

***Chapter 2***

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**Land Use, Growth and  
Travel Demand**



**METRO**

**2004 RTP**



## 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 potential regional and RTP subarea disparities which may exist between the location of new jobs and new housing in the Portland metropolitan region and the expected impact of these potential 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
<b>Total Region (four-county) <sup>1</sup></b>			
• Population	1,552,673	2,348,945	+51%
• Households	599,698	986,207	+64%
• Employment	947,647	1,610,956	+70%
<b>Intra Metro UGB<sup>2</sup></b>			
• Population	1,142,463	1,666,636	+46%
• Households	453,283	716,150	+58%
• Employment	791,410	1,327,939	+68%

<sup>1</sup> Includes Clark, Clackamas, Multnomah and Washington counties.

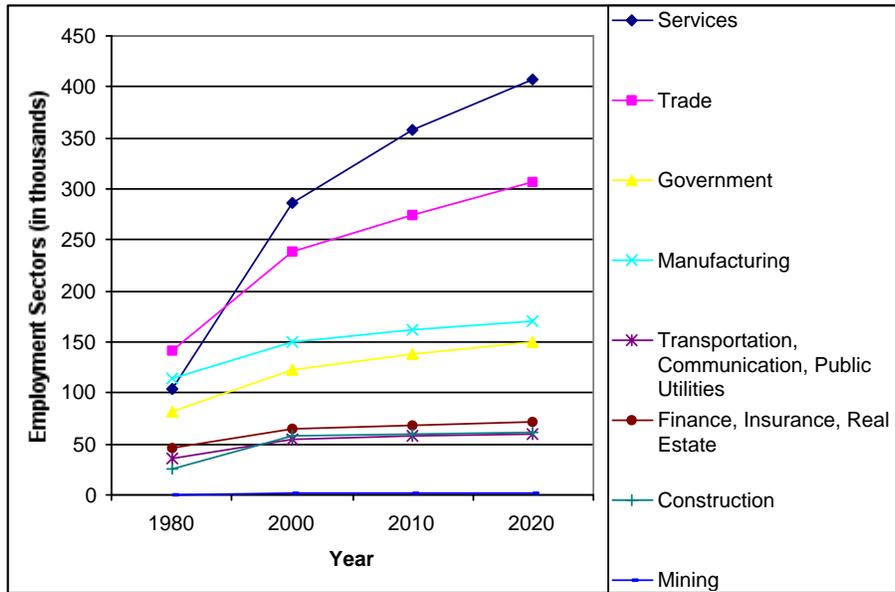
<sup>2</sup> Within Metro urban growth boundary (excludes Clark County, Wash. and areas of Clackamas, Multnomah and Washington counties outside of the Metro urban growth boundary).

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*<sup>1</sup>, 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.

<sup>1</sup> 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.<sup>2</sup> This combined with population growth is expected to put increased demands on the regional transportation system.

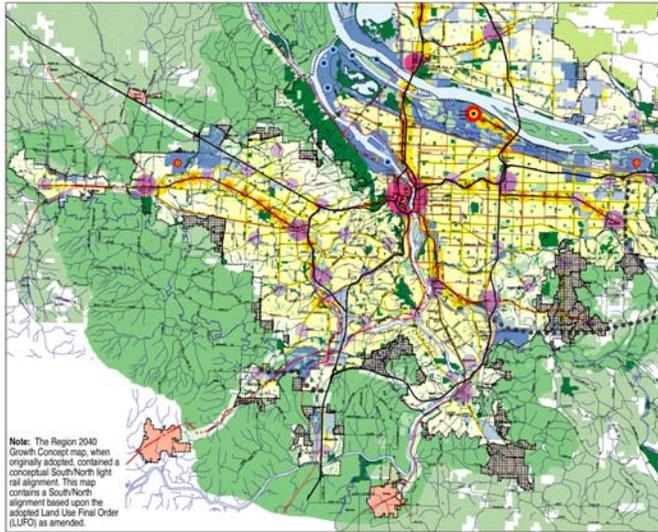
Freight movement is largely dependent upon trucks. Today and in the future, about 60 percent of all cargo moving in and out of the Portland metropolitan region is predicted to move on a truck at some point of its journey here in the region. In addition, more than 70 percent of all truck traffic is expected 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.<sup>3</sup> Transportation dependent sectors include the manufacturing, trade, transportation, communications, public utilities, construction and mining sectors.

<sup>2</sup> *Ibid*, p. 71.

<sup>3</sup> *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 was acknowledged by LCDC in 1996 to comply with statewide land use goals. 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 seeks to achieve the desired urban form in 2040 with the following approach:

- 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, areas outside of and adjacent to the urban growth boundary, primarily exception lands, are also assumed to

accommodate new growth during the next 20 years. The areas 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 allow incremental extension of transportation facilities throughout the region. To preserve farmland, the urban growth boundary will be expanded into areas where new urban transportation facilities are needed.

In 1998, the Metro Council expanded the urban growth boundary to include 3,527 acres of the more than 18,000 acres assumed in the 2020 forecast to accommodate growth for the next 20 years. These lands are estimated to accommodate 15,000 dwelling units and nearly 6,300 jobs. These 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 land from these areas adjacent 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 areas outside of and adjacent to the 1997 urban growth boundary. In general, the jobs and housing assumed for each 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 areas, 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 potential 2040 communities 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.

These subareas were used for governmental coordination purposes to illustrate facilities which serve related city, county and district areas as part of the functional plan role of this RTP. The location and boundaries of these subareas are for analysis purposes only, and roughly correspond to county boundaries.

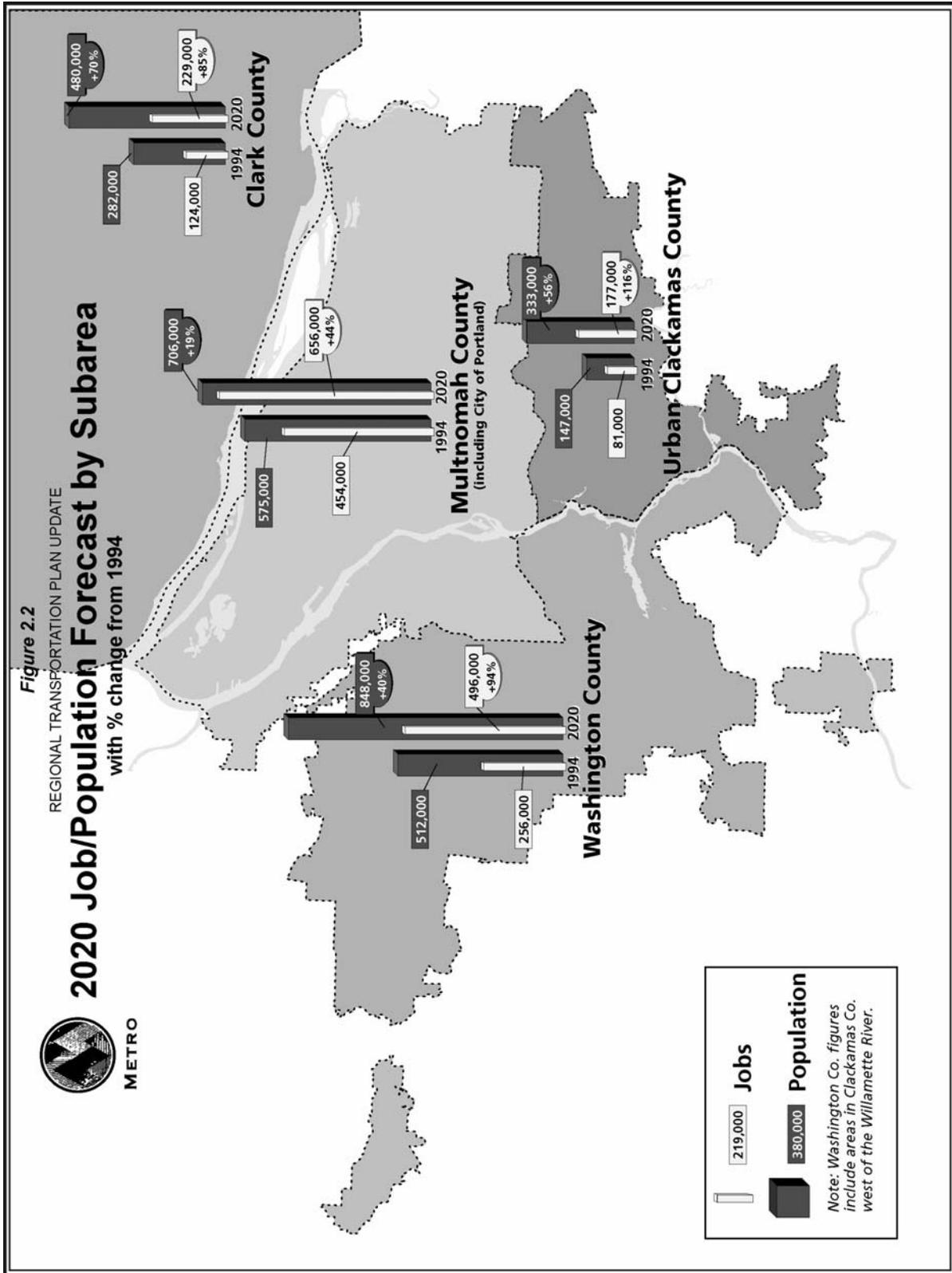


Table 2.2

2020 Population and Employment Forecast by RTP Subarea

Combined RTP Subarea	Population			Employment		
	1994	2020	Increase	1994	2020	Increase
Multnomah County Subareas						
• Portland Central City and Neighborhoods	376,495	428,309	51,814 (+ 14%)	334,882	449,548	114,666 (+ 34%)
• West Columbia Corridor	9,465	18,899	9,434 (+ 100%)	51,010	98,497	47,487 (+ 93%)
• East Multnomah County	188,734	258,694	69,960 (+ 37%)	68,195	107,610	39,415 (+ 58%)
<b>Sub-total</b>	<b>574,694</b>	<b>705,902</b>	<b>131,208</b> <b>(+ 23%)</b>	<b>454,087</b>	<b>655,655</b>	<b>201,568</b> <b>(+ 44%)</b>
Clackamas County Subareas						
• Urban Clackamas County	133,322	207,615	74,293 (+ 56%)	77,691	143,500	65,809 (+ 85%)
• Damascus/Pleasant Valley	13,425	125,397	111,972 (+ 834%)	3,908	33,084	29,176 (+ 746%)
<b>Sub-total</b>	<b>146,747</b>	<b>333,012</b>	<b>186,265</b> <b>(+ 127%)</b>	<b>81,599</b>	<b>176,584</b>	<b>94,985</b> <b>(+ 116%)</b>
Washington County Subareas <sup>1</sup>						
• North Washington County	229,807	368,064	138,257 (+ 60%)	134,090	293,477	159,387 (+ 119%)
• South Washington County	195,111	264,722	69,611 (+ 36%)	122,156	202,873	80,717 (+ 66%)
<b>Sub-total</b>	<b>424,918</b>	<b>632,836</b>	<b>207,918</b> <b>(+ 49%)</b>	<b>256,246</b>	<b>496,350</b>	<b>240,104</b> <b>(+ 94%)</b>
Clark County, Wash.	<b>282,437</b>	<b>480,387</b>	<b>197,950</b> <b>(+ 70%)</b>	<b>123,759</b>	<b>228,523</b>	<b>104,764</b> <b>(+85%)</b>
Areas outside of the urban growth boundary <sup>4</sup>	<b>123,868</b>	<b>196,806</b>	<b>72,938</b> <b>(+ 59%)</b>	<b>31,956</b>	<b>53,844</b>	<b>21,888</b> <b>(+ 68%)</b>
<b>Total Region (4-county)</b>	<b>1,552,664</b>	<b>2,348,943</b>	<b>796,279</b> <b>(+ 51%)</b>	<b>947,647</b>	<b>1,610,956</b>	<b>663,309</b> <b>(+ 70%)</b>

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

Source: Metro

<sup>4</sup> These figures include growth in small cities and rural residential land uses that fall within the 1,260 transportation analysis zones used for RTP modeling. In addition, some of the growth that is expected outside of the urban growth boundary is part of the expected expansion of the current urban growth boundary.

### **2.3.1 West Columbia Corridor**

This subarea is planned to be the 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 376,495 in 1994 to 428,309 people in 2020. This reflects a 14 percent increase in population. The number of jobs in the subarea is expected to increase by 34 percent. In 1994, more than 334,000 people worked in the subarea. By 2020, more than 449,000 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 37 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 258,000. The number of jobs in the subarea is expected to increase by nearly 58 percent, changing from more than 68,000 jobs in 1994 to 107,610 jobs in 2020.

### **2.3.4 Urban Clackamas County (excluding Damascus)**

The number of people living in this subarea is expected to increase by more than 55 percent between 1994 and 2020. In 1994, more than 133,300 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be more than 207,600. 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 77,000 people worked in this part of the region. By 2020, the number of jobs in the subarea is expected to be more than 143,000. 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 13,000 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 more than 125,000. The number of jobs in the Damascus subarea is also expected to increase dramatically, growing from slightly more than 3,900 jobs in 1994 to more than 33,000 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 35 percent between 1994 and 2020. In 1994, more than 195,000 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be more than 264,700. The number of jobs in the subarea is expected to increase by 66 percent, growing from slightly more than 122,000 jobs in 1994 to more than 202,000 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 60 percent between 1994 and 2020. In 1994, more than 229,000 people lived in this part of the region. By 2020, the number of people living in the subarea is expected to be slightly more than 368,000. The number of jobs in the subarea is expected to increase by 118 percent, growing from slightly more than 134,000 jobs in 1994 to more than 293,000 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 TPR requires that the regional TSP reduce reliance on the automobile as measured by vehicle miles traveled per capita. Providing opportunities for people to make fewer and shorter trips can reduce vehicle miles traveled per capita. As one part of the 2040 Growth Concept policy to balance jobs and housing, this subregional analysis serves as the basis for findings in Chapters 3 and Chapter 5, which establish the impact of expected growth in population, households and employment on regional transportation corridors that serve key 2040 design types. These corridors have the greatest traffic volumes and the longest trips among the highest concentrations of jobs and housing in the region. This subregional analysis serves as the basis for understanding trip patterns based on the location of jobs and housing throughout the region and is one tool for identifying opportunities to reduce the number and length of trips in these high volume corridors based on those trip patterns.

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, the analysis indicates disparities between the location of new jobs and new housing in the Portland metropolitan region. Table 2.3 shows the potential 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.

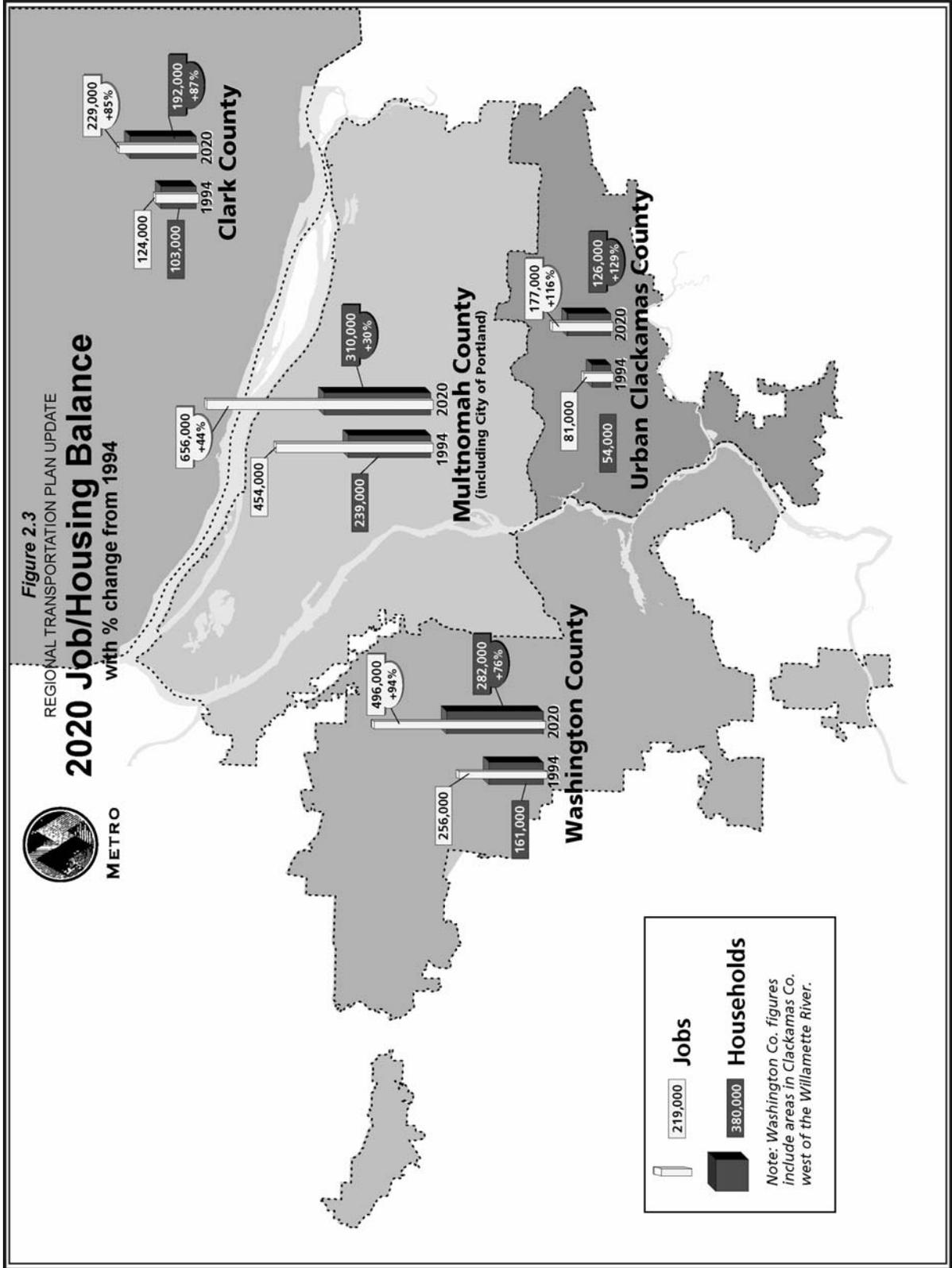
The rate of employment growth is expected to be highest in the Clackamas and Washington counties subareas, increasing by 116 percent and 93 percent respectively. However, the greatest increase in the number of new jobs is expected to occur in the Multnomah and Washington counties subareas, with each 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 by RTP Subarea**

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%)	334,882	449,548	114,666 (+ 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%)	68,195	107,610	39,415 (+ 58%)
<b>Sub-total</b>	<b>239,533</b>	<b>310,414</b>	<b>70,881 (+ 31%)</b>	<b>454,087</b>	<b>655,655</b>	<b>201,568 (+ 44%)</b>
Clackamas County Subareas						
• Urban Clackamas County	45,602	66,571	20,969 (+ 46%)	77,691	143,500	65,809 (+ 85%)
• Damascus/Pleasant Valley	3,372	32,034	28,662 (+ 850%)	3,908	33,084	29,176 (+ 746%)
<b>Sub-total</b>	<b>54,855</b>	<b>125,719</b>	<b>70,864 (+ 129%)</b>	<b>81,599</b>	<b>176,584</b>	<b>94,985 (+ 116%)</b>
Washington County Subareas <sup>1</sup>						
• North Washington County	77,061	140,778	63,717 (+ 83%)	134,090	293,477	159,387 (+ 119%)
• South Washington County	67,405	100,410	33,005 (+ 49%)	122,156	202,873	80,717 (+ 66%)
<b>Sub-total</b>	<b>160,585</b>	<b>282,464</b>	<b>121,879 (+ 76%)</b>	<b>256,246</b>	<b>496,350</b>	<b>240,104 (+ 94%)</b>
Clark County, Wash.	<b>102,664</b>	<b>192,290</b>	<b>89,626 (+ 88%)</b>	<b>123,759</b>	<b>228,523</b>	<b>104,764 (+85%)</b>
Areas outside of the urban growth boundary	<b>42,061</b>	<b>75,319</b>	<b>33,258 (+ 79%)</b>	<b>31,956</b>	<b>53,844</b>	<b>21,888 (+ 68%)</b>
<b>Total Region (4-county)</b>	<b>599,698</b>	<b>986,206</b>	<b>386,508 (+ 64%)</b>	<b>947,647</b>	<b>1,610,956</b>	<b>663,309 (+ 70%)</b>

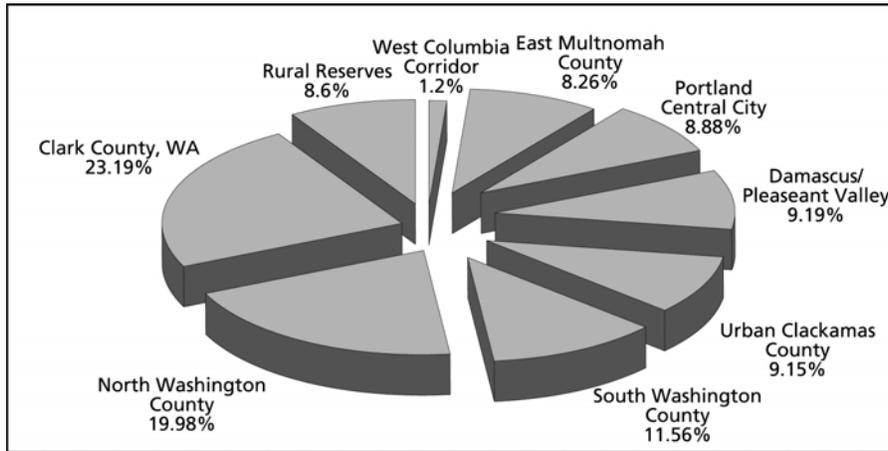
<sup>1</sup> This subarea includes areas of Clackamas County west of the Willamette River.

Source: Metro



**Figure 2.4**

**RTP Subarea Household Growth**

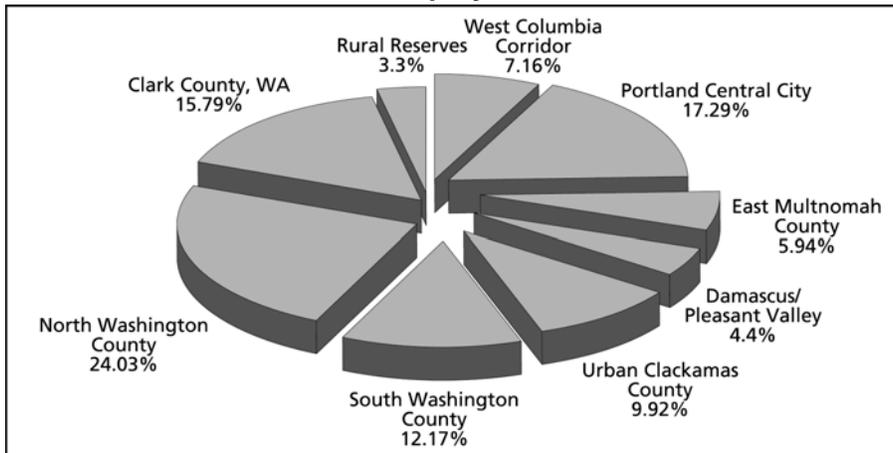


Note: Number represents the percentage of total regional growth in households.

Source: Metro

**Figure 2.5**

**RTP Subarea Employment Growth**



Note: Number represents the 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**

<b>Combined RTP Subarea</b>	<b>Number of jobs per household</b>		
	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
Multnomah County Subareas	<b>1.90</b>	<b>2.11</b>	<b>+11.4%</b>
Washington County <sup>1</sup> Subareas	<b>1.60</b>	<b>1.76</b>	<b>+10.1%</b>
<b>Total Region (4-county region)</b>	<b>1.58</b>	<b>1.63</b>	<b>+3.3%</b>
Clackamas County Subareas	<b>1.49</b>	<b>1.40</b>	<b>-5.58%</b>
Clark County, Wash.	<b>1.21</b>	<b>1.19</b>	<b>-1.4%</b>

<sup>1</sup> 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 farmland surrounding the urban growth boundary in that part of the region.

## **2.5 Effects of Growth on the 2020 No-Build System**

If no new transportation projects or programs are constructed, the estimated population and employment growth will impact the existing regional transportation system. This No-Build System shows where additional regional transportation system needs are created by that growth. The regional TSP, then, adequately addresses those needs in the Priority System in Chapter 5.

### **2.5.1 Overall System Performance<sup>5</sup>**

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 to increase faster than trips for non-work purposes such as shopping and recreation. In addition, despite a nearly 50 percent increase in the 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.

<sup>5</sup> Based on Appendix 1.2.

**Table 2.5**

**2020 No-Build System Average Weekday Trips<sup>1</sup>**

	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
Average weekday person trips	4,864,738	7,597,888	+ 56%
Average home-based work trip length	6.45 miles	6.36 miles	- 1%

Note: These numbers exclude trucks and through traffic.

<sup>1</sup> Within Metro urban growth boundary (excludes Clark County, Wash. and areas of Clackamas, Multnomah and Washington counties outside of the Metro urban growth boundary).

Source: Metro

**Table 2.6**

**2020 No-Build System Vehicle Miles of Travel<sup>1</sup>**

	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
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%

Note: These numbers exclude trucks and through traffic.

<sup>1</sup> Within Metro urban growth boundary (excludes Clark County, Wash. and areas of Clackamas, Multnomah and Washington counties outside of the Metro urban growth boundary).

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, 15 percent of the region's freeway network experienced congestion during the evening two-hour peak period. By 2020, almost 37 percent of the region's freeway network is expected to experience congestion during the evening two-hour peak period. 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 6 percent in 1994 to almost 25 percent in 2020. 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<sup>1</sup>**

	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
Average motor vehicle speed	25 mph	19 mph	- 24%
Average motor vehicle travel time	11 minutes	14 minutes	+ 27%
Percent of freeway miles experiencing congestion (v/c >0.9)	14.9%	36.7%	+ 146%
Percent of arterial street miles experiencing congestion (v/c >0.9)	6.0%	24.6%	+ 310%
Total motor vehicle hours of delay	7,764	64,786	+ 734%

<sup>1</sup> Based on evening two-hour peak period. Within Metro urban growth boundary (excludes Clark County, Wash. and areas of Clackamas, Multnomah and Washington counties outside of the Metro urban growth boundary).

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<sup>1</sup>**

	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
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 <sup>2</sup>	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%

<sup>1</sup> Within Metro urban growth boundary (excludes Clark County, Wash. and areas of Clackamas, Multnomah and Washington counties outside of the Metro urban growth boundary).

<sup>2</sup> 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. 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<sup>1</sup>**

	<b>1994</b>	<b>2020</b>	<b>Percent Change</b>
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	132	1,222	+ 840%

Note: This summary of freight system performance reflects Metro's regional truck travel forecasting model.

<sup>1</sup> Within the 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**

Major Travel Corridor	Auto Travel Times (in minutes)		Transit Travel Times (in minutes)	
	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* (-26%)
T-6 to I-205 on NE Portland Highway	23.10	28.87 (+ 25%)	n/a	n/a
Portland international Airport to Gateway on Airport Way and I-205	9.98	15.74 (+ 58%)	n/a	12.01

\* Transit travel times are on light rail unless noted by an asterisk. Travel times are based on Round 3 model results.

Source: Metro

### 2.5.6 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.