

# CHAPTER 7. Future Conditions

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This chapter provides a summary of the regional and University area population and employment growth trends. Population and employment growth forecasts directly affect the demand for transportation. The demographic forecasts provide a foundation for the travel demand forecast model developed for this study, building on the Puget Sound Regional Council's model. The UATS focuses on the next 10 years as a forecast horizon but also provides travel demand forecasts for 2020. Information on the development of the travel forecast model is provided in the appendix.

## REGIONAL GROWTH

Compared to King County as a whole, the population of Seattle has not grown as much in the last decade. Seattle's population (563,300 in 2000) increased by 9 percent between 1990 and 2000, compared with a 15 percent increase in King County, and a 22 percent increase in the four-county central Puget Sound region (King, Kitsap, Pierce and Snohomish Counties). The City projected that Seattle's population will continue to grow, by 16 percent from 2000 to 2020. As was the case for the past decade, the City's growth rate would be less than that of King County or the Puget Sound Region, which are projected at: 24 percent for King County, and 30 percent for the four-county region.

The City of Seattle's employment growth rate of 11 percent between 1990 and 2000 exceeded its population growth rate. Total employment in 2000 was 524,000. Given that the labor force is significantly less than its total population, Seattle is clearly a net importer of workers. However, King County's employment growth rate of 22 percent in the last decade exceeded Seattle's employment growth rate. Employment growth through 2020 is forecast to increase by 35 percent for Seattle, 26 percent for King County, and 28 percent for the four-county region.

**Table 7-1** summarizes population and employment growth between 1990, 2000, and growth projected for 2020.

**Table 7-1. Historical and Projected Population and Employment**

Location	1990		2000		2020 (projected)	
	Population	Employment	Population	Employment	Population	Employment
Region	2,700,000	1,450,000	3,300,000	1,800,000	4,300,000	2,300,000
King County	1,500,000	973,000	1,740,000	1,190,000	2,150,000	1,500,000
Seattle	516,000	470,000	563,000	524,000	655,000	708,000

Source: PSRC and City of Seattle Strategic Planning Office, 2001.

## PROJECTED STUDY AREA GROWTH

The zone boundaries used to develop a travel demand forecast model in the study are shown in **Figure 7-1**. Zones are defined as either being in the study area or considered to be of influence to the study area. The zone system used is consistent with census geography and the system developed by the Puget Sound Regional Council (PSRC).

The study found the following trends related to households, employment and student population within the study area:

### Households:

- 14,550 households in 1990
- 17,900 households in 2000
- Rate of increase: 22 percent

### Employment:

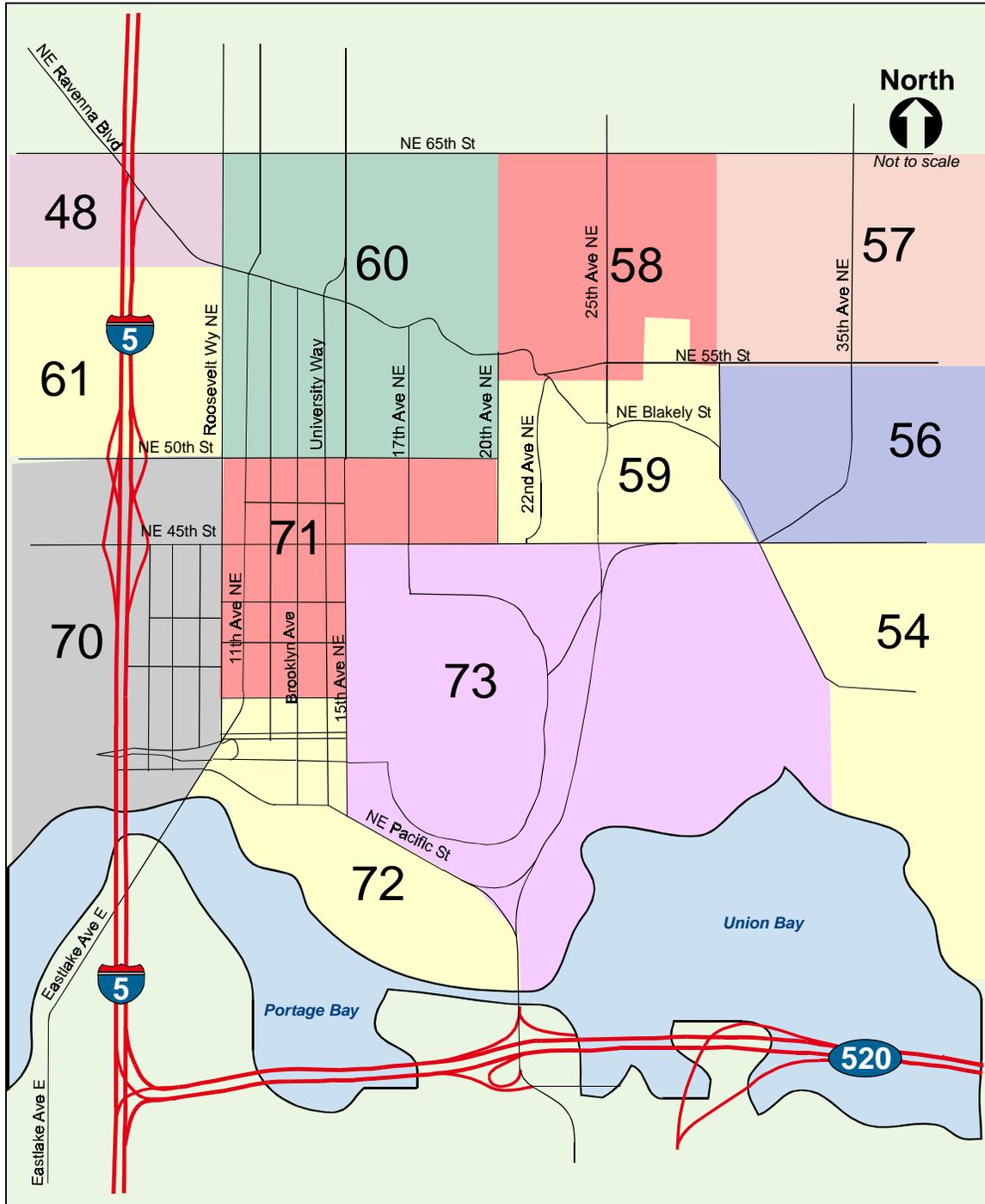
- 37,000 jobs in 1990
- 43,500 jobs in 2000
- Rate of increase: 18 percent

### Student population:

- 30,000 full time equivalent students in 1990
- 33,000 full time equivalent students in 2000
- Rate of increase: 10 percent

The U.W. is the major employer in the study area and most of the employment growth in the last decade is related to the expansion of the University campus.

**Figure 7-1. Zone System for the Study Area**



Source: Mirai Associates, 2001.

## Permitted/Under Construction Growth

Two data sources were used to create future estimates of housing and employment growth in and around the study area.

1. Pipeline (permitted), completed and current construction activities were reviewed, converted to estimates of new households and employees, and added to the base year estimates.
2. Future year (2010) estimates of employees and households obtained from the PSRC were then compared to the base year and pipeline estimates. Adjustments were made to those zones where the pipeline growth is near or exceeds the PSRC's 2010 projections.

City of Seattle staff also reviewed growth capacity constraints based on land use regulations and the revised estimate of household and employment for 2010 and 2020. The household and employment data for 2010 and 2020 used for developing the travel demand model for the UATS are shown in **Table 7-2**.

**Table 7-2. 2010 and 2020 Households and Employment Forecasts in the Study Area**

ZONE NUMBER	Households					Employment				
	2000		2010		Growth (2010-2000)	2000		2010		Growth (2010-2000)
48	841	890	49	956	115	502	631	129	622	120
54	1,730	1,799	69	1,845	115	3,721	3,836	115	4,084	363
56	795	876	81	945	150	700	798	98	843	143
57	1,031	1,056	25	1,070	39	216	263	47	275	59
58	897	1,000	103	1,084	187	154	273	119	345	191
59	1,613	1,928	315	2,085	472	1,609	1,984	375	2,448	839
60	2,542	2,998	456	3,234	692	985	1,147	162	1,462	477
61	948	1,049	101	1,125	177	259	319	60	403	144
70	2,504	2,954	450	3,201	697	1,491	1,768	277	2,266	775
71	2,285	2,737	452	2,960	675	6,774	9,252	2,478	10,771	3,997
72	702	1,015	313	1,311	609	3,002	4,383	1,381	4,646	1,644
73	0	0	0	0	0	24,044	26,320	2,276	27,746	3,702
<b>Total</b>	<b>17,888</b>	<b>20,312</b>	<b>2,424</b>	<b>21,836</b>	<b>3,948</b>	<b>43,457</b>	<b>52,984</b>	<b>7,527</b>	<b>57,931</b>	<b>12,474</b>

Source: PSRC and City of Seattle Strategic Planning Office, 2001.

Main findings are as follows:

#### Households

- The study area's total households will grow by about 2,500 in the next 10 years, which is an increase of 13.5 percent.
- In the two decades from 2000 to 2020, households will grow by about 4,000, which is an increase of 22 percent.

#### Employment

- The growth of employment will be much larger than the household growth in the next two decades in the study area.
- The total study area's employment growth from 2000 to 2010 is projected to be about 11,250 in the next decade. The total employment in 2010 will reach 53,000 jobs. Eleven thousand new jobs in the next 10 years represent an increase of about 27 percent.
- By 2020 the total employment in the study area will reach 58,000 jobs, an increase of 39 percent from 2000.

## **FUTURE TRANSPORTATION DEMAND**

While much of the UATS focused on improving mobility choices for bicyclists and pedestrians, travel forecasting research for these modes is still emerging compared to that for motor vehicles. While it was beyond this study's scope to develop a model for forecasting pedestrian and bicycle mode use in the University area, some data are available from the *U.W. Master Plan Transportation Technical Report* (October 2000). The *Master Plan* projected bicycle and pedestrian modes for 2012 based on current mode use and expected U.W. population growth.

### **Future Pedestrian Conditions**

Projected future pedestrian conditions for the study area are based on two primary factors: new development location and light rail station locations. The *U.W. Master Plan* forecast pedestrian users to increase from 55,525 in 1999 to 64,645 in 2012, with the pedestrian mode share remaining at 27% (zero percent change between 1999 and 2010). The *Master Plan* also provided the following descriptions of the future pedestrian conditions in its October 2000 *Transportation Technical Report*.

## **New Development**

Major pedestrian paths to the U.W. campus will be partly defined by new development in the area. Improvements to areas within walking access to the campus can attract pedestrians. The Master Plan identifies areas to the west, central campus and north campus as sites for potential new development.

Existing or new housing within a one-half mile radius from campus can also attract pedestrians, particularly if direct, high quality walking paths are provided. The barriers around the University, such as I-5 and the bridges, create funneling points for pedestrians. Additional housing within 1,000 feet of the University will maximize the walking mode split.

## **Transit Stops**

The U.W. area will likely receive improved transit service in the future. The proposed Sound Transit Central Link Light Rail plan calls for two underground station locations near the University, although the route and station locations are undecided at this time.

These transit stations would draw pedestrian activity from a one-third mile radius from the station entrances. It is likely that the stations will service an area bounded by I-5 to the west, NE 52<sup>nd</sup> Avenue to the north, Montlake Boulevard NE to the east, and the Ship Canal to the south.

Sound Transit's 1999 *FEIS for the Central Link Light Rail Transit Project* projects that by 2010, daily light rail users accessing the NE 45<sup>th</sup> Street station will total 8,700, and those at the NE Pacific Street station will total 10,400. Such large numbers of pedestrians will need direct connections from the light rail stations to campus and to other bus transit services.

## **Future Bicycle Conditions**

The *U.W. Master Plan Transportation Technical Report* (October 2000) provides the following description of future bicycle conditions in the study area. **Table 7-3** shows the estimated bicycle usage for the U.W. Campus by 2012.

**Table 7-3. 2012 Estimates of Bicycle Users for U.W. Campus**

Users	1999 Population Estimate	1999 Percentage of Bike Users	1999 Estimated Bike Users**	2012 Forecast Population	2012 Percentage of Bike Users*	2012 Estimated Bike Users**
Students	35,062	5%	1,755	39,182	8%	3,135
Faculty	6,035	10%	605	7,435	11%	820
Staff	14,428	5%	720	18,028	6%	1,080

\* Based on mode split and assumes an 8% average mode split for each user group.

\*\* Estimates are rounded to the nearest integer of five.

Source: U.W. Master Plan Transportation Technical Report, October 2000.

As **Table 7-3** indicates, there is a significant increase in the number of estimated bicycle users by 2012, based on an increase in the bicycle mode split percentage and an increase in the campus population. This assumes that the student and staff mode split increases from current levels and the faculty mode split remains unchanged.

The current bicycle mode share of six percent and an assumption that improved bicycle facilities will attract more riders provides the basis for forecast 8% mode share by 2012. A U.W. survey in 1994 documented a 10% bicycle mode share that year, suggesting that an 8% share is not unrealistic. Bicyclists tend to take transit to campus if they cannot ride, so increasing opportunities for bicycle commuting will also preserve transit seats for additional riders.

The greatest number of potential bicycle users would access campus from the west, with the second-largest group coming from the north. Together, these two groups would comprise 82% of bicycle users accessing the campus by 2012. This high concentration suggests that improvements to the north and west of campus could greatly benefit future bicycle users.

### **Future Automobile Conditions**

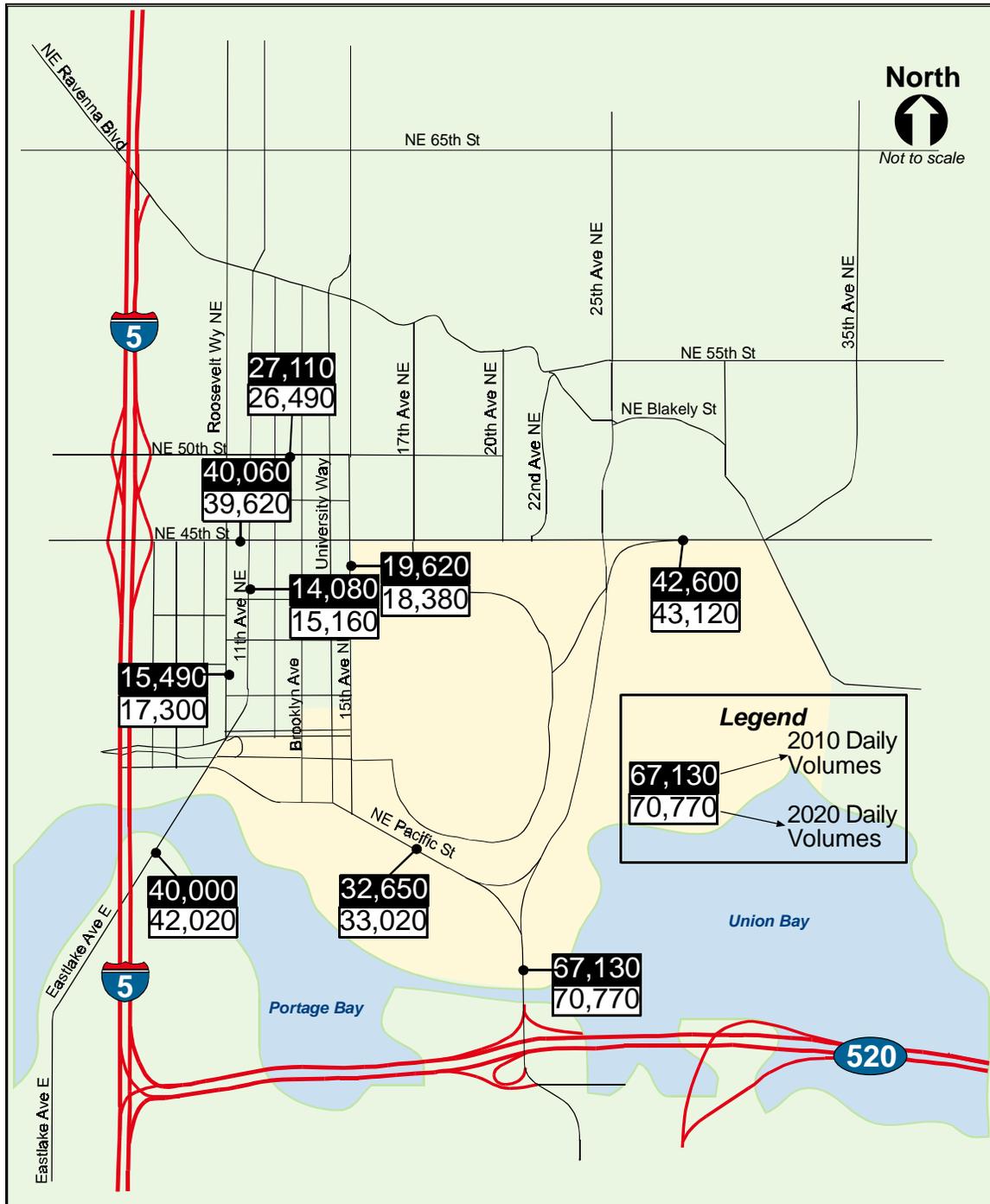
Daily and PM peak hour estimates of vehicle demand were developed for the four screenlines in the study area. Overall, the vehicle volumes for the four screenlines increase between 6 and 13 percent between 2000 and 2010. The growth between 2010 and 2020 is much less, varying between one and four percent. Detailed screenline information can be found in the appendix.

Future daily vehicular demand at selected facilities within the study area is shown in **Figure 7-2**. Future PM peak hour vehicular demand is shown in **Figure 7-3**. **Table 7-4** compares 2010 and 2020 daily traffic volumes with existing 2000 volumes on selected arterial streets. Similarly, **Table 7-5** compares PM peak hour traffic growth between 2000 and 2010 and between 2000 and 2020.

Key findings are listed below:

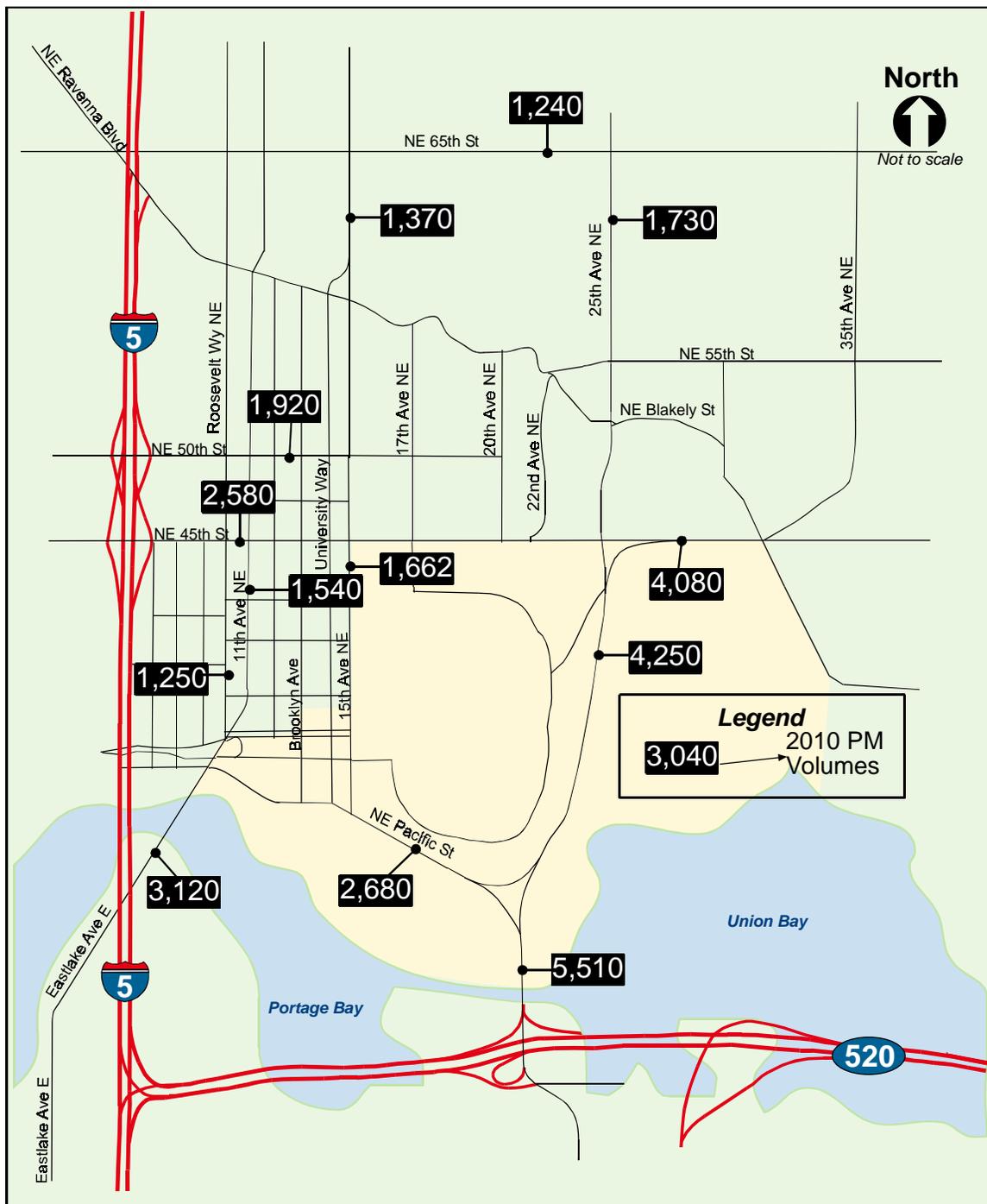
- The University area will continue to increase daily traffic volumes in the next two decades. However, the growth rate in the decade after 2000 will generally be higher than the decade after 2010.
- Reflecting the capacity limits of the most heavily congested corridors, such as NE 45<sup>th</sup> Street and Montlake Boulevard NE, daily traffic growth rates for those corridors are less than for those with more remaining capacity. Eastlake Avenue E at the University Bridge is projected to carry more than 7,000 vehicles per day in 2010 than today.
- Since NE 45<sup>th</sup> Street is currently operating at capacity, most of the east-west traffic growth will be accommodated by NE 50<sup>th</sup> Street.
- By 2020, Montlake Boulevard NE at the Montlake Bridge will carry 70,000 vehicles per day. This is a high volume of daily traffic, considering that the bridge has only four lanes. (The forecast assumes that no improvement on SR 520 will be made.)
- The traffic volume growth rates of the PM peak hour are not as high as those of the daily volumes. For many of the arterial corridors, it would be impossible to add any more traffic due to the lack of capacity. Unless the capacity is expanded by more efficient traffic operation or improved physical layouts, the peak period will be longer and traffic congestion will last many hours of the day.

**Figure 7-2. Year 2010 and 2020 Daily Traffic Volumes**



Source: Mirai Associates, 2001.

**Figure 7-3. Year 2010 PM Peak Period Traffic Volumes**



Source: Mirai Associates, 2001.

**Table 7-4. Comparison of 2010 and 2020 Daily Traffic Volumes with Existing Volumes on Selected Arterials**

Street	Location	2000	2010	Growth (2010-2000)	Percent Growth (2010 - 2000)	2020	Growth (2020-2000)	Percent Growth (2020 - 2000)
NE 50th Street	East of 11th Ave NE	22,810	27,110	4,300	19%	26,490	3,680	16%
NE 45th Street	East of Roosevelt Wy	38,480	40,060	1,580	4%	39,620	1,140	3%
Roosevelt Way NE	North of NE 41st Street	13,540	15,490	1,950	14%	17,300	3,760	28%
11th Avenue NE	South of NE 45th Street	10,680	14,080	3,400	32%	15,160	4,480	42%
Eastlake Avenue E	At University Bridge	32,500	40,000	7,500	23%	42,020	9,520	29%
15th Avenue NE	South of NE 45th Street	17,790	19,620	1,830	10%	18,380	590	3%
Pacific Street NE	West of Pacific Place	28,000	32,650	4,650	17%	33,020	5,020	18%
Montlake Boulevard	South of Pacific Street	62,200	67,130	4,930	8%	70,770	8,570	14%
NE 45th Street	West of Union Bay Place	40,030	42,600	2,570	6%	43,120	3,090	8%
NE 65th Street	East of 15th Ave NE	14,880	16,400	1,520	10%	17,250	850	5%
25th Avenue NE	South of NE 65th Street	16,020	17,500	1,480	9%	19,000	1,500	9%

Source: Mirai Associates, 2001.

**Table 7-5. 2010 PM Peak Hour Traffic Volumes Compared with Existing Volumes on Selected Arterials**

Street	Location	2000	2010	Growth (2010-2000)	Percent Growth (2010-2000)
NE 50th Street	East of 11th Ave NE	1,860	1,920	60	3%
NE 45th Street	East of Roosevelt Wy	2,540	2,580	40	2%
Roosevelt Way NE	North of NE 41st Street	1,000	1,250	250	25%
11 <sup>th</sup> Avenue NE	South of NE 45th Street	1,260	1,540	280	22%
Eastlake Avenue E	At University Bridge	2,960	3,120	160	5%
15 <sup>th</sup> Avenue NE	South of NE 45th Street	1,230	1,540	310	24%
Pacific Street NE	West of Pacific Place	2,490	2,680	190	8%
Montlake Boulevard NE	South of Pacific Street	5,120	5,510	390	8%
NE 45th Street	West of Union Bay Place	3,150	3,410	260	8%
NE 65th Street	East of 15th Ave NE	1,130	1,240	110	10%
25 <sup>th</sup> Avenue NE	South of NE 65th Street	1,460	1,730	270	18%

Source: Mirai Associates, 2001.

**2010 Intersection LOS (PM Peak Hour, Without Recommended Improvements)**

Chapter 5 included discussion of existing (1999) intersection levels of service (LOS), including definitions. The UATS calculated LOS for signalized intersections using the 2010 PM peak hour volumes described above. Findings from the intersection LOS analysis for 2010 are shown in **Figure 7-4**. Major findings are summarized below:

- If all intersections can operate without interference from queues from the freeways and bridges, one signalized intersection will operate with LOS F in 2010: the intersection of NE Pacific Street and NE Pacific Place.

- Six intersections will operate at LOS E (sixty seconds or more of delay):
  - NE 65<sup>th</sup> Street and 15<sup>th</sup> Avenue NE
  - NE 65<sup>th</sup> Street and 25<sup>th</sup> Avenue NE
  - I-5 Southbound ramps (5<sup>th</sup> Avenue NE) and NE 45<sup>th</sup> Street
  - I-5 Northbound Ramps (7<sup>th</sup> Avenue NE) and NE 45<sup>th</sup> Street
  - NE 45<sup>th</sup> Street and Montlake Boulevard NE
  - Montlake Boulevard NE and Lake Washington Boulevard (SR 520 eastbound off-ramp)
  
- It is possible that the existing peak hour traffic counts are low because of the bottlenecks at the bridges and freeway ramps. The actual peak hour demand could be higher if those bottlenecks and backups were free flowing. Since the future levels of service are calculated using existing volumes as the base, it is possible that the 2010 level of service might be understated.
  
- Before the NE 65<sup>th</sup> Street reconstruction project in the Capital Improvement Program is carried out, the City needs to review the corridor's traffic operation, particularly related to the intersections with 25<sup>th</sup> Avenue NE and 15<sup>th</sup> Avenue NE.

Further discussion comparing the No Action 2010 scenario with 2010 with Proposed Improvements can be found in Chapter 11.

**Figure 7-4. 2010 Intersection LOS (Without Recommended Improvements)**



Source: Mirai Associates, 2001