CHAPTER 2

Land Use, Growth and Travel Demand

2.0 Introduction

Chapter 1 presented the overall policy framework for the specific transportation policies, objectives and actions contained in the Regional Transportation Plan. This chapter provides an overview of the expected land-use and travel patterns for the year 2020 based on implementation of the 2040 Growth Concept and predicted growth in population and employment. This chapter will also describe how expected growth in the region will affect our transportation system, assuming no new transportation projects are built. This transportation system is called the "2020 No-Build System."

This chapter is organized as follows:

2020 Population and Employment Forecast: This section provides an overview of expected growth in population and employment between 1994 and 2020 for the Portland metropolitan region. A discussion of expected growth in freight movement in the region is also provided.

2020 Land-Use Assumptions: This section describes the land-use assumptions used to define the 2020 population and employment forecast, including a brief summary of the 2040 Growth Concept and assumptions for urban reserves designated by the Metro Council in 1997.

2020 Population and Employment Forecast by RTP Subarea: This section provides an overview of expected growth in population and employment between 1994 and 2020 for each RTP Subarea. For RTP analysis purposes, the Portland metropolitan region is divided into seven different subareas, called RTP subareas. These subareas are: Portland Central City and Neighborhoods, West Columbia Corridor, East Multnomah County, urban Clackamas County, Damascus/Pleasant Valley, North Washington County and South Washington County.

Regional Jobs and Housing Balance: This section identifies regional and RTP subarea disparities exist between the location of new jobs and new housing in the Portland metropolitan region and the potential impact of these disparities on operation of the regional transportation system.

Effects of Growth on the 2020 No-Build System: This section summarizes the impact of expected growth on the regional transportation system if no new transportation projects or programs are constructed.

2.1 2020 Population and Employment Forecast

By the year 2020, the Portland metropolitan region, including Clark County, Wash., is predicted to be home to approximately 2.3 million people, an increase of 51 percent from 1994. Approximately two-thirds of future population growth is projected to come from people moving to this region.

Employment in the region is expected to grow by 70 percent, bringing the number of jobs in the region to 1.6 million. Retail employment in the region grows by 81 percent between 1994 and 2020, as compared to other employment sectors, which grow by 68 percent. Employment is expected to continue to grow at a faster rate than population. Table 2.1 shows forecasted household, population and employment growth.

Table 2.1
2020 Population and Employment Forecast

	1994	2020	Percent Change
Total Region (four-county)*			
• Population	*1,552,673*	*2,348,945*	*+51%*
• Households	*599,698*	*986,207*	*+64%*
• Employment	*947,647*	*1,610,956*	*+70%*
Intra Metro UGB**			
• Population	*1,142,463*	*1,666,636*	*+46%*
• Households	*453,283*	*716,150*	*+58%*
• Employment	*791,410*	*1,327,939*	*+68%*

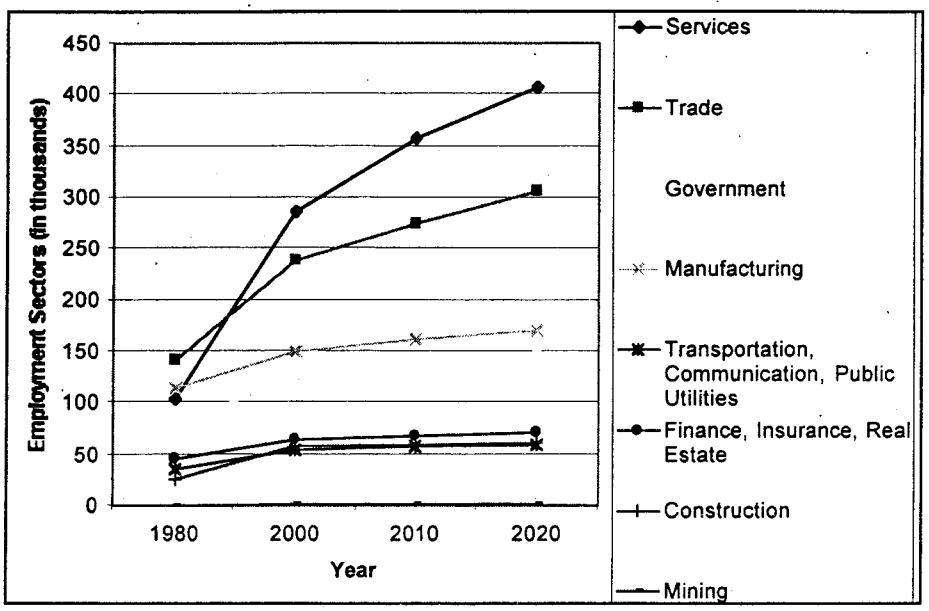
* Includes Clark, Clackamas, Multnomah and Washington counties.
** Within Metro urban growth boundary, excludes Clark County, Wash..

Source: Metro

The Portland metropolitan region's position as a major regional and national distribution hub has an impact on the regional economy and on the volume of freight movement in the region. A recent report summarizes expected employment growth in the Portland metropolitan region, highlighting changes in the movement of goods and services and their possible impact on the region's transportation system and the regional economy. This report, *Commodity Flow Analysis for the Portland Metropolitan Area*[1], predicts a shift in the composition of the manufacturing sector from a focus on wood products and other heavy materials to the electrical machinery, plastics and chemicals industries between 1980 and 2020. This shift away from an economy largely driven by the demand for agricultural products, wood products and the manufacturing of heavy equipment to an economy dominated by the service, trade and light manufacturing sectors is expected to impact the nature and extent of freight movement in the region. Figure 2.1 graphs expected employment growth by employment sector for the Portland metropolitan region between 1980 and 2020.

[1] ICF Kaiser, Columbus Group, Reebie Associates, the WEFA Group and Port of Portland, Commodity Flow Analysis for the Portland Metropolitan Area, p. 9.

Figure 2.1
Growth by Employment Sector for the Portland Metropolitan Area



Source: WEFA Group, Eddystone, Pennsylvania

As population, employment and trade grow, more freight is predicted to move through the region. Freight volume is expected to more than double (in terms of tonnage) by the year 2030 – a rate higher than projected population growth.[2] This combined with population growth is expected to put increased demands on the regional transportation system.

Freight movement is largely dependent upon trucks. Today and in the future, about 60 percent of all cargo moving in and out of the Portland metropolitan region is predicted to move on a truck at some point of its journey here in the region. In addition, more than 70 percent of all truck traffic is expected to be intra-regional in nature, meaning that both the origin and destination are in the Portland metropolitan area. Finally, all transportation dependent employment sectors combined account for nearly 50 percent of the region's total employment by 2020.[3] Transportation dependent sectors include the manufacturing, trade, transportation, communications, public utilities, construction and mining sectors.

[2] Ibid, p. 71.
[3] Ibid, p. 10.

2.2 2020 Land-Use Assumptions

2.2.1 2040 Growth Concept

The land-use assumptions used in the 2020 population and employment forecast are based on the 2040 Growth Concept. Adopted in 1995 as part of the RUGGOs, the 2040 Growth Concept resulted from a three-year planning process that evaluated how different land-use strategies could accommodate expected growth in this region. The possible consequences of such strategies were analyzed, including their impact on operation of the regional transportation system. Results from the transportation modeling and land-use analysis suggest that the important differences between strategies relate to where growth is directed and how land inside the urban growth boundary is used. The Region 2040 process found that building neighborhoods and communities to focus new jobs, housing and services closer together creates land-use patterns that support walking, biking and transit use for local trips. As a result, this land-use pattern provides many benefits and has important implications for the regional transportation system.

Using what was learned from the technical analysis and from discussions with the residents of this region, the adopted 2040 Growth Concept relies on:

- a modest expansion of the urban growth boundary
- using land more wisely through infill and redevelopment, emphasizing higher density and mixed-use development in key centers and corridors
- focusing jobs and shopping closer to where people live
- expanding transportation choices
- protecting prime farmland, rural reserves, open spaces and other environmentally sensitive lands

When the 2040 Growth Concept was developed, there was an emphasis on limiting expansion of the urban growth boundary and protecting prime farmland. As a result, the 2040 Growth Concept directs new growth to centers and along existing major transportation corridors. In addition, specified areas outside of the urban growth boundary, called urban reserves, are also assumed to accommodate new growth during the next 20 years. The urban reserves tend to be focused in areas outside of the urban growth boundary that are predominately zoned for rural residential development and which have rolling topography. Therefore, while this strategy meets the larger goal of preserving prime farmland, it does not focus growth impacts evenly throughout the region or in areas that may have adequate transportation capacity.

Approximately 18,570 acres of urban reserves were designated by the Metro Council in 1997. In 1998, the Metro Council expanded the urban growth boundary to include 3,527 acres of the more than 18,000 acres of urban reserves to accommodate 15,000 dwelling units and nearly 6,300 jobs. These urban reserve areas are still undergoing more detailed planning so that development of these areas will be timed to coincide with provision of public facilities such as sewer, stormwater, water and road systems. The Metro Council is likely to add more urban reserves to the urban growth boundary in the future once natural resource protection techniques are better defined to address the federal Endangered Species Act listing of salmon and steelhead in the Pacific Northwest.

The 2020 population and employment forecast assumed varying levels of new jobs and homes in each of the urban reserve areas designated by the Metro Council in 1997. In general, the jobs and housing assumed for each urban reserve area intentionally attempted to help balance the current mix of jobs and housing in that part of the region, given the suitability of each urban reserve area for certain types of development (e.g., housing, industrial or employment uses). Many of these concentrated urban reserves, such as the Pleasant Valley/Damascus area, are large enough to require new transportation networks, not merely extensions of existing facilities, such that development in areas that will be more difficult to serve with transportation and other urban services. As a result, the Damascus/Pleasant Valley area and other urban reserves will be the subject of master planning by Metro and local partners.

2.3 2020 Population and Employment Forecast by RTP Subarea

For RTP analysis purposes, the Portland metropolitan region is divided into seven different subareas, called RTP subareas. These subareas are: Portland Central City and Neighborhoods, West Columbia Corridor, East Multnomah County, Urban Clackamas County, Damascus/Pleasant Valley, North Washington County and South Washington County. Figure 2.2 shows a map identifying the combined RTP subareas and a graph of expected change in population and employment between 1994 and 2020. Figure 2.2 provides a table summary of predicted population and employment growth for each individual subarea. A text summary of predicted population and employment growth for each subarea follows Table 2.2.

Figure 2.2

REGIONAL TRANSPORTATION PLAN UPDATE

2020 Job/Population Forecast by Subarea

with % change from 1994

METRO

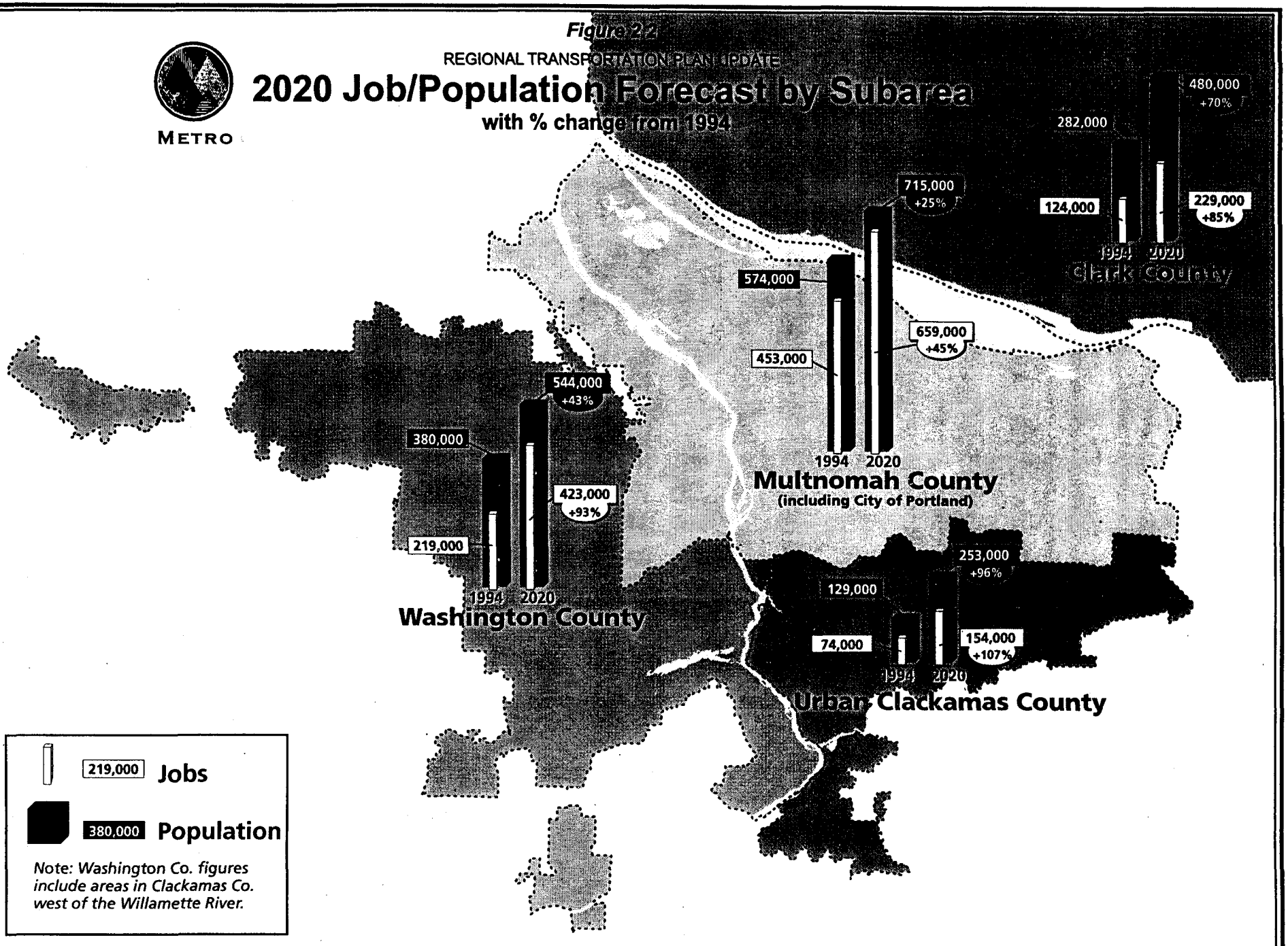


Table 2.2
2020 Population and Employment Forecast by RTP Subarea

Combined RTP Subarea	Population 1994	Population 2020	Population Increase	Employment 1994	Employment 2020	Employment Increase
Multnomah County Subareas						
• *Portland Central City and Neighborhoods*	*375,268*	*426,336*	*51,068 (+ 14%)*	*333,586*	*447,806*	*114,220 (+ 34%)*
• *West Columbia Corridor*	*9,465*	*18,899*	*9,434 (+ 100%)*	*51,010*	*98,497*	*47,487 (+ 93%)*
• *East Multnomah County*	*188,930*	*270,065*	*81,135 (+ 43%)*	*68,220*	*111,869*	*43,649 (+ 64%)*
Sub-total	**573,663**	**715,300**	**141,637 (+ 25%)**	**452,816**	**658,172**	**205,356 (+ 45%)**
Clackamas County Subareas						
• *Urban Clackamas County*	*118,524*	*155,695*	*37,171 (+ 31%)*	*70,911*	*127,757*	*56,846 (+ 80%)*
• *Damascus/Pleasant Valley*	*10,699*	*97,685*	*87,016 (+ 816%)*	*3,295*	*25,570*	*22,275 (+ 676%)*
Sub-total	**129,193**	**253,380**	**124,187 (+ 96%)**	**74,206**	**153,327**	**79,121 (+ 107%)**
Washington County Subareas*						
• *North Washington County*	*207,145*	*324,998*	*117,853 (+ 57%)*	*115,404*	*258,822*	*143,418 (+ 124%)*
• *South Washington County*	*173,218*	*218,824*	*45,606 (+ 26%)*	*103,586*	*164,075*	*60,489 (+ 58%)*
Sub-total	**380,363**	**543,822**	**163,459 (+ 43%)**	**218,990**	**422,897**	**203,907 (+ 93%)**
Clark County, Wash.	**282,437**	**480,387**	**197,950 (+ 70%)**	**123,759**	**228,523**	**104,764 (+85%)**
Rural reserves	**282,437**	**480,387**	**197,950 (+ 70%)**	**77,876**	**148,037**	**70,161 (+ 90%)**
Total Region (4-county)	**1,552,664**	**2,348,943**	**796,279 (+ 51%)**	**947,647**	**1,610,956**	**663,309 (+ 70%)**

* This subarea includes areas of Clackamas County west of the Willamette River.

Source: Metro

2.3.1 West Columbia Corridor

This subarea is planned to be focus of employment growth and is expected to serve as the region's most important center of industrial and freight terminal activity. Population and employment in the subarea are predicted to nearly double, increasing from 9,500 to 18,900 people and from 51,000 to 98,500 jobs, between 1994 and 2020. Employment growth is expected to be family-wage jobs based on the transportation-related industry that locates near marine and air intermodal terminals in this subarea.

2.3.2 Portland Central City and Neighborhoods

The number of people living in the subarea is predicted to increase from 375,268 in 1994 to 426,336 people in 2020. This reflects a 14 percent increase in population. The number of jobs in the subarea is expected toincrease by 34 percent. In 1994, more than 333,500 people worked in the subarea. By 2020, more than 447,800 people are expected to work there. Most of the population and employment growth will be accommodated through infill and redevelopment.

2.3.3 East Multnomah County

The number of people living in the subarea is expected to increase by more than 40 percent between 1994 and 2020. In 1994, more than 188,000 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be more than 270,000. The number of jobs in the subarea is expected to increase by nearly 64 percent, changing from slightly more than 68,000 jobs in 1994 to almost 112,000 jobs in 2020.

2.3.4 Urban Clackamas County (excluding Damascus)

The number of people living in this subarea is expected to increase by slightly more than 31 percent between 1994 and 2020. In 1994, more than 118,500 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be more than 155,600. Though the rate of employment growth exceeds 80 percent during the plan period, the number of jobs in the subarea continues to outpace the number of homes. In 1994, more than 70,000 people worked in this part of the region. By 2020, the number of jobs in the subarea is expected to be more than 127,000. However, the significant growth in the number of jobs helps to balance the mix of jobs and housing in this part of the region. The urban reserves in the Stafford Basin are expected to develop more housing than jobs between 1994 and 2020 because of topographic constraints that limit employment in this area, especially industrial uses.

2.3.5 Damascus/Pleasant Valley Urban Reserves

The number of people living in this subarea is expected to increase dramatically between 1994 and 2020. In 1994, more than 10,000 people lived in this part of the region in a largely rural land use pattern. By 2020, the number of people living in the subarea is expected to be nearly 100,000. The number of jobs in the Damascus subarea is also expected to increase dramatically, growing from slightly more than 3,200 jobs in 1994 to more than 25,000 jobs in 2020. Despite such a significant increase in both jobs and population, this area of the region continues to fall behind the rest of the region in having a balanced mix of jobs and housing. This has important implications for the transportation system serving this area.

2.3.6 South Washington County

The number of people living in this subarea is expected to increase by slightly more than 26 percent between 1994 and 2020. In 1994, more than 173,000 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be more than 218,800. The number of jobs in the subarea is expected to increase by 58 percent, growing from slightly more than 103,500 jobs in 1994 to more than 164,000 in 2020. The urban reserve areas adjacent to Sherwood, Tualatin and Wilsonville are

expected to develop more housing than jobs between 1994 and 2020 to help further balance the mix of jobs and housing in this part of the region.

2.3.7 North Washington County

The number of people living in this subarea is expected to increase by slightly more than 58 percent between 1994 and 2020. In 1994, more than 207,000 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be almost 325,000. The number of jobs in the subarea is expected to increase by 124 percent, growing from slightly more than 115,000 jobs in 1994 to more than 258,000 in 2020. The urban reserve areas located north of US 26 and south of Tualatin Valley Highway are expected to develop more housing than jobs between 1994 and 2020 to help balance the mix of jobs and housing in this part of the region.

2.4 Regional Jobs/Housing Balance

The household and employment forecasts outlined in Table 2.1 demonstrate that the number of households and jobs are growing at a similar rate regionally, 64 percent and 70 percent respectively. However, disparities exist between the location of new jobs and new housing in the Portland metropolitan region. Table 2.3 shows disparities between the location of new jobs and new housing in the Portland metropolitan region. Figure 2.3 summarizes the household and employment growth in the region by combined RTP subarea and percent change in jobs per household from 1994.

The rate of housing growth is predicted to be highest in the Clackamas County subarea, which includes urban Clackamas County and the Damascus/Pleasant Valley urban reserve areas. Clark County, Wash. and the Washington County subareas, however, are expected to represent 20 percent and 25 percent of the regional growth in households respectively, as compared to 12 percent in the Clackamas County subarea. Figure 2.4 summarizes predicted growth in households by RTP subarea, indicating the proportion of the region's total growth in households within each RTP subarea.

The rate of employment growth is expected to be highest in the Clackamas and Washington counties subareas, increasing by 107 percent and 93 percent respectively. However, the greatest increase in the number of new jobs is expected to occur in the Multnomah and Washington counties subareas, with each subarea representing 45 percent of the overall increase in jobs in the four-county region. Figure 2.5 summarizes predicted growth in employment by RTP subarea, indicating the proportion of the region's total growth in employment within each RTP subarea.

Table 2.3

2020 Household and Employment Forecast
(RTP Subarea Totals)

Combined RTP Subarea	Households			Employment		
	1994	2020	Increase	1994	2020	Increase
Multnomah County Subareas						
• *Portland Central City and Neighborhoods*	*164,061*	*197,918*	*33,857 (+ 21%)*	*333,586*	*447,806*	*114,220 (+ 34%)*
• *West Columbia Corridor*	*4,298*	*8,936*	*4,638 (+ 108%)*	*51,010*	*98,497*	*47,487 (+ 93%)*
• *East Multnomah County*	*70,726*	*106,065*	*35,339 (+ 50%)*	*68,220*	*111,869*	*43,649 (+ 64%)*
Sub-total	**239,085**	**312,919**	**73,834 (+ 31%)**	**452,816**	**658,172**	**205,356 (+ 45%)**
Clackamas County Subareas						
• *Urban Clackamas County*	*45,602*	*66,571*	*20,969 (+ 46%)*	*70,911*	*127,757*	*56,846 (+ 80%)*
• *Damascus/Pleasant Valley*	*3,372*	*32,034*	*28,662 (+ 850%)*	*3,295*	*25,570*	*22,275 (+ 676%)*
Sub-total	**48,974**	**98,605**	**49,631 (+ 101%)**	**74,206**	**153,327**	**79,121 (+ 107%)**
Washington County Subareas*						
• *North Washington County*	*77,061*	*140,778*	*63,717 (+ 83%)*	*115,404*	*258,822*	*143,418 (+ 124%)*
• *South Washington County*	*67,405*	*100,410*	*33,005 (+ 49%)*	*103,586*	*164,075*	*60,489 (+ 58%)*
Sub-total	**144,466**	**241,188**	**96,722 (+ 67%)**	**218,990**	**422,897**	**203,907 (+ 93%)**
Clark County, Wash.	**102,664**	**192,290**	**89,626 (+ 88%)**	**123,759**	**228,523**	**104,764 (+85%)**
Rural reserves	**64,507**	**141,205**	**76,698 (+ 119%)**	**77,876**	**148,037**	**70,161 (+ 90%)**
Total Region (4-county)	**599,696**	**986,207**	**(+ 64%)**	**947,647**	**1,610,956**	**663,309 (+ 70%)**

* This subarea includes areas of Clackamas County west of the Willamette River.

Source: Metro

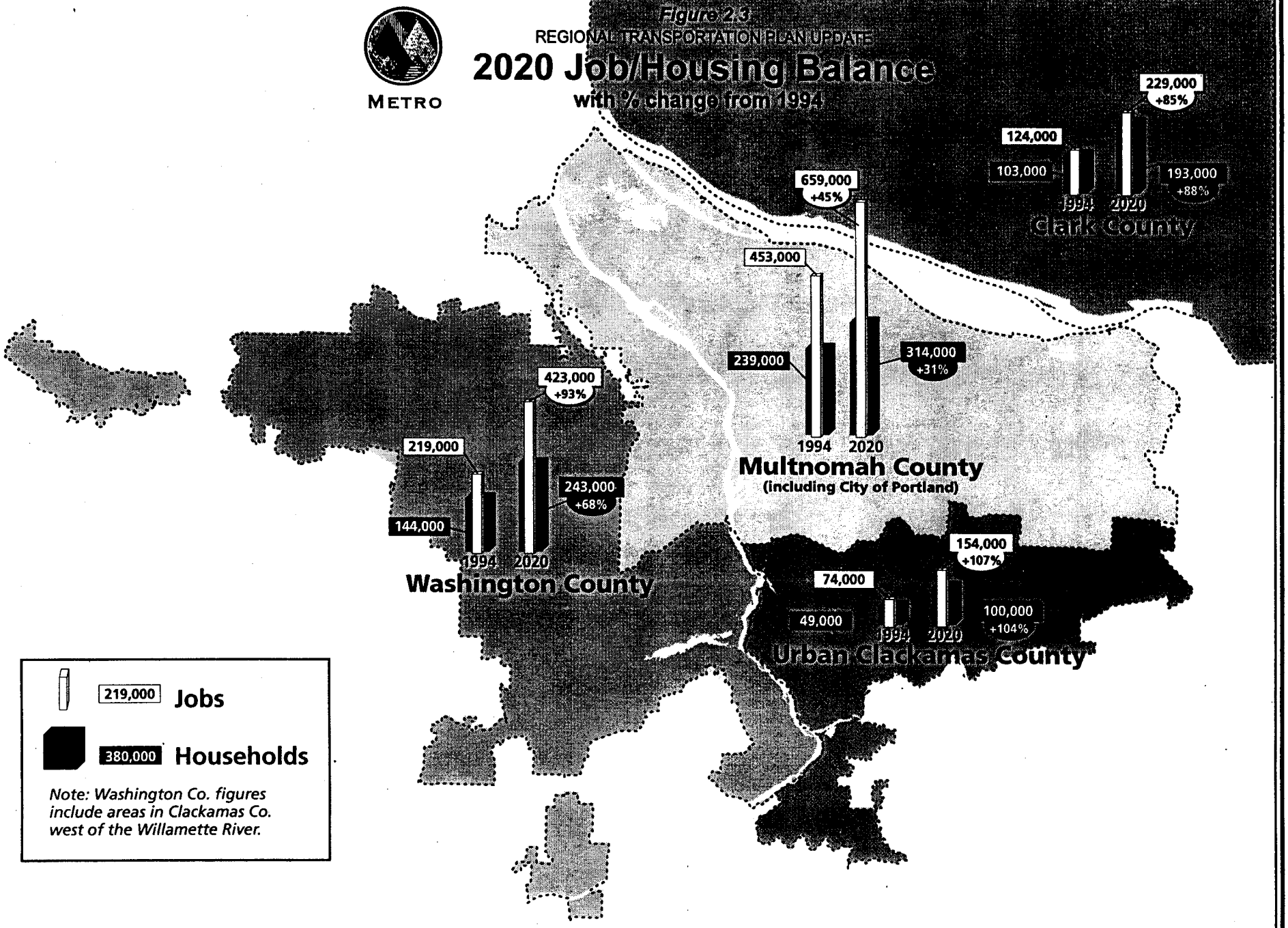
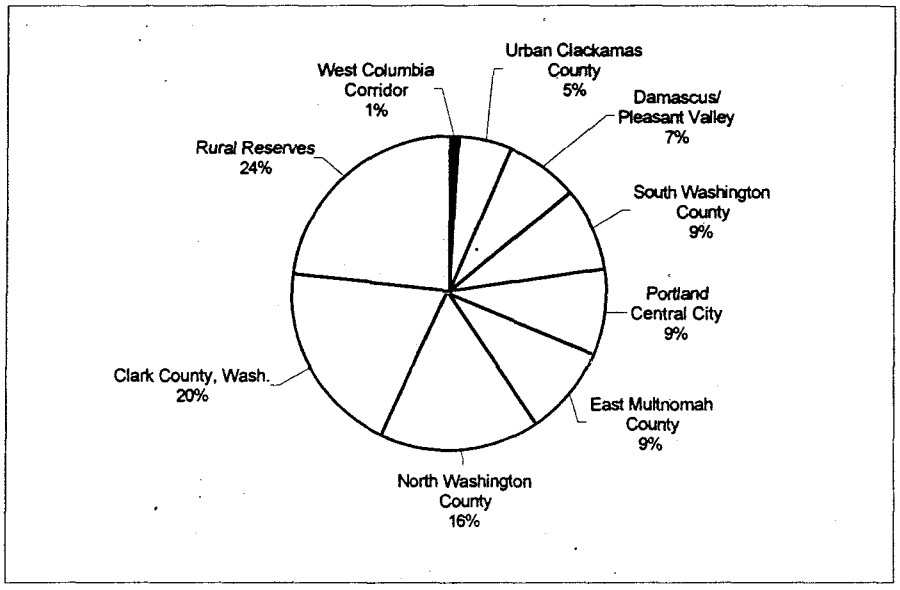


Figure 2.3
REGIONAL TRANSPORTATION PLAN UPDATE
METRO
2020 Job/Housing Balance
with % change from 1994
229,000
+85%
124,000
103,000
193,000
+88%
1994
2020
Clark County
659,000
+45%
453,000
239,000
314,000
+31%
1994
2020
Multnomah County
(including City of Portland)
423,000
+93%
219,000
243,000
+68%
144,000
1994
2020
Washington County
154,000
+107%
74,000
49,000
100,000
+104%
1994
2020
Urban Clackamas County
219,000 Jobs
380,000 Households
Note: Washington Co. figures include areas in Clackamas Co. west of the Willamette River.

Figure 2.4

RTP Subarea Household Growth

(as a percentage of total regional growth in households)

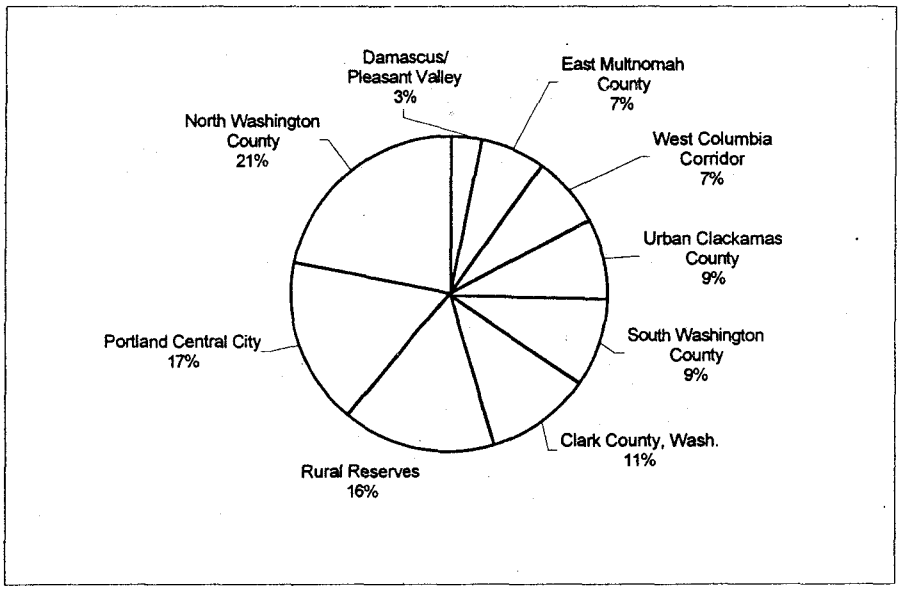


Source: Metro

Figure 2.5

RTP Subarea Employment Growth

(as a percentage of total regional growth in employment)



Source: Metro

Despite the high rate of household and employment growth in the Clackamas County subarea, this part of the region is predicted to have more housing than jobs in 2020 to the extent that individuals will need to travel to jobs in other parts of the region, particularly Multnomah and Washington counties. This has important implications on how the region's transportation system operates. Likewise, Clark County, Wash. falls behind the rest of the region in terms of having a balanced mix of jobs and housing. Table 2.4 summarizes the number of jobs per household for each RTP subarea, Clark County, Wash., and for the four-county region as a whole.

Table 2.4
Jobs/Housing Ratio

Combined RTP Subarea	Number of jobs per household		
	1994	2020	Percent Change
Multnomah County Subareas	1.89	2.10	+11%
Washington County* Subareas	1.52	1.75	+16%
Total Region (4-county region)	**1.58**	**1.63**	**+3.3%**
Clackamas County Subareas	1.52	1.55	+2.6%
Clark County, Wash.	1.21	1.19	-1.4%

* This subarea includes areas of Clackamas County west of the Willamette River.

Source: Metro

A perfect balance of jobs and housing will be difficult to achieve. Market demand and personal choice and willingness to travel longer distances to their place of work influence where people choose to work and live. The Clackamas County subarea is expected to have more housing than jobs overall in 2020. However, a decision to provide additional housing in Washington County beyond what is assumed in the 2040 Growth Concept and designated urban reserve areas would likely impact prime farm land surrounding the urban growth boundary in that part of the region.

2.5 Effects of Growth on the 2020 No-Build System

2.5.1 Overall System Performance[4]

Population and employment is expected to increase by 46 percent and 68 percent respectively between 1994 and 2020 within the urban growth boundary. Growth in population and employment is predicted to result in a corresponding increase in travel demand during the same time period for both people and freight movement. Between 1994 and 2020, the number of person trips beginning and ending within the urban growth boundary are expected to increase by 56 percent, to 7.6 million trips per day. Since employment in the region is expected to increase faster than population, the number of trips devoted to work is also expected increase faster than trips for non-work purposes such as shopping and recreation. The number of work trips is predicted to grow by nearly __ percent between 1994 and 2020, while non-work trips is predicted to increase by __percent. In addition, despite a nearly 50 percent increase in the

[4] Based on System Performance Measures for Intra-UGB Trips, dated October 15, 1999.

average vehicle miles traveled overall and a nearly 4 percent increase in vehicle miles traveled on a per capita basis between 1994 and 2020, vehicle miles traveled per employee are expected to decline by almost 10 percent. Table 2.5 summarizes changes in trips made in the region between 1994 and 2020. Following Table 2.5, Table 2.6 summarizes changes in vehicle miles traveled between 1994 and 2020.

Table 2.5
2020 No-Build System
Average Weekday Trips (intra-Metro UGB*)
(numbers exclude trucks and through traffic)

	1994	2020	Percent Change
Average weekday person trips	*4,864,738*	*7,597,888*	*+ 56%*
Average weekday work trips	*939,578*		
Average weekday non-work trips	*3,925,162*		
Average home-based work trip length	*6.45 miles*	*6.36 miles*	*- 1%*

* Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

Table 2.6
2020 No-Build System
Vehicle Miles of Travel (intra-Metro UGB*)
(numbers exclude trucks and through traffic)

	1994	2020	Percent Change
Average weekday vehicle miles traveled	*16,112,462*	*24,384,986*	*+49%*
Average weekday vehicle miles traveled per person	*14.10*	*14.63*	*+3.7%*
Average weekday vehicle miles traveled per employee	*20.36*	*18.36*	*- 9.8%*

* Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

2.5.2 Motor Vehicle System Performance

As a result of the significant increase in trips made in the region and without implementation of new transportation projects or strategies, average motor vehicle speeds are expected to decrease from 25 mph in 1994 to 19 mph in 2020 during the evening two-hour peak period. This reduction in travel speeds reflects an increase in the proportion of the region's freeway and arterial street network experiencing congestion during the evening two-hour peak period.

In 1994, slightly more than 1 percent of the region's freeway network experienced congestion during the evening two-hour peak period. By 2020, 2.5 percent of the region's freeway network is expected to experience congestion during the evening two-hour peak period. This means that ___ percent of the freeway network does not meet the motor vehicle performance measures defined in Table 2.1 in Chapter 1 of this plan. Assuming no new transportation projects are constructed, the proportion of the region's

arterial streets experiencing congestion is predicted to increase by more than three times 1994 levels, increasing from nearly 6 percent in 1994 to almost 24 percent in 2020. This means that ___ percent of the arterial street network does not meet level-of-service operating standards defined in Table 2.1 in Chapter 1 of this plan. Delay on the region's freeway and arterial street networks also is also expected to increase between 1994 and 2020, with the greatest amount of delay predicted to occur on the arterial street network. Table 2.7 summarizes changes in the amount and extent of congestion within the Metro urban growth boundary between 1994 and 2020.

Table 2.7
2020 No-Build System
Motor Vehicle System Performance* (intra-Metro UGB**)

	1994	2020	Percent Change
Average motor vehicle speed	*25 mph*	*19 mph*	*- 24%*
Average motor vehicle travel time	*11 minutes*	*14 minutes*	*+ 27%*
Percent of freeway experiencing congestion (v/c >0.8)	*1.05%*	*2.53%*	*+ 77%*
Percent of arterial streets experiencing congestion (v/c >0.8)	*5.88%*	*23.81%*	*+ 305%*
Total motor vehicle hours of delay	*7,509*	*64,786*	*+ 763%*

* Based on evening two-hour peak period.
** Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

2.5.3 Alternative Mode Performance

Drive alone trips as a percentage of all person trips remain almost the same between 1994 and 2020, without implementation of new transportation projects or strategies. In 1994, drive alone trips represented nearly 62 percent of all person trips within the Metro urban growth boundary. In 2020, drive alone trips are expected to remain virtually unchanged of all trips within the urban growth boundary. By comparison, bicycle and pedestrian travel are expected to increase between 1994 and 2020. In 1994, bicycling or walking (not including walk trips to transit) represented slightly more than 6 percent of all person trips inside the urban growth boundary. By 2020, bicycle and pedestrian travel is expected to represent slightly less than 8 percent of all person trips made inside the urban growth boundary. Transit revenue hours are expected to increase by 27 percent between 1994 and 2020, increasing from 4,400 average weekday revenue hours in 1994 to more than 5,600 average weekday hours in 2020. Transit's share of all trips is expected to increase by 15 percent per year during the plan period, reflecting an overall increase of 15 percent of all trips between 1994 and 2020. The proportion of households and jobs within 1/4-mile of transit service is expected to decline by 7 and 4 percent respectively between 1994 and 2020. Table 2.8 summarizes alternative mode performance.

Table 2.8
2020 No-Build System
Alternative Mode Performance (intra-Metro UGB*)

	1994	2020	Percent Change
Walk trips (as a percent of total person trips)	5.18%	6.79%	+ 31%
Bike trips (as a percent of total person trips)	.97%	1.2%	+ 24%
Transit trips (as a percent of total person trips)	3.55%	4.08%	+ 15%
Average weekday transit revenue hours**	4,400	5,608	+ 27%
Percent of households within 1/4-mile of transit	78%	72%	- 7.7%
Percent of jobs within 1/4-mile of transit	86%	82%	- 4.7%

* *Within Metro urban growth boundary, excludes Clark County, Wash.*
** *Average weekday transit revenue hours were calculated using existing daily peak and off-peak expansion factors.*

Source: Metro

2.5.4 Freight System Performance

Trucks are a critical part of moving goods within the Portland metropolitan region. Today, of the total goods moving into, out of and within the region, 62 percent complete all or part of the trip by truck. The region is expected to handle more than 72,000 truck trips daily by 2020. With an average trip length of 24 miles expected by 2020, the total truck miles traveled during the evening two-hour peak period is expected to be ____ miles. Of this total, approximately __ percent are traveling through congestion during the evening two-hour peak period. As a result, average truck travel times are expected to increase by 30 percent between 1994 and 2020. Truck hours of delay are also expected to increase by more than nine times over 1994 levels by 2020 if no new transportation projects are constructed, increasing from 130 hours in 1994 to more than 1,000 hours in 2020. Table 2.9 summarizes key performance measures for the regional freight system.

Table 2.9
2020 No-Build System
Freight System Performance (total region*)
(reflects Metro's regional truck travel forecasting model)

	1994	2020	Percent Change
Average weekday total truck trips	54,598	72,118	+ 32%
Average weekday truck average travel time	37 minutes	48 minutes	+ 30%
Average weekday truck average trip length	22.64	23.96	+ 6%
Peak period truck vehicle hours of delay	130	1,222	+ 840%

* Four-county region, includes Clark, Clackamas, Multnomah and Washington counties.

Source: Metro

2.5.5 Regional Travel Times

In all parts of the region, evening two-hour peak period auto travel times are expected to increase from 1994 travel times assuming no implementation of new transportation projects or strategies. The largest increases in auto travel times are expected to occur along I-5, I-205 and Highway 217. Transit travel times are also expected to increase throughout much of the region, reflecting no expansions in service and no transit preferential improvements. Table 2.10 summarizes auto and transit travel times along major corridors that link key 2040 land-use components.

Table 2.10
2020 No-Build System
Major Corridor Auto and Transit
Travel Time Comparison

	Auto Travel Times (in minutes)		**Transit Travel Times** (in minutes)	
Major Travel Corridor	**1994**	**2020** (%change)	**1994**	**2020** (%change)
Central city to Beaverton on Highway 217	20.63	23.28 (+13%)	34.35*	22.61 (- 34%)
Central city to Vancouver on I-5	23.46	42.52 (+81%)	28.65*	50.28* (+75%)
Central city to Milwaukie on 99E	19.57	29.52 (+ 51%)	26.54*	38.11* (+44%)
Washington Square to Oregon City on Highway 217, I-5 and I-205	28.45	55.84 (+ 96%)	70.72*	102.36* (+45%)
Gateway to Gresham on Division St.	17.77	23.12 (+ 30%)	18.29	17.96 (- 2%)
Gateway to Oregon City on I-205	21.75	35.85 (+65%)	80.91*	102.39* (+27%)
Milwaukie to Clackamas on Highway 224	10.48	14.36 (+ 13%)	11.56*	14.67* (+27%)
Beaverton to Hillsboro on TV Highway	19.62	22.38 (+ 14%)	35.41*	26.03* (+71%)
T-6 to I-205 on NE Portland Highway	23.10	28.87 (+ 2%)	n/a	n/a
Portland international Airport to Gateway on Airport Way and I-205	9.98	15.74 (+ 54%)	n/a	12.01

* Transit travel times are on light rail unless noted by an asterisk.

Source: Metro

2.5.6 Air Quality Impacts

This section to be completed as part of Post-Resolution Activities, with anticipated completion date of June 2000.

2.5.7 Title 3 Areas and Endangered Species Act

The Stream and Floodplain Protection Plan, adopted by Metro in June 1998, is an example of a functional plan that contains specific requirements to protect vegetated corridors along rivers, streams and wetlands. The plan also addresses ways to control soil erosion and reduce flooding within the 100-year floodplain. Together these provisions help to enhance the region's water resources and manage land use in floodplains.

There are a number of water quality issues embedded in stormwater management. Roads, parking lots, sidewalks and multi-use paths collect chemical residues, which are washed off the hard surface and into the stormwater drainage system. Transportation-related activities to control the quantity and quality of stormwater runoff include reducing impacts caused by hard (impervious) surfaces, building parking lot swales to filter runoff and building detention ponds for stormwater storage.

On March 16, 1999, the National Marine Fisheries Service (NMFS) listed eight species of salmon and steelhead in Washington and Oregon as threatened and one as endangered under the Endangered Species Act (ESA). With the ESA listing, there is new attention to projects that mitigate the affect of road projects on fish habitat and water quality. MTIP funds allocated to projects on Foster Road, Sunnyside Road and Highway 213 have been designed to make fish passage in the creeks that are crossed easier. Also, replacement of the Northeast 47th Avenue culvert over the Columbia Slough is designed to improve water quality and canoe passage. In August 1999, Metro received funding for a "green streets" pilot program, which would, among other tasks, screen proposed transportation projects for potential impacts on fish and to develop fish-friendly design solutions

Even with a No-Build System, work is proceeding to ensure that regional transportation projects do not block fish passage. More than 150 culverts requiring repair to be "fish-friendly" have been identified. Federal and state transportation programs must allocate funds to replace or repair these fish access problems. Other work in progress includes prioritization of the existing culverts that block fish passage to identify a "dirty dozen" that should be replaced first. However, there will be limited opportunities to replace existing culverts without making improvements to the regional street system.

Chapter 3

Growth and the Preferred System

CHAPTER 3

Growth and the Preferred System

3.0 Introduction

Chapter 2 of this plan describes predicted growth in population and employment between 1994 and 2020 and overall regional travel patterns for the year 2020. The projects and programs identified in this chapter represent all the transportation projects and programs needed to address the impacts of future growth on our regional transportation system based on policies identified in Chapter 1. This system is called the "2020 Preferred System."

This chapter is organized as follows:

Proposed Preferred System Improvements for 2020: This section provides an overview of the process and principles used to identify the 2020 Preferred System and generally describes the types of projects and programs included in that system.

Regional Congestion Management System Findings for the 2020 Preferred System: This section describes federal congestion management requirements and provides an analysis of how the Regional Transportation Plan meets these requirements.

2020 Preferred System Analysis: This section evaluates the performance of the 2020 Preferred System on a regional and sub-region basis and highlights areas for further study and analysis as part of refinement plans, local transportation system plans, corridor studies or project development.

Environmental Impacts of the 2020 Preferred System: This section describes environmental impacts of the preferred system.

3.1 Proposed Preferred System Improvements for 2020

3.1.1 Process to Identify System Needs and Projects

While the primary mission of the 2020 Regional Transportation Plan is to implement the 2040 Growth Concept, the plan must also address other state and federal transportation planning requirements that may not directly assist in implementing the growth concept.

Chapter 1 of this plan identifies specific transportation needs for each 2040 Growth Concept land-use component and policies for achieving a balanced regional transportation system, including mode share targets and regional performance measures. Federal requirements also set forth a system for managing congestion (*see Section 3.2 of this chapter*), which requires a careful evaluation of transportation alternatives before adding roadway capacity. This chapter establishes regional congestion management findings for all projects in the 2020 Preferred System. Specific principles for identifying 2020 Preferred System needs and projects to meet those needs are summarized in Table 3.1.

Table 3.1
2020 Preferred System
Principles for Identifying Needs and Projects

Vision for consistency with the 2040 Growth Concept
- Implements all primary land-use components transportation needs
- Preserves "Regional highways" function
- Addresses most secondary land-use components transportation needs
- Addresses many transportation needs for other 2040 Growth Concept land-use components

Structure for consistency with the 2040 Growth Concept
- Central city and regional centers served by light rail have direct access to the regional highway system and contain a mix of arterial street, pedestrian and bicycle systems improvements
- Industrial areas are connected to the regional highway system and intermodal facilities
- Town centers, corridors and main streets served by regional transit contain a mix of arterial street, pedestrian and bicycle systems improvements
- Neighborhoods and employment areas served by community transit, arterial capacity improvements and some improvements to the pedestrian and bicycle systems

2020 Preferred System Performance
- Meets all Chapter 1 mode share targets *(from Chapter 1)*
- Meets all Regional Transportation Plan performance measures *(from Chapter 1)*
- Meets all Oregon Transportation Planning Rule requirements *(from Chapter 6)*
- Meets all federal Congestion Management System requirements *(from Chapter 6)*
- Meets all regional operations, maintenance and preservation needs
- Meets all 20-year benchmarks for 2040 Growth Concept implementation *(from Chapter 6)*

Source: Metro

3.1.2 Sources of Preferred System Projects

The list of preferred system projects was generated during the last two years based on extensive input from the residents of this region and state, regional, and local government partners. The list of transportation projects and programs were identified at workshops and events identified in Table 3.2.

Table 3.2
Sources of 2020 Preferred System Projects

July 1996	• Resolution on Chapter 1 sets direction for project identification as part of RTP System Component
July 1997	• JPACT/Metro Council workshop on level-of-service and street connectivity sets more direction for projects
September 1997	• Technical workshops held with local jurisdiction staff to expand project identification to address 2040 implementation and role of alternative analysis findings.
October 1997	• Citizen Advisory Committee workshop held
November 1997	• Public workshops held throughout the region
January 1998	• Citizen Advisory Committee Idea Kit released that incorporates project ideas identified during September-November 1997 workshops
Spring 1998	• TPAC refines CAC Idea Kit and initiates RTP Round 1 modeling which establishes federal CMS finding
August 1998	• TPAC reviews RTP Round 1 findings and initiates RTP Round 2 modeling • JPACT and the Metro Council are briefed on status of RTP update
October 1998	• RTP open houses held throughout the region • RTP Round 2 projects described in "Proposed Transportation Solutions for 2020" document
March 1999	• TPAC reviews RTP Round 2 modeling results and proposes final RTP Round 3 project refinements • JPACT and the Metro Council are briefed on status of RTP update
October 1999	• TPAC reviews RTP Round 3 model results and proposes final recommendations on RTP project list
October 1999	• Public comment meetings on draft RTP

Source: Metro

3.1.3 Scale and Scope of 2020 Preferred System Projects

More than 800 projects and programs are proposed in the 2020 Preferred System, which focus transportation investments to meet regional performance measures and leverage the 2040 Growth Concept. The 2020 Preferred System efficiently meets all Chapter 1 mode share targets, most regional performance measures, Oregon transportation planning rule requirements and regional system operations, maintenance and preservation needs. The 2020 preferred system would require all currently identified revenue sources, but would require new unspecified revenue sources at the local, regional, state or federal level to fully implement. The 2020 preferred system represents all the improvements necessary to build a complete transportation system during the next 20 years based on predicted population and employment growth.

3.1.4 Overview of Key 2020 Preferred System Projects

The improvements and programs described on the following pages represent the region's commitment to establishing a balanced transportation system that meets all of the region's travel needs during the next 20 years. Table 3.3 provides a general overview of the preferred system. Figure 3.1 depicts the number and modal emphasis of the road-related projects proposed in the preferred system. (Note: Throughout the document, cost estimates referring to "road-related" improvements include the full modal mix reflected in Figure 3.1. For example, any single road-related project may benefit multiple modes, including motor vehicles, bicyclists and pedestrians). Proposed transit capital projects are not included in Figure 3.1.

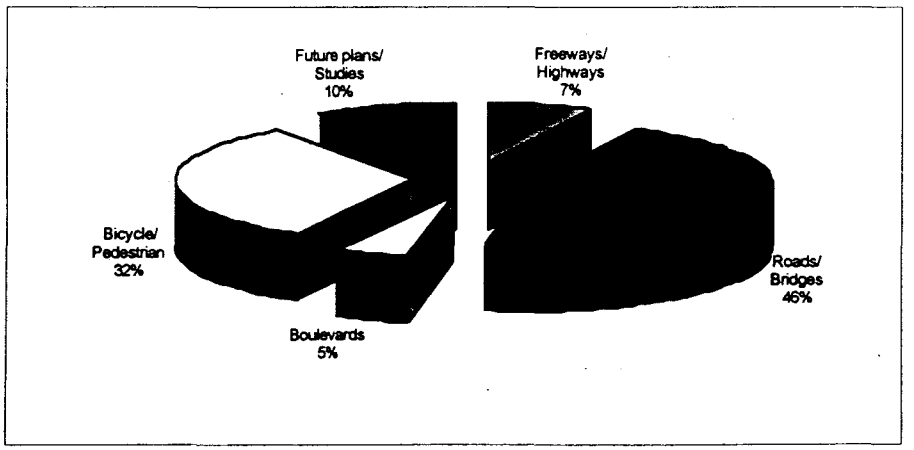
Table 3.3
General Overview of the
2020 Preferred System (intra-Metro UGB*)
(in lane/route miles)

	1994	2020	Percent Change
Freeway lane miles	*572*	*710*	*+ 24%*
Arterial lane miles	*3,230*	*3,779*	*+ 17%*
Freight network miles**	*618*	*650*	*+ 5%*
Light rail miles	*15.1*	*67.4*	*+ 346%*
Rapid/Frequent bus route miles		*172*	
Local bus route miles		*1,131*	
Bicycle lane miles			
Pedestrian lane miles			

* Within Metro urban growth boundary, excludes Clark County, Wash.
** Includes arterial and freeway lane miles.

Source: Metro

Figure 3.1
2020 Preferred System
Road-Related Projects



Note: All "Road" and "Boulevard" projects include a bicycle and pedestrian component.

Source: Metro

Examples of the types of projects included in Figure 3.1 include:

- *Willamette River Bridge preservation.* Preservation and maintenance of the Willamette River bridges, including sidewalk/multi-use path repair, deck replacement, painting and lift span repair, and improved bicycle and pedestrian bridge access.

- *Expanded regional trails network.* Better bike and pedestrian connections to the regional trails network and construction of many new multi-use paths throughout the region.

- *Freight access and connections.* Rail and road expansions to maintain access and connections for national and international rail, air and marine freight to reach its destination with limited delay.

- *Highway expansion.* Major highway expansions to maintain regional mobility and enhance access to intermodal industrial areas and facilities where goods move from one transportation mode to another.

- *Arterial street expansion.* Arterial street expansions to maintain access to the regional highway system and to maintain circulation and access between the central city, regional centers and town centers.

- *New street connections.* New street connections across and parallel to regional highways to slow increases in traffic congestion and provide direct alternate routes and, within regional and town centers, to improve access by all modes of travel.

- *Retrofit of major streets for walking, biking and transit.* Wider sidewalks, safer street crossings, landscaped buffers, improved bus stops and shelters, and bikeways along major streets that serve the central city, regional and town centers, corridors, main streets, employment areas and neighborhoods.

- *Transportation system management.* System management strategies, such as ramp metering, signal timing and access management, to better manage the flow of traffic on existing freeways and arterial streets to achieve maximum efficiency of the current road system without adding major new infrastructure. Improve transit service reliability through the use of transit preferential treatments and service adjustments such as bus-only lanes, signal preemption, modified stop spacing and more direct routes. Real time information for the motorist and transit user about transportation operating conditions (i.e., traffic congestion and bus arrival times).

- *Transportation demand management.* Demand management strategies, such as transportation management associations in the central city, regional centers, some town centers and employment areas, attempt to increase transit ridership, vehicle occupancy, walking and biking, telecommuting and reduce the length of some trips, move some trips to off-peak travel periods or eliminate some trips altogether.

- *Future studies.* These studies include: (a) town center plans to define long-term transportation needs for all modes of travel in these areas; (b) corridor refinement plans to develop phased strategies for implementing planned improvements in a particular corridor; and (c) regional highway corridor

studies to identify phased road and transit improvements to maintain regional mobility and address travel demand in the corridor.

Other projects that are included in the preferred system, but are not identified in Figure 3.1 include:

- *State and local road maintenance.* Maintenance and preservation of the existing road system to remove the backlog of pavement in poor condition and keep 90 percent of regionally significant roads in fair or better condition.

- *Expanded transit service.* A three-fold increase in transit service hours, including light rail transit to the central city and regional centers, commuter rail between Wilsonville and Beaverton and streetcar service in downtown Portland. Faster and more direct transit connections to regional and town centers, corridors and main streets, minimizing the need to go to downtown Portland to transfer. New community and local routes to better serve neighborhoods and employment areas.

- *Transit capital improvements to enhance expanded transit service.* Provide new park-and-ride facilities, low-floor air-conditioned buses, transit station upgrades that include ticket machines and bicycle parking and better passenger amenities at bus stops, including maps, phones, electronic displays showing actual bus locations and arrival times, covered shelters, curb extensions, special lighting and benches.

3.2 Regional Congestion Management Findings for the 2020 Preferred System

The Congestion Management System (CMS) is a transportation-related management process required for metropolitan transportation planning under 23 CFR Part 500 for all federally designated Transportation Management Areas (TMAs). As the federally designated metropolitan planning organization, Metro is responsible for reviewing transportation projects for consistency with federal CMS requirements.

The purpose of a congestion management system is to provide information on transportation system performance and alternative strategies to alleviate congestion and enhance the mobility of people and goods. A key provision of CMS requirements is that consideration be given to a variety of demand reduction and traffic management strategies prior to expanding capacity for single-occupant vehicles to address congestion. Significant, new single-occupant vehicle capacity can only be added to the transportation system when it is demonstrated that alternatives cannot cost-effectively address a congestion problem. The congestion management system includes methods to monitor and evaluate transportation system performance, identify alternative actions, assess and implement cost-effective actions and evaluate the effectiveness of implemented actions. The congestion management system can help the transportation system in the following ways:

- develop and implement more efficient projects
- extend the life span of projects, thereby reducing costs
- enhance a project's multi-modal characteristics
- improve the relationship between transportation and land-use planning

- assist in project prioritization.

To address the CMS requirements from a regional "systems level" planning analysis, a number of strategies were developed as part of the RTP Preferred System to minimize the need for additional single-occupant vehicle capacity. In the first round of the 2020 Preferred System project selection process, improvements to arterial streets and freeways were initially limited to a total of five lanes and six lanes, respectively. The underlying philosophy of this approach was that five-lane arterial streets and six-lane freeways are reasonable capacities within an urban transportation system from an impact and cost perspective. If further capacity improvements were needed beyond this amount, a project would go through a series of congestion management system actions. For example, some seven-lane arterial street projects were identified in earlier local transportation plans. The purpose of applying congestion management system actions to the RTP project selection process was to revisit the seven-lane projects from previous plans and to look at regional street connectivity and alternative mode strategies before concluding that a particular seven-lane arterial project was an appropriate strategy in a given corridor.

The following congestion management actions are included and accounted for in the 2020 Preferred System:

- **Regional transportation demand strategies.** Parking pricing and reduced transit fares were assumed in the 2020 Preferred System. These transportation demand management assumptions varied by 2040 Design Type.

- **Regional transportation system management strategies, including intelligent transportation systems (ITS).** The 2020 Preferred System includes transportation system management strategies such as ramp metering, signal timing, access management and transit preferential treatment.

- **High-Occupancy Vehicle (HOV) strategies.** Any capacity improvements beyond six lanes on the freeway will consider express, HOV or peak period pricing as the project proceeds through preliminary engineering studies.

- **Regional transit, bicycle and pedestrian system improvements to improve mode split.** The Metro model is able to analyze the effect of improvements to the regional transit system; however the impact of proposed bicycle or pedestrian system improvements is difficult to quantify. As a result, local jurisdictions were asked to identify bicycle and pedestrian projects throughout the region. The model then relied on a 2020 intersection density as a surrogate measure to reflect the impact of proposed bicycle and pedestrian improvements on mode split. The intersection density represents the expected number of street intersections per mile for each 2040 Design Type. Intersection density affects choice and trip length for all modes of travel, and helps determine how direct and convenient a trip will be.

- **Unintended land use and transportation effects resulting from proposed single-occupancy vehicle (SOV) projects.** Applying this CMS factor helped identify unintended impacts of adding capacity improvements on areas outside the urban growth boundary. Specific findings about accessibility are described elsewhere in this chapter.

- **Latent demand effects from proposed SOV projects on other modes, routes or times of day.** Latent demand is traffic that would use a congested route if it could, but shifts to another destination, time of day, mode or route due to the congestion. Consideration of latent demand is important when adding capacity to the regional transportation system to ensure that if a roadway is expanded, it does not simply fill up with latent demand that should more appropriately be accommodated by other routes, time of day or mode. The RTP Preferred System used a 1997 latent demand analysis to guide roadway capacity expansion consistent with the function a particular roadway is intended to perform.

- At the conclusion of Round 1 modeling, local jurisdictions were asked to identify projects needed to meet motor vehicle performance measures as defined in Title 6 of the Urban Growth Management Functional Plan and are reflected in Chapter 1, Table 1.1 in this plan.

Analysis demonstrated that the above considerations did not adequately or cost-effectively address the congestion problem. As such, additional significant capacity projects were recommended for inclusion in this plan.

Initially, 3 seven-lane arterial street improvements and 2 eight through-lane freeways were proposed for inclusion in the 2020 Preferred System. As a result of taking the projects through a congestion management system "check-list," four arterial streets were assumed to require more than five lanes for limited segments: Scholls Ferry Road south of Washington Square regional center, Farmington Road south of Beaverton regional center, Walker Road north of Beaverton regional center and Sunnyside Road in the Clackamas regional center. In most cases, projects with this capacity will be constructed. Likewise, the following freeways were assumed to have more than six lanes: I-5 south of Highway 217 to I-205, I-205 north of Oregon City, Highway 217 and miscellaneous auxiliary lanes sections on numerous freeways. In addition, 99W in Tigard between I-5 and Highway 217 was assumed to have seven lanes. However, these capacities were assumed as "placeholders" for which more detailed corridor studies are needed before such capacity is constructed. See Chapter 6 for more information on future studies related to these and other corridors.

While the 2020 Preferred System meets regional congestion management "systems level" planning requirements, there remain local congestion management system requirements at the project level. As projects proceed through corridor planning and when projects are more specific at the local level, local governments must still address localized congestion management system requirements. Further detail of local transportation project analysis under congestion management system requirements described in Chapter 6 of this plan.

3.3 2020 Preferred System Analysis

3.3.1 Regional Performance[1]

Population and employment is expected to increase by 46 percent and 68 percent respectively between 1994 and 2020 within the urban growth boundary. Growth in population and employment is predicted to result in a corresponding increase in travel demand during the same time period for both people and freight movement. Between 1994 and 2020, the number of person trips beginning and ending within the urban growth boundary are expected to increase by 55 percent, to 7.5 million trips per day. Since

[1] Based on System Performance Measures for Intra-UGB Trips, dated October 15, 1999.

employment in the region is expected to increase faster than population, the number of trips devoted to work is also expected increase faster than trips for non-work purposes such as shopping and recreation. The number of work trips is predicted to grow by nearly 65 percent between 1994 and 2020, while non-work trips are predicted to increase by 54 percent.

In addition, despite a nearly 50 percent increase in the average vehicle miles traveled overall and a 2.4 percent increase in vehicle miles traveled on a per capita basis between 1994 and 2020, vehicle miles traveled per employee are expected to decline by 11 percent. Table 3.4 summarizes changes in trips made in the region between 1994 and 2020. Table 3.5 summarizes changes in vehicle miles traveled between 1994 and 2020.

Table 3.4
2020 Preferred System
Average Weekday Trips (intra-Metro UGB*)
(numbers exclude trucks and through traffic)

	1994	2020	Percent Change
Average weekday person trips	*4,864,738*	*7,534,953*	*+ 55%*
Average weekday work trips	*939,578*	*1,547,213*	*+ 65%*
Average weekday non-work trips	*3,925,162*	*6,036,811*	*+ 54%*
Average home-based work trip length	*6.45 miles*	*6.62 miles*	*+ 3%*

* Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

Table 3.5
2020 Preferred System
Vehicle Miles of Travel (intra-Metro UGB*)
(numbers exclude trucks and through traffic)

	1994	2020	Percent Change
Average weekday vehicle miles traveled	*16,112,462*	*24,061,990*	*+ 49%*
Average weekday vehicle miles traveled per person	*14.10*	*14.44*	*+ 2.4%*
Average weekday vehicle miles traveled per employee	*20.36*	*18.12*	*- 11%*

* Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

Assuming implementation of the 2020 Preferred System and travel behavior remains static, average motor vehicle speeds are expected to decrease from 25 mph in 1994 to 22 mph in 2020 during the evening two-hour peak period. This reduction in travel speed reflects an increase in the proportion of the region's freeway and arterial street network experiencing congestion during the evening two-hour peak period.

In 1994, slightly more than 1 percent of the region's freeway network experienced congestion during the evening two-hour peak period. By 2020, slightly more than 2 percent of the region's freeway network is expected to experience congestion during the evening two-hour peak period. This translates to almost ___ miles of the freeway network not meeting motor vehicle performance measures defined in Table 1.1 in

Chapter 1 of this plan. Assuming the 2020 Preferred System is implemented, the proportion of the region's arterial streets experiencing congestion is predicted to more than double, increasing from almost 6 percent in 1994 to more than 14 percent in 2020 period. This translates to ____ miles of the arterial street network not meeting motor vehicle performance measures defined in Table 1.1 in Chapter 1 of this plan. Delay on the region's freeway and arterial street networks also is also expected to increase between 1994 and 2020, with the greatest amount of delay predicted to occur on the arterial street network, reflecting several "hotspots" throughout the region. Table 3.6 summarizes changes in the amount and extent of congestion within the Metro urban growth boundary between 1994 and 2020.

Table 3.6
2020 Preferred System
Motor Vehicle System Performance* (intra-Metro UGB**)

	1994	2020	Percent Change
Average motor vehicle speed	*25 mph*	*22 mph*	*- 12%*
Average motor vehicle travel time	*11 minutes*	*13 minutes*	*+ 18%*
Percent of freeway experiencing congestion (v/c >0.9)	*1.05%*	*2.19%*	*+ 180%*
Percent of arterial streets experiencing congestion (v/c >0.9)	*5.5%*	*14.1%*	*+ 156%*
Total motor vehicle hours of delay (v/c >0.9)	*7,509*	*34,280*	*+ 289%*
Motor vehicle hours of delay on freeway (% of total)	*2,441 (1.91%)*	*10,182 (4.4%)*	*+ 317%*
Motor vehicle hours delay on arterial streets (% of total)	*5,068 (3.97%)*	*24,098 (10.4%)*	*+ 375%*

* Based on evening two-hour peak period.
** Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

Drive-alone trips as a percentage of all person trips decrease by almost 5 percent between 1994 and 2020. In 1994, drive-alone trips represented 62 percent of all person trips within the Metro urban growth boundary. In 2020, drive alone trips are expected to represent 59 percent of all trips within the urban growth boundary. By comparison, bicycle and pedestrian travel are expected to increase between 1994 and 2020. In 1994, bicycling or walking (not including walk trips to transit) represented slightly more than 6 percent of all person trips inside the urban growth boundary. By 2020, bicycle and pedestrian travel is expected to represent more than 8 percent of all person trips made inside the urban growth boundary. Transit service hours are expected to increase by nearly 214 percent between 1994 and 2020. Transit trips as a proportion of all person trips are expected to more than double during the plan period, increasing from 3.55 percent of all person trips in 1994 to more than 7.3 percent of all person trips in 2020. Table 3.7 summarizes alternative mode performance. When implemented as a package, the preferred alternative mode strategies stabilize growth in single-occupant vehicle reliance, stabilize growth in vehicle miles traveled per capita and offer a number of choices for travel in this region.

Table 3.7
2020 Preferred System
Alternative Mode Performance (intra-Metro UGB*)

	1994	2020	Percent Change
Walk trips (as a percent of total person trips)	5.18%	6.81%	+ 31%
Bike trips (as a percent of total person trips)	.97%	1.25%	+ 28%
Transit trips (as a percent of total person trips)	3.55%	7.32%	+ 106%
Average weekday transit revenue hours	4,400	13,836	+ 214%
Percent of households within 1/4-mile of transit	78%	83%	+ 6.6%
Percent of jobs within 1/4-mile of transit	86%	88%	+ 3.5%

* Within Metro urban growth boundary, excludes Clark County, Wash.

Source: Metro

Trucks are a critical part of moving goods within the Portland metropolitan region. Of the total goods moving into, out of and within the region, 62 percent complete all or part of the trip by truck. Other modes that move goods are barge, rail and air. In 1994, the region handled more than 17,000 truck trips daily. This number is expected to grow by nearly than 18,000 truck trips daily, representing an increase of 32 percent between 1994 and 2020. Of this total, approximately 11 percent are expected to be on the regional transportation system during the evening two-hour peak period. With the average trip length of 24 miles, the total truck miles traveled during the evening two-hour peak period is 195,000 miles. Of this total, approximately 28 percent are traveling through congestion during the evening two-hour peak period. Truck hours of delay are expected to increase by more than five-fold during the evening two-hour peak period between 1994 and 2020. This represents a change from 4 percent of truck hours experiencing delay in 1994 to nearly 13 percent of truck hours experiencing delay during the evening two-hour peak period. Table 3.8 summarizes performance of the regional freight system assuming implementation of the 2020 Preferred System. Overall, the preferred system results in adequate mobility and access for freight movement in the region.

Table 3.8
2020 Preferred System
Freight System Performance (total region*)
(reflects Metro's regional truck travel forecasting model)

	1994	2020	Percent Change
AWD total truck trips	54,598	72,118	+ 32%
AWD truck average trip length	22.64	23.90	+ 5%
Two-hour peak period truck vehicle hours of delay	130	732	+ 463%
Two-hour peak period average truck travel time	36.53	43.28	+ 18%

* Includes Clark, Clakcamas, Multnomah and Washington counties.

Source: Metro

3.3.2 Regional Travel Times

In most parts of the region, evening two-hour peak period auto travel times will increase from 1994 travel times while overall transit travel times decrease. The largest increases in auto travel times are expected to occur along I-205 from I-5 to Gateway; I-5 north of the central city to Vancouver, Wash.; Highway 224 from Milwaukie regional center to Clackamas regional center and between T-6 and I-205 along Northeast Portland Highway.

Transit travel times, in contrast, are faster throughout much of the region, reflecting expanded service, including rapid bus and light rail, and transit preferential improvements in many corridors. The largest decreases in transit travel times are expected to occur in corridors where rapid bus or light rail service is proposed. Table 3.9 summarizes auto and transit travel times along major corridors that link key 2040 land-use components consistent with RTP transit objectives. Transit travel times are less than 1.5 times the two-hour peak period auto travel time for the same corridor, in all of the corridors examined except for I-205 between Gateway and Oregon City regional centers.

Table 3.9
2020 Preferred System
Major Corridor Auto and Transit
Travel Time Comparison

	Auto Travel Times (in minutes)		**Transit Travel Times** (in minutes)	
Major Travel Corridor	**1994**	**2020** (%change)	**1994**	**2020** (%change)
Central city to Beaverton on Highway 217	20.63	21.49 (+ 4%)	34.35*	22.61 (- 34%)
Central city to Vancouver on I-5	23.46	30.73 (+ 31%)	28.65*	32.87 (+ 13%)
Central city to Milwaukie on 99E	19.57	23.72 (+ 21%)	26.54*	23.46 (- 13%)
Washington Square to Oregon City on Highway 217, I-5 and I-205	28.45	48.78 (+ 71%)	70.72*	51.12* (- 28%)
Gateway to Gresham on Division St.	17.77	19.55 (+ 10%)	18.29	17.96 (- 2%)
Gateway to Oregon City on I-205	21.75	30.78 (+ 42%)	80.91*	47.92* (- 41%)
Milwaukie to Clackamas on Highway 224	10.48	13.14 (+ 25%)	11.56*	12.54 (8%)
Beaverton to Hillsboro on TV Highway	19.62	17.08 (-13%)	35.41*	25.44 (-29%)
T-6 to I-205 on NE Portland Highway	23.10	26.76 (+ 16%)	n/a	n/a
Portland International Airport to Gateway on Airport Way and I-205	9.98	15.72 (+ 58%)	n/a	12.01

* Transit travel times are on light rail unless noted by an asterisk that denotes rapid bus service.

Source: Metro

3.3.3 Regional Travel Patterns

In addition to an increase in the number of trips being made, travel patterns in the region are also expected to change as a result of planned land uses and expected population and employment growth during the next 20 years. Figure 3.2 shows 1994 motor vehicle and transit person trips between RTP subareas. Figure 3.3 shows 2020 motor vehicle and transit person trips between RTP subareas.

The following are key findings, reflecting analysis of Figures 3.2 and 3.3[2].

- Expected urban area expansion and growth in the Pleasant Valley and Damascus subarea is expected to result in widespread effects on the regional transportation system. Because of the limited number of expected jobs in this part of the region, many residents are predicted to commute to other parts of the region, placing increased traffic pressure on I-205 and other eastside routes. The number of daily motor vehicle trips from this part of the region is expected to increase by more than 700 percent between 1994 and 2020. In 1994, more than 16,000 motor vehicle trips were made from this part of the region. In 2020, the number of motor vehicle trips is expected to grow to be more than 132,000. Most of these motor vehicle trips are expected to travel to Subarea 3 (East Multnomah County) and Subarea 5 (Urban Clackamas County), reflecting 34,815 and 33,510 motor vehicle trips respectively.

- The number of daily motor vehicle trips from the North and South Washington County subareas to the Portland central city subarea is expected to decline while the number of transit trips are expected to significantly increase between 1994 and 2020. In 1994, more than 111,000 motor vehicle trips were destined for the Portland central city subarea. In 2020, the number of motor vehicle trips destined for the Portland central city subarea is predicted to decrease to almost 110,800 motor vehicle trips. In contrast, the number of transit trips are expected to more than triple between 1994 and 2020, increasing from 9,201 in 1994 to more than 35,000 in 2020. The dramatic increase in the number of transit trips reflect substantially improved transit service between Washington County and the Portland central city subarea, including opening of westside light rail, rapid bus improvements on Barbur Boulevard and an expanded network of regional transit routes that connect to westside light rail.

- The number of daily motor vehicle trips from Clark County, Wash. to the Portland metropolitan region is expected to increase by 74 percent between 1994 and 2020. In 1994, more than 75,000 motor vehicle trips were destined for the region. In 2020, the number of trips destined for the Portland metropolitan region is expected to increase to more than 130,000, with the majority of the motor vehicle trips traveling to the Portland central city and West Columbia Corridor subareas. The number of transit trips are expected to increase five-fold between 1994 and 2020, reflecting an extension of light rail from the Portland Metropolitan Exposition (Expo) Center to Clark County, Wash. In 1994, more than 3,200 transit trip were made from Clark County, Wash. to the Portland metropolitan region. In 2020, the number of transit trips destined for the Portland metropolitan region is expected to increase to more than 16,000.

- Freight travel patterns are expected to continue to be first north-south oriented (I-5, I-205) and second easterly oriented (I-84). [3]

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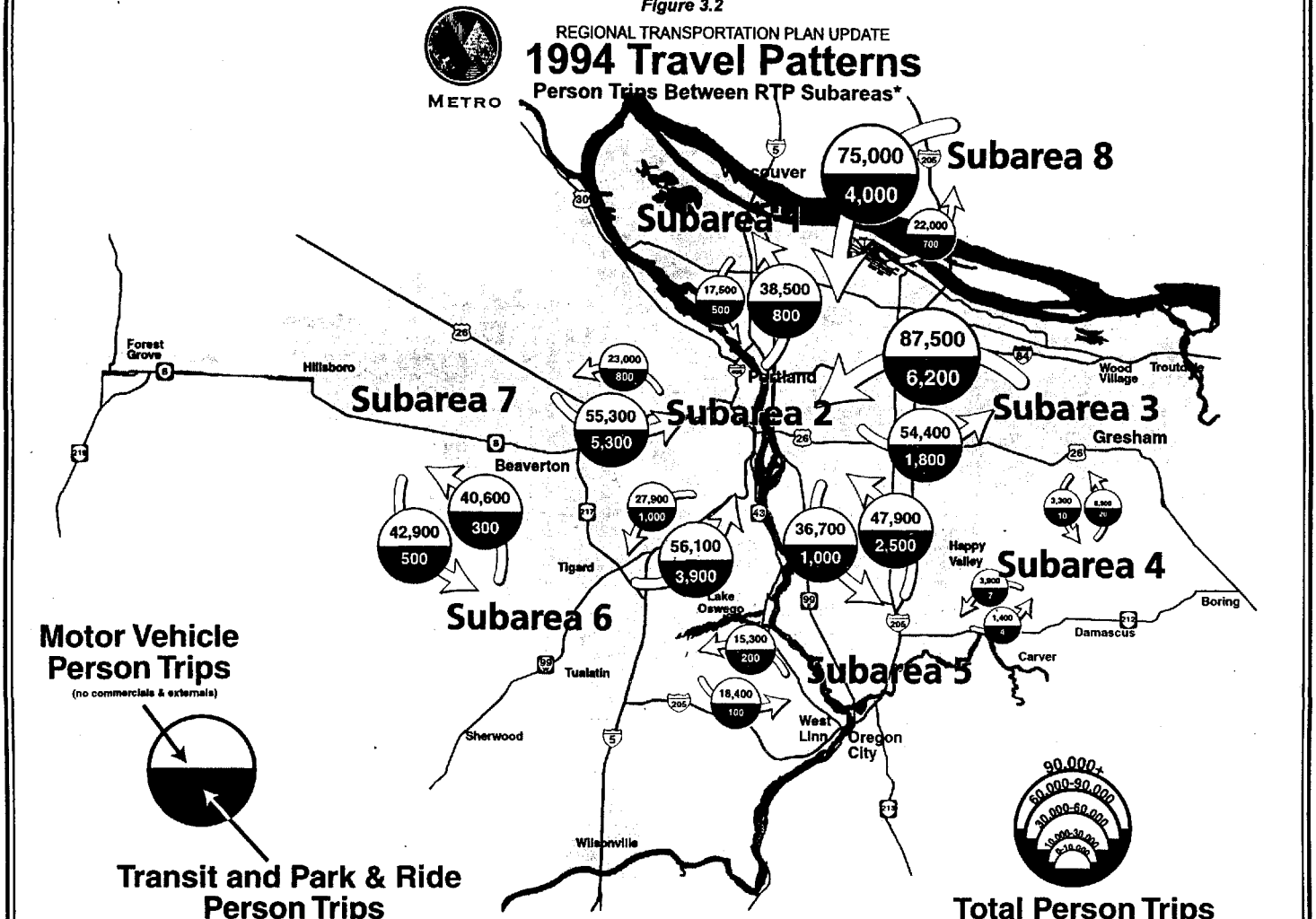
[2] These numbers represent one-way trips from production zone to attraction zone.
[3] ICF Kaiser, Columbus Group, Reebie Associates, the WEFA Group and Port of Portland, Commodity Flow Analysis for the Portland Metropolitan Area, p. 58.

Figure 3.2



* One-way trips from a production zone to an attraction zone in the Preferred System.

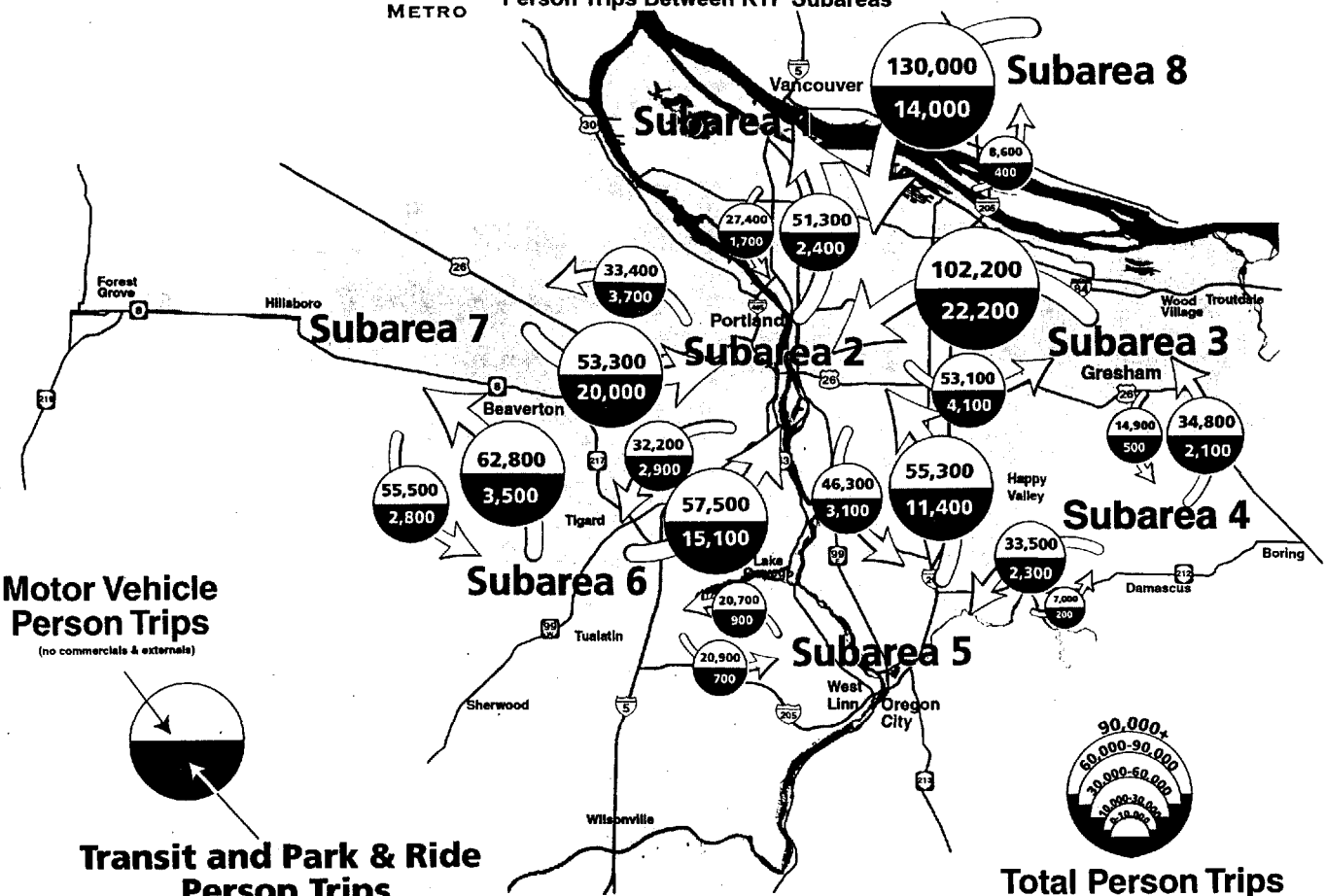
Figure 3.3

REGIONAL TRANSPORTATION PLAN UPDATE

2020 Travel Patterns

Person Trips Between RTP Subareas*

METRO



* One-way trips from a production zone to an attraction zone in the Preferred System.

3.3.4 Major Corridor Performance[4]

Motor vehicle and transit volumes are expected to increase along major corridors throughout the region. Major corridors are defined as those corridors in the region that serve as the primary people and goods moving routes. Tables 3.10, 3.11 and 3.12 summarize the percent increase in peak direction auto and transit and peak and off-peak direction truck volumes during the evening two-hour peak period for key corridors in the region. Figure 3.4 and Figure 3.5 highlight auto and transit cutline results for these major corridors in the region. Following Figure 3.5 are key findings on the performance of these major corridors. Further detail on each of the corridors can be found within the subarea findings in Section 3.4 of this chapter.

Table 3.10
2020 Preferred System Motor Vehicle Volumes
(peak direction during the evening two-hour peak period)

Corridor*	1994	2020	1994-2020 Change
(A) I-5 North, Martin Luther King Jr. Boulevard, Interstate Avenue and Greeley Avenue	*18,799*	*21,203*	*2,404 (+13%)*
(B) I-5 North Interstate Bridge	*11,504*	*18,487*	*6,983 (+61%)*
(C) I-84, Broadway/Weidler, Burnside, Stark, Belmont, Morrison and Hawthorne streets	*28,267*	*29,794*	*1,527 (+5%)*
(D) Powell, Division and Holgate streets	*7,243*	*8,163*	*920 (+13%)*
(E) I-5 and Barbur Boulevard	*13,716*	*15,300*	*1,584 (+12%)*
(F) US 26, Cornell, Burnside and Beaverton-Hillsdale Highway	*19,156*	*20,824*	*1,668 (+9%)*
(G) Highway 30	*3,123*	*4,026*	*903 (+30%)*
(H) Macadam/17th/McLoughlin Boulevard	*10,215*	*14,999*	*4,784 (+47%)*
(I) Sandy Boulevard and I-84	*12,365*	*14,398*	*2,033 (+16%)*
(J) Halsey, Glisan, Burnside, Stark, Division and Powell streets	*15,626*	*19,803*	*4,177 (+27%)*
(K) 172nd/Foster Road/190th Avenue	*1,783*	*8,133*	*6,350 (+356%)*
(L) US 26, 242nd, Orient and Powell Valley roads	*6,077*	*10,026*	*3,949 (+65%)*
(M) Highway 212, Sunrise Corridor and Sunnyside Road	*6,337*	*18,366*	*12,029 (+190%)*
(N) Highway 213, Molalla Avenue and 99E	*8,615*	*14,794*	*6,179 (+72%)*
(O) 181st, 207th, 223rd, 242nd and Hogan roads	*8,312*	*14,766*	*6,454 (+78%)*
(P) I-205 east of 60th Avenue	*7,103*	*12,168*	*5,065 (+71%)*
(Q) I-5 South and Boones Ferry Road	*15,728*	*19,635*	*3,909 (+25%)*
(R) Tualatin-Sherwood Road, 99W and I-5 to 99W connector	*4,052*	*9,320*	*5,268 (+130%)*
(S) Highway 217, Hall Boulevard, Scholls Ferry and Oleson roads	*15,582*	*18,663*	*3,081 (+20%)*
(T) Tualatin Valley Highway and Farmington Road	*7,184*	*11,076*	*3,892 (54%)*
(U) Cornell Road, Beaverton-Hillsdale Highway, Canyon, Walker and Barnes roads	*20,611*	*22,672*	*2,061 (+10)*
(V) Tualatin Valley Highway and Baseline and Cornell roads	*6,437*	*9,561*	*3,124 (+49%)*
(W) I-205, 82nd and 92nd avenues	*14,315*	*21,528*	*7,211 (+50%)*

* Refer to Figures 3.4 and 3.5 for actual cut-line locations indicated in parenthesis.

Source: Metro

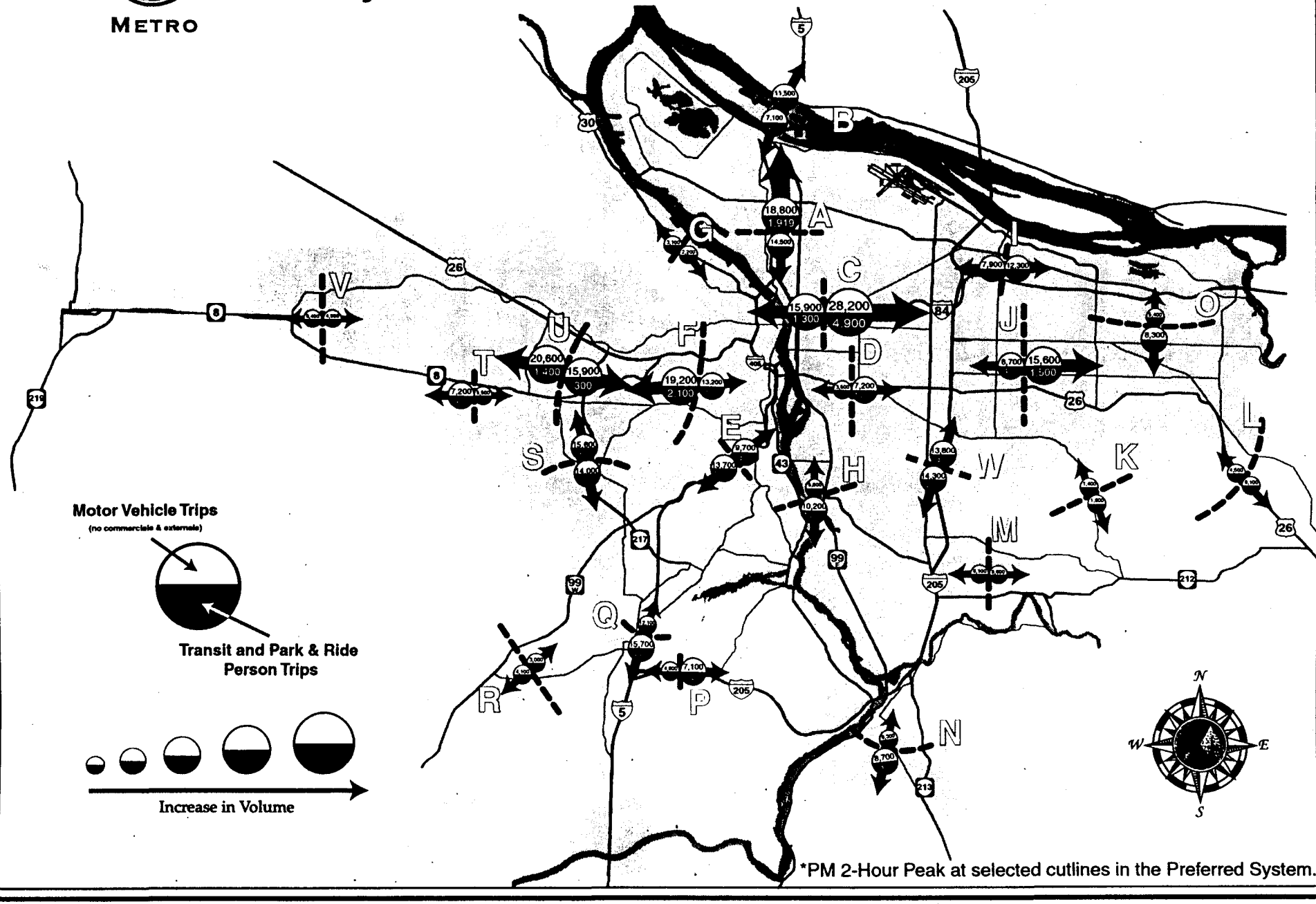
[4] Based on PM 2-Hour Major Corridor Cutlines: Auto Volumes handout *(dated 10/15/99)*

Figure 3.4

METRO

REGIONAL TRANSPORTATION PLAN UPDATE

1994 Major Corridor Auto and Transit Volumes*



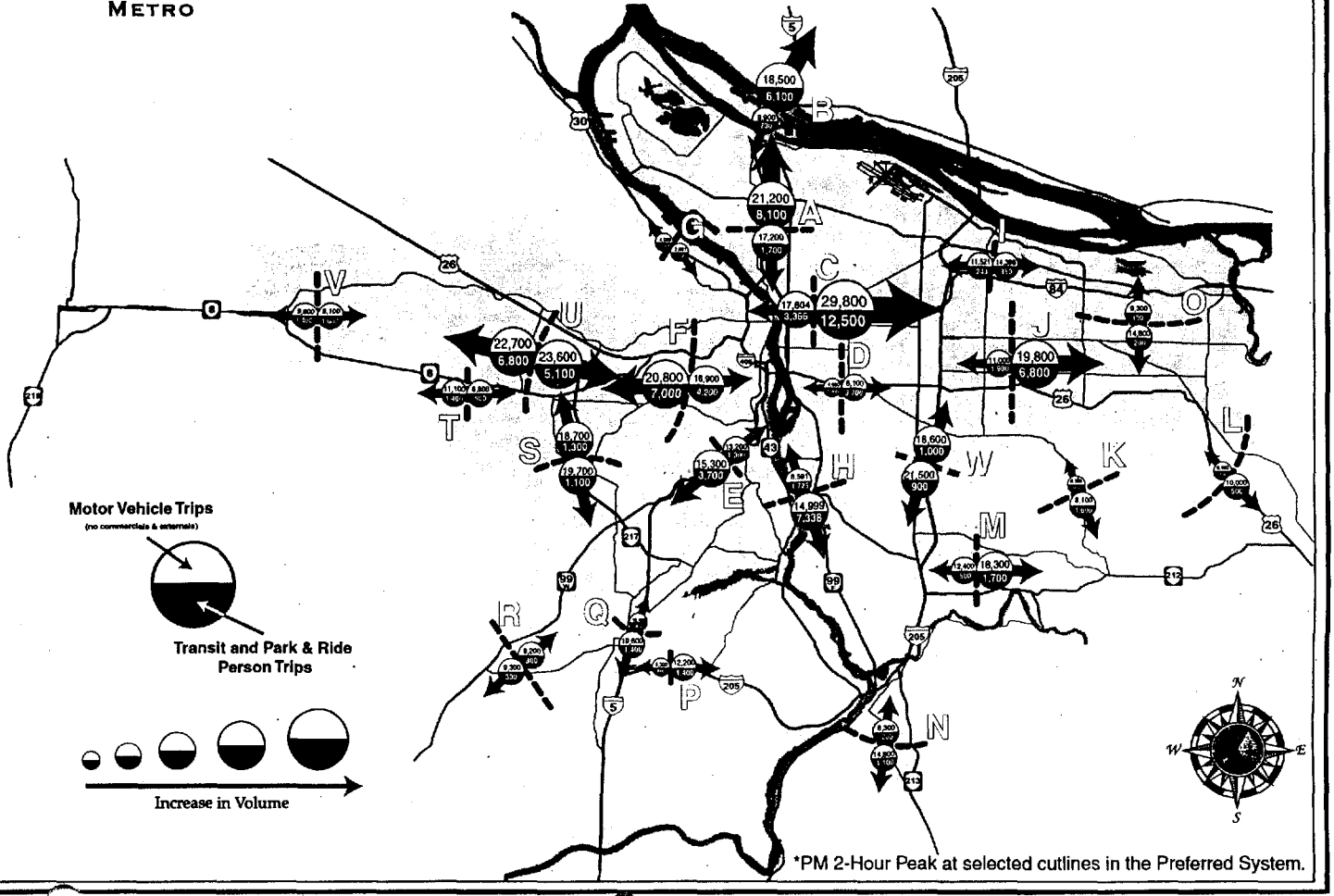
*PM 2-Hour Peak at selected cutlines in the Preferred System.

METRO

REGIONAL TRANSPORTATION PLAN UPDATE

Figure 3.5

2020 Major Corridor Auto and Transit Volumes*



*PM 2-Hour Peak at selected cutlines in the Preferred System.

Table 3.11
2020 Preferred System
Selected Transit Volumes
(Average weekday peak direction)

Corridor*	1994	2020	1994-2020 Change
(A) LRT, I-5 North, Martin Luther King Jr Boulevard, Interstate Avenue and Greeley Avenue	*1,919*	*8,138*	*6,219 (+324%)*
(B) LRT, I-5 North Interstate Bridge	*1,227*	*6,126*	*4,899 (+400%)*
(C) LRT, I-84, Broadway/Weidler, Burnside, Stark, Belmont, Morrison and Hawthorne streets	*4,905*	*12,493*	*7,588 (+155%)*
(D) Powell, Division and Holgate streets	*1,226*	*3,721*	*2,495 (+204%)*
(E) I-5 and Barbur Boulevard	*1,043*	*3,768*	*2,725 (+261%)*
(F) LRT, US 26, Cornell, Burnside and Beaverton-Hillsdale Highway	*2,082*	*7,682*	*5,600 (+269%)*
(H) LRT, Macadam/17th/McLoughlin Boulevard	*1,186*	*7,338*	*6,152 (+519%)*
(J) Halsey, Glisan, Burnside, Stark, Division and Powell streets	*1,525*	*6,777*	*5,252 (+344%)*
(K) 172nd/Foster Road/190th Avenue	*n/a*	*1,579*	*1,579*
(S) Highway 217, Hall Boulevard, Scholls Ferry and Oleson roads	*305*	*1,285*	*980 (+321%)*
(U) LRT, Cornell Road, Beaverton-Hillsdale Highway, Canyon, Walker and Barnes roads	*1,447*	*6,823*	*5,376 (+372%)*
(W) I-205, 82nd and 92nd avenues	*224*	*919*	*695 (+310%)*

* Refer to Figures 3.4 and 3.5 for cut-line locations.

Source: Metro

Table 3.12
2020 Preferred System
Selected Truck Volumes
(Evening two-hour peak period)

Corridor*	1994		2020		1994-2020 Change	
	Peak direction	*Off-peak direction*	*Peak direction*	*Off-peak direction*	*Peak direction*	*Off-peak direction*
(B) I-5 North Interstate Bridge	*456*	*493*	*740*	*764*	*284 (62%)*	*271 (55%)*
(E) I-5 and Barbur Boulevard	*519*	*495*	*734*	*776*	*215 (41%)*	*281 (57%)*
(F) US 26, Cornell, Burnside and Beaverton-Hillsdale Highway	*312*	*308*	*506*	*469*	*194 (62%)*	*161 (52%)*
(G) Highway 30	*205*	*182*	*283*	*251*	*78 (146%)*	*69 (158%)*
(I) I-84 and Sandy Boulevard	*460*	*450*	*676*	*689*	*216 (47%)*	*239 (53%)*
(S) Highway 217, Hall Boulevard, Scholls Ferry and Oleson roads	*219*	*169*	*290*	*262*	*71 (33%)*	*93 (55%)*
(W) I-205, 82nd and 92nd avenues	*367*	*374*	*654*	*622*	*287 (78%)*	*248 (66%)*

* Refer to Figures 3.4 and 3.5 for cut-line locations.

Source: Metro

Key findings for the evening two-hour peak period (unless otherwise noted) include:

- The overall highest traffic volumes are expected to remain in the interstate corridors such as I-5, I-84 and I-205.

- The largest percentage increase occurs on highways and roads that serve new growth in urban reserves such as Highway 213 and the Powell Boulevard/Foster Road corridors.

- Average weekday transit ridership is expected to be highest in the radial corridors that lead to the Portland central city and within the most developed areas of the regional centers and neighborhoods. Average weekday transit ridership is expected to be lowest along the peripheral routes, such as I-205 between I –5 and Oregon City.

- Truck volumes are expected to be highest on the interstate routes, particularly I-5 and I-84 east of I-205, during the evening two-hour peak period. Truck volumes are expected to be comparable for both peak and off-peak directions during the evening two-hour peak period. This reflects their distribution-oriented travel patterns compared to commuter-oriented work trip patterns. Unlike auto volumes, truck peaks are expected to be higher at the midday, generally from 10 a.m. to 2 p.m., and they are expected to represent a higher percentage of the overall traffic during that time of day. In general, trucks contribute two to three times their number in terms of congestion because they take up the two to three times the capacity of a passenger vehicle.

- The region's interstate routes are most significant for truck mobility. These corridors carry almost 66 percent of all truck miles of travel. The corridors with the greatest hours of delay are predicted to also be the corridors with the highest truck volumes.

3.4 Subarea Performance

While some congestion is predicted to remain on the regional transportation system during peak periods, the 2020 Preferred System meets the overall travel needs of the Portland metropolitan region for the next 20 years particularly when compared with other scenarios. This section summarizes the performance of proposed 2020 Preferred System improvements on the regional transportation system by RTP Subarea. The discussion focuses on the performance of the regional highway corridors, major arterial street corridors, the central city, industrial areas and intermodal facilities, regional centers and some town centers. A finding that a particular highway or arterial street corridor experiences "congestion" translates to not meeting the motor vehicle performance measure for that corridor as defined in Table 1.1 in Chapter 1 of this plan.

3.4.1 Subarea 1: West Columbia Corridor

This subarea stretches from the Smith and Bybee lakes area west to Interstate 205 and from the Columbia River south to the Interstate 205/Columbia Boulevard/Lombard Street interchange and Swan Island. The Columbia Corridor is an important freight destination in the region – with several employment areas, industrial areas and intermodal facilities located within the area. The subarea includes Hayden Island employment and industrial areas, Terminal 6 marine shipping berths, the Delta Park employment area, Portland International Airport and adjacent employment areas and Swan Island employment and industrial areas. Figure 3.6 shows a map of the subarea.

Figure 3.6
West Columbia Corridor Subarea

Source: Metro

Regional Corridors in the West Columbia Corridor Subarea

Interstate 5 North (Marquam Bridge to Interstate Bridge)

Improvements defined in the 2020 Preferred System for the I-5 north corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from North and Northeast Portland neighborhoods and Clark County, Wash.
- providing a transit alternative to I-5
- maintaining peak and off-peak period freight mobility
- maintaining an acceptable level of access to Swan Island, marine terminals in the Rivergate industrial areas, Marine Drive, Northeast Portland Highway, and Columbia Boulevard

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: I-5 north from the Marquam Bridge to the Columbia River will continue to be congested during the evening 2-hour peak period despite widening to a full six through-lanes from I-84 to the Interstate Bridge, eight through-lanes across the Interstate Bridge, a new bridge connection to West Hayden Island and frequent light rail and bus service in the corridor. Congestion on I-5 north is expected to exceed the motor vehicle performance measure for this corridor (F/E). The congestion is expected to occur primarily on the Lombard Street and Delta Park interchanges and the interstate bridges despite an assumption of widening these segments. Light rail ridership is expected to be high, reflecting more frequent transit service. Arterial streets parallel to I-5 are not expected to be congested as a result of spillover traffic from congestion along I-5 because more through-traffic is accommodated on the freeway itself and because such a large share of traffic is destined for Clark County, Wash. The level and extent of congestion on I-5 is not predicted to affect accessibility from North and Northeast Portland to the central city, but could impact freight mobility to and from the West Columbia Corridor intermodal facilities and industrial areas if congestion spreads to off-peak periods.

Conclusions: The level of congestion in the corridor suggests that despite a range of different improvements to the I-5 interstate bridges and transit service, latent demand exists in the corridor that cannot be addressed with highway capacity improvements alone. Generally, congestion on I-5 north exceeds the motor vehicle performance measure proposed for this corridor at the Interstate Bridge and other segments that will affect travel throughout the corridor. Light rail transit and expanded bus service along parallel arterial streets are effective alternatives to I-5 for access to the Portland central city. Freight movement to intermodal facilities and industrial areas would be affected by the spreading of congestion to off-peak periods. To address these problems, the I-5 Trade Corridor Study will evaluate different capacity and transit improvements in this corridor and make recommendations for inclusion in the Regional Transportation Plan. This study will evaluate the impact of congestion in the corridor on freight movement to port terminals, concentrating on maintaining regional, national and international goods movement and multi-modal solutions for travel along this corridor. The study will also evaluate the impact of capacity increases to I-5 on conditions on I-205, Northeast Portland Highway and north

Portland arterial streets and neighborhoods. See Chapter 6 for more detail on the corridor study recommended for I-5.

Northeast Portland Highway (Rivergate industrial area to I-205)

Improvements defined in the 2020 Preferred System for the northeast Portland Highway corridor are focused on:

- developing a streamlined highway connection from Rivergate industrial area to I-205 along the Columbia Boulevard/Lombard Street/Killingsworth Street corridor
- maintaining peak and off-peak period freight mobility
- reducing the need for freight use of Marine Drive east of I-205, the Banfield Freeway and inner northeast portions of I-5

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Implementing improvements proposed by the Columbia Corridor Transportation Plan on Martin Luther King Jr. Boulevard at Columbia Boulevard and Lombard Street is expected to move through-trips currently on Columbia Boulevard to Lombard Street to better utilize excess capacity and thereby improve freight mobility in the corridor. This improved connection between the Rivergate industrial area and I-205 is expected to serve as an alternative to I-5, I-84 and Marine Drive for access to industrial areas and intermodal facilities in this part of the region. Portions of Northeast Portland Highway are predicted to experience some congestion during the evening two-hour peak period.

Conclusions: The proposed improvements in this corridor combine with better utilization of existing capacity to serve east west freight and traffic movement needs. Further study of the area is needed to define improvements for the sections that continue to operate below level of service standards defined for this corridor. See Chapter 6 for more detail on the refinement planning recommended for this corridor.

Interstate 205 North (I-84 to Clark County, Wash.)

Improvements defined in the 2020 Preferred System for the I-205 north corridor are focused on:

- maintaining an acceptable level of accessibility to Portland International Airport
- preserving freight mobility from I-5 to Clark County, Wash., with an emphasis on connections to I-84 east, Northeast Portland Highway and Portland International Airport
- maintaining an acceptable level of access to the Gateway regional center

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Northbound I-205 from Airport Way to Highway 14 in Vancouver, Wash. is expected to exceed the motor vehicle performance measure for this corridor (E/E). Ramp improvements at Airport Way are not expected to alleviate congestion during the evening two-hour peak period. The addition of auxiliary

lanes on I-205 from I-84 to Airport Way would allow that segment to operate at an acceptable level of service during the evening two-hour peak period.

Conclusions: Improvements are needed in this corridor to address existing deficiencies and expected growth in travel demand during the next 20 years. A detailed corridor study should consider the potential of auxiliary lanes from I-84 to Airport Way and use of express, peak period pricing or HOV lanes as a strategy for expanding capacity in the corridor. The I-205 north corridor study should also evaluate the potential of high-capacity transit extending north from Gateway regional center into Clark County, Wash. that could serve trips destined for the airport and surrounding employment areas. See Chapter 6 for more detail on the corridor study recommended for I-205.

Other Major Corridors in the West Columbia Corridor Subarea

Marine Drive (west of I-5)

Improvements defined in the 2020 Preferred System for the Marine Drive corridor are focused on:

- maintaining an acceptable level of accessibility from the Rivergate industrial area and West Hayden Island intermodal facilities to I-5 and Northeast Portland Highway
- reducing conflicts between rail and truck freight movement

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Though Marine Drive is expected to function effectively as the primary connection to Rivergate and West Hayden Island terminals, congestion on I-5 may limit access to Marine Drive during the evening peak two-hour period. Access to the Rivergate intermodal facilities and industrial areas from the east and south is predicted to be limited by expected congestion along I-5 during the evening two-hour peak period. Long-term access from the west is predicted to be limited by the structural and design constraints of the St. Johns Bridge and truck movements through the St. Johns town center and surrounding community.

Conclusions: Proposed improvements to I-5, Northeast Portland Highway and Marine Drive west of I-5 will provide access to Rivergate terminals during most hours of the day, with limited access during the evening two-hour peak period. Long-term freight access to the Rivergate industrial area from Highway 30 should be determined during the plan period.

Major Centers in the West Columbia Corridor Subarea

St. Johns Town Center

Improvements defined in the 2020 Preferred System for the St. Johns town center are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center

- improving pedestrian access to transit along major transit corridors
- reducing the impact of truck traffic traveling from US 30 to Columbia Boulevard and West Hayden Island

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: St. Johns Bridge is expected to experience congestion during the evening two-hour peak period. Frequent bus ridership along Lombard Street shows promising results. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: A long-term freight access plan is needed to help reduce freight traffic impacts on the town center and adjacent neighborhoods. Future updates to this plan should evaluate the effectiveness of a new bridge crossing north of St. Johns Bridge to more directly link US 30 to the Rivergate industrial area and West Hayden Island terminals and address functional limitations of the St. Johns Bridge. See Chapter 6 for more detail on refinement planning for a North Willamette River crossing study in this part of the region. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this area through 2020.

Major Intermodal Facilities and Industrial Areas in the West Columbia Corridor Subarea

Portland International Airport

Improvements defined in the 2020 Preferred System for the Portland International Airport are focused on:

- maintaining an acceptable level of accessibility to freight and passenger terminals
- providing a transit alternative to Airport Way and I-205
- improving traffic circulation in the vicinity of the airport to better serve growing industrial and office activities without impacting terminal access

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Airport Way is expected to experience congestion in the vicinity of I-205 during the evening two-hour peak period, despite several ramp improvements. Several routes in the vicinity of the airport and Portland International Center are expected to be congested, despite an aggressive set of capacity improvements

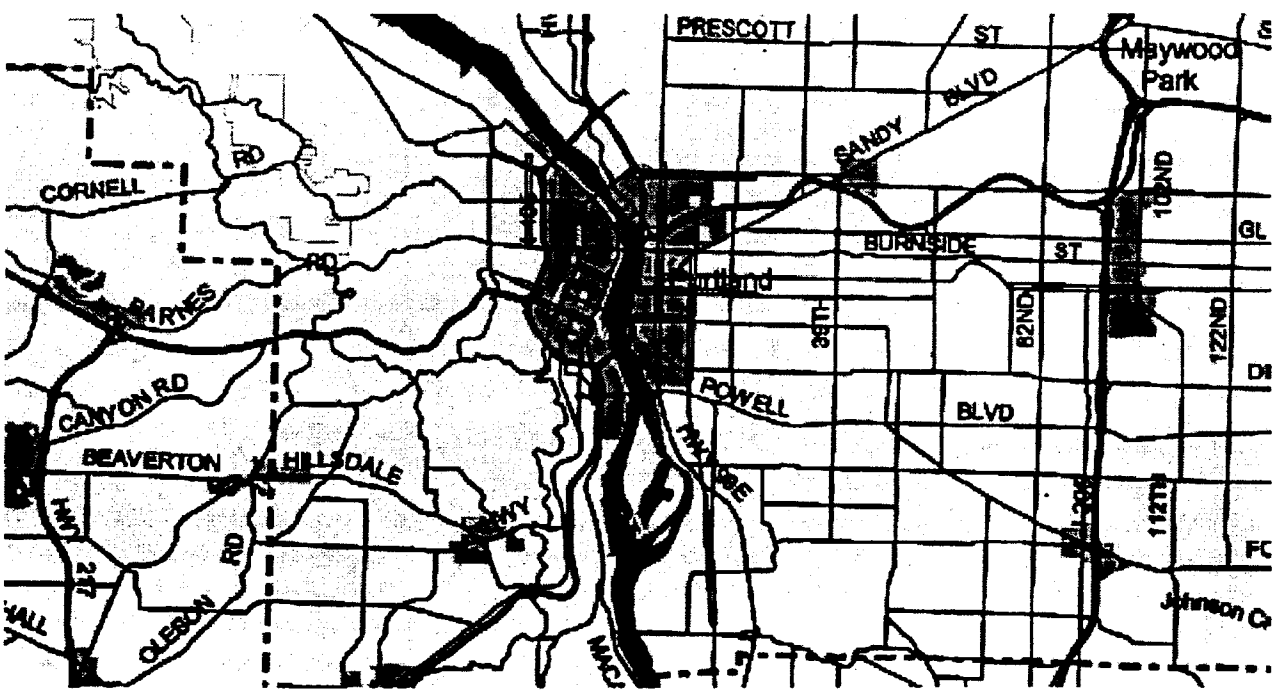
Conclusions: Access to the airport is generally maintained, but requires a relatively large investment in roadway capacity improvements. Light rail access to the airport complements other modes, but does not lessen the need for major capacity improvements to I-205 and Airport Way in the vicinity of the airport. The I-205 north corridor study should also evaluate the potential of high-capacity transit extending north

from Gateway regional center into Clark County, Wash. that could serve trips destined for the airport and surrounding employment areas. Transportation demand management measures can help reduce congestion in this area. The Columbia Corridor Association employs a full-time transportation coordinator and is interested in transportation management area (TMA) start-up assistance from Metro. Any recommendations for adding to the operational capacity of Portland international airport (e.g., a new third runway) should be accompanied by a thorough analysis of impacts and mitigation strategies for I-205, I-84, Northeast Portland Highway, airport light rail and Columbia Corridor arterial streets and collectors.

3.4.2 Subarea 2: Portland Central City and Neighborhoods

This subarea includes the City of Portland from the vicinity of the Columbia Corridor on the north to Johnson Creek on the south, and from the vicinity of Sylvan on the west to I-205 on the east. Located in the center of the subarea is the Portland central city, including the downtown business district, the Lloyd District, the Central Eastside Industrial District, the River District and the North Macadam District. Town centers in the subarea include Hollywood, St. Johns, Lents, Hillsdale, Raleigh Hills and West Portland. Figure 3.7 shows a map of the Portland central city subarea.

Figure 3.7
Portland Central City Subarea



Source: Metro

Regional Corridors in the Portland Central City Subarea

I-5 North (Marquam Bridge to Interstate Bridge)

See page 3-22 for key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

I-5 South (Capitol Highway to Marquam Bridge)

Improvements defined in the 2020 Preferred System for the I-5 south corridor are focused on:

- preserving access to and from the central city
- maintaining off-peak freight mobility
- improving connections to the Central Eastside Industrial District and Highway 99E/224 corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Portions of the I-5 south corridor continue to be congested during the evening two-hour peak period, particularly from the Portland central city to Terwilliger interchange, despite the addition of southbound truck climbing lanes and expanded transit service and traffic management strategies on parallel arterial routes. Similarly, bottlenecks and access issues will continue at the Ross Island bridgehead and at Capitol Highway. Parallel rapid bus service along Barbur Boulevard shows promising ridership levels.

Conclusions: Congestion on I-5 south does not exceed the motor vehicle performance measure for this corridor (E/E). Proposed improvements to the I-5 south corridor are adequate to accommodate freight movement and maintain reasonable traffic flows and address key bottlenecks during the evening two-hour peak period, given the proposed transit alternatives in the corridor and significant environmental and physical barriers to further highway expansion.

Interstate 405 Loop (I-5 south to I-5 north)

Improvements defined in the 2020 Preferred System for the I-405 loop are focused on:

- maintaining an acceptable level of accessibility to and from the Portland central city from I-84, US 26 and I-5
- maintaining off-peak freight mobility
- maintaining off-peak freeway to freeway connections between I-84, Sunset Highway and I-5

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Segments of I-405 are congested during the evening two-hour peak period, particularly from the Burnside Street interchange at I-405 to I-5 north.

Conclusions: Congestion on I-405 does not exceed the motor vehicle performance measure for this corridor (F/E). Congestion on this facility appears to be localized in nature and does not significantly limit access to the Portland central city during the evening two-hour peak period. Projects should focus on safety and key bottlenecks.

Banfield Freeway (I-5 to I-205)

Improvements defined in the 2020 Preferred System for the Banfield Freeway are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from eastside Portland neighborhoods and East Multnomah County
- providing a transit alternative to I-84
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- mitigating infiltration on adjacent arterial streets due to congestion on I-84

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Banfield Freeway will continue to be congested during the evening two-hour peak period. Analysis completed by Metro in 1997 demonstrated that congestion would not be eliminated by constructing additional travel lanes on I-84 due to the heavy demand for travel in the corridor. As part of this analysis, despite widening I-84 to ten lanes, the corridor remained congested during the evening two-hour peak period. Light rail ridership is high, reflecting more frequent service in the corridor. Transit volumes parallel to I-84 are also expected to be high. Parallel arterial streets are also congested, particularly south of the Banfield Freeway. The Sandy Boulevard corridor, for example, is expected to experience some congestion during the evening two-hour peak period. Frequent bus service in this corridor is expected to experience high ridership.

Conclusions: Generally, congestion on the Banfield Freeway would not exceed the motor vehicle performance measure for this corridor (F/E). Parallel light rail and expanded bus service are effective alternatives to the Banfield Freeway for accessing the Portland central city and I-5 north. However, congestion on parallel arterial streets, including Halsey, Glisan, Burnside and Stark streets, is not adequately addressed by proposed improvements. Additional consideration of these and other congested parallel streets is needed as part of refinement planning in local transportation system plans. Proposed transit, pedestrian and bicycle improvements along Sandy Boulevard serve expected pedestrian and bicycle travel needs in this corridor through 2020. See Chapter 6 for more detail on the refinement planning recommended for this corridor.

Sunset Highway (I-405 to Sylvan interchange)

Improvements defined in the 2020 Preferred System for this segment of the Sunset Highway are focused on:

- maintaining an acceptable level of accessibility to the Portland central city, I-5 and I-84 from Wash. County
- providing a transit alternative to US 26
- maintaining off-peak freight mobility

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Sunset Highway to the Sylvan Road interchange is predicted to be congested outbound from the Portland central city during the evening two-hour peak period, despite added truck climbing lanes and more frequent light rail service. Light rail ridership is expected to be high, reflecting more frequent service during the evening two-hour peak period. Streets parallel to this segment of US 26 are also expected to experience some congestion.

Conclusions: Generally, congestion on this portion of the Sunset Highway will not exceed the motor vehicle performance measure for this corridor (F/E). Parallel light rail service is expected to provide an effective, reasonable alternative for accessing the Portland central city. Freight movement to Washington County is enhanced by completion of a westbound truck climbing lane on Sunset Highway through the Sylvan Road interchange; however, it remains limited by congestion during the evening two-hour peak period. Additional refinement planning is recommended for this corridor in terms of the design of projects proposed for US 26; see Chapter 6 for details.

Highway 99E (Portland central city to Highway 224)

Improvements defined in the 2020 Preferred System for this segment of 99E are focused on:

- maintaining an acceptable level of accessibility to the Portland central city
- providing a transit alternative to Highway 99E
- providing a better transition from Highway 99E to Highway 224 in Milwaukie

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Highway 99E is expected to remain congested during the evening two-hour peak period despite widening to six lanes, significant street access limitations and frequent light rail transit and bus service in the corridor. Light rail ridership is expected to be high during the evening two-hour peak period. Parallel arterial streets are not expected to experience congestion during the evening two-hour peak period.

Conclusions: A more detailed evaluation of the timing and scope of proposed improvements, including light rail to Clackamas regional center along Highway 224, is needed to address heavy travel demand in this corridor and along Highway 224 between 99E and I-205. In addition, a LOS policy change to F/E during the evening two-hour peak period is recommended. Metro is currently leading a study to consider transportation alternatives in this corridor to define an interim solution for addressing travel demand in this corridor. The study, called the South Corridor Transportation Alternatives Study, was established to address the above factors as well as in response to the defeat of the November 1998 ballot measure that would have reaffirmed local funding for the South/North light rail project. The study is organized into segment-specific corridor teams based on specific study segments, allowing for solutions that are tailored to the needs of each segment. The transportation strategies for each segment will be integrated into a single transportation strategy for the entire corridor. In the later part of the plan period, parallel light rail service provides an effective, reasonable alternative for accessing the Portland central city. See Chapter 6 for more detail on the South Corridor Transportation Alternatives study.

Other Major Corridors in the Portland Central City Subarea

Going Street/Greeley Avenue

Improvements defined in the 2020 Preferred System for the Going Street/Greeley Avenue corridor are focused on:

- maintaining an acceptable level of accessibility to intermodal facilities at Swan Island
- improving access from the industrial area to regional highways, including I-5, Northeast Portland Highway and I-205
- reducing conflicts between rail and truck freight movement

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Going Street at Greeley Avenue is expected to be congested during the evening two-hour peak period. Interstate light rail ridership is expected to be high. Union Pacific rail yards and Swan Island port facilities are expected to remain accessible during the evening two-hour peak period via Greeley Avenue and Going Street. However, congestion on I-5 during the peak period limits truck access to these routes that serve the UP Yard/Swan Island area.

Conclusions: The transit and system management improvements proposed for this corridor are expected to meet projected travel needs through 2020. Recommended improvements provide access to Rivergate terminals and the Union Pacific rail yard during the 20-year plan period. The Swan Island industrial area has expressed interest in forming a transportation management association (TMA). Localized congestion at the Going Street intersection with Greeley Avenue should be addressed as part of the Portland transportation system plan.

Powell Boulevard/Foster Road Corridor (Portland central city to Lents)

Improvements defined in the 2020 Preferred System for the Powell Boulevard/Foster Road corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from southeast Portland neighborhoods and the Lents town center
- explore possibility of high-capacity transit (e.g., rapid bus service) in corridor
- expanding traffic management and high-capacity transit strategies to better accommodate expected traffic growth in the corridor, especially near Lents town center due to growth in the Pleasant Valley/Damascus area.

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Powell Boulevard/Foster Road corridor is expected to emerge as a major travel corridor due to expected growth in Clackamas County. The Powell Boulevard/Foster Road corridor is expected to experience congestion during the evening two-hour peak period, including parallel arterial streets. Traffic volumes are expected to increase significantly even though no additional road capacity is proposed for this segment of the corridor, except in the vicinity of the Ross Island Bridge. Rapid bus service is expected to experience promising ridership levels.

Conclusions: Expanded transit service is an essential part of the Regional Transportation Plan's strategy for linking Southeast Portland neighborhoods to the Portland central city. In addition, this corridor connects Portland with rapidly developing areas of Clackamas County, and a detailed combination of transit service and improved management of the roadway system should be addressed as part of a corridor study and through Portland's transportation system plan. Ross Island bridgehead improvements should also be developed through a refinement study. See Chapter 6 for more detail on this corridor study recommended for this part of the region.

Highway 43 (Portland central city to Lake Oswego town center)

Improvements defined in the 2020 Preferred System for the Highway 43 corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from southwest Portland neighborhoods and Lake Oswego town center, and
- expanding traffic management and high-capacity transit strategies to better accommodate expected traffic growth in the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Highway 43 corridor is expected to experience congestion during the evening two-hour peak period. No additional road capacity is proposed for this corridor due to topographic constraints. Frequent bus service is expected to experience promising ridership levels.

Conclusions: Expanded transit service is an important part of the Regional Transportation Plan's strategy for linking Southwest Portland neighborhoods and Lake Oswego town center to the Portland central city. Due to the unique topographic constraints of this corridor, expanded transit service should be implemented in this corridor in conjunction with improved roadway system management. A refinement study of the potential for phasing future trolley commuter service from Lake Oswego to Portland central city and commuter rail service from Lake Oswego to Milwaukie is appropriate. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this corridor through 2020. See Chapter 6 for more detail on the refinement planning recommended for this corridor.

Barbur Boulevard (Portland central city to Highway 217)

Improvements defined in the 2020 Preferred System for the Barbur Boulevard corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from southwest Portland neighborhoods and Hillsdale and West Portland town centers,
- expanding traffic management and high-capacity transit strategies to better accommodate expected traffic growth in the corridor
- improving the pedestrian and streetscape character of Barbur Boulevard at selected locations

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Segments of Barbur Boulevard are expected to experience congestion, particularly just south of I-405. Rapid bus service along Barbur Boulevard and other expanded bus service in the corridor are expected to experience promising ridership levels.

Conclusions: The combination of proposed transit and system management strategies proposed for this corridor are adequate to meet projected travel needs through 2020 in this corridor. Actual implementation of high-capacity transit service in this corridor should be studied further as part of refinement planning. Proposed pedestrian and bicycle improvements serve expected transit, pedestrian and bicycle travel needs in this corridor through 2020. See Chapter 6 for more detail on the proposed corridor planning identified for I-5 south of the central city, which includes an evaluation of rapid bus service along Barbur Boulevard.

West Burnside Street (Portland central city to Barnes Road)

Improvements defined in the 2020 Preferred System for the West Burnside Street corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from Northwest Portland neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- enhancing the pedestrian and transit environment east of Northwest 23rd Avenue to downtown Portland

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: West Burnside Street is expected to experience congestion during the evening two-hour peak period. Expanded bus service in the corridor is expected to experience promising ridership levels.

Conclusions: The combination of physical and topographic constraints along West Burnside Street, including the tunnel, require a combination of expanded transit service and better roadway system management to be implemented in this corridor to meet projected travel needs through 2020. Proposed pedestrian and bicycle improvements are expected to serve pedestrian and bicycle travel needs in this corridor through 2020.

Highway 30 (Portland central city to Cornelius Pass Road)

Improvements defined in the 2020 Preferred System for the Highway 30 corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from northwest Portland neighborhoods
- maintaining freight mobility between the Northwest industrial area and the Rivergate terminals

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Highway 30 is expected to experience congestion from the Portland central city to the St. Johns Bridge/Germantown Road as a result of traffic using this route to travel to destinations in Washington County and the Rivergate industrial area. The St. Johns Bridge is expected to experience congestion, limiting freight access between the Northwest industrial area and Rivergate terminals.

Conclusions: The combination of proposed transit and system management strategies proposed for this corridor meet projected travel needs through 2020 in this corridor. However, a long-term strategy to serve freight movement should be developed as part of refinement planning for a North Willamette River crossing study and the Portland transportation system plan. See Chapter 6 for more detail on refinement planning for this corridor.

East Burnside Street (Portland central city to Gateway regional center, including other routes parallel to I-84 such as Stark, Glisan and Halsey streets)

Improvements defined in the 2020 Preferred System for the East Burnside Street corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from Southeast Portland neighborhoods to the Gateway regional center and to the Portland central city
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor.

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: This corridor is expected to experience some congestion during the evening two-hour peak period, possibly as a result of significant congestion on the Banfield Freeway. Frequent bus service along several east/west streets south of the Banfield Freeway is expected to experience high ridership.

Conclusions: Although light rail and expanded bus service on adjacent streets provide effective, reasonable alternatives to this primary route, expected travel local travel demand between Southeast Portland neighborhoods and the central city is not fully addressed by proposed improvements. The combination of proposed transit and system management strategies proposed for this corridor should be evaluated further as part of local transportation system plans. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this corridor through 2020.

Major Centers in the Portland Central City Subarea

Portland Central City

The Portland central city area east of the Willamette River and generally within the I-405 freeway ring has an extensive grid of well-connected arterial, collector and local streets. This area is well served by transit and conducive to bicycle and pedestrian travel. The Willamette River bridges are a key part of the transportation system, connecting the central city and adjacent neighborhoods to the region. Unfortunately, all the bridges have high maintenance and preservation needs. The hilly topography has constrained much of the transportation system in the Northwest and Southwest portions of the central city. The result is high traffic demand on streets such as Cornell Road, Burnside Street and Beaverton-Hillsdale Highway.

The Portland central city is designated as an area of special concern in Chapter 1 of this plan, therefore, improvements defined in the 2020 Preferred System for the Portland central city are focused on:

- achieving targets set for walking, biking, use of transit and shared ride
- improving street connectivity and supporting mixed-use development
- implementing parking ratios

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: The Portland central city has an excellent system of walkways and bikeways that connect the central city to surrounding neighborhoods. Proposed improvements address pedestrian travel deficiencies on the Willamette River bridges and major traffic streets such as West Burnside Street, Naito Parkway and the Grand Avenue/Martin Luther King Jr. Boulevard couplet. The proportion of trips made to and from downtown Portland by walking, bicycling, shared ride and transit represent 67 percent of all trips in this part of the region.

Conclusions: The Portland central city has been identified as an area of special concern. Congestion on the I-405 loop is not expected to limit accessibility to the central city during the evening two-hour peak period. Other arterial streets providing access to the central city operate within the level of service policy.

The combination of proposed transit and system management strategies proposed for this corridor is expected to meet projected travel needs through 2020. Proposed pedestrian and bicycle improvements are expected to serve pedestrian and bicycle travel needs within the central city through 2020. Based on substitute performance measures identified in Chapter 6, the transportation system in this part of the region is adequate to serve planned land uses. See Appendix 3.1 for more detail on the substitute performance measures used to make this evaluation.

Union Station

Improvements defined in the 2020 Preferred System for the Union Station area are focused on:

- preserving access to and from Union Station by all modes of travel, including bus, light rail, passenger rail, motor vehicles, walking and bicycles
- further developing Union Station as an intermodal passenger terminal

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Union Station is currently a highly accessible intermodal facility, with passenger connections between public and private bus systems and passenger rail. Motor vehicle, pedestrian and bicycle access to the passenger terminal is also provided. Proposed transit improvements, such as expanded light rail and bus service and transit mall realignment, are expected to further improve transit access to the Union Station passenger terminal.

Conclusions: Existing and proposed transit service and other transportation improvements will provide exceptional, multi-modal access to the Union Station passenger intermodal facility.

Hollywood Town Center

Improvements defined in the 2020 Preferred System for the Hollywood town center are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center
- improving pedestrian access to transit along major transit corridors
- redesigning the diagonal street intersections along Sandy Boulevard to improve pedestrian crossing safety and motor vehicle traffic circulation

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Most radial access routes to the Hollywood town center are expected to function well and provide good motor vehicle access to the town center during the evening two-hour peak period, including Sandy Boulevard, 33rd and 47th avenues and Broadway Street. Halsey Street is expected to experience congestion during the evening two-hour peak period, which could limit bus and motor

vehicle access to the Hollywood transit station during peak travel periods. Access to the town center from surrounding southeast Portland neighborhoods is potentially limited by predicted congestion along 39th Avenue during the evening two-hour peak period. No capacity improvements are recommended for 39th Avenue due to constraints presented by the existing built environment along the corridor. Transit ridership along 39th Avenue, connecting to the town center, is also expected to be strong. Bikeway improvements north and south of the town center and along Tillamook Street and Sandy Boulevard are expected to provide bikeway access to the town center from surrounding neighborhoods. Proposed north/south bikeway improvements parallel and east of 39th Avenue are expected to provide a "bypass" of busy intersections along Sandy Boulevard and 39th Avenue. Pedestrian improvements are proposed at a number of locations as part of the draft Hollywood Town Center Plan, addressing many difficult street crossings and sidewalk deficiencies.

Conclusions: Transportation recommendations adopted in the Hollywood Town Center Plan should be incorporated into the Regional Transportation Plan, as appropriate. Proposed transit improvements are particularly appropriate because few roadway projects are possible given the constraints of the built environment. Improved transit service along 39th Avenue should be implemented given the heavy travel demand and mix of land uses in this corridor. Proposed bikeway and pedestrian improvements will provide excellent access to the town center from surrounding neighborhoods. Bikeway and pedestrian improvements should address the difficult crossings and sub-standard pedestrian and bicycle facilities within the town center.

Lents Town Center

Improvements defined in the 2020 Preferred System for the Lents town center and vicinity are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center
- improving pedestrian access to transit along major transit corridors
- reducing the impact of truck traffic from I-205 and the impact of high motor vehicle volumes within the town center
- developing a strategy for the provision and management of adequate on-street parking to support commercial redevelopment

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Foster Road (Foster/Woodstock couplet within the town center) is a major barrier to north/south travel and circulation within the town center due to heavy motor vehicle volumes. Though roadway capacity improvements are not proposed here, the planned growth in the Pleasant Valley/Damascus urban reserve areas to the east require capacity improvements to Foster Road east of 122nd Avenue, thus affecting traffic volumes throughout the corridor. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway

deficiencies. The 82nd Avenue corridor is congested, affecting motor vehicle access to the town center from some nearby Southeast Portland neighborhoods.

Conclusions: The proposed strategy for Foster Road emphasizes an expanded transit network in combination with some capacity improvements and access management strategies to serve growing travel demand in this corridor. Foster Road is expected to be an attractive, important connection between the Damascus/Pleasant Valley area and employment areas in the I-205 corridor and Portland. As a result, future capacity improvements, access management strategies and high-capacity transit service are proposed for this corridor, connecting to the Lents town center and the Portland central city. However, environmental constraints limit future expansion of Foster Road east of 122nd Avenue. These proposed improvements would result in a change in functional classification of Foster Road east of 172nd Avenue, from major arterial to minor arterial to reflect an emphasis on more localized travel, with 172nd Avenue upgraded to major arterial to emphasize longer trips.

Within the town center the potential decoupling of Foster Road-Woodstock Street has been studied and rejected in favor of enhancements to the couplet – additional signalized crossings, wider sidewalks, widening to provide additional on-street parking and bike lanes. Proposed bicycle and pedestrian improvements address difficult street crossings and sidewalk/bikeway deficiencies within the town center. Though proposed system management strategies for 82nd Avenue may not fully address congestion during the peak periods, the proposed frequent bus service provides an appropriate alternative to driving. This combination of system management and transit strategies is a reasonable alternative to capacity improvements that are limited by the topographic and built environment.

St. Johns Town Center

See page 3-24 for key findings and conclusions, reflecting analysis of the performance of the improvements defined for this part of the region.

Hillsdale Town Center

Improvements defined in the 2020 Preferred System for the Hillsdale town center and vicinity are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center
- improving pedestrian access to transit along major transit corridors
- redesigning the intersection of Beaverton-Hillsdale Highway, Capitol Highway and Bertha Boulevard to improve safety and access to the town center by all modes of travel

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Capitol Highway is expected to experience heavy traffic volumes between Barbur Boulevard and Beaverton-Hillsdale Highway, affecting circulation within the Hillsdale town center and creating

difficult street crossings for pedestrians. Major streets, including Bertha Boulevard, Capitol Highway, Sunset Boulevard and Beaverton-Hillsdale Highway are generally not expected to be congested during the evening two-hour peak period.

Conclusions: Pedestrian improvements are proposed throughout the town center to address difficult street crossings and inadequate sidewalk facilities. Bikeways are proposed along several routes to address inadequate facilities and provide access from neighborhoods to the town center. A proposed intersection improvement at Bertha Boulevard/Capitol Highway/Beaverton-Hillsdale Highway will address safety and capacity deficiencies that currently exist.

West Portland Town Center

Improvements defined in the 2020 Preferred System for the West Portland town center are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center
- improving pedestrian access to transit along major transit corridors
- redesigning the intersection of Barbur Boulevard, Capitol Highway and Taylors Ferry Road to improve safety and access to the town center by all modes of travel
- investigating potential new southbound freeway access locations between the central city and the town center to relieve the concentration of this function at the existing Barbur/Capitol/Taylors Ferry interchange

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: The complex intersection at Capitol Highway, Barbur Boulevard is expected to create safety and congestion problems in the area, particularly during the evening two-hour peak period. A major problem is that the freeway interchange ramps are located in the center of the town center and that some physical or distance separation of the ramp facilities from the primary arterial intersection of the area is needed. Also, because this location is the first southbound ramp opportunity to I-5 south of the central city, it attracts an excessive amount traffic from southwest Portland and beyond. Much of the town center's vehicular capacity is expected to serve trips that are not destined for town center destinations. An additional southbound I-5 access location between the central city and the town center is expected to significantly relieve congestion at the Barbur Boulevard/Capitol Highway intersection. Bike access to the town center is currently poor, with narrow travel lanes on Capitol Highway and Taylors Ferry Road, and heavy traffic on Barbur Boulevard that acts as an impediment for both bicyclists and pedestrians. I-5 is a major barrier to circulation within the town center, particularly for pedestrians. Pedestrian access to the Barbur transit center is currently limited by heavy traffic volumes along Barbur Boulevard and an absence of pedestrian facilities connecting to the transit center. Proposed rapid bus on Barbur Boulevard shows heavy ridership potential.

Conclusions: A proposed study to examine long term southbound freeway access between the central city and the town center should address the conflicts of regional and local traffic at the Barbur Boulevard/Capitol Highway intersection. In addition, proposed pedestrian overcrossings will connect western neighborhoods to town center destinations, such as the Capitol Hill Library and area schools. In addition to pedestrian and bicycle connections, local street connections would be beneficial to local circulation within the town center and provide some traffic congestion relief. The presence of the transit center offers significant opportunity for attaining mode split goals for the town center, especially with the development of transit-supportive land uses and improved pedestrian access facilities. Boulevard treatment for Barbur will address bicycle and pedestrian design deficiencies along this heavily traveled route and improve pedestrian access to the Barbur Transit Center. Barbur rapid bus should be considered for early implementation as a strategy to address overall transit demand in the BarburBoulevard/I-5 corridor, and reduce the need for capacity improvements on Barbur Boulevard in the West Portland town center. See Chapter 6 for more detail on the proposed corridor planning identified for I-5 south of the central city.

Raleigh Hills Town Center

Improvements defined in the 2020 Preferred System for the Raleigh Hills town center and vicinity are focused on:

- providing better bicycle and pedestrian connections to and within the town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the town center
- improving pedestrian access to transit along major transit corridors
- redesigning the intersection of Beaverton-Hillsdale Highway, Scholls Ferry Road and Oleson Road to improve safety and access to the town center by all modes of travel

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: The Raleigh Hills town center is expected to be easily accessed by transit, with service connecting to neighborhoods in four directions. High traffic volumes on Beaverton-Hillsdale Highway, and the scale of this arterial creates a major bicycle and pedestrian barrier within the town center. Scholls Ferry Road is expected to experience congestion during the evening two-hour peak period, limiting motor vehicle access to the town center; physical constraints prevent major capacity expansion of this facility. Transit demand is expected to be strong along this route.

Conclusions: The proposed intersection redesign at Beaverton-Hillsdale Highway/Oleson Road/Scholls Ferry Road (as proposed in Raleigh Hills Town Center Plan) will improve circulation within the town center area and provide safer pedestrian crossings. Proposed bikeway and pedestrian improvements address difficult crossings, deficient bikeway and sidewalk facilities. Proposed transit and bikeway improvements along Scholls Ferry Road are expected to provide reasonable travel alternatives during congested peak periods.

Southeast Portland Neighborhoods

Improvements defined in the 2020 Preferred System for the southeast Portland neighborhoods and vicinity are focused on:

- providing better bicycle and pedestrian connections to the Portland central city
- expanding transit service and traffic management strategies to better accommodate expected traffic growth
- improving pedestrian access to transit along major transit corridors

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: This part of the region is characterized by an extensive grid network of arterial, collector and local streets with less capacity on the major streets when compared to other parts of the region. The regional model does not include the local street network, and, therefore, may be overestimating the demand for travel on the collector and arterial street network. As a result, many of the streets that connect to the central city experience congestion during the two-hour peak period, including Glisan, Burnside, Stark, Belmont, Hawthorne, Division, Powell, Holgate, Woodstock, 20th and 39th streets. This finding is supported by the Regional Connectivity Study conducted in 1997, which used an example from inner southeast Portland to examine the effects of local street connectivity on travel demand on the arterial street network. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, providing better bicycle and pedestrian connections to the central city and adjacent town centers. Expansion of transit service and implementation of traffic management strategies are proposed to better accommodate expected traffic growth on regional streets connecting to these neighborhoods. Other improvements are proposed to improve pedestrian access to transit along major transit corridors.

Conclusions: Proposed bikeway and pedestrian improvements address difficult crossings, deficient bikeway and sidewalk facilities. Proposed transit improvements along Glisan, Burnside, Stark, Belmont, Hawthorne, Division, Powell, Holgate, Woodstock, 20th and 39th streets are expected to provide reasonable travel alternatives during congested peak periods.
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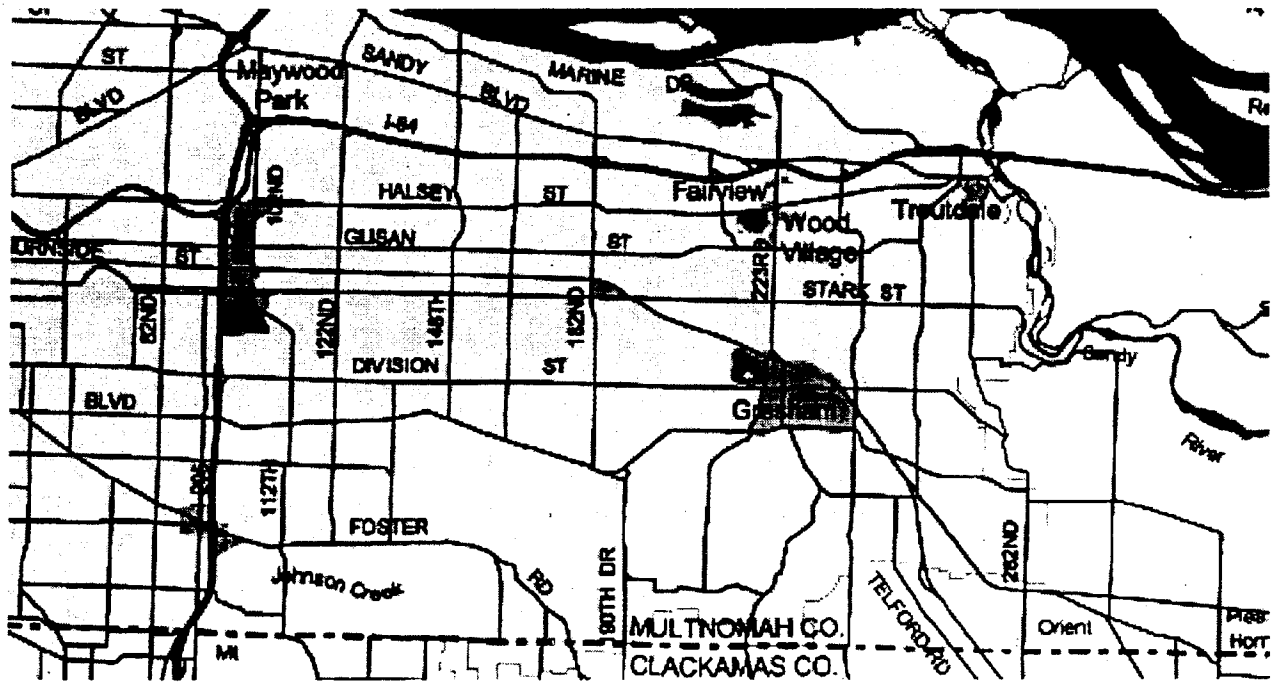
3.4.3 Subarea 3: East Multnomah County

This subarea stretches from Interstate 205 to the eastern urban growth boundary, and from urban Clackamas County to the Columbia River. The cities of Gresham, Troutdale, Fairview and Wood Village make up the east half of the subarea. The west half of the subarea falls within the city limits of Portland. The subarea includes the Gresham and Gateway regional centers, and Rockwood, Fairview/Wood Village and Troutdale town centers. The South Shore industrial area includes most of the area north of Interstate 84. Figure 3.8 shows a map of the East Multnomah County subarea.

Figure 3.8
East Multnomah County Subarea



Source: Metro

Regional Corridors in the East Multnomah County Subarea

Interstate 84 (I-205 to the urban growth boundary)

Improvements defined in the 2020 Preferred System for the Banfield Freeway are focused on:

- maintaining an acceptable level of accessibility to the Portland central city from Gateway regional center and other parts of East Multnomah County
- providing transit as an alternative to I-84
- mitigating infiltration on adjacent arterial streets due to congestion on I-84

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Banfield Freeway is expected to experience congestion during the evening two-hour peak period as it approaches the Gateway regional center from the west. Light rail ridership is expected to be high, reflecting more frequent service in the corridor. Parallel bus service is expected to generate high ridership in the corridor. Parallel arterial streets entering the Gateway regional center from the west are expected to experience congestion during the evening two-hour peak period. The Banfield Freeway east of I-205 does not experience congestion during the evening two-hour peak period.

Conclusions: Proposed improvements to I-84 east of I-205 are adequate for addressing travel demand to the year 2020. However, congestion on parallel arterial streets, including Glisan, Burnside and Stark streets as they enter the Gateway regional center, is not adequately addressed by proposed improvements. Additional consideration of these and other congested parallel streets is needed as part of refinement planning for the Gateway regional center See Chapter 6 for more detail on proposed refinement planning for this part of the region.

Interstate 84 to US 26 Connector

Improvements defined in the 2020 Preferred System for the Mt. Hood Parkway corridor are focused on:

- interim improvements along the 242nd Avenue corridor for an eventual highway link between I-84 and US 26
- providing transit as an alternative to Hogan Road
- maintaining an acceptable level of accessibility to the Gresham regional center

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Hogan Road/242nd Avenue is predicted to perform well during the evening two-hour peak period with congestion limited to certain intersections.

Conclusions: The long-term need to develop a highway link between I-84 and US 26 exists, but proposed interim improvements to Hogan Road meet projected growth in travel demand through 2020. In addition to proposed improvements, local transportation system plans should consider more aggressive access management between Glisan Street and Powell Boulevard and redesigned intersection improvements at Stark Street, Division Street, Burnside Street and Powell Boulevard to stream-line traffic flow in the corridor.

Other Major Corridors in the East Multnomah County Subarea

Powell Boulevard (I-205 to Gresham regional center)

Improvements defined in the 2020 Preferred System for the Powell Boulevard corridor are focused on:

- maintaining an acceptable level of accessibility to the Gresham regional center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor
- providing access to the major growth area of Pleasant Valley/Damascus

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Powell Boulevard is expected to experience congestion during the evening two-hour peak period from the Portland central city to just north of the Pleasant Valley and Damascus urban reserve areas, despite widening to five lanes east of I-205. Capacity improvements for this corridor reflect a strategy to carry longer trips east of I-205 on Powell Boulevard rather than on Division Street to the north or Foster Road to the south. As such, Powell Boulevard is planned as the primary connection to Gresham regional center from the west, with a five-lane capacity improvement from I-205 to Gresham and an emphasis on access management. Frequent bus service is expected to generate high ridership. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Heavy travel demand exists in this corridor in part due to planned growth in the Pleasant Valley and Damascus urban reserve areas. As capacity is added to this corridor, local access should be carefully managed to adequately serve the demand for this route to serve longer trips. Proposed pedestrian and bicycle improvements are adequate to serve expected pedestrian and bicycle travel needs in this area through 2020.

Division Street (I-205 to Gresham regional center)

Improvements defined in the 2020 Preferred System for the Division Street corridor are focused on:

- maintaining an acceptable level of accessibility to the Gresham regional center for shorter trips
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor, particularly in key main street locations

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Division Street is expected to experience congestion during the evening two-hour peak period from the Portland central city to just north of the Pleasant Valley and Damascus urban reserve areas, reflecting expected growth in east Multnomah County and the urban reserve areas south of Gresham.

Conclusions: In tandem with the upgrade in classification to Powell Boulevard, the classification of Division Street east of 82nd Avenue is be dropped from a major arterial classification to minor arterial, reflecting an increased emphasis on serving more localized travel demand. No capacity changes are assumed for Division Street, but the changed emphasis would require fewer access management efforts in the future and is more compatible with planned land uses in the Division Street corridor.

Major Centers in the East Multnomah County Subarea

Gresham Regional Center

Improvements defined in the 2020 Preferred System for the Gresham regional center are focused on:

- preserving access to and from the regional center by all modes of travel
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the regional center
- improving multi-modal design of major streets that enter the regional center, including Stark Street, Burnside Street, Division Street and 181st Avenue
- emphasizing better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Gresham regional center is expected to remain accessible from all directions during the evening two-hour peak period, although some congestion exists along the 223rd and 242nd corridors north of the regional center. Light rail performs well as does frequent bus service along Division Street. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Proposed improvements are expected to meet expected growth in travel demand to the year 2020. This supports an emphasis on multi-modal retrofits of major routes in the vicinity of the regional center and system and demand management strategies to manage traffic speed and volumes. Proposed pedestrian and bicycle improvements serve expected travel needs in this area through 2020.

Gateway Regional Center

Gateway regional center has been identified as an area of special concern in Chapter 1 of this plan, therefore, improvements defined in the 2020 Preferred System for the Gateway regional center are focused on:

- defining new access routes serving the regional center that move regional traffic from the center of the regional center to the periphery
- creating a fine-grained network of local streets that meet regional connectivity standards
- optimizing traffic flow within the regional center by coordinating the operation of all traffic control devices serving the regional center
- creating a transit service plan, that maximizes the use of transit to access the regional center
- creating design standards for local and regional streets within the district to address the unique travel needs of bicyclists and pedestrians

- constructing additional pedestrian and bicycle facilities

- examining the role of park-and-ride as a means of accessing light rail

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Much of the congestion in the Gateway regional center is a function of regional traffic passing through the regional center to reach the freeway system. Most of the travel on 102nd Avenue is local, and would benefit from a finer grain of local streets that could provide alternate routes. The impact of the park-and-ride facility at Gateway is perceived to have a much greater impact on the regional center than can be established from empirical measures. The regional center is deficient in bicycle and pedestrian facilities.

Conclusions: Except at a few intersection locations and along Glisan Street between I-205 and NE 102nd Avenue, proposed improvements are adequate to meet expected growth in travel demand in the primary corridors to the year 2020. To the extent possible every effort should be made to route this heavy regional traffic volume outside of the regional center. Other means must be developed to access the light rail service in addition to park & ride facilities. Mobility with should be enhanced within the District by creating better network of local streets. Transit serving the District should be enhanced and expanded. The bicycle and pedestrian network within the District must be expanded to provide greater opportunities for these modes of travel.

Major Industrial Areas in the East Multnomah County Subarea

East Columbia Corridor Industrial Area

Improvements defined in the 2020 Preferred System for the east Columbia Corridor industrial area are focused on:

- improving freight access to Portland international Airport and intermodal facilities in the west Columbia Corridor

- improving substandard rail overcrossings that limit freight mobility on north/south arterial streets in the area

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: East Columbia Corridor industrial area facilities are expected to continue to be accessible during the evening two-hour peak period via Marine Drive, Sandy Boulevard and north/south arterial streets that connect to I-84. Airport Way is predicted to experience some congestion during the evening two-hour peak period.

Conclusions: Proposed improvements provide access to east Columbia Corridor industrial area, Portland International Airport and Troutdale Airport during the 20-year plan period.

3.4.4 Subarea 4: Damascus/Pleasant Valley

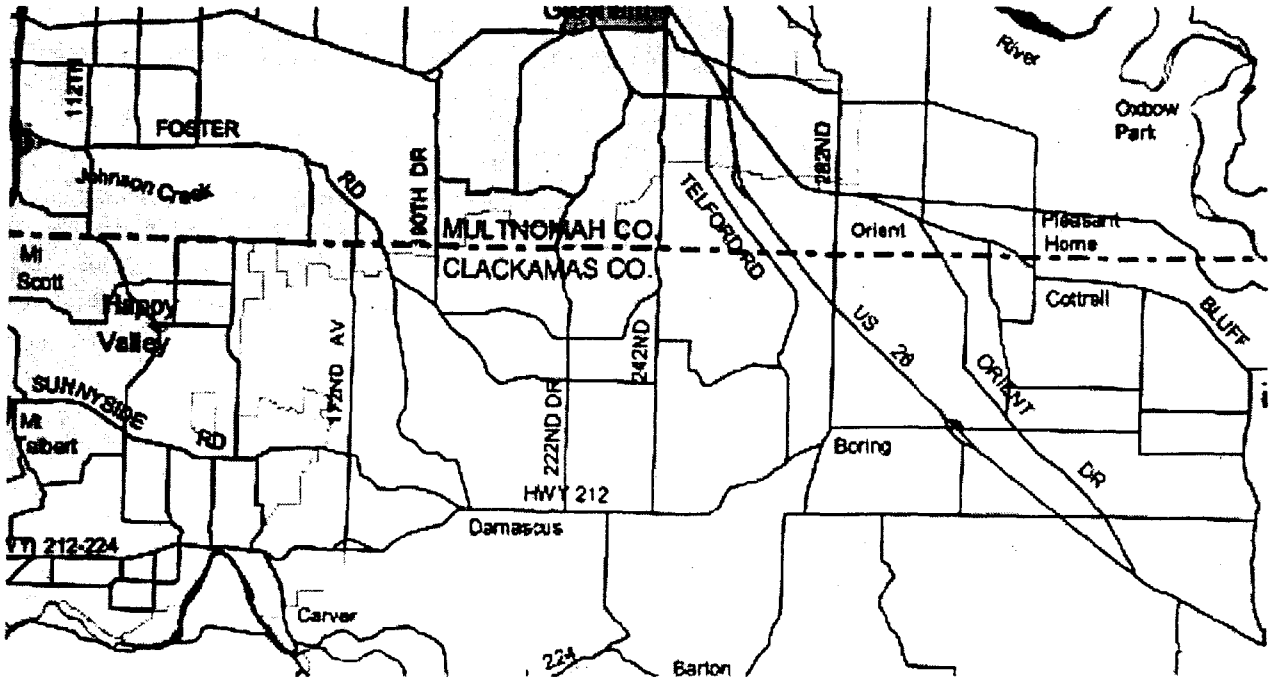
The Damascus subarea includes portions of rural Clackamas County south of Gresham and east of the existing urban growth boundary. The subarea includes Pleasant Valley and Damascus town centers and adjacent urban reserves.

Metro received a planning grant from the Federal Highways Administration that focuses on identifying the future transportation and land-use needs of the Damascus/Pleasant Valley urban reserves while addressing the impacts of urbanization on local communities and the environment. Metro will work in partnership with Gresham, Portland, Happy Valley, Clackamas County, the Johnson Creek Watershed Council and the community to develop the plan. Issues to be addressed include:

- developing a future transportation system for all types of travel that serves the community, provides good access to the rest of the region and avoids impacts to the environment
- planning for local services, such as grocery stores and medical facilities, to meet the needs of residents
- providing for a range of housing types and prices
- preserving and enhancing streams and wetlands to prevent pollution and downstream flooding
- protecting open spaces and planning for public access to them

Figure 3.9 shows a map of the Pleasant Valley/Damascus subarea.

Figure 3.9
Pleasant Valley/Damascus Subarea



Source: Metro

Regional Corridors in the Pleasant Valley/Damascus Subarea

Sunrise Corridor (I-205 to US 26)

Improvements defined in the 2020 Preferred System for the Sunrise Corridor are focused on:

- developing a new highway link between I-205 and US 26 at Ashley's Village in phases along the Highway 212 corridor

- timing phases to reinforce development of Damascus/Pleasant Valley urban reserves and protect adjacent rural reserves from urban traffic impacts

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Sunrise Corridor draft environmental impact statement design (southern alignment) used in RTP modeling is based on a 2005 plan year, and is not expected to adequately address travel needs and land use patterns through 2020 in this part of the region. The segment of the new facility along the existing Highway 212 alignment, from 122nd Avenue to Rock Creek, is predicted to experience

congestion during the evening two-hour peak period, limiting access to Clackamas industrial area. This bottleneck may also limit accessibility to the east by effectively metering the traffic flow. Consequently, the Sunrise Corridor is expected to operate at a very high level of service east of this congested section.

Conclusions: Proposed capacity of the Sunrise Corridor is adequate to meet expected travel demand in the developing Pleasant Valley/Damascus urban reserve areas. Although a draft environmental impact statement has been prepared for this corridor, the final environmental impact statement should be refined to consider express, toll, peak period pricing or HOV lanes as phases of the Sunrise Corridor are constructed. In addition, the FEIS should address congestion limiting access to the Clackamas industrial area, including consideration of separating the Sunrise Corridor from Highway 212 altogether, which would allow Highway 212 to function as a parallel arterial route. Access locations and configurations should be reviewed as part of the FEIS process to best enhance development of the urban reserve areas and protect adjacent rural reserves. The FEIS should also consider purchase of right-of-way only for sections east of Rock Creek, and phase construction of these segments after development of the Damascus town center. The TCSP urban reserve planning project should emphasize east/west improvements on parallel routes in the Sunnyside/Sunrise Corridor corridor. See Chapter 6 for more detail on refinement planning recommended for this corridor.

Other Major Corridors in the Pleasant Valley/Damascus Subarea

Sunnyside Road (Clackamas regional center to Damascus town center)

Improvements defined in the 2020 Preferred System for the Sunnyside Road corridor are focused on:

- maintaining an acceptable level of accessibility to the Clackamas regional center from the Damascus town center and surrounding neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Sunnyside Road is expected to experience congestion in several "bottleneck" areas, such as from Sunnybrook Road to 122nd Avenue, during the evening two-hour peak period. This segment of Sunnyside Road lacks alternative parallel routes to relieve the bottleneck. Frequent bus service on Sunnyside Road, from Damascus town center to Clackamas regional center, is expected to experience good ridership.

Conclusions: Recommended transit and street improvements meet much of the expected travel demand in this corridor. However, capacity improvements on Sunnyside Road should be completed in tandem with system management strategies and parallel route improvements identified in the Clackamas County transportation system plan. General connectivity on local streets; potential parallel route improvements and system management strategies should be explored through the Transportation and Community System Preservation (TCSP) urban reserve planning project along the eastern portions of Sunnyside

Road. Frequent bus service on Sunnyside Road provides a reasonable alternative to the congested roadway during peak travel periods, and warrants early implementation as community or regional bus service in the corridor. This interim bus service should be expanded to frequent bus service as the Sunnyside Road corridor and Damascus town center develop.

172nd Avenue (Foster Road to Sunnyside Road)

Improvements defined in the 2020 Preferred System for the 172nd Avenue corridor are focused on:

- maintaining an acceptable level of accessibility to the Damascus town center
- expanding transit service to better accommodate expected traffic growth in the corridor
- connecting to 182nd Avenue via 190th Avenue and Highland Drive to create a major north-south spine to focus development in the Pleasant Valley/Damascus area and provide a through-route from I-84 to the Sunrise Corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: 172nd Avenue is expected to experience congestion due to heavy traffic volumes during the evening two-hour peak period. Regional bus service between Clackamas regional center and Gresham regional center, via 172nd Avenue and Pleasant Valley town center is expected to generate high ridership.

Conclusions: The conceptual network of supporting streets in the 172nd Avenue corridor resulted in congestion on 172nd Avenue. 172nd Avenue capacity improvement should be accompanied by appropriate access management strategies to ensure mobility for longer trips, consistent with the facility's Major Arterial functional classification. Further, the Pleasant Valley future street plan will be developed as part of Damascus TCSP study, and should focus on providing parallel routes to 172nd Avenue. More direct regional bus service linking Gresham, Pleasant Valley and Clackamas should be considered along the Sunnyside Road/172nd Avenue/Towle Road/Eastman Parkway alignment.

Foster Road (Lents town center to Damascus town center)

Improvements defined in the 2020 Preferred System for the Foster Road corridor are focused on:

- maintaining an acceptable level of accessibility from the developing Pleasant Valley and Damascus town centers to employment areas along the Foster Road/Powell Boulevard corridor and the central city
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor
- constraining traffic demand due to topographic and environmental constraints

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Powell Boulevard/Foster Road corridor is expected to emerge as a major travel corridor due to expected growth in Clackamas County and the Pleasant Valley/Damascus urban reserves. The portions of Powell Boulevard/Foster Road corridor leading to this area are expected to experience congestion during the evening two-hour peak period, including parallel arterial streets. Rapid bus ridership is expected to generate good ridership. The Pleasant Valley and Damascus town centers are expected to be accessible by motor vehicle and transit via the future street network developed as part of the master planning process. No specific bicycle or pedestrian improvements were identified for RTP analysis; the master planning process should also address these needs.

Conclusions: Recommended transit and street improvements meet much of the expected travel demand in this corridor. However, capacity improvements on Foster Road should be completed in tandem with system management strategies and parallel route improvements identified in the Portland and Clackamas County transportation system plans and a corridor study identified for this corridor. General connectivity on local streets; potential parallel route improvements and system management strategies should be explored through the TCSP urban reserve planning project along the southeastern portions of Foster Road. Foster Road rapid bus service provides a reasonable alternative to the congested roadway during peak travel periods, and warrants early implementation as community or regional bus service in the corridor. This interim bus service should be expanded to frequent bus service as the Foster Road corridor and Damascus town center develop. See Chapter 6 for more on the corridor study recommended for this part of the region.

Damascus and Pleasant Valley Town Centers

Improvements defined in the 2020 Preferred System for the Damascus and Pleasant Valley town centers are focused on:

- developing a conceptual network of arterial and collector streets adequate to serve planned growth in the Pleasant Valley and Damascus urban reserve areas, while protecting environmentally sensitive areas and adjacent rural reserves from the impacts of urban traffic

- expanding transit service to better accommodate expected traffic growth

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this part of the region.

Findings: The Pleasant Valley and Damascus town centers are expected to be accessible by motor vehicle and transit via a conceptual street network modeled for the 1999 RTP update; however this network experienced congestion based on RTP analysis. No specific bicycle or pedestrian improvements were identified. Urban reserves in the Damascus and Pleasant Valley are expected to be added to the urban growth boundary incrementally, and will not be necessarily timed according to needed transportation improvements. Master street planning is needed to ensure that critical arterial and collector street connections occur as part of urbanization in this area.

Conclusions: Development of a future street plan for this area should focus on access to the town centers from surrounding areas by all modes of travel. The future street plan to be developed as part of the TCSP project should be for the entire urban reserve area, and anticipate incremental construction of this system as development warrants. See Chapter 6 for more detail on the TCSP project for this part of the region.

Rural Reserve Areas Outside the Pleasant Valley/Damascus Subarea

Improvements defined in the 2020 Preferred System for the rural reserve areas are focused on:

- protecting environmentally sensitive areas and adjacent rural reserves from the impacts of urban traffic

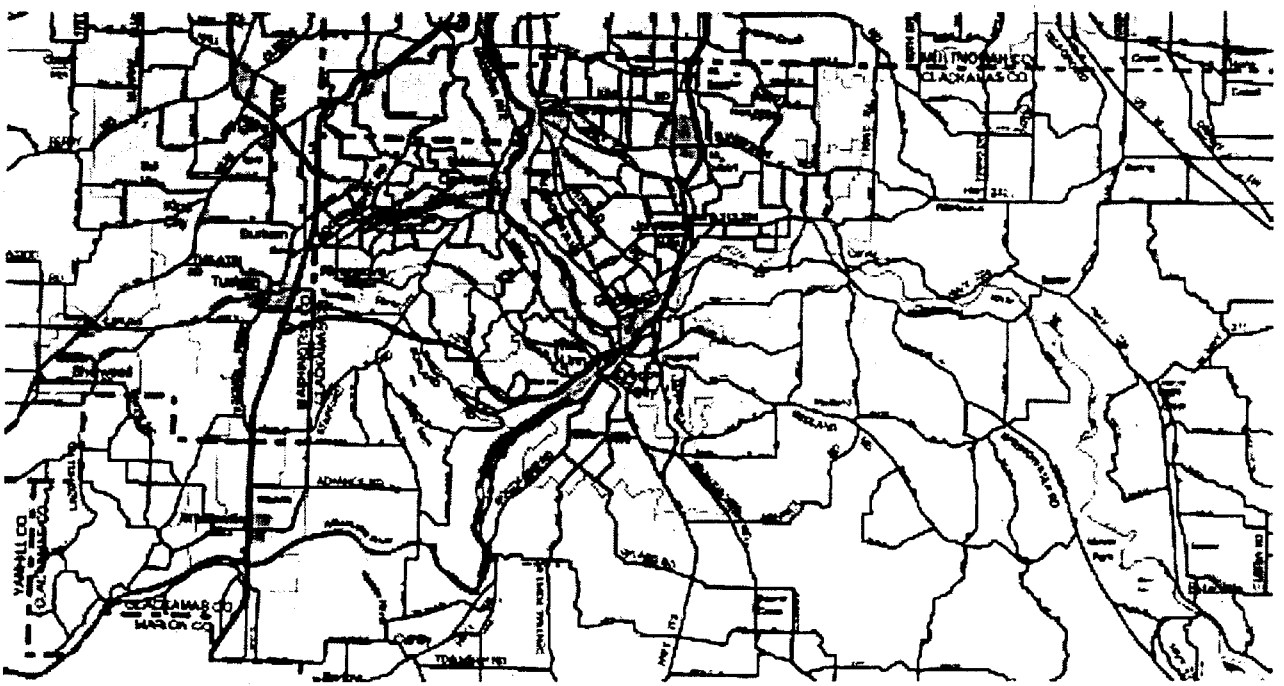
Findings: The proposed Sunrise Corridor offers opportunities to create a "hard edge" to the urban area where the southern alignment skirts the Damascus urban reserves. Congestion is expected to occur on 242nd Avenue, between the proposed Sunrise Corridor and Gresham regional center, during the evening two-hour peak period.

Conclusions: The final environmental impact statement for the Sunrise Corridor should examine opportunities to design the highway as a "hard edge" facility and reconsider the appropriateness of a full interchange at 242nd Avenue, possibly limiting 242nd Avenue access to parallel "old" Highway 212 arterial. Findings and conclusions on performance of the Sunrise Corridor are described on page 3-45. The TCSP planning process should address Scouter's Mountain "island," using the future street plan to define "edges" of this rural reserve. See Chapter 6 for more detail on refinement planning recommended for the Sunrise Corridor and the TCSP planning process.

3.4.5 Subarea 5: Urban Clackamas County

This subarea includes Clackamas County within the urban growth boundary, stretching from the cities along the Willamette River east to Happy Valley, and the northern county boundary to the southern urban growth boundary, east of the Willamette River. The subarea includes Milwaukie, Clackamas and Oregon City regional centers, and Lake Oswego, West Linn, Johnson City, Gladstone and Happy Valley town centers. The Clackamas industrial area and the Beavercreek urban reserve are also located in this subarea. Figure 3.10 shows a map of the urban Clackamas County subarea.

Figure 3.10
Urban Clackamas County Subarea



Source: Metro

Regional Corridors in the urban Clackamas County Subarea

Interstate 205 South (Oregon City to I-5)

Improvements defined in the 2020 Preferred System for the I-205 south corridor are focused on:

- maintaining regional mobility for regional trips during peak travel periods
- maintaining off-peak freight mobility
- maintaining an acceptable level of access to Oregon City regional center

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: This corridor is expected to experience congestion during evening two-hour peak period despite widening to six through-lanes from West Linn to I-5. Cut line results show that trips that travel through this corridor are dispersed to destinations throughout the region. Rapid bus service between Oregon City and Tigard is expected to experience low ridership levels despite good quality, frequent service. Topographic constraints and the urban growth boundary limit parallel route improvements.

Conclusions: Improvements are needed in this corridor to address existing deficiencies and expected growth in travel demand. Low transit ridership in this heavily traveled corridor points to the difficulty of serving the corridor with fixed transit due to the dispersed nature of trips in this corridor. A detailed corridor study should evaluate the potential of express, peak period pricing or HOV lanes as a strategy for expanding capacity. See Chapter 6 for more detail on the corridor study recommended for I-205.

Interstate 205 Middle (Oregon City to I-84)

Improvements defined in the 2020 Preferred System for the I-205 south corridor are focused on:

- maintaining regional mobility for regional trips during peak travel periods through ramp, overcrossing and parallel route improvements
- preserving freight mobility from I-5 to Clark County, with an emphasis on connections to Highway 213, Highway 224 and the Sunrise Corridor
- maintaining an acceptable level of access to the Clackamas and Gateway regional centers

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Additional express lanes in each direction would perform well, preserving freight movement in the corridor. Cut line results show that trips that travel through this corridor are dispersed to destinations throughout the region. Rapid bus service is not expected to perform well; ridership is similar to the I-205 south segment.

Conclusions: Improvements are needed in this corridor to address existing deficiencies and expected growth in travel demand. Low transit ridership in this heavily traveled corridor points to the difficulty of serving the corridor with fixed transit due to the dispersed nature of trips in this corridor. A detailed corridor study should evaluate the potential of express, peak period pricing or HOV lanes as a strategy for expanding capacity. See Chapter 6 for more detail on the corridor study recommended for I-205.

Highway 224 (Milwaukie to Clackamas regional center)

Improvements defined in the 2020 Preferred System for the Highway 224 corridor are focused on:

- preserving access between Milwaukie and the Clackamas regional center
- maintaining regional mobility along the corridor, including providing a transit alternative to Highway 224

- providing a better connection between Highway 99E and Highway 224 at Milwaukie
- providing improved transit access to Milwaukie and Clackamas regional centers

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Highway 224 is expected to experience congestion during the evening two-hour peak period from Highway 99E in Milwaukie to I-205 despite widening to six through-lanes, aggressive access management, including grade separated intersections, and expanded transit service that includes light rail transit to Clackamas regional center. Congestion is also expected on 17th Avenue and Tacoma Street, reflecting spillover traffic from Highway 99E/224.

Conclusions: A more detailed evaluation of the timing and scope of proposed improvements, including light rail to Clackamas regional center, is needed to address heavy travel demand in this corridor. Metro is currently leading the South Corridor Transportation Alternatives Study to consider transportation alternatives in this corridor to define an interim solution for addressing travel demand in this corridor. The study was established to address the above factors as well as in response to the defeat of the November 1998 ballot measure that would have reaffirmed local funding for the South/North light rail project. The study is organized into segment-specific corridor teams based on specific study segments, allowing for solutions that are tailored to the needs of each segment. The transportation strategies for each segment will be integrated into a single transportation strategy for the entire corridor, including 99E from the Portland central city to Highway 224 in Milwaukie. Local transportation system plans should monitor local collector routes and mitigate spillover effect from congestion on Highway 99E and Highway 224. See Chapter 6 for more detail on the corridor study recommended for Highway 99E/224.

Highway 99E (Milwaukie to Oregon City)

Improvements defined in the 2020 Preferred System for the Highway 99E corridor are focused on:

- maintaining an acceptable level of access to the Oregon City regional center
- reducing through-traffic to allow 99E to better serve local needs

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Light rail service in this corridor is expected to generate ridership comparable to end of line on westside and airport light rail, and to rapid bus ridership on Highway 43.

Conclusions: Light rail transit is an appropriate strategy for this corridor as long as Oregon City remains a regional center in the future. Further consideration of McLoughlin Boulevard and I-205 access routes to Oregon City is warranted. Local transportation system plans should monitor local collector routes and mitigate spillover effect from congestion on Highway 99E and Highway 224.

Highway 213 (Oregon City to the urban growth boundary)

Improvements defined in the 2020 Preferred System for the Highway 213 corridor are focused on:

- improving the highway link between I-205 and the Willamette Valley in phases
- addressing development of the Oregon City regional center and expected freight mobility demands
- addressing access needs of Beavercreek urban reserves

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The I-205/Highway 213 interchange and Highway 213 south of Oregon City are expected to experience congestion during the evening two-hour peak period despite capacity and intersection improvements from I-205 to Washington Street and Beavercreek Road to Leland Road. Expanded transit service is not proposed for this corridor. New facilities parallel to Highway 213 would also be difficult to construct due to topographic and environmental constraints.

Conclusions: Revisit suitability of Beavercreek urban reserves in light of constraints that limit serving this area by improvements to existing routes. This review should be done in conjunction with comprehensive plan amendments proposed for the landfill site at Highway 213 and Abernethy Road. A more detailed evaluation of Highway 213 congestion should be included in I-205 corridor study. Implement the strategies identified in the Highway 213 corridor study following refinement based on urban reserve and landfill redevelopment decisions. See Chapter 6 for more detail on refinement planning recommended for this corridor.

Highway 43 (Lake Oswego to Oregon City)

Improvements defined in the 2020 Preferred System for the Highway 43 corridor are focused on:

- maintaining an acceptable level of accessibility to the central city, Lake Oswego and West Linn town centers and Oregon City regional center from adjacent neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Highway 43 corridor is expected to experience congestion during the evening two-hour peak period. No additional road capacity is proposed for this corridor due to topographic, environmental and neighborhood constraints. Frequent bus service is expected to generate good ridership. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Heavy travel demand exists in this corridor, however, physical and environmental constraints preclude major roadway expansion. Therefore, expanded transit service should be implemented in conjunction with improved roadway system management. A long-term traffic management plan should also be developed for this corridor. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this area through 2020. See Chapter 6 for more detail on refinement planning recommended for this corridor.

Major Centers in the urban Clackamas County Subarea

Clackamas regional center

Improvements defined in the 2020 Preferred System for the Clackamas regional center are focused on:

- preserving access to and from the regional center by all modes of travel
- improving multi-modal design of major streets that define the regional center, including Sunnyside Road, 82nd Avenue and Fuller Road
- emphasizing more street connectivity, better bicycle and pedestrian connections and improved pedestrian access to transit
- expanding transit service and traffic management strategies to better accommodate expected growth in the regional center

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Sunnyside Road and 82nd Avenue within the regional center are expected to experience congestion which could significantly impact development of the regional center by limiting access from the surrounding trade area. Expanded transit service along Sunnyside Road is expected to generate good ridership. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: New street connections and capacity improvements to streets parallel to 82nd Avenue and Sunnyside Road help improve local circulation. Evaluate ITS or other system and demand management strategies as part of the Clackamas County transportation system plan. Proposed improvements also provide good east/west transit connectivity and good bicycle and pedestrian access with bike lanes and pedestrian improvements on Sunnyside Road, 82nd Avenue, Fuller Road and other streets within the regional center. Sunnyside Road frequent bus service is a necessary component of the region's strategy for maintaining access to the regional center. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this area through 2020.

Oregon City regional center

Improvements defined in the 2020 Preferred System for the Oregon City regional center are focused on:

- preserving access to and from the regional center by all modes of travel
- improving multi-modal design of major streets that define the regional center, including McLoughlin Boulevard, Washington Street and 7th Street
- emphasizing better bicycle and pedestrian connections and improved pedestrian access to transit.

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: I-205 is expected to experience congestion west of Oregon City despite capacity improvements and rapid bus service during the evening two-hour peak period. In addition, sections of Highway 99E near the I-205 bridges are also expected to be very congested. Proposed rapid bus service connecting to Clackamas regional center will generate marginal ridership. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Proposed improvements do not adequately maintain access to the Oregon City regional center. In particular, local circulation within and access to the Oregon City regional center is limited by a combination of congestion on I-205, Highway 213, McLoughlin Boulevard, Washington Street and South End Street. The Oregon City transportation system plan should address this congestion in conjunction with proposed corridor studies that will focus on I-205 and Highway 213 and developing strategies for meeting future travel demand in this part of the region. Urban reserve areas to the south of Oregon City are also impacting access to the regional center as planned growth in these areas cannot be adequately served by proposed improvements to Highway 213. Land uses within the urban reserve and the Oregon City landfill site should be evaluated together in order to adequately evaluate impacts and site transportation improvements. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this area through 2020.

Lake Oswego town center

Improvements defined in the 2020 Preferred System for the Lake Oswego town center are focused on:

- preserving access to and from the town center by all modes of travel
- improving multi-modal design of major streets that define the town center, including Macadam Avenue, State Street and A Street
- emphasizing better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Congestion on Highway 43 is expected to impact north and south access to the town center during the evening two-hour peak period. The Stafford Basin urban reserve areas south of the town

center are expected to contribute to this congestion, in part due to the lack of connecting streets in this part of the region. The limited network also is expected to be impacted by spillover traffic from I-205 during the two-peak period. Proposed transit service to the town center is north/south oriented. Highway 43 is a barrier between the town center and the Willamette River. Access to the town center from I-5 is constrained by congestion on Kruse Way and Boones Ferry Road during the evening two-hour peak periods. Boulevard retrofits of major streets and bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Upgrade bicycle and pedestrian connectivity in the area surrounding the town center. System management improvements are necessary on Highway 43. Consider system management to manage congestion along Boones Ferry/Kruse Way route to the town center. Conduct a refinement plan to examine rail transit opportunities in the area, including the Macadam/Highway 43 corridor to Portland and existing rail connections to Milwaukie and Tualatin. Consider a transportation management association to address congestion along the Kruse Way/Boones Ferry corridor. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs in this area through 2020. See Chapter 6 for more detail on recommended refinement planning for the Highway 43/Macadam Avenue corridor. In general, the Stafford Basin urban reserves are expected to be more difficult to serve with transportation, particularly absorbing additional traffic from these urban reserves on adjacent transportation facilities, particularly Highway 43. Future urban reserve planning should consider potential transportation solutions to address the impact of this traffic as these areas urbanize.

Milwaukie Town Center

Improvements defined in the 2020 Preferred System for the Milwaukie town center are focused on:

- preserving access to and from the town center by all modes of travel
- improving multi-modal design of major streets that define the town center, including McLoughlin Boulevard, Johnson Creek Boulevard and Lake Road
- emphasizing better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Highway 99E and Highway 224 within the town center are expected to experience congestion during the evening two-hour peak period. Access from the neighborhoods is expected to be good. Proposed transit service is oriented toward light rail transit in the long-term with rapid bus service along Highway 99E and Highway 224 from Portland central city to Clackamas regional center until light rail service can be provided. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: The Milwaukie transportation system plan should address congestion along 17th Avenue and identify improvements needed to link the Sellwood area to the Milwaukie town center to serve more locally oriented trips and discourage access to the Sellwood Bridge, as well as access to the town center via Highway 212/224. Proposed pedestrian and bicycle improvements serve expected pedestrian and

bicycle travel needs in this area through 2020. See Chapter 6 for more detail on recommended corridor planning for the Highway 99E/224 corridor.

Clackamas industrial area

Improvements defined in the 2020 Preferred System for the Clackamas industrial area are focused on:

- improving access from the industrial area to Portland International Airport and other intermodal facilities in the Columbia Corridor

- maintaining freight mobility within the industrial area along the Sunrise Corridor and Highway 224

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

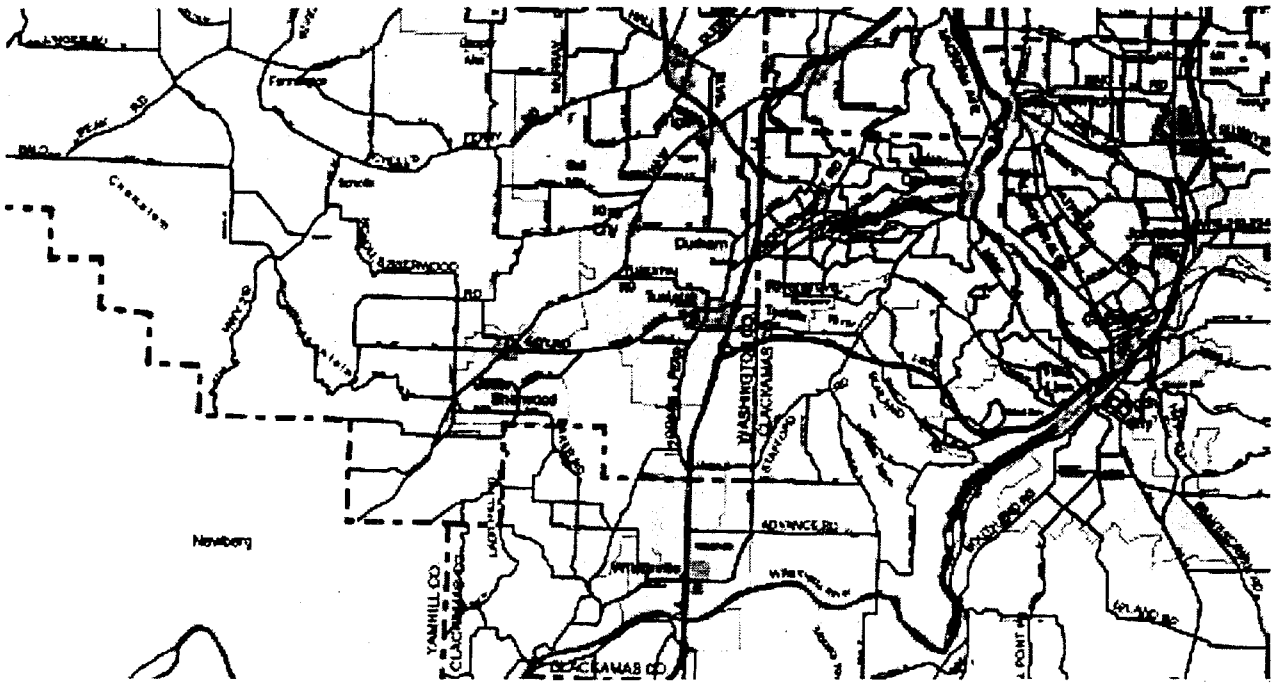
Findings: The Sunrise Corridor is expected to experience congestion during the evening two-hour peak period between 122nd Avenue and the Rock Creek interchange. Jennifer Street and portions of 82nd Drive also are expected to experience congestion during the evening two-hour peak period.

Conclusions: Proposed improvements do not maintain adequate access to the Clackamas industrial area due to congestion on the Sunrise Corridor north of the industrial area and Jennifer Street within the industrial area. Final phasing and alignment of Sunrise Corridor should address the impacts of congestion on the industrial area and consider HOV lanes or peak period pricing to better utilize added capacity for freight movement. Implementation of a transportation management association or other system and demand management strategies should also be considered to better accommodate travel demand the area.

3.4.6 Subarea 6: South Washington County

This subarea stretches from Washington Square south to the city of Wilsonville and from the Willamette River to the southwestern urban growth boundary line. The subarea includes Washington Square regional center and Durham, Tigard, King City, Lake Grove, Murray Hill, Rivergrove, Tualatin, Sherwood and Wilsonville town centers. The Tualatin industrial area and the urban reserves south of Tualatin, south of Sherwood, adjacent to Wilsonville and in the Stafford Basin are also located in this subarea. Figure 3.11 shows a map of the South Washington County subarea.

Figure 3.11
South Washington County Subarea



Source: Metro

Regional Corridors in the South Washington County Subarea

Interstate 5 South (Highway 217 to the Willamette River)

Improvements defined in the 2020 Preferred System for the I-5 south corridor are focused on:

- preserving access to and from I-205 and Highway 217, and to Washington Square regional center
- maintaining off-peak freight mobility
- defining a long-term strategy for managing increased travel demand along I-5 in the Willamette Valley

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The I-5 south corridor is expected to experience congestion during the evening two-hour peak period, particularly from Highway 217 to the Willamette River. This congestion occurs despite expanded transit service in combination with system management strategies and capacity improvements on parallel routes such as Hall Boulevard, 72nd Avenue and Boones Ferry Road. A large percentage of traffic in this corridor is expected to either originate from or be destined to points south of the region. In addition, traffic volumes are expected to be high on parallel routes. Commuter rail ridership is expected to be somewhat lower between Wilsonville and Tualatin town centers as compared to the segment between

Tualatin and Beaverton. Rapid bus service on Hall Boulevard between Tualatin and Tigard is expected to generate good ridership.

Conclusions: Proposed capacity and transit improvements to parallel arterial routes will not adequately address congestion along I-5 south during the evening two-hour peak period. However, without these improvements, traffic congestion on I-5 would be worse. It will be important to conduct a more detailed I-5 south corridor study to better identify future travel demand from outside the region and the effects of this congestion on regional freight mobility. ODOT's Willamette Valley model and the Willamette Valley Livability Forum will help future analysis of this issue. The study should also consider high-capacity transit and demand management solutions. Final commuter rail design should consider a phased approach where ridership levels are low. Support of inter-city transit service to the extent that it benefits the I-5 corridor will also be important. See Chapter 6 for more detail on the recommended corridor planning for I-5 in this part of the region.

Interstate 5 to 99W Connector

Improvements defined in the 2020 Preferred System for the I-5 to 99W corridor are focused on:

- improving regional access to 99W and inter-regional connections to Newberg, McMinnville and Highway 18 to the coast

- balancing improvements with impacts on Tualatin and Sherwood town centers, the Tualatin industrial area and adjacent rural reserves

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: A southern alignment of the I-5 to 99W connector is expected to experience higher traffic volumes than the northern alignment during the evening two-hour peak period. 99W through Sherwood is expected to remained relatively uncongested with the southern alignment of the I-5/99W Connector without major improvements to 99W. Northern alignment caused significant congestion on 99W in Sherwood despite major improvements to 99W. Severe access management, frontage road and intersection improvements in Sherwood are not expected to fully address congestion on 99W when implemented in conjunction with the northern alignment. These improvements are not expected to be needed with the proposed southern alignment. I-5 between I-205 and north Wilsonville is expected to be significantly less congested with the northern alignment as compared to the southern alignment.

Conclusions: This new connection is included in the 2040 Growth Concept and was modeled to connect to 99W north of Sherwood in Round 1 and south of Sherwood in Round 2, both of which should be considered further because the need for this connection has been established in this plan. With each alignment, the connector carried significant traffic volumes and successfully diverted traffic from Tualatin-Sherwood Road that would otherwise impact the future development of the Tualatin and Sherwood town centers. Although the connector provides a good regional route in and out of the region via 99W, it is not expected to reduce congestion on sections of 99W north of the connector in King City and Tigard town centers.

An expanded major investment study is needed to further explore I-5 to 99W connector options. This study should further evaluate the potential of express, HOV or peak period pricing as a strategy for

expanding capacity. In addition, land use and environmental impacts of a southern or northern alignment need to be addressed as part of the final design of this facility. In particular, examine the impacts on urban and rural reserves adjacent to the southern alignment and existing neighborhoods adjacent to northern alignment. For example, a southern alignment that connects to 99W just south of Sherwood would not only negate difficult and costly access control measures along 99W in Sherwood, this alignment might prove to be more attractive for through-trips, given the higher traffic volumes experienced in the southern alignment. A southern alignment would also suggest the need for auxiliary lanes on I-5 from the connector interchange to I-205. The study should also examine the potential of this highway serving as a "hard edge" in the ultimate urban form of the Sherwood area. Final project phasing should reflect conditions along Tualatin-Sherwood Road and the impacts of congestion on Sherwood and Tualatin town centers and the Tualatin industrial area. See Chapter 6 for more detail on the corridor study proposed for the I-5 to 99W connector.

Highway 217 (I-5 to Washington Square regional center)

Improvements defined in the 2020 Preferred System for the Highway 217 corridor are focused on:

- maintaining regional mobility for regional trips during peak travel periods
- improving parallel routes to accommodate local trips
- maintaining off-peak freight mobility
- maintaining an acceptable level of access to I-5, the sunset corridor industrial area and the Washington Square regional center

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Proposed improvements are expected to accommodate a substantial increase in traffic during the evening two-hour peak period, although a few congested access points are predicted to remain. Highway 217/Kruse Way is expected to operate with an acceptable level of service with proposed improvements identified in the phased Highway 217/Kruse Way project, except for localized congestion on Kruse Way east of I-5. Rapid bus service on Hall Boulevard and commuter rail between Tualatin and Beaverton are expected to generate acceptable ridership.

Conclusions: Proposed capacity and transit improvements to parallel arterial routes address congestion along Highway 217 during the two-hour peak period. Final design, modal mix and phasing of projects should reflect final recommendations from the Highway 217 corridor study, although the need for some level of improvement has been established in this plan. The corridor study should specifically address the competing needs of serving localized trips to Washington Square and Beaverton regional centers and longer trips on Highway 217 from I-5 to the Sunset Corridor. An emphasis on demand management strategies to address Kruse Way congestion is also needed. The corridor study should also investigate the potential for express, HOV or peak period pricing. See Chapter 6 for more detail on this corridor study.

Interstate 205 South (Oregon City to I-5)

See page 3-52 for key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Other Major Corridors in the South Washington County Subarea

Highway 99W (I-5 to Sherwood)

This corridor is designated as an area of special concern in Chapter 1 of this plan, therefore, improvements defined in the 2020 Preferred System for the Highway 99W corridor and vicinity are focused on:

- achieving targets set for walking, biking, use of transit and shared ride
- improving street connectivity and supporting mixed-use development
- implementing parking ratios

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: 99W is expected to experience congestion in Tigard during the two-hour peak period. Existing development patterns and economic constraints limit the ability to expand capacity in this area. Rapid bus service on 99W is expected to generate high ridership. Streets connecting to 99W south of Tigard also are expected to experience congestion during the evening two-hour peak period. Expansion of transit service and implementation of traffic management strategies are proposed to better accommodate expected traffic growth on regional streets connecting to these neighborhoods. Other improvements are proposed to improve pedestrian access to transit along major transit corridors.

Conclusions: More emphasis on demand management, access management, local street connectivity and congestion management is needed to address congestion in the corridor. Proposed rapid bus improvements will require substantial, yet presently undefined street improvements along corridor. A corridor refinement plan is recommended to establish an area of special concern action plan that shall consider land use strategies and transportation solutions for managing the effects of continued traffic growth in this part of the region. See Chapter 6 for more detail on recommended refinement planning for this corridor.

Hall Boulevard (Washington Square regional center to Tualatin town center)

Improvements defined in the 2020 Preferred System for the Hall Boulevard corridor are focused on:

- maintaining an acceptable level of accessibility to the Washington Square regional center from Tigard and Tualatin town centers and adjacent neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the I-5 south corridor

- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Hall Boulevard is expected to experience congestion at Beaverton and Washington Square regional centers during the evening two-hour peak period. A proposed extension of Hall Boulevard across the Tualatin River is expected to experience high traffic volumes and congestion during the evening two-hour peak period, and is expected to draw traffic from Boones Ferry Road. Rapid bus service on Hall Boulevard is expected to generate acceptable ridership.

Conclusions: A north/south major arterial route parallel to I-5 is lacking south of Highway 217. Further evaluation of the Hall Boulevard extension is warranted as part of local transportation system plans due to the lack of arterial routes parallel to I-5 to serve this part of the region. Environmental constraints may limit the ability to extend Hall Boulevard over the Tualatin River. Consider upgrading Hall Boulevard to Durham Road to Upper Boones Ferry Road to major arterial as part of the Tigard TSP. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Scholls Ferry Road (Hall Boulevard to Beef Bend Road)

Improvements defined in the 2020 Preferred System for the Scholls Ferry Road corridor are focused on:

- maintaining an acceptable level of accessibility to the Washington Square regional center and Murray town center from adjacent neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Scholls Ferry Road is expected to experience localized congestion with five lanes southwest of Washington Square regional center during the evening two-hour peak period. Widening Scholls Ferry Road to seven lanes from Highway 217 to 125th Avenue is expected to reduce congestion in this corridor during the evening two-hour peak period. Primary bus service on Scholls Ferry Road is expected to generate adequate ridership.

Conclusions: Capacity improvements to Scholls Ferry Road address travel demand in the corridor to the year 2020. Any major capacity improvements in this corridor would need to consider the impact to rural reserves. More emphasis on system management and alternative modes is needed in this corridor. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Murray Boulevard (Scholls Ferry Road to Tualatin Valley Highway)

Improvements defined in the 2020 Preferred System for the Murray Boulevard corridor are focused on:

- maintaining an acceptable level of accessibility to the Beaverton regional center from the Farmington town center and adjacent neighborhoods
- improving access to Tigard town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Murray Boulevard is expected to experience some congestion just south of Farmington Road and near the US 26 interchange. Primary bus ridership volumes are expected to increase closer to connections with light rail transit. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Capacity improvements to Murray Boulevard address travel demand in the corridor. Localized congestion should be addressed as part of the Washington County transportation system plan, including an evaluation of system and traffic management strategies along corridor to mitigate congestion. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Major Centers in the South Washington County and Urban Clackamas County Subareas

Washington Square regional center

Improvements defined in the 2020 Preferred System for the Washington Square regional center are focused on:

- preserving access to and from the regional center by all modes of travel, consistent with recommendations contained in the Washington Square regional center plan
- providing alternatives to Highway 217 for local travel between the regional center and Beaverton
- improving multi-modal design of major streets that define the regional center, including Hall Boulevard, Greenburg Road and Scholls Ferry Road
- emphasizing more street connectivity, better bicycle and pedestrian connections, especially across Highway 217, and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Washington Square is expected to be accessible during the evening two-hour peak period; although, some congestion is expected at limited access points along Hall Boulevard and Scholls Ferry Road. Widening Scholls Ferry Road to seven lanes from Highway 217 to 125th Avenue is expected to reduce congestion in this corridor during the evening two-hour peak period. Primary bus service on Scholls Ferry Road is expected to generate good ridership.

Conclusions: Complete Highway 217 corridor study. The corridor study should specifically address serving localized trips to Washington Square and Beaverton regional centers and longer trips on Highway 217 from I-5 to the sunset industrial area. Express lanes, HOV or peak period pricing should be considered to serve these longer trips. Proposed improvements provide good north/south and east/west transit connectivity and good regional bicycle and pedestrian access with bike lanes and pedestrian improvements on Scholls Ferry, Greenburg Road, Oleson Road and Hall Boulevard. Any major capacity improvements along Scholls Ferry Road would need to consider impact to rural reserves.

Tualatin town center and adjacent industrial area

Improvements defined in the 2020 Preferred System for the Tualatin center and adjacent industrial area are focused on:

- preserving access to and from the town center by all modes of travel
- maintaining an acceptable level of access to the industrial area from I-5
- improving multi-modal design of major streets that define the town center, including Hall Boulevard, Boones Ferry Road and Tualatin Road
- emphasizing more street connectivity, better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Localized congestion is expected to occur in the vicinity of the I-5/Nyberg Road interchange despite construction of the I-5/99W Connector. Hall Boulevard and Boones Ferry Road are expected to experience significant congestion entering the town center. The Hall Boulevard crossing of the Tualatin River is expected to experience congestion during the evening two-hour peak period. Rapid bus service on Hall Boulevard is expected to generate good ridership. Ridership volumes on commuter rail between Tualatin and Beaverton is also expected to generate good ridership. Both I-5/99W connector alignments are expected to reduce traffic volumes along Tualatin-Sherwood Road.

Conclusions: New street connections and capacity improvements to streets parallel to 99W help improve local circulation. Evaluate ITS or other system management strategies to further address travel demands along Hall Boulevard and Boones Ferry Road as part of the Tualatin transportation system plan. Proposed improvements maintain adequate access to the industrial and employment area in Tualatin. Project phasing of I-5 to 99W connector should reflect conditions along Tualatin-Sherwood Road and the impacts of congestion on Sherwood and Tualatin town centers and the Tualatin industrial area. Proposed improvements also provide good north/south transit connectivity and good bicycle and pedestrian

access with bike lanes and pedestrian improvements on Boones Ferry Road, Tualatin Road and Hall Boulevard.

Tigard town center

Improvements defined in the 2020 Preferred System for the Tigard town center are focused on:

- preserving access to and from the town center by all modes of travel
- emphasizing improvements to streets parallel to 99W and I-5
- improving multi-modal design of major streets that define the town center, including Hall Boulevard, 72nd Avenue and Walnut Street
- emphasizing more street connectivity, better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: 99W is expected to experience significant congestion within the town center during the evening two-hour peak period and at mid-day despite a new I-5 to 99W connector to the south, capacity improvements to facilities parallel to 99W and new street connections in the town center, including extensions of Hunziker Road and Dartmouth Street. Walnut and Gaarde streets experience significant congestion and traffic volumes during the evening two-hour peak period. Rapid bus service on 99W is expected to generate good ridership.

Conclusions: Further emphasis on demand management, access management, local street connectivity and congestion management is needed to address congestion in the corridor in the Tigard Transportation System Plan. Proposed rapid bus improvements along 99W corridor will require substantial, yet presently undefined street improvements within the town center. Proposed improvements provide good north/south transit connectivity and good regional bicycle and pedestrian access with bike lanes and pedestrian improvements on Walnut Street, 72nd Avenue, Scholls Ferry Road and Hall Boulevard. See Chapter6 for more detail on refinement planning recommended for 99W in the town center.

Wilsonville town center

Improvements defined in the 2020 Preferred System for the Wilsonville town center are focused on:

- preserving access to and from the town center by all modes of travel
- improving local access across I-5 with new multi-modal crossings
- improving multi-modal design of major streets that define the town center, including Wilsonville Road and Town Center Loop

- emphasizing more street connectivity, better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: The Barber Street connection at Town Center Loop is expected to experience congestion during the evening two-hour peak period. The proposed extension of Kinnamon Road is expected to perform as desired, carrying significant traffic volumes parallel to I-5. The Wilsonville Road interchange is expected to experience congestion during the evening two-hour peak period. Grahams Ferry Road, outside of the urban growth boundary, is expected to experience significant congestion during the evening two-hour peak period, in part due to expected growth in the urban reserves west of Wilsonville and rural residential development in Washington County. Peak-hour express bus service to downtown Portland is expected to experience moderate ridership volumes. Ridership on the proposed commuter rail line is expected to relatively low between Wilsonville town center and Tualatin as compared to the segment between Tualatin and Beaverton.

Conclusions: New street connections and minor capacity improvements improve local circulation and access across I-5. Final commuter rail design should consider phasing where initial ridership levels are low. Support inter-city transit service to the extent that it benefits the I-5 corridor. Proposed improvements provide good north/south transit connectivity and good regional bicycle and pedestrian access with bike lanes and pedestrian improvements on Town Center Loop and Parkway Center Drive. The Wilsonville transportation system plan should consider a TDM/TMA program. An evaluation of the congestion on Grahams Ferry Road and potential system management strategies or other improvements is warranted to address the impact of growing travel demand on adjacent rural reserves as part of the Washington County transportation system plan. Expanded transit service connections to Salem and other Willamette Valley towns should be further evaluated as a potential strategy for reducing traffic volumes entering and existing the region via I-5 during the evening two-hour peak period. An examination of expanded transit service should also involve consideration of an additional park-and-ride lot and commuter rail station for Willamette Valley inter-city service to connect to other parts of the Portland metropolitan region. See Chapter 6 for more detail on corridor planning recommended for I-5 in this part of the region.

Sherwood town center

Improvements defined in the 2020 Preferred System for the Sherwood town center are focused on:

- preserving access to and from the town center by all modes of travel
- improving multi-modal design of major streets that define the regional center, including 99W, Oregon Street and Sherwood Boulevard
- emphasizing more street connectivity, better bicycle and pedestrian connections and improved pedestrian access to transit

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

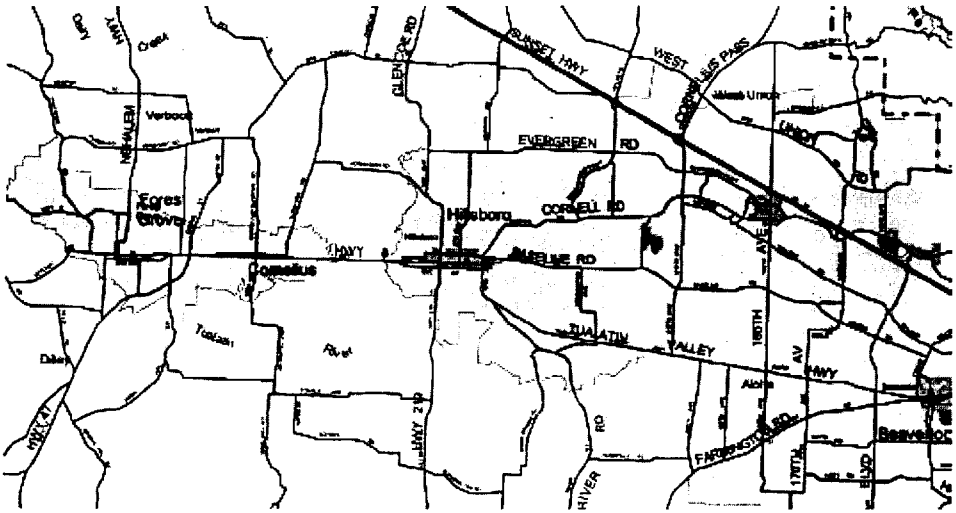
Findings: Both proposed I-5/99W connector alignments are expected to reduce traffic volumes along Tualatin-Sherwood Road during the evening two-hour peak period. Pacific Street, entering the town center, is expected to experience congestion during the evening two-hour peak period. 99W through Sherwood is expected to perform better with the southern alignment of the I-5 to 99W connector. Severe access management, frontage road and intersection improvements modeled in Sherwood is not expected to fully address congestion on 99W when implemented in conjunction with the northern alignment. These improvements are not expected to be necessary with a southern alignment of the I-5/99W connector. Proposed improvements are expected to provide good regional bicycle and pedestrian access with bike lanes and pedestrian improvements on Edy Road, Oregon Street and 99W.

Conclusions: Project phasing of I-5 to 99W connector should reflect the impacts of congestion on the Sherwood town center. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

3.4.7 Subarea 7: North Washington County

This subarea stretches from Washington Square north to Forest Park and from West Portland and Forest Park to the urban growth boundary, west of Forest Grove. This subarea includes Beaverton and Hillsboro regional centers; and Forest Grove, Cornelius, Sunset, Cedar Mill, Bethany, Tanasbourne and Farmington town centers. The Sunset industrial area, west-side light-rail station communities, Sunset Highway, Tualatin Valley Highway, Highway 217 and several urban reserve areas north of US 26 and south of Tualatin Valley Highway are also located in this subarea. Figure 3.12 shows a map of the South Washington County subarea.

Figure 3.12
North Washington County Subarea



Source: Metro

Regional Corridors in the North Washington County Subarea

US 26 – Sunset Highway (Sylvan interchange to the urban growth boundary)

Improvements defined in the 2020 Preferred System for the US 26 corridor are focused on:

- maintaining an acceptable level of accessibility to the Portland central city and the Sunset industrial area
- maintaining off-peak freight mobility

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Proposed capacity and transit improvements are expected to maintain adequate traffic flows during the evening two-hour peak period. New crossings over US 26 are expected to experience traffic volumes in the range of 10,000 to 20,000 vehicles per day. Westside light rail transit ridership is expected to be high, reflecting more frequent service during the evening two-hour peak period. Parallel streets such as Cornell, Barnes and Walker roads, are generally not expected to experience congestion during peak periods.

Conclusions: The transit and capacity improvements proposed for this corridor, including parallel routes, are adequate to meet travel needs through 2020. More detailed evaluation of future multi-modal

crossings of US 26 should be considered as part of local transportation system plans to address congestion at individual interchanges or to meet specific multi-modal access needs. See Chapter 6 for more detail on refinement planning recommended for the US 26 corridor.

Highway 217 (Washington Square to US 26)

See page 3-62 for key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Tualatin Valley Highway (Beaverton to Forest Grove)

Improvements defined in the 2020 Preferred System for the Tualatin Valley Highway corridor are focused on:

- maintaining an acceptable level of accessibility to the Hillsboro and Beaverton regional centers and Hillsboro industrial areas
- managing access and improving parallel routes to accommodate local trips
- improving segment from Murray Boulevard to Brookwood Avenue to maintain primary connection between Beaverton and Hillsboro regional centers

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Aggressive access management along the corridor and an expanded system of parallel routes are expected to limit congestion in this corridor, although the approach segments west of Brookwood Avenue and east of Murray Boulevard are expected to experience congestion during the evening two-hour peak period. Capacity improvements to parallel streets and new street connections are expected to reduce some of the local traffic demand on this route. Frequent bus service between Forest Grove and Hillsdale transit centers via Tualatin Valley Highway and Beaverton-Hillsdale Highway is expected to generate good ridership.

Conclusions: The 2020 Preferred System identifies the need for additional people moving capacity along the Tualatin Valley Highway corridor. The proposed system of parallel routes significantly reduces some of the local travel demand on this route. A corridor refinement study is recommended to define a phased strategy to implement a largely limited-access facility in this corridor, including traffic management strategies in Beaverton, Aloha and Hillsboro to address congestion. The strategy should also balance the need for additional motor vehicle capacity with the function of this route as a major transit route, including the need to improve pedestrian access to transit along the entire corridor. Develop and adopt an access management plan that supports proposed improvements in the corridor as part of Beaverton, Hillsboro and Washington County TSPs. See Chapter 6 for detail on the corridor study recommended for Tualatin Valley Highway.

Other Major Corridors in the North Washington County Subarea

Hall Boulevard/Watson Avenue (Beaverton to Washington Square)

Improvements defined in the 2020 Preferred System for the Hall Boulevard corridor are focused on:

- maintaining an acceptable level of accessibility to the Beaverton regional center from adjacent neighborhoods
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: The Hall/Watson couplet south of Beaverton regional center is expected to experience congestion during the evening two-hour peak period. Rapid bus service between Tualatin, Tigard, Beaverton and Sunset transit center is expected to perform well, particularly between Tigard and Beaverton. Proposed bicycle and pedestrian improvements are expected to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Further evaluation of congestion on Hall Boulevard is recommended as part of the Beaverton transportation system plan, including additional system management and access management strategies to address points of congestion prior to recommending the addition of capacity to address increase in travel demand in this corridor. The strategy should also balance the potential need for additional motor vehicle capacity with the function of this route as a major transit route, including the need to improve pedestrian access to transit along the entire corridor. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Cornell Road (Cedar Mill town center to Hillsboro regional center)

Improvements defined in the 2020 Preferred System for the Cornell Road corridor are focused on:

- maintaining an acceptable level of accessibility to the Beaverton and Hillsboro regional centers from adjacent neighborhoods
- maintaining adequate access to the Sunset industrial area from US 26
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Cornell Road is expected to perform well as the primary access route from US 26 to the Sunset industrial area and Hillsboro regional center, with isolated congestion expected in the Tanasbourne and Cedar Mill town centers and entering the Hillsboro regional center. Proposed bicycle and pedestrian improvements are expected to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Cornell Road appears to benefit from improved connectivity through this portion of North Washington County. An additional limited access route from the Sunset industrial area to Hillsboro is not warranted during the 20-year plan period. However, improvements to Cornell Road are appropriate because this route serves as an important access route to jobs in the Hillsboro area. The extent of capacity improvements through the Cedar Mill town center should be determined through the town center planning process. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Farmington Road (Beaverton regional center to Cornelius Pass Road)

Improvements defined in the 2020 Preferred System for the Farmington Road corridor are focused on:

- maintaining an acceptable level of accessibility to the Beaverton regional center from adjacent neighborhoods and the Farmington town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Farmington Road is expected to experience some congestion during the evening two-hour peak period from Murray Boulevard to the Farmington town center. Proposed bicycle and pedestrian improvements are expected to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Pursue system and traffic management strategies along corridor to mitigate congestion as part of the Washington County TSP. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Murray Boulevard (Scholls Ferry Road to Tualatin Valley Highway)

See page 61 for key findings and conclusions, reflecting analysis of improvements defined for this corridor.

Beaverton-Hillsdale Highway (Raleigh Hills to Beaverton)

Improvements defined in the 2020 Preferred System for the Beaverton-Hillsdale Highway corridor are focused on:

- maintaining an acceptable level of accessibility to the Beaverton regional center from adjacent neighborhoods and Raleigh Hills town center
- expanding transit service and traffic management strategies to better accommodate expected traffic growth in the corridor
- improving pedestrian access to transit along the corridor

The following are key findings and conclusions, reflecting analysis of the performance of the improvements defined for this corridor.

Findings: Beaverton-Hillsdale Highway is expected to approach current capacity during the evening two-hour peak period. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: Limited congestion along corridor does not impact access to the Beaverton regional center due to the availability of alternate uncongested routes such as Canyon Road and Hall Boulevard. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Major Centers in the North Washington County Subarea

Beaverton regional center

The Beaverton regional center is designated as an area of special concern in Chapter 1 of this plan, therefore, improvements defined in the 2020 Preferred System for the regional center are focused on:

- achieving targets set for walking, biking, use of transit and shared ride
- improving street connectivity and supporting mixed-use development
- implementing parking ratios

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Tualatin Valley Highway, Beaverton-Hillsdale Highway and Hall Boulevard entering the regional center are expected to experience congestion during the evening two-hour peak period while downtown streets perform well as a result of proposed street connectivity improvements. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, providing better bicycle and pedestrian connections to the regional center from adjacent neighborhoods. Expansion of transit service and implementation of traffic management

strategies are proposed to better accommodate expected traffic growth on regional streets connecting to these neighborhoods. Other improvements are proposed to improve pedestrian access to transit along major transit corridors.

Conclusions: Downtown connectivity improvements are expected to relieve internal congestion, particularly on the north side of the regional center, and provide more bicycle and pedestrian connectivity. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020. Based on substitute performance measures identified in Appendix 3.2, the transportation system in this part of the region is adequate to serve planned land uses. See Appendix 3.2 for more detail on the substitute performance measures used to make this evaluation.

Hillsboro regional center

Improvements defined in the 2020 Preferred System for the Hillsboro regional center are focused on:

- preserving access to, from and within the regional center by all modes of travel
- maintaining Cornell Road and Shute Road as access routes to US 26
- maintaining Tualatin Valley Highway as primary connection between the regional center and Beaverton
- providing better bicycle and pedestrian connections and better access to transit, particularly westside light rail, from neighborhoods

The following are key findings and conclusions, reflecting analysis of the performance of improvements defined for this part of the region.

Findings: Major streets entering the regional center are expected to perform well, with limited congestion along Tualatin Valley Highway and Cornell Road in the eastern part of the regional center. Traffic volumes on Tualatin Valley Highway west of Brookwood Parkway are expected to be comparable to volumes on US 26 from Cornelius Pass Road to Shute Road. Frequent bus service to Hillsboro is expected to generate good ridership. Bicycle and pedestrian improvements are proposed to address difficult street crossings and existing sidewalk/bikeway deficiencies, and improve pedestrian access to transit.

Conclusions: The 2020 Preferred System identifies the need for additional people moving capacity along the Tualatin Valley Highway corridor. A detailed refinement study for the Tualatin Valley Highway corridor should evaluate where limited access should end to better deal with congestion at Brookwood Avenue. Transportation system management along Cornell Road entering the regional center seems appropriate. Proposed pedestrian and bicycle improvements serve expected pedestrian and bicycle travel needs along this corridor through 2020.

Sunset industrial area

Improvements defined in the 2020 Preferred System for the Sunset industrial area are focused on:

- maintaining an acceptable level of access to and from the industrial area via Highway 217 and US 26

Findings: Limited portions of Cornell Road, Cornelius Pass Road and Brookwood Parkway are expected to experience congestion during the evening two-hour peak period.

Conclusions: Proposed improvements accommodate expected growth in traffic in this area. Consider additional traffic management and demand management strategies to address limited congestion in the area. New US 26 overcrossings would help workers access jobs in the industrial area and should be considered as congestion occurs at specific interchanges.

3.5 Environmental Impacts of the 2020 Preferred System

3.5.1 Air Quality Impacts

Adoption of the 1999 Regional Transportation Plan must conform with the State Implementation Plan to maintain federal ozone and carbon monoxide standards. In order to demonstrate this conformity, two key findings are necessary:

(1) That the region intends to make progress on implementing transportation control measures (TCMs) within reasonably expected revenue sources. The TCMs adopted by the Environmental Quality Commission are:
   a. 1.5 percent per year transit service expansion
   b. progress toward implementation of South/North light rail
   c. ___ miles per year of bike and pedestrian facility construction
   d. implementation of parking limits with new development
   e. implementation of the overall land use direction of the 2040 Growth Concept.

(2) That the overall vehicle emissions level projected with implementation of the 1999 Regional Transportation Plan under constrained financial resources is forecasted to be within the budgeted levels for the Portland metropolitan area airshed for the transportation sector (accounting for emissions from industrial and area-wide sources).

Demonstration of conformity will be completed after the Regional Transportation Plan is adopted by resolution in December 1999. Amendments to the Regional Transportation Plan may be triggered if this demonstration cannot be made.

3.5.2 Title 3 and Endangered Species Act Impacts

While transportation projects in the 2020 preferred system would cross areas designated in Title 3 of the Urban Growth Management Functional Plan and watershed areas designated in the Endangered Species Act listing of salmon and steelhead, the transportation impacts on these areas can be identified and mitigated. Metro is working to make sure that regional transportation projects do not block fish passage through the *Green Streets* program. The new *Green Streets* program will propose new regional street connectivity standards tailored to urban reserve areas and provide a handbook that recommends new guidelines for transportation projects to ensure fish-friendly design solutions.

With the 2020 Preferred System, regional transportation projects would be designed so they do not block fish passage. There would be opportunities to fix existing problem culverts when improvements are

made to the regional street system. For example, more than 150 culverts around the region were found to need repair to allow fish to pass under roads. Additional federal and state transportation programs may be required to allocate funds to replace or repair existing culverts with fish access problems.

RTP preferred system transportation projects would likely impact many Title 3 areas and watersheds included in the 1999 National Marine Fisheries Service endangered species listing. However, compliance with NEPA requirements and implementation of the *Green Streets* program guidelines would mitigate transportation impacts. An analysis of where proposed capacity improvements intersected with designated Title 3 and ESA areas found:

- In the RTP preferred system there are 4,489 total lane miles of roadways on the regional system.
- About 687 roadway lane miles (15 percent of the regional system) are new or added capacity.
- Of the new or added capacity, about 47 roadway miles (7 percent of the regional system) cross through Title 3 areas.

This analysis includes regional transportation system streets only. Local streets will also impact Title 3 areas, and they are not included in the above analysis.

Light rail projects included the 2020 Preferred System include nearly 47 miles of new track. There are three miles of new light rail tracks in Title 3 areas, including about slightly more than one mile of the South LRT project and slightly less than one mile of the Oregon City extension. Title 3 and ESA impacts of light rail projects would be mitigated through the NEPA process.

Chapter 4

2020 Revenue Forecast

CHAPTER 4

Financial Analysis

4.0. Introduction

In order to evaluate whether the Preferred System of transportation improvements defined in the previous chapter is a viable strategy to address the growth in travel demand in the region, it is necessary to analyze transportation revenues and the costs of providing that Preferred System. This chapter is organized as follows:

- **Revenue Sources and Forecast:** this section defines existing sources of revenues available for transportation and forecasts the amount of revenue they will produce in during the planning period of the years 2000 through 2020.

- **Projected Costs of the 2020 Preferred System:** this section defines several cost categories for constructing, operating and maintaining the Preferred Transportation System and estimates the costs of these categories through the year 2020.

- **Assignment of Revenues to Costs and Funding Shortfall for the Preferred System:** this section compares the revenues available to the costs of providing and maintaining the Preferred Transportation System and defines the revenue shortfalls for the several categories of transportation costs;

- **Potential New Revenue Sources:** this section describes potential revenue options that could be created to provide new revenues for transportation needs that currently have no identified source of funding.

- **Conclusions:** this section summarizes the issues associated with funding the Preferred Transportation System.

4.1 Revenue Sources and Forecast

4.1.1 Traditional Sources

Federal

Highway Trust Fund. For road-related projects, Congress provides these revenues to the Metro region through the Federal Highway Administration (FHWA) to the Oregon Department of Transportation (ODOT) and then to Metro and the local cities and counties. For transit related projects, Congress provides these revenues to the Metro region through the Federal Transit Administration (FTA) to Tri-Met, South Metropolitan Area Rapid Transit (SMART, providing transit based in the Wilsonville area) and Metro.

Metro allocates to or approves the spending of these revenues by transportation agencies and local jurisdictions for projects in this region. The original source of these monies is primarily the federal gas tax and various truck taxes. Allocation and distribution of federal funds, other than routine maintenance, are accounted for in the Metropolitan Transportation Improvement

Program (MTIP, see also section 6.5). Some of these revenues are limited by FHWA to a particular purpose, such as highway bridge replacement and rehabilitation. Most of the funds, however, are flexible in that they can be spent on roads, bikeways, sidewalks, transit capital, transportation system management (TSM), and transportation demand management (TDM)/air quality programs.

Metro estimates approximately $860 million of federal trust fund money to be allocated directly to the Metro region during the years 2000 through 2020. This includes:

- $475 million of Regional Surface Transportation Program (STP) funds. These funds may be used for virtually any transportation purpose short of building local residential streets.

- $166 million of Congestion Mitigation/Air Quality (CMAQ) funds. The purpose of CMAQ funds are to assist urban areas to achieve or maintain air quality standards for ground-level ozone and carbon monoxide. Typically, CMAQ funds support alternative mode and demand management programs.

- $118 million of bridge funds. The highway bridge replacement funding program was established to repair or replace bridges that have structural deficiencies and physical deterioration.

- $64 million of enhancement funds. Enhancement funds is limited to a list of 10 eligible activities relating to alternative modes to the single occupant vehicle, preservation of right-of-way, historic preservation, and environmental mitigation for transportation projects.

- $37 million of safety funds. The hazard elimination system program funds safety improvement projects that cost less than $500,000.

Additionally, the Oregon Department of Transportation will use federal trust fund money for transportation projects in the Metro region. At this time, ODOT limits the spending of these monies to road preservation and safety projects.

Transit Formula Funds. These funds are primarily for transit capital purchases such as buses and transit maintenance facilities. As the local transit providers, Tri-Met and SMART propose and Metro approves requests to the US Department of Transportation for use of these monies. Approximately $642 million in federal transit formula funds is estimated to be available to the Metro region in the years 2000-2020. These funds will be used to maintain Tri-Met's current fleet and operations. Capital expenses related to expansion of transit service needs to be funded from other sources.

Transit Discretionary Funds. These funds are for major new transit projects and in this region and have primarily been used to provide the federal portion of capital cost construction of the light rail system. Other eligible uses include bus purchases, bus rapid transit and system capital improvements. As the regional transportation planning agency, Metro determines which large transit capital projects will be given priority in the region to receive these funds. Once the priority has been determined, Tri-Met applies to the Federal Transit Administration for transit

discretionary funds to build the project. Based on the region's past success in acquiring these funds, it is estimated the region will continue to secure transit discretionary funds and could receive approximately $217 million of transit discretionary funds for projects exclusive of light rail during the planning period.

Additionally, if the region can provide matching funds and comply with federal planning and environmental requirements, transit discretionary funds could be provided to the region in the following amounts for the following light rail projects that are part of the Preferred System:

- $257.5 million for Interstate Avenue light rail
- $500 million for South light rail (to Clackamas Town Center)
- $150 million for Interstate Avenue light rail extension to Clark County
- $175 million for a light rail extension to Oregon City.

These revenues would only be available to the region if the specific light rail projects are built and are not transferable to other uses.

Federal Forest Receipts. Forest receipts are revenues sent to counties by the federal government based on the amount of forest logging revenues realized on federal forests within a county. Counties have historically used these revenues for transportation projects and maintenance. Clackamas and Multnomah counties are expected to receive $17.8 million in federal forest receipts during the planning period.

State

State revenues for transportation projects are distributed by the Oregon Transportation Commission, in accordance with state statutes, from the State Highway Trust Fund. The fund derives its revenues from the statewide gas tax, vehicle registration fee and truck weight/mile tax. Use of trust fund monies is limited to road and bridge construction, maintenance and preservation.

The 1999 Oregon Legislature passed House Bill 2082 that would raise the gas tax of 24 cents per gallon by 5 cents, raise the vehicle registration fee of $30 per biennium by an additional $10 per biennium, and provide for a local option vehicle registration fee of $20 per biennium. The bill would also institute a diesel tax and additional heavy truck registration fees in lieu of the truck weight/mile tax. Implementation of this bill may be delayed or repealed if referred to a popular election by petition.

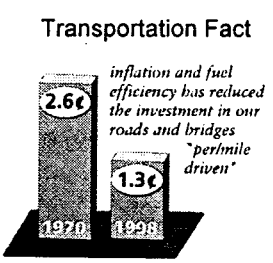
After collection costs, approximately 8 percent of the trust fund is dedicated to highway modernization. This amounts to about $53 million in the year 2000, increasing to $65 million in the year 2000. Of that money, approximately $12.7 million will be spent by ODOT for modernization in the Metro region, increasing to $15.8 million in the year 2020.

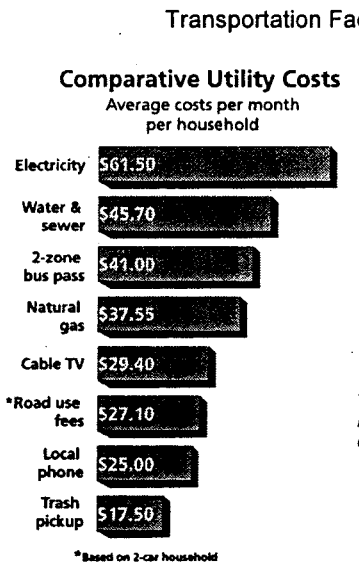
Of the remaining monies, approximately 60 percent of the State highway trust fund revenues are distributed to ODOT. Oregon counties receive approximately 24 percent of the trust fund revenues and Oregon cities approximately 16 percent. Of the state highway trust funds distributed to ODOT, the department generally allocates about 24 percent of that money in the Metro region. This amounts to an estimated $135 million in the year 2000, increasing to $165 million by the year 2020.

As prescribed by state statute, the Oregon Transportation Commission distributes the state highway trust fund money to Oregon cities and counties. Generally, trust fund money is distributed to counties based on its number of registered vehicles. The metropolitan portion of Clackamas, Multnomah and Washington counties currently accounts for approximately 37 percent of all state trust fund revenues distributed to Oregon counties. The distribution of state trust fund money to Oregon cities is based on population. Cities in the Metro area currently receive approximately 47 percent of all state trust fund monies distributed.

ODOT has not had the opportunity at this time to fully estimate the effect of the potential change in trust fund revenues that would be created by House Bill 2082. For the purposes of this RTP, Metro has made a preliminary estimate of the amount of revenue that would be generated using an ODOT forecast of the years 2000-2005 and by use of previous ODOT forecasts on expected growth of state gas tax revenues for the years 2006-2020. Approximately $125 million of state highway trust fund revenues would be available for ODOT for use within the Metro region over the course of the planning period, if HB 2082 is implemented. Additionally, HB 2082 revenues would fund the capital projects described below as part of the state bond program and additional revenues would be passed along to local jurisdictions, also described below.

A portion of the new revenue generated by the additional gas tax and vehicle registration fee would be dedicated to a $600 million bond program for construction of new or improved state highway facilities. Approximately $189 million would be used for projects in the Metro region. A process to determine which projects will be funded under the bond program is scheduled to be complete by February 2000. As with the rest of HB 2082, the bond program is subject to repeal through voter referral.





Taxes and fees for use of the road and highway system compare favorably to other household utility costs.

Source: Metro

Local

Many of the cities and counties in the metropolitan region provide other sources of revenue to operation, maintenance and preservation (OMP) and new construction to the regional transportation system. The amount of revenue applied to the system is controlled by each jurisdiction and is spent within their boundaries. Based on historical trends and expected future growth, Metro has forecast how much revenue is expected to support the regionally significant transportation system from the following local revenue sources.

Local Portion of State Highway Trust Fund. As noted, 40 percent of state trust fund revenues are distributed to the cities and counties of Oregon.

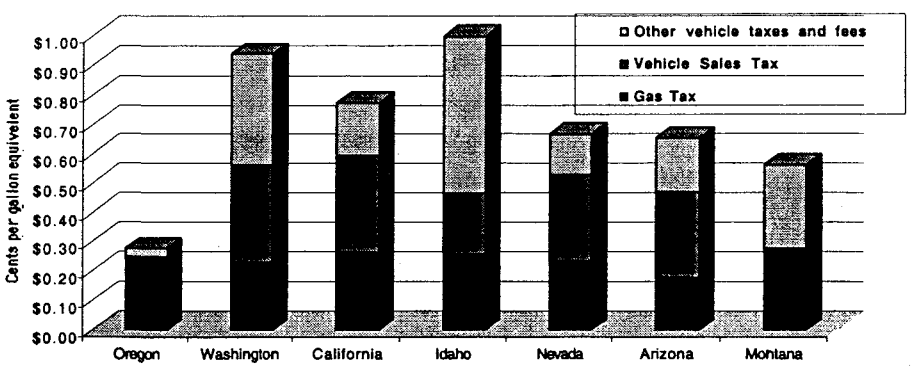
Based on historical trends, $104 million of state trust fund money would be available to the cities and counties of the metropolitan region in the year 2000, increasing to $126 million by the year 2020. That amount could increase to $115 million in the year 2000 and $151 million in the year 2020 with additional tax and vehicle registration fee revenue made available by House Bill 2082.

Local Gas Tax. Multnomah County levies a 3 cents per gallon gas tax and Washington County levies a 1 cent per gallon gas tax. Both counties share these revenues with the cities within their boundaries. These revenues may be used for road maintenance and for road expansion. Approximately $9.3 million of local gas tax revenue is expected in the year 2000, increasing to $11.3 million in the year 2020.

Comparison of Auto Taxes of Western States

Transportation Fact

Oregon's taxes on automobiles are among the lowest in the nation.



Source: Metro

Payroll Tax. Tri-Met levies a payroll tax of .6176 percent in its district, estimated to generate $147 million in the year 2000 and $509 million by the year 2020. SMART is funded through a .3 percent payroll tax in the Wilsonville area, estimated to generate $1.7 million in the year 2000 and $3.9 million by the year 2020. This revenue is used to support operations and maintenance of the transit systems. Growth of the regions employment is expected to support approximately a 1.5 percent annual increase in service hours of the transit system.

Tri-Met Passenger Fares and Other Revenues. Tri-Met passenger fare revenues also support operation of the transit system and, if the Preferred Transit system is implemented, expected to generate approximately $54 million in the year 2000 and $167.5 million by the year 2020. SMART is a fareless transit system.

4.1.2 Development-Based Sources

Development-based sources of transportation funding are fees collected by local jurisdictions based on the development or use of land. These include:

- transportation system development charges levied on new development, expected to generate $37.5 million during the planning period,
- traffic impact fees on commercial properties, expected to generate $54.3 million during the planning period, and
- urban renewal funding , expected to generate $317 million during the planning period.

These revenues are collected by the cities and counties in the region for use within their jurisdictions. These revenues are generally limited to providing transportation projects to serve the new development on the assessed properties.

4.1.3 Special Funds and Levies

A final category of transportation funding in the region is special funds and levies. These include:

- property taxes such as the Washington County's Major Streets Transportation Improvement Program, approved by popular election and expected to generate $26.2 million during the planning period;
- local improvement districts, such as one in the Lloyd District of Portland where a group of commercial property owners agreed to provide money, in addition to their regular taxes, for public improvements and services (including transportation projects);
- vehicle parking fee revenues from the Portland public parking garages and meters; and
- Port of Portland transportation improvement fund revenues, expected to provide $166.8 million during the planning period. These revenues, derived from passenger facility charges, parking revenues and lease revenues, are limited to fund projects or services on Port property. Investment of these revenues is guided by the Port Transportation Improvement Plan (1999) and approved by the Port Commission.

4.2 Projected Costs of the 2020 Preferred System

4.2.1 Highway and Road-Related Costs

State highway OMP costs

ODOT had estimated operations, maintenance and preservation (OMP) costs at $135 million in the year 2000, increasing to $199 million in the year 2010 to achieve 90 percent of state highways in fair or better condition with the metro area by the year 2010. This does not include costs for a safety or access management program. As the use of highways continues to increase and inflation impacts the ability to provide services, OMP costs for state highways will rise to $270 million per year by the year 2020.

State highway capital costs

Construction of new or improved state highway facilities in the Preferred System, including projects such as the Sunrise Highway, the Tualatin-Sherwood connector and the I-5/Highway 217/Kruse Way interchange, would cost $2.11 billion (1998$).

Regional road OMP costs

Based upon information provided by cities and counties, Metro has estimated that to achieve 90 percent of the roads in the metro region in fair or better condition by the year 2020, annual operations, maintenance and preservation (OMP) cost would be $180 million in the year 2000. This cost would increase to $365 million per year in the year 2020. To keep roads at their existing level of repair and not increase the size of the backlog of deficient pavement would cost $122 million per year in the year 2000, increasing to $248 million in the year 2020.

Regional road capital costs

Construction and improvement of city and county owned regional road facilities in the 2020 Preferred System would cost $2.65 billion (1998$). This includes all projects that expand road capacity and/or improves right-of-way for freight, vehicles, bicycles and pedestrians.

4.2.2 Transit-Related Costs

Transit operations and maintenance

Implementation of the 2020 Preferred System would occur incrementally during the plan period leading to full implementation by the year 2020. Increasing Tri-Met and SMART service by 4.5 percent each year would fully implement the 2020 Preferred System by the year 2020. Annual operating costs of the Preferred System would be $254 million in the year 2000 and $899 million in the year 2020, accounting for the approximately doubling of cost due to inflation and a doubling of the amount of transit service provided.

Transit capital

Capital costs for transit include construction of the light rail, commuter rail and streetcar rail systems, acquisition of additional buses and expanded maintenance facilities, right-of-way improvements such as bus shelters, bypass lanes and signals and new or upgraded transit centers and park-and-ride lots. Total capital costs for implementation of the Preferred System is $4.3 billion in 1998 dollars.

4.3 Assignment of Revenues to Costs and Funding Shortfall for the Preferred System

4.3.1 Highway and Road-Related Revenue Shortfall

State Highway Operations, Maintenance and Preservation. The 1999 Oregon Highway Plan describes the Oregon Department of Transportation policy on funding priorities for Oregon highways (pp5-12). This policy describes a progression of four funding levels from current funding levels to a significant increase in funding availability.

For the purpose of developing this financial plan, however, it is assumed that all operations, maintenance and preservation of the road network are a priority to receive road-related revenues prior to expansion of the road system. Properly maintaining and preserving roads ensures that more costly road reconstruction of inadequately maintained roads is not necessary at a later date. Therefore, only revenues in excess of road OMP needs and revenue sources specifically dedicated to highway modernization and expansion have been assumed to be available for road capital costs.

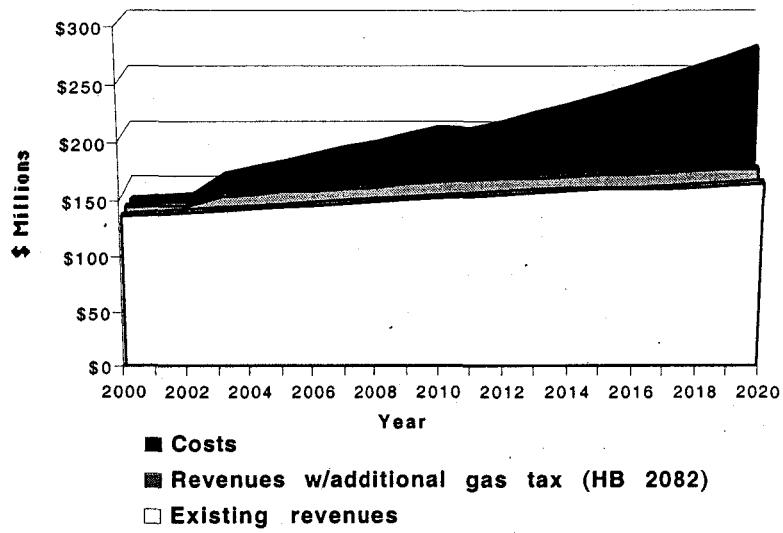
State Highway Trust Fund revenues distributed to ODOT have been assigned to state highway OMP costs with any remaining revenues above defined OMP needs assigned to state highway capital costs.

Assuming this allocation scenario, ODOT will spend an estimated $135 million on highway OMP in the year 2000, increasing to $163 million in the year 2020 and operations, maintenance and preservation of the state highway system would be fully funded in the metropolitan area through the year 2002. After 2002 a combination of inflation, increased road use and an increased percentage of highways and bridges reaching their age to require major rehabilitation creates a shortfall of revenue available for needed OMP costs. This shortfall ranges from $8 million in the year 2003 to $107 million in the year 2020. Revenues from HB 2082 would decrease the funding shortfall by approximately $6 million per year through the year 2020.

It is expected that at current funding levels, all state trust fund monies after the year 2002 that are not legally dedicated to road modernization would have to be used for highway OMP purposes. This amount of funding would still fall short of money needed to adequately maintain the state highway system in the metropolitan area. As such, a backlog of maintenance needs will develop and, if not addressed, lead to more expensive reconstruction of these highways.

Figure 4.1 shows the growing gap between state highway operations, maintenance and preservation costs and existing revenues.

Figure 4.1
State Highway OMP Costs in the Metro Region and Existing Revenues



Source: Metro

State Highway Modernization and Expansion. Cost for new construction of state highways and freeways in the Preferred System would cost $2.11 billion (1998$). There will be approximately $305 million dollars available for modernization and expansion of state highways in the metropolitan area during the course of the 20-year planning period. This results in a shortfall of $1.8 billion of revenues to build the Preferred state highway system.

An additional $189 million in revenues for state highway modernization and expansion in the metropolitan area may be available as part of the capital bond program of HB 2082 passed by the 1999 Legislature. An additional $16 million dollars could be available to the region from HB 2082 as revenue available after funding state highway OMP needs in the region through the year 2002. With these additional revenues, the shortfall of funding to build the Preferred state highway system is reduced to $1.6 billion.

Figure 4.4 shows the difference between 2020 Preferred System state highway capital costs and existing revenues.

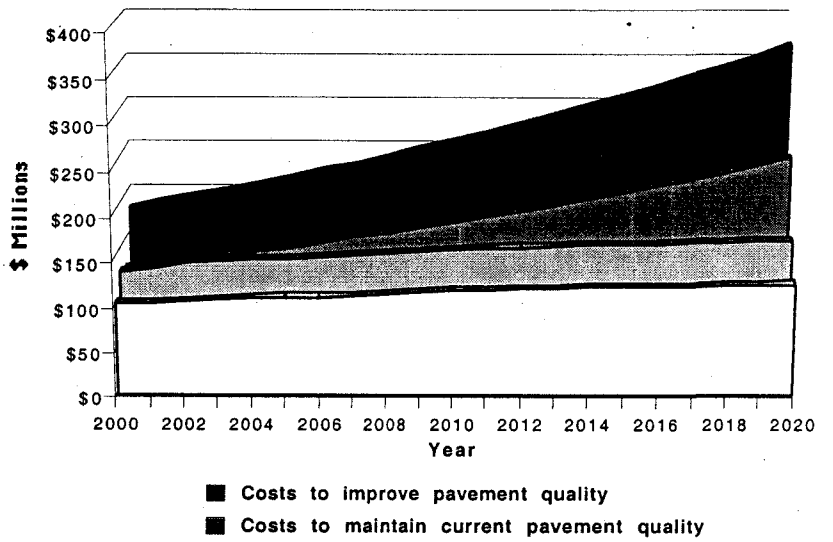
Regional Road Operations, Maintenance and Preservation. Based on the need to address OMP costs of local roads in the Metro area and the historical spending of these revenues towards OMP costs, State Highway Trust Fund revenues that are distributed to cities and counties are expected to continue to pay for OMP costs. All local gas tax revenues from Multnomah and Washington counties and some Portland parking revenues have also been assigned to these costs.

With these revenues, there is still a shortfall of $18.6 million in the year 2000 to maintain local roads at current pavement standards (77 percent in fair or better condition). This shortfall grows to $121.8 million by the year 2020. To address the backlog of maintenance and preservation needs and achieve a pavement standard of 90 percent of roads in fair or better condition by the year 2020, the region would need an additional $76.6 million in the year 2000, growing to an additional $239.5 million by the year 2020.

House Bill 2082 would begin to address this shortfall by providing an additional $15.1 million to regional road OM&P from the state trust fund in the year 2000. This amount would increase to $25.1 million by the year 2020. Additionally, HB 2082 authorizes any county to impose a $10 annual vehicle registration fee by majority vote of the county commission. These monies are to be used for any road or bridge related expense, except in Multnomah County, where a majority of the revenues are to be used for Willamette River bridges. If implemented in all three metro area counties, an additional $9.4 million for regional roads and $3.1 for Willamette River Bridges in the year 2000, increasing to $13.2 million and $3.5 million respectively by the year 2020.

Figure 4.3 shows the growing gap between regional road-related operations, maintenance and preservation costs and projected revenues.

Figure 4.2
Regional Road
OM&P Costs and Existing Revenues



Source: Metro

Regional Road Modernization and Expansion. New construction of regional roads and bridges in the Preferred System would cost $2.65 billion (1998$). Local development based sources and special funds and levies dedicated to road projects have been assigned to regional road capital costs.

Between these revenues and the local portion of state highway trust fund money, there would be approximately $273 million dollars available for modernization and expansion of regional roads and bridges during the course of the 20-year plan period. This results in a shortfall of $2.38 billion of revenues to construct the preferred regional road system.

House Bill 2082 could provide an additional $70 million in revenues from a local vehicle registration fee increase if implemented by Multnomah County for work on Willamette River bridges. These additional revenues reduce the shortfall of funding the Preferred regional road network to $2.31 billion.

Figure 4.4 shows the gap between the 2020 Preferred System road-related capital costs and existing revenues.

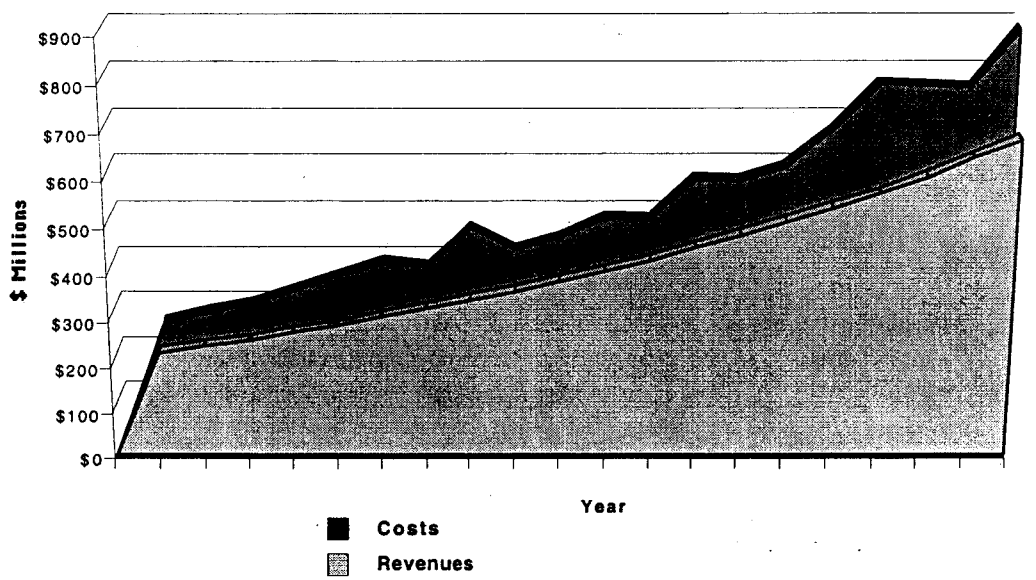
4.3.2 Transit-Related Revenue Shortfall

Operations and Maintenance

All payroll tax revenues and passenger fares revenues are used for transit operations and maintenance costs. Transit formula funds that would be used to replace existing buses and facilities have also been assigned to cover these operations and maintenance costs.

Even with expected payroll tax, passenger fare and transit formula fund revenues, funding operations and maintenance of the preferred transit system would require an additional $31.7 million in the year 2000, growing at an annual rate of 4.5 percent. In the year 2020, the projected revenue shortfall would be $185.7 million.

Figure 4.3
2020 Preferred System
Transit Related Operations and Maintenance Costs and Revenues



Source: Metro

Capital

All federal transit discretionary and all transit formula funds for buses and facilities that would provide new service have been assigned to transit capital costs. There are also assumptions of federal trust fund money to the Interstate light rail transit project. Port of Portland, city of

Portland, Tri-Met and private funds have been assumed to fund airport light rail. Finally, some Portland parking and local improvement district revenues have been assigned to fund construction of the central city streetcar project and Portland urban renewal district funds assigned to fund the construction of the Interstate Avenue light rail project.

With capital costs of $4.34 billion dollars ($1998) and expected revenues for transit capital of $1.13 billion ($1.08 billion federal discretionary funds and $47 million of local funds) there is a $3.21 billion shortfall of revenue needed for capital costs of the preferred transit system.

Figure 4.4 compares the capital costs of building the Preferred transit system with projected revenues available to build the system.

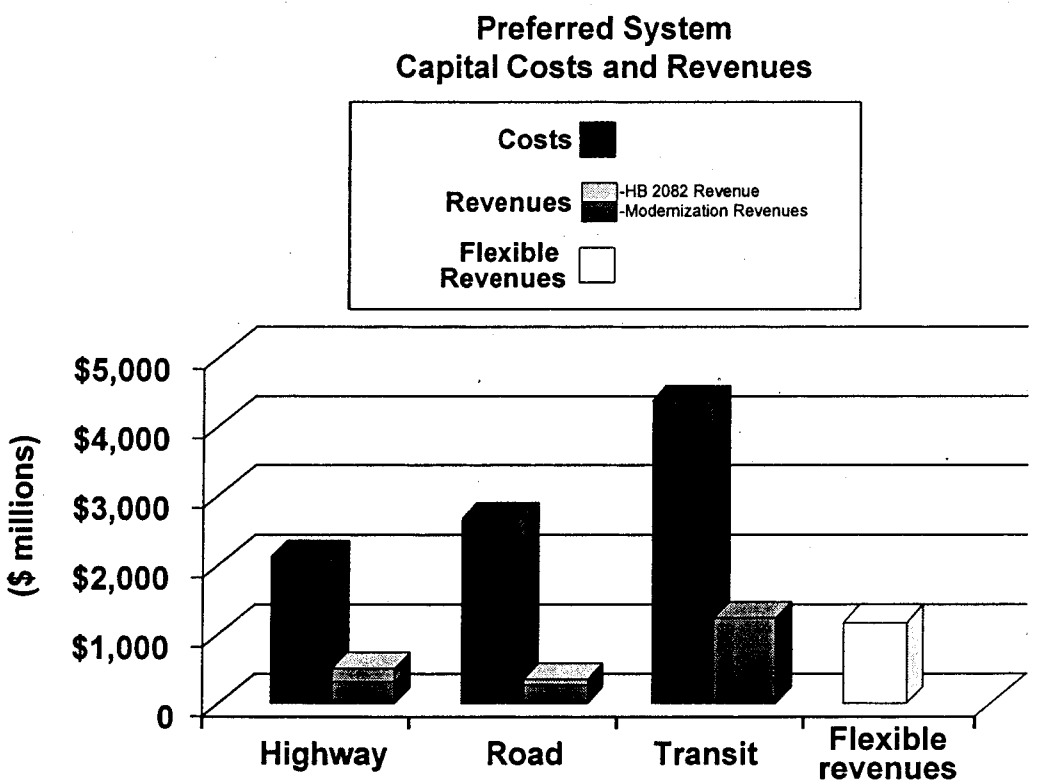
4.3.3 Flexible Revenues

There are several sources of funds that could generally be applied to any of the categories of revenue shortfalls. These include Regional STP funds ($475 million), congestion management and air quality (CMAQ) funds ($166 million), enhancement funds ($64 million), federal forest receipts ($17.8 million) and local urban renewal funds ($317 million). These revenues total $1.04 billion.

These revenues could not be spent on any project in the preferred system but could only be applied to projects that meet the criteria of the particular funding source. However, each category of funding (highway, road, and transit capital and O&M) contain projects that would be eligible for these revenues. See descriptions of these funding sources in Section 4.1 for an explanation of projects that could qualify for funding.

Figure 4.4 demonstrates how these revenue sources compare to the funding shortfalls for state highway, regional roads and transit capital costs. The MTIP process (see section 6.5) will determine which projects become eligible for the Regional STP, CMAQ and enhancement funds. The jurisdiction in which an urban renewal district is located will determine which projects will get funded with urban renewal funds.

Figure 4.4



See Section 4.1 for a description of spending restrictions of the flexible revenue sources.
Source: Metro

4.4 Potential New Revenue Sources

4.4.1 User Pay Systems

- **Increase in State gas tax.** Under current rates of distribution of state gas taxes, an additional 1 cent in the state gas tax would initially result in an additional $5 million annually for the regional road system and an additional $3.9 million annually for the state highway system within the metro area. By the year 2020, that same one cent increase would result in an

additional $6 million for the regional road system and $4.6 million for state highways in the metro area.

- **Tri-county gas tax.** Revenue could be created for transportation maintenance or capital projects with a uniform gas tax in Clackamas, Multnomah and Washington counties. Raising the tax in Clackamas and Washington counties to equal Multnomah county's 3 cents per gallon would create an additional $4.7 million of revenue in the year 2000 for the regional road system, increasing to $6.8 million by the year 2020. Each additional 1 cent per gallon would create an additional $3.7 million of revenue in the year 2000 for the regional system, increasing to $5.4 million by the year 2020.

- **Tri-county vehicle registration fee.** The 1999 Legislature provided each county the ability to raise additional transportation revenues through a local vehicle registration fee of up to $10 per year. If all three metro area counties implemented this fee, $9.4 million would be available for local roads, in addition to $3.1 million for Willamette River bridges in the year 2000, increasing to $13.3 million and $ 3.5 million respectively by the year 2020.

  Authority already exists for the three counties or Metro to refer to voters a vehicle registration fee up to the amount of the state vehicle registration fee. At $40 per biennium, approximately $25 million could be raised in the region in the year 2000 increasing to $33.5 million in the year 2020.

- **Peak period pricing.** Electronic tolling of highway use during congested periods can reduce the need for new roadways while providing revenues for needed highway expansions. The Traffic Relief Option Study completed in 1999 by Metro and ODOT examined the potential of various types of roadway pricing to meet regional transportation, environmental and land use goals.

  The study, undertaken with guidance from a citizen task force, found that pricing of existing lanes would generate the most revenue – up to $25 million a year net of construction and operating costs. It could also result in the most significant reduction in vehicle miles of travel. However, due to the negative public reaction and possible deleterious effects on adjacent areas and accessibility, the citizen's task force did not recommend pricing of existing roadways. Instead, the citizen's task force recommended that pricing be considered whenever major new highway capacity was planned. The study found that congested roadways had the potential to generate some revenue towards the cost of construction. Depending on the roadway, revenues from study options were expected to cover between 30 and 90 percent of associated, annualized operating and capital costs.

  The evaluation of the performance of eight specific pricing options is contained in *Working Paper 9* dated May 10, 1999. The study recommended further consideration of peak period pricing on all major, new highway capacity projects. A regional analysis of the effect of this approach to pricing is currently being conducted. Further analysis is recommended as part of individual highway projects.

- **Development Based Systems**

- **Increase in system development charges.** Cooperation among most or all of the jurisdictions of the region to pursue a partial or full cost-recovery strategy for transportation infrastructure with system development charges would result in additional revenues available for transportation purposes. The amount of revenue available would depend on the exact nature of the policy, the number of jurisdictions participating, and the costs of providing infrastructure in each jurisdiction.

4.4.3 Special Funds and Levies

- **Road maintenance fee.** A road maintenance fee is a general assessment of properties for maintenance of the transportation system that serves the property. The city of Tualatin has such a system that assesses property by the number of vehicle trips typically generated by the developed use of that property. The fee is collected as a part of the city utility bill. A road maintenance utility fee similar to Tualatin's, implemented by all of the local jurisdictions on property within the metro region, could generate approximately $22 million in the year 2000, increasing to $32 million in the year 2020. Rates could be adjusted to collect revenues equal to all or some portion of the cost to maintain the jurisdiction's road system.

- **Payroll tax rate increase for transit.** A potential source of additional revenue for transit operations would be to raise the rate of the payroll tax for either Tri-Met or SMART. An increase of .1% of the payroll tax rate would raise $21 million annually in the Tri-Met district or approximately $500,000 annually in the SMART district ($1998).

- **Property tax general obligation bond.** General obligation bonds, backed by property taxes have been used for transportation improvements in the metro region, especially for capital projects. These taxes must be approved by voters in a general election. A tax of 1 cent per $1,000 of assessed property value would raise $770,000 annually in the metro region in the year 2000, increasing to approximately $1.5 million in the year 2020. Bonding this revenue stream for capital projects would incur bonding and interest costs but save money on project inflationary costs by constructing the projects earlier than would otherwise be possible.

The Oregon Department of Transportation has recently published the final report of the "Innovative Finance Study," a review of potential new sources of transportation funding. In addition to several of the potential sources described, the study investigated the potential for funding transportation projects with:

- **Value Capture:** private interests compensating a public agency for a portion of the economic value created to the private interest with the creation of the transportation facility,

- **State Infrastructure Banks:** a revolving fund that can offer loans and credit assistance to sponsors of certain highway or transit capital projects,

- **Federal Credit - Transportation Infrastructure Finance and Innovation Act:** authorizes state DOTs to provide secured loans, loan guarantees and standby lines of credit to sponsors of certain highway and transit projects, and

- **Grant Anticipation Notes:** allows state DOTs to generate up-front capital for large capital projects by allowing recovery of interest payments and other bond issue costs on anticipation of receipt of future federal grant monies.

The region, in cooperation with the Oregon Department of Transportation, could pursue these finance options for eligible transportation improvements.

4.4 Conclusion

The financial analysis identifies a large funding gap in every category of costs to implement the preferred transportation system in the metro region. This demonstrates the need to raise additional revenues to fund the transportation system and to reduce the costs of the preferred transportation system.

While operations, maintenance and preservation costs are drastically under-funded in the long term, the short -term gap in funding could be addressed with moderate amounts of additional revenues to keep highways and roads at current pavement conditions. Addressing the backlog of maintenance needs and improving pavement conditions will require more substantial amounts of additional revenue. Additional revenues from HB 2082 address the short-term funding gap for OM&P for keeping state highways at current conditions through the year 2003 and provide additional revenues for regional and local road OM&P.

Capital costs for modernization and expansion of the highway and regional road system are more severely under-funded. The bonding program portion of HB 2082 would address approximately ten percent of the unfunded portion of state highway capital costs in the Preferred System. Additional revenue sources and innovative financing methods will be needed to provide additional modernization of the highway system. The regional road system will also require additional revenues; approximately ten times the existing resources currently dedicated to road modernization and expansion. Flexible revenue sources could be applied to either the road or highway capital funding needs but even if all of the flexible resources were applied to either category, the needs of either category would not be fully funded.

Operation and maintenance of the Preferred transit system would be fourteen percent under-funded in the year 2000, growing to twenty five percent under-funded by the year 2020. An additional revenue source that begins to close this funding gap and provides additional stability to funding revenues would be desirable.

Transit capital costs of the preferred system are expected to be only twenty five percent funded with existing revenue sources. A large portion of the expected revenue sources would only be made available for a few specific light rail projects, themselves requiring local match funding, potentially limiting revenues available to other capital projects unless new revenue sources are created.

As an alternative to finding new sources of revenue to fully fund the preferred system, Chapter 5 of this plan will identify a transportation system, referred to as the strategic system, that is less expensive than the preferred system. This system would still provide the most critical transportation projects and programs needed to adequately address the impacts of future growth on our regional transportation system.

Section 5.2 also identifies several strategies for policy makers to consider for additional transportation revenues to fund the strategic transportation system.