 12th Street) on the west end of the study area and 148th Avenue NE on the east end. Minor arterials in the Bel-Red Corridor include NE 20th Street, 116th Avenue NE (north of NE 12th Street), 124th Avenue NE, 140th Avenue NE, and 156th Avenue NE. All roadway classifications in the Bel-Red Corridor are illustrated in Figure 10-1. With the exception of 116th Avenue NE north of Bel-Red Road and 124th Avenue NE, all other major and minor arterials in the Bel-Red Corridor have at least two lanes in each direction, and most have a center two-way, left-turn lane. Speed limits on these roadways range between 25 and 35 miles per hour (mph).

Many arterials in the Bel-Red Corridor are designated truck routes (Figure 10-1). All trucks, truck tractors, truck and trailer combinations, or truck tractor and semitrailer combinations over eight feet wide, 32 feet long, or over 32,000 pounds, and all vehicles transporting radioactive or hazardous cargo shall be restricted to these authorized routes and/or the Washington State Highway System when traveling in or through the city of Bellevue. Half of the city's 20 authorized truck routes are located in or adjacent to the Bel-Red Corridor.

Traffic Volumes

Existing (2005) average daily traffic (ADT) volumes were provided by the City of Bellevue. Within the Bel-Red Corridor, the major and minor arterials (Bel-Red Road, NE 20th Street, 116th Avenue NE, 140th Avenue NE, 148th Avenue NE, and 156th Avenue NE) currently receive the heaviest use, with numbers ranging from 22,000 to 40,000 vehicles per day.

The remaining north-south arterial routes (124th Avenue NE and 130th Avenue NE) all receive daily usage generally ranging from 5,000 to 11,000 vehicles. Existing 2005 PM peak-hour traffic volumes are illustrated in Figure 10-1. PM peak-hour traffic volumes are typically 8 to 12 percent of the daily total volumes.

Intersection Traffic Operations

Table 10-2 summarizes and Figures 10-2 and 10-3 illustrate the 2005 LOS for intersections within and surrounding the Bel-Red Corridor.

TABLE 10-2
Existing (Year 2005) PM Peak, Two-Hour Average Level of Service at Study Intersections
Bel-Red Corridor Draft Environmental Impact Statement

Intersecting Streets		Level of Service	Delay (seconds per vehicle)
Bel-Red Road	NE 20th Street ¹	D	38
Bel-Red Road	NE 24th Street ¹	D	39
Bel-Red Road	NE 40th Street	D	39
Bellevue Way NE	Northup Way NE	D	42
NE 29th Place	NE 24th Street	B	12
Northup Way	NE 24th Street ¹	C	28
SR 520 southbound ramps	NE 51st Street	B	11
SR 520 northbound ramps	NE 51st Street	C	31
108th Avenue NE	Northup Way NE	D	49
112th Avenue NE	NE 4th Street	C	33
112th Avenue NE	NE 8th Street	F	107
112th Avenue NE	NE 12th Street	F	101
116th Avenue NE	NE 4th Street	C	27
116th Avenue NE	NE 8th Street ¹	D	46
116th Avenue NE	NE 12th Street ¹	D	47
120th Avenue NE	NE 8th Street	C	32
120th Avenue NE	NE 12th Street ¹	C	31
124th Avenue NE	Bel-Red Road ¹	D	52
124th Avenue NE	NE 8th Street	D	45
124th Avenue NE	Northup Way NE ¹	D	41
130th Avenue NE	NE 20th Street ¹	C	36
140th Avenue NE	Bel-Red Road ¹	D	50
140th Avenue NE	NE 8th Street	D	51
140th Avenue NE	NE 20th Street ¹	D	49
140th Avenue NE	NE 24th Street	D	36
148th Avenue NE	Bel-Red Road ¹	D	52
148th Avenue NE	NE 8th Street	D	48
148th Avenue NE	NE 20th Street ¹	E	66
148th Avenue NE	NE 29th Place	E	57
148th Avenue NE	NE 40th Street	D	41
148th Avenue NE	NE 51st Street	D	42
148th Avenue SE	SE 24th Street ¹	B	17

TABLE 10-2
Existing (Year 2005) PM Peak, Two-Hour Average Level of Service at Study Intersections
Bel-Red Corridor Draft Environmental Impact Statement

Intersecting Streets		Level of Service	Delay (seconds per vehicle)
156th Avenue NE	Bel-Red Road ¹	D	37
156th Avenue NE	NE 8th Street	D	50
156th Avenue NE	NE 24th Street ¹	F	94
156th Avenue NE	NE 31st Street	D	36
156th Avenue NE	NE 40th Street	D	42
156th Avenue NE	NE 51st Street	C	32
156th Avenue NE	Northup Way NE ¹	D	51
156th Avenue SE	SE Eastgate Way	D	51

Source: City of Bellevue, 2006.

¹Intersections located within the Bel-Red/Northup mixed commercial/residential area (MMA 4).

As shown in Table 10-2 and Figures 10-2 and 10-3, most intersections evaluated as part of this study currently operate at LOS D or better. The following six intersections currently operate at LOS E or F:

- 112th Avenue NE at NE 12th Street (LOS F)
- 112th Avenue NE at NE 8th Street (LOS F)
- 148th Avenue NE at NE 20th Street (LOS E)
- 156th Avenue NE at NE 24th Street (LOS F)
- 148th Avenue NE at NE 29th Place (LOS E)

The average delay of all intersections analyzed for this study is 44.7 seconds per vehicle, which corresponds to LOS D. The average V/C ratio is 0.67 for all study intersections and 0.69 for intersections located within the Bel-Red/Northup mixed commercial/residential area (MMA 4).

Accident Rates

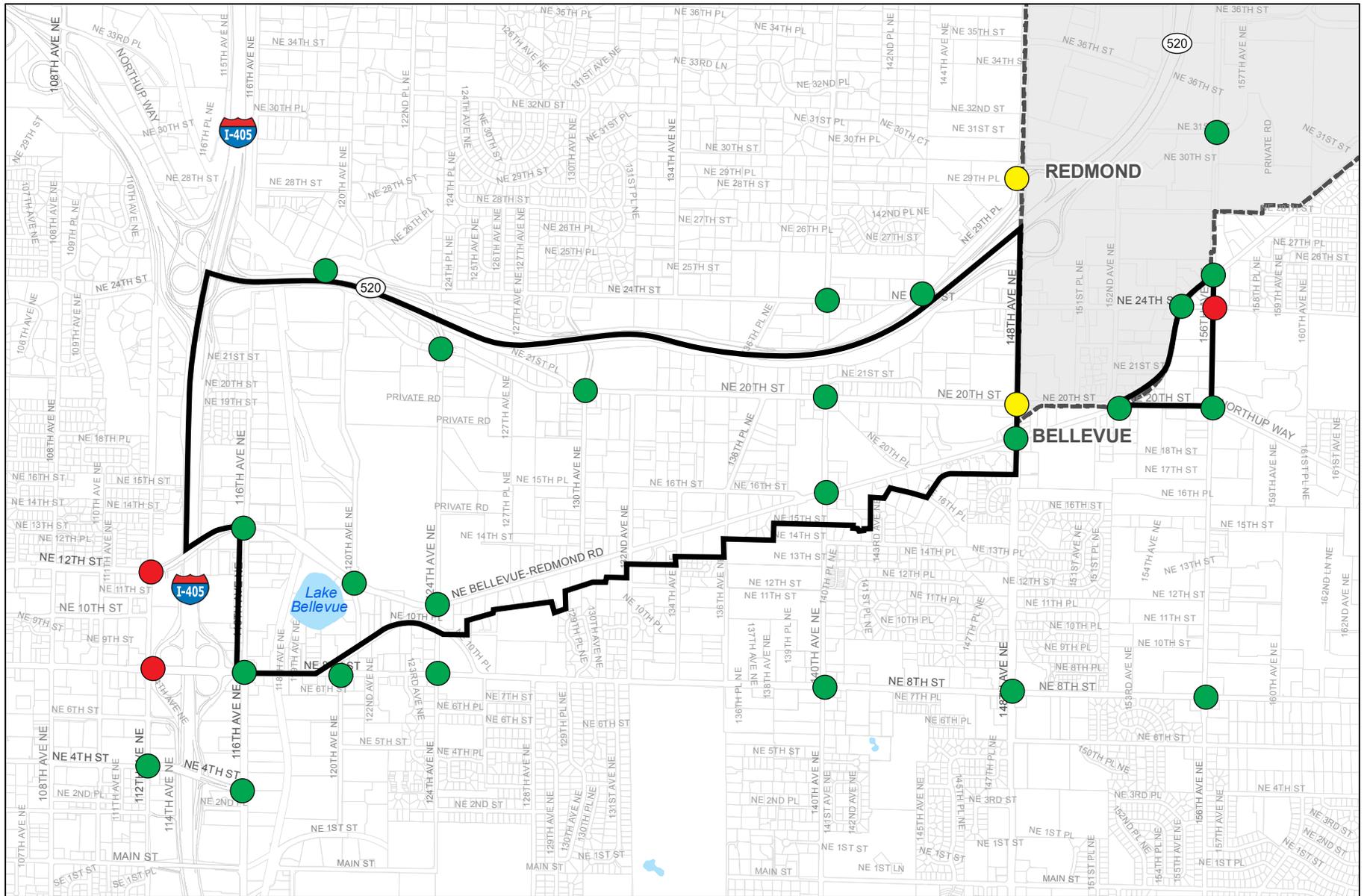
Table 10-3 lists the Bel-Red Corridor intersections that are included in the City's top 30 high accident intersections, along with the accident rate for each. Table 10-4 lists the midblock locations within the Bel-Red Corridor that are included in the City's top 15 high accident midblock corridors.

TABLE 10-3
2005 Highest Intersection Accident Rates Within the Bel-Red Corridor
Bel-Red Corridor Draft Environmental Impact Statement

Rank	Intersection	Rate ¹
13	Bel-Red Road at 140th Avenue NE	1.03
14	NE 24th Street at 156th Avenue NE	0.99
15	NE 20th Street at 130th Avenue NE	0.92
24	Northup Way at NE 24th Street	0.84
27	NE 8th Street at 116th Avenue NE	0.77
28	Bel-Red Road at 152nd Avenue NE	0.77

Source: City of Bellevue, 2006.

¹Accidents per million vehicles entering the intersection.



LEGEND

-  Bel-Red Corridor
-  Roadway
-  Parcel
-  City boundary
-  Lake

- Intersections level of service (LOS):**
-  LOS A, B, C, or D
 -  LOS E
 -  LOS F

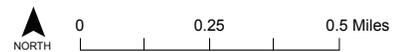
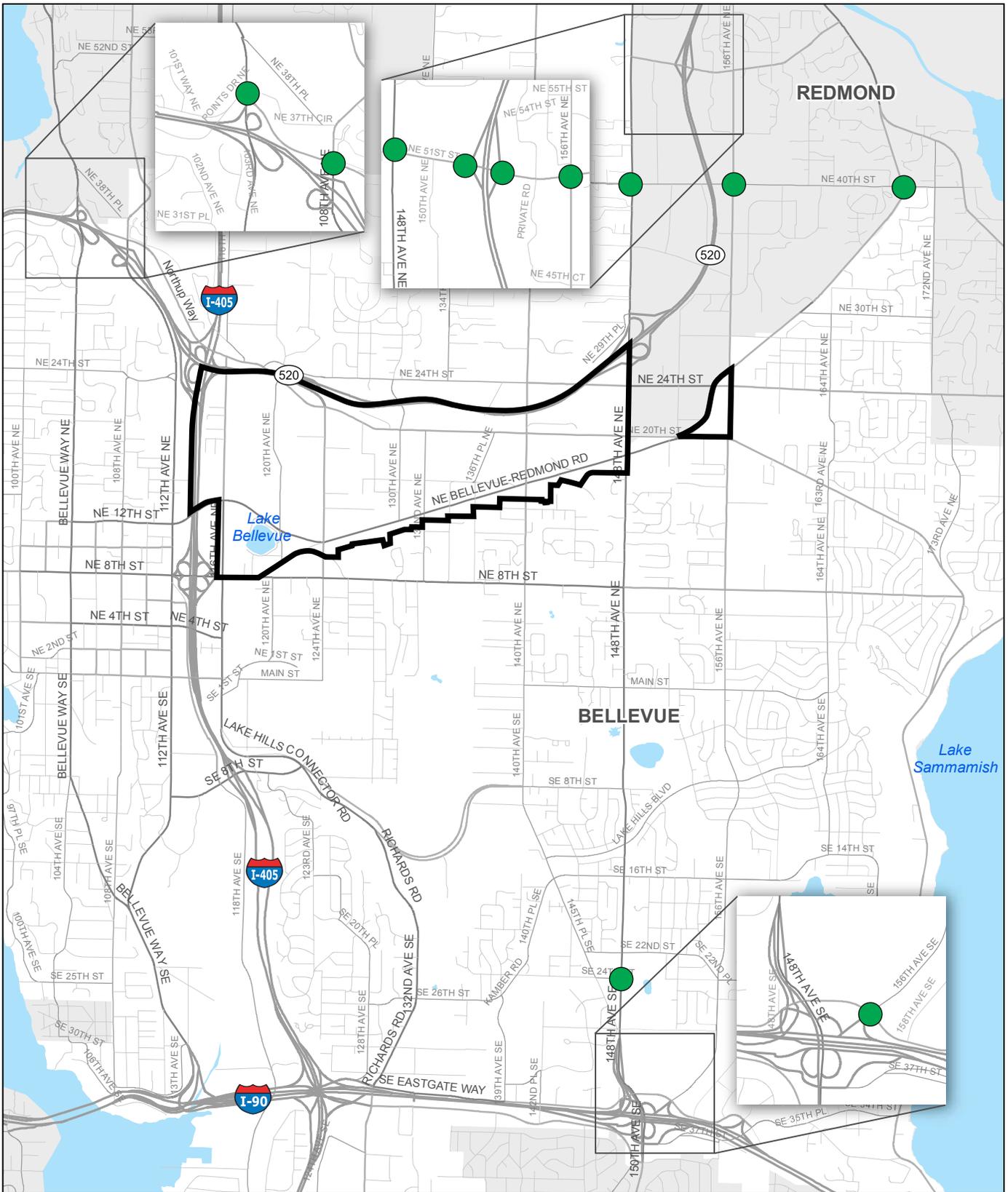


Figure 10-2
Existing (2005)
LOS Conditions
 Bel-Red Corridor Draft EIS



LEGEND

 Bel-Red Corridor

Intersections
level of service (LOS):
 LOS A, B, C, or D

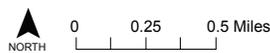


Figure 10-3
Existing (2005) LOS
Conditions
Bel-Red Corridor Draft EIS

TABLE 10-4
2005 Highest Midblock Corridor Accident Rates Within the Bel-Red Corridor
Bel-Red Corridor Draft Environmental Impact Statement

Rank	Midblock Corridor	Rate ¹
4	Bel-Red Road from NE 16th Street to 140th Avenue NE	13.49
7	140th Avenue NE from NE 14th Street to Bel-Red Road	11.29
13	NE 20th Street from Bel-Red Road to 156th Avenue NE	9.17

Source: City of Bellevue, 2006.

¹Accidents per million vehicle miles traveled in the corridor.

Bel-Red Road from NE 16th Street to 140th Avenue NE had the fourth-highest midblock accident rate in 2005. In 2004, this midblock location was ranked first with nearly the same accident rate (11.81).

Based on a review of the City of Bellevue's accident records for roadways in the Bel-Red corridor, accidents involving a pedestrian and/or bicycle have occurred along the following roadways between January 2001 and July 2006:

- 8th Avenue NE between NE 116th Street and NE 120th Street: two accidents (one bicycle, one pedestrian)
- NE 116th Street from 8th Avenue NE to Northrup Way: two accidents (one bicycle, one pedestrian)
- 120th Avenue NE between Bel-Red Road and Northrup Way: one accident (bicycle)
- 124th Avenue NE between NE 10th Place and Bel-Red Road: one accident (pedestrian)
- Northrup Way between 116th Avenue NE and 130th Avenue NE: one accident (pedestrian)
- NE 20th Street between 130th Avenue NE and 148th Avenue NE: five accidents (three bicycle, two pedestrian)
- 130th Avenue NE between Bel-Red Road and NE 24th Street: three accidents (one bicycle, two pedestrian)
- 134th Avenue NE between Bel-Red Road and NE 16th Street: two accidents (1 bicycle, 1 pedestrian)
- 136th Place NE between NE 16th Street and NE 20th Street: two accidents (one bicycle, one pedestrian)
- 140th Avenue NE between Bel-Red Road and NE 21st Street: three accidents (all bicycle)
- Bel-Red Road between 124th Avenue NE and 148th Avenue NE: nine accidents (five bicycle, four pedestrian)
- 148th Avenue NE between NE 16th Street and SR 520 eastbound ramps: two accidents (one bicycle, one pedestrian)

As shown above, the highest number of pedestrian and bicycle accidents occurred along NE 20th Street and Bel-Red Road. Specific accident causes and contributing factors are details of an accident analysis that will be studied when a specific roadway project is proposed and a corresponding project-level EIS is prepared.

Railway

A BNSF railroad right-of-way runs north-south through the western portion of the study area and is used on a limited basis for freight and the Spirit of Washington Dinner Train.

The PSRC is examining current and potential future transportation uses for the rail corridor in east King and south Snohomish counties between the cities of Renton and Snohomish. The study, to be completed in early 2007, will identify the most desirable and feasible uses for the corridor. For the Bel-Red Corridor project, however, it was assumed that the existing rail line will be used as a multiuse path and/or trail, with the option for future rail use in accordance to rail-banking provisions.

Transit Facilities and Service

Park-and-Ride Lots

Within the city of Bellevue are two types of park-and-ride lots: permanent lots are provided by a public agency, such as WSDOT, or a transit agency; and lots where parking spaces are not used during weekdays are leased from churches or other entities for use by commuters.

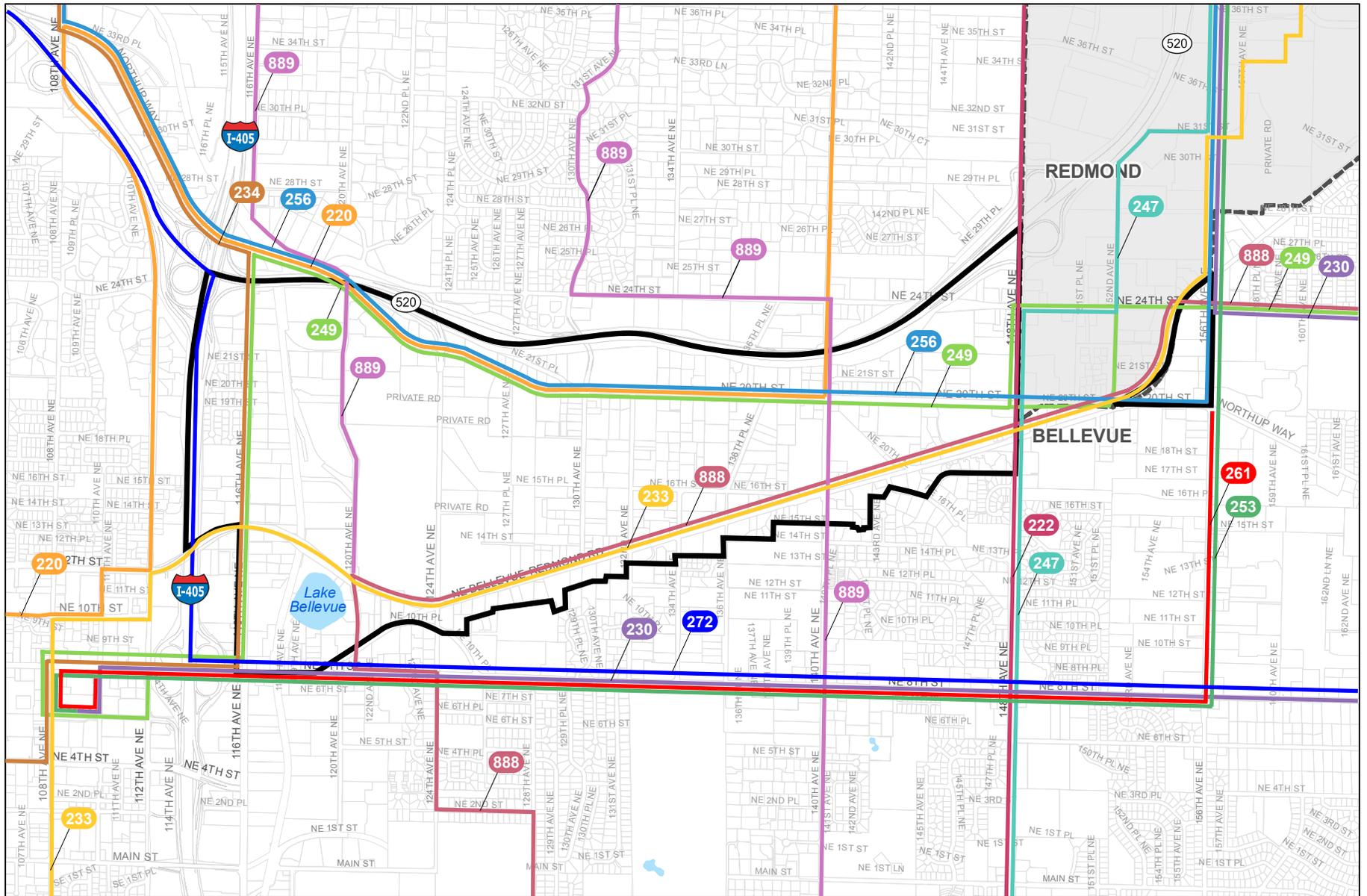
Most permanent park-and-ride lots in Bellevue serve as hubs where connections can be made between regional, intercommunity, and local transit services. Leased lots might only serve one or two routes, or they might be meeting places for vanpools and carpools. There are no park-and-ride lots located in the Bel-Red Corridor, but there are two nearby. The Bellevue Christian Reformed Church parking lot located on 148th Avenue NE just south of the study area provides 20 leased spaces for park-and-ride use. The Overlake park-and-ride lot, located on 152nd Avenue NE and NE 24th Street in Redmond, provides 203 spaces.

Transit Service

King County Metro currently provides limited bus service within the Bel-Red Corridor as illustrated in Figure 10-4 and listed below:

- Bel-Red Road: Routes 233 and 888
- Northup Way and NE 20th Street: Routes 220, 249, and 256
- NE 8th Street: Routes 230, 253, 261, 272, and 886
- 116th Avenue NE: Route 234
- 140th Avenue NE: Route 889
- 148th Avenue NE: Routes 222 and 247

Routes 886, 888, and 889 provide service to Bellevue, Interlake, and Sammamish high schools, respectively. All other routes run on half-hour headways during the peak commute periods. Routes 247, 256, and 261 provide peak-hour service only; the remaining routes operate on 30- to 60-minute headways during off-peak periods.



LEGEND

- Bel-Red Corridor
 - Roadway
 - Parcel
 - City boundary
 - Lake
- | | | |
|-----|-----|-----|
| 220 | 247 | 272 |
| 222 | 249 | 888 |
| 230 | 253 | 889 |
| 233 | 256 | |
| 234 | 261 | |

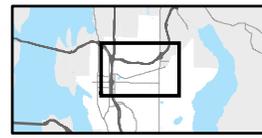
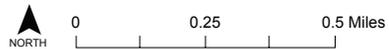


Figure 10-4
Existing
Transit Routes
 Bel-Red Corridor Draft EIS

Nonmotorized Transportation

The figures in Appendix F illustrate the existing pedestrian and bicycle network in the Bel-Red Corridor. In this figure, sidewalks are drawn in red and bicycle paths in yellow.

Sidewalks

Sidewalks exist on many major arterial roads, but they are sporadic, especially through the study area interior. Moreover, the existing block system in most of the study area is quite large in scale: four of the existing east-west blocks measure about one-quarter mile, two measure one-third to nearly one-half mile, and one is a relatively small and pedestrian-friendly one-eighth mile. Thus, only a small percentage of the study area is accessible from a street network, and only a small percentage of these streets, in turn, provide pedestrians with a sidewalk. The lack of a pedestrian system is largely a function much of the existing development, which consists of predominantly automobile- and truck-oriented land uses, such as warehouse, storage, and distribution facilities.

Multipurpose Paths

One off-street multipurpose path exists in the study area, an approximately 350-foot stretch connecting 136th Place NE to Bel-Red Road. In addition, a regional path, the SR 520 Trail, follows along the north side of SR 520, which currently ends on the west at NE 24th Street near 124th Avenue NE.

Bicycle System

Three types of routes are provided for bicyclists in the city of Bellevue: primary, secondary, and tertiary routes. Primary routes provide general mobility throughout the city and serve as the backbone of the bicycle system. Secondary routes provide connections to and between primary routes. Tertiary routes provide connections to secondary routes and are typically more local in nature. The following primary, secondary, and tertiary bicycle routes currently exist in the Bel-Red Corridor:

- Primary: SR 520 Trail, Bel-Red Road, NE 12th Street, and 140th Avenue NE
- Secondary: NE 24th Street, NE 8th Street, Main Street, Northup Way, and NE 20th Street between 120th and 124th Avenues NE
- Tertiary: Northup Way west of 120th Avenue NE, 124th Avenue NE, 130th Avenue NE, and 132nd Avenue NE

Impacts

The following impact assessment addresses how the No-Action Alternative and the three action alternatives would affect the Bel-Red Corridor transportation system.

Construction Impacts

Construction activity impacts would occur as a result of land redevelopment and the construction of new transportation facilities under each action alternative. Construction impacts will also occur with the No-Action Alternative, but to a lesser extent. Construction activities

would cause delay and inconvenience to vehicle and nonmotorized traffic near the construction work zones. Temporary and intermittent lane closures, detours, and property access restrictions would occur. Construction activities might cause traffic to shift to other routes during the construction period. Access to businesses located in work zones might be temporarily disrupted. Pedestrians would experience inconvenience and delays where roadways are widened and existing sidewalks reconstructed. Truck traffic associated with construction activities would increase and could cause some temporary inconvenience. The potential for traffic accidents could rise during construction due to traffic revisions, changes in access, and increased congestion. And last, impacts to utilities and interruptions in service might be experienced as construction in the area proceeds.

Construction traffic impacts would be greatest for Alternative 3 due to the amount of redevelopment and new construction (approximately 10.5 million square feet) that is expected to occur. The least amount of impact is expected to occur with the No-Action Alternative (approximately 1 million square feet of new construction). Also, impacts are expected to be greater in the western half of the corridor because most transportation facilities listed in Table 10-5 would be located there.

North of the Bel-Red Corridor, construction traffic impacts would occur in the North Bellevue neighborhood when the two-way, left-turn lane on Northrup Way (all alternatives) is constructed. Some construction traffic impacts would be expected in Downtown Bellevue during construction of the NE 16th Street/ NE 12th Street connection to Downtown (Alternatives 1 and 3) and the NE 10th Street I-405 overcrossing (all alternatives). In the Wilburton neighborhood, construction traffic impacts are expected while the NE 4th or NE 6th Street extension (all action alternatives) is being constructed and during the widening of 120th Avenue NE (all action alternatives).

Although completing the 124th Avenue NE interchange with SR 520 will generate some construction and operational impacts in the Bel-Red Corridor, this environmental document addresses only those actions taken by the City, as opposed to those taken by WSDOT. A separate project-level environmental analysis will be conducted for the 124th Avenue and SR 520 interchange.

Operational Impacts Common to All Action Alternatives

The impacts described in this section generally display measurable differences between the No-Action Alternative and the action alternatives. Tables in each subsequent subsection summarize impacts by alternative. The No-Action Alternative is used to compare all action alternatives. To meaningfully compare the overall effects of the alternatives, the No-Action Alternative and action alternatives are discussed together under each topic heading. This allows each alternative to be compared and contrasted with the others in terms of its relative performance. Details on specific components of the project proposal, such as specific transportation network improvements, are discussed in the next section.

TABLE 10-5
 Transportation System Improvement Matrix by Land Use Alternative
Bel-Red Corridor Draft Environmental Impact Statement

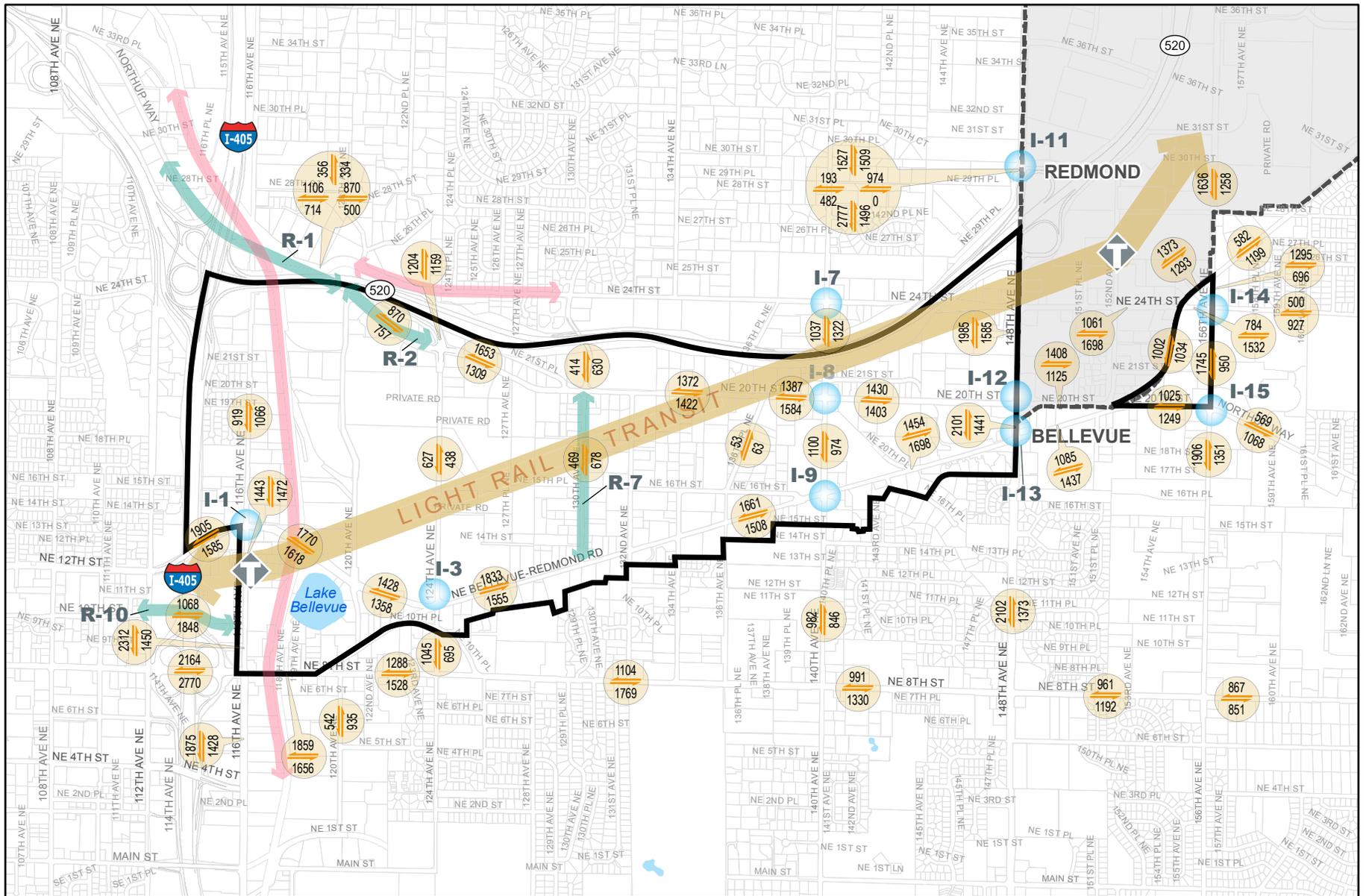
Transportation Improvement	Alternative			Project No. on Figures 10-5 through 10-8	
	No-Action	1	2		3
Light-Rail Transit					
Two LRT Stations between I-405 and 156th Avenue NE	■	■			n/a
Three LRT Stations between I-405 and 156th Avenue NE			■	■	n/a
Nonmotorized Transportation					
Sidewalks on all new streets and street improvements	■	■	■	■	n/a
Bicycle facilities on all arterials (shared lanes or bicycle lanes)		■	■	■	n/a
Off-street paths, including BNSF right-of-way	■	■	■	■	n/a
Neighborhood Protection					
Traffic-calming or diverting measures designed to discourage thru traffic		■	■	■	n/a
Parking restrictions and enforcement		■	■	■	n/a
Roadway					
Northup Way, two-way left-turn lane west of 120th Avenue NE	■	■	■	■	R-1
Northup Way, add eastbound through lane between 120th and 124th Avenues NE	■	■	■	■	R-2
NE 4th or NE 6th Street Extension, 116th to 120th Avenues NE, four lanes		■	■	■	R-3
116th Avenue NE, widen to two lanes in each direction		■	■	■	R-4
120th Avenue NE, widen to five lanes between Northup Way and NE 8th Street		■	■	■	R-5
124th Avenue NE, widen to five lanes between Northup Way and Bel-Red Road		■	■	■	R-6
130th Avenue NE, widen to four lanes with turnpockets between NE 16th Street and NE 20th Street	■	■	■	■	R-7
NE 16th Street					R-8
Five-lane roadway, linking to Downtown Bellevue via NE 12th Street		■		■	
Three-lane roadway, west terminus at 116th Avenue NE			■		
NE 16th Street east end treatment with terminus at NE 20th Street.					R-9
Five-lane to three-lane reduction following along 136th Avenue NE		■	■	■	
Continue three-lane section to NE 20th Street along 136th Avenue NE		■	■	■	
Two-lane nonarterial connection between 136th Avenue NE and Bel-Red Road		■	■	■	
NE 10th Street I-405 overcrossing	■	■	■	■	R-10
NE 10th Street extension, 116th to 124th Avenues NE					R-11

TABLE 10-5
 Transportation System Improvement Matrix by Land Use Alternative
Bel-Red Corridor Draft Environmental Impact Statement

Transportation Improvement	Alternative			Project No. on Figures 10-5 through 10-8
	No-Action	1	2	
Three-lane roadway		■	■	
Four-lane roadway				■
NE 12th Street				R-12
Widen to six lanes between 112th Avenue NE and new NE 16th Street connection		■	■	■
Reduce functional class and capacity between new NE 16th Street and 124th Avenue NE				■
SR 520 and 124th Avenue NE interchange, construct ramps to and from the east		■	■	■
SR 520 and 124th Avenue NE interchange, construct ramps to and from the east		■	■	■
NE 12th St and 116th Avenue NE, intersection turn pockets ¹	■	■	■	■
Northrup Way and 124th Avenue NE, intersection turn pockets ¹	■	■	■	■
Bel-Red Road and 124th Avenue NE				I-3
Intersection turn pockets	■			
Realign 124th Avenue NE to the west and under NE 12th Street		■		
North approach channelization revisions			■	
Five-leg intersection				■
NE 8th Street and 124th Avenue NE, intersection turn pockets ¹		■	■	■
NE 20th Street and 136th Avenue NE, intersection turn pockets ¹		■	■	■
NE 16th Street and Bel-Red Road, right-in and right-out access only		■	■	■
NE 24th Street and 140th Avenue NE, intersection turn pockets ¹	■	■	■	■
NE 20th Street and 140th Avenue NE, intersection turn pockets ¹	■	■	■	■
Bel-Red Road and 140th Avenue NE, intersection turn pockets ¹	■	■	■	■
NE 8th Street and 140th Avenue NE, intersection turn pockets ¹				■
NE 29th Place and 148th Avenue NE, intersection turn pockets ¹	■	■	■	■
NE 20th Street and 148th Avenue NE, intersection turn pockets	■	■	■	■
Bel-Red Road/148th Avenue NE, intersection turn pockets	■	■	■	■
NE 24th Street and 156th Avenue NE, intersection turn pockets ¹	■	■	■	■
NE 20th Street and 156th Avenue NE, intersection turn pockets ¹	■	■	■	■

Source: CH2M HILL, 2006.

¹See Appendix G for specific intersection improvements.



LEGEND

- Bel-Red Corridor
- Intersection improvements
- 2030 PM peak-hour traffic volumes
- Arterial improvements
- Nonmotorized improvements
- Potential LRT alignments
- Potential LRT station locations; number of and specific locations will require additional analysis.

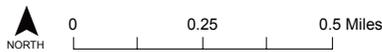
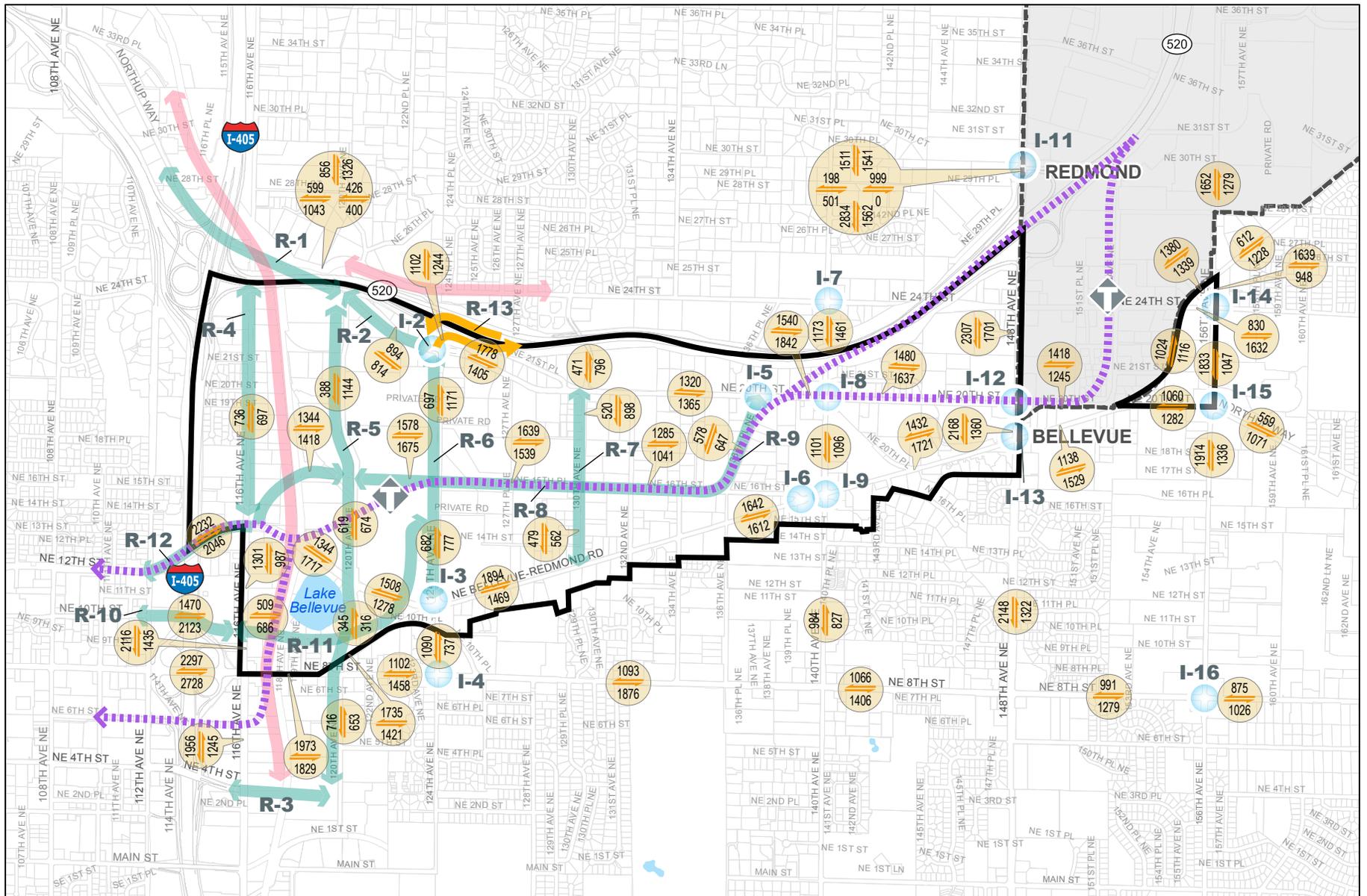


Figure 10-5
No-Action Alternative
Transportation Improvements and
2030 PM Peak-Hour Traffic Volumes
 Bel-Red Corridor Draft EIS



LEGEND

-  Bel-Red Corridor
-  Intersection improvements
-  2030 PM peak-hour traffic volumes
-  New freeway access
-  Arterial improvements
-  Nonmotorized improvements
-  Potential LRT alignments
-  Potential LRT station locations; number of and specific locations will require additional analysis.

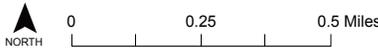
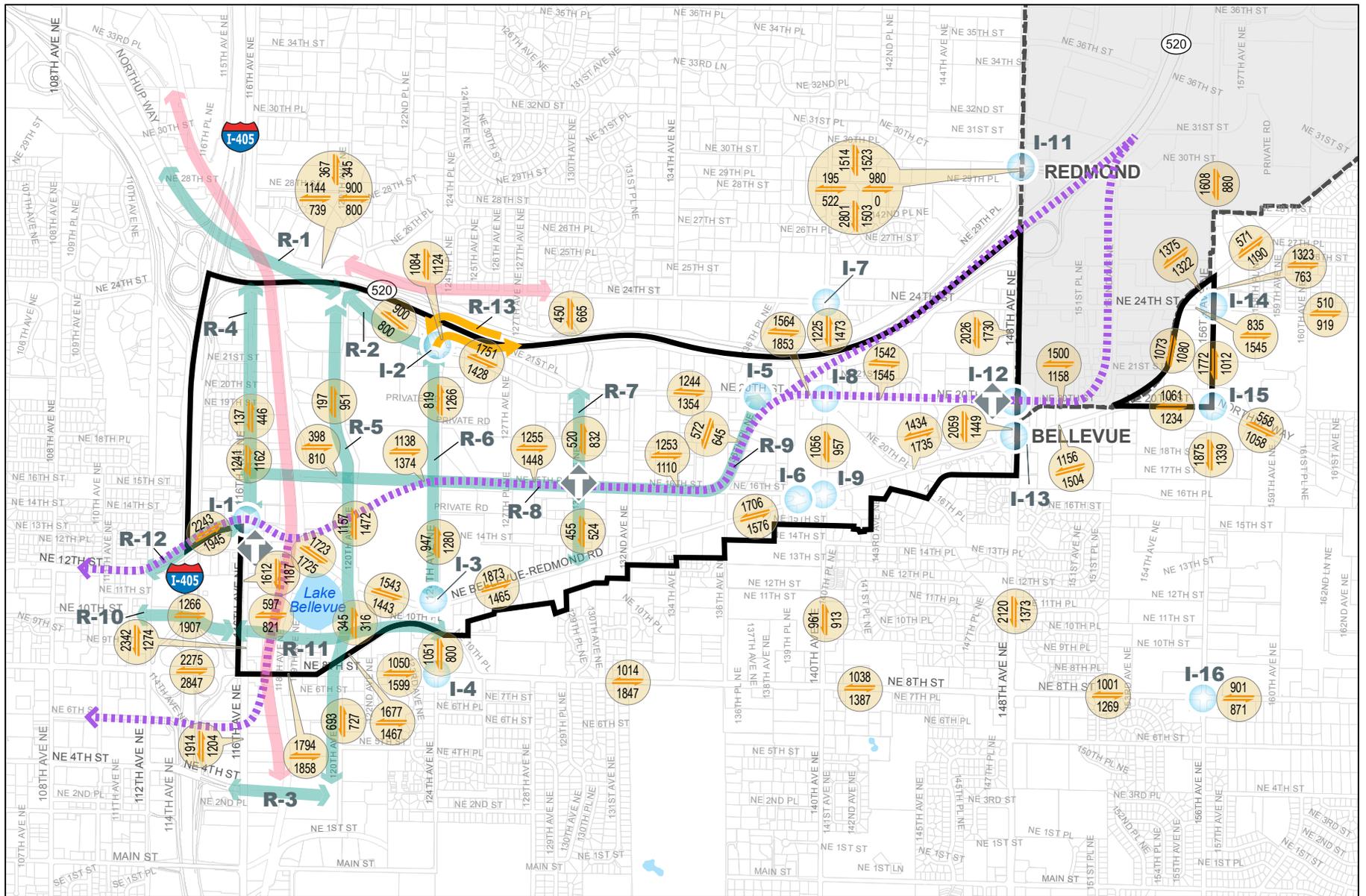


Figure 10-6
Alternative 1
Transportation Improvements and
2030 PM Peak-Hour Traffic Volumes
 Bel-Red Corridor Draft EIS



LEGEND

Bel-Red Corridor

Intersection improvements

2030 PM peak-hour traffic volumes

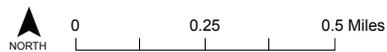
New freeway access

Arterial improvements

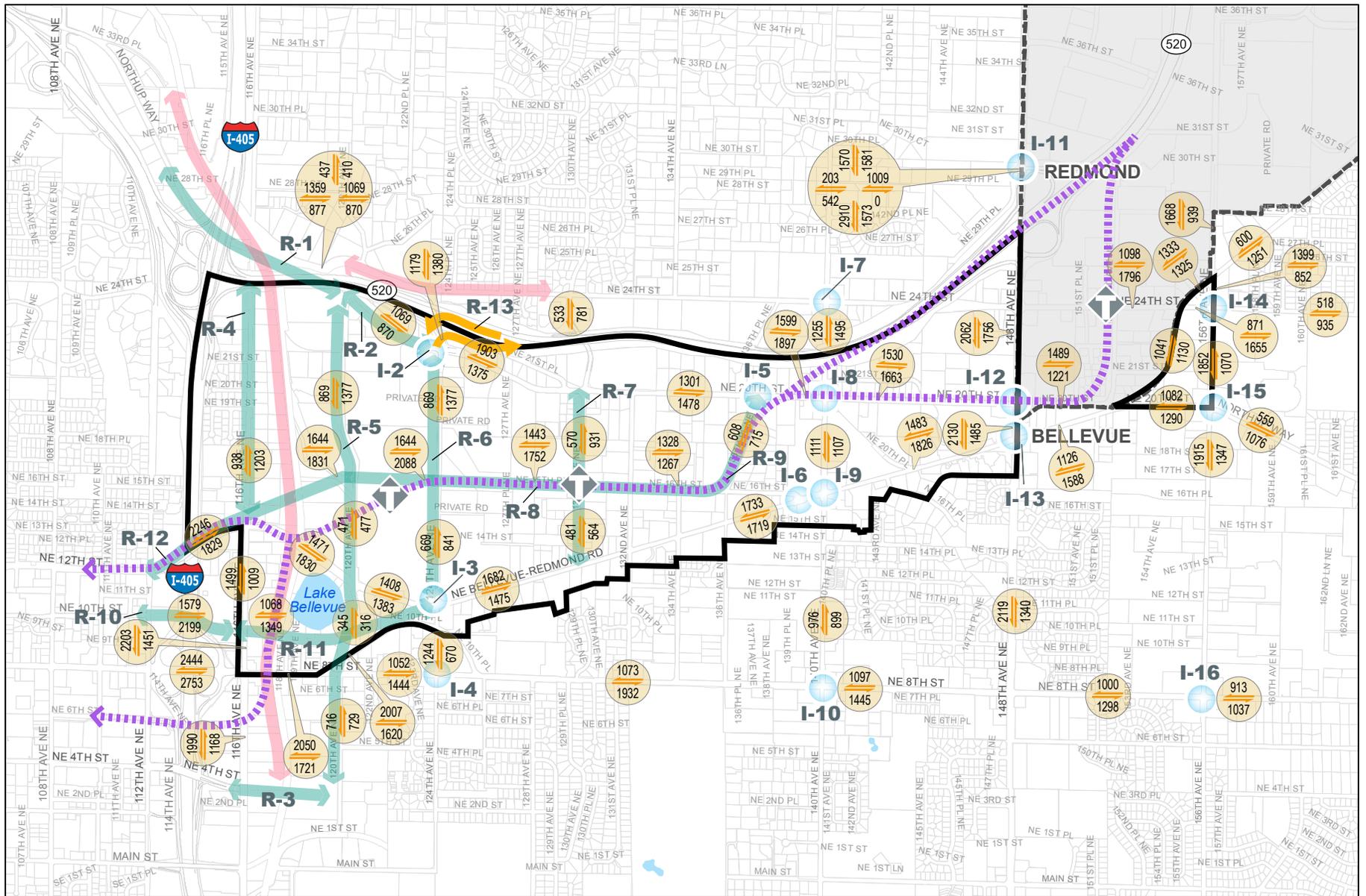
Nonmotorized improvements

Potential LRT alignments

Potential LRT station locations; number of and specific locations will require additional analysis.



**Figure 10-7
Alternative 2
Transportation Improvements and
2030 PM Peak-Hour Traffic Volumes
Bel-Red Corridor Draft EIS**



LEGEND

Bel-Red Corridor

Intersection improvements

2030 PM peak-hour traffic volumes

New freeway access

Arterial improvements

Nonmotorized improvements

Potential LRT alignments

Potential LRT station locations; number of and specific locations will require additional analysis.

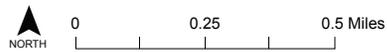


Figure 10-8
Alternative 3
Transportation Improvements and
2030 PM Peak-Hour Traffic Volumes
 Bel-Red Corridor Draft EIS

Roadways

Planned Projects

The Bel-Red/Overlake Transportation Study (BROTS) is a cooperative effort and subject to an interlocal agreement between the cities of Bellevue and Redmond to balance transportation and development to the mutual benefit of both communities through 2012. This Interlocal Agreement was originally completed in September 1999 and has been updated annually since then. The agreement identifies specific projects intended to accommodate growth and create transportation solutions in both Bellevue and Redmond.

To analyze the No-Action Alternative, it was assumed that all funded projects within and immediately surrounding the Bel-Red Corridor and all (funded and unfunded) projects outside of the Bel-Red Corridor from BROTS, the City of Bellevue projects in the TFP, the City of Bellevue projects associated with the *Downtown Implementation Plan (DIP)*, and the *NE 10th Street Extension and Overlake Hospital Medical Center Expansion EIS* would be in place by 2030. For the action alternatives, these same improvements, as well as several additional improvements proposed as part of the land use alternatives, also were assumed to be in place by 2030. Figures 10-5 through 10-8 identify the projects within the Bel-Red Corridor assumed to be part of the No-Action Alternative and all action alternatives; these transportation improvement projects are also listed in Table 10-5.

Some of the improvements listed in Table 10-5 differ among the action alternatives. For example, three different east-end treatments for the NE 10th Street extension were analyzed, one in each land use alternative, with the intent that the analysis would identify one preferred alternative that could be included in the preferred land use alternative. The three roadway improvements that differ among the three action alternatives include the following:

- **Bel-Red Road and 124th Avenue NE:** roadway realignment and/or intersection and channelization modifications
- **NE 16th Street:** changes to roadway capacity, west-end street extensions and/or roadway realignment
- **NE 10th and NE 12th streets:** roadway extension (NE 10th Street) and changes to roadway capacity

The way in which these improvements differ among the alternatives – and the effects that these improvements would have on traffic operations – are presented in a subsequent section entitled Roadway Alternatives Assessment.

Traffic Volumes

Figures 10-5 through 10-8 illustrate the alternative effects on roadway PM peak-hour roadway link volumes. As shown in the figures, Alternative 3 generally results in slightly higher PM peak-hour traffic volumes on many arterials located in the eastern half of the Bel-Red Corridor than the other action alternatives; this is a result of the concentration of higher-density land uses in this area. In the corridor's western half, traffic volumes are generally slightly higher along most arterials with Alternative 3 than with Alternatives 1 and 2; however, traffic volumes along the roadways in this area vary widely depending on the combination of transportation facility improvements that are assumed to be part of each alternative.

The mode split (percentage of users of different modes of transportation) differs dramatically between the No-Action Alternative and the three action alternatives. Eighty-six percent of trips are via SOVs for the No-Action Alternative, compared with 75 to 80 percent for the three action alternatives. HOV trips remain roughly 4 to 5 percent across all alternatives, while park-and-ride transit trips range between 1 and 3 percent. Transit and pedestrian trips make up roughly 7 percent of the total No-Action Alternative trips, whereas those same trips increase to 13 to 18 percent for the three action alternatives.

In general, traffic volumes for Alternatives 1 and 2 increase by approximately 10 percent compared with the No-Action Alternative, whereas traffic volumes increase by 12 percent for Alternative 3. For all action alternatives, the following roadways within the Bel-Red Corridor have the highest traffic volume increases (greater than 10 percent):

- NE 20th Street, between 136th and 148th Avenues NE (between 10 and 22 percent)
- 140th Avenue NE, between NE 20th and NE 24th Streets (between 11 and 17 percent)
- 136th Avenue NE, south of NE 20th Street (10 times current volumes)
- 130th Avenue NE, near NE 20th Street (between 18 and 31 percent)
- 120th Avenue NE, near NE 12th Street (between 86 and 135 percent for Alternatives 1 and 2 and 30 and 40 percent for Alternative 3)

For Alternative 1, other roadways within the Bel-Red Corridor with the highest traffic volume increases (greater than 10 percent) include the following:

- Northup Way, near NE 24th Street (20 percent)
- NE 12th Street, near 112th Avenue NE (26 percent)
- 112th Avenue NE, near NE 12th Street (21 percent)

For Alternative 2, roadways within the Bel-Red Corridor with the highest traffic volume increases (greater than 10 percent) include the following:

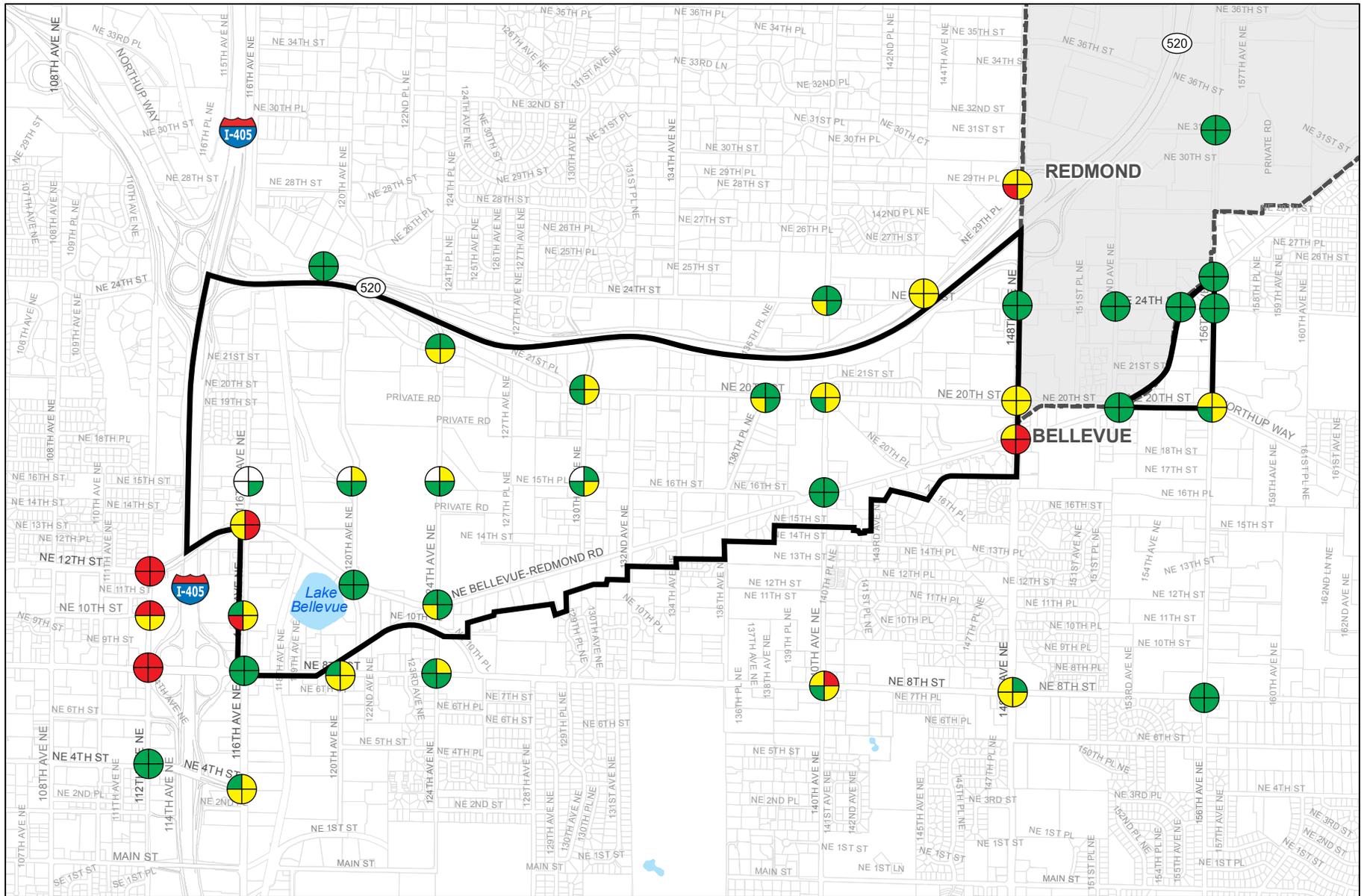
- NE 12th Street, between 112th and 124th Avenues NE (between 12 and 34 percent)
- 124th Avenue NE, between NE 8th Street and Northup Way (between 15 and 30 percent)
- 112th Avenue NE, near NE 12th Street (21 percent)

For Alternative 3, roadways within the Bel-Red Corridor with the highest traffic volume increases (greater than 10 percent) include the following:

- Northup Way, between NE 24th Street and 124th Avenue NE (between 14 and 23 percent)
- NE 24th Street, near Northup Way (23 percent)
- NE 12th Street, near 112th Avenue NE (17 percent)
- 156th Avenue NE, between Bel-Red Road and NE 24th Street (between 11 and 12 percent)
- 124th Avenue NE, between NE 8th Street and Northup Way (between 14 and 26 percent)

Intersection Traffic Operations

Table 10-6 and Figures 10-9 and 10-10 summarize 2030 PM peak-hour intersection LOS and average delays for the No-Action Alternative and all action alternatives. The intersections expected to operate at LOS F in 2030 are shown in bold and italics. The results of the LOS analysis were further reviewed and summarized to compare the number of intersections operating at LOS E and F and overall corridorwide average intersection delays; Table 10-7 summarizes the results of these comparisons.



LEGEND

- Bel-RedCorridor
- Roadway
- Parcel
- City boundary
- Lake

Intersections level of service (LOS):

- LOS A, B, C, or D
- LOS E
- LOS F
- Not applicable

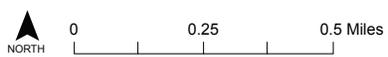
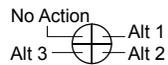
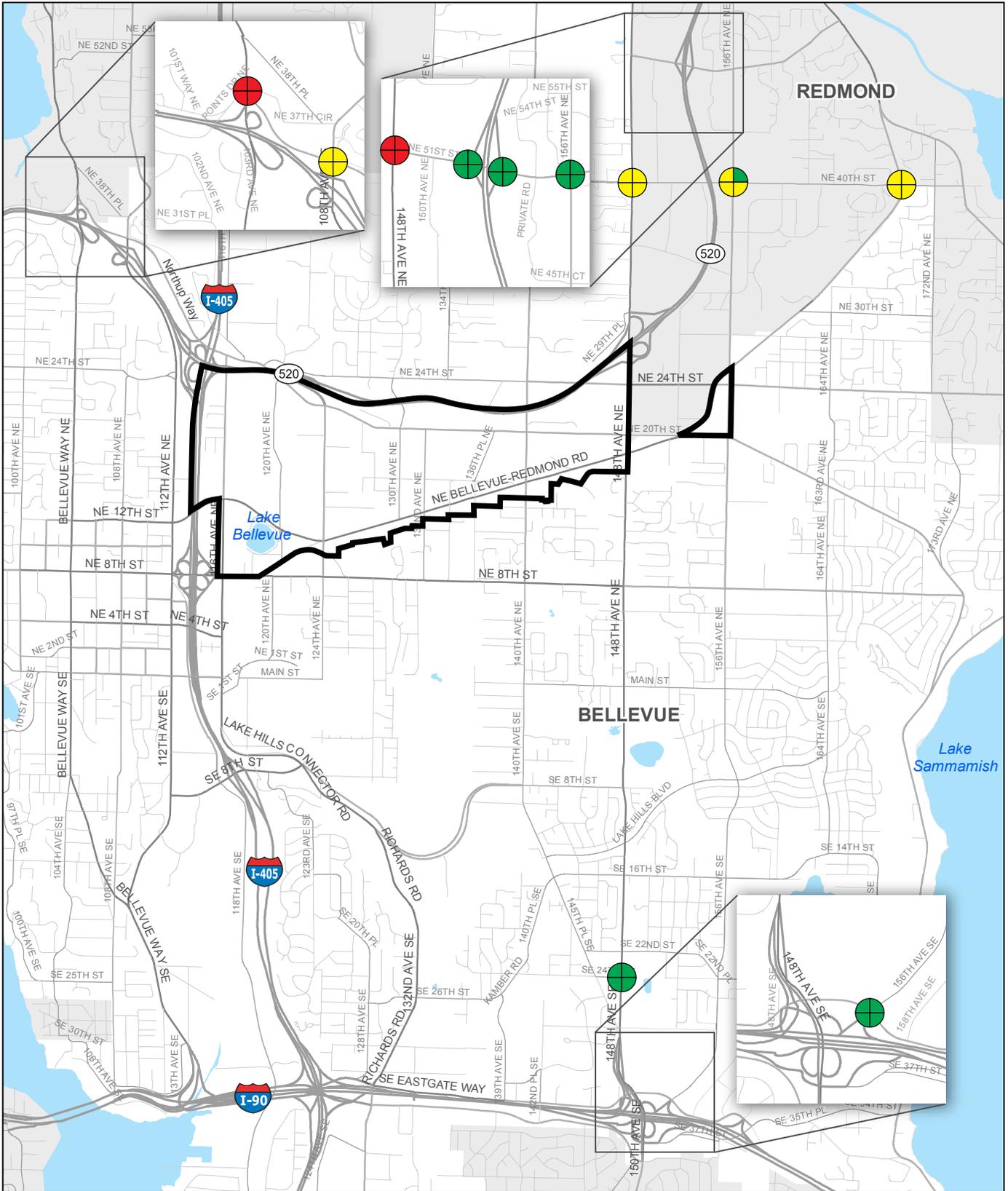


Figure 10-9
Future (2030)
LOS Conditions
 Bel-Red Corridor Draft EIS



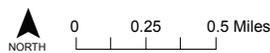
LEGEND

Bel-Red Corridor

Intersections level of service (LOS):

- LOS A, B, C, or D
- LOS E
- LOS F

No Action
 Alt 3 Alt 1
 Alt 2



**Figure 10-10
 Future (2030) LOS
 Conditions**

Bel-Red Corridor Draft EIS

TABLE 10-6
2030 PM Peak-Hour Intersection Level of Service and Delay
Bel-Red Corridor Draft Environmental Impact Statement

Intersection No.	Streets		No-Action ¹		Alternative 1 ²		Alternative 2 ²		Alternative 3 ²	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
25	112th Avenue NE	NE 12th Street	F (F)	136 (94)	F	133	F	140	F	152
26	112th Avenue NE	NE 8th Street	F	115	F	127	F	128	F	134
29 ³	116th Avenue NE	NE 12th Street	F (E)	97 (71)	F	128	F	99	E	78
30 ³	116th Avenue NE	NE 8th Street	D	51	D	52	D	53	D	53
32 ³	120th Avenue NE	NE 12th Street	C	35	D	40	D	53	C	35
34 ³	124th Avenue NE	Bel-Red Road	D	38	D	37	D	46	E	59
35	124th Avenue NE	NE 8th Street	D	45	E	57	D	51	D	52
39 ³	140th Avenue NE	NE 20th Street	F (E)	103 (63)	E	77	E	75	D	52
40 ³	140th Avenue NE	Bel-Red Road	E (D)	66 (53)	D	54	D	54	D	53
41	140th Avenue NE	NE 8th Street	E	71	F	82	E	77	D	48
47 ³	148th Avenue NE	NE 20th Street	F (E)	109 (68)	E	79	E	77	E	75
48 ³	148th Avenue NE	Bel-Red Road	F (E)	93 (80)	F	88	F	84	F	91
49	148th Avenue NE	NE 8th Street	F (E)	88 (65)	D	52	E	70	E	78
55 ³	148th Avenue SE	SE 24th Street	D	46	D	48	D	47	D	47
58 ³	Bel-Red Road	NE 20th Street	D	45	D	48	D	47	D	47
59 ³	Bel-Red Road	NE 24th Street	C	33	D	40	D	37	D	41
60 ³	156th Avenue NE	Bel-Red Road	D	51	D	51	C	50	D	51
61 ³	156th Avenue NE	NE 24th Street	F (D)	90 (52)	D	50	D	55	D	52
62 ³	156th Avenue NE	Northup Way NE	F (E)	116 (63)	E	64	E	79	D	53
63	156th Avenue NE	NE 8th Street	D	53	D	54	D	53	D	55
64	140th Avenue NE	NE 24th Street	E (D)	73 (53)	D	52	D	52	E	65
68 ³	130th Avenue NE	NE 20th Street	D	50	E	67	E	63	D	49
72	112th Avenue NE	NE 4th Street	D	41	D	43	D	42	D	44
74	Bellevue Way NE	Northup Way NE	F (F)	129 (86)	F	89	F	100	F	95
78	108th Avenue NE	Northup Way NE	F (E)	83 (58)	E	76	E	76	E	66
79	148th Avenue NE	NE 40th Street	F (E)	94 (68)	E	73	E	68	E	77
86	156th Avenue SE	SE Eastgate Way	D	49	D	39	D	48	D	48
88 ³	124th Avenue NE	Northup Way NE	D	51	D	54	E	64	E	68
118 ³	Northup Way	NE 24th Street	C	29	C	32	C	30	C	32
138	Bel-Red Road	NE 40th Street	F (E)	87 (70)	E	74	E	74	E	77
139	116th Avenue NE	NE 4th Street	D	55	E	57	E	61	E	61
188	148th Avenue NE	NE 29th Place	F (E)	108 (72)	E	79	E	73	F	80
189	NE 29th Place	NE 24th Street	E	62	E	65	E	64	E	72
233	120th Avenue NE	NE 8th Street	C	22	E	61	E	61	E	72
239	156th Avenue NE	NE 40th Street	E	56	D	54	E	56	E	58
249	148th Avenue NE	NE 51st Street	F	>180	F	111	F	>180	F	>180
250	SR 520 SB ramps	NE 51st Street	B	12	B	12	B	12	B	12

TABLE 10-6
2030 PM Peak-Hour Intersection Level of Service and Delay
Bel-Red Corridor Draft Environmental Impact Statement

Intersection No.	Streets	No-Action ¹		Alternative 1 ²		Alternative 2 ²		Alternative 3 ²		
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
251	SR 520 NB ramps	NE 51st Street	C	35	C	35	C	34	C	34
255	156th Avenue NE	NE 51st Street	<i>F</i> (D)	73 (48)	C	30	C	28	C	30
264	156th Avenue NE	NE 31st Street	D	44	D	50	D	50	D	46
901	112th Avenue NE	NE 10th Street	<i>F</i> (F)	118 (88)	<i>F</i>	102	E	78	E	76
902 ³	116th Avenue NE	NE 10th Street	C	28	E	60	E	69	<i>F</i>	147
903 ³	116th Avenue NE	NE 16th Street	---	---	---	---	B	14	---	---
904 ³	120th Avenue NE	NE 16th Street	---	---	E	74	D	38	D	49
905 ³	124th Avenue NE	NE 16th Street	---	---	E	69	D	49	D	55
906 ³	130th Avenue NE	NE 16th Street	---	---	D	50	E	57	D	55
907 ³	136th Avenue NE	NE 20th Street	C	34	D	51	D	53	E	57

Source: CH2M HILL, 2006.

¹Numbers in parentheses are the results with additional intersection channelization improvements beyond those specified in the BROTS, the City of Bellevue TFP, and the NE 10th Street Extension and Overlake Hospital Medical Center Expansion EIS, identified in Table 10-5.

²LOS and delay results shown assume that intersection improvements listed in Table 10-5 and Appendix G will be made, where possible, to optimize operational performance for all action alternatives.

³Intersections located within the Bel-Red/Northrup mixed commercial/residential area (MMA 4).

BROTS Bel-Red/Overlake Transportation Study
EIS environmental impact statement
LOS level of service
TFP *Transportation Facilities Plan*

It should be noted that additional delay associated with an at-grade LRT system is not included in the LOS calculations presented in Table 10-6 because it is not known at this time whether the LRT system will be at-grade or elevated.

As shown in Table 10-7, the No-Action Alternative would result in 22 intersections operating at LOS E or F during the PM peak hour in 2030, assuming only funded improvements. Average intersection delays would worsen significantly over existing conditions. Additional intersection mitigation improvements, over and above those identified for the No-Action Alternative, were identified to allow for an equal comparison with the action alternatives. These intersection improvements are listed in Table 10-5. With these additional intersection improvements in place, average intersection operations for the No-Action Alternative would improve to more reasonable levels. With mitigation improvements, the number of intersections operating at LOS E or F would be reduced from 22 to 17, and many of the intersections that would operate at LOS F without mitigation would improve to LOS E or better.

With each action alternative, the number of intersections operating at LOS E or F would be the same as or higher than the No-Action Alternative as might be expected with greater development. The overall average delay per intersection for all action alternatives, however, would be better than the unmitigated No-Action Alternative. Of the three action alternatives, Alternative 3 would result in the fewest number of intersections operating at LOS E or F within the study area.

TABLE 10-7
Corridorwide Comparison of Existing and 2030 PM Peak-Hour Intersection Level of Service, Delay,
and Volume-to-Capacity Results
Bel-Red Corridor Draft Environmental Impact Statement

Criteria	Existing Conditions	Alternative			
		No-Action ¹	1 ²	2 ²	3 ²
Number of intersections operating at LOS E	2	5 (12)	16	18	15
Number of intersections operating at LOS F	3	17 (5)	8	6	7
Total intersections operating at LOS E or F	5	22 (17)	24	24	22
Average intersection delay per vehicle	44.7	70.2 (58.3)	63.5	65.6	69.9

Source: CH2M HILL, 2006.

¹Numbers in parentheses are the results with additional intersection mitigation improvements beyond those specified in BROTS, the City of Bellevue TFP, and the NE 10th Street Extension and Overlake Hospital Medical Center Expansion EIS.

²LOS and delay results shown assume that additional intersection improvements beyond those listed in Table 10-5 will be made, where possible, to optimize operational performance for all action alternatives.

BROTS Bel-Red/Overlake Transportation Study

EIS environmental impact statement

LOS level of service

TFP *Transportation Facilities Plan*

Within the overall study area, however, Alternative 3 would also result in the highest overall average delay. Alternatives 1 and 2 would result in the highest number of intersections operating at LOS E or F. Of the three action alternatives, Alternative 1 would result in the lowest average delay per intersection.

These results are somewhat counterintuitive, since Alternative 3 would have the highest concentration of commercial and residential development; however, there are some transportation capacity differences between the alternatives. For example, Alternative 3 includes three LRT stations in areas surrounded by high-density uses (and the resulting high-ridership forecasts), an extra lane in each direction on the NE 10th Street extension from 116th Avenue NE to 124th Avenue NE, a five-lane NE 16th Street, and added intersection turn lanes at the NE 8th Street and 140th Avenue NE intersection. These differences all help to diffuse the potential traffic impacts associated with Alternative 3. Even with fewer intersections operating at LOS E or F (as compared with Alternatives 1 and 2), many intersections operating at LOS E or F with Alternative 3 would have higher delays than the LOS E and F intersections associated with Alternatives 1 and 2.

From these observations, it is clear that no single action alternative stands out as operating significantly better or worse than any other action alternative. In fact, all action alternatives, with roughly the same improvements, would operate in the midrange of LOS E, with only 6.5 seconds of delay on average separating the high- and low-action alternatives. Comparatively, the No-Action Alternative also would operate on average at LOS E but closer to the LOS D end of the scale. These results indicate that from a roadway operational standpoint, the three action alternatives are not clearly distinguishable from one another. The analysis of other modes of transportation in the Bel-Red Corridor, however, does provide results that distinguish the alternatives, particularly for LRT. The LRT analysis is described later in this chapter, and a more

detailed comparison of specific roadway improvement impacts is provided in the following section, Roadway Alternatives Assessment.

Roadway Alternatives Assessment

This section describes the impacts of potential individual roadway improvements proposed as part of the Bel-Red Corridor project action alternatives. The improvements include roadway widenings, channelization revisions, roadway realignments, street extensions, and changes in functional classification. The transportation improvements assumed for each action alternative are listed in Table 10-5 and illustrated in Figures 10-5 through 10-8. Not all potential improvements included in the action alternatives are discussed here; instead, this section focuses on only those improvements that differ among the three action alternatives. These include improvements at the following locations:

- **Bel-Red Road and 124th Avenue NE:** roadway realignment and/or intersection and channelization modifications
- **NE 16th Street:** changes to roadway capacity, west end street extensions and/or roadway realignment
- **NE 10th and NE 12th Streets:** roadway extension (NE 10th Street) and changes to roadway capacity

The way in which these improvements differ among the alternatives – and the effects these improvements would have on traffic operations – are discussed below.

Bel-Red Road and 124th Avenue NE. Improvements are recommended at the Bel-Red Road and 124th Avenue NE intersection with all three action alternatives. This is a critical intersection because 124th Avenue NE will provide north-south access to SR 520, while Bel-Red Road offers east-west access to Downtown Bellevue and Overlake. The following are the assumed improvements associated with each alternative:

- **Alternative 1:** North of Bel-Red Road, a “spur” of 124th Avenue will run parallel and west of the original 124th Avenue NE and continue under NE 12th Street to a connection with Old Bel-Red Road, providing a grade-separated arterial crossing
- **Alternative 2:** North approach channelization revisions will accommodate the proposed five-lane widening.
- **Alternative 3:** The NE 10th Street extension will continue to the intersection of Bel-Red Road and 124th Avenue NE, where it will create a fifth leg of the intersection. However, the existing NE 12th Street leg of the intersection will become a minor approach to the intersection and use significantly less green time than it currently does. The expectation is that the NE 10th Street extension will become the new east-west major arterial that feeds into Bel-Red Road as opposed to the existing NE 12th Street.

Table 10-8 shows how these improvements would affect 2030 PM peak-hour LOS at and near the Bel-Red Road and 124th Avenue NE intersection. As shown in Table 10-8, intersection operations in the improvement vicinity would be slightly better overall with Alternative 2 as compared with Alternatives 1 and 3. All intersections in the improvement vicinity, however, would operate at LOS D or better with the No-Action Alternative. Although the results show that the 124th Avenue NE and Bel-Red Road intersection would operate best with 124th Avenue

NE realigned to the west and under NE 12th Street (Alternative 1), traffic volumes at this intersection are projected to be lower with Alternative 1 than with Alternatives 2 and 3 (see Figures 10-5 through 10-8).

TABLE 10-8
2030 PM Peak-Hour Level of Service Results with Bel-Red Road and 124th Avenue NE Improvements
Bel-Red Corridor Draft Environmental Impact Statement

Intersection No.	Streets		No-Action		Alternative 1		Alternative 2		Alternative 3	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
34	124th Avenue NE	Bel-Red Road	D	38	D	37	D	46	E	59
35	124th Avenue NE	NE 8th Street	D	45	E	57	D	51	D	52
233	120th Avenue NE	NE 8th Street	C	22	E	61	E	61	E	72

Source: CH2M HILL, 2006.
LOS = level of service

NE 16th Street. All three action alternatives assume that improvements would be made to NE 16th Street. On the east end, all action alternatives would include a five- to three-lane reduction along 136th Avenue NE, a three-lane section to NE 20th Street along 136th Avenue NE, and a two-lane nonarterial connection between 136th Avenue NE and Bel-Red Road. With all three alternatives, right-in, right-out access only would be provided at the NE 16th Street and Bel-Red Road intersection. All three action alternatives would also extend NE 16th Street west from 136th Avenue NE. The west-end treatment, however, was assumed to differ between the alternatives, as described below:

- **Alternatives 1 and 3:** provide five-lane roadway linking to Downtown Bellevue via NE 12th Street
- **Alternative 2:** Provide three-lane roadway with a west terminus at 116th Avenue NE

Table 10-9 shows how these west-end treatments would affect 2030 PM peak-hour LOS along NE 16th Street and at the intersection of NE 12th Street and 112th Avenue NE, which would provide an important connection to Downtown Bellevue.

As shown in Table 10-9, Alternative 3 would result in the best overall intersection operations along NE 16th Street. Alternative 3 also results in the highest PM peak-hour traffic volumes on NE 16th Street as compared with the other action alternatives (see Figures 10-5 through 10-8). It should be noted, however, that the level of improvement assumed for each alternative or intersection differs slightly and that the NE 16th Street intersections could likely operate reasonably well in 2030 with all alternatives if additional intersection channelization improvements are made. Alternative 3, however, would have the biggest impact on the NE 12th Street and 112th Avenue NE intersection, which would be the gateway to Downtown Bellevue for NE 16th Street.

TABLE 10-9
2030 PM Peak-Hour Level of Service Results with NE 16th Street Improvements
Bel-Red Corridor Draft Environmental Impact Statement

Intersection No.	Streets		No-Action		Alternative 1		Alternative 2		Alternative 3	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
25	112th Avenue NE	NE 12th Street	F	94	F	133	F	140	F	152
903	116th Avenue NE	NE 16th Street	---	---	---	---	B	14	---	---
904	120th Avenue NE	NE 16th Street	---	---	E	74	D	38	D	49
905	124th Avenue NE	NE 16th Street	---	---	E	69	D	49	D	55
906	130th Avenue NE	NE 16th Street	---	---	D	50	E	57	D	55

Source: CH2M HILL, 2006.
LOS level of service

NE 10th and NE 12th Streets. With all action alternatives, NE 10th Street would be extended from 116th Avenue NE and 124th Avenue NE, and NE 12th Street would be widened to six lanes between 112th Avenue NE and the new NE 16th Street connection. With both Alternatives 1 and 2, the NE 10th Street extension would be constructed as a three-lane roadway. With Alternative 3, the new segment of NE 10th Street would consist of a four-lane roadway, and the capacity of NE 12th Street would be reduced between the new NE 16th Street and 124th Avenue NE. Table 10-10 shows how these capacity changes on NE 12th and NE 10th streets – combined with other transportation network improvements associated with the three action alternatives – would affect intersection operations.

TABLE 10-10
2030 PM Peak-Hour Level of Service Results with NE 12th Street Improvements and NE 10th Street Extension
Bel-Red Corridor Draft Environmental Impact Statement

Intersection No.	Streets		No-Action		Alternative 1		Alternative 2		Alternative 3	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
25	112th Avenue NE	NE 12th Street	F	94	F	133	F	140	F	152
29	116th Avenue NE	NE 12th Street	E	71	F	128	F	99	E	78
32	120th Avenue NE	NE 12th Street	C	35	D	40	D	53	C	35
34	124th Avenue NE	Bel-Red Road	D-	38	D	37	D	46	E	59
901	112th Avenue NE	NE 10th Street	F	88	F	102	E	78	E	76
902	116th Avenue NE	NE 10th Street	C	28	E	60	E	69	F	147

Source: CH2M HILL, 2006.
LOS level of service

As shown in Table 10-10, Alternatives 1 and 2 would both result in LOS E and F operations at four intersections as compared with five intersections with Alternative 3. With a wider cross-section on NE 10th Street (four lanes) Alternative 3 would result in the most intersections operating at LOS E or F, and the 112th Avenue NE and NE 12th Street intersection and 116th

Avenue NE and NE 10th Street intersection would operate at LOS F with higher delays than any other alternative. However, with reduced capacity on NE 12th Street, the 116th Avenue NE and NE 12th Street intersection would operate better with Alternative 3 (LOS E) than with Alternatives 1 and 2 (LOS F).

Transportation System Performance

This section summarizes how the overall transportation system performs under each alternative. Vehicle miles traveled (VMT), vehicle hours traveled (VHT), and average speed are three common system performance measures. Because the BKR model covers the entire Puget Sound Region, a subarea system was created to measure the performance of the Bel-Red Corridor study area and nearby surroundings. The VMT, VHT, and average speed of all vehicles traveled in the Bel-Red Corridor were summarized for the 2030 PM peak hour.

As shown in Table 10-11, the VMT values are similar among all three alternatives, compared with the No-Action Alternative. Due to the increased roadways (for example NE 16th Street) and increased overall travel demand generated from high growth in population and employment in the study area, the VMT values for each alternative are about 3 to 4 percent higher than the No-Action Alternative.

TABLE 10-11
Bel-Red Corridor Study Vehicle Miles Traveled, Vehicle Hour Travel, and Average Speed Summary
Bel-Red Corridor Draft Environmental Impact Statement

	No-Action Alternative	Alternative 1	Alternative 2	Alternative 3
Vehicle hours traveled	10,118	10,655	10,557	10,928
Vehicle miles traveled	200,131	207,257	206,429	208,010
Average speed (miles per hour)	19.96	19.93	19.94	19.83
Change from No-Action Alternative (percent)				
Vehicle hours traveled	0	5.3	4.3	8.0
Vehicle miles traveled	0	3.6	3.1	3.9
Average speed (miles per hour)	0	-0.2	-0.1	-0.7

Source: BKR Model and CH2M HILL, 2006

The VHT values would be expected to show notable differences among all three alternatives given different development programs. Alternative 3 would have the highest increase of 8 percent in VHT compared with the No-Action Alternative. Alternative 1 would increase by 5 percent and Alternative 2 by 4 percent as compared with the No-Action Alternative. The sharper increase in VHT compared with VMT indicates potentially more congestion in Alternative 3. With a slight increase of vehicle miles, longer time is required to travel the similar distance. Average speed is a direct measure of congestion in the transportation system from a user's perspective; however, the alternatives all show similar levels of performance. While Alternative 3 shows the lowest average speed, the difference is slight.

Effect on Adjacent Neighborhoods

There is likely to be some traffic intrusion into the neighborhoods surrounding the Bel-Red Corridor, although the intrusion would not likely be significant. Table 10-12 summarizes 2030 PM peak-hour traffic volumes at screenline locations north, south, west, and east of the Bel-Red Corridor.

As shown in Table 10-12, little to no change in screenline volumes are expected south of and east of the Bel-Red Corridor. This suggests that capacity would be constrained along many major roadways entering the Wilburton, East Bellevue, and Overlake neighborhoods. Many of these major roadways at the south and east screenlines are expected to be operating at or above capacity with the No-Action Alternative and all action alternatives.

Some neighborhood traffic impacts would likely occur to the north of the Bel-Red Corridor because some major roadways entering the Bridle Trails neighborhood still have underutilized capacity. These streets include 116th, 130th, and 140th Avenues NE. Consistent with the level of development associated with the various action alternatives, Alternative 3 would likely result in slightly greater neighborhood traffic intrusion than Alternative 1, and Alternative 2 would result in the lowest level of impact.

Some neighborhood traffic intrusion would also be expected west of the Bel-Red Corridor, primarily due to the additional east-west capacity that would be provided by 2030 along Northrup Way, NE 16th, NE 12th, and NE 10th Streets and because of the interaction between Bel-Red Road and Downtown Bellevue. Similar to the north screenline, neighborhood intrusion to the west of the corridor would be highest with Alternatives 1 and 3 and lowest with Alternative 2. In this case, however, Alternative 1 would likely result in slightly higher impacts to the Downtown Bellevue and North Bellevue neighborhoods than would Alternative 3 due to the higher functional classification and roadway capacity proposed for NE 12th Street. Traffic-calming devices and traffic control measures would be considered on a case-by-case basis for nonarterial streets meeting certain criteria in neighborhoods affected by growth in the Bel-Red Corridor.

Traffic Safety

As shown in Tables 10-3 and 10-4, six intersections in the Bel-Red Corridor study area were included in the City of Bellevue's top 30 high accident intersections and three midblock locations were included in the City's top 15 high accident midblock corridors. Of these locations, the following intersections and midblock locations would likely receive some safety benefit from the transportation improvements proposed as part of the Bel-Red Corridor project:

- Bel-Red Road at 140th Avenue NE
- NE 24th Street at 156th Avenue NE
- NE 20th Street at 130th Avenue NE
- Bel-Red Road from NE 16th Street to 140th Avenue NE

The NE 8th Street and 116th Avenue NE intersection was recently reconstructed and is planned for further improvements as part of the mitigation associated with the NE 10th Street Extension and OHMC expansion. As a result, congestion-related collisions might have already started to decline with the recent improvements, and there could be potential for further reduction in accidents with upcoming improvements.

TABLE 10-12
 2030 PM Peak-Hour Traffic Volumes at Project Boundaries
Bel-Red Corridor Draft Environmental Impact Statement

Screenline Location	Existing Condition (2005) Total Volume	No-Action A1 Alternative Total Volume	Alternative 1		Alternative 2		Alternative 3	
			Total Volume	Change over No-Action Alternative (percent)	Total Volume	Change over No-Action Alternative (percent)	Total Volume	Change over No-Action Alternative (percent)
North of NE 24th Street	8,260	10,500	11,120	6	10,880	4	11,300	8
South of Bel-Red Road	7,600	10,730	10,260	-4	10,770	0	10,450	-3
West of 112th and 116th Avenues NE	4,090	6,860	7,700	12	7,260	6	7,450	9
East of 156th Avenue NE	5,060	7,390	7,560	2	7,410	0	7,600	3

Source: BKR Model and CH2M HILL, 2006

The remaining two intersections and two midblock locations are expected to experience higher volumes and congestion in 2030 with the No-Action Alternative and all action alternatives with no identified improvement, which could result in similar or higher accident rates in the future. The No-Action Alternative and all action alternatives would likely result in increases in vehicular, transit, bicycle, and pedestrian activity near the LRT stations; these stations should be designed to provide safe and easy access for all modes so that any potential safety concerns are minimized.

Transit

Bellevue Transit Plan

The *Bellevue Transit Plan*, adopted in June 2003, identifies a set of recommendations regarding future transit services and capital support for these services. The recommendations are based on a ten-year vision of service improvements. This plan focuses on the following three major elements: connections within Bellevue, connections between Bellevue and other Eastside communities, and connections between Bellevue and other communities in the region. To allow for convenient transfers between these services, a network of transit hubs has been identified near activity areas, such as retail and employment centers.

King County Metro Six-Year Transit Development Plan

The *King County Metro Six-Year Transit Development Plan*, adopted in September 2002, established objectives and strategies to increase transit and rideshare services and add new transit-supportive capital facilities throughout the county. The City of Bellevue worked closely with King County Metro to incorporate many of Bellevue's transit recommendations into this plan. The King County Metro plan is similar to the *Bellevue Transit Plan* in that it calls for a core network of routes providing frequent, all-day connections between major destinations. A web of local and intercommunity routes supports the core network and allows people to travel to both local and regional destinations. These hubs are identified as Downtown, Overlake, Crossroads, Factoria, and Eastgate/Bellevue Community College. The Bel-Red Corridor is not identified in the existing Transit Plan as a hub for service, but it links identified centers in Downtown and Overlake and should be identified as a transit hub under any action alternative given land uses changes.

In addition, a recent initiative passed in King County, known as Transit Now, will expand King County Metro Transit service by 15 to 20 percent over the next 10 years. Intended to help Metro keep pace with regional growth, this plan will provide bus rapid transit (BRT) service on NE 8th Street from Downtown Bellevue to 156th Avenue NE and on 156th Avenue NE from NE 8th Street into Redmond. In addition, route improvements are planned along Bel-Red Road.

Light-Rail Transit

Sound Transit has recently updated its *Long-Range Plan* regarding the future regional transit system. Consistent with the *Long-Range Plan* update, the next phase of LRT improvements proposed in the ST2 package of mass transit projects includes the East Link Project. East Link is a proposed extension of the Central Link LRT system with its corridor extending approximately 19 miles from Downtown Seattle to Bellevue and to Redmond via I-90 and Mercer Island. The Sound Transit Board will identify a package of projects to present to voters in 2007. This package will define the East Link project's length and implementation schedule. The actual project length could vary between 11 and 19 miles and is expected to traverse the Bel-Red Corridor, depending on how the project is implemented. Although the LRT system itself will

generate some construction and operational impacts in the Bel-Red Corridor, this environmental document addresses only those actions taken by the City, as opposed to those taken by Sound Transit. A project-level EIS is currently underway for the East Link Project and is expected to be released in early 2008.

Table 10-13 summarizes the predicted AM peak three-hour boardings and alightings at the proposed LRT stations in the Bel-Red Corridor as well as subtotal boardings and alightings in the two other East Link segments. The ridership forecasts in this section were obtained from the BKR model and are total ridership for each alternative. They are mutually exclusive forecasts and should be viewed independently. Under the No-Action Alternative, zero population growth is projected in the Bel-Red Corridor study area by 2030. At the same time, 2,630 new on-site employees¹ will be added by 2030 in the same area. The No-Action Alternative lacks the residential and employment density near the LRT station to support high-transit ridership. The two stations in the study area for the No-Action Alternative would be located near OHMC and 156th Avenue NE in Redmond. About 900 AM hourly boardings and alightings, as well as 1,939 daily LRT boardings are expected at these stations. Much of the ridership would be derived from the OHMC, which currently employs more than 2,100 employees (OMHC, 2007).

As shown in Table 10-13, AM peak-hour LRT ridership is expected to be highest in the Bel-Red Corridor with Alternative 3 followed by Alternative 1; this is primarily due to the proximity of the LRT stations to areas of higher density, such as mixed-use housing, commercial, and retail uses. All three alternatives appear to result in similar ridership patterns in the Downtown Bellevue segment. Alternatives 2 and 3 would result in the highest ridership in the Overlake segment; however, the forecasts are all similar among the action alternatives due to the relatively far distance of these stations from stations proposed in the Bel-Red Corridor segment.

Although Alternative 1 provides only two LRT stations within the Bel-Red Corridor, both of these stations would be located in areas surrounded by high-density uses. Most of the 3,500 additional households proposed in Alternative 1 would have convenient access to the LRT stations. About 2,500 households would be located near the 122nd Avenue LRT station; those households result in 473 morning boardings (20 percent AM peak one-hour LRT boarding per household) at the 122nd Avenue NE station. Also, 500 households would be added near the 152nd Avenue NE station. Along with the existing households in that area, 424 AM peak one-hour LRT boardings would be generated. Table 10-14 summarizes the residential units near the station area as well as the morning boardings for each alternative. On the employment side, the preexisting employment and the 5,875 new employees in the area are expected to generate 1,087 AM peak one-hour LRT alightings in the Bel-Red study area (Table 10-15).

Along with the other preexisting and projected land use, the 6,339 new employees and 3,500 households in the area are expected to generate approximately 6,650 daily LRT boardings in the Bel-Red area. The total daily boardings in the Bel-Red Corridor, Downtown Bellevue, and Overlake areas are expected to be 29,150 riders per day. Table 10-16 presents the daily LRT boardings in relation to households and employment.

¹Ratio of square feet to employee is derived using data from King County (2002); this assumes that there are 400 square feet per employee for Office, 333 square feet per employee for Retail, and 600 square feet per employee for Light Industrial. This includes estimate of light industrial jobs lost; new employment does not include uses that are part of the baseline condition (e.g., existing uses).

TABLE 10-13
 2030 AM Peak-Hour High-Capacity Transit Ridership Summary: Total Boardings and Alightings
Bel-Red Corridor Draft Environmental Impact Statement

Station and/or Segment	No-Action Alternative		Alternative 1		Alternative 2		Alternative 3	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Bellevue Central Business District (Bellevue Transit Center)								
<i>Subtotal Bellevue CBD</i>	442	3,527	471	3,737	469	3,605	462	3,685
Bel-Red Corridor (2 to 3 Stations)								
Overlake Hospital	76	232	---	---	91	329	---	---
122nd Avenue NE	---	---	473	465	---	---	151	404
130th Avenue NE	---	---	---	---	350	254	324	272
148th Avenue NE	---	---	---	---	270	359	--	---
152nd Avenue NE	---	---	424	622	---	---	457	581
156th Avenue NE	254	337	---	---	---	---	---	---
<i>Subtotal Bel-Red Corridor</i>	330	569	897	1,087	711	942	932	1,257
Overlake (NE 40th Street)	337	285	349	318	374	312	377	312
Total East Link: Downtown Bellevue, Bel-Red, and Overlake	1,109	4,417	1,717	5,142	1,554	4,859	1,771	5,254
<i>Bel-Red Change over No-Action</i>	---	---	567	518	381	373	602	688
<i>Total East Link Boards and Alightings</i>	5,526		6,859		6,413		7,025	
<i>East Link Total Change over No-Action</i>	---	---	608	725	504	533	662	837

Source: BKR forecasting model.

Note: The BKR model included an LRT station at 156th Avenue NE for all action alternatives in addition to stations at 152nd or 148th Avenues NE. Because both stations would not exist separately in reality, boardings and alightings for Alternatives 1 and 3 at 156th Avenue NE were added to boardings and alightings at 152nd Avenue NE. For Alternative 2, 75 percent of boardings and alightings from the 156th Avenue NE station were added to the 148th Avenue NE station boardings and alightings.

TABLE 10-14
Residential Units Near Light-Rail Transit Stations vs. AM Peak One-Hour Boarding
Bel-Red Corridor Draft Environmental Impact Statement

Stations	Residential Units			AM Peak One-Hour Boardings		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
122nd and 132nd Avenues NE	2,500	1,650	2,300	473	350	475
148th Avenue NE		800	400		270	
152nd Avenue NE	500	200	600	424		457
Subtotal	3,000	2,650	3,300	897	620	932
Other	500	2,350	1,700			
TOTAL	3,500	5,000	5,000			
Percent households near stations	86	53	66			

Source: City of Bellevue and BKR forecasting model, 2006.

TABLE 10-15
New Employment vs. AM One-Hour Peak Alightings in Bel-Red Corridor
Bel-Red Corridor Draft Environmental Impact Statement

	Alternative			
	No-Action	1	2	3
New employment	2,367	6,339	4,740	9,249
1-Hour AM alightings	2,400	1,087	942 ¹	1,257

¹Alternative 2 includes a station next to OHMC, which accounts for 329 of the AM alightings.

Source: City of Bellevue and BKR forecasting model, 2006.

TABLE 10-16
Daily Light-Rail Transit Boardings vs. Households and Employment in the Bel-Red Corridor
Bel-Red Corridor Draft Environmental Impact Statement

	Alternative			
	No-Action	1	2	3
New households	0	3,500	5,000	5,000
New employment	2,367	6,339	4,740	9,249
Daily boardings in Bel-Red Corridor (from new and preexisting households and employers)	1,939	6,650	6,100	7,800
Daily boardings in Downtown Bellevue	15,900	17,550	16,900	17,500
Daily boardings in Overlake	5,850	4,950	5,700	5,000
Total ridership	23,689	29,150	28,700	30,300

Source: City of Bellevue and BKR forecasting model, 2006.

Similar to Alternative 1, Alternative 3 also directly serves high-density housing, retail, and commercial uses with the 122nd and 152nd Avenue NE stations and provides a third station at 130th Avenue NE. The area surrounding the 122nd Avenue NE station consists primarily of medium-density office uses, which generates fewer boardings and a higher number of alightings than the higher-density, mixed-use housing and commercial uses. The 130th Avenue NE Station – also surrounded by mixed-use housing and commercial uses – serves a smaller mixed-use housing and commercial area with Alternative 3 than does the 122nd Avenue NE Station with Alternative 1.

For Alternative 3, about two-thirds of the 5,000 households added will have convenient access to the proposed LRT stations. An estimated 2,300 households would be located near the 122nd and 130th Avenues NE LRT stations. Those households are expected to generate about 475 (151 + 324) (20 percent AM peak one-hour LRT boardings per household) morning boardings at 122nd and 130th Avenue NE stations. Also, 500 households would be added near the 152nd Avenue NE station. Along with the existing households in that area, 457 AM peak one-hour LRT boardings will be generated (Table 10-14). On the employment side, the preexisting employment and the 9,249 new employees in the area are expected to generate 1,257 AM peak one-hour LRT alightings in the Bel-Red Corridor (Table 10-15).

Combined with the other preexisting and projected land use, the 9,249 new employees and 5,000 households in the study area are expected to generate approximately 7,800 daily LRT boardings in the Bel-Red Corridor. The total daily boardings in the Bel-Red Corridor, Downtown Bellevue, and Overlake areas are expected to be 30,300 riders per day (Table 10-16). Of the three action alternatives, Alternative 2 results in the lowest LRT ridership in the Bel-Red Corridor. Although two stations would be surrounded by higher-density, mixed-use housing and retail, these high-density areas are not as broad as the similar areas developed as part of Alternatives 1 or 3.

Among 5,000 households added in Alternative 2, about half would have convenient access to the proposed LRT stations. Approximately 1,650 households would be located near the 130th Avenue NE station. Those households are expected to generate about 350 (22 percent AM peak one-hour LRT boardings per household) morning boardings at the 130th Avenue NE station. Also, 800 households will be added near 148th Avenue station. Two-hundred-seventy AM peak one-hour LRT boardings will be generated (Table 10-14). Alternative 2 is unique among the three alternatives to include an LRT station next to the OHMC. On the employment side, the preexisting employment, including the hospital employees, and the 4,740 new employees in the area are expected to generate 942 AM peak one-hour LRT alightings in the Bel-Red Corridor (Table 10-15).

Together with the other preexisting and projected land use, the 4,740 new employees and 5,000 households in the area are expected to generate approximately 6,100 daily LRT boardings in the Bel-Red Corridor area. The total daily boardings in the Bel-Red Corridor, Downtown Bellevue, and Overlake areas are expected to be 28,700 riders per day (Table 10-16).

In summary, the location of the residential units and employment-related land uses in relation to the LRT stations directly affects the LRT ridership. Alternatives 1 and 3 are expected to generate similar AM peak-hour boardings for the area (about 900 to 930) because of their similar number of residential units near the stations (about 3,000 to 3,300). Alternative 3 would generate the highest morning LRT alightings due to its highest employment in the area. Alternative 2 is

expected to generate the least number of both morning boardings and alightings due to its lowest number of residential units near the stations (2,650) and fewest new employees (4,740). Overall, Alternative 3 would have the highest daily boardings (7,800) in the area. The total daily boardings in the Bel-Red Corridor, Downtown Bellevue, and Overlake areas are expected to range from 28,700 riders per day (Alternative 2) to 30,300 (Alternative 3).

Besides LRT ridership, mixed-use neighborhoods and proximity between multifamily residences and retail/office could result in high walk trips and bicycle trips. However, neither mode of nonmotorized transportation could be forecast from the BKR model.

Transit Facilities and Service

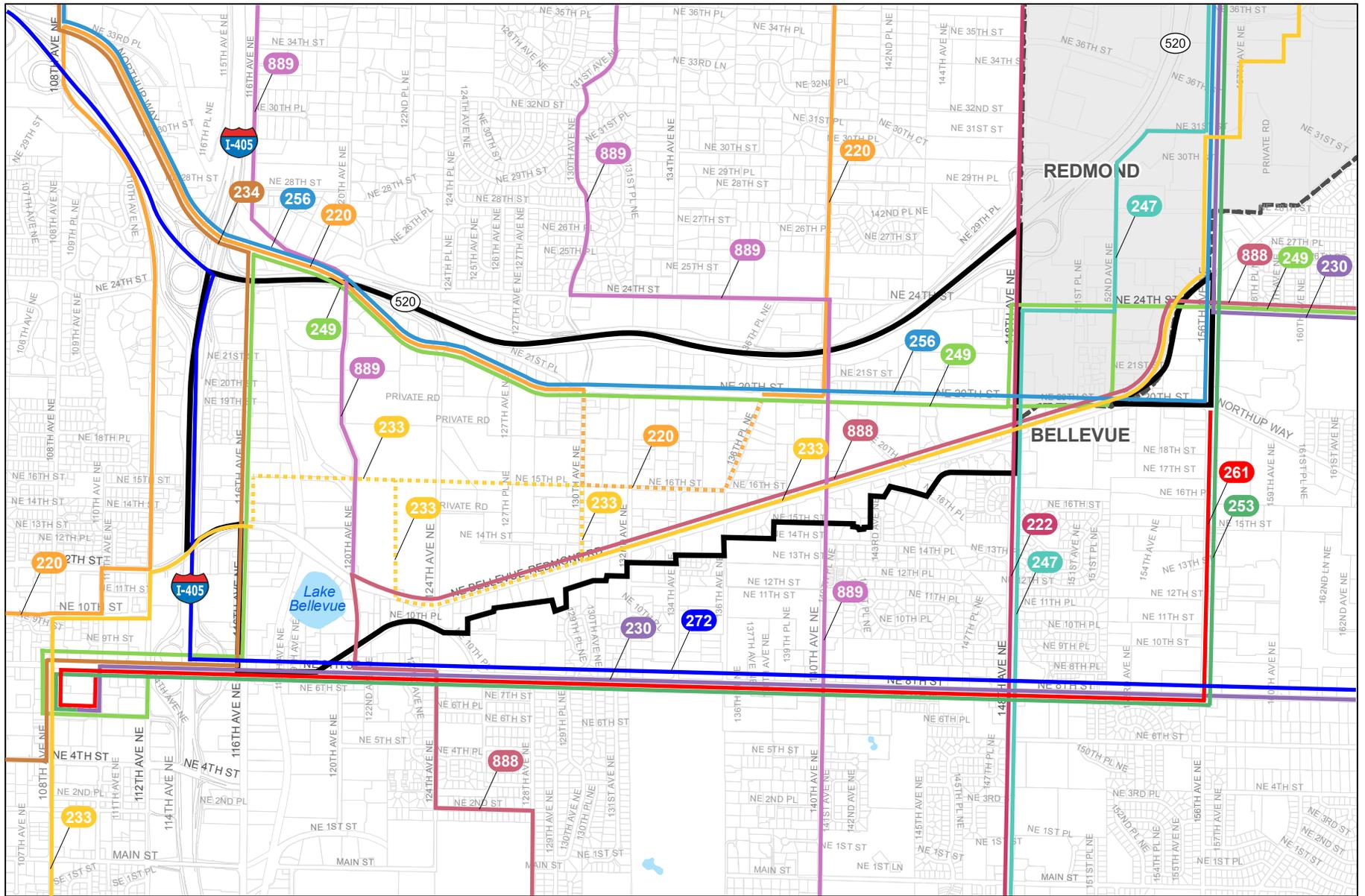
Park-and-Ride Lots. Many existing and new transit trips to the Bel-Red Corridor are likely to be made by people who use a park-and-ride facility. Capturing the forecasted transit ridership for each action alternative might require accommodating many more park-and-ride spaces than are currently provided. While no park-and-ride lots or spaces are proposed for the Bel-Red Corridor (nor were they modeled in the BKR model), Alternative 1, followed closely by Alternative 3, might require the highest number of park-and-ride spaces outside the study area because they would generate the highest ridership. Compared with the action alternatives, the No-Action Alternative might require fewer park-and-ride spaces because it would result in the lowest projected ridership in the Bel-Red Corridor segment and the entire East Link Project Corridor.

Transit Service. For all action alternatives, introducing LRT service to the Bel-Red Corridor would result in a reasonably high LOS quality for local and regional express service. In particular, transit customers along the proposed LRT route would benefit from more frequent service, greater service span (length of service day), improved reliability, and shorter travel times. Most of the existing service to the Bel-Red Corridor operates on half-hour headways during the peak commute periods. By implementing LRT service, some existing transit services could be restructured to augment LRT service (illustrated in Figure 10-11). The frequency of existing transit routes could be increased, and new local circulators or regional express services could be initiated. The LRT ridership forecasts shown in Table 10-13 assume that these types of transit service improvements would be in place.

Nonmotorized Transportation

The planned pedestrian and bicycle system—as described in the 1999 update of the *Bellevue Pedestrian and Bicycle Transportation Plan*—is more extensive than the existing conditions and consists of sidewalks along roadways and a paved path on the BNSF railroad right-of-way. Bicycle facilities planned include designated shared roadways on Bel-Red Road and on 140th Avenue NE.

Nonmotorized transportation facilities for each action alternative support the intended land uses, and these facilities feature on-street, off-street, and regional trail connections. The figures in Appendix F show the nonmotorized transportation facilities associated with the No-Action Alternative and all action alternatives. Each action alternative offers the potential to develop walkable, cyclable neighborhoods around higher-density, transit-rich development nodes. These are areas where specific facilities cannot be called out at this time—due to unknown locations of potential streets and the nature of potential new development—but where certain LOS standards, or degree of quality, with regard to nonmotorized facilities are intended.



LEGEND



Bel-Red Corridor

Roadway

Parcel

City boundary

Lake

Note: Transit lines shown dashed are proposed relocations of existing routes.



0 0.25 0.5 Miles

- | | | |
|-----|-----|-----|
| 220 | 247 | 272 |
| 230 | 249 | 888 |
| 233 | 253 | 889 |
| 234 | 256 | |
| | 261 | |



Figure 10-11
Future Transit Routes
 Bel-Red Corridor Draft EIS

Types of Nonmotorized Transportation Facilities Envisioned

Across the Bel-Red Corridor there is the potential for a wide variety of land use environments that might be created as redevelopment occurs under any of the action alternatives, and a correspondingly wide range of facilities to accommodate the pedestrian and bicyclist. Some types of facilities would be geared to provide an element of the transportation infrastructure, and some facilities might be purely recreational; other facilities might perform dual roles. Bicycle commuters might rely on bicycle lanes or wider outside travel lanes to commute to work. Sidewalks with widths ranging from a minimum 5 feet within residential neighborhoods to 12 feet or more on pedestrian-oriented shopping streets might provide pedestrians with direct and comfortable connections for walking to work, shopping, parks, and transit or to run errands. Multipurpose paths along stream corridors and elsewhere would provide off-street connections for commuting or recreation, and in the case of the BNSF railroad right-of-way, connections to regional destinations. Each action alternative would integrate nonmotorized transportation facilities within the neighborhoods, and intersect those facilities to create a network that would help the Bel-Red Corridor to be much more walkable and cyclable than in the No-Action Alternative. In other words, each action alternative would significantly enhance the LOS for pedestrians and bicyclists over the No-Action Alternative.

Level of Service Standards for Pedestrian and Bicycle Facilities

Generally, LOS for pedestrians and bicyclists is an assessment of the perceived degree of safety, comfort, and visually welcoming environment the user experiences. LOS A depicts a nonmotorized transportation facility on which the pedestrian or bicyclist feels safe, comfortable, and welcome. Conversely, LOS F depicts a facility that is perceived to be unsafe, uncomfortable, and unwelcoming. Table 10-17 describes each LOS category.

TABLE 10-17
Nonmotorized Level of Service Category Descriptions
Bel-Red Corridor Draft Environmental Impact Statement

LOS Category	Description of Environment (Subjective Impression of User)
A	Highest degree of safety and comfort for pedestrians and bicyclists. Visually welcoming environment.
B	High level of pedestrian and bicyclist comfort and safety. Many amenities to signal a welcome queue to pedestrians and bicyclists.
C	Acceptable degree of safety. Average level of pedestrian and bicyclist comfort. Amenities are present to signal a welcome queue to pedestrians and bicyclists, though not in abundance.
D	Less than acceptable degree of safety for pedestrian and bicycle travel. Less than average level of pedestrian and bicyclist comfort. Few amenities to display a welcome environment for pedestrians and bicyclists.
E	Low degree of safety for pedestrian and bicycle travel. Low pedestrian and bicycle comfort. Amenities to display a welcome environment for pedestrians and bicyclists are severely lacking.
F	Unsafe for pedestrian and bicyclist travel. Pedestrians and bicyclists are very uncomfortable. Visually unwelcoming environment.

Source: City of Bellevue, 2006.

There are many factors – both quantitative and qualitative – that contribute to the LOS for pedestrians and bicyclists. Various combinations of these factors can be employed in accordance

to the specific setting to create the environment in which the pedestrian and bicyclist move through an area. For instance, a continuous arterial corridor that is intended to achieve LOS A might look a bit different from place to place due to the combination of factors used to achieve the intended LOS. But the result will be the same—a safe, comfortable, and welcoming environment.

Table 10-18 provides a toolkit of features that can be used when designing streets and sidewalks to achieve the intended LOS for pedestrians. This table details only LOS standards A through C because the vision for the Bel-Red Corridor is to achieve a high level of pedestrian and bicycle activity, especially within and connecting to the LRT station development nodes. It is important to note that individual streets might not feature all of these characteristics; rather, many characteristics involve trade-offs with another. For example, bicycle lanes and landscape buffers might be needed along five-lane, heavily trafficked arterials to achieve LOS A for pedestrians, whereas a parking lane and street trees might be sufficient on a less busy arterial. Some features would weigh stronger in individuals' perception of the LOS, although those weights have not been established for this report.

TABLE 10-18
Pedestrian Level of Service Toolkit
Bel-Red Corridor Draft Environmental Impact Statement

Facility Feature	LOS A	LOS B	LOS C
Directness (actual per minutes) ¹	Low A/M ratio (meaning that there is a dense pedestrian network)		Medium A/M ratio (the higher the number the less direct the pedestrian connections)
Continuity	Complete and continuous sidewalk with pockets of open space	Complete and continuous sidewalk separated from road by landscape	Continuous sidewalks, varying widths, with or without landscape buffer
Traffic lanes	3 or fewer	4 to 5	6 or more
Left-turn lanes at intersections	0	1 t	2 or more
Traffic volume	Less than 10,000 per day	10,000 to 20,000 per day	Greater than 20,000 per day
Traffic speeds	Less than 25 mph	25 to 35 mph	Greater than 35 mph
Horizontal separation from traffic lanes	Sidewalk 10 feet or wider	Sidewalk 6 to 10 feet	Sidewalk Less than 6 feet
	Landscape buffer 5 feet or more	Landscape buffer less than 5 feet	No landscape buffer
	Parking lane	Parking lane	No parking lane
	Bicycle lane	Bicycle lane	No bicycle lane
Percentage of heavy vehicles and buses	Less than 2 percent	2 to 4 percent	5 percent or more
Driveway access	Seldom (two or fewer curb cuts per block)	Intermittent (two to four curb cuts per block)	Frequent (greater than four curb cuts per block)

TABLE 10-18
 Pedestrian Level of Service Toolkit
Bel-Red Corridor Draft Environmental Impact Statement

Facility Feature	LOS A	LOS B	LOS C
Intersections	Clear indication of proper action to take by motorist and pedestrian (signals, signs, and infrastructure)		
	Well-marked crosswalks or special paving	Some of the features listed for LOS A intersections	Few of the features listed for LOS A intersections
	Good, pedestrian-scale lighting		
	ADA standard curb ramps		
	Automatic pedestrian-crossing phase		
	Strong indication of a pedestrian crossing at each crossing location		
	Unobstructed views for both motorists and pedestrians		
Visual interest and amenity	Varying building design, shape, texture, and color		
	Active street frontage		
	Pedestrian scale lighting	Some of the amenities listed for LOS A visual interest	Few of the amenities listed for LOS A visual interest
	Street trees and landscaping		
	Properly located street furniture		
Safety and security	Prominence and safety enhancements (e.g., improved crossings, traffic calming)		
	Visibility from adjacent buildings	Some of the amenities listed for LOS A safety and security	Few of the amenities listed for LOS A safety and security
	Good, pedestrian scale lighting		

Source: City of Bellevue, 2006.

¹Calculated as the ratio of the actual walking distance from an origin to destination to the minimum hypothetical walking distance (straight line between the two).

ADA Americans with Disabilities Act
 LOS level of service
 mph miles per hour

Table 10-19 is a toolkit for bicycle facility LOS standards. In many cases, both pedestrian and bicyclist perceptions would reflect a similar LOS that depends on a certain combination of features and characteristics. There are a few features and characteristics, however, that conflict between the two – increasing pedestrian LOS while lowering bicycle LOS or vice versa – or

have an affect on one but not another. For that reason, separate tool kits for pedestrian facilities and for bicycle facilities LOS are needed.

TABLE 10-19
Bicycle Level of Service Toolkit
Bel-Red Corridor Draft Environmental Impact Statement

Facility Feature	LOS A	LOS B	LOS C
Through lanes	Three or fewer	Four to five	Six or more
Turn lanes	0	One to two	Two or more
Width of outside travel lane	14 feet or more	14 feet or more	Less than 14 feet
Presence of outside lane marking	Yes	Yes	No
Width of bicycle lane or paved shoulder	5 feet or more	4 feet	Less than 4 feet
Traffic volume	Low: less than 10,000 per day	Medium: 10,000 to 20,000 per day	High: More than 20,000 per day
Traffic speeds	20 to 25 mph	25 to 35 mph	35 mph or more
Percentage of heavy vehicles and buses	Low: less than 2 percent	Medium: 2 to 4 percent	High: More than 4 percent
FHWA five-point roadway pavement condition rating ¹	Five	Four	Less than four
On-street parking with 50 percent or more occupation	No	No	Yes
Driveway and/or parking access	Seldom (two or fewer curb cuts per block)	Intermittent (two to four curb cuts per block)	Frequent (more than four curb cuts per block)
Intersections	<p>Clear indication of proper action to take by motorist and bicyclist (signals, signs, infrastructure)</p> <p>Clear instruction of proper bicyclist placement</p> <p>Good lighting</p> <p>Sensitive loop detector and indication of how to trigger detector</p> <p>Strong indication of bicyclist crossing at each crossing location</p> <p>Unobstructed views for both motorists and bicyclists</p>	Some of the amenities listed for LOS A intersections	Few of the amenities listed for LOS intersections

TABLE 10-19
Bicycle Level of Service Toolkit
Bel-Red Corridor Draft Environmental Impact Statement

Facility Feature	LOS A	LOS B	LOS C
	Varying building design, shape, texture, and color		
Visual interest and amenity	Active street frontage Pedestrian scale lighting	Some of the amenities listed for LOS A visual interest	Few of the amenities listed for LOS A visual interest
Safety and security	Street trees and landscaping Prominence and safety enhancements (improved crossings and traffic calming)		

Source: City of Bellevue, 2006.

"5" represents the best rating, "1" represents the worst rating.

LOS level of service

mph miles per hour

Mitigation Measures

Construction

For all action alternatives, traffic maintenance and traffic control plans would be developed before constructing any major transportation improvement project. The City of Bellevue, WSDOT, and local agency standards would be implemented and followed during design and construction. Construction activities, lane restrictions, and detours would be coordinated with appropriate agencies and public service providers. Information regarding construction activities would be provided to businesses, residents, community groups, and community service providers. Project-specific construction mitigation measures could be developed during the project design to further reduce construction activity impacts. As development and road projects progress, plans will be developed to ensure limited interruption in utility services, as well.

Operation

This section describes the measures that the City of Bellevue could implement to minimize impacts during project operation.

Roadways

The transportation system improvements listed in Table 10-5, in effect, serve as mitigation for the various land use alternatives being considered for the Bel-Red Corridor. Several additional intersection channelization improvements are proposed for mitigation and were assumed to be in place by the year 2030. These intersection improvements were evaluated as part of the project alternatives and are listed in Appendix G. Future (2030) LOS analysis results listed in Tables 10-6 and 10-7 and shown in Figures 10-9 and 10-10 assume that these mitigation improvements

would be in place. In addition to the specific roadway improvements included in the action alternatives, the following general measures could also be implemented to minimize future transportation impacts:

- Annually monitor congestion in the Bel-Red Corridor and surrounding neighborhoods and consider implementing in phases additional capacity improvements as travel demand increases with growing development.
- Implement traffic monitoring and signal system optimization on key roadways and intersections by using real-time video at the City Traffic Control Center.
- Coordinate with WSDOT on potential SR 520 and I-405 access point improvements.
- Continue aggressive transportation demand management activity in cooperation with the Bellevue Downtown Association/TransManage and King County Metro specifically tailored to the Bel-Red Corridor.
- Phase in zoning to correspond with transportation system capacity.
- Consider a NE 16th Street crossing of I-405 terminating at 112th Avenue NE.

Neighborhood Traffic Calming

The following mitigation measures could also be implemented to aid in neighborhood traffic calming:

- Continue and/or expand ongoing City of Bellevue programs dealing with neighborhood traffic calming, traffic enforcement, and parking regulations. This could include implementing traffic-calming or traffic-diverting measures (e.g., pavement treatments, diverters, and half closures) to discourage through-traffic to minimize any potential impacts to neighborhoods surrounding the Bel-Red Corridor. Candidate roadways, such as 130th Avenue NE to the north and 134th Avenue NE to the south of the corridor, would be subject to Neighborhood Traffic Control Program guidelines.
- Implement parking restrictions, and enforcement measures to prevent spillover parking impacts in these Bel-Red Corridor neighborhoods.

Transit

The following transit mitigation measures could also be implemented for the action alternatives:

- Continue ongoing efforts to coordinate with King County Metro and Sound Transit to expand and improve transit service, including cooperating on the Capital and Policy Elements of the *Bellevue Transit Plan*; this plan assumes that service must be doubled to accommodate future trips. Update Transit Plan to make the Bel-Red Corridor a transit hub. Focus transit service enhancements in those areas where an incremental increase in service might eliminate the need for a roadway project.
- Work with King County Metro and Sound Transit to develop and implement transit improvements before LRT is implemented, particularly between the Bel-Red Corridor and the Downtown Transit Center.

- Work with King County Metro and Sound Transit to integrate surface transit improvements with proposed LRT stations to increase LRT ridership. By implementing LRT service, some existing transit services could be restructured to augment LRT service. The frequency of existing transit routes could be increased, and new local circulators or regional express services could be initiated.
- Coordinate with Sound Transit to study and develop the East Link Project.

Nonmotorized Transportation

The following mitigation measures could also be implemented to aid nonmotorized transportation:

- Incorporate nonmotorized safety improvements in all locations where planned capacity improvements are implemented.
- Improve the environment along congested roadways by building buffers, enhancing streetscapes, and developing ground-level retail and restaurant businesses.
- Seek opportunities to reduce pedestrian delay at signals, provided that acceptable traffic operations can be maintained.
- Provide multiple access points between the nonmotorized transportation system and the future BNSF Trail.
- Provide enhanced pedestrian and bicycle facilities on the new NE 12th Street bridge over I-405.
- Provide a high-quality pedestrian environment within LRT station areas and to other neighborhoods to encourage walking.
- Work to achieve LOS C or better on all roads in the Bel-Red Corridor. Require bicycle parking, with showers for employees, to be provided with new commercial buildings.

Unavoidable Adverse Impacts

Increases in traffic volumes and corresponding increases in congestion (including intersections projected to operate at LOS F) would occur in the Bel-Red Corridor, surrounding neighborhoods, and the regional system with the No-Action Alternative and all action alternatives. These increases would be due in part to regional factors, including economic growth and land use changes in areas outside of Bellevue.

