Exhibit A to Ordinance No. 14-1340

www.oregon**metro.gov**

MAKING A GREAT PLACE

Metro

Regional Transportation Plan

Adopted July 17, 2014

www.oregonmetro.gov/rtp

2014

Metro respects civil rights
Metro fully complies with Title VI of the Civil Rights Act of 1964 and related statutes that ban discrimination. If any person believes they have been discriminated against regarding the receipt of benefits or services because of race, color, national origin, sex, age or disability, they have the right to file a complaint with Metro. For information on Metro's civil rights program, or to obtain a discrimination complaint form, visit www.oregonmetro.gov/civilrights or call 503-797-1536.

Metro provides services or accommodations upon request to persons with disabilities and people who need an interpreter at public meetings. If you need a sign language interpreter, communication aid or language assistance, call 503-797-1700 or TDD/TTY 503-797-1804 (8 a.m. to 5 p.m. weekdays) 5 business days before the meeting. All Metro meetings are wheelchair accessible. For up-to-date public transportation information, visit TriMet's website at www.trimet.org.

Metro is the federally mandated metropolitan planning organization designated by the governor to develop an overall transportation plan and to allocate federal funds for the region.

The Joint Policy Advisory Committee on Transportation (JPACT) is a 17-member committee that provides a forum for elected officials and representatives of agencies involved in transportation to evaluate transportation needs in the region and to make recommendations to the Metro Council.

The established decision-making process assures a well-balanced regional transportation system and involves local elected officials directly in decisions that help the Metro Council develop regional transportation policies, including allocating transportation funds.

Project web site: www.oregonmetro.gov/rtp

The preparation of this report was financed in part by the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. The opinions, findings and conclusions expressed in this report are not necessarily those of the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

2014 Regional Transportation Plan

TABLE OF CONTENTS

Executive Summary

Chapter 1 - Changing Times:

Why a new approach is needed for planning and investments in the region's transportation system

Chapter 2 – Vision, Concepts and Policies

What is vision for our transportation system?

Chapter 3 – Investment Strategy

What is our strategy for achieving our vision?

Chapter 4 – Performance Evaluation and Monitoring

How far do we go toward achieving our vision?

Chapter 5 – Implementation

How do we implement our strategy?

EXECUTIVE SUMMARY

Over the years, the diverse communities of the Portland metropolitan area have taken a collaborative approach to planning that has helped to make our region one of the most livable in the country. In the 1990s, regional policy discussions centered on how and where we should grow to protect to the things that make this region a great place to live, work and play. Those discussions led to adoption of the region's long-range plan, the 2040 Growth Concept. This plan reflects shared community values and desired outcomes that continue to resonate today.

We have set our region on a wise course and experienced many successes – but times are changing. Our region is growing and evolving, shaped by a global economy, a warming planet, demographic changes, public health and safety concerns and changes in how we live and travel. Today it is time to revisit how we are implementing our vision, make some corrections and find new strategies and resources to create the future we want for our region.

Setting a new course for transportation

This document is the latest update to the region's long-range transportation plan to confront the changes and challenges we face. Over the past year, Metro worked with state and local government partners as well as residents, community groups, and businesses to develop the 2014 Regional Transportation Plan. A summary of public engagement efforts as well as a log of all public comments and staff responses are provided in the appendix.

The plan sets a new course for future transportation decisions and implementation of the 2040 Growth Concept. The plan takes into account the changing circumstances and challenges we face and addresses them directly. It continues most of the policies, goals and objectives from the 2035 Regional Transportation Plan, which adopted an outcomes based approached that distinguished it from past RTPs. The 2014 update has strengthened and added more detail to the bicycling and walking policies to reflect direction from the Regional Safety Plan and Regional Active Transportation plan.

Innovative approaches, policies and strategies to respond

The 2014 RTP recognizes the diversity of transportation needs throughout the Portland metropolitan region and integrates land-use, economic, environmental and transportation policies to accomplish desired outcomes for the region. The plan lays out the priorities for road, transit, freight, bicycle and pedestrian improvements, and a strategy to pay for them.

Through its policies, projects and strategies, the 2014 RTP aims to attract jobs and housing to downtowns, main streets and employment areas. It seeks to increase the use of public transit, improve the safety, convenience and appeal of bicycling and walking, and reduce miles traveled and emissions by cars and trucks in the metropolitan region. It also seeks to increase the safety, reliability and efficiency of the roadway and transit systems for all users.

Central to this plan is an overall emphasis on desired outcomes and measurable performance. The plan includes innovative policies to link investments to aspirations to support community

revitalization and job creation. Growing congestion is addressed comprehensively through a multi-pronged strategy to make existing highways, roads and transit networks work as efficiently as possible, provide real options for walking, bicycling and riding transit and expand transit and roadways in a strategic manner.

The RTP proposes investing more than $22 billion in local, regional, state and federal funds during the next 25 years to improve safety, system reliability and travel choices for everyone, revitalize downtowns and main streets, create jobs and support the region's economy, and reduce our region's carbon output. It provides for record levels of investment in transit, system management, bicycle and pedestrian-oriented projects. Further, it establishes a new outcomes-based framework and sets ambitious targets for evaluating future transportation investments against regional targets for reducing greenhouse gas emissions and vehicle miles traveled; increasing safety, equity and active transportation; and improving the reliability of freight movement.

The pages ahead describe this updated blueprint and investment strategy for a more sustainable and equitable transportation system that links land use and transportation, protects the environment and supports the region's economic vitality.

"We must recognize that we are on the cusp of a new wave of transportation policy. The infrastructure challenge of President Eisenhower's 1950s was to build out our nation and connect within…in the 1980s and 1990s it was to modernize the program and better connect roads, transit, rail, air and other modes. Today, the challenge is to take transportation out of its box in order to ensure the health, vitality and sustainability of our metropolitan areas."

ROBERT PUENTES, *Brookings Institution, A Bridge to Somewhere: Rethinking American Transportation for the 21st Century*

CHAPTER 1

CHANGING TIMES:

WHY A NEW APPROACH IS NEEDED FOR PLANNING AND INVESTMENT IN THE REGION'S TRANSPORTATION SYSTEM

1.0 INTRODUCTION

The Portland metropolitan region is an extraordinary place to live. Our region has vibrant communities with inviting neighborhoods. We have a diverse economy and a world-class transit system. The region features an exciting nightlife and cultural activities as well as beautiful scenery, parks, trails and wild places close to home.

Our region is growing and changing, shaped by a global economy, a warming planet, demographic changes, public health and safety concerns and changes in how we live and travel. Over the years, the diverse communities of the Portland Metropolitan area have taken a collaborative approach to planning that has helped to make our region one of the most livable in the country.

We have set our region on a wise course and experienced many successes – but times are changing. Our treasured region and the planet face formidable challenges. Shorter-term circumstances such as the current economic recession and longer-term concerns such as climate change demand that we do things differently and make a new approach to our planning responsibilities all the more timely.

Transportation shapes our communities and daily lives in profound and lasting ways. This chapter describes the role of the Regional Transportation Plan and key trends and issues affecting the region to frame the challenges that lay before us and opportunities for how the region moves forward. How we respond to these challenges today will set the course for generations to come.

The chapter is organized into the following sections:

1.1 Geographic setting: This section describes the geographic context of the Portland-Vancouver metropolitan region and Metro's role in transportation planning. The region's unique landscape and natural features and role as a global gateway connecting the Pacific Northwest to North America and other Pacific Rim countries make this region a great place to live, work and play.

1.2 Climate change: This section describes the link between transportation and greenhouse gas emissions and more recent state and federal legislative actions that will direct current and future RTP updates. Climate change may be the defining challenge of the 21st century.

1.3 Competing in a global economy: This section describes employment trends in the Portland-Vancouver metropolitan region and expected growth in employment and the movement of freight and goods.

1.4 Shifting demographics: This section describes demographic trends in the Portland-Vancouver metropolitan region, including expected population growth and changes in the ethnic and cultural diversity of the region.

1.5 Growing congestion: This section describes how growth in travel is affecting the region's highways and streets and the region's strategy for addressing growing congestion.

1.6 Changing travel behavior: This section describes how travel behavior has been changing in the region, including more recent bicycle pedestrian and transit travel trends.

1.7 Deteriorating infrastructure and declining revenues: This section summarizes the state of transportation finance in the region, including the region's growing maintenance needs. Chapter 3 includes a more detailed discussion of transportation finance issues facing the region.

1.8 Public health, environmental and safety concerns: This section describes the link between transportation and public health and safety.

1.9 What's next moving forward? This section summarizes the steps needed to move forward to address these issues.

More information about these trends can be found in a series of background reports in the Appendices or on Metro's website at www.oregonmetro.gov/rtp.

The MAX serves as a reliable form of travel for residents in the Portland metro area.

1.1 GEOGRAPHIC SETTING

The Portland-Vancouver metropolitan region is part of the broader Pacific Northwest region, also called Cascadia. Shown in **Figure 1.1**, the Pacific Northwest encompasses most of British Columbia, Washington, Oregon and adjoining parts of Alaska, Montana and California. Linked together by a rich and complex natural environment, abundant recreational opportunities and major metropolitan areas, the Pacific Northwest also serves as a global gateway for commerce and tourism, connecting to other Pacific Rim countries and the rest of the United States.

The Portland region is situated at the northern end of the Willamette Valley, a fertile river valley surrounded by dramatic natural features - the Coast Range to the west, the Cascade Range to the east, and the Columbia River to the north (including the Columbia River Gorge National Scenic area). Several snow-capped mountains are visible from different vantage points in the region – including Mt. Hood, Mt. St. Helens, Mt. Rainier and Mt. Adams. Within the region, rivers, streams, wetlands, buttes, forest lands, meadows and rolling to steep hillsides dominate the natural landscape. Outside the urban growth boundary, agricultural lands and other natural landscape features influence the sense of place for the greater region.

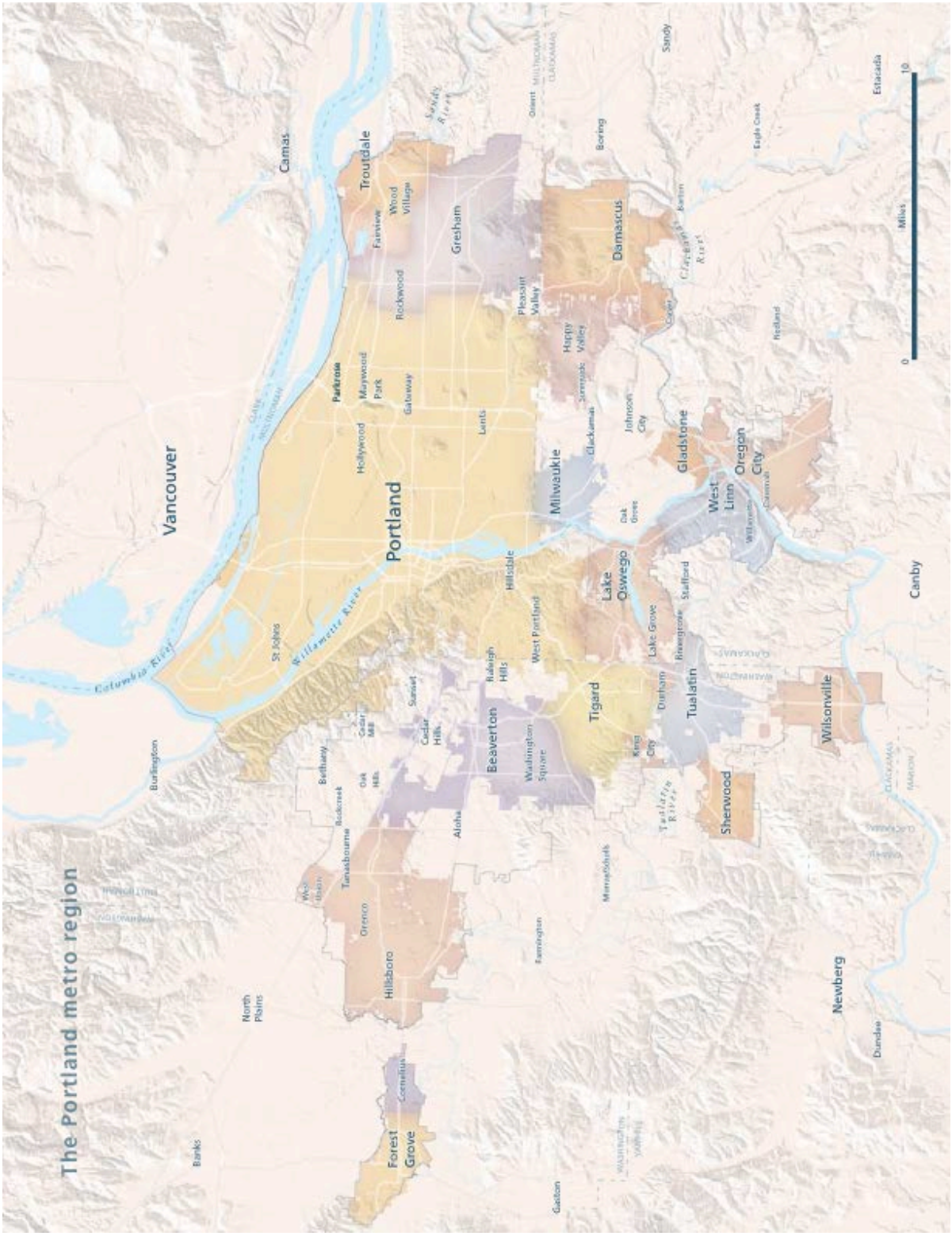
Although not the largest gateway on the U.S. West Coast, the Portland-Vancouver metropolitan region is one of four international gateways on the West Coast, including the Puget Sound, the San Francisco Bay area and Southern California. In this role, the region serves as a gateway to domestic and international markets for businesses located throughout the state of Oregon, Southwest Washington, the Mountain states and the Midwest. Clackamas, Multnomah and Washington counties also play a significant role in the state's agricultural production, representing nearly 17 percent of the state's total value of production and 60 percent of the Port of Portland's export tonnage.[1] The economy of our region and state partially depends on our ability to support the transportation needs of these industries and provide reliable access to gateway facilities.

The Oregon portion of the Portland-Vancouver metropolitan region encompasses 25 cities and 3 counties as shown in **Figure 1.2.** Metro's urban growth boundary includes 403 square miles and more than 1.5 million residents and just under 800,000 jobs in 2012, representing 38.9% percent of the state's population and 48.5 percent of the state's jobs. Metro's urban growth boundary and jurisdictional boundaries are shown in **Figure 1.3**.

[1] *Identification and Assessment of the Long-Term Commercial Viability of Metro Region Agricultural Lands*, Oregon Department of Agriculture, January 2007, Pg. 4.

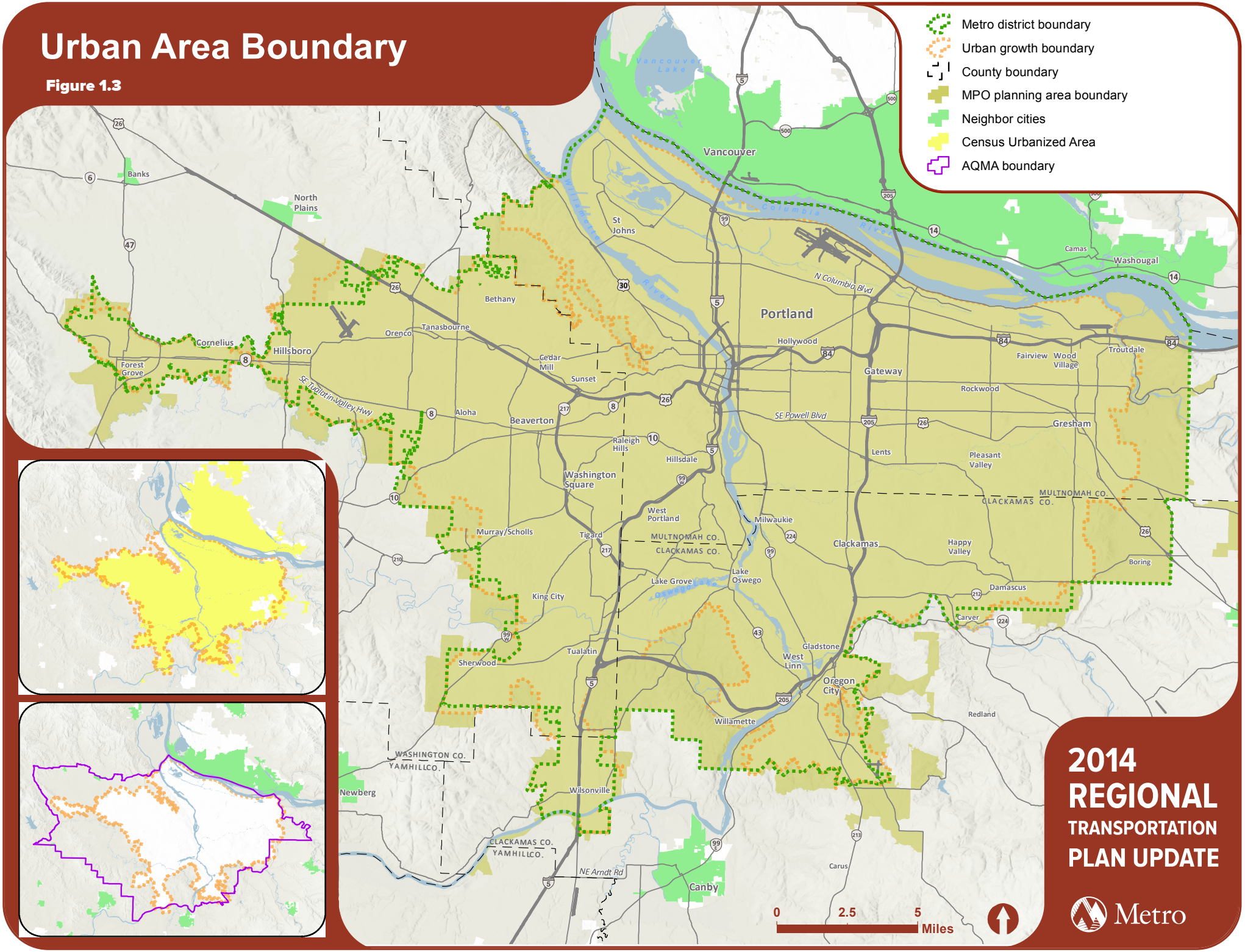
Figure 1.1
Portland-Vancouver Metropolitan Region Geographic Context

Figure 1.2
Cities and counties of the Portland-Vancouver metropolitan region



Urban Area Boundary

Figure 1.3



Metro's Role in Transportation Planning

Metro's transportation planning activities are guided by a federally mandated decision-making framework called the metropolitan transportation planning process. This planning process requires all urban areas with populations over 50,000 to have a designated Metropolitan Planning Organization (MPO) to coordinate transportation and air quality planning and programming of federal transportation dollars within their boundaries.

Metro is the designated MPO for the Portland tri-county area. As such, Metro is responsible for coordinating development of the RTP in cooperation with the region's transportation providers—the 25 cities and three counties in the Metro boundary, the Oregon Department of Transportation, Oregon Department of Environmental Quality, Port of Portland, TriMet, South Metro Area Rapid Transit (SMART), Southwest Washington Regional Transportation Council (RTC), Washington Department of Transportation and other Clark County governments. The process also includes opportunities for open, timely and meaningful involvement of the public, and requires comprehensive consideration of the link between transportation and other regional goals for land use, the economy and the environment, including public health, safety, mobility, accessibility and equity. A summary of RTP public engagement efforts as well as a log of comments and staff responses are provided in the Appendix.

The Metro Council adopted the first RTP in 1983. As a cornerstone of the metropolitan transportation planning process, the RTP provides a long-range blueprint for transportation in the Portland metropolitan region with a 20-year minimum time horizon. The RTP is updated every four years to reflect changing conditions in the region and respond to new federal and state regulatory developments.

State law establishes requirements for consistency of plans at the state, regional and local levels. The RTP serves as the region's regional transportation system plan (TSP), consistent with Oregon Transportation Planning Rule (TPR) requirements. The RTP must be consistent with the Oregon Transportation Plan, state modal and facility plans that implement the Oregon Transportation Plan, and the Oregon Transportation Planning Rule. Local plans must be consistent with the RTP. Projects and programs must be in the RTP's Financially Constrained System in order to be eligible for federal and state funding.

The Appendix provides additional information on state and federal planning requirements.

The region has several planning boundaries with different purposes

Federal and state law requires several metropolitan transportation planning boundaries be defined in the region for different purposes. These boundaries are shown in **Figure 1.3**.

First, Metro's jurisdictional boundary encompasses the urban portions of Multnomah, Washington and Clackamas counties. Second, under Oregon law, each city or metropolitan area in the state has an urban growth boundary that separates urban land from rural land. Metro is responsible for managing the Portland metropolitan region's urban growth boundary.

Third, the Urbanized Area Boundary (UAB) is defined to delineate areas that are urban in nature distinct from those that are largely rural in nature. The Portland-Vancouver metropolitan region is somewhat unique in that it is a single urbanized area that is located in two states and served by two MPOs. The federal UAB for the Oregon-portion of the Portland-Vancouver metropolitan region is distinct from the Metro Urban Growth Boundary (UGB).

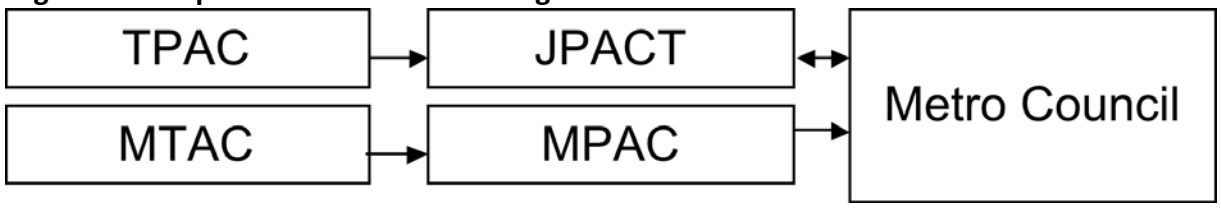
Fourth, MPO's are required to establish a Metropolitan Planning Area (MPA) Boundary, which marks the geographic area to be covered by MPO transportation planning activities. At a minimum, the MPA boundary must include the urbanized area, areas expected to be urbanized within the next twenty years and areas within the Air Quality Maintenance Area Boundary (AQMA) – a fifth boundary.

The federally-designated AQMA boundary includes areas located within attainment areas that are required to be subject to ozone regulations, although recent changes mean that air quality conformity no longer is required to be performed for ozone in this region. The region continues to complete air quality conformity for carbon monoxide for projects within the Metro jurisdictional boundary.

Metro facilitates the metropolitan transportation planning process through Metro's advisory committees

Metro facilitates the metropolitan transportation planning process through four advisory committee bodies –the Joint Policy Advisory Committee on Transportation (JPACT), the Metro Policy Advisory Committee (MPAC), the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC). In addition, the Metro Committee for Citizen Involvement (MCCI) advises the Metro Council on ways to engage residents in regional planning activities. **Figure 1.4** displays the regional transportation decision-making process.

Figure 1.4
Regional Transportation Decision-Making Process



Source: Metro

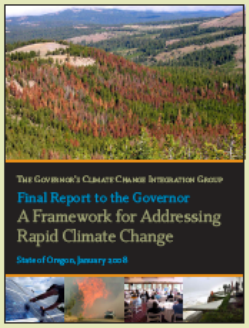
All transportation-related actions (including federal MPO actions) are recommended by JPACT to the Metro Council. The Metro Council can approve the recommendations or refer them back to JPACT with a specific concern for reconsideration. Final approval of each item, therefore, requires the concurrence of both bodies. Under state law, the RTP serves as the region's transportation system plan (TSP). As a result, the Metro Policy Advisory Committee (MPAC) also has a role in approving the regional transportation plan as a land use action, consistent with statewide planning goals and the Metro Charter.

In addition, the Bi-State Coordination Committee advises the RTC, and JPACT/Metro on issues of bi-state significance. On issues of bi-state land use and economic significance, the Committee advises the local and regional governments appropriate to the issue. Since formation in 1999, the committee has reviewed Federal transportation funding reauthorization, Columbia River Channel deepening and projects and studies focused on the I-5 Corridor.

Restructuring in 2004, expanded this role to include examining the connection between land use and transportation in the I-5 corridor and taking a multi-modal approach – including freight and transit – in considering the impacts of land use and transportation decisions within the context of economic development and environmental justice issues. JPACT and the RTC Board cannot take action on an issue of major bi-state transportation significance without first referring the issue to the Bi-State Coordination Committee for their consideration and recommendation.

Metro facilitates the metropolitan transportation planning process through four advisory committee bodies and on-going coordination with the Bi-State Coordination Committee.

1.2 CLIMATE CHANGE



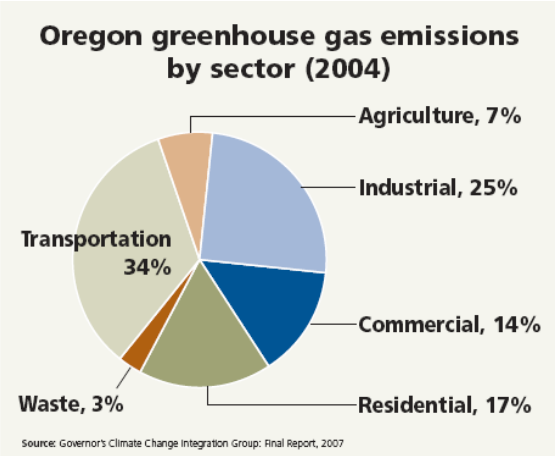
Greenhouse gas goals adopted by the Oregon Legislature and Governor Kulongoski in HB 3543:

- **Short-term:** by 2010, stop increases in greenhouse gas emissions
- **Medium-term:** by 2020, reduce greenhouse gas emissions to 10 percent below 1990 levels
- **Long-term**: by 2050, reduce greenhouse gas emissions to 75 percent below 1990 levels.

Climate change may be the defining challenge of the 21st century. Global climate change poses a growing threat to our environment and our economy, creating uncertainties for the agricultural, forestry and fishing industries as well as winter recreation. The planet is warming and we have less and less time to act. Documented effects include warmer temperatures and sea levels, shrinking glaciers, shifting rainfall patterns and changes to growing seasons and the distribution of plants and animals.

Warmer temperatures will affect the service life of transportation infrastructure, and the more severe storms that are predicted will increase the frequency of landslides and flooding. Consequent damage to roads and rail infrastructure will compromise system safety, disrupt mobility and hurt the region's economic competitiveness.

Our ability to respond will have unprecedented impacts on our lives and our survival. Since 2006, the state of Oregon has initiated a number of actions to respond. As one of five states participating in the Western Climate Initiative, Oregon has signaled a long-term commitment to significantly reduce greenhouse gas emissions. Transportation sources account for 34 percent of greenhouse gas emissions in Oregon, largely made up of carbon dioxide (CO_2).



In 2007, the Oregon Legislature passed House Bill 3543, which commits the state to reduce greenhouse gas emissions to 10 percent below 1990 levels by 2020 and 75 percent below 1990 levels by 2050. With the region expecting a million more people over the next 25 years, we are challenged to develop a transportation strategy to serve that growth and reduce CO_2emissions sufficient to meet state goals.

House Bill 3543 also created the Oregon Global Warming Commission, which is charged with recommending ways to achieve the emission reduction goals and prepare Oregon for the effects of global warming. The Commission is tasked with monitoring the economic, environmental, health and social impacts of global warming and reporting on Oregon's progress toward the emission reduction goals on a biennial basis.

House Bill 3543 also created the Oregon Climate Change Research Institute within the state's Department of Higher Education. The Institute will be administered by Oregon State University and will facilitate climate change research, serve as a clearinghouse for climate change information, provide technical assistance to local governments and support the Global Warming Commission.

In 2008, the Environmental Quality commission approved the greenhouse gas reporting rules under the direction of Governor Kulongoski. The rules govern the collection of annual greenhouse gas emissions from certain facilities such as industrial facilities with air quality permits, wastewater treatment facilities, and more. The information gathered is used to provide a better understanding of greenhouse gas emissions and to improve the ability to track progress toward meeting long-range greenhouse gas reduction goals[2]

Between 2009 and 2010, the Oregon Legislature passed House Bill 2001 and Senate Bill 1059, creating The Oregon Statewide Transportation Strategy (STS): A 2050 Vision for Greenhouse Gas. The STS is part of a larger effort known as the Oregon Sustainable Transportation Initiative and is a state-level planning effort that examines all aspects of the transportation system to identify strategies to reduce greenhouse gas emissions. It will identify the most effective GHG emission reduction strategies in transportation systems, vehicle and fuel technologies, and urban land use patterns. The strategies identified are expected to have additional benefits, including improved health, cleaner air, and a more efficient transportation system.

In 2010, the Global Warming Commission began a Roadmap to the 2020 project that offers recommendations for how Oregon can meet its 2020 greenhouse gas reductions goals of 10% below 1990 levels. In 2011, after recommendations from technical committees, the Commission completed a "roadtrip" for the Roadmap, seeking public review through workshops, presentations, and online public surveys.

In 2012, Governor Kitzhaber released a 10-Year Energy Action Plan to protect Oregon consumers and ensure energy investments are made that will strengthen the economy. The plan outlines strategies to meet energy efficiency, renewable energy, greenhouse gas reductions, and transportation objectives with strategies that help keep investment opportunities to keep more capital circulating in Oregon. The plan presents three strategies to maximize energy efficiency, enhance clean infrastructure development, and accelerate the market transition to a cleaner transportation system.

What is the "traded sector"?

As defined in ORS 285A.010, (8), "traded sector" means industries in which member firms sell their goods or services into markets for which national or international competition exists. As a result of their exchange earnings, these industries increase spending power within their regional or state economies.

1.3 COMPETING IN A GLOBAL ECONOMY

Despite a growing "buy local" movement, most of the products we buy come from someplace else. And many of the goods we produce in Oregon move on to markets in other states and countries. The global economy is expanding

[2] http://www.deq.state.or.us/aq/climate/greehousegas.htm

rapidly, and our region's ability to move products to far-flung markets depends on an efficient transportation system. As a critical West Coast domestic hub and international gateway for commerce and tourism, the Portland area must maintain well-functioning river ports, rail connections and highways. The economic health of the region is also dependent on industries that have been attracted to the region because of our well-trained labor pool, relatively low cost of living and high quality of life.

Job retention and creation

The region's economy has been marked by job growth, shifts in job types, and growth in traded sector businesses. The greater Portland area employs over a million workers, the fifth largest workforce on the west coast[3]. Despite the national recession, greater Portland's employment base grew by 4% in the past five years[4]. Nearly one-fifth of Portland's economy is generated by the traded sector. The traded sector workforce has grown by 3% in the past five years to approximately 143,000 residents[5].

Table 1.1 summarizes overall forecasted job growth for the four-county region.

Table 1.1
Forecasted Growth in Employment by County[6]

County	2010	2040	Increase
Portland Central City and Neighborhoods	374,342	531,209	156,867 (42%)
East Multnomah County	44,822	95,501	50,679 (113%)
Multnomah County	419,164	626,710	207,546 (50%)
Clackamas County	137,946	227,483	89,537 (65%)
Washington County	232,019	422,236	190,217 (82%)
Three-county sub-total	789,129	1,276,429	487,300 (38%)
Clark County (Wash.)	127,267	237,411	110,144 (87%)
Four-county total	916,396	1,513,840	597,444 (65%)

Source: Metro

Although the traded-sector accounted for only one-quarter of area's new jobs between 1975 and 2005, all jobs—and the area's economy—depend on this sector's ability to bring new money into the area.[7] The region's continued ability to bring new money into the area and attract and retain jobs will depend on how well this sector's transportation needs are met.

[3] Greater Portland Work Book, 2013-14The Regional Business Plan, January 2006, p. 4.
[4] Ibid. p. 11
[5] Greater Portland Export Plan, Metro Export Initiative
[6] The totals for each county include the area both inside and outside the urban growth boundary.
[7] *Cost of Congestion to the Economy of the Region Study (2005)*

Recession Recovery

Figure 1.5 Employment Growth

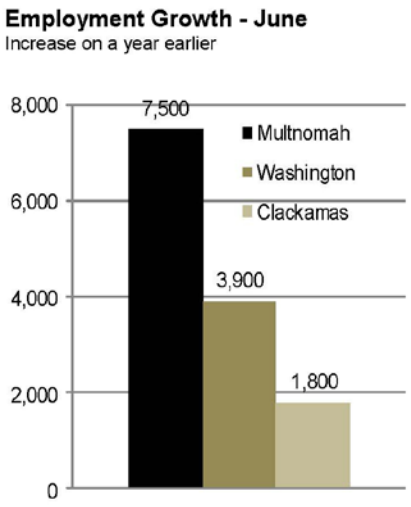
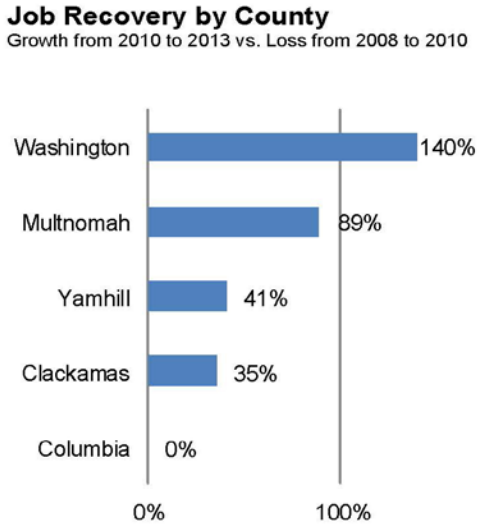


Figure 1.6 Job Recovery by County



Source: State of Oregon Employment Department, July 2013

The Portland region experienced a historic recession in the middle of the last decade from which it has now mostly recovered. **Figures 1.5 and 1.6** provide two different ways to look at that recovery. **Figure 1.5** shows that in from June 2012 to June 2013 all three counties in Metro's planning area have added jobs, **Figure 1.6** shows that from 2010 to 2013 our region has regained nearly all of the jobs lost in the recession, though it varies geographically, with Washington County recovering the fastest. Additionally, the unemployment level in the Portland region (7.3% as of June 2013) has dropped a full point from June 2012, and is now lower than the national unemployment average, after being above it for several years.

Attracting talented labor pool

Attracting and retaining a young, college-educated work force is a critical component for being economically competitive in today's knowledge and information economy. Recent research conducted by Jason Jurjevich and Greg Schrock found that younger populations are placing greater value in quality of life – from political milieu to public transportation – compared to traditional economic factors such as work and careers.

The Portland metropolitan region has been successfully attracting a talented and educated workforce since the 1980s. Despite periods of economic uncertainty through the years, the Portland region has attracted college-educated individuals under the age of 40 at some of the highest net migration rates[8].

[8] Is Portland Really the Place Where Young People Go To Retire? Migration Patterns of Portland's Young and College-Educated, 1980-2010 (2011)

Portland as a global gateway

As a critical west coast hub, Portland area must maintain well-functioning river ports, rail connections and highways.

An international airport, river ports, rail connections and an interstate highway system move tourists, freight and goods to the region and beyond. The region's economy depends more heavily on transportation than many other regions of comparable size.[9] Businesses and households depend on an efficient, multi-modal transportation system that reliably moves freight, services, and people.

Freight transportation demand is expected to increase the amount of goods that will travel to and through this region – in part due to growth in businesses and industry in other parts of the state. The economy of our region and the rest of the state depend on providing reliable access to this gateway and hub.

The Portland region is a primary economic engine for Oregon. Due to the region's commerce-supporting infrastructure and globally focused businesses, much of the freight moved in the state has ties to the region. Tables 1.2 through 1.4 provide a statewide look at both the types of commodities moved in Oregon and how they are moved today and into the future.

Statewide freight travel

Table 1.2 shows the top-tier commodities shipped to, from and within Oregon by weight and value. The mix of high-weight and value commodities demonstrate the diversity of Oregon's economy, which supports both resource-based commerce (logs, cereal grains and other agricultural products, meat/seafood), and technology and manufacturing (electronics, machinery, precision instruments). The commodities mix also drives the choice of mode(s) for shipment.

[9] Cost of Congestion Study

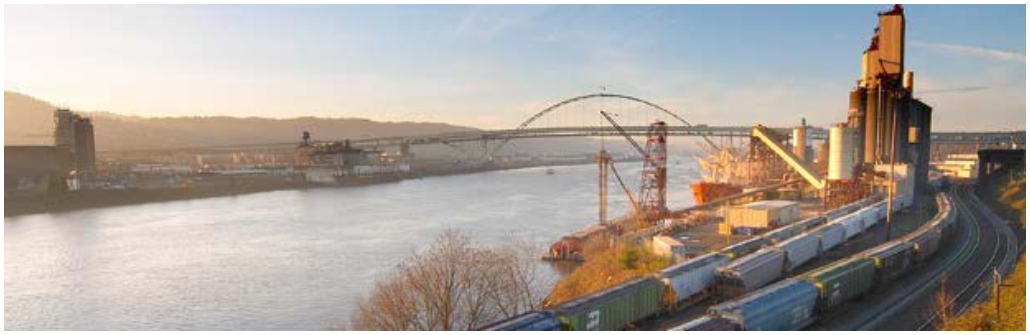
Table 1.2
Oregon Shipments for Top-Tier Commodities, by Weight and Value for 2011

Tons (millions)						Value ($ millions)					
Within State		**From State**		**To State**		**Within State**		**From State**		**To State**	
Gravel	34.0	Wood products	10.7	Cereal Grains	13.6	Machinery	13,801	Motorized Vehicles	13,005	Machinery	10,477
Non-metal mineral products	19.3	Non-metal mineral products	10.5	Basic Chemicals	8.8	Mixed Freight	8,468	Meat/ Seafood	11,643	Motorized Vehicles	9,175
Logs	13.0	Cereal grains	5.9	Coal	8.0	Gasoline	6,511	Precision Instruments	9,109	Pharma-ceuticals	8,040
Waste/ Scrap	13.0	Other Foodstuffs	4.9	Wood Products	3.6	Electronics	4,984	Electronics	8,834	Electronics	5,874
Wood products	8.9	Other Ag. Products	4.5	Waste/ Scrap	5.4	Articles-base Metal	4,345	Machinery	7,708	Textiles / Leather	5,744

Source: Freight Analysis Framework (FAF[3.4]), Federal Highway Administration, 2013.

Each freight mode provides a distinct function in the movement of freight, with different operating and cost characteristics that make them particularly suited to certain commodities and markets. While different freight modes can compete directly for business, more often they are connected, like links in a chain, supplying door-to-door transportation of shipments.

Table 1.3 and 1.4 compare 2011 Oregon shipments by weight and value with those forecast for 2040, respectively. With regard to both weight and value, trucks are moving the bulk of Oregon shipments today and into the future. As reported on the federal websites, in addition to truck-only shipments, trucks are included as the highway modal link for air cargo, and for shipments combining rail and trucks. Also important to note are the forecasted changes for other modes. Moderate percentage increases in tons shipped from the state are forecasted for truck (104%) and rail (85%). Forecasted changes in the value of shipments reinforce the prediction of small to moderate growth in freight movement for all freight modes.



Currently freight rail is accommodating traffic volumes, but projected growth will cause constraints in the system by 2030. Port of Portland Rail Plan, 2013.

Table 1.3
Oregon Shipments by Weight for 2011 and 2040(in millions of tons)

Mode	2011						2040					
	Within State		From State		To State		Within State		From State		To State	
	#	%	#	%	#	%	#	%	#	%	#	%
DOMESTIC												
Truck	138.	96.	35.	75.	23.	40.	257.	96.	58.	76.	49.9	45.
Rail	.9	<1	4.8	10.	18.	30.	1.2	<1	6.9	9	34.4	31.
Water	1.7	1.2	.3	<1	1.1	1.8	4.4	1.6	.4	<1	.5	<11
Air, air and truck	0		.07	<1	.05	<1			.02	<1	0.2	<1
Multiple Modes &	.7	<1	5.9	12.		9.9	1.6	<1	9.9	13	10.2	9.2
Pipeline[1]	<.04	<1	.01	<1	10.	16.	.07	<1	.01	<1	14.3	13
Other/unknown	1.6	1	.5	<1	.03	<1	19.1	5	40.	18	51.4	30
Totals[1]	143.	100	46.	100	59.	100	268.	100	76.	100	110.	100
IMPORT												
Truck	2.5	89.	2.6	81.	2.9	28.	8.8	91.	6.3	86.	8.9	39.
Rail	.3	8.3	.4	12	6.4	63.	.6	6	.5	7.1	11.0	48.
Water	.001	<1	.00	<1	.00	<1	.004	<1	.00	<1	.002	<1
Air, air and truck	0	0	0	0	.00	<1	0	0	0	0	.007	<1
Multiple Modes &	.02	<1	.2	5.2	.7	7	.06	<1	.4	5.7	2.8	12
Pipeline[1]	0	<1	0	<1	.00	<1	0	0	0	0	.006	<1
Other/unknown	.04	1.4	.02	<1	.05	<1	.2	1.5	.06	<1	.2	<1
Totals[1]	2.8	100	3.1	100	10.	100	9.6	100	7.3	100	22.9	100
EXPORT												
Truck	2.8	57.	8.8	65.	4.3	39.	8.4	50.	29.	59.	10.1	48
Rail	.06	1.1	1.4	10.	2.6	24.	.2	1.3	4.8	9.7	4.4	20.
Water	.06	1.2	.2	1.4	.6	5.7	.2	1.3	2.0	4.2	.8	3.8
Air, air and truck	0	<1	.00	<1	.00	<1	0	0	.00	<1	.02	<1
Multiple Modes &	.1	2.6	1.6	11.	1.7	16	.3	2	7.3	15	4.3	20.
Pipeline	0	0	0	0	.00	<1	0	0	0	0	.002	<1
Other/unknown	1.8	37.	1.5	11.	1.5	14.	7.6	45.	5.7	11.	1.4	6.8
Totals[1]	4.7	100	13.	100	10.	100	16.7	100	49.	100	20.9	100

Source: Freight Analysis Framework (FAF[3.4]), Federal Highway Administration, 2013.
[1]Due to rounding, individual columns may not match totals.

Table 1.4
Oregon Shipments by Value for 2011 and 2040(in millions of dollars)

Mode	2011						2040					
	Within State		From State		To State		Within State		From State		To State	
	#	%	#	%	#	%	#	%	#	%	#	%
DOMESTIC												
Truck	84,354	92.6	67,515	69.3	47,650	54	145,705	90.6	115,401	55.3	115,352	53
Rail	339	<1	2,559	2.6	8,168	9.3	341	<1	3,482	1.7	11,177	5.1
Water	375	<1	343	<1	363	<1	497	<1	217	<1	62	<1
Air, air and truck	0	0	2,527	2.6	3,394	3.9	0	0	18,923	9.1	15,131	7
Multiple Modes & Mail	3,287	3.6	22,670	23.3	20,623	23.4	9,638	6	67,896	32.5	64,227	29.5
Pipeline	16	<1	7	<1	6,403	7.3	27	<1	5	<1	7,189	3.3
Other/ unknown[2]	2,654	2.9	1,687	1.7	1,613	1.8	4,630	2.9	2,766	1.3	4,440	2
Totals	91,026	100	97,309	100	88,214	100	160,837	100	208,662	100	217,576	100
IMPORT												
Truck	5.400	93.6	11,020	90	8,103	58.9	17,789	93.5	19,547	84.5	28,307	60.1
Rail	140	2.4	211	1.7	1,781	13	307	1.6	279	1.2	3,114	6.6
Water	3	<1	0	0	2	<1	7	<1	0	0	4	<1
Air, air and truck	0	0	3	<1	221	1.6	0	0	9	<1	858	1.8
Multiple Modes & Mail	150	2.6	430	3.5	3,205	23.3	639	3.7	1,064	4.6	13,627	28.9
Pipeline	0	0	0	0	2	<1	0	0	0	0	3	<1
Other/ unknown	77	1.3	578	4.7	434	3.1	288	1.5	2,225	9.6	1,181	2.5
Totals	5.770	100	12,242	100	13,747	100	19,030	100	23,123	100	47,094	100
EXPORT												
Truck	1.959	81.8	6,484	66.6	3,788	63.2	8,655	85	17,584	62	9,908	64.7
Rail	6	<1	1,059	10.9	467	7.8	31	<1	2,692	9.5	612	4
Water	13	<1	45	<1	170	2.8	36	<1	398	1.4	185	1.2
Air, air and truck	0	0	183	1.9	371	6.1	0	0	706	2.5	2,005	13.1
Multiple Modes & Mail	44	1.8	1,240	12.7	876	14.6	211	2	4,698	16.6	2,318	15.1
Pipeline	0	0	0	0	0	<1	0	0	0	0	0	0
Other/ unknown	373	15.6	730	7.5	318	5.3	1,241	12.2	2,277	8	297	1.9
Totals	2.395	100	9,741	100	5,989	100	10,174	100	28,355	100	15,325	100

Source: Freight Analysis Framework (FAF[3.4]), Federal Highway Administration, 2013.

Freight travel in the Portland region

The 2008-2009 Great Recession was deeper in the Portland region than in the nation as a whole. The rosy forecasts of dramatic growth in freight tonnage and value moved have given way to more tempered expectations of growth. The upside for the region is that while weakened by recession, it has been near the forefront of economic recovery. The bright spot is the rise in export activity. A 2013 Brookings Institute study found the region to be the second-fastest growing export market among the 100 largest metropolitan areas. Between 2003 and 2010, the region increased its export volume by 109.3%, creating 45,863 new jobs. The study also found that 92% of export growth was driven by 10 industries. Of this, the computer and electronic products industry accounted for 57% of total exports and 63.4% of export growth. These exporting industries depend on heavily on a well-functioning freight system to bring their goods to market.[10]

Trucks

Trucks will continue to be the dominant mode of transport in the freight transportation system, with Oregon truck volumes expected to grow with implications for the region's highway network. Even though the use of other modes will expand, trucks will maintain their preeminent status as the first and last links in delivering goods to the end user due to their flexibility. A trend toward lighter weight, higher value, increasingly time sensitive, producer to retailer shipments – common for the computer and electronic products industry - is expected to continue, again reinforcing the role of trucking in the freight transportation system hierarchy.

Truck access between port facilities, industrial sanctuaries and the National Highway System is critically important to shippers, carriers and distributors of freight. These connections are commonly referred to as "first mile/last mile" connections. Motor carriers identified correcting regional bottlenecks on the principal NHS roads as their first priority. Motor carriers also support implementation of Transportation System Management strategies such as truck signal priority and incident management.[11]

Aviation

Air cargo, although low in tonnage, carries high-value, time-sensitive goods—electronics, footwear and perishables—to international and domestic markets and is expected to increase its market share. Air cargo continues to require efficient access for these perishable and high-value goods and production-critical components.

Area industries producing goods shipped via air freight have had to adjust their production schedules repeatedly due to roadway congestion in order to meet air freight departure deadlines. In turn, this has led firms to lose valuable production time and increase their production costs.

Air cargo is expected to increase its market share in the region.

[10]Brookings Institute, Greater Portland Export Plan, 2013

[11] See Section 2.5.7 for more information about the types of strategies recommended for this region.

Rail

The 2003 *I-5 Rail Capacity Study* provides a road map for investment in freight rail. The boom years saw trade expand and rail volumes grow, and significant investment in the region's freight rail infrastructure. The Great Recession changed the economic landscape and saw a decline in rail volumes as trade dropped. With a thawing of the economic downturn, it is expected that freight volumes for all modes, including rail, will rebound.

There are newer trends that will impact freight rail investment and operations. With rising trucking costs, it has now become cost-effective for rail to operate in some 300-500 mile freight corridors, where historically rail was competitive above 1,000 miles. This trend will increase rail volumes in urban areas. Another trend is the increasing length of unit trains that will drive investment in infrastructure to accommodate these longer trains. The focus on increasing passenger rail service, such as the Oregon Passenger Rail project, will mean sharing capacity on some rail corridors. Finally, technology advances will increase efficiency and lower costs for intermodal transfers between rail and other modes.[12]

With these trends in mind, the 2013 *Port of Portland Rail Plan* lays out an investment strategy for the Port's rail facilities and key bottlenecks off Port property. The project found that at present the freight rail network has adequate capacity to accommodate current volumes but growth in trade and passenger service demand will generate capacity constraints within the 20 year planning horizon.

Class 1 railroads like the Union Pacific rail yard in North Portland are experiencing capacity constraints.

[12] Port of Portland, Port of Portland Rail Plan, 2013.

The ports of Portland and Vancouver along the lower Columbia River are national leaders in the shipment of grain

Marine

Modern commercial navigation of the Columbia River began in 1877, when Congress approved dredging a navigation channel between the Portland-Vancouver area and the mouth of the river in Astoria. In 2012, 1,302 vessels called on the Portland-Vancouver Harbor[13]. Navigation channel depth on the Columbia River continues to be the limiting factor on the size, and therefore the number, of ships that call on the Portland-Vancouver Harbor. The Columbia River Channel Deepening project was completed in 2010, deepening 103 miles of river to 43 feet, which allows vessels serving the lower Columbia River ports to accommodate more cargo weight.

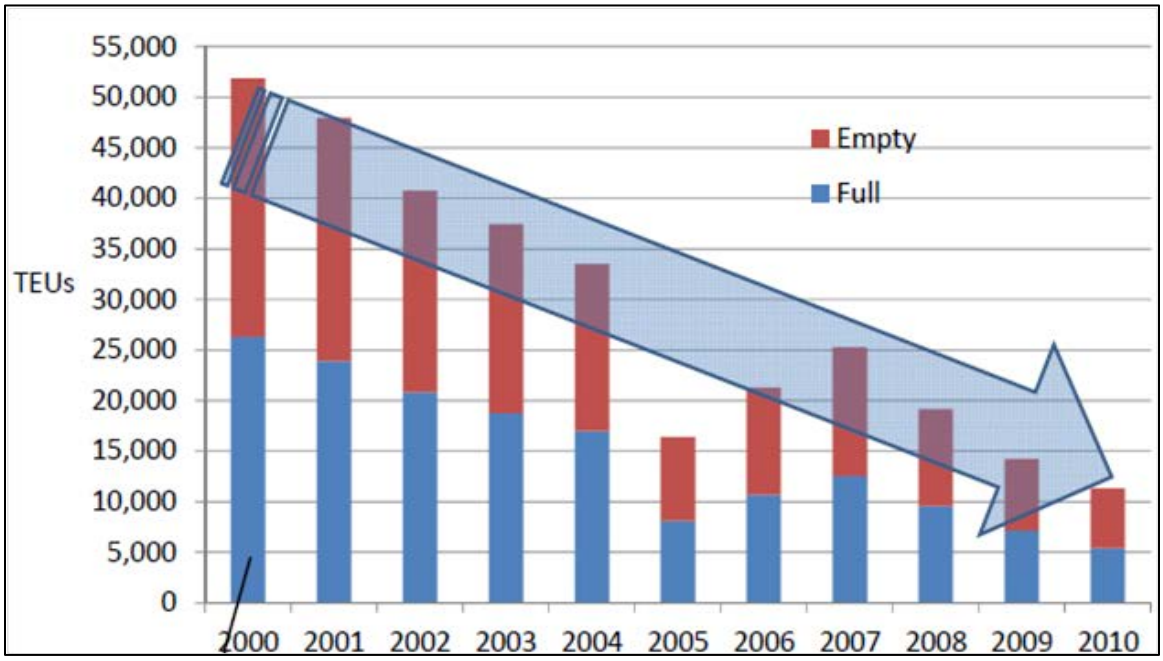
The ports of Portland and Vancouver, as well as the other ports located along the lower Columbia River, are national leaders in the shipment of grain. They also ship large quantities of other bulk agricultural commodities from Oregon, Idaho and Washington to the rest of the world. The region's ports will still manage to grow by moving a wide range of marine cargoes, such as energy and transportation project related materials, manufactured goods, automobiles, agricultural and mining related products and fuel. The ports generate significant volumes of truck and rail traffic in the West Vancouver and Rivergate areas. Vehicle congestion during peak hours adversely impacts these truck movements. Intermittent rail congestion from movements required as Class 1 and shortline railroads access the marine ports adds to both local freight and passenger congestion in the port intermodal areas.

Barge operators on the Columbia/Snake River system use equipment specifically constructed to operate in the locks on those rivers, adding significantly to their capital costs. Barges are also used to transport grain, fuel, steel and aggregate related products on the lower Willamette River. It should be noted, however, that most import and export shippers prefer to use truck and rail for any higher value products moving through the ports. The primary limiting factors to barge movement in the region are the BNSF rail and I-5 bridges crossing the Columbia River and maintenance of navigable locks on the Columbia and Snake rivers. Barge traffic has been steadily declining in recent years as shown in **Figure 1.7**

[13] Merchants Exchange of Portland Oregon, 2012 Annual Report

Figure 1.7

Columbia River Barge Activity, 2000 - 2010



Center for Commercial Deployment of Transportation Technologies, 2011

Industrial land supply

In the context of support for preserving and expanding, as appropriate, all industrial land in the region, industrial sanctuaries should continue to be considered a unique and protected land use. Preserving the region's existing industrial sanctuaries is essential to maintaining economic growth. As industrial land in the region becomes increasingly scarce, active protection of the region's industrial sanctuaries will become critical.

Protection of industrial sanctuaries should include modernization of existing sites as needed, as long as the industrial nature of the land use is maintained. There will be an increased need for industrial waterfront lands to support growth in maritime trade. Industrial land uses are frequently incompatible with, and pressured by, residential development.

Extra care must also be taken when placing industrial land uses in close proximity to residential development, recreational or environmental resources. Industrial land users consider residential development incompatible with their operations, while residential property owners take issue with aspects of industrial development. Similarly, locating housing adjacent to primary truck routes or rail lines is also viewed as undesirable by carriers and residential property owners alike. Maintaining and improving multimodal freight access to the 2040 industrial sanctuaries is critically important to ensuring long-term viability of industry in the region.

1.4 GROWTH AND SHIFTING DEMOGRAPHICS

The world's population is growing, and here at home our population continues to grow as well. New forecasts show that between 2010 and 2040, over 917,000 additional people are expected to live within the 4-county area.[14] While this growth brings jobs and opportunity, it also creates new challenges. In an average week, the greater Portland area gains more than 500 new residents. About half of the new residents anticipated in the region during the next 20 years will be born here. More than 62 percent of households in the Portland region consist of just one or two people, according to the 2010 census.

Demographic trends influence the type, location and amount of demand on transportation facilities and services and pose potential equity considerations. Demographic trends in the greater Portland-Vancouver region have been marked by strong population growth, especially in Washington County and Clark County, an increase in ethnic and cultural diversity throughout the region and shifts in age distribution. Trends also indicate that higher numbers of low-income, culturally diverse populations are moving to areas of the region that have higher levels of transportation system gaps and barriers. This highlights the need for regional transportation planning to strive for equitable distribution of transportation resources by both population and geographic distribution.

Table 1.5 shows population growth by county between 2000 and 2010. Growth has slowed since the 1990s, but remains robust at an average annual rate of about 1.55 percent per year.

Table 1.5
Growth in county population and households between 2000 and 2010
(County percent of regional total shown in parentheses)

County	2000		2010		Percent Increase 2000–2010	
	Population	Households	Population	Households	Population	Households
Multnomah	660,486 (37%)	272,098 (39%)	735,334 (36%)	304,540 (38%)	11%	12%
Clackamas	338,391 (19%)	128,201 (18%)	375,992 (18%)	145,790 (18%)	11%	14%
Washington	445,342 (25%)	169,162 (24%)	529,710 (26%)	200,934 (25%)	19%	19%
Clark (Wash.)	345,238 (19%)	127,208 (18%)	425,363 (20%)	158,099 (19%)	23%	24%
Total	**1,789,457**	**696,669**	**2,066,399**	**809,363**	**15%**	**16%**

Source: Social Explorer Tables (SE), Census 2000, Census 2010, U.S. Census Bureau and Social Explorer (percents have been rounded)

[14] Metro 2040 Growth forecast.

Table 1.6 shows Metro's growth forecast from 2010 to 2040. As the table shows, the Portland-Vancouver metropolitan region is expected to add approximately 917,000 more people - the equivalent of adding two cities the size of Portland. A million more people means that more freight, goods and services will travel our waterways, rails, streets and throughways. More people will be using the region's transportation system to get to work, school, shopping and other daily activities

Table 1.6
Forecasted Population Growth by County (2010-2040)

County	2010	2040	Increase
Multnomah County			
Portland Central City and Neighborhoods	583,776	832,378	248,602 (43%)
East Multnomah County	151,847	195,614	43,767 (29%)
Clackamas County	401,757	616,309	214,552 (53%)
Washington County	503,656	719,026	215,370 (43%)
Three-county sub-total	1,641,036	2,363,327	722,291 (44%)
Clark County (Wash.)	425,363	620,193	194,830 (46%)
Four-county total	**2,066,399**	**2,983,520**	**917,121 (44%)**

Source: Metro 2040 Regional forecast.

Our region is becoming more culturally diverse

Minority populations in the Portland-Vancouver region have more than doubled in 10 years.

The Portland-Vancouver region minority population increased significantly between 2000 and 2010, growing from 330,000 to 501,000 in that decade. Hispanic/Latino populations grew the most, increasing by 92,000 from 132,000 to 224,000, a 70 percent increase for the decade.

Asian Americans comprised the second fastest-growing population in the region, posting an increase of 44 percent during that decade. Between 2000 and 2010, the region gained an additional 37,000 Asian Americans[15]. From 2000 to 2010 the Black/African-American population grew from about 49,000 to 59,000, a 21 percent increase[16]. International migration between 2000 and 2009 accounted for about 30 percent of the population growth in the region. The largest share has come from the former USSR (18 percent) and Mexico (17 percent). Other major countries of origin include Vietnam (8 percent), China (7 percent), India (5 percent), Korea (3 percent), and the Philippines (3 percent). Future population growth due to immigration and migration will depend

[15] 2010 Census
[16] 2010 Census

on national and international conditions that are difficult to predict. Regional research indicates that the areas with highest percentage of in-migration by low-income, culturally diverse populations are less served by transit, bicycle, and pedestrian facilities than higher income areas.[17] These factors highlight the need to address transportation equity for populations at all income levels and communities outside the central city.

Among the immigrants were highly-educated professionals in high-paying jobs, and a large number of workers with limited education in low-paying jobs. Both immigrant professional families and families with low-income have tended to settle in or move to suburban communities, where housing prices are lower than in the Portland central city. Counties in the Portland-Vancouver region that experienced the greatest amount of international migration between 2000 and 2009 are Multnomah County and Washington County. Ninety percent of migration in Multnomah County (and fifty percent in Washington County) are from international immigrants.[18]

However, in the suburbs and outlying areas, transportation choices are more limited. Transit service, bicycle facilities and sidewalks commonly have gaps or may be missing altogether. Furthermore, low density, single-use development and inadequate levels of street connectivity make it difficult to provide frequent, cost-effective transit service. In areas closer to the center of the region, residents can walk a shorter distance to access transit than neighborhoods in the outlying parts of the region.[19]

Our region is getting older

Age distributions are influenced by birth rates, death rates and migrations. The proportion of people over 65 has begun to rise in both absolute numbers and percentage of the total population. The median age in the Portland region was 36.7 according to 2012 American Community Survey data, up from 34.8 in 2000.

In 2012, about 13.1 percent of the population in the Portland-Vancouver area was over 65; by 2030, that number is forecasted to be 17 percent.[20] An aging population requires transportation facilities equitably designed to serve people with a range of physical abilities.

The percentage of people over 65 is expected to increase after 2011.

[17] Regional Equity Atlas (2007). Coalition for a Livable Future in partnership with Portland State University.
[18] Greater Portland Pulse, Migration
[19] Regional Equity Atlas (2013). Coalition for a Livable Future in partnership with Portland State University
[20] Portland State University, "Age-Related Shifts in Housing and Transportation Demand", pgs. 6,8.

Transportation facilities need to be designed to ensure safe and convenient access for people of all ages and abilities.

As our population grows more diverse, as the Baby Boom generation ages and as we live and work longer, employment patterns, lifestyles and housing needs are expected to change. Increasing numbers of single-parent, childless and multifamily households have joined traditional nuclear families in our communities.

As a result, the nature, location and pricing of housing needs to evolve to provide a broader range of affordable housing options.

1.5 DETERIORATING INFRASTRUCTURE AND INADEQUATE FUNDING MECHANISMS

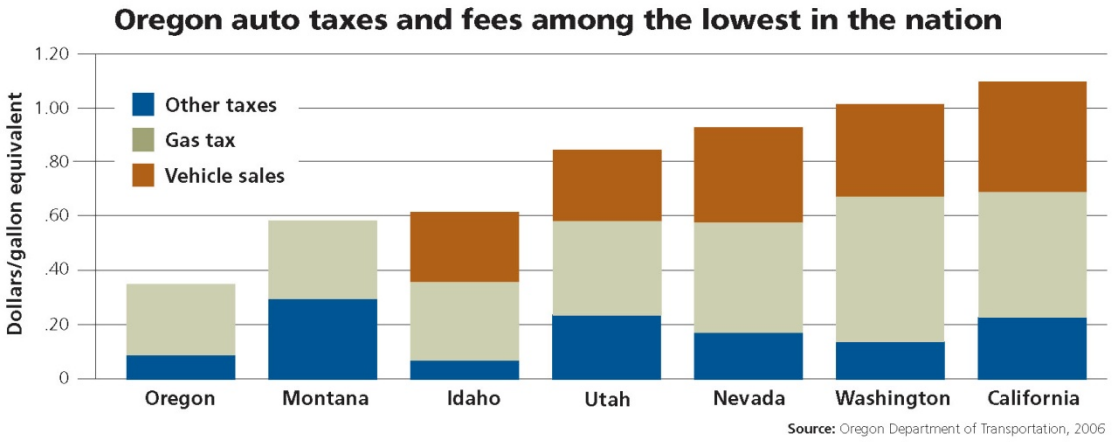
Today the federal government is investing less in infrastructure than ever before. While budgets are shrinking, aging roads and bridges are operating beyond capacity, and our transit systems lack funding to expand. Traditional approaches to financing transportation projects are not only failing to maintain existing infrastructure, they are wholly inadequate to build new systems to accommodate growth and keep our economy moving.

Federal and state transportation sources are not keeping up with growing needs

Federal and state funding sources are at their lowest levels since the 1960s. Since 1965, government spending on transportation, sewers and water systems has declined from 39 cents to 25 cents for every dollar spent on private residential construction. Oregon relies heavily on weight-mile fees for heavy trucks and a gas tax (24 cents per gallon). Until the passage of House Bill 2001 that increased the state gas tax by six cents, the state gas tax had not increased since 1993. Purchasing power of this source is further eroded because the state gas tax is not indexed to inflation.

Oregon ranks last compared with other western states (California, Idaho, Montana, Nevada, Washington and Utah) in total auto taxes and fees collected as shown in **Figure 1.8**[21]. Reduced purchasing power leads to increased competition for transportation funds and reduced capability to maintain and expand the existing system. Meanwhile, the region's transportation infrastructure continues to age and require more maintenance.

Figure 1.8
Oregon ranks last compared to other western states in auto taxes and fees collected



Purchasing power is further eroded by rising material costs. Over the next two decades, the gap is expected to grow between the revenues we have and the investments we need just to keep our bridges, roads and transit systems in their current condition, to say nothing of addressing new needs. Current sources of transit funding are not enough to support the system expansions needed to serve its rapidly growing ridership.

Growing streets and throughways maintenance backlogs

The region's aging infrastructure is deteriorating and requires more maintenance than ever before. The Oregon Department of Transportation (ODOT), cities, and counties devote nearly all existing state and federal gas tax revenues to operation and maintenance of the existing road system. Although maintenance consumes most funds, a backlog of projects is growing.

According to the American Society of Civil Engineers, 65 percent of Oregon's major roads are in poor or mediocre condition, and 5.7 percent of Oregon's bridges are structurally deficient[22]. Comprehensive data of the Portland metropolitan region is not currently available. The City of Portland estimates it would take $1.5 billion over 10 years to get the city's transportation system to

Bridges
Hawthorne Bridge (1910)
Steel Bridge (1912)
Broadway Bridge (1913)
Sellwood Bridge (1925)
Burnside Bridge (1926)
Ross Island Bridge (1926)
St. Johns Bridge (1931)
Interstate Bridge (1958)
Morrison Bridge (1958)
Glen Jackson Bridge (1964)
Marquam Bridge (1966)
Fremont Bridge (1973)

[21] Data in Figure 1.8 does not include House Bill 2001 gas tax increase.
[22] *ASCE*, 2013 Report Card for America's Infrastructure

fair or better condition, including roads, bridges, signals and other categories. Increased traffic volume also increases the maintenance needs of regional streets and throughways.

Maintenance needs of regional streets and throughways are compounded by the current age of most regional facilities. Compounding all of this, maintenance costs often compete with funding available for new or expanded facilities.[23]

Aging regional bridges

All ten Willamette River bridges provide critical regional connections across the Willamette River. ODOT is responsible for maintenance and operations of the St. Johns, Ross Island, Marquam and Fremont bridges. Union Pacific Railroad owns the Steel Bridge, which also serves as a critical connection for the region's high capacity transit system and intercity passenger rail service.

Multnomah County is responsible for the remaining five bridges. Within 20 years, four of Multnomah County's five Willamette River Bridges will be 100 years old. The county's capital program for these bridges is estimated to cost $550 million, yet only $179 million in federal, state and county revenues have been identified for the plan period. All the region's bridges face maintenance challenges that come from age and use.

The Marquam Bridge, a double deck cantilever truss bridge built in 1966, was ranked as the safest due to restraining devices that connect the decks to piers, which reduce the chance of the decks' collapsing.

Some investments have been made

Despite limited resources, maintenance of the region's bridges is a high priority, and as a result many bridges have all seen considerable investments in recent years. The Marquam Bridge was the first Portland bridge to undergo a seismic retrofit in 1995. The Hawthorne Bridge is the oldest regional bridge in Portland. From 1998-99, the bridge went through a $21 million restoration, which included replacing the steel grated deck, removal of lead-based paint and repainting and widening the sidewalks to enhance pedestrian and bicycle travel. In 2001, the sidewalks were connected to the Eastbank Esplanade.

The Steel Bridge is currently owned by Union Pacific Railroad with the upper deck leased to Oregon Department of Transportation, and subleased to TriMet. The City of Portland is responsible for ramp approaches to the bridge. Between 1984 and 1986 the Steel Bridge underwent a $10 million rehabilitation including MAX construction. In 2001, a cantilevered walkway was installed on the southern side of the bridge's lower deck as part of the Eastbank Esplanade (there are also sidewalks on the upper deck).[24]

The Sellwood Bridge, built in 1925, was originally intended to be a local community connector. However with population growth over time, the bridge has been serving as a primary connector to

[23] *Metro*, A Profile of Regional Roadway System in the Portland Metropolitan Region, 2007, pgs. 2-3.
[24] http://www.answers.com/topic/steel-bridge?cat=technology. Retrieved on 11/09/07.

the I-5 freeway with more than 30,000 vehicles crossings per day. Because of this, the structure quickly advanced to a state of deterioration, causing weight limit restrictions placed on vehicles over 10 tons including TriMet buses and heavy trucks.

Construction began in 2011 for the new Sellwood Bridge and is expected to be completed in 2015. After completion of the new bridge, the old Sellwood Bridge will be demolished and recycled. The Sellwood Bridge replacement began as a planning effort in 2006 to develop community supported alternatives to addressing structural deficiencies.

In 1997, Multnomah County replaced the lift-span sidewalk and installed guardrails on the Broadway Bridge. Sidewalks and lighting were replaced on the Broadway Bridge in 2001. From 2003-2005 additional bridge rehabilitation work included the replacement of steel grating and some painting.

In 2002, the Burnside Bridge went through a seismic retrofit, making it the first bridge operated by Multnomah County to receive earthquake protection. In 2007, the bridge underwent reconstruction to replace the deck.

The Ross Island Bridge underwent a $12.2 million renovation in 2000-2001. The bridge deck, sidewalk and lighting were replaced, the railings were upgraded, and the drainage system was improved. During this renovation, lead paint was discovered and removed.

From 2003 to 2006, ODOT completed a major rehabilitation of the St. John's bridge, including the replacement of the deck, repainting of the towers, water-proofing the main cables, replacing nearly half of the 210 vertical suspender cables, lighting upgrades, and improving access for bicycle and pedestrian travel.

The St. Johns Bridge, built in 1931, underwent a major rehabilitation from 2003 to 2006.

The region's first toll bridge, the Interstate Bridge (I-5/Columbia River Crossing) is actually made up of two side-by-side bridges. The northbound bridge was built in 1917 and the southbound bridge in 1958. Today, the Interstate Bridge carries 135,000 vehicles per day. Because congestion is so heavy in the morning and evening commute hours, bridge lifts for river traffic have been restricted during the weekday rush hour. Narrow lanes, short on-ramps, and a lack of safety shoulders on the bridge contribute to crashes. In addition, the existing bridge is at risk if a significant earthquake occurred in the region.

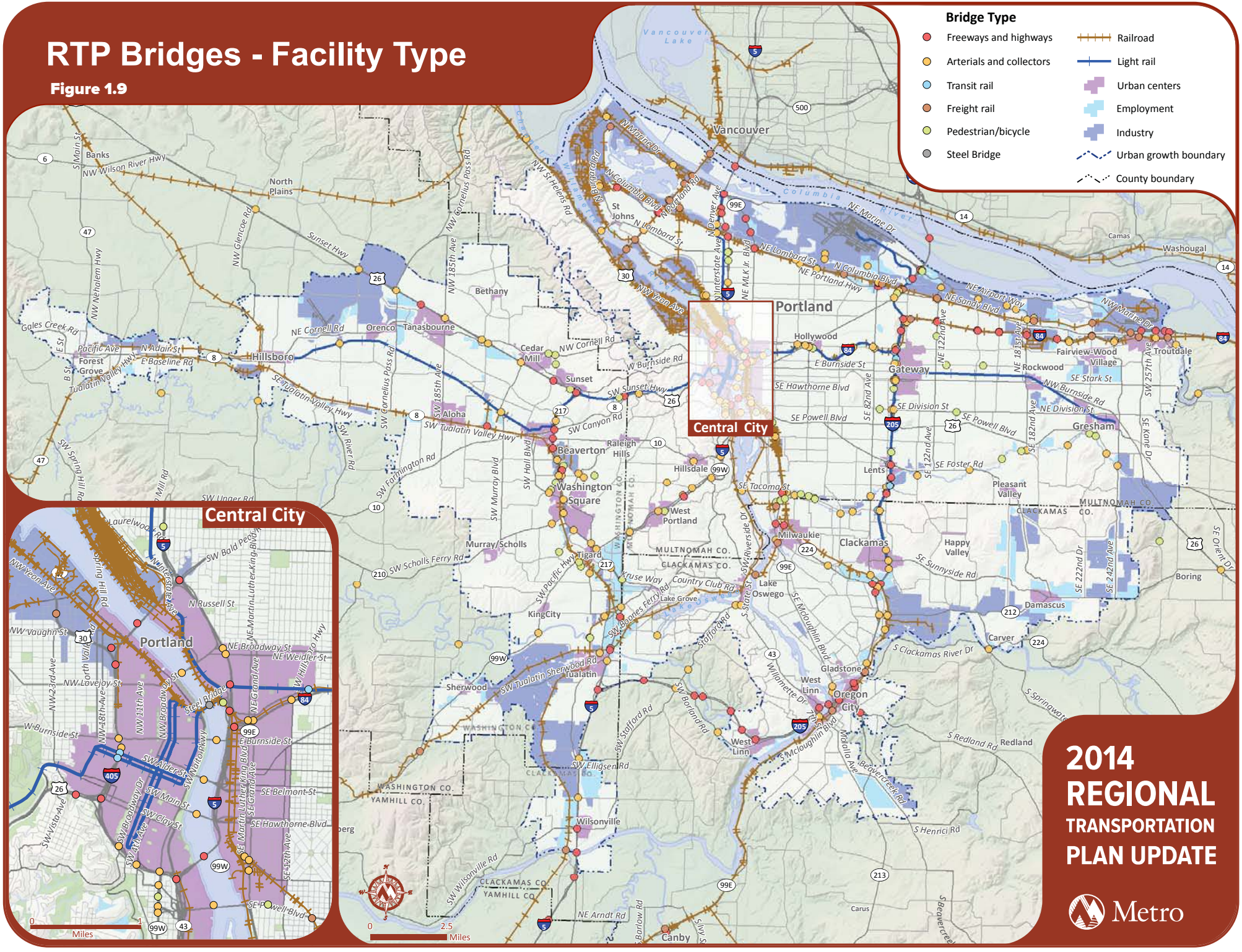
The I-5 Bridge crossing the Columbia River that connects Portland to Vancouver.

An inventory of these and other regional bridges is shown in **Figure 1.9**.[25] A long-term strategy is needed to ensure all of the region's bridges are adequately maintained.

[25] The RTP Bridge Inventory was compiled as a means to catalog all of the regionally significant bridges in the Portland metro area. It was compiled using visual identification through aerial photos and the ODOT overpasses shape file. The ODOT overpasses file was too comprehensive for the inventory intended, but also missed many of the pedestrian facilities that we wanted to capture. Only overcrossings where the type of the facility making the overcrossing matched one of our categories were inventoried. In instances where an interchange had many crossing ramps, the interchange was counted as one "bridge", rather than calling out each individual ramp (or overcrossing). Also, bridges that are actually composed of multiple separate spans (i.e. I-5 Columbia Crossing) are counted as one single bridge. Pedestrian/Bicycle bridges include any bridges on a Regional Trail and all pedestrian-specific overcrossings.

RTP Bridges - Facility Type

Figure 1.9



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Transit demand outpacing funding

The region has been looking to TriMet to provide major growth in transit service to meet a range of goals. The Climate Smart Communities project identified expanding transit as one of the most promising strategies. In previous Regional Transportation Plans, the cities and counties of the region set a policy goal of tripling mode share by 2035. Air quality-related federal laws require consistent service growth over time. Estimates by TriMet on how much transit to provide is still evolving through the Climate Smart Communities project, but it will require very robust growth compared to today.

In order to meet the long-term growth in transit service the region envisions, TriMet needs to ensure long-term fiscal stability. TriMet currently faces fundamental budget challenges over the next few years without changes in its underlying cost structure. Contributors to the budget deficit include active and retiree health care benefits and annual wage increases that exceed inflation. Health care costs have increased significantly beyond payroll tax revenues (revenue excluding rate increases).

In addition to the need to support growing service levels to meet regional goals, TriMet's fleet and facilities also need to be kept in a state of good repair through continual investment. Currently, 19 percent of TriMet's bus fleet is older than the optimal replacement age of 16 years. The cost of replacing these buses is estimated to be $50 million. After several years of deferring bus replacement due to funding constraints, TriMet embarked on an accelerated bus replacement schedule that will replace 254 buses between 2013 and 2016. By 2017, the average age of TriMet's bus fleet will be 8 years, on par with the industry average, down from 12 years currently. Afterwards TriMet plans to resume its regular replacement cycles of 40 buses per year at an annual cost of $17.8 million. TriMet is also projecting the addition of 6 more buses to the fleet every other year to meet demands of service expansion through 2040.

In addition, MAX light rail vehicles will need to be replaced during the plan period. The 26 oldest high-floor Type 1 MAX vehicles will need to be replaced by 2027 at a cost of $125 million, followed by 52 Type 2 MAX vehicles in 2034 and 27 Type 3 MAX vehicles in 2040 at a cost of $250 million and $130 million respectively.

As required by the Americans with Disabilities Act, transit agencies have to provide all paratransit (door-to-door) rides requested by eligible individuals. Paratransit costs per ride are over 10 times the cost of a fixed route ride, with LIFT and cab operating costs per ride of $30.93 for 2013 compared to $2.64 for bus, MAX and WES. LIFT costs grew at double digit rates annually until

2008, when they began to moderate. The last five years have averaged 1.8 percent growth in ridership. TriMet meets with all individual LIFT riders at least once to ascertain their mobility and provide travel training about any fixed-route services that might be available to ensure that those using the higher-cost service really do need it. Ride Connection (a non-profit mobility agency with a variety of services ranging from volunteer drivers for individuals to operating flexible services for multiple riders) also provides mobility for those who might otherwise need to rely on LIFT.

For the period covered by the 2014 RTP, the average annual increase in LIFT operating costs is projected to be 4.3 percent, or roughly $2.5 million annually.[26] In addition, costs for LIFT vehicle replacement and fleet expansion to keep up with growth are projected to total $106,250,000 over the course of the RTP, reflecting 40 annual LIFT vehicle purchases in early years with expansion in later years of the plan.

Moving forward to adequately fund the region's transportation needs

Diminished resources mean increased competition for transportation funds and reduced ability to expand, improve and maintain existing transportation infrastructure. New funding strategies, enhanced public and private collaboration and stronger public support for new revenue sources must be developed to pay for major system investments, such as added roadway capacity and new bridges. Meanwhile, the following interim steps are crucial:

- Maximize operational efficiency of the current system, using new tools and management strategies.
- Prioritize less-expensive, short-term improvements that yield the maximum benefit in relation to the outcomes that they achieve – safety, congestion relief, community development, freight reliability, etc.
- Avoid the higher costs of deferred maintenance by making maintenance of existing infrastructure a priority.

Chapter 3 of this RTP presents more details about the current and future transportation needs and expected resources to pay for those needs.

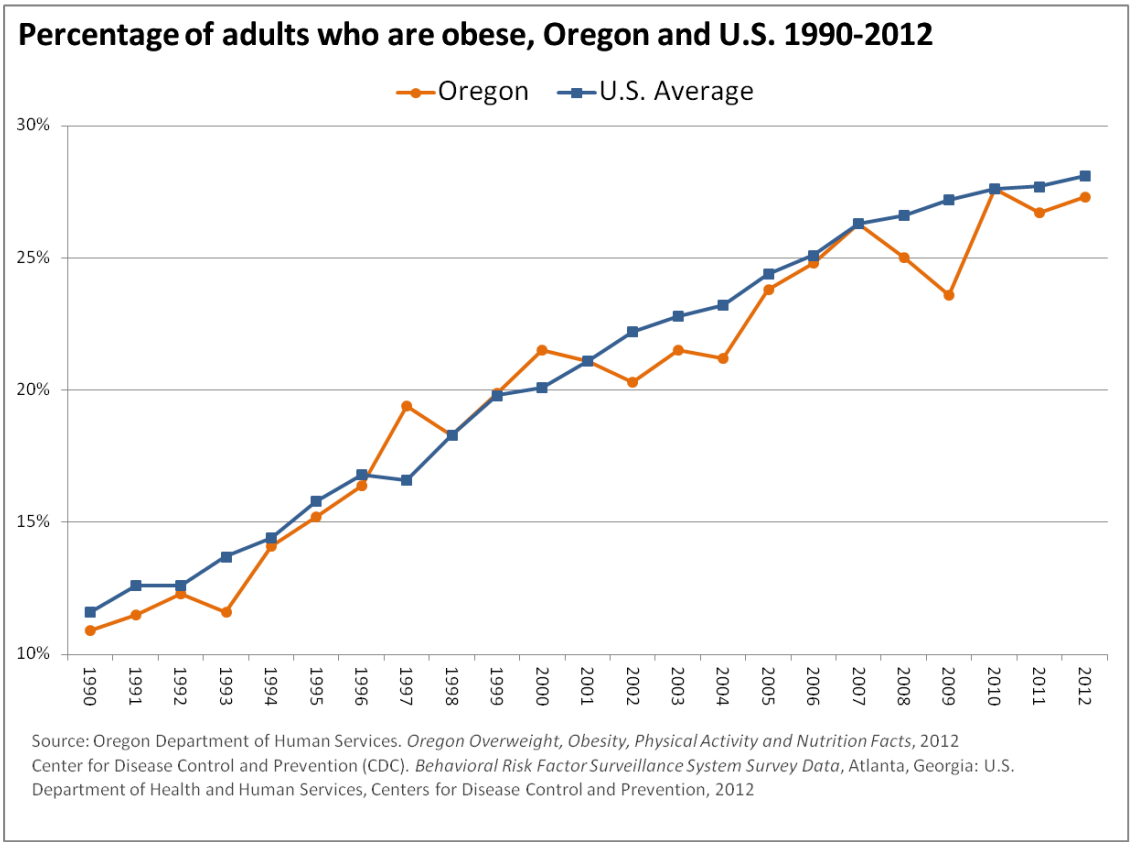
1.6 PUBLIC HEALTH, ENVIRONMENTAL AND SAFETY CONCERNS

Inactive lifestyles are fueling an alarming increase in obesity in U.S. adults and children, and health experts are warning us about the resulting long-term health implications. At the same time, population growth puts added pressure on our air and water quality, which directly impact public health. The estimated annual medical cost of obesity in the U.S. was $147 billion in 2008 U.S. dollars; the medical costs for people who are obese were $1,429 higher than those of normal weight.[27]

[26] TriMet Financial Forecast: FY15 Budget Forecast and Financial Analysis
[27] Eric A. Finkelstein, Justin G. Trogdon, Joel W. Cohen and William Dietz. Annual Medical Spending Attributable To Obesity: Payer-And Service-Specific Estimates. Health Affairs, 28, no.5 (2009):w822-w831

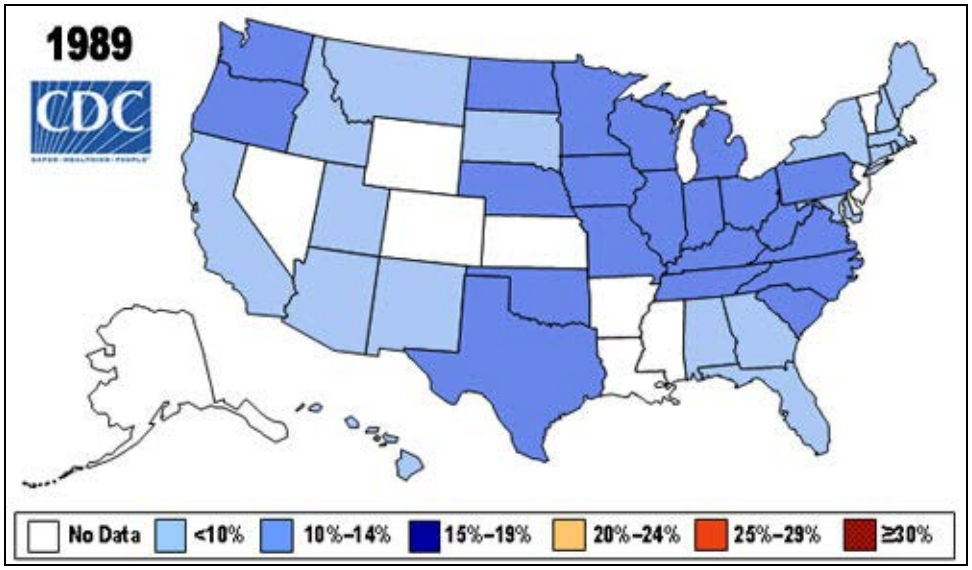
Public health and obesity

Interest in the connection between urban planning and active living grew in the 1990s, an outcome of a growing interest in "smart growth," a movement to integrate land use, transportation and public health planning. Studies since then report positive effects on human health in neighborhoods built to encourage walking and biking.[28] In addition, transportation systems impact chronic diseases such as asthma that are related to air quality and vehicle emissions. While the Portland region has long embraced such policies, based on land use and transportation benefits, the introduction of health goals and objectives in transportation planning and the RTP is a new realm for the region.

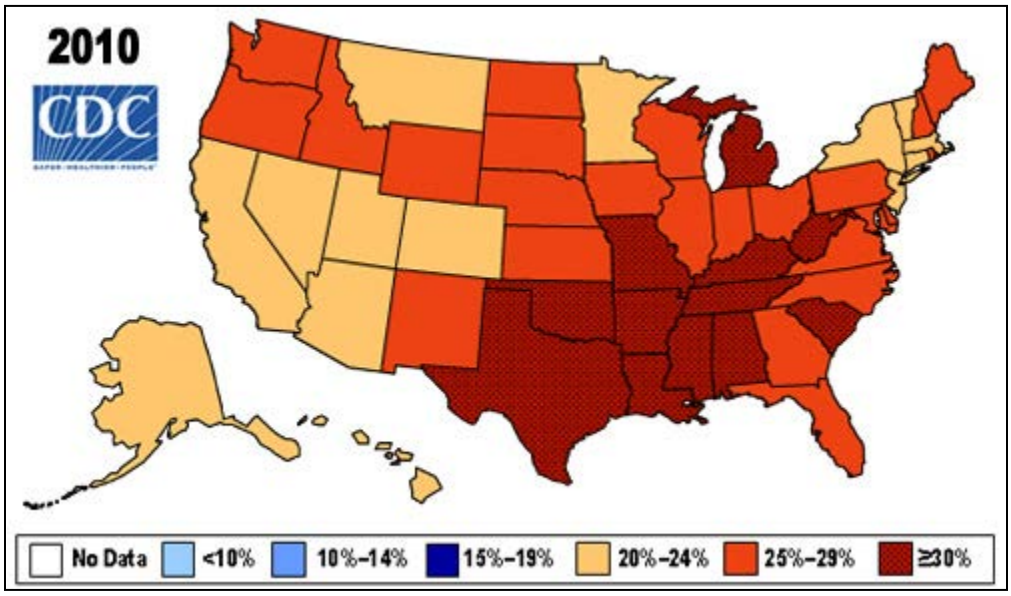


Source: Oregon Department of Human Services. *Oregon Overweight, Obesity, Physical Activity and Nutrition Facts*, 2012
Center for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2012

[28] LD Frank, PO Engelke - Journal of Planning Literature, The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health Journal of Planning Literature, Vol. 16, No. 2, 202-218 (2001) DOI: 10.1177/08854120122093339, Sage Publications.



Source: Centers for Disease Control and Prevention



Source: Centers for Disease Control and Prevention

We face a trend of rapidly rising rates of chronic disease associated with obesity, being overweight and sedentary lifestyles, conditions that public health officials now describe as epidemic. There was a dramatic increase in obesity in the United States from 1989 through 2010. Today, more than one-third of U.S. adults (35.7%) are obese.[29] Oregon obesity levels are lower than national levels; in 2010, 26.8% of Oregon's population was obese.

[29] Centers for Disease Control and Prevention. http://www.cdc.gov/obesity/data/adult.html#History

In the greater Portland region the percentage of adult survey respondents who reported being overweight or obese increased between 2002 and 2010. In 2010, Washington County had the highest percentage of adult survey respondents reporting being overweight (39.2 %). Clackamas County had the highest percentage of adult survey respondents reporting being obese (27.6 %). Washington County also had the highest percentage of adults who were either obese or overweight (63.1%). Multnomah County had the lowest percentage of adults who were either obese or overweight (56.5%).[30]

There is ample evidence that transportation and community design are critical factors in determining whether residents are able to be physically active enough to ensure their health. The region's transportation system is incomplete from the perspective of enabling sufficient physical activity.

Built environments that promote active living include compact mixed-use developments and street designs that feature well-lit sidewalks and safe cycling facilities[31].

There are many efforts in the region to promote active living. Some cities and counties have Transportation Management Associations that provide information on transportation options, including the City of Portland's Bureau of Transportation Smart Trips Program. Safe Routes to School programs work on increasing the number of children that walk and bike to school. A new program of the Safe Routes to School National Partnership focused on the Pacific Northwest will focus on the region. The HEAL Cities Campaign is a partnership between the League of Oregon Cities and the Oregon Public Health Institute, funded by a grant from Kaiser Permanente[32]

The RTP includes active living, human health and improved air quality as goals of the plan. However, more work is needed to expand the region's analytical capability. Additional resources will be required to analyze transportation investments in terms of their public health and environmental benefits. The use of health impact assessments and other evaluation tools will be considered moving forward.

Air and water quality and healthy ecosystems

Emissions from vehicle exhaust introduce particulates, irritants and toxins to the air; road runoff contributes to erosion and introduces oil and other chemicals into streams and groundwater. Roads can interrupt wildlife corridors and fish passageways. Although roads cover only about one percent of the country's land, they affect a disproportionate 15 to 20 percent of adjacent habitat.[33]

[30] Greater Portland Pulse. http://www.portlandpulse.org/
[31] "Four Model Ordinances to help Create Physically Active Communities. https://www.planning.org/smartgrowthcodes accessed 9/13/07
[32] Active Living By Design Website (Research Page, viewed on Oct. 5, 2006) www.activelivingbydesign.org.HEAL Cities Website http://www.healcitiesnw.org/www.activelivingbydesign.org.
[33] Forman, R.T.T. and Deblinger, R.D. The Ecological Road-Effect Zone for Transportation Planning and Massachusetts Highway Example. Proceedings of the International Conference on Wildlife Ecology and Transportation. (Florida Department of Transportation Publication FL-ER-69-98) 1998

Some measures of air quality have improved dramatically; others indicate more work is needed. Regional air quality has met the Environmental Protection Agency's air quality standards for six pollutants, sufficient to achieve "maintenance" status. In the 1960s, the region averaged 180 days of air quality violations every year for ozone and carbon monoxide, but today we average zero.

Active living, enhancing human health and improving air quality are goals of the RTP that will guide investments in the region's transportation system.

More work is needed, though. The I-5 corridor and the Pacific Northwest have unacceptable levels of benzene and other air toxics. For example, levels of toxic emissions near downtown Portland—most notably benzene—have been measured at more than 8.5 times the federal standard. [34] Diesel particulate matter is another air toxin of concern, and diesel emission levels in parts of the region exceed healthy levels. This air toxin comes primarily from diesel engines that are widely used in marine vessels, heavy-duty trucks and construction equipment. Regulatory monitoring of these air toxics and carbon emissions is not currently required, yet they pose threats to human health, the environment and the region's economy.

Several Metro-initiated activities are aimed at restoring habitat or mitigating the effects of the transportation system on air quality and the natural environment, including:

Metro has initiated several activities aimed at restoring habitat and mitigating the effects of the transportation system on air, water and other natural resources.

- The Livable Streets and Green Streets programs to encourage environmentally sensitive street design and minimize storm water runoff.
- Air quality conformity of transportation projects and programs and on-going monitoring activities with the Oregon Department of Environmental Quality.
- An inventory of regionally significant fish and wildlife habitat to identify and map ecologically sensitive areas.[35]
- "Wildlife Crossings: Providing Safe Passage for Urban Wildlife" (Metro 2009) handbook to minimize impacts of roadways on wildlife populations.

[34] Oregon Department of Environmental Quality *Fact Sheet*, 11/15/06
[35] Regional Conservation Strategy and Biodiversity Guide. http://theintertwine.org/Conservation

- A 2002 inventory of culverts in the region that needed repair or replacement to accommodate endangered or threatened fish species, and uses the inventory with rankings of applications for flexible funds to retrofit culverts.
- Metro is currently working with the Oregon Department of Fish and Wildlife to establish a statewide database of culverts that are barriers to fish passage.
- Metro has developed "The Trails Top 10" - Natural Resource Considerations for Trail Planners.
- Metro "Green Trails: Guidelines for Environmentally Friendly Trails" (Metro 2005).

Transportation Safety

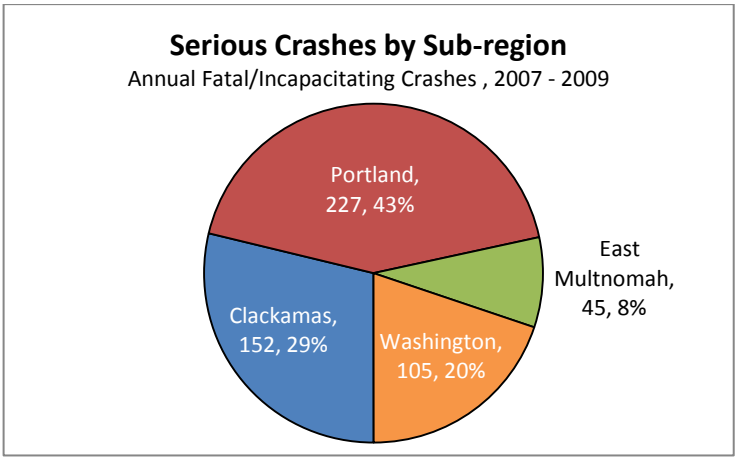
Traffic safety affects the Metro region on multiple levels. Safety concerns may prevent people from choosing to walk or bike. Crashes cause personal tragedy, lost productivity, rising insurance costs, congestion and delay to the movement of people and goods. Increasing awareness of safety issues is a first step to improving safety in the region.

Between 2007 and 2009, in the Portland Metro region there were more than 18,000 crashes involving motor vehicles, including 159 fatalities and more than 1,400 crashes resulting in a severe injury. This represented 43% of Oregon's crashes, 14% Oregon's fatalities, and 36% of Oregon's severe injury crashes. The annual economic cost to the region of these crashes is estimated at $958 million, which includes medical costs, lost wages, lost productivity, property damage and administrative costs.[36]

Efforts to improve transportation safety are a critical priority for the residents of this region. Efforts generally center on preventing traffic crashes that result in severe injury or death. It is also important to address crashes that cause congestion, delays, and property damage.

Figure 1.10 below shows the number of serious (fatal and severe/incapacitating injury) crashes that occurred between 2007 and 2009 in Multnomah (excluding Portland), Clackamas and Washington counties, and the City of Portland.

Figure 1.10
2007 - 2009 serious crashes in the region's counties and the City of Portland



[36] *Metro*. Regional Transportation Safety Plan (May 2012).

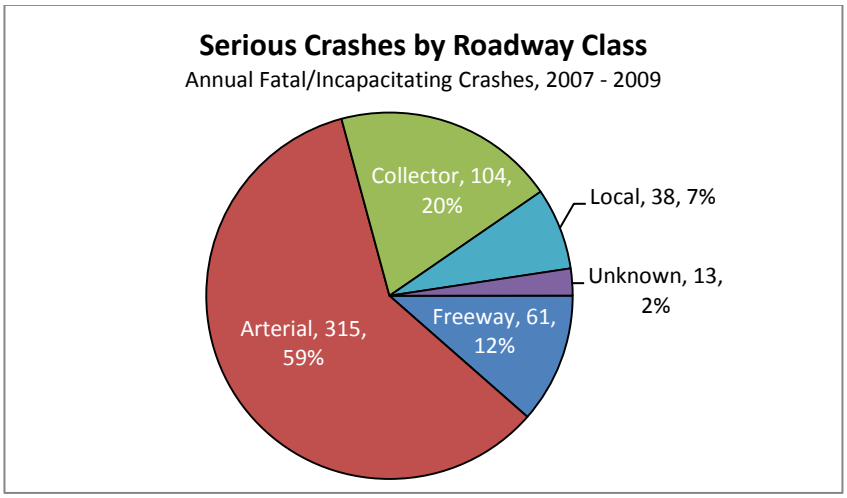
User behavior is a contributing factor in nearly every crash. Alcohol or drugs are a contributing factor in 57% of the region's fatal crashes. Excessive speed and aggressive driving are common factors in serious crashes. Driver inattention is believed to be a significant factor as well, although it is difficult to accurately measure.

Arterial roadways are the location of the majority of the serious crashes in the region. This is also true for crashes involving pedestrians and cyclists. Per mile travelled, arterial and collector roadways experience more serious crashes than freeways and their ramps. **Figure 1.11** shows crash data for 2007 - 2009 by roadway classification in the Metro region.[37]

Behavioral issues are a complex safety problem that involves numerous factors like public attitudes, driver behavior, vehicle performance, roadway design, speed management, and enforcement strategies. The types and designs of roadways also influence driver behavior. Urban streets designed with street trees and on-street parking have been shown to calm traffic and encourage drivers to proceed with caution, improving safety for other drivers, cyclists and pedestrians.[38]

Crash prevention measures in the region include tracking high-crash locations, a high-crash corridor program, road improvements targeted at specific safety problems, mode-specific safety efforts, enforcement and public education programs and messaging.

Figure 1.11
2007 – 2009 serious crash location by road type (Metro region)



[37] Metro, State of Safety report, April 2012

[38] For more information on specific livable street improvements see Metro's "Creating Livable Streets: Street design guidelines for 2040." June 2002.

The RTP includes a number of investments and actions aimed at further improving safety in the region, including:

- Investments targeted to address known safety deficiencies and high-crash locations.
- Completing gaps in regional bicycle and pedestrian systems, including safe roadway crossings at regular intervals.
- Retrofits of existing streets in downtowns and along main streets to include on-street parking, street trees, marked street crossings and other designs to encourage traffic to follow posted speed limits.
- Intersection changes and ITS strategies, including signal timing and real-time traveler information on road conditions and hazards.
- Expanding safety education, awareness and multi-modal data collection efforts at all levels of government.

The best, most comprehensive source of crash data is collected and maintained by ODOT's Crash Analysis Unit. The data is distributed to local governments to conduct safety analysis. ODOT is continuously working to improve the usability of this data.

Between 2009 and 2012, Metro provided ongoing safety planning support to promote collaboration and commitment among regional partners to consider, evaluate and implement regional multi-disciplinary safety solutions (i.e. environment, engineering, education, enforcement, and emergency services) through sharing of innovations, best practices, and case studies in transportation safety. This included the development of safety performance measures to track on a regular basis through the Congestion Management Process and the State of Safety in the Region report, completed in April, 2012. The report provided the basis for the Regional Transportation Safety Plan, which recommended actions at local, regional and state levels. The performance measures may also be used to influence investment criteria for projects at the local, regional, and state levels.

Security and Emergency Management

The terrorist event of September 11, 2001 and Hurricane Katrina in 2005 provide good illustrations of the challenges facing metropolitan areas in preparing for and responding to unexpected security incidents or natural disasters. Terrorist attacks are sudden and without notice. Natural disasters such as the Mt. St. Helens volcanic eruption, Hurricane Katrina or earthquakes often, but not always, have some early warning.

One lesson from past events is paramount—effective coordination and communication among the many different operating agencies in a region and across the nation is absolutely essential.[39]

Such coordination is needed to allow enforcement/security/safety responses to occur in an expeditious manner, while at the same time still permitting the transportation system to handle the possibly overwhelming public response to the security incident or natural disaster.

Effective coordination and communication between many different agencies in the region is critical in the event a natural disaster. The RTP calls for implementing investments to increase system monitoring for operations, management and security of the regional mobility corridor system.

Complementary to this is the need to make sure the public has clear and concise information about the situation and what actions they should take. Most studies of sudden disruptions to the transportation network, either from natural or human-made causes, have concluded that the redundancies in a metropolitan area's transportation system provides a rerouting capability that allows the flow of people and vehicles around disrupted network links.

Security efforts in the region focus on emergency preparedness and management, security of the transit system, security of both marine and air port facilities, and safe movement of hazardous material through the region. The Regional Emergency Management Group (REMG) focuses on coordinating regional agencies to prepare for emergencies. This group, formed in 1993, is made up of emergency management professionals and elected officials in the region. The group's major efforts include creating Emergency Transportation Routes (ETRs) in case of an earthquake or other emergency and doing a Critical Infrastructure Analysis of the region, which will determine how the transportation and other infrastructure will hold up in the case of different disaster scenarios.

Founded in 1993, The Regional Emergency Management Group focuses on coordinating regional agencies to prepare for emergencies.

[39] The Role of the Metropolitan Planning Organization (MPO) In Preparing for Security Incidents and Transportation System Response, Michael D. Meyer, Ph.D., P.E. Georgia Institute of Technology. Accessed November 10, 2007 at http://www.planning.dot.gov/Documents/Securitypaper.htm.

Portland has centralized the city's emergency management services into the Portland Bureau of Emergency Management (BEM). BEM is responsible for emergency prevention, mitigation and recovery, and is also charged with addressing Community Preparedness, Homeland Security, Planning, Mitigation, Response, Recovery and Inter-bureau and Regional Collaboration for the city.[40] TriMet, the Port of Portland and ODOT each focus on transportation-related security measures for facilities under their management.

The RTP calls for implementing investments to increase system monitoring for operations, management and security of the regional mobility corridor system. These types of investments would enhance existing coordination and communication efforts in the region, and recognize these facilities would serve as the primary transportation network in the event of an evacuation of the region.

The plan also directs Metro to work with local, state and regional agencies to identify critical infrastructure in the region, assess security vulnerabilities and develop coordinated emergency response and evacuation plans. Finally, transportation providers are directed to monitor the regional transportation and minimize security risks at airports, transit facilities, marine terminals and other critical infrastructure. Future RTP updates will consider expanding Metro's role, as the MPO, to increase existing coordination and planning efforts in the region and funding of initiatives to address these issues.

Another security issue relevant to the RTP is the increasing uncertainty of the supply and price of oil. The U.S economy's reliance on foreign oil is mainly due to transportation. The transportation sector's share of U.S petroleum use has been increasing and now consumes 71% of the oil supplied to the US economy[41]. This dependence on oil is an issue for the RTP, considering the uncertainty surrounding oil's supply and price. Uncertainty is defined as a measure of the decreasing confidence that supply and price of oil will not be much different next year compared to today's figures[42].

Future oil supply uncertainty is generally approached from either a security angle ("Energy Security") or scarcity angle ("Peak Oil"). The "energy security" view focuses on the risk to U.S. interests posed by external forces, whether unfriendly governments or natural disasters, that may affect the supply and price of oil. The "peak oil" view focuses on a theorized imminent (within the next 30 years) decline of worldwide oil production. The views are not non-complementary, and both agree that we are entering a period of uncertainty in oil supply and price. Both views have been supported by established petroleum geologists, as well as by mainstream political figures.[43]

[40] Portland Bureau of Emergency Management https://www.portlandoregon.gov/pbem/
[41] U.S. Energy Information Administration, "Annual Energy Outlook 2013." April 2013. http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf, accessed 12/02/13.

[42] Lerch, Daniel. "White Paper: Future Oil Supply Uncertainty and Metro." April 2006. http://library.oregonmetro.gov/files/whitepaper_oilsupplyuncertainty.pdf

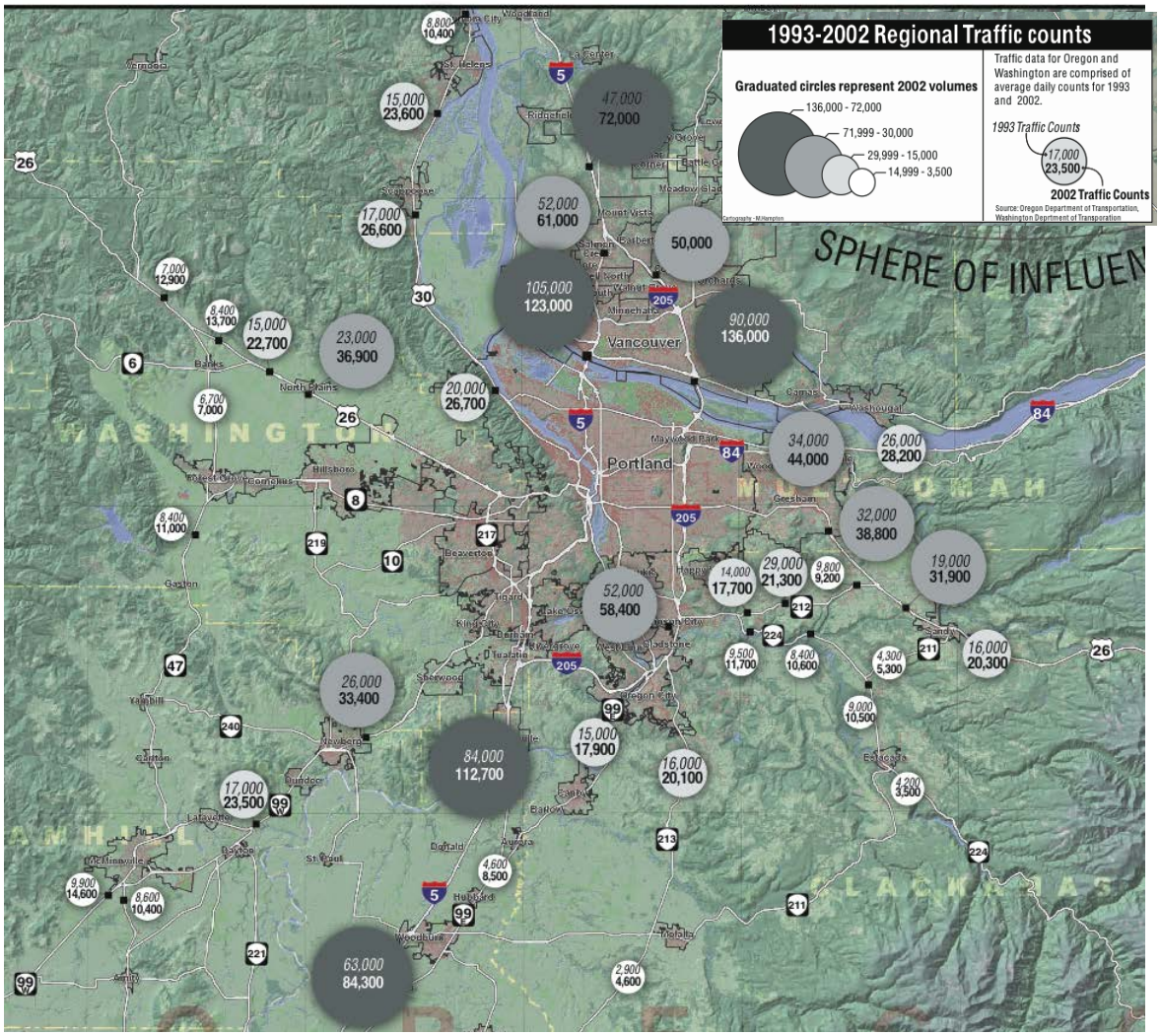
[43] Lerch, Daniel. "White Paper: Future Oil Supply Uncertainty and Metro." April 2006. http://library.oregonmetro.gov/files/whitepaper_oilsupplyuncertainty.pdf

1.7 GROWING CONGESTION

Congestion is growing. Freeway congestion increased 20 percent between 2000 and 2005, despite increased transit use and reductions in driving. Delays caused by freeway congestion pose significant economic challenges for freight transportation and commuters, affecting our region's economic competitiveness, environment and quality of life.

The region's streets and throughways reflect the effects of increasing traffic and changing travel patterns. Traffic volumes in the Portland-Vancouver region increased between 1993 and 2002 in several key transportation corridors as shown in **Figure 1.12**, reflecting population and job growth within and outside the urban growth boundary, longer commute distances and changing commute patterns with more suburban-to-suburban travel.

Figure 1.12
Traffic Volume Increases in Key Corridors: 1993 to 2002



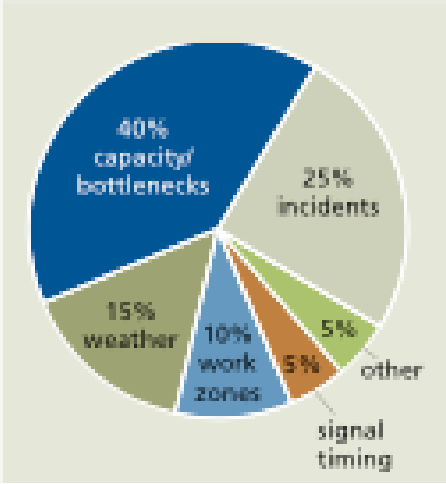
Source: Metro

Causes of congestion

Congestion plagues all growing urban areas. Congestion growth manifests as greater severity, peak traffic periods that last longer and peak conditions that extend over a larger area. Congestion that arises from peak-hour volumes, known bottlenecks, and problematic interchanges are predictable. Although commute times due to predictable congestion may be long and frustrating, they are reliable. Congestion that arises from non-recurring incidents, such as crashes, breakdowns, construction, natural disasters and inclement weather, are unpredictable and negatively affect travel time reliability.[44] Travel time reliability is of growing interest to transportation practitioners as an important measure of mobility.

Figure 1.13 presents national data on the causes of congestion. As the figure shows, more than half of all congestion is caused by non-recurring incidents. In 2005, the region's freeway system averaged 1,000 such incidents a month (808 breakdowns and 249 crashes).

Figure 1.13
Causes of Congestion (national data)[45]



Source: Federal Highway Administration

The 2005 study, *Cost of Congestion to the Economy of the Portland Region,* estimated potential losses in the region of $844 million annually by 2025 from increased freight costs and lost worker productivity as a result of increases in travel time due to congestion.[46]Historically, roadway congestion has been described in terms of volume-to-capacity (v/c) ratio and level of service (LOS) using Metro's travel demand model. More recently congestion has been assessed using average travel speeds and travel times drawing from an archive of real-time traffic monitors generated by the Oregon Department of Transportation (ODOT) and maintained by Portland State University (PSU). Currently these data are available only for the region's limited-access freeways. Efforts are

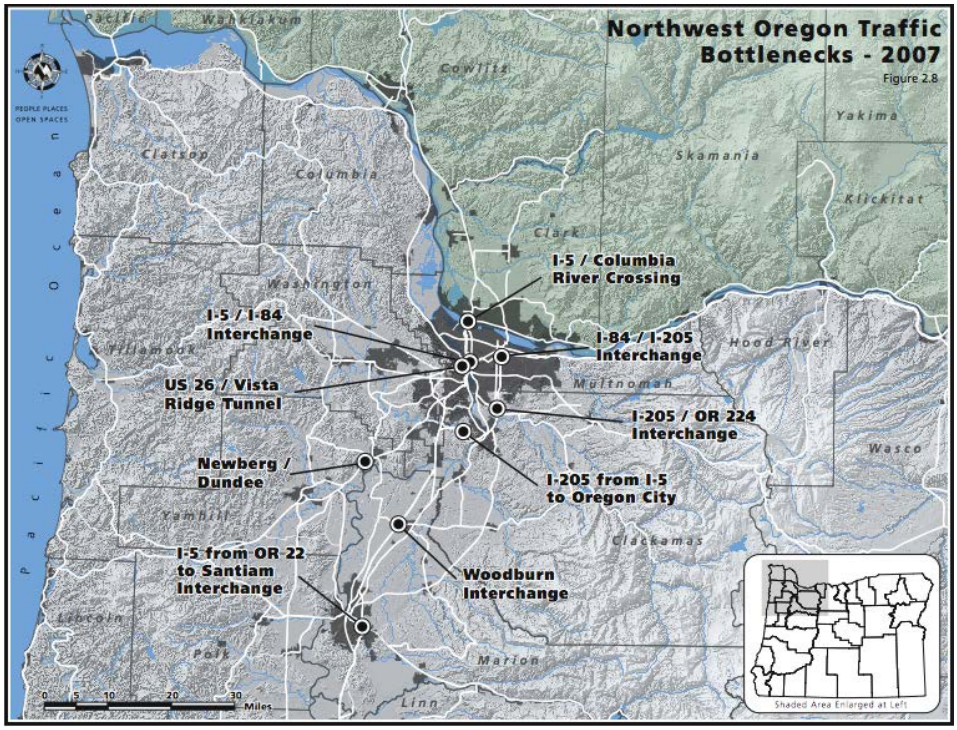
[44] FHWA, 2006. Travel Time Reliability: Making it there on time, every time.
[45] Traffic Congestion and Reliability: Linking Solutions to Problems, prepared for the Federal Highway Administration by Cambridge Systematics, Inc., and the Texas Traffic Institute, 2004, accessed at www.ops.fhwa.dot.gov
[46] Metro. *Cost of Congestion to the Economy of the Portland Region* (2005).

underway to expand current data collection to include the regional arterial network. Research found that congestion is greatest on the freeways and interstate highway system.[47] PSU data from 2006 confirms—and drivers know—that the significant throughway system bottlenecks in the region include:

- I-5 Interstate Bridge Influence Area/Columbia River Crossing
- I-84/I-5 interchange
- US 26/Vista Ridge tunnel
- I-84/I-205 interchange
- I-205/OR 224 interchange
- I-205 from I-5 to Oregon City

Figure 1.14 shows the locations of these significant bottlenecks on a map of the region. In 2007, ODOT identified six other significant bottlenecks in other parts of the state.

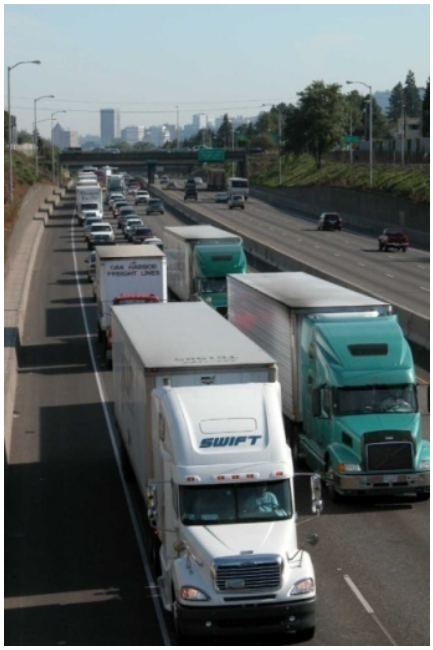
Figure 1.14
Northwest Oregon Traffic Bottlenecks (2007)



[47] Ibid, p. 12-13.

A comprehensive strategy to address growing congestion

Metro maintains a Congestion Management Process (CMP) for the Portland metropolitan region as required by federal law. The CMP includes a performance management system that informs needed capital investments, such as new or improved transit and road capacity as well as demand and system management strategies to improve performance of the existing infrastructure. In addition to traditional congestion management strategies, the region has developed non-traditional approaches to managing congestion to reduce the number of vehicles on roads and highways, improve traffic flow and improve travel-time reliability.



The region has developed non-traditional approaches to manage growing congestion and improve freight reliability, including the use of ITS, building transit-oriented development near transit stations and implementation of programs to increase walking, biking and carpooling.

Among the most cost-effective approaches to managing congestions and improving travel time reliability involves applications of Intelligent Transportation Systems (ITS). Examples of ITS include traffic signal synchronization, ramp meters, weigh-in motion transponders for commercial truck traffic, real-time road condition data, and global positioning systems that coordinate signal timing for commercial traffic and transit vehicles.[48]ITS alone cannot solve congestion problems, but they can provide relatively low-cost support to other management strategies and strategic road and transit capacity investments.[49]

Figure 1.15 shows where some of these strategies are currently being applied in the region.

Other strategies and actions the region is pursuing to address congestion include:

- Implementation of a high-occupancy vehicle (HOV) lane on one section of I-5 northbound. During the evening rush hour, when the HOV rule is in effect, drivers eligible to use that travel lane are able to travel significantly faster (45 mph) than drivers traveling in the general-purpose lanes (20-25 mph). The effects of this HOV lane are limited by bottlenecks at either end of the HOV lane section – most notably the Columbia River Crossing Bridge on the north end.

- Improved incident detection and clearance times on highways and arterials. Instituting best practices, including "move over" laws, quick clearance techniques, real-time traveler information, and scene safety measures.

[48] *Metro*, A Profile of Regional Roadway System in the Portland Metropolitan Region, 2007, p. 2.
[49] Ibid, p. 4.

- Building transit-oriented development (TOD)—mixed-use, higher density developments near transit stations to encourage transit use.

- Regional Travel Options (RTO) program to reduce drive-alone travel. Over the past 10 years, the RTO program has worked with large employers in the region to help them comply with the Employee Commute Options (ECO) rule by implementing transportation demand management (TDM) strategies. The RTO program also provided technical assistance to Transportation Management Associations (TMAs) in the region, including the Lloyd District TMA, Westside Transportation Alliance and Swan Island TMA; operated the Metro VanPool program, and operated Carpool MatchNW. **Figure 1.16** shows where demand management efforts are occurring in the region.

- Employer Outreach programs to encourage large employers to promote transit use in their workforce.

- Public education efforts to promote trip reduction. For example, in February 2006 the Oregon Department of Transportation (ODOT), Metro, TriMet, City of Vancouver and other public and private partners launched the Drive Less/Save More Campaign, to reduce drive-alone car trips that are not related to work. Such trips constitute more than two-thirds of drive-alone travel.[50]

- Consideration of peak-period pricing as a tool for managing congestion in the region's busiest travel corridors. The Traffic Relief Options Study (1999) led to a new regional policy in 2000 that requires that new highway capacity projects be evaluated for potential benefits of peak-period pricing as a tool for managing long-term mobility.

- Adoption of local parking management plans in centers and station communities and developing tools at the regional level to assist with their development.

- Promotion of walking, bicycling and transit use. Many cities in the region are helping residents learn about their choices. The City of Portland is currently running an individualized marketing project, "Smart Trips."Safe Routes to School Program activities in the region. This federally-funded program provides funding for engineering, safety education, enforcement and encouragement strategies to increase the number of students walking or bicycling to school. These strategies help reduce congestion, particularly around schools, and increase physical activity. The National Highway Transportation Administration estimates between 20-25 percent of morning rush hour traffic is due to parents driving their children to school.[51]

[50] http://www.drivelesssavemore.com
[51] http://www.saferoutesinfo.org/ask_a_question/answer.cfm?id=435. Accessed December 10, 2007.

RTP scenarios results point to an integrated solution for managing congestion

The transportation system plays a crucial role in sustaining economic health of the region and the state of Oregon. Unmitigated congestion and delay will compromise the economy in the future. As a global trade gateway and domestic hub for commerce and tourism, the region must expand current efforts to address growing congestion, particularly on the region's mobility corridors. Business and consumer needs are expected to double the amount of goods moved on the region's waterways, runways, railways, and roadways over the next 30 years. The continued economic health of our region and state depends on effectively serving growing transportation needs of business by providing reliable highway and arterial access to gateway and hub facilities as well as on preserving the beauty and livability of the region that attracts industry and a high-quality labor pool.

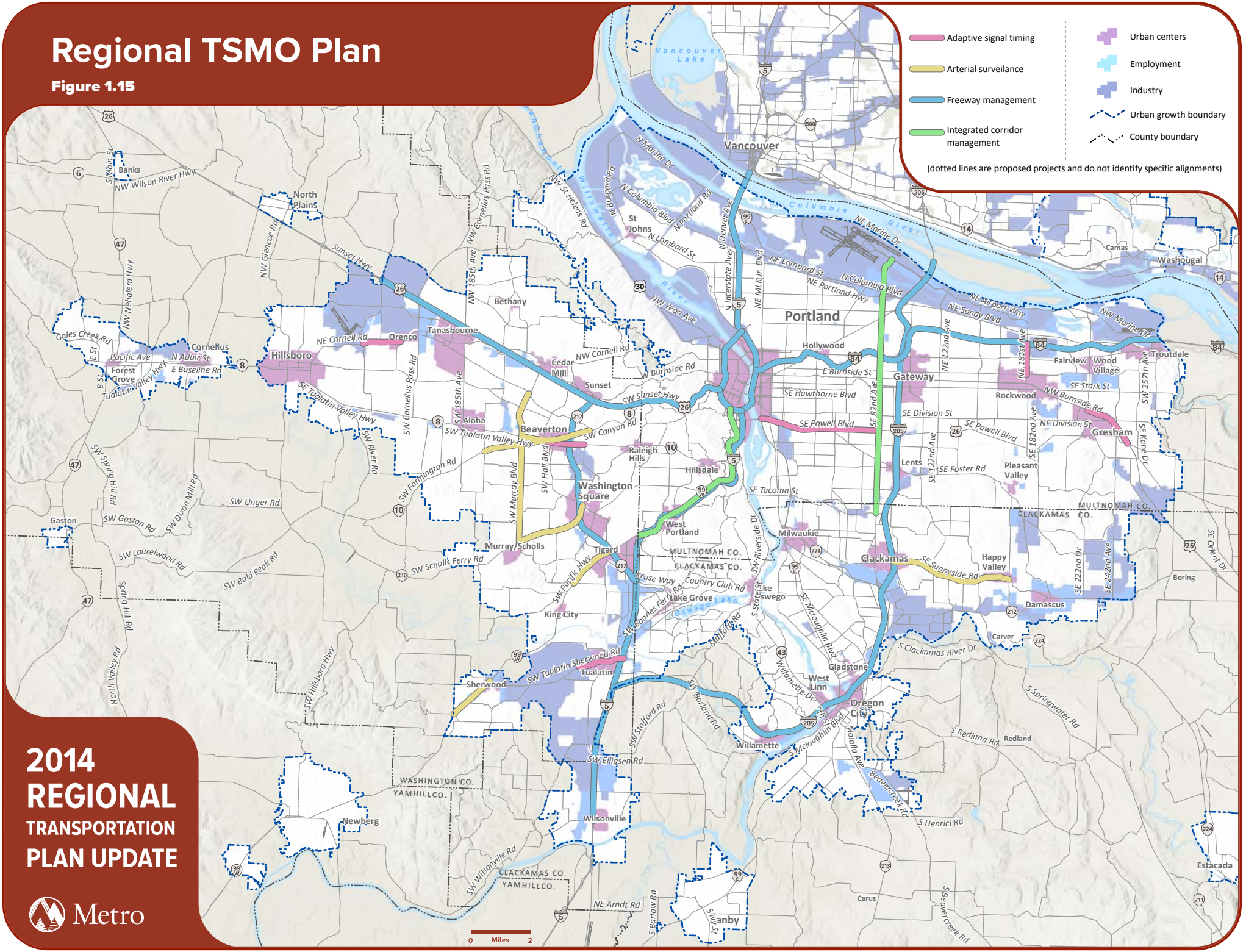
The results of the scenarios analysis support a growing body of research that suggest adding road capacity alone is not a sustainable solution to congestion. Rather, a coordinated strategy that links land use and transportation decisions, provides targeted road and highway improvements along with high quality transit service, better transportation options, and system management shows greater promise in mitigating congestion and delay into the future.

The region must pinpoint the most critical locations to mitigate roadway congestion and delay to enhance freight mobility and access to industrial areas and intermodal facilities. These strategic investments must allow us to move goods and people in ways that support our livability, economy, and environment. The region must also expand current system and demand management efforts to help preserve highway capacity for longer distance goods movement and person trips. Potential new strategies include congestion pricing, high-occupancy vehicle lanes, managed travel lanes and freight-only lanes. More evaluation of these strategies is needed to better understand their effect on the region's parallel arterials, low-income households and land use patterns to ensure any unintended consequences are identified and addressed in design and implementation.

Finally, land-use planning and environmental considerations must be integrated into transportation decisions to ensure that needed highway projects solve existing problems rather than inducing demand from outside the region and generating a new set of problems.

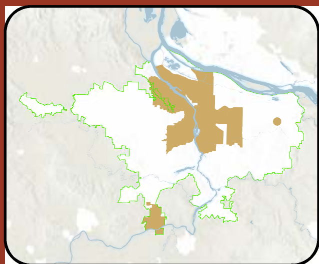
Regional TSMO Plan

Figure 1.15

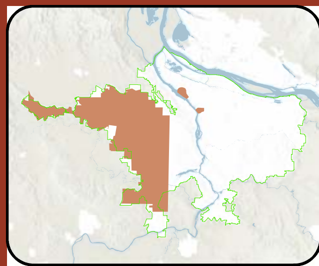


Transportation Demand Management System

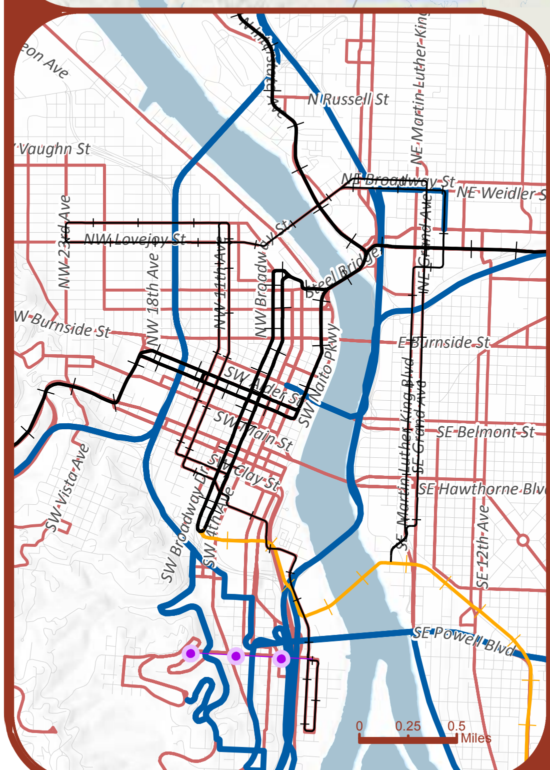
Figure 1.16

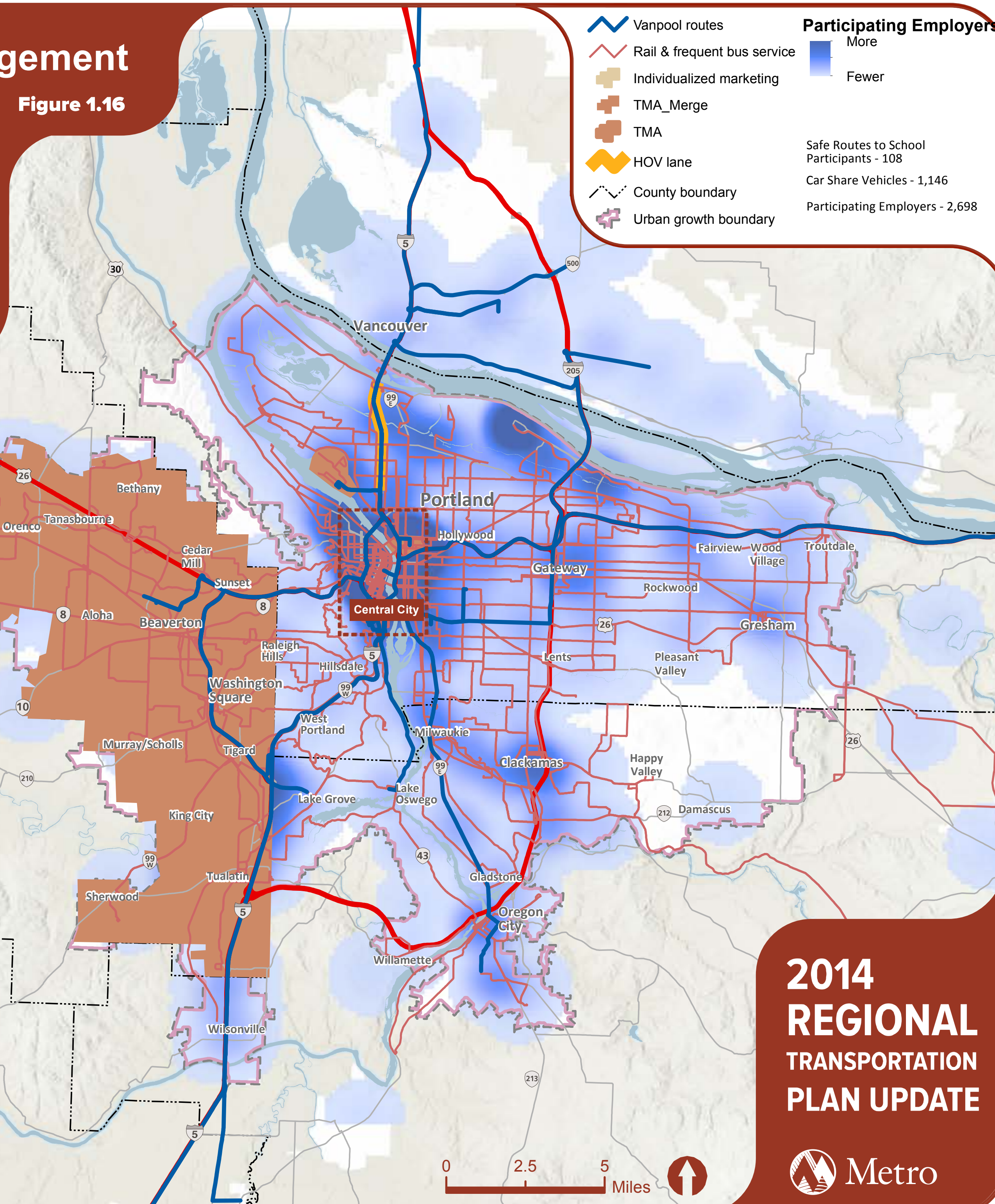


Individualized Marketing



TMA


N Russell St
NE Martin Luther King
NE Broadway St
NE Weidler St
NW Lovejoy St
NW 23rd Ave
NW 18th Ave
NW 14th Ave
NW Broadway
Steel Bridge
W Burnside St
E Burnside St
SW Alder St
SW Naito Pkwy
SW Main St
SW Clay St
SE Belmont St
SE Hawthorne Blvd
SE Grand Ave
SE 12th Ave
SE Powell Blvd
SW Vista Ave
SW Broadway
0
0.25
0.5
Miles


Vanpool routes
Rail & frequent bus service
Individualized marketing
TMA_Merge
TMA
HOV lane
County boundary
Urban growth boundary
Participating Employers
More
Fewer
Safe Routes to School Participants - 108
Car Share Vehicles - 1,146
Participating Employers - 2,698
Vancouver
Portland
Hollywood
Central City
Gateway
Fairview
Wood Village
Troutdale
Rockwood
Gresham
Lents
Pleasant Valley
Hillsboro
Orenco
Tanasbourne
Bethany
Forest Grove
Cedar Mill
Sunset
Aloha
Beaverton
Raleigh Hills
Hillsdale
Washington Square
West Portland
Murray/Scholls
Tigard
Milwaukie
Clackamas
Happy Valley
Damascus
Lake Grove
Lake Oswego
King City
Tualatin
Sherwood
Gladstone
Oregon City
Willamette
Wilsonville
0
2.5
5
Miles

2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

1.8 CHANGING TRAVEL BEHAVIOR

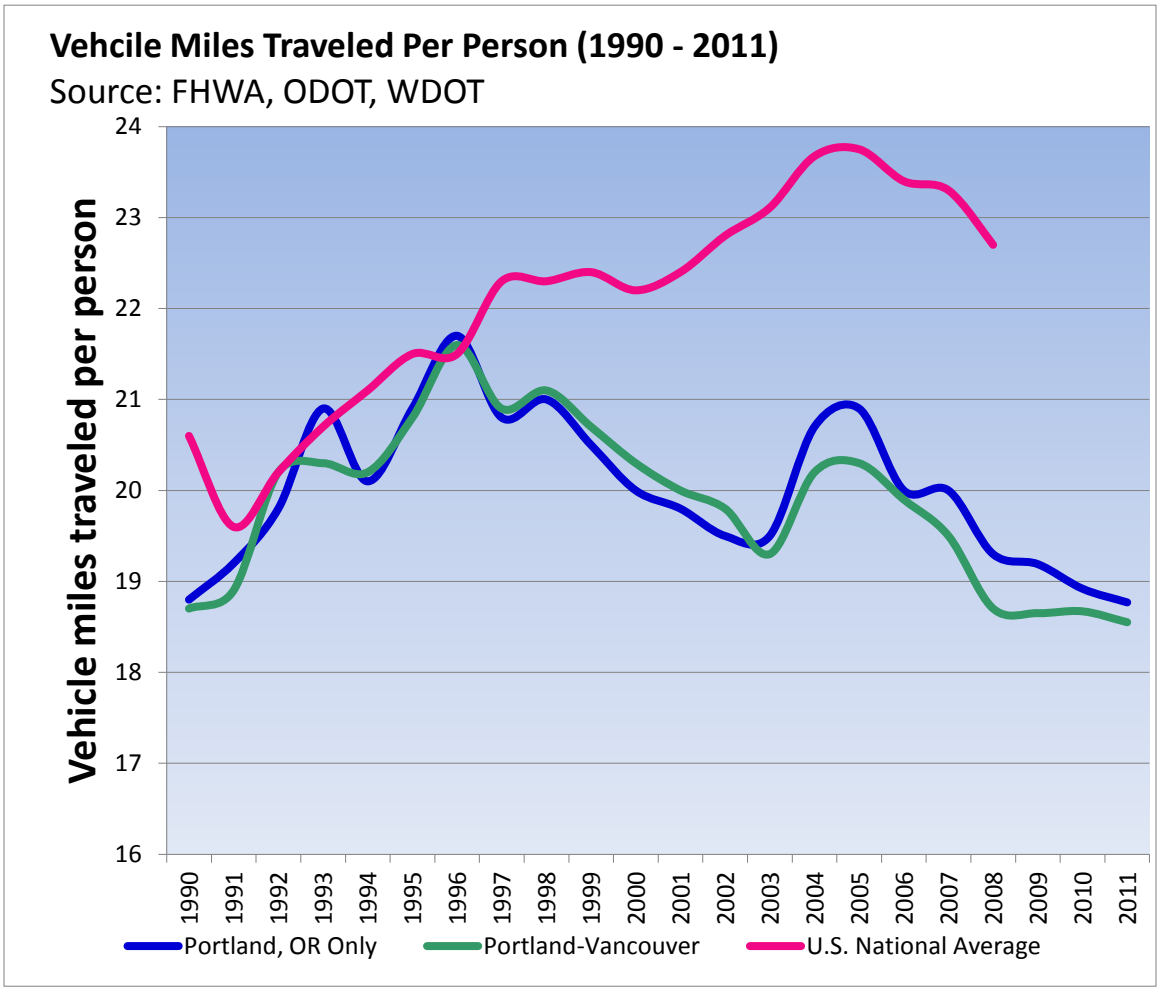
Travel behavior—mode choice, commuting patterns, trip length and frequency—is influenced by a number of factors, including demographics, land use, community design, cost, access, the economy, job locations as well as social and environmental values.

Our region is driving less per person than other similar sized regions

Between 1990 and 1995, daily vehicle miles traveled (VMT) per capita increased significantly nationally as well as in the Portland metropolitan region. During the past 18 years, implementation of the region's integrated transportation and land use planning strategy—the 2040 Growth Concept—has resulted in 15 percent fewer miles driven per capita and less time spent commuting than the national average. As a result, $2.5 billion is circulating in our economy every year that would otherwise have left the region. Between 1996 and 2008, the last year for which national data is available, daily VMT per capita declined in the region by 14 percent. In contrast, while motor vehicle miles traveled per person peaked nationally in 2004, they nevertheless increased by 1 percent during the same period. The Portland region has shown it is possible to counter this trend by providing transportation options and more compact growth.

In addition, implementation of this strategy also reduced vehicle miles traveled on a per capita basis with associated reductions in greenhouse gas emissions. More recent research by ODOT and the Texas Transportation Institute also found that despite increases in congestion in the region, residents here spend less time commuting than in other metropolitan areas of comparable size. The region has added three light rail lines to the high capacity transit system and frequent service bus lines connecting the Central City as well as Regional and Town Centers. **Figure 1.17** compares the increase in daily VMT per person in Portland-Vancouver with the other urban areas with similar populations.

Figure 1.17
Portland region per capita vehicle miles traveled (1990-2007)



Residents are commuting longer, but less than the national average

Time spent commuting increased in the Portland-Vancouver region between 2000 and 2012. Although most commuters (65 percent) spent less than 30 minutes commuting to work, the share of people in the region who commute for more than 30 minutes one way increased, reflecting changes in congestion and/or changes in residence location compared with that of job or school.[52] The average commute time in the region remained constant at 25 minutes between 2000 and

[52] U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates, Table B08303 and Census 2000: SF3, P31

2012.[53] Nationally, the average commute time remained constant at 25 minutes during this same period.

By 2012, Washington County residents had the shortest commutes in the region by a small margin. Clackamas County residents had the longest commutes in 2012, more than two minutes longer than Multnomah and Washington counties. This suggests that integrated transportation and land use decisions supporting a compact urban form and focusing on connections to centers and other employment areas are making an impact on slowing the growth of the average commute time.

Furthermore, as seen in **Table 1.7**, not all counties have the same share of residents who commute to another county for work. All four counties saw a decrease in the share of its residents leaving the county for work, suggesting an improved jobs/housing balance. Clackamas and Clark Counties saw the greatest decrease with a 4 percentage point drop each in the share of residents commuting to another county. Clark County decreased by 3 percentage points and Washington County decreased by 2 percentage points.

Table 1.7
Share of Residents Commuting to another County for Work: 2000 and 2012

County	2000	2012
Clackamas County	51%	47%
Clark County	35%	32%
Multnomah County	22%	18%
Washington County	32%	30%

Personal travel is growing faster than work travel

Travel to work has typically been the focus of transportation planning, especially given its prominence in the morning and evening peak periods. Nevertheless, nationwide travel for non-work purposes, such as shopping, errands and recreation is growing faster than work travel.

The National Household Travel Survey found that in 2001, a majority of peak period person trips in vehicles are not related to work. Looking at an average weekday, non-work travel comprises 56 percent of trips during the morning rush hour period and 69 percent of trips during the evening rush hour period.[54]

As of 2001, the average American was taking approximately four more trips a week for non-work purposes compared to 1990.[55] This trend has been acknowledged at Metro through the Regional

[53] U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates, Table GCT0101 U.S. Census Bureau, which stated one minute of the increase in travel time is due to a change in methodology.
[54] *Congestion: Non-Work Trips in Peak Travel Times*, USDOT, April 2007.
[55] Congestion: Who is Traveling in the Peak?, USDOT, August 2007.

Travel Options (RTO) program, which promotes and supports the transportation choices available in the region to reduce the number of drive alone trips. The RTO program made a shift in its 2003 strategic plan to also target non-commute trips during rush hour and throughout the day as a key strategy to congestion and air quality issues.

Residents are choosing active transportation options with increased frequency

Bicycle travel and related benefits

The Portland metropolitan region is known for its bicycle culture. Bicycles play an important and growing role in the regional transportation system and the region's economy. Interest in bicycling has expanded across the region in recent years, adding to the growing demand for improved bicycle facilities. Bicycling for transportation grew by 191% between 1994 and 2011.[56]

Bicycles are cost-effective and a low-cost travel mode that can increase transportation for all age groups and income levels. Bicycle activity also supports efficient urban form because bicycles require less roadway and parking space than autos, decreasing the total cost and land area dedicated to parking and reducing the need to increase roadway capacity. Bicycle facilities boost economic activity by attracting bicycle-focused businesses and active tourism, and by providing a venue suitable for large events.

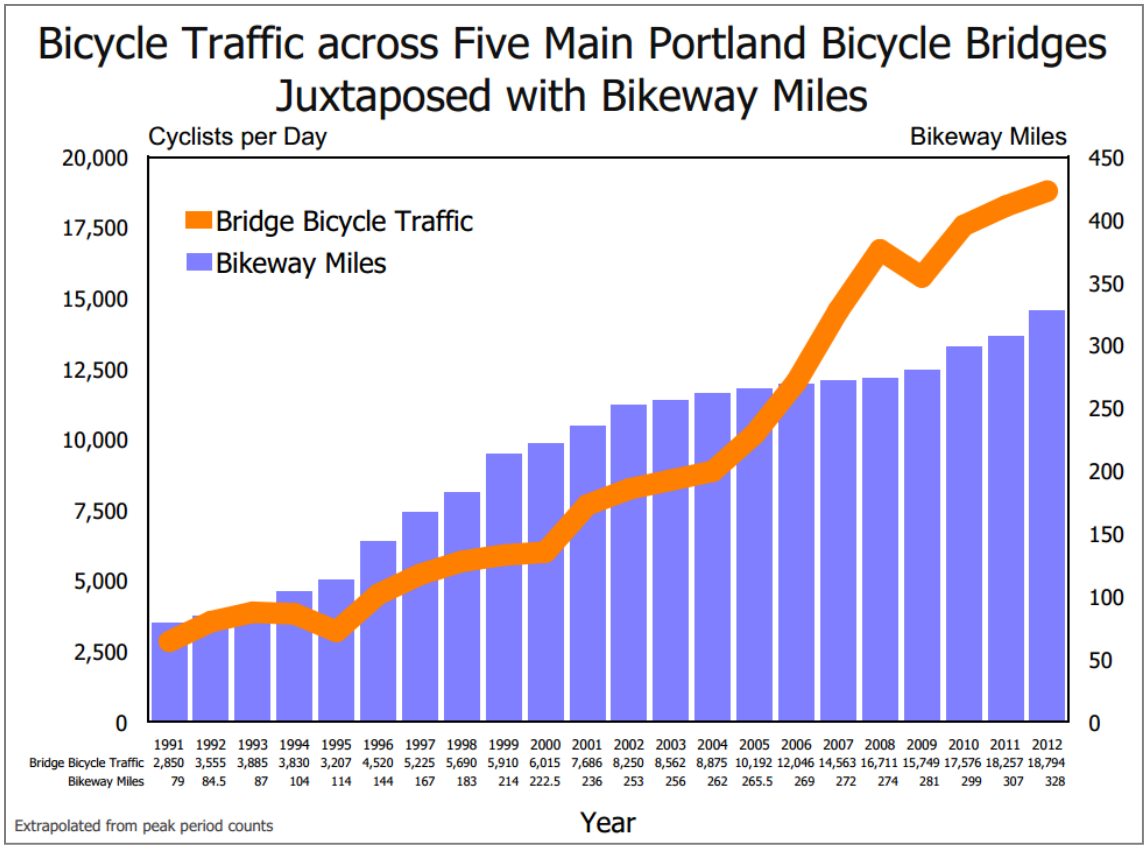
A study by the North Carolina Department of Transportation found that the availability of good bicycle facilities played an important role in tourist decisions, and that investments in bicycle facilities yielded an estimated nine-to-one return on investment in tourist dollar.[57] A recent state-wide study sponsored by Travel Oregon found that travelers who participated in bicycle-related activities while traveling in Oregon spent nearly $400 million in 2012 ($90 million was generated in the Portland region), representing about 4.4 percent of the direct travel spending in the state.[58] The bicycle-related industry in Portland is currently valued at approximately $90 million and includes retail, rental, repair, tours, races, rides, events, distribution and manufacturing, and professional services.[59] Between 1991 and 2004, the City of Portland invested $12 million in the city's developed bikeway network, increasing the mileage from 78 to 256.[60] The network includes bike lanes and designated "bike boulevards"—low-traffic city streets suitable for bicycling. Bicycle counts released for 2012 showed the highest number of bicycle trips across Portland's bridges since annual counts began in 2000.[61]

Counts taken across five central city bridges reported 18,794 daily trips—a 128 percent increase over the previous 10 years. Bicycle count data is currently limited to Portland, but anecdotal evidence suggests that bicycle ridership has increased throughout the region. Increased ridership is due in part to improved bicycle infrastructure as well as increased recognition of the health

[56] 2011 Oregon Household Activity Survey, Metro.
[57] *Pathways to Prosperity*, North Carolina Department of Transportation, 5/11/04
[58] The Economic Significance of Bicycle-Related Travel in Oregon, 2012. Dean Runyan and Associates.
[59] Alta Planning, Value of the Bicycling-Related Industry in Portland, 2008.
[60] Birk, Mia and Geller, Roger. Bridging the Gaps: How the Quality and Quantity of a Connected Bikeway Network Correlates with Increasing Bicycle Use, 2005, p. 14
[61] Portland Office of transportation, Bicycle Count Report, 2012.

benefits of bicycling. **Figure 1.18** shows growth in bicycle travel on the Willamette River bridges between 1991 and 2012.

Figure 1.18
Bicycle Traffic on Willamette River Bridges and Miles of Bikeways Constructed - 1991 - 2012



Beginning in January 2008, the Portland Police Bureau lowered the threshold for reporting bicycle-involved crashes. The change means that crashes previously unreported are now entering the reporting system. Despite the change in reporting methods, the City of Portland does not believe that the change in reported crashes is representative of changes in actual crash activity. . Reported bicycle crashes declined in 2011 (the last year for which data is available) for the first time since 2007.[62].

[62] 2006 City of Portland Bicycle Count Report – Significant Findings & Analysis Portland Bicycle Count Report 2012.

Figure 1.19

Bicycle Traffic on Willamette River Bridges and miles of Bicycle Crashes - 1991 - 2010

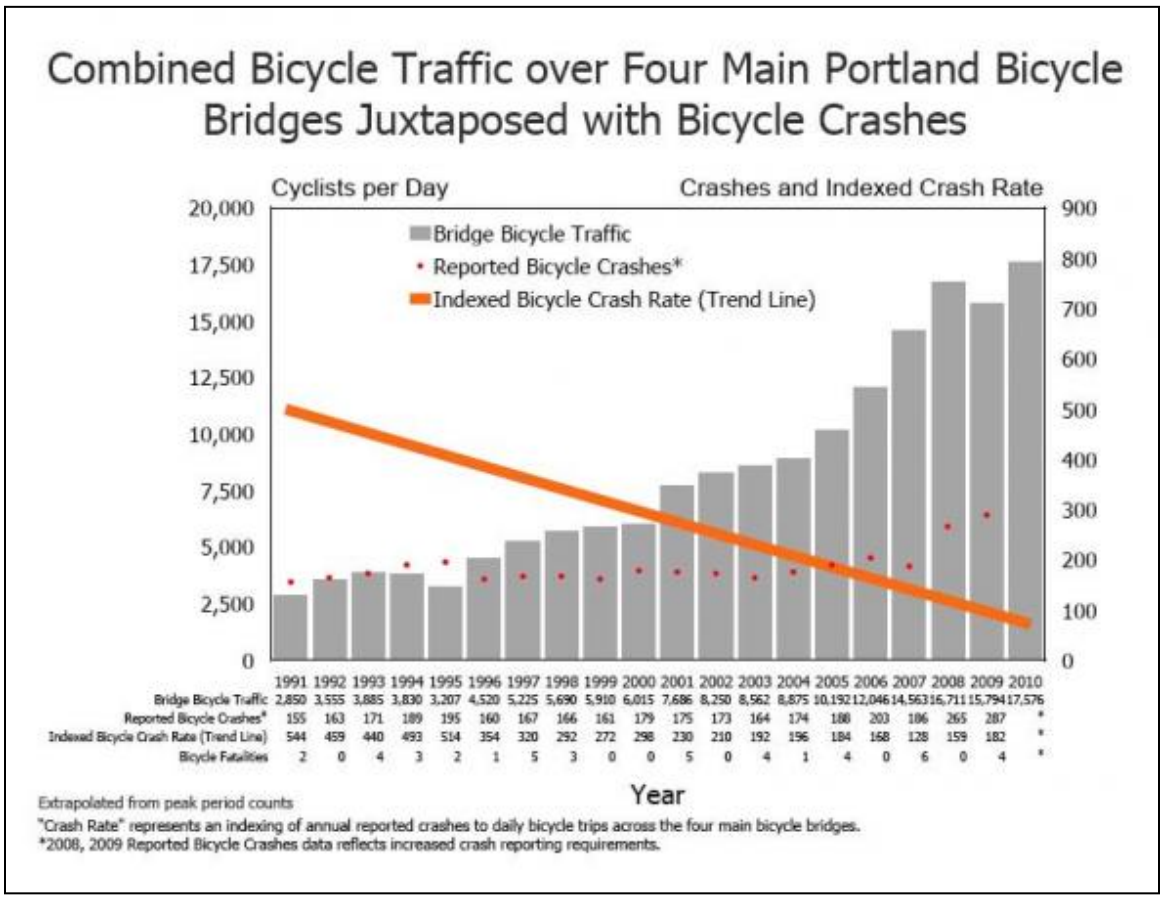
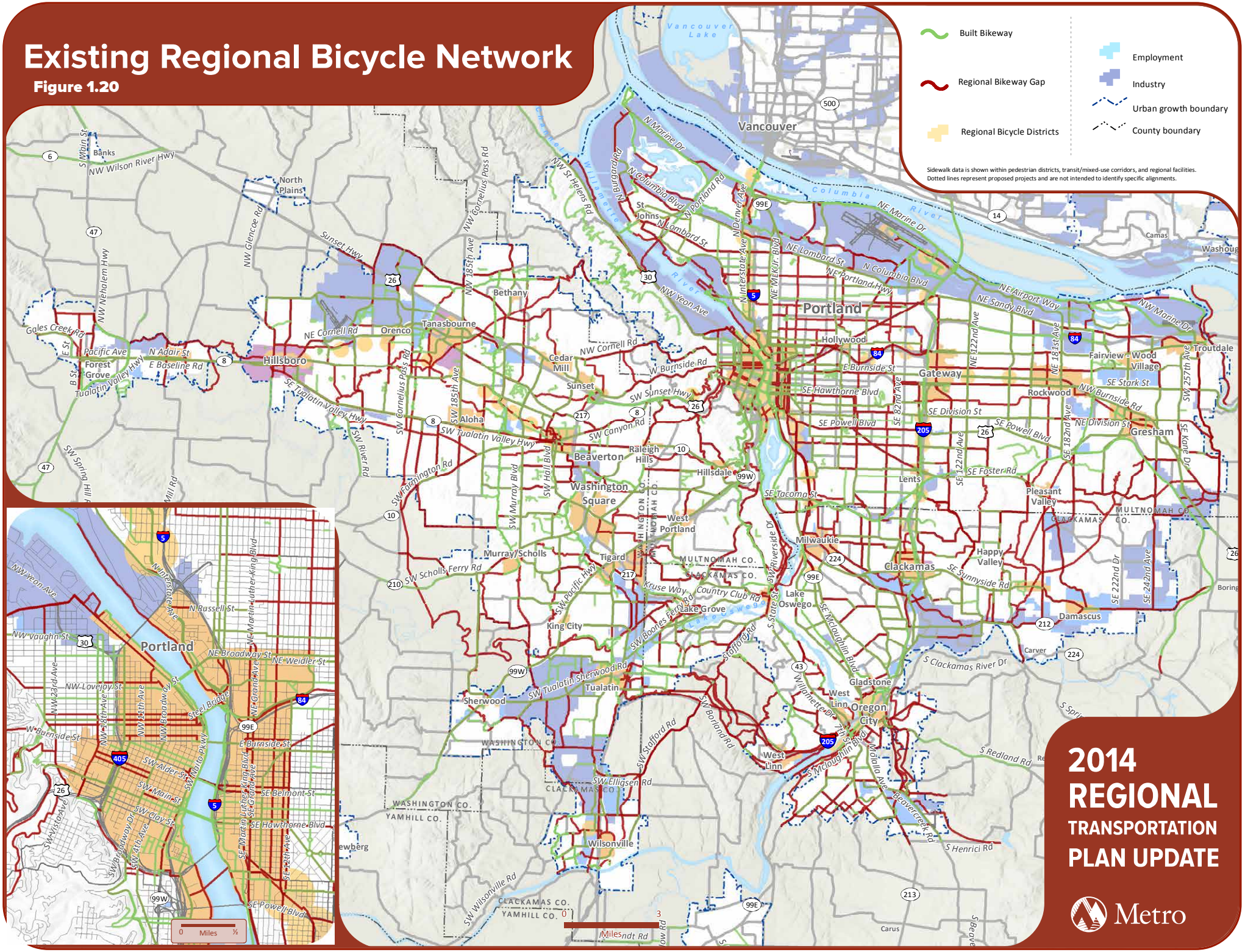


Figure 1.20 shows the existing regional bicycle network. **Figure 1.21** shows the existing and planned regional and inter-regional trails network. **Figure 1.21** is provided to give context for the regional trails included in the Regional Bicycle and Pedestrian Networks and to link the RTP to regional parks and greenspaces implementation efforts.

Existing Regional Bicycle Network

Figure 1.20



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Regional Trails and Greenways

Figure 1.21

Walking

Walking is the most widespread and primary form of transportation. Whether an entire trip is done on foot (or using a wheelchair or similar mobility device), people must walk for at least part of every trip, even when the rest of the trip takes place on transit, in a vehicle or on a bicycle. People are recognizing that walking more on a regular basis provides significant health benefits. Therefore it is critical that our transportation system supports and encourages walking for short trips.

Pedestrian activity thrives in places where sidewalks and intersections are well connected, safe and attractive.

Pedestrian activity indicates economic and social vitality in residential, commercial and mixed-use areas. Pedestrian activity thrives where the pedestrian facilities are well connected, safe and attractive—well lit, free of debris and in good repair—and where intersections have crosswalks or signalized lights. Audible signals at crosswalks and curb ramps at intersections improve the utility of pedestrian facilities for people with physical challenges.

Many parts of the region have well-connected pedestrian facilities. Sidewalk data for the region collected in 2011 indicates that 38% of regional pedestrian corridors are missing sidewalks on at least one side of the roadway.[63] . **Figure 1.22** shows the existing regional pedestrian network.

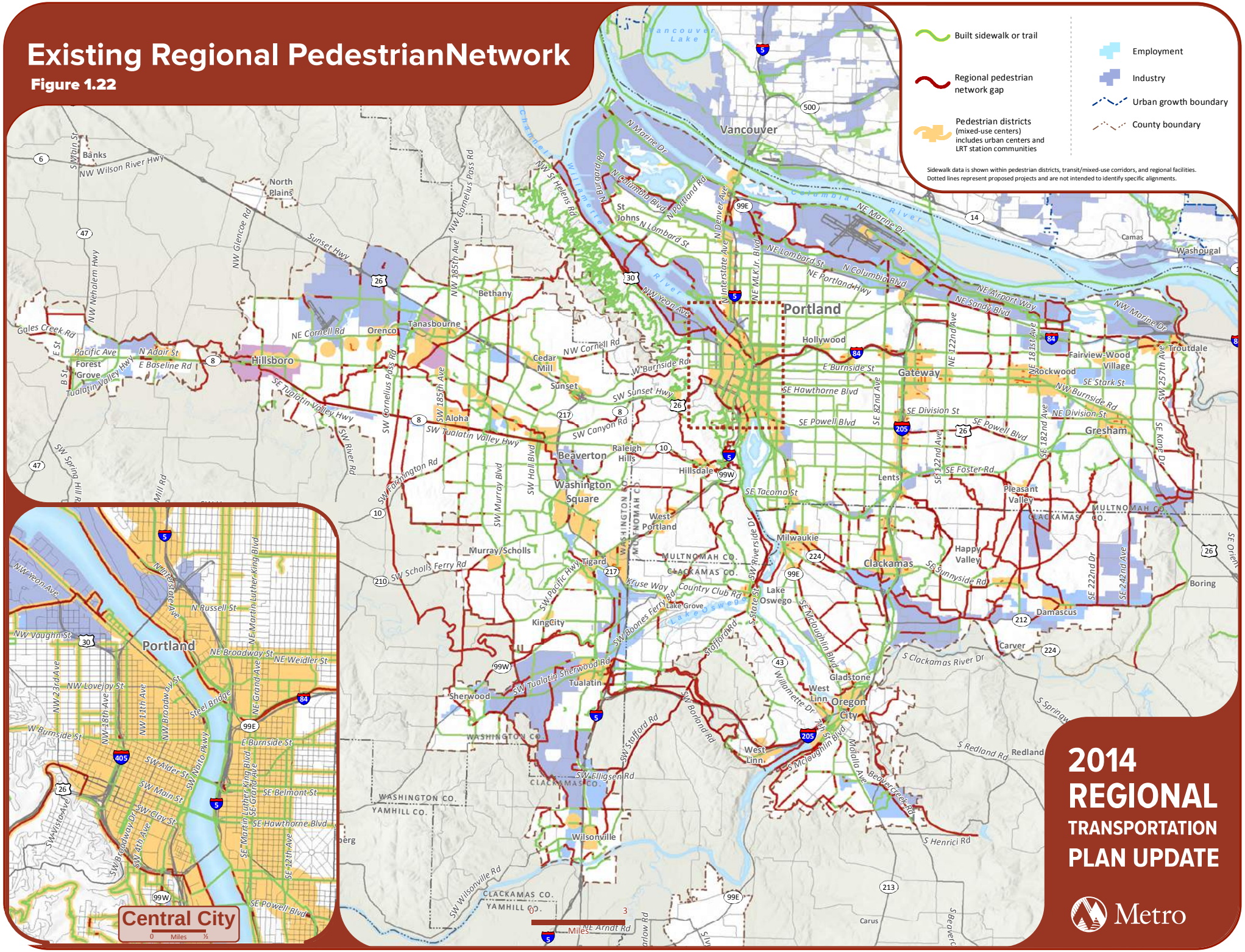
Even though 90 percent of the region's population lives within a half-mile of a bus stop or light rail platform, sidewalks connect to only about 69 percent of the stops. TriMet is working with local jurisdictions to improve pedestrian access to transit, to not only support increased ridership, but also to enable more people to use fixed-route transit who would otherwise need door-to-door service.[64]

[63] Metro, 2011, Regional Land Inventory System (RLIS). 19.2% of all roadways on the regional pedestrian network have no sidewalks, 18.7% have sidewalks on one side of the roadway, and 61.9% of roadways have sidewalks on both sides of the roadway.

[64] TriMet, *2013 Transit Investment Priorities*., and TriMet Pedestrian Network Analysis

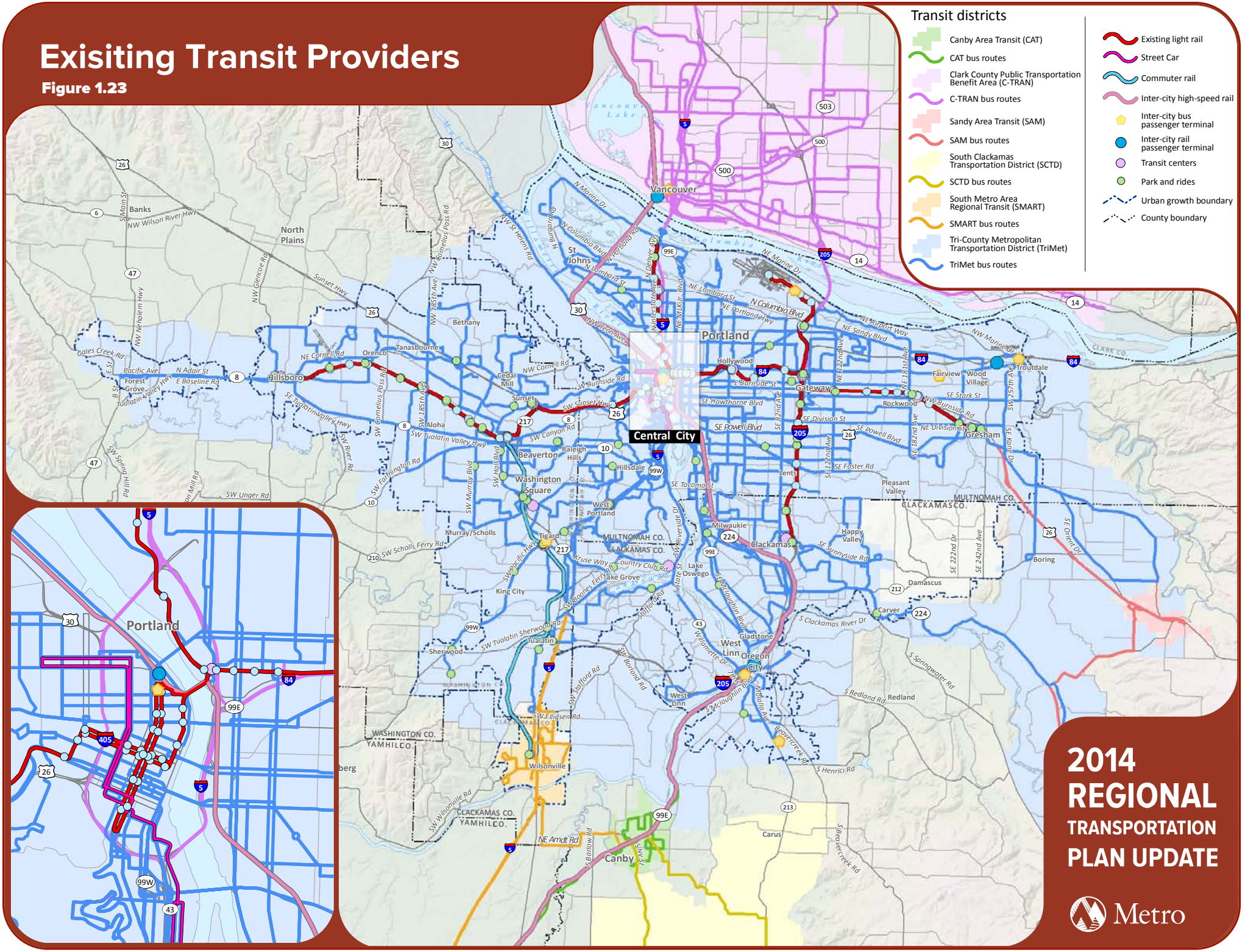
Existing Regional PedestrianNetwork

Figure 1.22



Exisiting Transit Providers

Figure 1.23



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Pedestrians will be increasingly affected by the growth in motor vehicle and bicycle traffic on the major street systems. If trends continue as they have, the expected growth in motor vehicles on our roads will inhibit the region's goal to become more walkable and bikable. We must begin to provide more and better pedestrian and bike facilities to encourage walking and biking. The expected growth in bicycling will increase the need to educate both cyclists and pedestrians on the safe use of sidewalks, bikeways and shared multi-purposes routes that are designed to serve both cyclists and pedestrians.

Transit

Light rail, commuter rail, bus, and streetcars and supporting infrastructure make up the current regional transit system. Ridership on bus and light-rail lines in the region increased by 45 percent between 1997 and 2007, nearly twice the percentage growth rate in population, which grew by 20 percent.

Fifty-two miles of MAX light rail lines operated by TriMet currently run through the Portland region, serving 85 stations, connecting the Portland Expo center with downtown Portland, the Portland International Airport with downtown Beaverton, and downtown Gresham with downtown Hillsboro. The MAX Green Line from Clackamas Town Center to Portland State University in downtown Portland opened in September 2009. Construction began in 2011 for a new light rail line connecting downtown Portland to downtown Milwaukie. The Portland-Milwaukie line's expected completion is in 2015 and features Portland's first new bridge since 1973. Engineering and design is well advanced for a light rail line from downtown Portland to Vancouver, Washington. Planning is underway for additional high capacity connections between downtown Portland and Tualatin via Tigard in the Southwest portion of the region and between downtown Portland and Gresham along Powell-Division corridor in the eastern part of the region.

The Portland Streetcar is one part of the transit system in the region, along with light rail, commuter rail and buses. Ridership on the streetcar has increased by an average of 17.4 percent since 2001.

Commuter rail service between Wilsonville and Beaverton in Washington County began operation in 2008. Potential commuter rail connections have been identified for future study to connect the Portland metropolitan region to Salem and other neighboring communities.

Regional bus service is provided by TriMet and the South Metropolitan Area Rapid Transit (SMART), with connections to a number of other transit providers, as shown in **Figure 1.23**. TriMet bus service includes 79 routes covering 864 miles, with 12 Frequent Service carrying 58 percent of TriMet's bus trips. TriMet defines Frequent Service as 15 minute headways or better throughout the day, seven days a week. Temporary budget constraints during the recent recession changed this to 17-20 minute headways in non-rush hours and on weekends, but TriMet remains committed to

providing these lines with the most frequent service seven days a week. TriMet is beginning to restore Frequent Service bus as the economy recovers and the agency's budget situation improves. For example, starting in March 2014, all Frequent Service lines will have 15 minute headways or better from the beginning of the AM peak weekdays through the day and to the end of the PM peak.

SMART bus service in Wilsonville operates seven fixed-route buses five days a week, with two of the routes also operating on Saturday. SMART buses serve Wilsonville and also connect with bus services in Portland, Tualatin, Canby and Salem.

The Portland Streetcar opened a second line, the Central Loop (CL), in September 2012. With the addition, streetcar lines serve downtown Portland and surrounding areas including South Waterfront Pearl District, NW Portland, Lloyd District, and OMSI. Streetcar service is managed by a non-profit that was organized by the City of Portland, but is operated by TriMet personnel through an agreement with the City. Both the City of Portland and TriMet share operating costs. Ridership has increased by an average of 17.4 percent since 2001.[65]

The population of seniors is growing, particularly at the edges of the Metro region, and there are numerous human service transportation providers in the region, each offering similar transportation options. Providers range from transit agencies like TriMet and SMART to non-profit providers like Ride Connection, Inc. Each provides demand response services for seniors and people with disabilities.

TriMet meets the needs of seniors and people with disabilities with the LIFT and Medical Transportation programs. TriMet operates 268 LIFT vehicles that provide door-to-door service, providing 930,000 million rides annually to seniors and people with disabilities in 2013.[66]Complementary cab services contracted by TriMet provided an additional 108,000 rides in 2013, while Ride Connection services provided another 255,000 rides.[67]

Regional research shows that more housing for seniors and people with disabilities should be located along transit corridors in order to reduce barriers to transit access.

[65] Metro. *A Profile of the Regional Transit System in the Portland Metropolitan Region*, 2007, pg. 16.
[66] TriMet, Transit Investment Plan. 2007. Pg. 4.
[67] Metro. Monthly Performance Report, Audited FY13 Summary

Because ADA paratransit rides are individually scheduled, demand for paratransit is proportional to increases in costs. Future LIFT growth is based on the state's population forecast by age for the tri-county area. About 30 percent of LIFT trips are made by individuals who are over age 70; their ridership is assumed to increase at the same rate of growth in elderly population as forecast by the state of Oregon. About 70 percent of LIFT trips are made by riders who are under age 70. Their ridership is assumed to grow with the growth in total population as forecast by the state of Oregon.

For the period covered by the 2014 RTP, the average annual increase in LIFT operating costs is projected to be 4.3 percent, or roughly $2.5 million annually.[68] In addition, costs for LIFT vehicle replacement and fleet expansion to keep up with growth are projected to total $106,250,000 over the course of the RTP, reflecting 40 annual LIFT vehicle purchases in early years with expansion in later years of the plan.

Regional research shows that between 35 percent and 59 percent of LIFT riders could potentially walk and use existing fixed route transit. TriMet's RideWise travel training and in-person LIFT eligibility assessment noted above have helped assist potential LIFT rider to use TriMet's fixed route services. However, barriers exist like discontinuous sidewalk segments and a lack of transit stops/destinations within a quarter of a mile of where the elderly and disabled reside. The research suggests that a focus should be put on providing housing for the elderly and disabled along transit corridors and addressing issues of sidewalk connectivity near existing bus stops and MAX light rail stations. However, current zoning often precludes locating housing for the elderly or disabled in transit corridors. Finally, with multiple providers and overlapping services within a region, there is a need for more coordination of services.

[68] TriMet Financial Forecast: FY15 Budget Forecast and Financial Analysis

1.9 WHAT'S NEXT MOVING FORWARD?

The Portland metropolitan region pioneered approaches to land use and transportation planning in the past, and is uniquely positioned to address these trends – mainly because the region has solid, well-integrated transportation and land-use systems in place and a history of working together to address complex challenges at a regional scale.

In the 1990s, regional policy discussions centered on how and where the region should grow to protect the things that make this region a great place to live, work and play. Those discussions led to the adoption of the region's long-range plan, the 2040 Growth Concept. This plan reflects shared community values and desired outcomes that continue to resonate today. Today it is time to revisit how we are implementing our vision, make some corrections and find new strategies and resources to create the future we want for our region. The rest of this plan represents a new step forward to respond to the changes and challenges we face and set a new course for future transportation decisions and implementation of the 2040 Growth Concept.

The pages ahead provide an updated blueprint and investment strategy for a more sustainable transportation system that links land use and transportation, protects the environment and supports the region's economy. Translating our vision into a reality will not be a simple task – and it will take time. More work is needed, as this plan does not achieve all the goals we've defined. It represents a new step forward for our region.

This RTP provides an updated blueprint and investment strategy for a more sustainable transportation system for everyone, linking land use and transportation, protecting the environment and supporting the region's economy.

CHAPTER 2

VISION, CONCEPTS AND POLICIES:

WHAT IS OUR VISION FOR THE TRANSPORTATION SYSTEM?

2.0 INTRODUCTION

Transportation shapes our communities and our daily lives, allowing us to reach our jobs and recreational opportunities, access goods and services, and meet daily needs. This chapter presents a shared, long-term vision, supporting policies and blueprint for the transportation system serving the Portland metropolitan region through 2040. The vision reflects the continued evolution of transportation planning from a project-driven endeavor to one that is framed by a broader set of outcomes that affect people's everyday lives.

The overall vision and supporting policies are aimed at better integrating transportation and land use efforts to sustain the region's economic competitiveness and prosperity, protect farms and natural areas, promote vibrant, compact communities, provide safe and reliable travel choices, reduce global warming and enhance our quality of life. This plan is implemented through a variety of strategies and actions at the local, regional, state and federal levels. The various jurisdictions in the region are expected to pursue policies and projects that contribute to specific elements of the vision.

This chapter is organized into the following sections:

2.1 Outcomes-based framework to guide planning and decision-making: The section describes the outcomes-based approach to which the RTP must respond, linking transportation to a broader set of desired outcomes for vibrant communities, a healthy economy, equity and the environment.

2.2 Integrated land use and transportation vision: This section describes the 2040 Growth Concept vision and establishes the primary mission of the plan as a key tool for implementing the 2040 Growth Concept and supporting local aspirations for growth.

2.3 Goals, objectives and targets for a 21st century transportation system: This section lays out ten goals, supporting objectives and performance targets for the regional transportation system. The goals, objectives and targets establish policy and investment priorities that will guide future planning, investment decisions and monitoring.

2.4 Regional system definition: This section defines and illustrates the components that make up the regional transportation system.

2.5 Regional network concepts and policies: This section describes each of the network concepts to guide the development and implementation of different parts of the system. The network concepts establish a vision and supporting policies for street design and all types of travel – motor vehicles, transit, walking and bicycling – as well as the movement of goods and freight by road, air, water and rail.

2.1 OUTCOMES-BASED FRAMEWORK TO GUIDE PLANNING AND DECISION-MAKING

Transportation planning is not just an exercise in analyzing numbers and defining projects. Shorter-term circumstances such as the current economic recession and longer-term concerns such as climate change demand that we do things differently and make a new approach to our planning responsibilities all the more timely.

In 2008, the Metro Council and our regional partners adopted six desired outcomes to guide regional planning for the future.[1]

Planning creates opportunities for individuals and communities to define and articulate their collective desires and aspirations for enhancing the quality of life in our region and their communities. It allows citizens and their elected leaders to take stock of the successes that have been achieved in their communities through years of hard work. It also requires us to think carefully about and to be accountable for our choices, ensuring we get the greatest possible return on public investments.

The RTP must also respond to the six desired outcomes in order for the region to be a responsible steward of public investment and the social, built and natural environments that shape our communities. This means local, regional and state governments must partner with the private sector to preserve and enhance the quality of life, our economy and the environment now and for future generations. It also means making transportation investment decisions based on achieving the multiple outcomes we are seeking rather than a single focus on addressing traffic congestion.

WHAT OUTCOMES ARE WE TRYING TO ACCOMPLISH?

VIBRANT COMMUNITIES – People live, work and play in vibrant communities where their everyday needs are easily accessible.

ECONOMIC PROSPERITY – Current and future residents benefit from the region's sustained economic competitiveness and prosperity.

SAFE AND RELIABLE TRANSPORTATION – People have safe and reliable transportation choices that enhance their quality of life.

LEADERSHIP ON CLIMATE CHANGE – The region is a leader in minimizing contributions to global warming.

CLEAN AIR AND WATER – Current and future generations enjoy clean air, clean water and healthy ecosystems.

EQUITY – The benefits and burdens of growth and change are distributed equitably.

As adopted by the Metro Council and MPAC in 2008 by Resolution No. 08-3940.

[1] Metro Resolution No. 08-3940 expressed the intent of Metro and its regional partners to use a performance-based approach to guide policy and investment decisions in the region. The resolution (1) affirmed a definition of a successful region, which have become known as the "six desired outcomes" and (2) directed staff to work with regional partners to identify the performance measures, targets, actions and decision-making process necessary to create successful communities.

To this end, the RTP uses an outcomes-based framework to inform transportation planning and investment decisions based on three balanced objectives:

1. **Equity –** Responsibility of the plan to the people of the region.

The plan identifies an interconnected and multi-modal transportation system that provides safe and affordable travel choices for everyone and equal access to work, education and nature for the region's residents. The implementation of the plan must ensure that the benefits and impacts of transportation decisions are fairly distributed to all people, regardless of race, national origin, or income, and that everyone has access to meaningful participation.

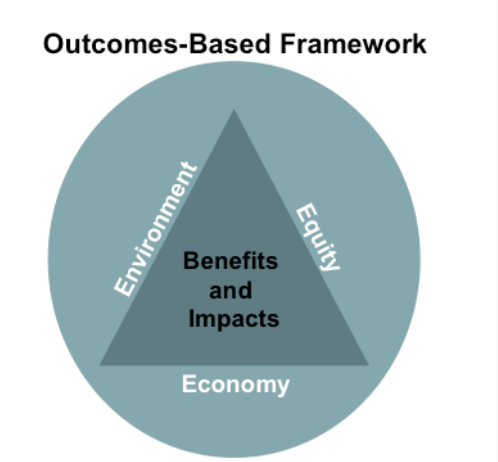
2. **Environment** - Responsibility of the plan to the landscape of the region.

The implementation of the plan should ensure that the multi-modal transportation system protects and enhances the region's unique setting and natural environment, planned urban form and cultural legacy.

3. **Economy** - Responsibility of the plan to the economic prosperity of the region.

The implementation of the plan should provide a multi-modal transportation system that supports a healthy regional economy and helps the region's businesses and industries remain competitive. Moving forward, the region must sharpen its efforts to quantify, assess and consider economic return on public investments in transportation infrastructure, in order to spend public funds wisely in support of the regional economy.

The RTP framework uses economic, social, and environmental objectives to guide planning and investment decisions.



Applying this framework to transportation planning and decision-making acknowledges that financial, cost-benefit, and economic considerations are not the sole drivers of transportation projects. Instead, it reflects a more balanced approach that embraces the concept that the economy, equity, and the environment must all be considered on a level playing field.

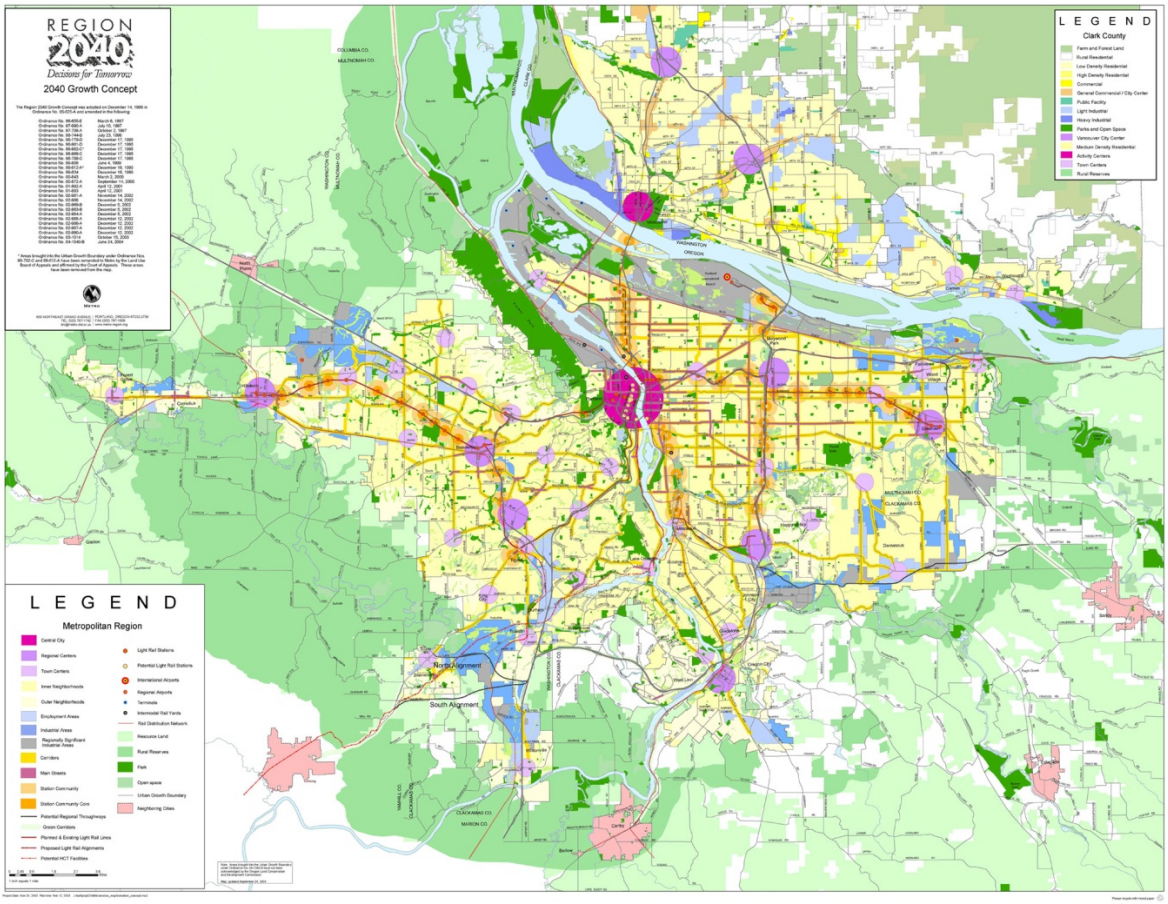
An outcomes-based planning and decision-making framework forms the foundation for the rest of the plan to ensure transportation decisions support this larger set of responsibilities and the six desired outcomes.

2.2 INTEGRATED LAND USE AND TRANSPORTATION VISION

In 1995, the Portland region adopted the 2040 Growth Concept, the long-range plan for managing growth that merges land use and transportation planning to reinforce the objectives of both. The unifying theme of the 2040 Growth Concept is to preserve the region's economic health and livability and plan for growth in the region in an equitable, environmentally-sound and fiscally-responsible manner.

The 2040 Growth Concept includes land-use and transportation building blocks as shown in **Figure 2.1**. It concentrates mixed-use and higher-density development in "urban centers"; "light-rail station communities;" "corridors" and "main streets". The 2040 Growth Concept includes plans for high-capacity transit to connect the Portland central city and seven regional centers. Frequent bus service, often at 15-minute intervals, is envisioned to connect "town centers" with the central city and regional centers.

Figure 2.1
Region 2040 Growth Concept – an integrated land use and transportation vision



The 2040 Growth Concept expresses the region's aspiration to incorporate population growth within existing urban areas as much as possible and expand the urban growth boundary only when necessary. Implicit in the 2040 Growth Concept is the understanding that compact development is more sustainable, more livable and more fiscally responsible than low-density sprawl, and will help reduce the region's carbon footprint.

Increased pedestrian and bicycle access and new transit and road capacity are needed to achieve the 2040 Growth Concept vision and support the region's economic vitality. Transportation and the economy are closely linked and investments that serve certain land uses or transportation facilities may have a greater economic return than others. Focusing transportation investments and other strategies to support the gateway function of our transportation system is the primary way in which to strengthen that gateway role for the region and the rest of the state. This means ensuring reliable and efficient connections between intermodal facilities and destinations within and outside the region to promote the region's function as a gateway for trade and tourism.

2040 Growth Concept Land-use Design Types

The 2040 Growth Concept land uses, called 2040 Design Types, are arranged in a hierarchy. RTP investments are focused in the primary and secondary land uses, referred to as 2040 Target Areas. The hierarchy also serves as a framework for prioritizing RTP investments. **Table 2.1** lists the 2040 design types based on this hierarchy.[2]

Table 2.1
2040 Growth Concept land-use design types

2040 Target Areas		
Primary land-uses	**Secondary land-uses**	**Other urban land-uses**
• Portland central city • Regional centers • Industrial areas • Freight and passenger intermodal facilities	• Employment areas • Town centers • Station communities • Corridors • Main streets	• Inner neighborhoods • Outer neighborhoods

Different parts of the region are at different stages of implementing the 2040 Growth Concept. As a result, different areas may have different transportation investment needs and priorities that will require substantial public and private investment over the long-term. **Table 2.2** summarizes infrastructure investment strategies for each stage of implementation.

[2] More detailed descriptions of the land use and transportation elements of each 2040 Design Type can be found in the Regional Urban Growth Goals and Objectives and Regional Framework Plan.

Table 2.2
Priority infrastructure investment strategies

Stage of Development	Developed Areas Built-out areas with most new housing and jobs accommodated through infill, redevelopment and brownfields development.	Developing Areas Redevelopable and developable areas, with most new housing and jobs being accommodated through infill, redevelopment, and greenfield development.	Undeveloped Areas More recent additions to the urban growth boundary, with most new housing and jobs accommodated through greenfield development.
Infrastructure Investment Strategies	Operations, maintenance and preservation of existing transportation assets. Managing the existing transportation system to optimize performance for all modes of travel. Leveraging infill, redevelopment and use of brownfields. Addressing bottlenecks and improving system connectivity to address barriers and safety deficiencies. Providing a multi-modal urban transportation system. Completing local street connections needed to complement the arterial street network.	Operations, maintenance and preservation of existing transportation assets. Preserving right-of-way for future transportation system. Managing the existing transportation system to optimize performance for all modes of travel. Leveraging infill, redevelopment and use of brownfields Providing a multi-modal urban transportation system. Focusing on bottlenecks and improving system connectivity to address barriers and safety deficiencies. Completing local street connections needed to complement the arterial network.	Operations, maintenance and preservation of existing transportation assets. Preserving right-of-way for future transportation system. Providing a multi-modal urban transportation system. Managing new transportation system investments to optimize performance for all modes of travel. Focusing on bottlenecks and improving system connectivity to address barriers and safety deficiencies. Completing local street connections needed to complement the arterial street network.

Community Building Concept

Transportation planning focused on community building outcomes will help protect our region's natural and cultural legacy and serve as an economic catalyst for businesses and jobs. The community building concept recognizes the important role of transportation in placemaking to achieve the 2040 Growth Concept vision for a strong economy, a healthy environment and communities that serve the needs of all. The concept calls for cultivating great communities by investing in the community assets essential to making downtowns, main streets and employment areas better places to live and work. Typically, these are

investments that help revitalize downtowns and main streets or provide critical access to industrial lands and freight intermodal facilities.

The community building concept recognizes the important role of transportation in placemaking to achieve a strong economy, a healthy environment and communities that serve the needs of everyone.

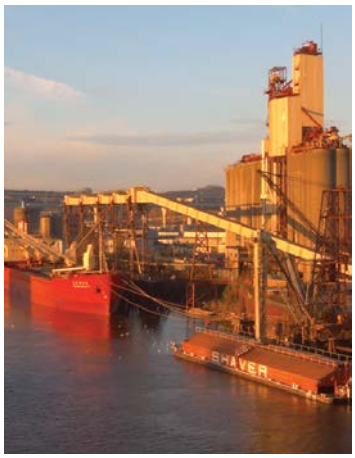
Centers and mainstreets

A diverse, walkable community depends on transportation infrastructure that provides a variety of ways to get around - serving pedestrians, bicyclists and transit-riders as well as drivers. The concept emphasizes streetscape retrofits, street connectivity, transit, sidewalks, bicycle and trail connections in downtowns and along main streets to leverage higher density mixed-use development and transit investments such as frequent bus, street car or high capacity transit. Centers and main streets should be optimized for pedestrians, bicycles and transit users.

For example, an attractive, tree-lined main street, complete with wide sidewalks and "street furniture" – benches, bus shelters, trash cans – is a source of community pride and a magnet for walkers, shoppers and tourists. High quality transit service in these areas further supports placemaking objectives and provides important access and circulation.

Industrial and employment areas

In industrial and employment areas, the community building concept emphasizes providing critical freight access to the interstate highway system and protecting interchange capacity to help the region's businesses and industry in these areas remain competitive. This means strategically adding road capacity to arterials and building new street connections in these areas in addition to providing access to support commercial delivery activities and upgrading main line and rail yard infrastructure. Using public transportation investments to leverage community aspirations, desired growth and private investment in 2040 centers, corridors and employment areas contributes to the quality of life and economic vitality of the region.



Providing freight access to the interstate highway system in industrial and employments areas helps the region's industry remain competitive.

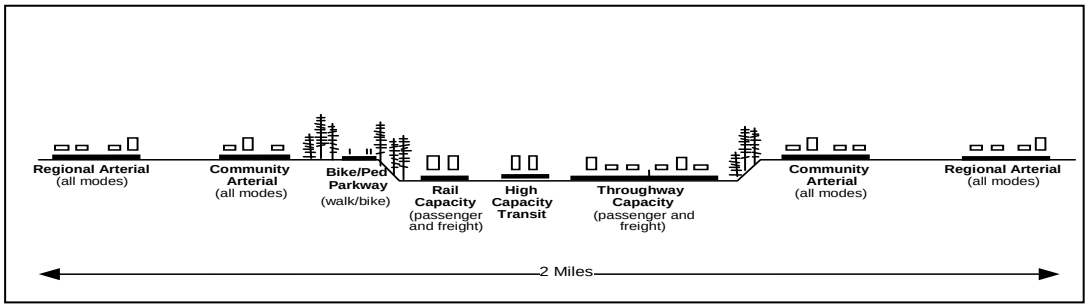
Regional Mobility Corridor Concept

The regional mobility corridor concept integrates arterial streets, throughways, high capacity transit, frequent bus routes, freight/passenger rail, and bicycle parkways into

subareas of the region that work together to provide for regional, statewide and interstate travel.[3] The function of this system of integrated transportation corridors is metropolitan mobility – moving people and goods between different parts of the region and, in some corridors, connecting the region with the rest of the state and beyond. These transportation corridors also have a significant influence on the development and function of the land uses they serve. The regional mobility corridor concept calls for consideration of multiple facilities, modes and land use when identifying needs and most effective mix of land use and transportation solutions to improve mobility within a specific corridor area. The concept of a regional mobility corridor is shown in **Figure 2.2**.

Since the 1980s, regional mobility corridors have had throughway travel supplemented by high capacity transit service that provides an important passenger alternative. Parallel arterial streets, heavy rail, bus service, bicycle parkways and pedestrian/bicycle connections to transit also provide additional capacity in the regional mobility corridors. The full array of regional mobility corridor facilities should be considered in conjunction with the parallel throughways for system evaluation and monitoring, system and demand management and phasing of physical investments in the individual facilities. Bicycle and pedestrian travel and access to transit are also important as we plan and invest in regional throughways and arterial streets. New throughway and arterial facilities, such as freeway interchanges or widened arterial streets, should be designed and constructed in such a manner as to support bicycling, walking and access to transit.

Figure 2.2
Regional Mobility Corridor Concept



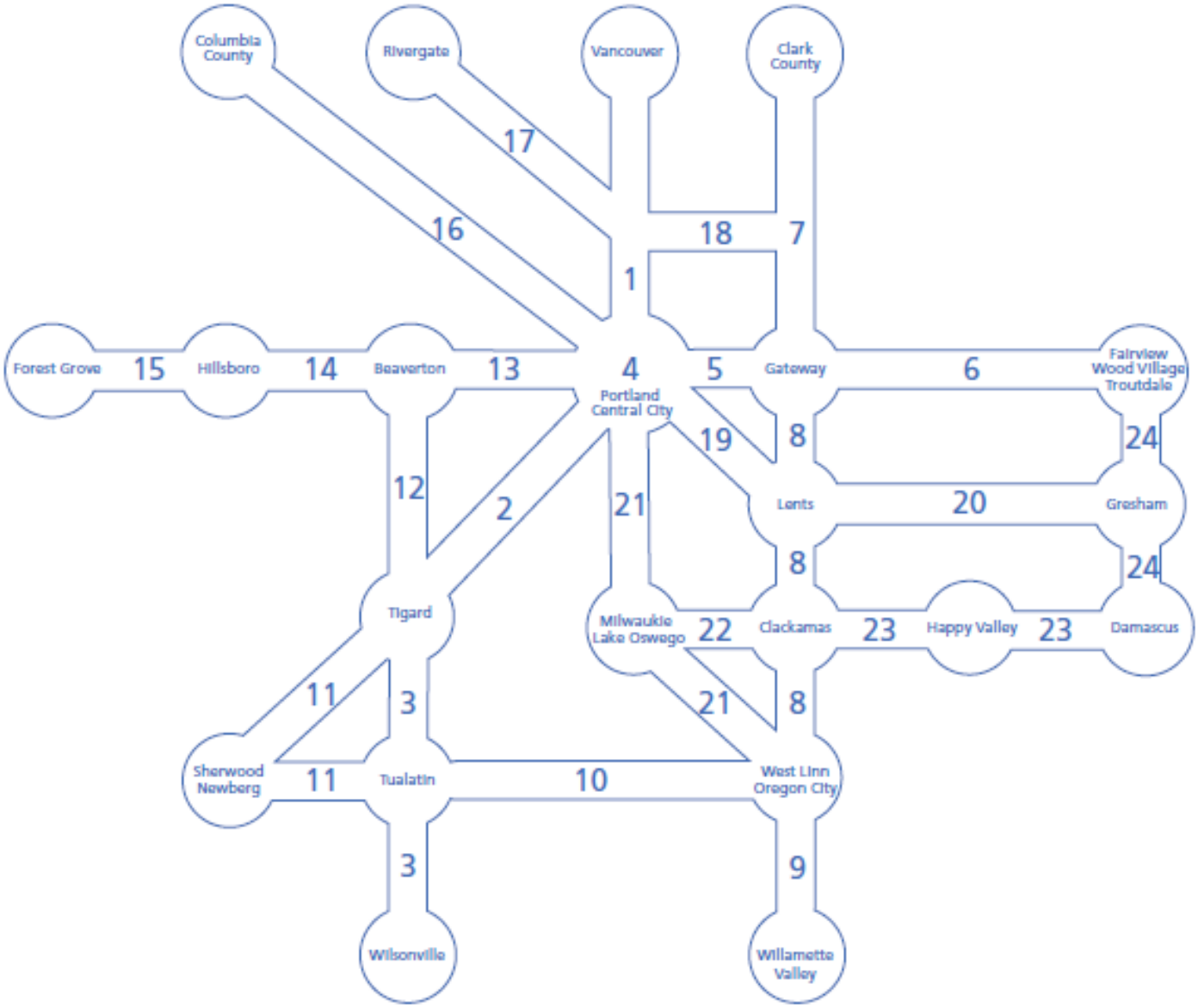
Note: Idealized concept for illustrative purposes showing recommended range of system analysis for the evaluation, monitoring, management and phasing of investments to throughways, arterial streets and transit service in the broader corridor. The illustration is modeled after I-84 between 12th and 60th avenues in Northeast Portland.

Figure 2.3 shows the general location of mobility corridors in the region.

[3] See 2.5.5.1 Regional Bicycle System for more information about the bicycle parkway concept.

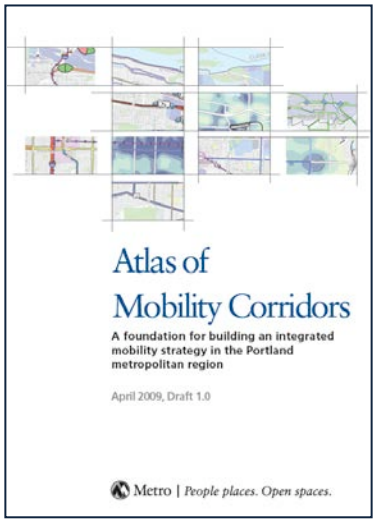
Figure 2.3

Mobility Corridors in the Portland Metropolitan Region



The Mobility Corridor Strategies provided in the Appendix provides a summary of the 24 corridors, describing facilities, functions, land uses, and documenting transportation needs and strategies for addressing them.

Atlas of Mobility Corridors



The Atlas of Mobility Corridors is a way to visually present current land use and multi-modal transportation performance data for each of the region's major travel corridors. For each of the 24 corridors, the Atlas provides a general overview that includes location in the region, primary transportation facilities and land use patterns, an assessment of performance by travel mode for each mobility corridor, and documents needs and proposed solutions as identified in the RTP. The first Atlas was published in 2009 as part of the last RTP update. The next version of the Atlas will coincide with the completion of the 2014 RTP.

The Atlas enhances the region's ability to analyze and compare data between corridors. This information will be used to help identify the most cost-effective strategies and investment priorities for each corridor and serve as a framework for monitoring how well different strategies are working in each corridor over time. The Atlas serves as the region's Congestion Management Process (CMP) monitoring and reporting documentation.

2.3 GOALS, OBJECTIVES AND TARGETS FOR A 21ST CENTURY TRANSPORTATION SYSTEM

Transportation planning and investment decisions and the region's desired land use, economic and environmental outcomes are so interconnected that success of the 2040 Growth Concept hinges significantly on achieving the plan's goals and objectives.

The RTP vision statement reflects the public's desired outcomes for the region's transportation system and reinforces the shared regional land use and transportation vision for the Portland metropolitan region – the 2040 Growth Concept. This vision is further described through the ten goals and objectives presented in this section. The vision for the RTP is to ensure that the Portland region remains prosperous and vibrant by improving safety, expanding transportation choices for everyone, enhancing human health and protecting the natural environment.

The overarching vision for the RTP reflects the public's desired outcomes and ensures that:

> *In the 21st Century, the Portland metropolitan region remains a vibrant and extraordinary region, with a world-class transportation system that is well-maintained and provides efficient movement of people and goods.*
>
> *This system sustains the region's economic competitiveness and prosperity, protects the region's environment, enhances human health and operates in an attractive and safe setting--it is a system that serves everyone.*
>
> *The system is fiscally sustainable and leverages community aspirations for revitalization and growth in downtowns, centers, main streets, and employment areas.*
>
> *The system manages both demand and capacity, employs the best technology, and joins rail, highway, street, bus, air, water, pedestrian and bicycle facilities into a seamless and fully interconnected system.*

Goal 1: Foster Vibrant Communities and Efficient Urban Form

Land use and transportation decisions are linked to optimize public investments and support active transportation options and jobs, schools, shopping, services, recreational opportunities and housing proximity.

- **Objective 1.1 Compact Urban Form and Design** - Use transportation investments to reinforce growth in and multi-modal access to 2040 Target Areas and ensure that development in 2040 Target Areas is consistent with and supports the transportation investments.
- **Objective 1.2 Parking Management** – Minimize the amount and promote the efficient use of land dedicated to vehicle parking.
- **Objective 1.3 Affordable Housing** – Support the preservation and production of affordable housing in the region.

Goal 2: Sustain Economic Competitiveness and Prosperity

Multi-modal transportation infrastructure and services support the region's well-being and a diverse, innovative, sustainable and growing regional and state economy.

- **Objective 2.1 Reliable and Efficient Travel and Market Area Access** - Provide for reliable and efficient multi-modal regional, interstate and intrastate travel and market area access through a seamless and well-connected system of throughways, arterial streets, freight services, transit services and bicycle and pedestrian facilities.
- **Objective 2.2 Regional Passenger Connectivity** – Ensure reliable and efficient connections between passenger intermodal facilities and destinations in and beyond the region to improve non-auto access to and from the region and promote the region's function as a gateway for tourism.
- **Objective 2.3 Metropolitan Mobility** - Maintain sufficient total person-trip and freight capacity among the various modes operating in the Regional Mobility Corridors to allow reasonable and reliable travel times through those corridors.
- **Objective 2.4 Freight Reliability** –Maintain reasonable and reliable travel times and access through the region, as well as between freight intermodal facilities and destinations within and beyond the region, to promote the region's function as a gateway for commerce.
- **Objective 2.5 – Job Retention and Creation** – Attract new businesses and family-wage jobs and retain those that are already located in the region.

Goal 3: Expand Transportation Choices

Multi-modal transportation infrastructure and services provide all residents of the region with affordable and equitable options for accessing housing, jobs, services, shopping, educational, cultural and recreational opportunities, and facilitate competitive choices for goods movement for all businesses in the region.

- **Objective 3.1 Travel Choices** - Achieve modal targets for increased walking, bicycling, use of transit and shared ride and reduced reliance on the automobile and drive alone trips.
- **Objective 3.2 Vehicle Miles of Travel** - Reduce vehicle miles traveled per capita.
- **Objective 3.3 Equitable Access and Barrier Free Transportation** - Provide affordable and equitable access to travel choices and serve the needs of all people and businesses, including people with low income, children, elders and people with disabilities, to connect with jobs, education, services, recreation, social and cultural activities.
- **Objective 3.4 Shipping Choices** – Support multi-modal freight transportation system that includes air cargo, pipeline, trucking, rail, and marine services to facilitate competitive choices for goods movement for businesses in the region.

Goal 4: Emphasize Effective and Efficient Management of the Transportation System

Existing and future multi-modal transportation infrastructure and services are well-managed to optimize capacity, improve travel conditions and address air quality goals.

- **Objective 4.1 Traffic Management –** Apply technology solutions to actively manage the transportation system.
- **Objective 4.2 Traveler Information –** Provide comprehensive real-time traveler information to people and businesses in the region.
- **Objective 4.3 Incident Management –** Improve traffic incident detection and clearance times on the region's transit, arterial and throughways networks.
- **Objective 4.4 Demand Management –** Implement services, incentives and supportive infrastructure to increase telecommuting, walking, biking, taking transit, and carpooling, and shift travel to off-peak periods.
- **Objective 4.5 Value Pricing –** Consider a wide range of value pricing strategies and techniques as a management tool, including but not limited to parking management to encourage walking, biking and transit ridership and selectively promote short-term and long-term strategies as appropriate.

Goal 5: Enhance Safety and Security

Multi-modal transportation infrastructure and services are safe and secure for the public and goods movement.

- **Objective 5.1 Operational and Public Safety** - Reduce fatal and severe injuries and crashes for all modes of travel.
- **Objective 5.2 Crime -** Reduce vulnerability of the public, goods movement and critical transportation infrastructure to crime.
- **Objective 5.3 Terrorism, Natural Disasters and Hazardous Material Incidents** - Reduce vulnerability of the public, goods movement and critical transportation infrastructure to acts of terrorism, natural disasters, hazardous material spills or other hazardous incidents.

Goal 6: Promote Environmental Stewardship

Promote responsible stewardship of the region's natural, community, and cultural resources.

- **Objective 6.1 Natural Environment** – Avoid or minimize undesirable impacts on fish and wildlife habitat conservation areas, wildlife corridors, significant flora and open spaces.
- **Objective 6.2 Clean Air** – Reduce transportation-related vehicle emissions to improve air quality so that as growth occurs, the view of the Cascades and the Coast Range from within the region are maintained.
- **Objective 6.3 Water Quality and Quantity** – Protect the region's water quality and natural stream flows.
- **Objective 6.4 Energy and Land Consumption** - Reduce transportation-related energy and land consumption and the region's dependence on unstable energy sources.
- **Objective 6.5 Climate Change** – Reduce transportation-related greenhouse gas emissions.

Goal 7: Enhance Human Health

Multi-modal transportation infrastructure and services provide safe, comfortable and convenient options that support active living and physical activity, and minimize transportation-related pollution that negatively impacts human health.

- **Objective 7.1 Active Living** – Provide safe, comfortable and convenient transportation options that support active living and physical activity to meet daily needs and access services.
- **Objective 7.2 Pollution Impacts** – Minimize noise, impervious surface and other transportation-related pollution impacts on residents in the region to reduce negative health effects.

Goal 8: Ensure Equity

The benefits and adverse impacts of regional transportation planning, programs and investment decisions are equitably distributed among population demographics and geography, considering different parts of the region and census block groups with different incomes, races and ethnicities.

- **Objective 8.1 Environmental Justice** – Ensure benefits and impacts of investments are equitably distributed by population demographics and geography.
- **Objective 8.2 Coordinated Human Services Transportation Needs** - Ensure investments in the transportation system provide a full range of affordable options for people with low income, elders and people with disabilities consistent with the Tri-County Coordinated Human Services Transportation Plan (CHSTP).
- **Objective 8.3 Housing Diversity** - Use transportation investments to achieve greater diversity of housing opportunities by linking investments to measures taken by the local governments to increase housing diversity.
- **Objective 8.4 Transportation and Housing Costs**– Reduce the share of households in the region spending more than 50 percent of household income on housing and transportation combined.

Goal 9: Ensure Fiscal Stewardship

Regional transportation planning and investment decisions ensure the best return on public investments in infrastructure and programs and are guided by data and analyses.

- **Objective 9.1 Asset Management–** Adequately update, repair and maintain transportation facilities and services to preserve their function, maintain their useful life and eliminate maintenance backlogs.
- **Objective 9.2 Maximize Return on Public Investment** - Make transportation investment decisions that use public resources effectively and efficiently, using a performance-based planning approach supported by data and analyses that include all transportation modes.
- **Objective 9.3 Stable and Innovative Funding –** Stabilize existing transportation revenue while securing new and innovative long-term sources of funding adequate to build, operate and maintain the regional transportation system for all modes of travel at the federal, state, regional and local level.

Goal 10: Deliver Accountability

The region's government, business, institutional and community leaders work together in an open and transparent manner so the public has meaningful opportunities for input on transportation decisions and experiences an integrated, comprehensive system of transportation facilities and services that bridge governance, institutional and fiscal barriers.

- **Objective 10.1 Meaningful Input Opportunities -** Provide meaningful input opportunities for interested and affected stakeholders, including people who have traditionally been underrepresented, resource agencies, business, institutional and community stakeholders, and local, regional and state jurisdictions that own and operate the region's transportation system in plan development and review.
- **Objective 10.2 Coordination and Cooperation** - Ensure representation in regional transportation decision-making is equitable from among all affected jurisdictions and stakeholders and improve coordination and cooperation among the public and private owners and operators of the region's transportation system so the system can function in a coordinated manner and better provide for state and regional transportation needs.

2.3.1 Performance targets

While goals and objectives are a vital component of the plan, equally important are quantifiable performance targets to track the region's progress. Investments that achieve performance targets are critical for the region to be successful in realizing a truly integrated, multi-modal transportation system that achieves the goals and objectives of the RTP.

Continuing the practice established with the RTP adopted in 2010, this plan includes transportation performance targets, listed in **Table 2.3,** that support the outcomes-based framework and the plan's goals and objectives. The performance targets provided policy direction for developing the investment strategy recommended in Chapter 3 and for updating local transportation system plans. **Table 2.3** includes findings on how well the RTP performs in relation to the targets. The supporting data is found in the Appendix.

Table 2.3
Regional Transportation Performance Targets[4]

Target	Performance	Finding
ECONOMY		
Safety –By 2040, reduce the number of fatal and severe injury crashes for pedestrians, bicyclists, and motor vehicle occupants each by 50% compared to 2007 - 2011 average.	Between 2007 - 2011: There were an annual average of: 63 fatal or severe injury pedestrian crashes 35 fatal or severe bike crashes 398 fatal or severe injury motor vehicle only crashes	Reducing the number of fatal and severe injury crashes by half would result in at least 248 fewer people killed or severely injured, on average, in crashes in the Metro region each year. The corresponding reduced societal cost of crashes would be approximately $480 Million (2012 dollars) annually in the Metro region.
Congestion – By 2040, reduce vehicle hours of delay (VHD) per person by 10 percent compared to 2010.	By 2040: VHD per person increases by 112% in 2 hour pm peak travel period VHD per person increases by 153% in the 1 hour mid-day travel period	The region does not meet the target. The data shows that VHD per person increases significantly from 2010.
Freight reliability – By 2040, reduce vehicle hours of delay per truck trip by 10 percent compared to 2010.	By 2040: VHD per truck trip increases by 59% in 2 hour pm peak travel period VHD per truck trip increases by	The region does not meet the target. The data shows that VHD for truck trips increases moderately in the pm peak and significantly in the mid-hour travel period.

[4] All 2010 and 2040 modeled outputs in Table 2.3 are based on intra-UGB travel.

Target	Performance	Finding
	89% in the 1 hour mid-day travel period	
ENVIRONMENT		
Climate change – By 2040, reduce transportation-related greenhouse gas emissions per capita below 2010 levels.	By 2040: Carbon dioxide emissions increase by 10% above 2010 levels.	The data shows that carbon dioxide increases slightly from 2010 based on the planned level and mix of investments.
Active transportation – By 2040, triple walking, biking and transit mode shares compared to 2010 modeled mode shares.	By 2040: Transit mode share increases to 7.8% compared to the target share of 13% Walking increases to 10.1% compared to the target share of 27% Biking increases to 3.8% compared to the target share of 11.1%.	Data shows that the region is making progress toward achieving the target.
Basic infrastructure – By 2040, increase by 50% the miles of sidewalk, bikeways, and trails compared to the regional networks in 2010.	Miles of regional trails increase by 61% (from 229[5] to 369 miles) Miles of regional bikeways increase by 68% (from 623 to 1044 miles)	The region meets the performance target for adding trails and bikeways. Data under development for miles of sidewalks added through RTP projects by 2040. As of 2010, 55% of regional pedestrian network has sidewalks on both sides of street. 209 additional miles of sidewalks are needed by 2040 to meet the target.
Clean air – By 2040, ensure zero percent population exposure to at-risk levels of air pollution.	In 2040: Carbon monoxide is estimated at 290,876 lbs/day, 75% below the regional motor vehicle emissions budget for 2040	The region meets the target for carbon monoxide exposure from transportation sources.
Travel – By 2040, reduce vehicle miles traveled per person by 10 percent	In 2010: Vehicle miles traveled per person decline 6.4% below	The region does not meet the target. However, the data shows that the region is

[5] There are 229 miles of trails in 2010 in the RTP trail network. This does not include mileage of trails not defined as part of the regional transportation system.

Target	Performance	Finding
compared to 2010.	2010 levels.	making progress toward achieving the target.
EQUITY		
Affordability – By 2040, reduce the average household combined cost of housing and transportation by 25 percent compared to 2010.	In 2010, the average household in the Portland region spent about 43.9 percent of its income on housing and transportation. In 2040 it is estimated that the average household in the region will spend about 51% on housing and transportation.	The region does not meet the target. However, the cost of transportation as a percentage of total household income holds steady from 2010 (13.7%) to 2040 (13.6%).
Access to daily needs – By 2040, increase by 50 percent the number of essential destinations accessible within 30 minutes by bicycling and public transit for low-income, minority, senior and disabled populations compared to 2005.	Data under development	The methodology for establishing a base line for this target is being developed.

The performance targets are numerical benchmarks to assess the region's progress in carrying out the RTP vision. These targets draw from federal and state legislation. They are aspirational and begin moving the region towards outcome-based decision making. It is expected that as evaluation methods and tools are enhanced the targets will be further refined during subsequent RTP updates.

2.3.2 Performance Standards

The RTP must demonstrate that it defines an adequate transportation system to serve planned land uses to meet state planning requirements. The targets in the previous section, the interim standards in this section and performance measures described in Chapter 4 will serve as the basis for determining whether the proposed transportation system adequately addresses the ten RTP goals and planned land uses during the plan period.[5]

Interim Regional Mobility Policy

The interim mobility policy shown in **Table 2.4** describes operational conditions that are used to evaluate the quality of service of the auto network, using the ratio of traffic volume to planned capacity (referred to as the volume/capacity ratio) of a given roadway. The measures are used to diagnose the extent of auto congestion during different times of the day in order to identify deficient roadway facilities and services in the plan. The interim regional mobility policy in **Table 2.4** shows the minimum performance level desired for auto transportation facilities and services within the region. Originally adopted in 2000 and amended into the Oregon Highway Plan in 2002, the interim regional mobility policy reflects a level of performance in the region that the Oregon Transportation Commission (OTC) deemed tolerable at the time of its adoption, but is also recognized as an incremental step toward a more comprehensive set of measures that consider system performance, as well as financial, environmental and community impacts.

The OTC has indicated a desire for Metro to advance beyond the traditional mobility performance measure used to guide investment decisions. Metro, ODOT and other regional partners will continue to work together to update the current regional mobility policy to better align with RTP outcomes.

This evaluation helps the region develop strategies to address roadway congestion in a more strategic manner, given limited transportation funding and potential environmental and community impacts. The system analysis described in Chapter 4 finds that the region cannot achieve the mobility policy listed in **Table 2.4** within current funding levels or with the mix of investments included in the analysis.

[5] The Oregon Transportation Planning Rule, subsection 0060, requires the RTP to include performance measures that ensure the transportation system is adequate to serve planned land uses.

Table 2.4
Interim Regional Mobility Policy
Deficiency Thresholds and Operating Standards

Location	Standard	Standard	
	Mid-Day One-Hour Peak [A]	PM 2-Hour Peak [A]	
		1st Hour	2nd Hour
Central City Regional Centers Town Centers Main Streets Station Communities	.99	1.1	.99
Corridors Industrial Areas Intermodal Facilities Employment Areas Inner Neighborhoods Outer Neighborhoods	.90	.99	.99
I-84 *(from I-5 to I-205)*	.99	1.1	.99
I-5 North *(from Marquam Bridge to Interstate Bridge)*	.99	1.1	.99
OR 99E *(from Lincoln Street to OR 224 interchange)*	.99	1.1	.99
US 26 *(from I-405 to Sylvan interchange)*	.99	1.1	.99
I-405 [B] *(I-5 South to I-5 North)*	.99	1.1	.99
Other Principal Arterial Routes I-205 [B] I-84 (east of I-205) I-5 (Marquam Bridge to Wilsonville) [B] OR 217 US 26 (west of Sylvan) US 30 OR 8 (Murray Boulevard to Brookwood Avenue) [B] OR 212 OR 224 OR 47 OR 213	.90	.99	.99

A. The demand-to-capacity ratios in the table are for the highest two consecutive hours of weekday traffic volumes. The mid-day peak hour is the highest 60-minute period between the hours of 9 a.m. and 3 p.m. The 2nd hour is defined as the single 60-minute period, either before or after the peak 60-minute period, whichever is highest.

B. A corridor refinement plan is required in Chapter 5 of the RTP, and will include a recommended mobility policy for each corridor.

Regional Modal Targets

Non-drive alone modal targets established in **Table 2.5** are intended to be goals for cities and counties to work toward as they implement the 2040 Growth Concept at the local level. Increases in walking, bicycling, ridesharing and transit mode shares will be used to demonstrate compliance with per capita travel reductions required by the state Transportation Planning Rule. The most urbanized areas of the region will achieve higher non-drive alone modal shares than less developed areas closer to the urban growth boundary.

Table 2.5
Regional Modal Targets

2040 Design Type	Non-drive alone modal target
Portland central city	60-70%
Regional centers Town centers Main streets Station communities Corridors Passenger intermodal facilities	45-55%
Industrial areas Freight intermodal facilities Employment areas Inner neighborhoods Outer neighborhoods	40-45%

Note: *The targets apply to trips to and within each 2040 design type. The targets reflect conditions needed in the year 2040 to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.*

2.4 REGIONAL SYSTEM DEFINITION

Multi-modal regional transportation facilities and services are defined both by the function they serve and by where they are located. Facilities and services are included in the regional transportation system based on their function within the regional transportation system rather than their geometric design, ownership or physical characteristics.

A facility or service is part of the regional transportation system if it provides access to any activities crucial to the social or economic health of the Portland metropolitan region, including connecting the region to other parts of the state and Pacific Northwest or provides access to and within 2040 Target areas, as described below.

Facilities that connect different parts of the region together are crucial to the regional transportation system. Any link that provides access to or within a major regional activity center such as an airport or 2040 target area is also a crucial element of the regional transportation system. These facilities are shown on the network maps in this chapter.

Regional Transportation System Components

Regional multi-modal transportation facilities and services include the following components:

1. Regional System Design
2. Regional Arterial and Throughway Network, which includes the National Highway System (NHS) and State highways
3. Regional Transit Network
4. Regional Freight Network
5. Regional Bicycle Network
6. Regional Pedestrian Network
7. Regional System Management & Operations which includes Demand Management

As a result, the regional transportation system is defined as:

1. All state transportation facilities (including interstate, statewide, regional and district highways and their bridges, overcrossings and ramps).
2. All arterial facilities and their bridges.
3. Transportation facilities, including bicycle and pedestrian facilities, within designated 2040 centers, corridors, industrial areas, employment areas, main streets and station communities.
4. All high capacity transit and regional transit networks and their bridges.
5. All regional bicycle and pedestrian facilities and their bridges, including regional trails shown on the regional pedestrian and bicycle networks.
6. All bridges that cross the Willamette, Columbia, Clackamas, Tualatin or Sandy rivers.
7. All freight and passenger intermodal facilities, airports, rail facilities and marine transportation facilities and their bridges.

8. Any other transportation facility, service or strategy that is determined by JPACT and the Metro Council to be of regional interest because it has a regional need or impact (e.g. transit-oriented development, transportation system management and demand management strategies, local street connectivity, and culverts that serve as barriers to fish passage).

Together, these facilities and services constitute an integrated and interconnected system that supports desired land use and provides transportation options to achieve the goals of the RTP.

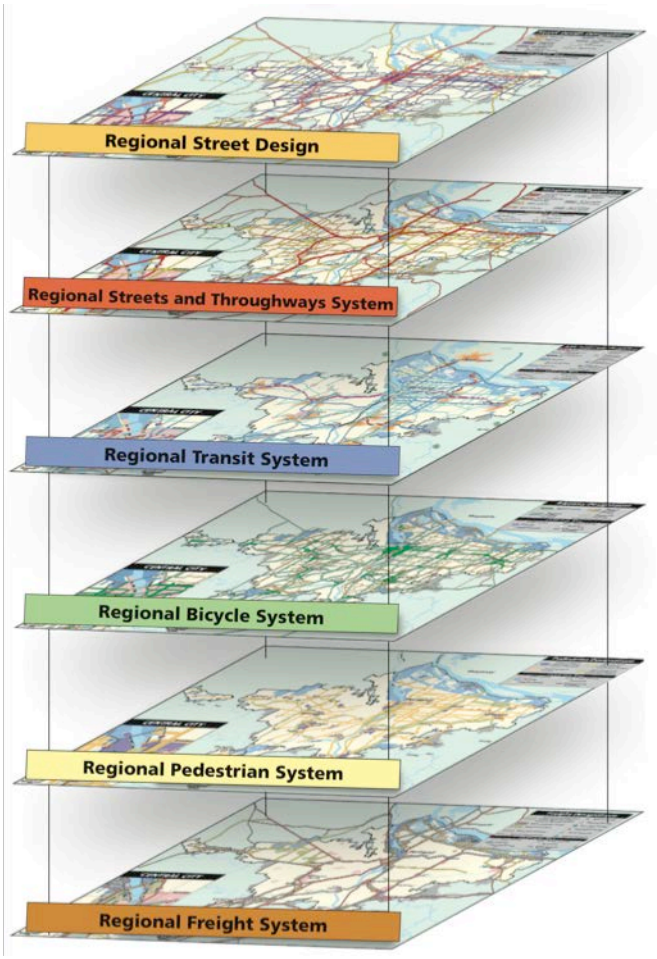
Visions, concepts and supporting policies are described for each component in the next section.

2.5 REGIONAL NETWORK VISIONS, CONCEPTS AND POLICIES

This section establishes a network vision, concept and supporting policies for each component of the regional transportation system. The network vision, concepts and policies represent a complete urban transportation system that meets the plan goals and supports local aspirations for growth.

The network visions, concepts and policies provide for travel through a seamless and well-connected system of regional throughways and streets, local streets, freight networks, transit services and bicycle and pedestrian facilities. The concepts and policies emphasize safety, access, mobility and reliability for people and goods and the community-building and placemaking role of transportation.

The network visions, concepts and policies guide the development, design and management of different components of the regional transportation system.



Regional Transportation Network Components

2.5.1 Regional System Design and Placemaking Concept

Regional system design concepts address federal, state and regional transportation planning mandates with design concepts intended that support regional and local implementation of the 2040 Growth Concept. This concept establishes guidelines for the physical design of the regional transportation system to foster livable communities throughout the region and encourage walking, bicycling and use of transit.

Land use planning determines where homes, schools, work, shopping, and other activities are located and can profoundly affect the way in which we move around the region and within our communities. The design concepts reflect that streets perform many, often conflicting functions. Conflicts among travel modes need to be reconciled for the safety of all modes of travel. The design concepts promote community livability and mobility by balancing all modes of travel and addressing the function and character of surrounding land uses. Linking land use and the physical design of transportation facilities is crucial to achieving state goals to limit reliance on any one mode of travel and to encourage walking, bicycling, carpooling, vanpooling and use of transit.

Metro's Livable Streets Handbooks, shown in **Figure 2.4**, provide the designs and vary depending on intended function of the street or throughway and the land uses the facility serves. Consideration is given to various arterial designs, designs for pedestrians, bicyclists and transit and the link between street design and stormwater management. Metro plans to update the handbooks in 2014-15 to better address design for freight and provide more detail on the pedestrian, bicycle and trail design guidance identified in the Regional Active Transportation Plan. The update will include design guidance for interaction of freight, pedestrians and bicycles; bicycle and transit interaction; and regional bikeway and trail design. A new handbook on wildlife crossings was developed and is available from Metro's website.

Figure 2.4
Metro's Livable Streets Handbooks

Table 2.6 summarizes throughway and arterial classifications, design elements and recommended functions, illustrating how multi-modal design elements can be integrated. The idealized cross sections in the table are illustrative only. **Figure 2.5** applies the design concepts to the regional arterial and throughway network. (See http://gis.oregonmetro.gov/RTP/ for zoomable version of map.)

Regional Design Classifications

Figure 2.5

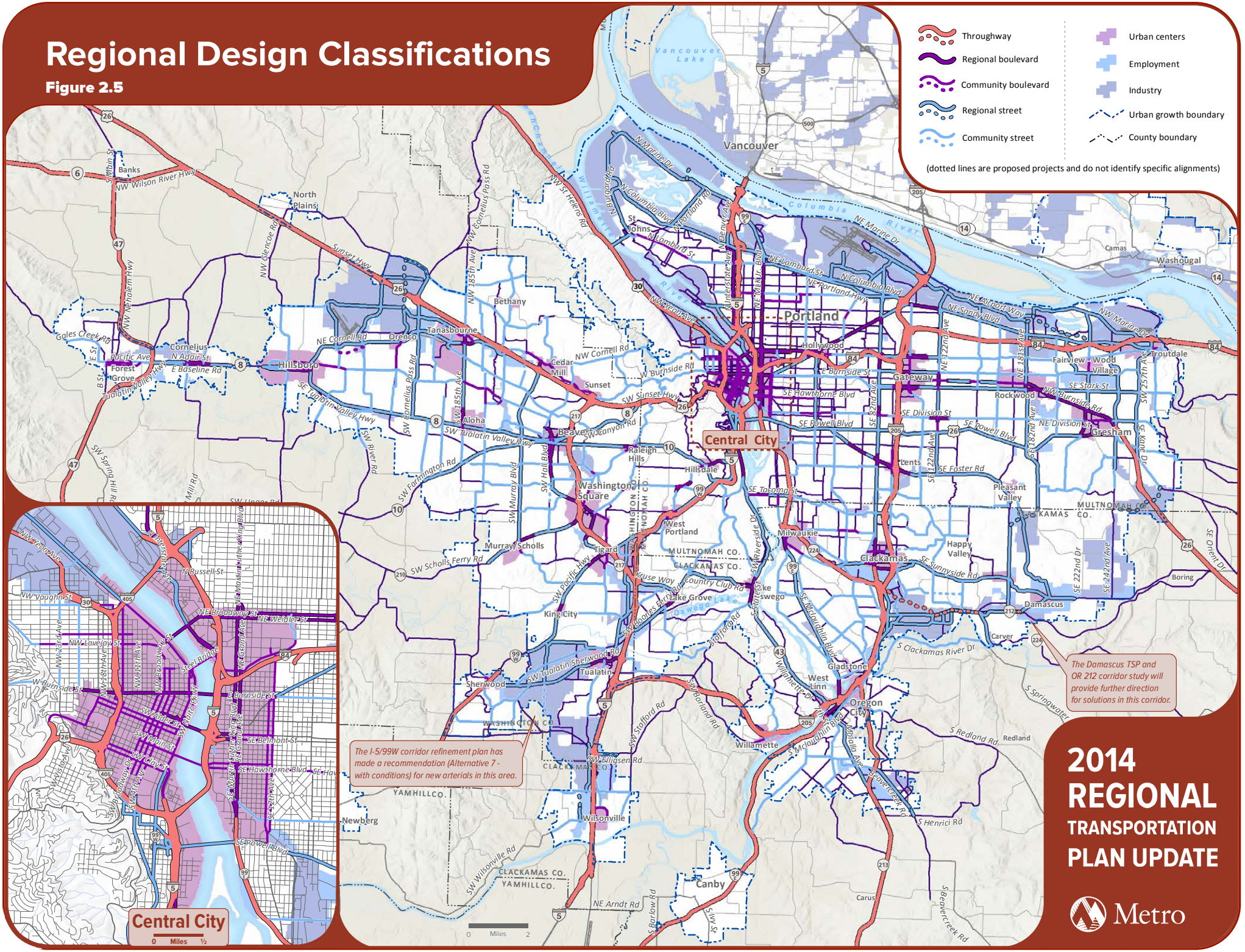
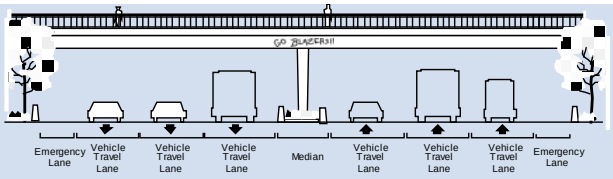
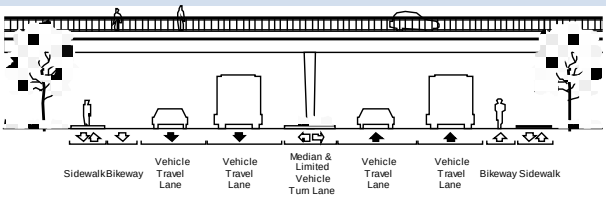
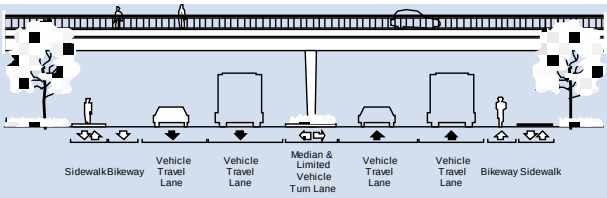
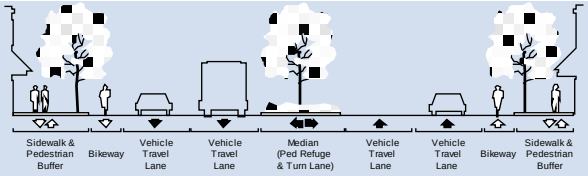
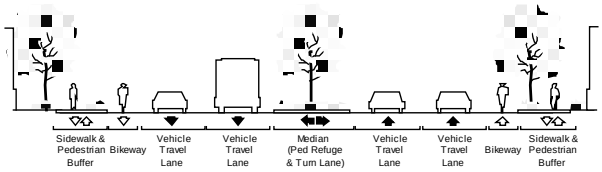
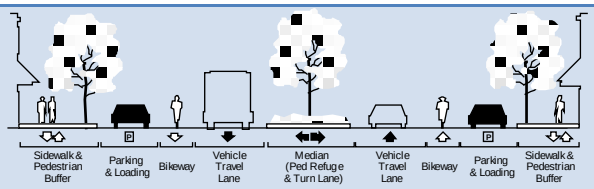
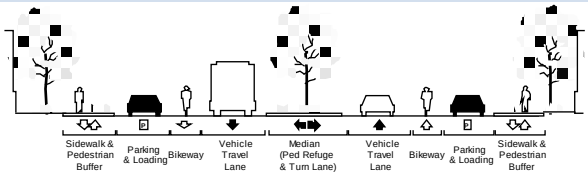


Table 2.6
Arterial and Throughway Design Concepts

Trip Type	2040 Design Concept	Network Function	Illustrative Design Concept	Typical number of planned travel lanes[6]
			THROUGHWAYS	
Interstate/ regional	Throughway (Freeway)	Principal arterial		6 through lanes (plus auxiliary lanes) with grade separated interchanges
Interstate/ regional	Throughway (Highway)	Principal arterial		6 through lanes (plus auxiliary lanes) with grade separated intersections/ interchanges
Interstate/ regional	Throughway (Parkway)	Principal arterial		6 through lanes (plus auxiliary lanes) with grade separated intersections/ interchanges
			ARTERIAL STREETS	
Regional / City	Regional Boulevard *2040 centers* *Station communities* *Main streets*	Major Arterial		Up to 4 through lanes with turn lanes
Regional / City	Regional Street *Industrial areas* *Employment areas* *Corridors* *Intermodal facilities*	Major Arterial		Up to 4 through lanes with turn lanes

[6] The number of through lanes may vary based on right-of-way constraints or other factors. Some places in the region may require additional lanes due to a lack of connectivity. Major and minor arterial streets can either be 2 or 4 lanes with turn lanes as appropriate.

City	Community Boulevard *2040 centers* *Station communities* *Main streets*	Minor Arterial		2 to 4 through lanes with turn lanes
City	Community Street *Industrial areas* *Employment areas* *Corridors* *Intermodal facilities*	Minor Arterial		2 to 4 through lanes with turn lanes

Source: Metro

Designs for pedestrians, bicyclists and transit users

Street and facility designs have a significant impact on people's ability to walk, bike and access transit comfortably, safely and easily. Sidewalks, trails and bikeways provide transportation options and encourage walking and bicycling. Where appropriate, traffic calming measures such as narrower travel lanes, compact intersections, landscaped buffers and on-street parking can slow vehicle traffic and reduce traffic accidents for pedestrians, bicyclists, motorcyclists and motorists. Painted crosswalks, appropriate use of signs and signals and median islands make it easier for pedestrians and bicyclists to cross busy roads.

Curb designs, ramps and crossing signals designed for the hearing- and sight-impaired facilitate safe travel for people of all ages and abilities. Facilities and infrastructure such as street lighting, wayfinding, benches, bicycle parking, waste baskets, street trees, and kiosks make the environment more attractive and create a sense of community and safety that encourages walking, bicycling and the use of transit. Design elements currently in use in the region and elsewhere that have been shown to increase the level of walking and bicycling and access to transit are described in the Regional Active Transportation Plan as design guidance. The design elements emphasize the need for separation from traffic, especially on streets with higher traffic volumes and/or

Well-designed sidewalks, benches, lighting, street trees and other urban design elements encourage more walking and provide for safe travel for people of all ages and abilities.

speeds or on roadways with heavy volumes of freight traffic, for separation of pedestrians and bicyclists on busy regional trails, and the importance of lighting and crossing treatments to increase safety.

Designs for stormwater management and natural resource protection

The effect that transportation infrastructure has on the health of the natural environment, particularly urban waterways, is well documented. The combined impervious surfaces of streets, paved trails, parking lots and driveways form the largest impervious surfaces in the urban landscape, accounting for up to 65 percent of the total impervious surface area. A particular challenge is addressing conflicts between transportation facilities and wildlife and riparian corridors, and determining how transportation improvements can be located, designed and constructed with regard for riparian corridor and upland habitat protection plans identified in the Intertwine Regional Conservation Strategy.

Impervious surfaces have been linked to changes in the shape of streams, water quality, water temperature and the biological health of waterways. Regional Green Streets guidelines seek to mitigate these effects through a combination of retrofits to existing streets and designs for new streets and throughways.

Green retrofits can help intercept rainwater thereby minimizing the negative impacts to streams and other waterways.

As arterial streets and throughways and other types of transportation infrastructure cut across the landscape, they form barriers to wildlife movement, disrupting migration patterns and population dynamics. These disruptions can be minimized through engineered solutions, such as wildlife-crossing devices, structures and through incorporating wildlife corridor acquisition/restoration needs into transportation project development or by avoiding the areas all together.

Infrastructure planning and design should first seek to avoid fish and wildlife habitat conservation areas. If that is not practicable, opportunities to mitigate the effects of transportation infrastructure and services through the application of "green" design treatments should be indentified and implemented. For example, street trees, vegetated swales and other green street treatments can intercept rainwater and convey stormwater in the public right-of-way adjacent to the region's throughways and arterial streets and pedestrian and bicycle projects can include improved crossings for wildlife. Refer to Metro's handbooks "Green Streets: Innovative

Solutions for Stormwater and Stream Crossings" and "Wildlife Crossings: Providing safe passage for urban wildlife" for more information on these designs.

2.5.2 Arterial and Throughway Network Vision

Though our region has changed dramatically over the past century, the shape of the major street network serving our region has not. Most of our regional streets were once farm-to-market roads, established along Donation Land Claim boundaries at half-mile or mile spacing. The region's throughway system evolved from the mid-1930s, when the first highway was built from Portland to Milwaukie, to the completion of I-205 in the early 1980s. Most of the throughway system was built along the same Donation Land Claim grid that shapes the regional street network, with most throughways following older farm-to-market routes or replacing major streets.

This inherited network design has proven to be an adequate match for accommodating the changing travel demands of our growing region. The regional arterial and throughway network concept seeks to apply this proven network design to developing and undeveloped areas in the region, while seeking opportunities to bring existing urban areas closer to this ideal when possible.

Freeways allow people and goods to connect to major destinations across the region.

Arterial and Throughway Network Concept

The regional arterial and throughway network concept contains policy and strategy provisions to develop a complete and well-connected roadway network that provides adequate capacity and supports all modes of travel.

Rather than relying on levels of congestion to direct how and where to address motor vehicle capacity needs, the concept calls for implementing a well-connected network design that is tailored to fit local geography, respect existing communities and future development and protect the natural environment.

Three policies form the foundation of this vision:

1. **Build a well-connected network of complete streets that prioritize safe and convenient pedestrian and bicycle access**
2. **Improve local and collector street connectivity**
3. **Maximize system operations by implementing management strategies prior to building new motor vehicle capacity, where appropriate**

Arterial and Throughway Policy 1. Build a well-connected network of complete streets that prioritize pedestrian and bicycle access

A well-connected network of complete streets is critical to achieving the 2040 Growth Concept vision. In general, the roadway network should be designed to provide for trips through or across the region on throughways, shorter trips through portions of the region on arterial streets and the shortest trips on collector and local streets.

This approach results in a street hierarchy of:

- throughways (for example, limited-access facilities such as I-84, US 26, I-5, I-205 and I-405)
- arterial streets (for example, Cornell Road in Washington County, 82nd Avenue in the City of Portland and Sunnyside Road in Clackamas County)
- collector streets
- local streets

Complete streets is a transportation policy and design approach for roadways that are planned, designed, operated, and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation. Complete Streets allow for safe travel by those walking, bicycling, driving automobiles, riding public transportation, or delivering goods.

The traditional street classifications for throughways, arterial streets and other streets are a good starting point for distributing traffic in communities to avoid bottlenecks on overburdened routes or avoid the need to build overly wide streets as a community grows. Throughways serve only as mobility routes, with little or no property access, and an emphasis on connecting major destinations across the region. Arterial streets provide both mobility, moving traffic, goods, and people within the region, and access to property along the street. The degree to which one of these regional street purposes predominates over the other is determined by the functional classification.

The RTP presumes that building a regional arterial and throughway network to accommodate all motor vehicle traffic during peak travel periods is not practical nor would it be desirable considering potential environment and community impacts. As a result, the regional arterial and throughway network concept calls for one-mile spacing of major arterial streets, with minor arterial streets or collector streets at half-mile spacing, recognizing that existing development, streams and other natural features may limit the provision of these connections. Major and minor arterial streets can be either 2 or 4 lanes with turn lanes as appropriate. Streets with 4 or more lanes should include medians, where possible, with appropriate median openings for turning movements and turn lanes. Access management strategies should be used on arterial streets and all streets with 4 or more lanes.

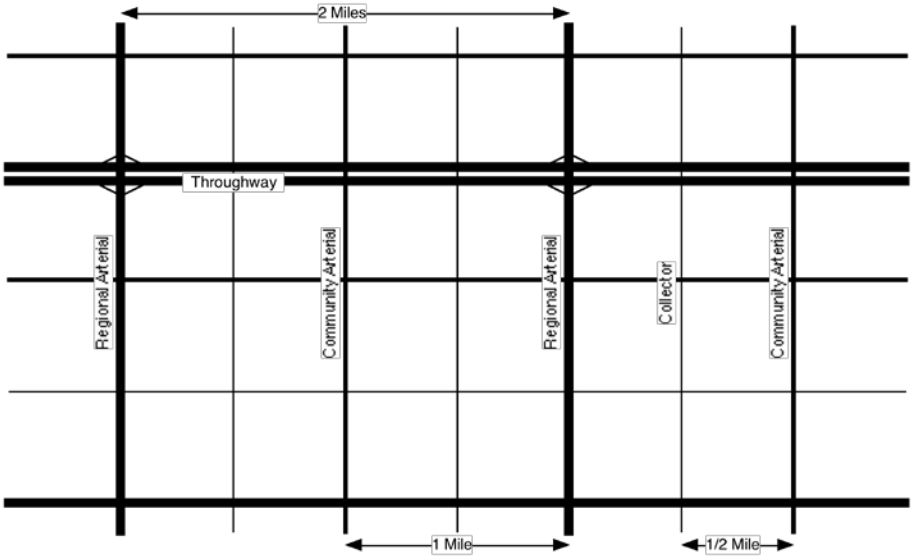
Shown in **Figure 2.6**, the illustrative arterial street network is complemented by a well-connected network of collector and local streets. This network of regional and local streets is multi-modal in design, serving automobiles, motorcycles, trucks, transit, bicycles and pedestrians. The regional arterial street design with median reflects an accepted compromise for all of these modes, accommodating urban levels of traffic, while also allowing for bicycle and pedestrian travel and crossings at major intersections.

Traffic speeds, access and level of street connectivity vary depending on the function of the street. The design of transportation facilities should consider the facility's traffic function, all modes of travel, and community development goals. As identified in the Regional Active Transportation Plan design guidance, traffic speeds, traffic volumes and the volume of heavy trucks should be considered in the design of pedestrian and bicycle facilities on streets on the regional network.

Research and experience have shown that there are optimal street designs for various types of roadways. Local streets and collectors are planned to consist of 2-lanes with turn lanes where needed, major arterials are planned to consist of up to 4-lanes with medians and with turn lanes and access management strategies, throughways are planned to consist of 6-lanes plus auxiliary lanes with grade separated interchanges or intersections. Therefore, before adding additional through lanes beyond the planned system, plans and studies must demonstrate that the additional lanes beyond the planned system do not compromise the function of the roadway for all modes and that the planned system of through lanes, transit service, bike, pedestrian and other parallel arterial, operational, system and demand management solutions do not adequately address transportation needs first, prior to considering widening beyond the planned system to address capacity concerns.

Figure 2.6

Regional Arterial and Throughway Network Concept

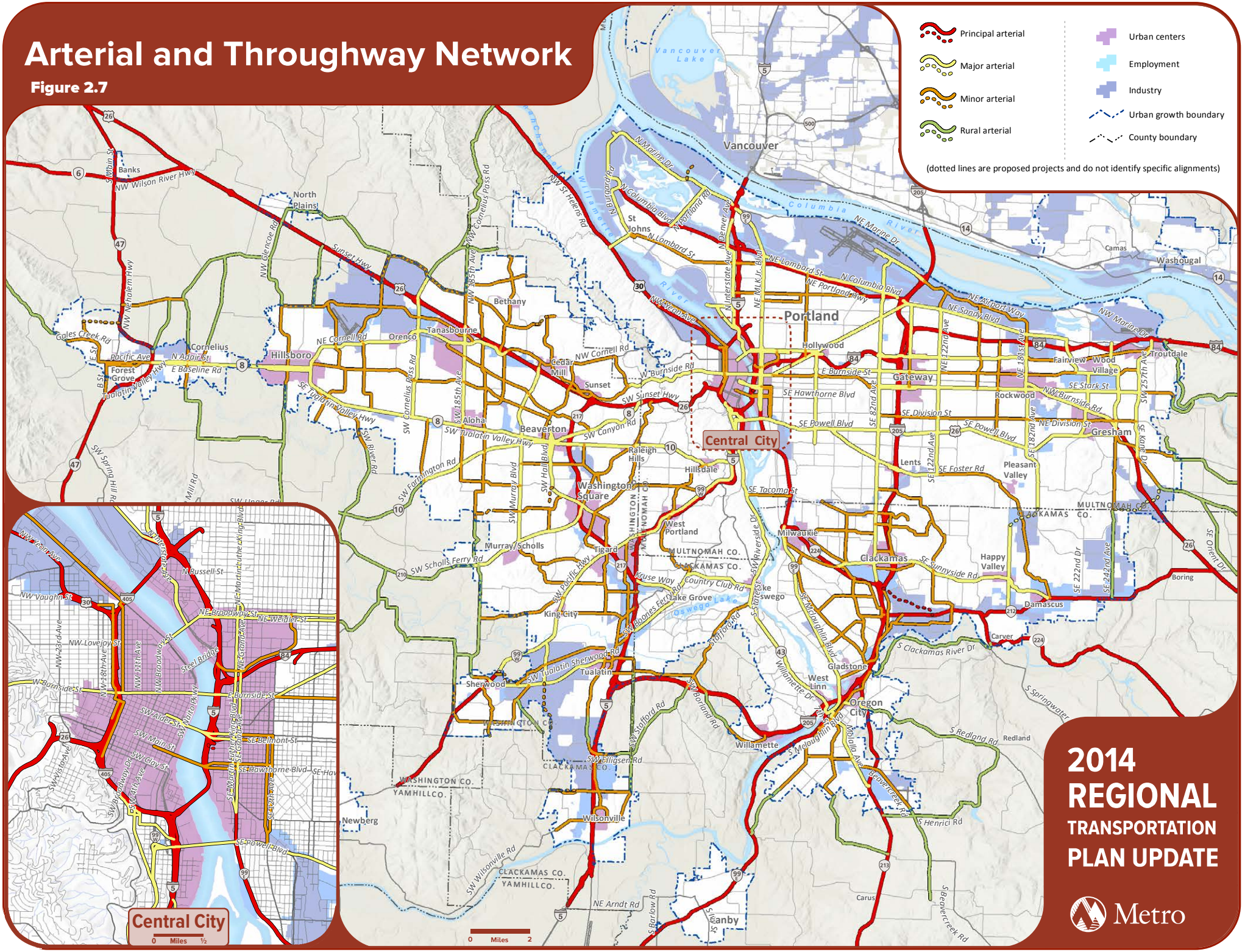


Note: Conceptual model, illustrating multi-modal transportation corridors and showing ideal spacing of arterial streets. Most of the region's travel occurs off the throughway network, on a network of multi-modal arterial streets. The RTP policy places a new emphasis on ensuring that arterial networks are fully developed as the region grows, providing both local circulation and preserving highway capacity for regional and statewide travel.

The Regional Arterial and Throughway Network is shown in **Figure 2.7**. (See http://gis.oregonmetro.gov/RTP/ for zoomable version of map.

Arterial and Throughway Network

Figure 2.7



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Throughways

Throughways generally span several jurisdictions and often are of statewide importance linking the Metro area with neighboring cities, other parts of the state, other states and Canada. Throughways are planned to consist of six through lanes, plus auxiliary lanes, with grade–separated interchanges or intersections, and serve as the workhorse for regional, statewide and interstate travel. Additional lanes may be required in some places based on the importance of a facility to regional and state economic performance, excessive demand, and limitations or constraints that prevent creation of a well-connected street network due to topography, existing neighborhoods, or natural resource areas. Chapter 5 explores where such conditions may exist and defines the parameters for future corridor refinement planning work specific to each regional mobility corridor.

Throughways currently carry between 50,000 to 100,000 vehicles per day, providing for high-speed travel on longer motor vehicle trips and serving as the primary freight routes, with an emphasis on mobility. Throughways help serve the need to move both trucks and autos through the region. Throughways connect major activity centers within the region, including the central city, regional centers, industrial areas and intermodal facilities.

The Throughway design classification implements the Principal Arterial vehicular functional classification. There are three types of Throughways as described in **Table 2.6**: Freeways - which are limited-access and completely grade separated, Highways and Parkways, which include a mix of separate and at-grade access points. Throughway interchanges are spaced no less than two miles apart.

Throughways accommodate longer-distance regional and state-wide travel and provide important access to the region's major activity centers, such as downtown Portland, and freight access to industrial areas and freight intermodal facilities.

Arterial streets

Arterial streets are intended to provide general mobility for travel within the region and provide important connections to the throughway network. Arterial streets connect major commercial, residential, industrial and institutional centers with each other and link these areas to the throughway network. Arterial streets are usually spaced about one mile apart and are designed to accommodate motor vehicle, truck, bicycle, pedestrian and transit travel.

Arterial streets usually carry between 10,000 and 40,000 vehicles per day and often allow higher speeds than collector and local streets. Major arterial streets accommodate longer-distance through trips and serve more of a regional traffic function. Minor arterial streets serve shorter trips that are localized within a community. As a result, major arterial streets usually carry more traffic than minor arterial streets. The arterial functional classification is implemented through the Boulevard and Street design classifications described in **Table 2.6** and in the glossary.

Major arterial streets accommodate longer-distance through trips, while minor arterials serve shorter trips within a community.

Safety is a primary concern on the regional arterial system, on which approximately 60% of the region's fatal and severe injury crashes occur. More attention to safe design and operation of the arterial system could reduce the number of people killed and injured, using national best practices as a guide. Efforts to substantively improve transportation safety in the region must give arterial roadways high priority, and may include:

- proven design strategies such as medians, speed management, access management, improved pedestrian crossings, roundabouts, and road diets;
- enforcement actions targeting high-risk behaviors, such as speeding, aggressive driving, driving under the influence, red-light running, and failure-to-yield at pedestrian crossings; and
- education initiatives intended to promote safer behavior among all users of the system.

The safety targets of the RTP will not be met without a concerted effort to make the region's arterial roadways substantially safer. The development of an objective metric to measure safety on the region's arterials, regardless of jurisdiction, should be developed to support prioritization of corridor safety efforts.

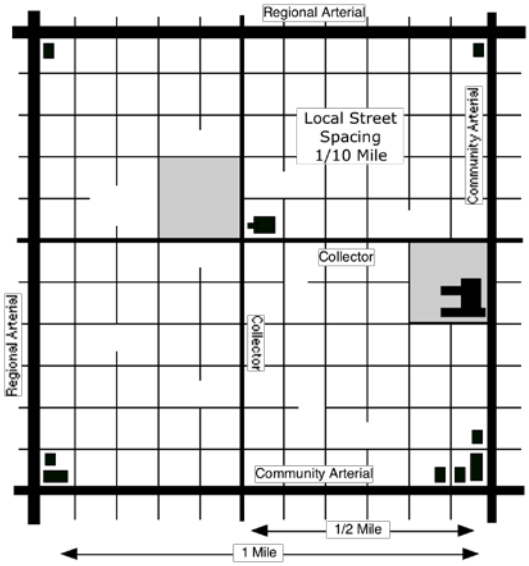
Arterial and Throughway Policy 2. Improve local and collector street connectivity

Collector and local streets are general access facilities that provide for community and neighborhood circulation. They are not usually part of the regional transportation system except when located within designated 2040 areas as described in Section 2.4 (or when they are part of the Regional Bicycle or Pedestrian Network), they play an important supporting role to the design and optimization of the regional transportation system. When local travel is restricted by a lack of connecting routes, local trips are forced onto the arterial and/or throughway networks, in some cases causing congestion on the regional system.

Local jurisdictions are responsible for defining the network of local and collector streets within the mile-spacing grid of arterial streets. The Regional Transportation Functional Plan requires local street spacing of no more than 530 feet in new residential and mixed-use areas, and cul-de-sacs are limited to 200 feet in length to distribute vehicle movements and provide direct bicycle and pedestrian routes. More frequent bike and pedestrian connections are required where collector and local streets cannot be constructed due to existing development or other topographic or environmental constraints.

A goal of the requirements is to encourage local traffic to use local and collector streets to minimize local traffic on regional arterial streets. Local street connectivity also benefits emergency response. Designs should retain the neighborhood character and livability along these local routes. Shown in **Figure 2.8**, the collector and local street network concept provides for bicycle and pedestrian travel and provides for direct access from local street networks to community destinations and transit on regional arterial streets.

Figure 2.8
Collector and Local Streets Network Concept



Note: Idealized concept for illustrative purposes showing desired spacing in residential and mixed-use areas to serve local circulation, walking and bicycling. The illustration is modeled after neighborhoods in Southeast Portland.

Collector Streets

Collector streets provide both access and circulation. As such, collectors tend to carry fewer motor vehicles at lower travel speeds than arterial streets. Collectors may serve as freight access routes, providing connections from industrial or commercial areas to the arterial network. Collector streets serve neighborhood traffic and commercial/industrial areas. Collectors provide local circulation alternatives to arterial streets. Collectors provide both circulation and access within residential and commercial areas, helping to disperse traffic that might otherwise use the arterial network for local travel. Collectors may also serve as local bike, pedestrian and freight access routes, providing connections to the arterial and transit network. Collectors usually carry between 1,000 and 10,000 vehicles per day, with volumes varying by jurisdiction. Collector streets are ideally spaced at half-mile intervals, or midway between arterial streets. Auto speeds and volumes on collector streets are moderate.

Local Streets

Local streets primary provide direct access to adjacent land uses, and usually carry fewer than 1,000 vehicles per day, with volumes varying by jurisdiction. Vehicle speeds on local streets are relatively low, which makes them good candidates for bicyclists and walkers traveling within and between centers.

Local streets have lower vehicle speeds and less vehicle traffic, serving an important role of supporting bicycle and pedestrian travel in the region.

While local streets are not intended to serve through traffic, the local street network serves an important role for supporting bicycle and pedestrian travel. As a result, regional local street connectivity policies require communities to develop a connected network of local streets to increase access to designated centers and the regional transit network by non-motorized travelers.

Arterial and Throughway Policy 3. Maximize system operations by implementing management strategies prior to building new motor vehicle capacity, where appropriate

The RTP calls for maximizing system operations by implementing management strategies prior to building new motor vehicle capacity, consistent with the Federal Congestion Management Process (CMP) and Oregon Transportation Plan policies. In some parts of the Portland metropolitan region, the transportation system is generally complete, while in other parts of the region, especially those where new development is planned, significant amounts of infrastructure will be added. In both contexts, management strategies have great value. Where the system is already built out, such strategies may be the only ways to manage congestion and achieve other objectives. Where growth is occurring, system and demand management strategies can be integrated before and during development to

efficiently balance capacity with demand. More information on management strategies can be found at Section 2.5.6.

2.5.3 REGIONAL TRANSIT NETWORK VISION

Transit is required to implement the 2040 Growth Concept, which calls for focusing future growth in regional and town centers, station communities, and 2040 corridors. A regional transit network, coupled with transit-supportive development patterns and policies that support taking transit, biking, and walking, will help the region:

- be less dependent on automobiles
- reduce overall transportation and housing costs
- lead healthier lives
- reduce greenhouse gas emissions

TriMet implements the majority of the transit service component of the RTP in what is called the Transit Investment Plan (TIP). The SMART district and other transit providers complement TriMet's service.

The regional street system has carried public transit for more than a century, beginning with the streetcars of the late 1800s and evolving into a combination of vans, buses, streetcars and light rail trains today. The Tri-County Metropolitan Transportation District of Oregon (TriMet) is the primary public transportation provider for the metropolitan region. The South Metro Area Rapid Transit (SMART) district in Wilsonville also provides regional transit service, connecting Wilsonville to downtown Portland. Just outside of the Metro region, Sandy Area Metro and Canby Area Transit provide transit service for Sandy and Canby. Bus service in other surrounding areas, all with connections to TriMet, is also provided by C-TRAN (Clark County, WA), Cherriots (Salem, OR), Tillamook County Transportation District (Tillamook, OR), and Yamhill County Transit Area (Yamhill County, OR).

Six policies form the foundation of this vision:

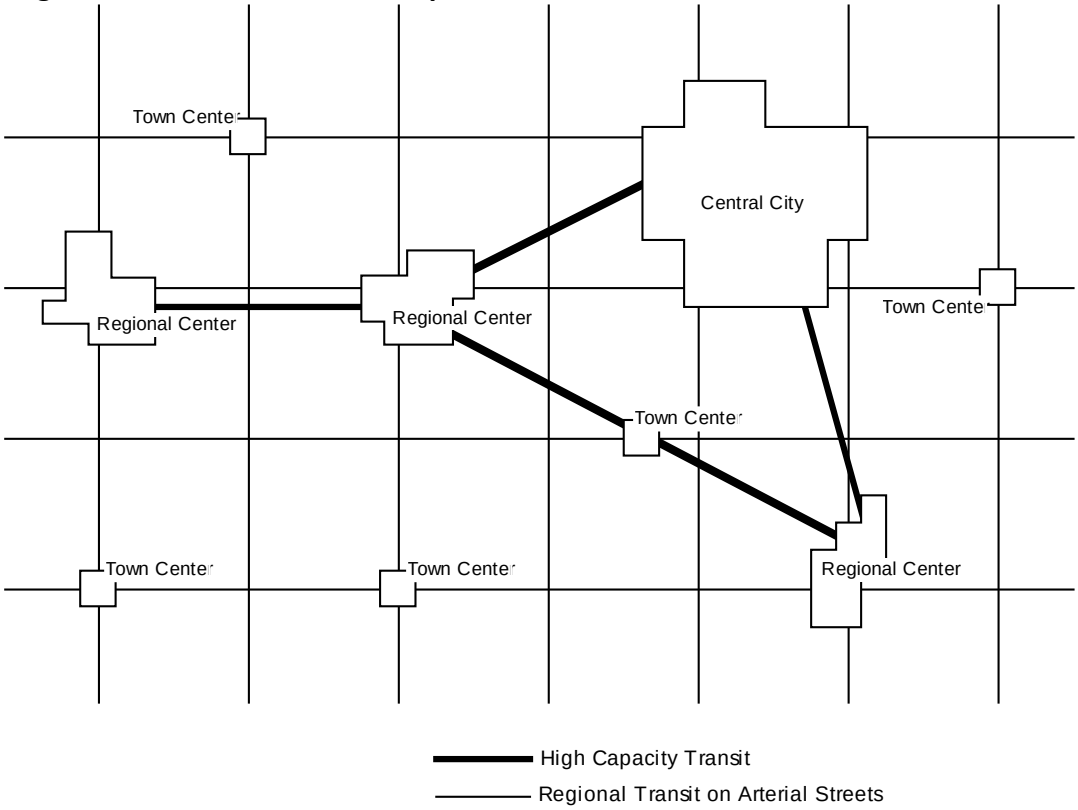
1. **Build the total network and transit-supportive land uses to leverage investments**
2. **Expand high capacity transit**
3. **Expand regional and local frequent service transit**
4. **Improve local service transit**

5. Support expanded commuter rail and intercity transit service to neighboring communities

6. Improve pedestrian and bicycle access to transit

TriMet's Transit Investment Priorities (TIP) and SMART's Master Plan are informed by these policies which aim to provide transit as an attractive and accessible travel option for all people in the Metro region, optimize existing transit system operations and ensure transit-supportive land uses are implemented to leverage the region's current and future transit investments. **Figure 2.9** shows how the regional transit system concept would connect the 2040 centers.

Figure 2.9
Regional Transit Network Concept



The 2040 Growth Concept sets forth a vision for connecting the central city to regional centers like Gresham, Clackamas and Hillsboro with high capacity transit. The RTP expands this vision to include a complete network of regional transit along most arterial streets to better serve suburban communities. Existing land use mixes and future transit-oriented development potential should be considered and incorporated into service and station location decisions.

The Regional Transit Network is shown in **Figure 2.10**. (See http://gis.oregonmetro.gov/RTP/ for zoomable version.

Trimet Service Enhancement Plans

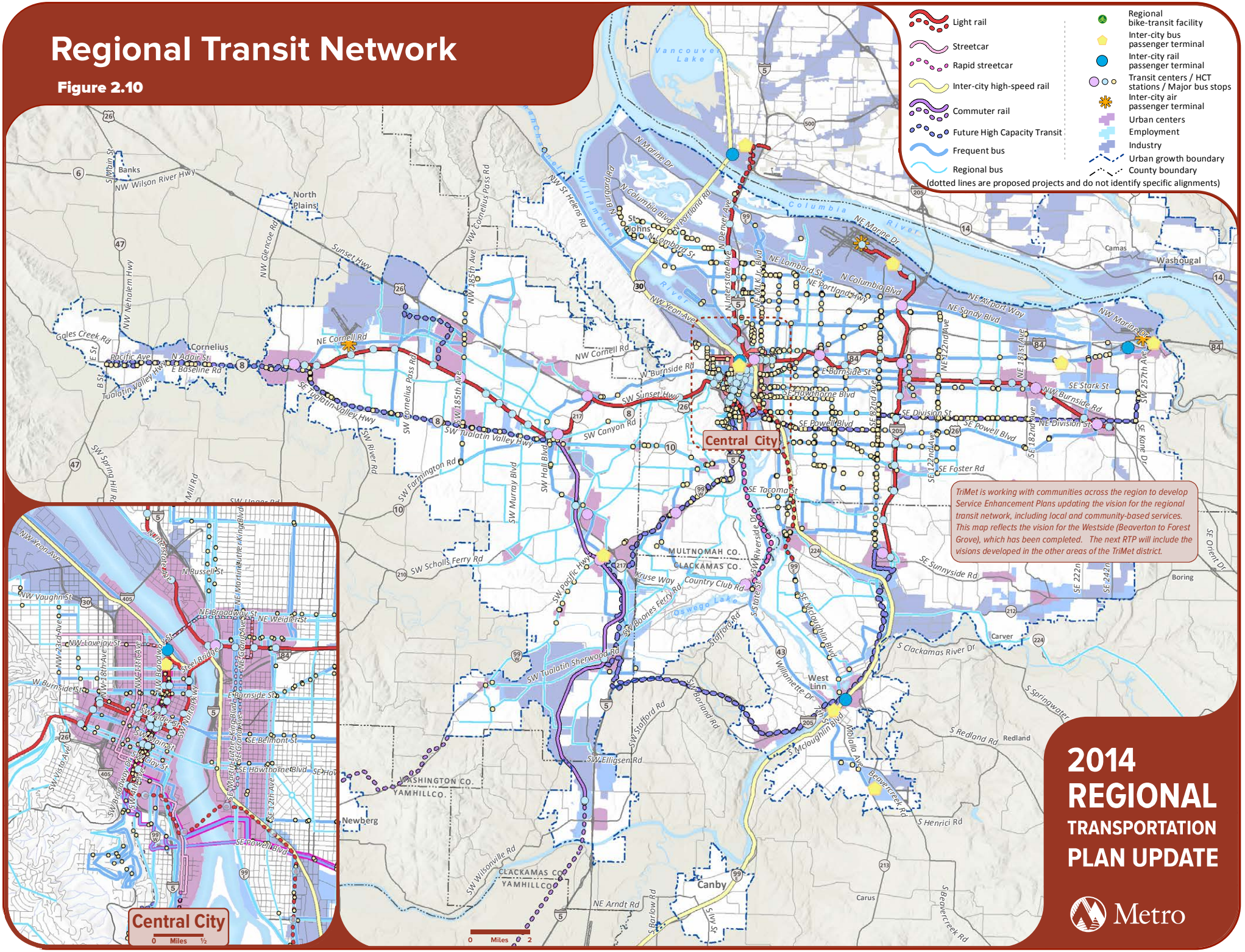
Figure 2.10 includes a note referencing the Service Enhancement Plans that TriMet is developing across the region. The Service Enhancement Planning process is a community-based process to help shape a shared vision for the future of transit in our region. These intensive community engagement efforts are taking place in every community TriMet serves as a way of identifying stakeholder needs on the ground now and in the future and to propose how to restructure current service and design new service to meet those needs.

The visions that come out of the Service Enhancement Planning process will guide how TriMet provides transit service in the future and are the basis for the improved transit service envisioned in the Climate Smart Communities Scenarios project.
Starting in 2012, the first in a series of these planning efforts focused on Beaverton, Hillsboro, Cornelius, Forest Grove and Washington County, including Aloha/Reedville, Bethany, Rock Creek, Cedar Mill and Cedar Hills. This Westside Service Enhancement Planning process has resulted in a new service vision that will inform the TIP process. The Westside Service Enhancement vision identifies areas for future service and opportunities to partner with jurisdictions and the private sector for access to transit improvements including biking and walking to bus lines and MAX. The result was a vision of almost doubling of service currently provided in the area. It will take years to implement this, as resources are available, but this gives a clear guide for how to improve service each year through the TIP process. These visions are consistent with the five policies guiding the Regional Transit Network vision and draw upon the full range of transit service types (high capacity transit, frequent regional and local service), while relying upon transit-supportive land use, and safe and attractive access to transit to build the total transit system.

In 2013-2014, TriMet is focusing on the Eastside, including East Portland and cities of East Multnomah County, as well as the Southwest, including Southwest Portland and the cities of Tigard, Tualatin, Sherwood, King City, Durham, Lake Oswego and West Linn. In 2014, TriMet will begin the process for the Southeast part of the TriMet district, including the service plan for the Portland-Milwaukie Light Rail Project opening, followed by Central and North Portland. While the Service Enhancement Planning process will continue for the next 12-18 months to develop visions for every part of the region, what TriMet has already learned is reflected in what has been proposed for transit service growth in Scenario C and will continue to be updated as these shared visions are developed.

Regional Transit Network

Figure 2.10



2014 REGIONAL TRANSPORTATION PLAN UPDATE

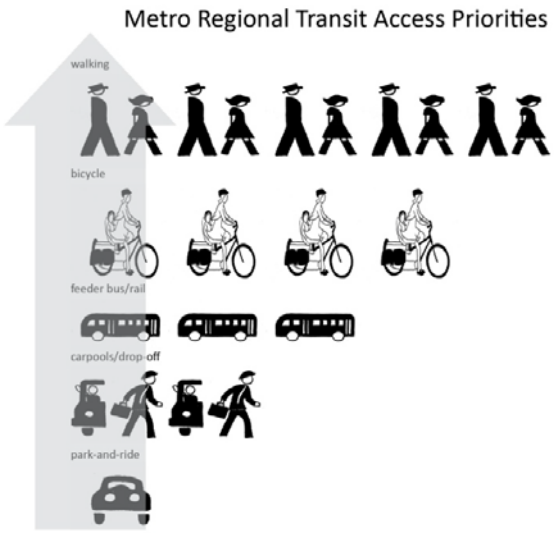
Metro

Transit Policy 1. Build the total transit network and transit-supportive land uses to leverage investments

Building the total transit network is based on providing frequent, reliable bus and rail service during all times of the day, every day of the week. However, it goes far beyond this, requiring actions on behalf of the region and all jurisdictions, not just the transit agency. All transit trips begin and end with different modes of access even if stations are mere steps from origins and destinations. Riders access transit via walking, bicycling, bus, rail, carpools and private automobiles.

At some point in their trip, all transit riders are pedestrians. The environment where people walk to and from transit facilities is a significant part of the overall transit experience. An unattractive or unsafe walking environment discourages people from using transit, while a safer and more appealing pedestrian environment may increase ridership. Likewise, high quality local and regional bicycle infrastructure extends the reach of the transit network, allowing more people to access transit from longer distances. **Figure 2.11** depicts the Metro region's priorities for providing multi-modal access to the region's transit service. It prioritizes walking and biking to transit and deemphasizes driving to transit.

Figure 2.11
Regional Transit Access Priorities



It is important to invest in making the whole trip more convenient and attractive: clear customer information; easy access to stops (including safe access to stations and secure bicycle parking), comfortable places to wait for transit; and modern, well-maintained vehicles.

It is also important to ensure land uses are transit-supportive to leverage and protect transit investments. Adjacent land uses, block size, street connectivity, and parking

management affect the success of transit service. Policies and investments that make transit work and not work are outlined in **Table 2.7**.

Table 2.7
What Works and Doesn't Work to Support Direct Transit Service

Characteristic	Works	Doesn't Work
Density	High	Low
Street layout	Small blocks	Long, winding streets
	Grid system	Cul-de-sacs, dead-end streets
Mix of uses	Mixed use (e.g., commercial, residential, and office uses)	Single use (e.g., all residential, all industrial)
Pedestrian and bicycle environment	Wide sidewalks	Narrow or no sidewalks
	Slow moving traffic	Fast moving traffic
	Street elements (e.g., benches, street trees, pedestrian-scale lighting)	Poor lighting
	Well-marked intersections with signalized crossings	No intersection markings and long pedestrian wait times
	Bicycle parking	
Site design	Buildings front the street and entrances	Buildings set back from the street and surrounded by surface parking
Parking	Limited	Abundant
	Fee-based parking	Free

Source: TriMet

Transit-supportive development patterns include:

- An urban form and densities that generate a high number of transit riders.
- A mix of uses, and a balance of jobs and housing, that creates a place where activity occurs at least 18 hours a day.
- Well-designed streets and buildings that encourage pedestrian movement.
- Streets that can accommodate 40-foot buses.
- Safe, direct and convenient pedestrian and bicycle access, within communities and to transit stops.

Development oriented transit promotes the seamless integration of land use and transit

- Street connectivity with good pedestrian and bike paths to extend the effective coverage of bus and rail service.
- Limited and managed auto parking.

Areas with low population and/or employment densities, abundant free parking, and with difficult access to transit stops generate fewer riders than areas with transit-supportive development. When fewer riders are generated, it costs more per ride to provide transit service than it does in transit-supportive areas. Ridership productivity is a key criterion in assessing the benefits of service improvements and new transit investments.

Transit Policy 2. Expand high capacity transit

As part of the RTP update, the region undertook a comprehensive assessment of the existing and potential future high capacity transit network. The results of this effort are captured in the High Capacity Transit (HCT) System Plan and incorporated into this section.

minimizes the need to expand the urban growth boundary and supports the region's efforts to reduce greenhouse gas emissions.

HCT investments help the region concentrate development and growth in its centers and corridors. The regional transit network concept calls for fast and reliable HCT service between the central city and regional centers. HCT service carries high volumes of passengers quickly and efficiently, and serves a regional travel market with relatively long trip lengths to provide a viable alternative to the automobile in terms of convenience and travel time.

High capacity transit provides the backbone of the transit network connecting the Portland central city, regional centers, and passenger intermodal facilities. It operates on a fixed guideway or within an exclusive right-of-way, to the extent possible. High capacity transit strives for frequencies of 10 minutes or better during the day and 15 minutes on weekends.

Passenger infrastructure at HCT stations and within station communities often include enhanced amenities, such as real-time schedule information, ticket machines, special lighting, benches, shelters, bicycle parking[7], civic art and commercial services. Using transit

[7] See section 2.4.2.4 for description of TriMet Bicycle Parking Design Guidelines.

signal priority at at-grade crossings and/or intersections preserves speed and schedule reliability.

In select suburban locations, park-and-ride facilities provide vehicular access to the high capacity transit network. These services require pedestrian and bicycle networks that provides access from adjacent streets and land uses to the regional transit network, especially for areas that cannot be well-served by local transit due to topography, street configuration, or lack of density.

To optimize and leverage transit supportive land uses, the RTP calls for alignments and station locations be oriented towards existing and future high density, mixed-use development. To this end, urban form and connectivity, redevelopment potential, market readiness, public incentives and infrastructure financing should all be considered during the corridor refinement and alternatives analysis phases of project development. High capacity transit investments are informed and prioritized by the System Expansion Policy.

Types of high capacity transit facilities and services include:

- Light Rail Transit (MAX)
- Rapid Streetcar (Streetcars running in mostly exclusive right-of-way so that they are able to travel faster safely)
- Bus Rapid Transit (limited stop, all day bus service with significant portions of the line running in transit-only right-of-way).
- On-Street Bus Rapid Transit (limited stop, all day bus service, mostly operating in mixed traffic with focused transit priority treatments, such as queue jump lanes). Due to its flexibility, On-Street Bus Rapid Transit can have attributes that are more like High Capacity Transit or like Frequent Service Bus and may be considered as a mode in either, depending on circumstances.
- Commuter Rail (WES)
- Interurban Passenger Rail (e.g., Amtrak or regional rail systems in other regions)
- Intermodal Passenger Facilities (e.g., Union Station and Greyhound)
- Bicycle stations/parking
- Park-and-ride lots
- Transit Centers
- Transit Stations

The RTP calls for HCT alignments and station locations to be oriented towards existing and future high density, mixed-use development.

HCT Plan and Priority Tiers

In June and July 2009, the Joint Policy Advisory Committee on Transportation and the Metro Council adopted the Regional High Capacity Transit (HCT) System Plan. The HCT Plan identifies corridors where new HCT is desired over the next 30 years. It prioritizes corridors for implementation, based on a set of evaluation criteria, and sets a framework to advance future corridors, consistent with the goals of the RTP and the region's 2040 Growth Concept.

The HCT system plan provides the framework for HCT network investments to be implemented as part of a broad corridor strategy that includes supportive land use and transit-oriented development (TOD), comprehensive parking programs, access networks for pedestrians and cyclists, park and rides and feeder bus networks. It identifies near- and long-term regional HCT priorities and creates a System Expansion Policy that will serve as a framework to advance future regional HCT corridors by setting targets and defining regional and local actions. The HCT Plan conducted much of its analysis using light rail as the representative HCT mode, but the corridors could be developed in a number of modes including light rail, bus rapid transit (on-street or exclusive), commuter rail, and rapid streetcar.

As described above, regional HCT system corridors are grouped into one of four priority tiers, along with specific targets and various steps local jurisdictions could follow to advance a project to a higher tier. The four tiers are based on an HCT corridor's readiness and regional capacity to study and implement HCT projects. Tiers would be reassessed as

part of each RTP update or by RTP amendment. These tiers would remain static and contain a similar number of projects over time.

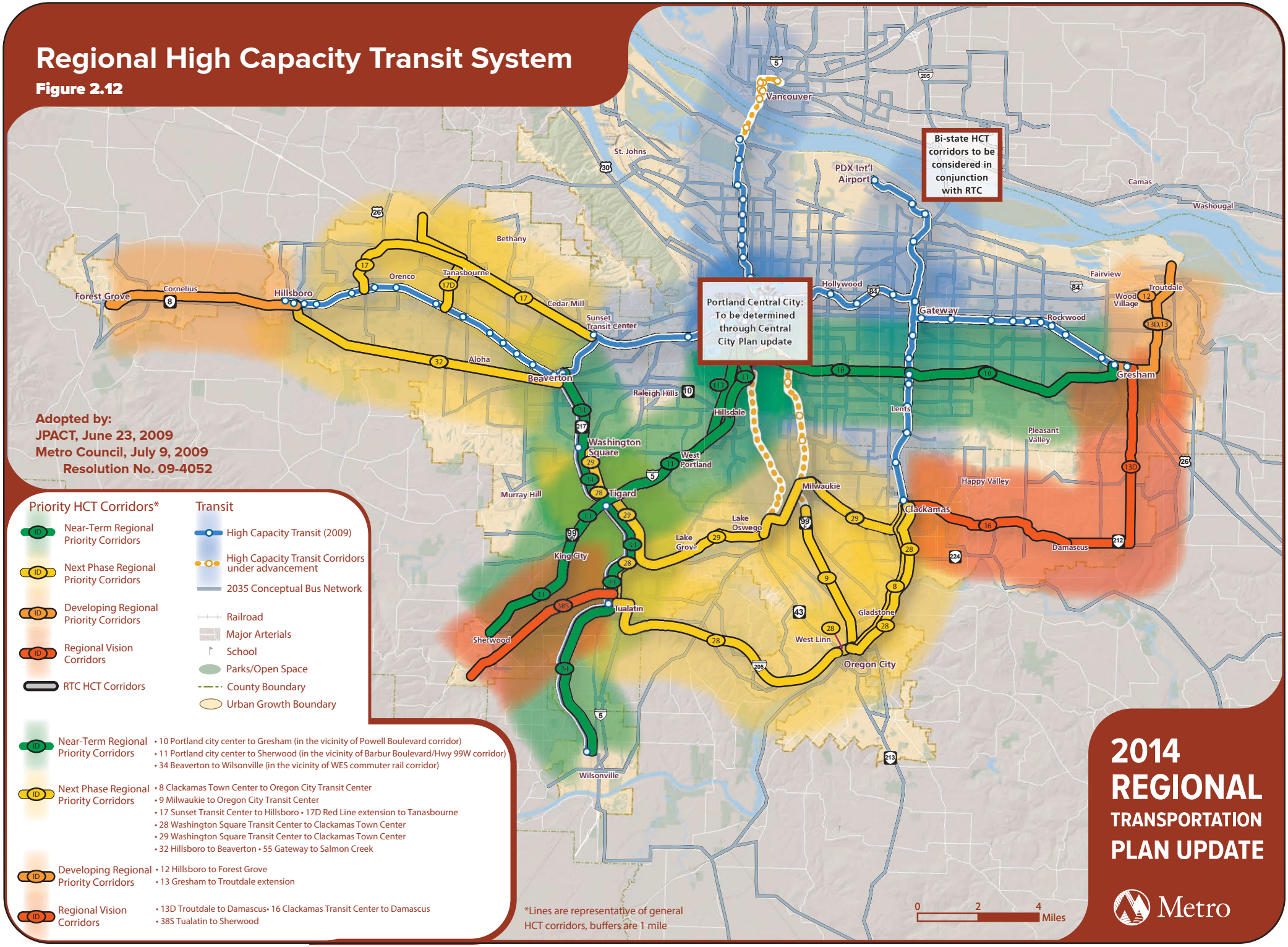
The four tiers are:

- Near-term regional priority corridors: Corridors most viable for implementation in next four years.
- Next phase regional priority corridors: Corridors where future HCT investment may be viable if recommended planning and policy actions are implemented.
- Developing regional priority corridors: Corridors where projected 2035 land use and commensurate ridership potential are not supportive of HCT implementation, but which have long-term potential based on political aspirations to create HCT supportive land uses.
- Regional vision corridors: Corridors where projected 2035 land use and commensurate ridership potential are not supportive of HCT implementation.

The HCT System Plan corridors are shown in **Figure 2.12.**

Regional High Capacity Transit System

Figure 2.12



Adopted by:
JPACT, June 23, 2009
Metro Council, July 9, 2009
Resolution No. 09-4052

Priority HCT Corridors*

- Near-Term Regional Priority Corridors
- Next Phase Regional Priority Corridors
- Developing Regional Priority Corridors
- Regional Vision Corridors
- RTC HCT Corridors

Transit

- High Capacity Transit (2009)
- High Capacity Transit Corridors under advancement
- 2035 Conceptual Bus Network
- Railroad
- Major Arterials
- School
- Parks/Open Space
- County Boundary
- Urban Growth Boundary

Near-Term Regional Priority Corridors
- 10 Portland city center to Gresham (in the vicinity of Powell Boulevard corridor)
- 11 Portland city center to Sherwood (in the vicinity of Barbur Boulevard/Hwy 99W corridor)
- 34 Beaverton to Wilsonville (in the vicinity of WES commuter rail corridor)

Next Phase Regional Priority Corridors
- 8 Clackamas Town Center to Oregon City Transit Center
- 9 Milwaukie to Oregon City Transit Center
- 17 Sunset Transit Center to Hillsboro • 17D Red Line extension to Tanasbourne
- 28 Washington Square Transit Center to Clackamas Town Center
- 29 Washington Square Transit Center to Clackamas Town Center
- 32 Hillsboro to Beaverton • 55 Gateway to Salmon Creek

Developing Regional Priority Corridors
- 12 Hillsboro to Forest Grove
- 13 Gresham to Troutdale extension

Regional Vision Corridors
- 13D Troutdale to Damascus• 16 Clackamas Transit Center to Damascus
- 38S Tualatin to Sherwood

*Lines are representative of general HCT corridors, buffers are 1 mile

2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

System Expansion

Light rail and other high capacity transit services have become popular in this and other regions over the past two decades. The ability of this region to grow toward the 2040 Growth Concept vision hinges upon the ability to develop and sustain high capacity transit. However, the number of additional high capacity transit corridors that can be implemented in this region are limited by several factors, including, though not limited to:

- Local funding and community support.
- Competition with other regions for scarce federal funding.
- Institutional and financial capacity to develop, build and operate additional high capacity corridors.

Because this region cannot implement all of the desired high capacity corridors in a short time, it is necessary to prioritize which corridors are completed first. To date, this process has hinged on regional decision-making, system needs, financial and political feasibility, and opportunity. The HCT Plan, as a component of the RTP, evaluated potential HCT corridors and ranked them based on a range of measures - many of which ultimately hinge on ridership potential.

The System Expansion Policy (SEP) seeks to extend the work of the HCT Plan and allow for refinement with each RTP update (or through mid-term RTP amendments if needed). The SEP is intended to provide policy direction on the range of factors that should be considered when determining the next high capacity transit corridor to pursue, including:

Pedestrian oriented design and blocks help bring people (density) and activities (diversity) to the transit system

- Community factors that center on local land use aspirations, transit-supportive land uses, building-orientation and block sizes, transportation infrastructure (e.g., sidewalks, bicycle facilities and street connectivity) parking and demand management policies, and design factors that will leverage HCT investments and increase ridership potential within a particular corridor. Generally, these factors are under the control of local governments and are implemented through local land use and transportation plans. If successfully implemented, these factors would bring a given HCT corridor and the communities connected by that corridor closer to the 2040 Growth Concept vision.
- Readiness factors such as political commitment, community support and partnerships needed to pursue the long and sometimes difficult process that even the most popular transportation investments must work through.

- Regional factors such as financial capacity and regional consensus on the appropriate next corridor.

The final decision on which corridor to pursue at any given point must rest on all of the factors. To aid this decision-making, the HCT Plan focuses on the technical factors. It will be updated with each RTP update, though the specific measures and methodologies are expected to evolve over time through a collaborative regional decision-making process. Potential HCT corridors can move closer to implementation, advancing from one tier to the next through a set of coordinated TriMet, Metro, ODOT and local jurisdiction actions that address the remaining factors. HCT corridors will be analyzed for a wide range of performance characteristics, including ridership and potential to compete for funding, before they are designated as the current priority for HCT development.

Chapter 5 of the RTP and the Regional Transportation Functional Plan will include guidance to help local jurisdictions, Metro and TriMet work together to achieve the community, readiness and regional factors listed above. This can include Memorandum of Understandings (MOUs) and eventually Intergovernmental Agreements (IGAs) that harness the synergy between community aspirations, the ability to develop high capacity transit to further those aspirations and other needed local, regional and state actions. It will also include specific targets to measure corridor readiness and contribution to regional goals.

The factors are complex and stem from the interactions of private individuals and businesses, local jurisdictions, and regional agencies. The intention of the guidance is that those jurisdictions which are achieving positive outcomes in these factors and/or have the aspiration to create the most improvement on these factors are simultaneously improving their own communities, creating more transit-friendly environments, and also may be able to pursue a near-term high capacity transit project along with the other jurisdictions in the corridor.

The RTP vision is to complete a network of regional transit along most arterial streets in the region to better serve suburban communities. Allowing mixed-use development and providing sidewalk and bicycle connections to bus stops and transit stations are important local strategies that leverage transit.

Transit Policy 3. Expand regional and local frequent transit service

Frequent service transit has service running every 15 minutes or better from the early morning to late in the evening, seven days a week. Its elements include additional service, reliability improvements, distinctive branding, improved passenger facilities at bus stops, enhanced pedestrian access and modern low-floor buses. Frequency is especially important for attracting riders who take short, local trips, because the time riders spend waiting for a bus to take a short trip is a proportionately larger component of the total travel time than it is for longer trips (that is, a ten minute wait for a five-minute ride is less attractive than a ten-minute wait for a sixty-minute ride).

Frequent transit service is important for attracting riders who take short and local trips.

In parts of the region where development focuses on regional and town centers and station communities, the RTP recommends providing radial frequent transit service to serve these centers. In 2040 corridors, main streets and centers, the RTP recommends supporting transit by providing transit-supportive development and well-connected street systems to allow convenient bicycle and pedestrian access.

Frequent bus service is appropriate when high ridership demand is demonstrated or projected, the streets are pedestrian-friendly, there are high proportions of transit-dependent residents, the lines connect to existing or proposed HCT corridors, and/or it serves multiple centers and major employers. Exhibiting many of the same service characteristics as frequent bus service, streetcar service functions primarily as a connection within and between 2040 centers and corridors.

Preferential treatments, such as transit signal priority, covered bus shelters, curb extensions, special lighting, enhanced sidewalks, protected crosswalks and bikeways, are all fundamental to making the frequent service bus and streetcars elements of the transit network function at its highest level. In select suburban locations, park-and-ride facilities may provide vehicular access to the frequent service network, especially for areas that cannot be well-served by local transit due to topography, street configuration, or lack of density.

Types of frequent transit services and facilities include:

- Frequent bus
- On-Street Bus Rapid Transit
- Streetcar (Local)
- Regional transit centers and stops
- Bicycle stations/parking
- Park-and-ride facilities

Transit Policy 4. Improve local transit service

The local transit network provides basic service and access to local destinations and the frequent and high capacity transit network. Service span and frequencies vary based on the level demand for the service. The local transit network ensures that the majority of the region's population has transit service available to them.

Local transit service is appropriate where there is some demand for transit service, but not enough to support frequent service. Local transit is designed to provide full transit service coverage to the region. Transit preferential treatments and passenger facilities are appropriate at high ridership locations. Sidewalk connectivity, protected crosswalks and bikeways are all fundamental to making the local transit service elements of the transit network function at its highest level.

Types of local transit services include:

- Local Bus
- Tram
- Para-Transit
- Employer Shuttle Service

The aerial tram is one type of local transit service that connects the Oregon Health Sciences University to Portland's South Waterfront district.

Right-of-Way Needs

The components of the regional transit network have different right-of-way needs. The regional transit network has a functional hierarchy similar to that of the regional arterial and throughway network. **Table 2.8** shows the regional transit service types and right-of-way treatments.

Table 2.8
Regional transit service types and right-of-way treatment

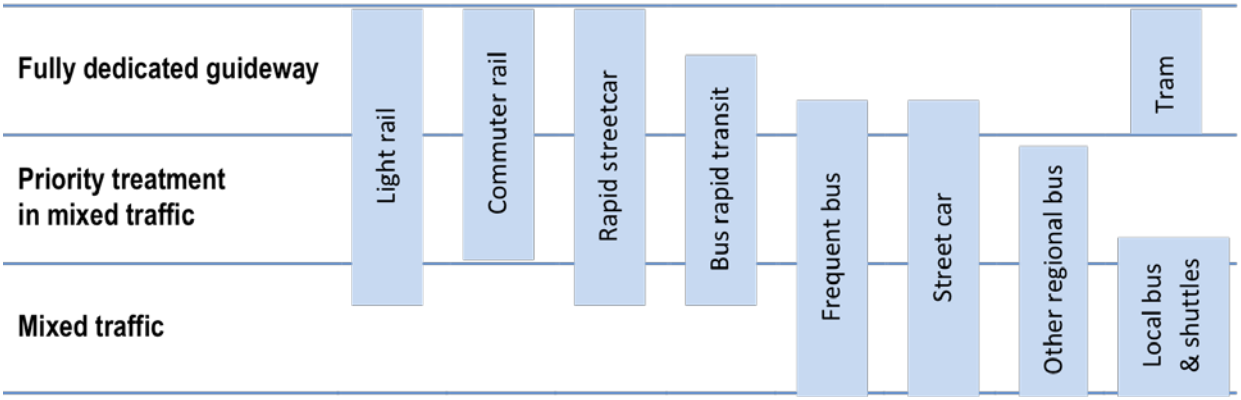


Table Notes:

- Commuter rail operates in right-of-way separated from street traffic, but in some cases may share ROW with main and branch railroad lines.
- Light rail transit, bus rapid transit and rapid street car modes generally operate in ROW separated from street traffic, but in some cases may share ROW with arterial, collector and local streets.
- Decisions about which modes are accommodated and which mode gets priority treatment within a particular roadway or rail ROW segment are made during the Corridor Refinement Plan or Alternative Analysis phase, and must consider the motor vehicle, freight, bicycle, and pedestrian functions/designations of the underlying roadway or rail line, and are subject to approval by the owner/operator of the underlying roadway or rail line.
- Refer to the glossary for detailed definitions of each mode.
- Bus rapid transit as shown in this table can include exclusive Bus Rapid Transit, as treated in the HCT Plan, and in fully or mostly dedicated right-of-way, as well as On-Street Bus Rapid Transit, which is mostly in mixed traffic.

Transit Policy 5. Support expanded commuter rail and intercity transit service to neighboring communities

Intercity passenger rail and bus service to communities outside of the region provides an important connection to the regional transit network. A high level assessment of potential demand for commuter rail outside of the Portland urban growth boundary was conducted as part of the HCT System Plan.

The demand estimates of ridership potential are highly conceptual and were developed only to determine the order of the magnitude of differences between corridors, not as actual predictions of ridership. The estimates are not based on detailed alignment, station location or service concepts. Rather, they estimate the potential to attract riders based on comparable commuter rail services in operation in the United States and the overall demand for work travel between the major corridor markets.

Key findings from this analysis are summarized below:[8]

- **Nonviable corridors.** Hood River, Scappoose and Sandy are not viable commuter rail markets given current and projected conditions. Even considering a very low capital cost to construct these corridors, any metric of cost per passenger served would be very high.

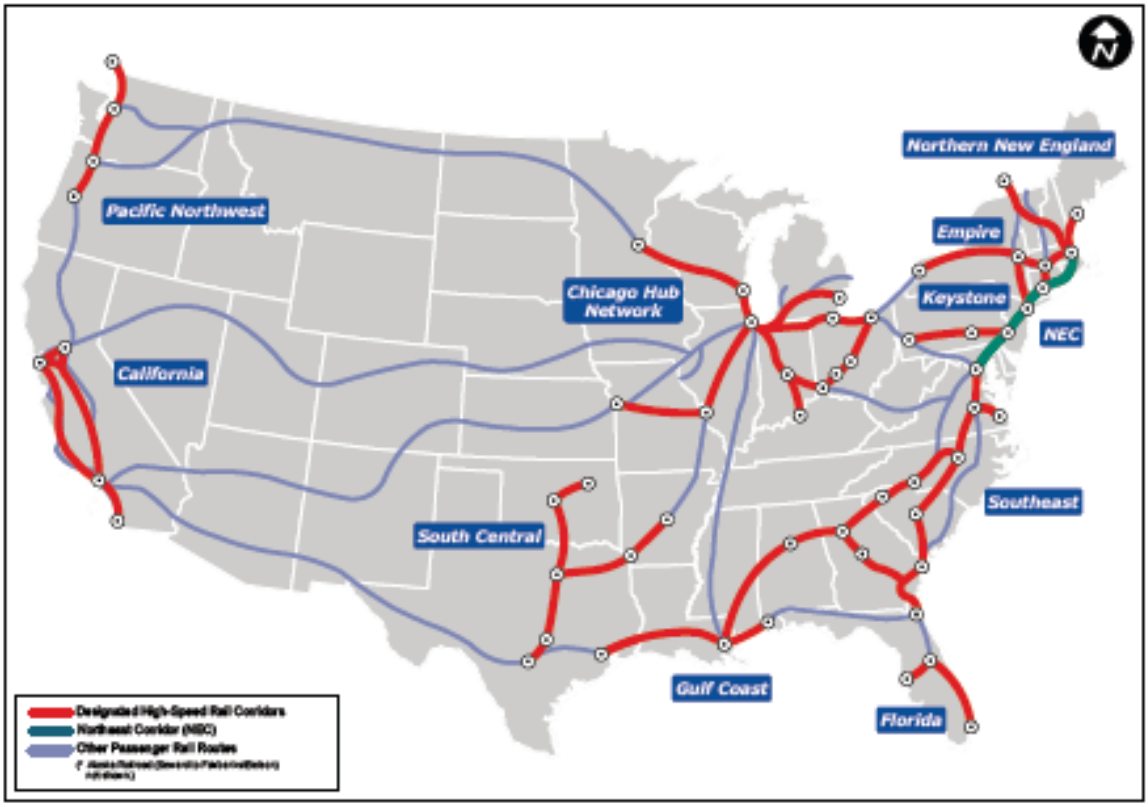
- **Potential corridor.** A potential future commuter rail line to Newberg may be feasible in the long term. Even though the riders per mile analysis looks favorable due to the relatively short distance of the line, the overall population in the rail shed is very low compared to other corridors, and overall ridership is relatively low. Metro, regional partners and corridor communities should consider right of way preservation planning for this corridor and consider land use planning activities that focus on transit supportive development around potential future commuter rail station areas.

- **Promising corridor**. Salem/Keizer is the most promising of the corridors evaluated. In addition to the highest market potential, this corridor has a number of favorable aspects: there is existing Amtrak passenger rail service in the corridor, this is a lightly used freight corridor that was evaluated in the 2001 Oregon Rail study as a potential commuter rail corridor, and an alignment could easily tie into the WES commuter rail service now operating to Wilsonville. If the region or state chose to focus on the development of inter-regional rail service, this alignment should take priority. After coming to a similar conclusion about this corridor, the Oregon State Legislature recently passed House Bill 2408, which directs ODOT to study the possible extension of commuter rail service from Wilsonville to Salem.

[8] More detailed information on ridership potential can be found in the HCT System Plan Summary Report.

In addition, the Pacific Northwest Corridor is one of ten corridors identified for potential high-speed rail investments to better connect communities across America. Shown in **Figure 2.13**, this corridor provides an important intercity rail connection between Eugene, Oregon and Vancouver, British Columbia. More work is needed to determine what partnerships, infrastructure investments and finance strategies are needed to support this level of service. More information about current efforts to support high speed rail are described in chapter 6.

Figure 2.13
U.S. Intercity Passenger Rail Network



Source: U.S. Department of Transportation, Vision for High-Speed Rail in America (April 2009)

Transit Policy 6. Improve pedestrian and bicycle access to transit

Establishing pedestrian and bicycle connections to bus and train stations and stops helps extend the reach of the transit network, making trips made by transit feasible for more people. Transit, pedestrian and bicycle travel benefit as improvements are made to each of the modes.

Improving pedestrian and bicycle access to transit is accomplished through:

- filling sidewalk gaps within a mile of stops and stations;
- filling bicycle and trail network gaps within three miles of stops and stations;

- integrating trail connections with transit;
- providing shelters and seating at stops and stations;
- providing pedestrian and bicycle protected crossings at stations and stops where appropriate, including secured, covered bicycle parking or Bike and Rides at stations and stops;
- allowing bicycles on board transit and exploring the use of apps to let bicycle riders know if a bus or train has bicycle space available;
- locating transit stops and stations on bicycle and pedestrian maps, integrating biking, walking and transit on tools such as TriMet's trip Planner;
- linking systems in plans.

2.5.4 Regional Freight Network Vision

The Portland –Vancouver region is a globally competitive international gateway and domestic hub for commerce. The multimodal freight transportation network is a foundation for the region's economic activities and we must strategically maintain, operate and expand it in a timely manner to ensure a vital and healthy economy.

Trade-dependent state economies

Exports: In 2012 Oregon state exports totaled $18 billion. Portland ranked 4th among the largest 100 U.S. metro areas in terms of export value as a share of metro output (24 percent).

Businesses: Oregon companies depend on Portland's marine, rail, air and road facilities for access to resources and markets: onions, apples, hazelnuts, grass seed, seafood, wood products, Les Schwab, Fred Meyer, Intel, Nike, Columbia Sportswear, etc.

Jobs: 490,000 Oregon jobs tie directly or indirectly to, or supported by, international trade

Sources: Portland Business Alliance, Today More than Ever: Oregon and Portland/Vancouver Depend on International Trade and Investment, 2013exports as a percentage of gross state product.

Regional Freight Network Concept

The Regional Freight Plan relies on a coordinated, integrated, multimodal and collaborative approach to integrating freight considerations into the multi-purpose transportation system and the larger land use issues in the region. It addresses the needs for freight through-traffic as well as regional movements, and access to employment and industrial areas, and commercial districts.

The Regional Freight Network Concept contains policy and strategy provisions to develop and implement a coordinated and integrated freight network that helps the region's businesses attract new jobs and remain competitive in the global economy.

Five policies to serve as the foundation of this vision:

1. **Use a systems approach to plan for and manage the freight network**
2. **Reduce delay and increase reliability**
3. **Protect industrial lands and freight transportation investments**
4. **Look beyond the roadway network to address critical marine and rail needs**
5. **Pursue clean, green and smart technologies and practices**

Freight Policy 1. Use systems approach to plan for and manage the freight network

A comprehensive, multi-modal systems approach is central to planning and managing the region's multimodal freight transportation infrastructure. This approach provides a strong foundation for addressing core throughway network bottlenecks, recognizing and coordinating both regional and local decisions to maintain seamless flow and access for freight movement that benefits all.

The transport and distribution of freight occurs via a combination of interconnected publicly- and privately-owned networks and terminal facilities. Rivers, mainline rail, pipeline, air routes, and arterial streets and throughways connect our region to international and domestic markets and suppliers beyond our boundaries.

Inside our region, throughways and arterial streets distribute freight moved by truck to air, marine, and pipeline terminal facilities, rail yards, industrial areas, and commercial centers. Rail branch lines connect industrial areas, marine terminals, and pipeline terminals to rail yards. Pipelines transport petroleum products to and from terminal facilities.

Better integrate freight issues in regional and local planning and communication
Potential freight impacts should be considered in all modal planning and funding, policy and project development and implementation and monitoring. This also means better informing the region's residents and decision makers about the importance of freight movement on our daily lives and economic well-being. Metro will work with its transportation partners to improve the level of freight information available to decision-makers, the business community and the public.

Figure 2.14 shows the components of the regional freight network and their relationships.

Figure 2.14
Regional Freight Network Concept

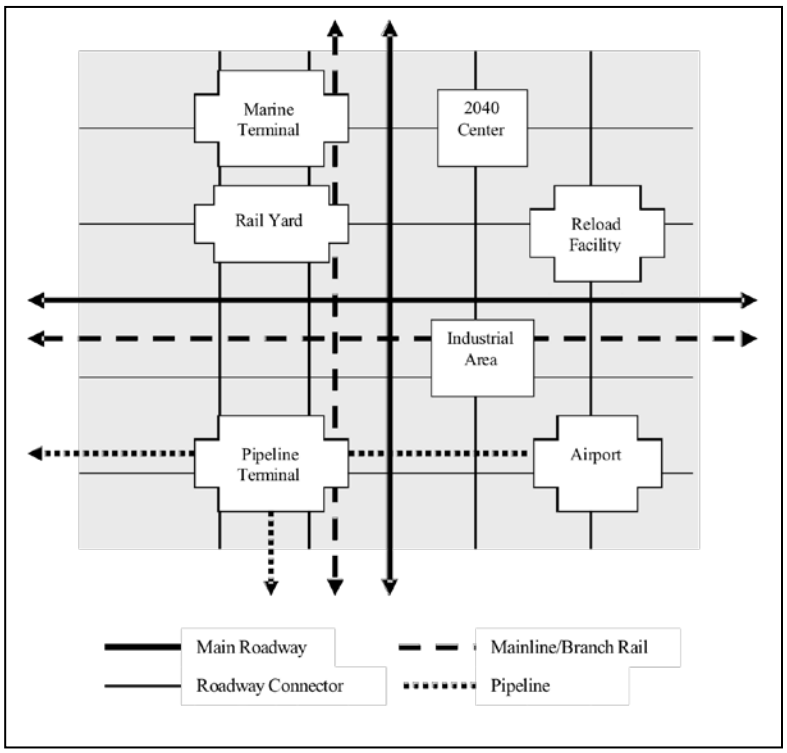
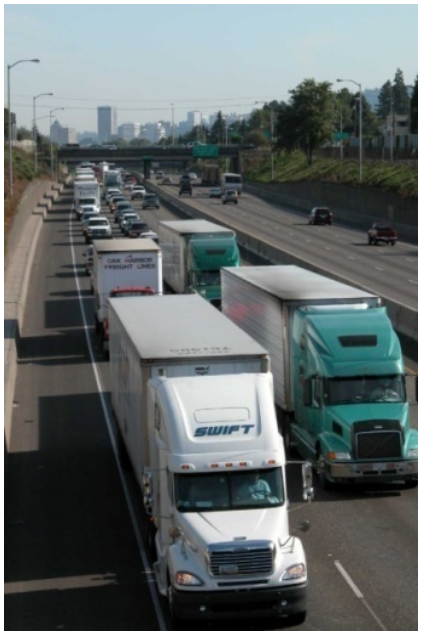


Figure 2.15 applies the regional freight network concept on the ground to identify the transportation networks and facilities that serve our region and the state's freight mobility needs. (See http://gis.oregonmetro.gov/RTP/ for zoomable version.

Freight Policy 2. Reduce delay and increase reliability

The 2005 Cost of Congestion to the Economy of the Portland Region Study reported that our region has a higher than average dependency on traded sector industries, particularly computer/electronic products, wholesale distribution services, metals, forestry/wood/paper products, and publishing; business sectors that serve broader regional, national, and international markets and bring outside dollars into the region's economy.

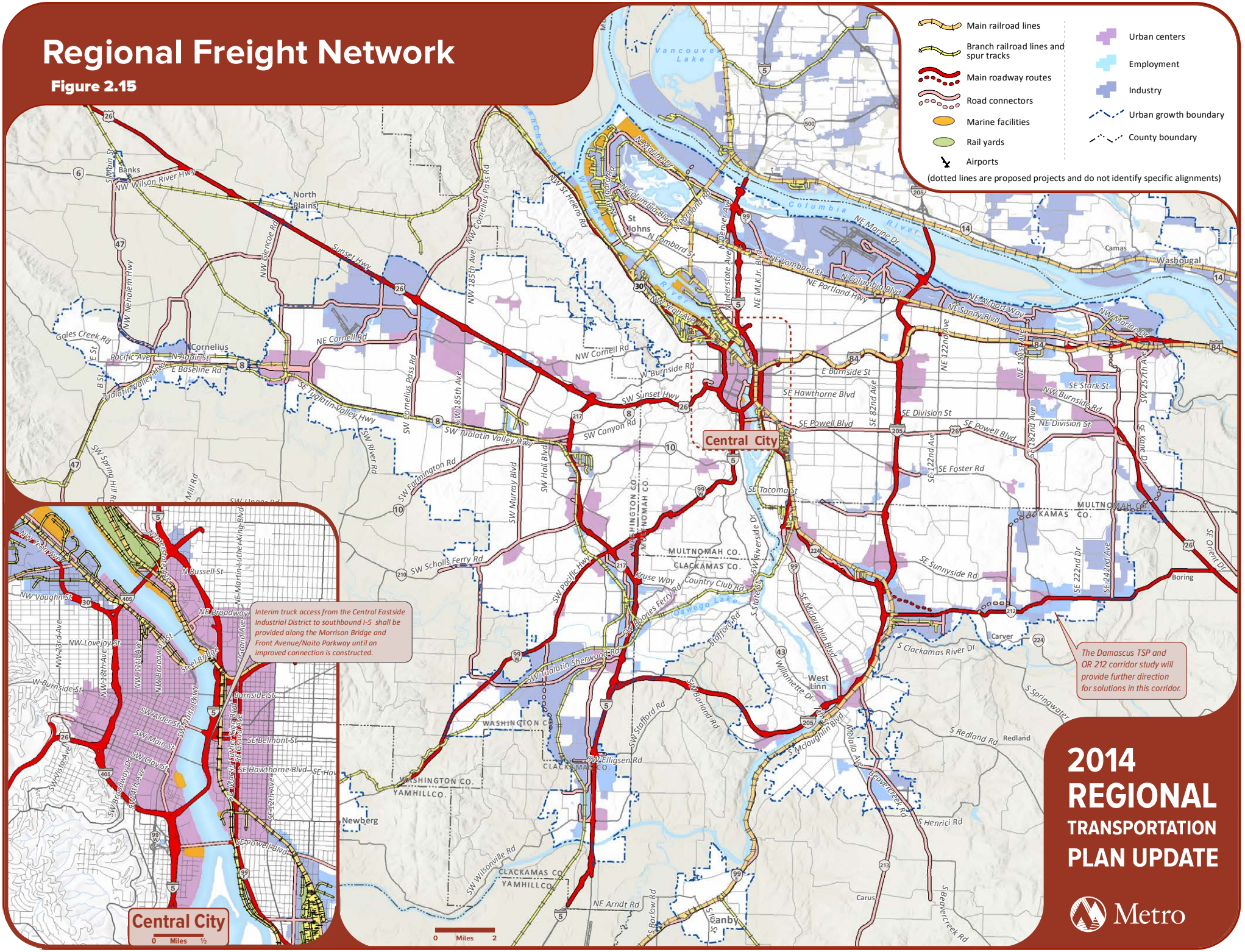
These industries depend on a well-integrated and well-functioning international and domestic transportation system to stay competitive in a global economy.



Reducing delay and increasingly reliability of the freight network is critical for the health our regional economy.

Regional Freight Network

Figure 2.15



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

As an international gateway and domestic freight hub, the region is particularly influenced by the dynamic trends affecting distribution and logistics. As a result of these global trends, U.S. international and domestic trade volumes are expected to grow at an accelerated rate. The value of trade in Oregon is expected to double by 2040, to $730 billion.[9] The region's forecasted population and job growth – an additional 917,000 residents and 597,000 jobs to be added between 2010 and 2040[10] – along with the associated boost in the consumption of goods and services are significant drivers of projected increases in local freight volume.

It is critical to maximize system operations and create first-rate multimodal freight networks that reduce delay, increase reliability, maintain and improve safety and provide cost-effective choices to shippers. In industrial and employment areas, the policy emphasizes providing critical freight access to the interstate highway system to help the region's businesses and industry in these areas remain competitive. Providing access and new street connections to support industrial area access and commercial delivery activities and upgrading main line and rail yard infrastructure in these areas are also emphasized.

Ensure adequate investment in freight capacity

In order to carry out an overall policy of reducing delay and increasing reliability, it will be necessary to expand the types of programs and amounts of funding for freight transportation infrastructure to adequately fund and sustain investment in our multimodal freight transportation network in order to ensure that the region and its businesses stay economically competitive. This includes a more rigorous analysis of the return-on-investment of all transportation projects (a practice which may result in prioritizing freight projects in some cases) and exploration of possible expansion of public-private partnerships to fund transportation system expansion. It also requires more analysis to understand appropriate public investment in private (freight) facilities when improvements in those facilities result in public benefits.

Freight Policy 3. Protect industrial lands and freight transportation investments

It is important to integrate freight mobility and access needs in land use decisions to ensure the efficient use of prime industrial lands, protection of critical freight corridors and access for commercial delivery activities. This includes improving and protecting the throughway interchanges that provide access to major industrial areas, as well as the last-mile arterial connections to both current and emerging industrial areas and terminals.

[9] Federal Highway Administration, Freight Analysis Framework version 3.4, 2013

[10] Metro 2040 growth forecast. Represents forecasted population and jobs within 4-county area (Multnomah, Clackamas, WAshignton, Clark).

Freight Policy 4. Look beyond the roadway network to address critical marine and rail needs

It is important to look beyond the roadway network to address needs of the multi-modal and intermodal system that supports our regional economy. As described in Chapter 1, freight rail capacity is adequate to meet today's needs but as rail traffic increases additional investment will be needed in rail mainline, yard and siding capacity.[11] Whenever right-of-way is considered for multiple uses such as freight rail, passenger rail and trails, analysis must include long-term needs for existing freight and freight rail expansion to ensure that necessary future capacity is not compromised.

In addition, navigation channel depth on the Columbia River continues to be the limiting factor on the size, and therefore the number, of ships that call on the Portland-Vancouver Harbor. Channel deepening has been pursued for several decades, balanced by the need to protect various fish stocks migrating on the river.

Freight Policy 5. Pursue clean, green and smart technologies and practices

It is important to ensure that the multimodal freight transportation network supports the health of the economy and the environment by pursuing clean, green and smart technologies and practices. Details of the most promising technologies and practices will be developed as part of the Regional Freight Plan's elaboration of a freight action plan, as identified in Chapter 10 of that plan; however examples could include support for Cascade Sierra Solutions to provide diesel emission reduction technologies in the region.

The Columbia River serves as a critical international marine gateway to the region's system of multi-modal freight networks.

[11] Port of Portland, Port of Portland Rail Plan, 2013

2.5.5 Regional Active Transportation Network Vision

A complete and welcoming active transportation network allows people of all ages, abilities, income levels and backgrounds to access transit, walk and bike easily and safely for many of their daily needs. The Regional Active Transportation Network vision was developed in the Regional Active Transportation Plan and starts with the understanding that integrated, complete and seamless regional pedestrian, bicycle and transit networks is necessary to achieve local and regional transportation goals, aspirations and targets.

Active transportation is human-powered transportation that engages people in healthy physical activity while they travel from place to place. People walking, bicycling, the use of strollers, wheelchairs /mobility devices, skateboarding, and rollerblading are active transportation.

Active transportation supports public transportation because most trips on public transportation include walking or bicycling.

Integrated Regional Active Transportation Network Concept

Many people in the region incorporate walking, transit and riding a bicycle into daily travel. The regional active transportation network concept focuses on the integration of bicycle, pedestrian and transit travel and connecting local pedestrian and bicycle networks into a coordinated and complete regional network.

The regional active transportation network is composed of pedestrian-bicycle districts and regional bikeways and walkways that connect to and serve frequent transit. Pedestrian-bicycle districts are urban centers and station communities.

Network guiding principles

The following ten guiding principles were developed in the Regional Active Transportation Plan to guide development of the regional active transportation network.

1. Cycling, walking, and transit routes are integrated and connections to regional centers and regional destinations are seamless.
2. Routes are direct, form a complete network, are intuitive and easy-to-use and are accessible at all times.
3. Routes are safe and comfortable for people of all ages and abilities and welcoming to people of all income levels and backgrounds.
4. Routes are attractive and travel is enjoyable.
5. Routes are integrated with nature and designed in a habitat and environmentally sensitive manner.
6. Facility designs are context sensitive and seek to balance all transportation modes.

7. Increases corridor capacity and relieves strain on other transportation systems.
8. Ensures access to regional destinations for people with low incomes, people of color, people with disabilities, people with low-English-proficiency, youth and seniors.
9. Measurable data and analyses inform the development of the network and active transportation policies.
10. Implements regional and local land use and transportation goals and plans to achieve regional active transportation modal targets.

Developing the regional active transportation network according to the guiding principles will provide a well-connected network of complete streets and off-street paths integrated with transit and prioritizing safe, convenient and comfortable pedestrian and bicycle access for all ages and abilities. This will help make walking and bicycling the most convenient and enjoyable transportation choice for short trips and provide access to regional destinations, jobs, regional and town centers, schools, parks and essential daily services.

It will also increase walking and bicycling access for underserved populations and ensures that the regional active transportation network equitably serves all people.[12]

2.5.5.1 Regional Bicycle Network Vision

Residents in the region have long recognized bicycling as an important form of transportation. The RTP elevates the importance of supporting bicycle travel because of the mobility, economic, environmental, health, and land-use benefits it provides.

Sidewalks, trails, bicycle facilities and transit cannot achieve their full potential if they are treated as stand-alone facilities – they must be planned and developed as part of a complete network.

Bicycle travel is an important mode that supports regional goals for mobility, public health and the environment.

Regional Bicycle Network Concept

- The Regional Bicycle Network Concept has been updated based on new information, data and regional input developed in the Regional Active Transportation Plan. The regional bicycle network concept includes: A bicycle parkway in each of the region's Mobility Corridors within the urban growth boundary to provide transportation options in these corridors.

[12] Underserved populations include low income, low-English proficiency, minority, senior (over 65) and youth (under 18).

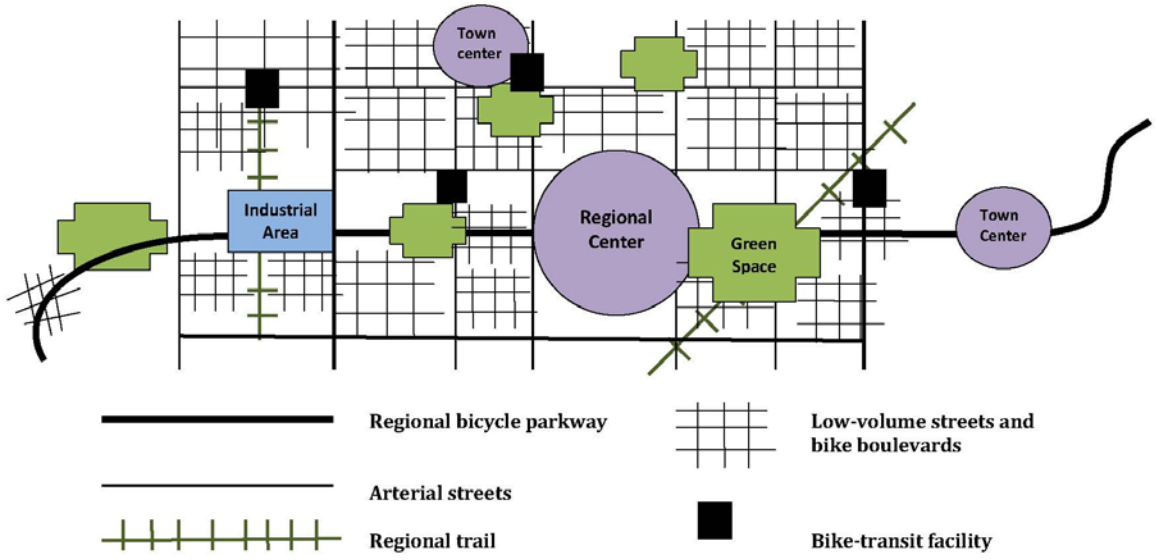
- A network of bicycle parkways, spaced approximately every two miles, that connect to and/or through every town and regional center, many regional destinations and to most employment and industrial land areas and regional parks and natural areas (all areas are connected by regional bikeways, the next functional class of bicycle routes).

- A network of regional bikeways that connect to the bicycle parkways, providing an interconnected regional network. Local bikeways connect to bicycle parkways and regional bikeways.

- Regional bicycle districts. Regional and town centers and station communities were identified as bicycle districts, as well as pedestrian districts.

Figure 2.16 shows the components of the regional bicycle network concept and their relationship to adjacent land uses. A region-wide bicycle network would be made up of on-street and off-street routes with connections to transit and other destinations.

Figure 2.16
Regional Bicycle Network Concept



The Region 2040 plan sets forth a vision for making bicycling safe, convenient and enjoyable, and to support bicycling as a legitimate travel choice for all people in the region. The RTP supports this vision with a region-wide network of bicycle districts and on-street and off-street bikeways integrated with transit.

This section describes the policy framework of the Regional Bicycle Network Concept. The regional bicycle policies have been refined and strengthened to reflect the policies of the Regional Active Transportation Plan. Additionally, the Regional Active Transportation Plan

identifies specific actions that Metro, in partnership with cities, counties, agencies and other stakeholders, can take to implement the policies.

Five policies form the foundation of this vision:

1. **Make walking and bicycling the most convenient, safe and enjoyable transportation choices for short trips less than three miles**
2. **Build an interconnected regional network of bicycle routes and districts integrated with transit and nature that prioritizes seamless, safe, convenient and comfortable access to urban centers and essential daily needs, including schools and jobs, for all ages and abilities**
3. **Build a green ribbon of bicycle parkways as part of the region's integrated mobility strategy**
4. **Improve bike-transit connections**
5. **Ensure that the regional bicycle and pedestrian network equitably serves all people**

Bicycle Policy 1. Make walking and bicycling the most convenient, safe and enjoyable transportation choices for short trips less than three miles

Nearly 45 percent of all trips made by car in the region are less than three miles, and 15 percent are less than one mile.[13] With complete networks, education, encouragement and other programs, many short trips made by car could be replaced with bicycle or pedestrian trips, increasing road capacity and reducing the need to expand the road system.

Bicycle travel holds huge potential for providing transportation options that can replace trips made by auto, especially for short trips. Bicycle trips made in the region for all purposes grew by 190% since 1995.[14] When bicycling is safe, comfortable, convenient and enjoyable, people have the option of making some of those short trips by bicycle.

Bicycle Policy 2. Build an interconnected regional network of bicycle routes and districts integrated with transit and nature that prioritizes seamless, safe, convenient and comfortable access to urban centers and essential daily needs including schools and jobs for all ages and abilities.

A well connected bicycle network does not have gaps and is comfortable and safe for people of all ages and abilities.Regional bicycle routes connect to and through urban centers to increasing access to transit, businesses, schools, and other destinations. Regional trails and

[13] 2011 Oregon Household Activity Survey. Vehicle trips by length for trips wholly within Clackamas, Multnomah, Washington and Clark Counties.
[14] 2011 Oregon Household Activity Survey.

transit function better when they are integrated with on-street bicycle routes. Wherever possible, routes should connect to and through nature and include trees and other green elements. Designing the network for universal access will make the regional bicycle network accessible and comfortable for all ages and abilities.

Bicycle Policy 3. Build a green ribbon of bicycle parkways as part of the region's mobility strategy

Regional bicycle parkways form the backbone of the regional bicycle system, connecting to 2040 activity centers, downtowns, institutions and greenspaces within the urban area while providing an opportunity for bicyclists to travel efficiently with minimal delays. In effect, the bicycle parkway concept mainstreams bicycle travel as an important part of the region's integrated mobility strategy. This concept emerged from work by the Metro Blue Ribbon Committee for Trails as part of the broader Connecting Green Initiative and further developed in the Regional Active Transportation Plan.

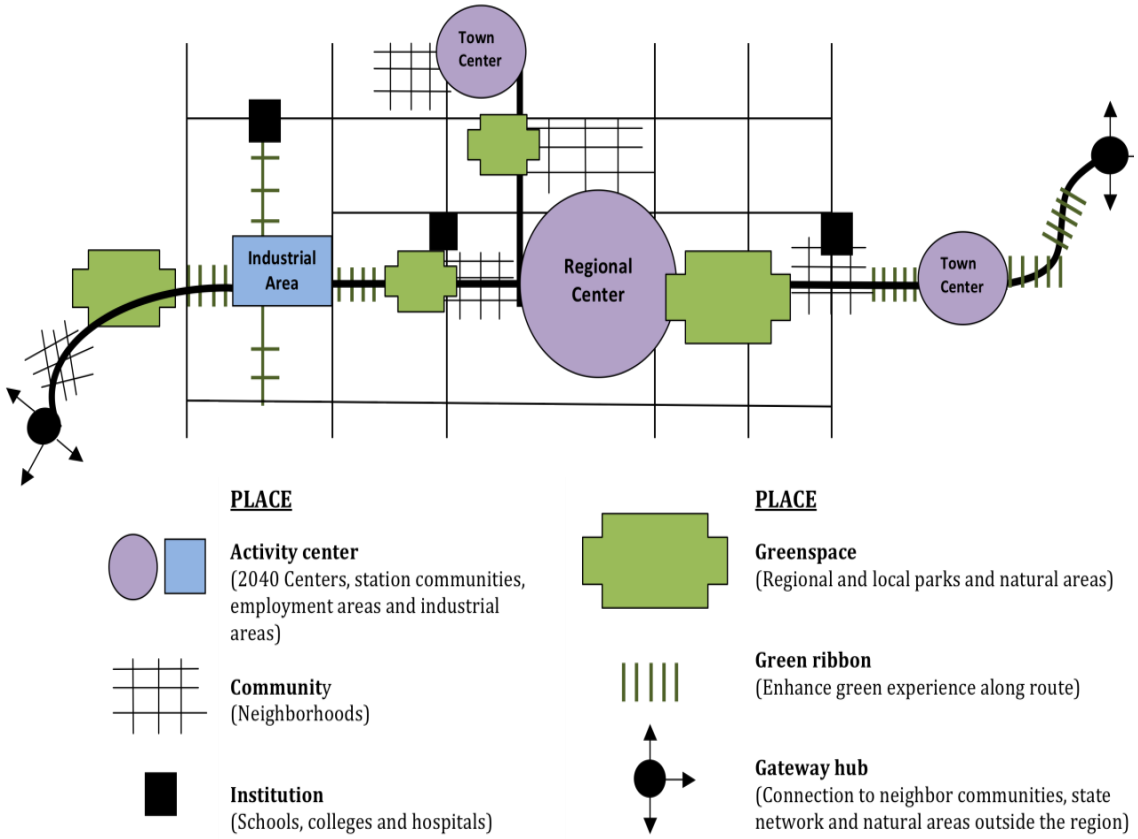
Key experiential aspects that bike parkways embody:

- A green environment with natural features such as trees or plantings (some will already be green, while others will be made greener as part of bike parkway development)
- Comfort and safety provided by protection from motorized traffic
- Large volumes of cyclists traveling efficiently with minimal delays

The bicycle parkway also connects the region to neighboring communities, other statewide trails and natural destinations such as Mt Hood, the Columbia River Gorge, and the Pacific Ocean.

Figure 2.17 illustrates this policy concept in the context of the regional bicycle parkway concept.

Figure 2.17
Bicycle Parkway Concept



A bicycle parkway serves as a green ribbon connecting 2040 activity centers, downtowns, institutions and greenspaces within the urban area.

The experience of the cyclist will be optimized to such a high level that people will clearly know when they are riding on a bicycle parkway. The specific design of a bike parkway will vary depending on the land use context within which it passes through. The facility could be designed as an off-street trail along a stream or rail corridor, a cycle track along a main street or town center, or a bicycle boulevard through a residential neighborhood. Priority treatments will be given to cyclists (e.g., signal timing) using the bike parkway when they intersect other transportation facilities, and connections to/from other types of bicycle routes will be intuitive. The Regional Active Transportation Plan provides design guidance on the development of bicycle parkways.

Bicycle Policy 4. Improve bicycle-transit connections

Public transit and bicycling are complementary travel modes. Effectively linking bicycling with transit increases the reach of both modes. It allows longer trips to be made without driving and reduces the need to provide auto park-and-ride lots at transit stations.

Transit provides a fast and comfortable travel environment between regional destinations that overcomes barriers to bicycling (hills, distance, and streets without bikeways); while bicycling provides access from the front door to a transit station, is faster than walking and can sometimes eliminate the need to transfer between transit vehicles.

A key component of the bike-transit connection is bicycle parking at transit stations and stops. Bike-Transit facilities provide connections between modes by creating a "bicycle park and ride." Both TriMet and SMART currently provide bicycle parking and storage at many transit stations and stops. TriMet, with input from regional stakeholders, has developed Bicycle Parking Guidelines. The guidelines consider station context and regional travel patterns, and are focused on three major factors for parking: location, amount and design. The guidelines will help TriMet and local jurisdictions determine the appropriate location, size and design of large-scale bike-parking facilities, including Bike-Transit Facilities designated in **Figure 2.18**.

Bicycle Policy 5. Ensure that the regional bicycle network equitably serves all people

All people in the region, regardless of race, income level, age or ability should enjoy access to complete and safe walking, bicycling and transit networks and the access they provide to essential destinations, including schools and jobs. Currently the regional active transportation network is incomplete in many areas of the region, including areas with low-income, minority and low-English proficiency populations. Transportation is the second highest household expense for the average American; providing transportation options in areas with low-income populations helps address transportation inequities. Future planning, design and construction of the networks must include consideration of the benefits and burdens of transportation investments to underserved and environmental justice populations.

The region's bicycle network supports a variety of facilities to make bicycling safe, direct and enjoyable.

Regional Bicycle Network Map and Functional Classifications

This section describes the regional bicycle network functional classifications shown on **Figure 2.18**, the Regional Bicycle Network. The regional bicycle network is composed of on-street and off-street bikeways that serve the central city, regional centers, town centers,

and other 2040 Target Areas, providing a continuous network that spans jurisdictional boundaries.

Figure 2.18 is a functional map illustrating how regional bicycle routes and districts work together to form a comprehensive network that would allow people to bike to transit, schools, employment centers, parks, natural areas and shopping. (See http://gis.oregonmetro.gov/RTP/ for zoomable version.)

The regional bicycle network has a functional hierarchy similar to that of the regional arterial and throughway network. **Figure 2.18** provides a vision for a future bicycle network; for a map of current bicycle facilities in the region, refer to Chapter 1.

The Regional Bicycle Network Functional Classifications have been updated based on new changes identified in the Regional Active Transportation Plan. The different functional elements of the regional bicycle network are:

The Eastbank Esplanade, along the Willamette River, is an example of how regional trails serve recreational and commuter travel needs.

- **Regional Bicycle Parkways** are a new functional class for the regional bicycle network. They are the highest functional class for bicycle routes and provide the spine of the bicycle network. Bicycle parkways are spaced approximately every two miles in a spiderweb-grid pattern, and connect to and through every urban center, many regional destinations and to most employment and industrial land areas, regional parks and natural areas. Each Mobility Corridor within the urban area has an identified bicycle parkway. Bicycle parkways were identified as routes that currently serve or will serve higher volumes of bicyclists and provide important connections to destinations.

- **Regional Bikeways** are the second functional class for bikeways and complete the regional level bicycle network. Like bicycle parkways, they provide for travel to and within the Central City, Regional Centers, and Town Centers. Regional bikeways can be any type of facility, including off-street trails/multi-use paths, separated in-street bikeways (such as buffered bicycle lanes) and bicycle boulevards. On-street Regional Bikeways located on arterial and collector streets are designed to provide separation from traffic.

- **Local Bikeways** are not identified as regional routes. However, they are very important to a fully functioning network. They are typically shorter routes with less

bicycle demand and use than regional routes. They provide for door to door bicycle travel.

- **Bicycle Districts** are a new concept for the RTP. The Central City, Regional and Town Centers and Station Communities are identified as bicycle and pedestrian districts. A bicycle district is an area with a concentration of transit, commercial, cultural, educational, institutional and/or recreational destinations where bicycle travel is intended to be attractive, comfortable and safe. Bicycle districts are also areas with current or planned high levels of bicycle activity. All bicycle routes within bicycle districts are considered regional and are eligible for federal funding. Bicycle facilities in bicycle districts should strive to be developed consistent with the design guidance described in Chapter 9.

  Which areas are designated as bicycle districts should be considered further in future Regional Transportation Plan and ATP updates. For example, areas around bus stops with high ridership should be evaluated as potential bicycle districts (light rail station areas are currently identified as bicycle districts); some Main Streets on the regional network may be considered for expansion as bicycle districts, as well as other areas

- **Bike-Transit Facilities** are often referred to as Bike & Rides and are generally located at transit centers and stations and provide secure, protected large-scale bike parking facilities. Some facilities may include additional features such as showers, lockers, trip planning and bicycle repair. In addition to existing bike and ride facilities at Wilsonville (SMART), Hillsboro, Beaverton Transit Center, Sunset Transit Center and Gresham Transit Center, TriMet is working in partnership with city and county jurisdictions to apply for funding to build additional bike and rides with current planning focusing on enhanced bike parking facilities in areas such as Gateway Transit Center in East Portland, Orenco/NW 231st Ave. in Hillsboro, Beaverton Creek in Beaverton, Goose Hollow in Portland and Park Ave. and Tacoma stations as part of the Portland-Milwaukie light rail line.

Bicycle Parkways and Regional Bikeways typically follow arterial streets but may also be located on collector and low-volume streets. On-street bikeways should be designed using a flexible “toolbox” of bikeway designs, including bike lanes, cycle tracks (physically separated bicycle lanes) shoulder bikeways, shared roadway/wide outside lanes and bicycle priority treatments (e.g. bicycle boulevards).

The Regional Active Transportation Plan provides recommended design guidance for trails/multi-use paths, and low volume and high volume streets. The appropriateness of each design is based on adjacent motor vehicle speeds and volumes. It may be difficult on some arterial streets at present to provide a comfortable facility. The RTP expects that these routes will eventually improve for bicycling, through better designs and lower auto speeds accompanying a more compact urban form. In the short-term the RTP recognizes the need

to continue to build ridership through providing low-volume routes for bicycle travel in the region.

Arterial streets provide direct routes that connect to 2040 Target Areas. Cyclists tend to travel on arterial streets when they want to minimize travel time or access destinations along them. Oregon State statutes and administrative rules establish that bicycle facilities are required on all collector and higher classification arterial streets when those roads are constructed or reconstructed.

Higher use trails can be designed to provide separation between bicyclists and pedestrians in order to avoid conflicts. Some trails that have been designed to minimum width requirements will need retrofits as more people use them.

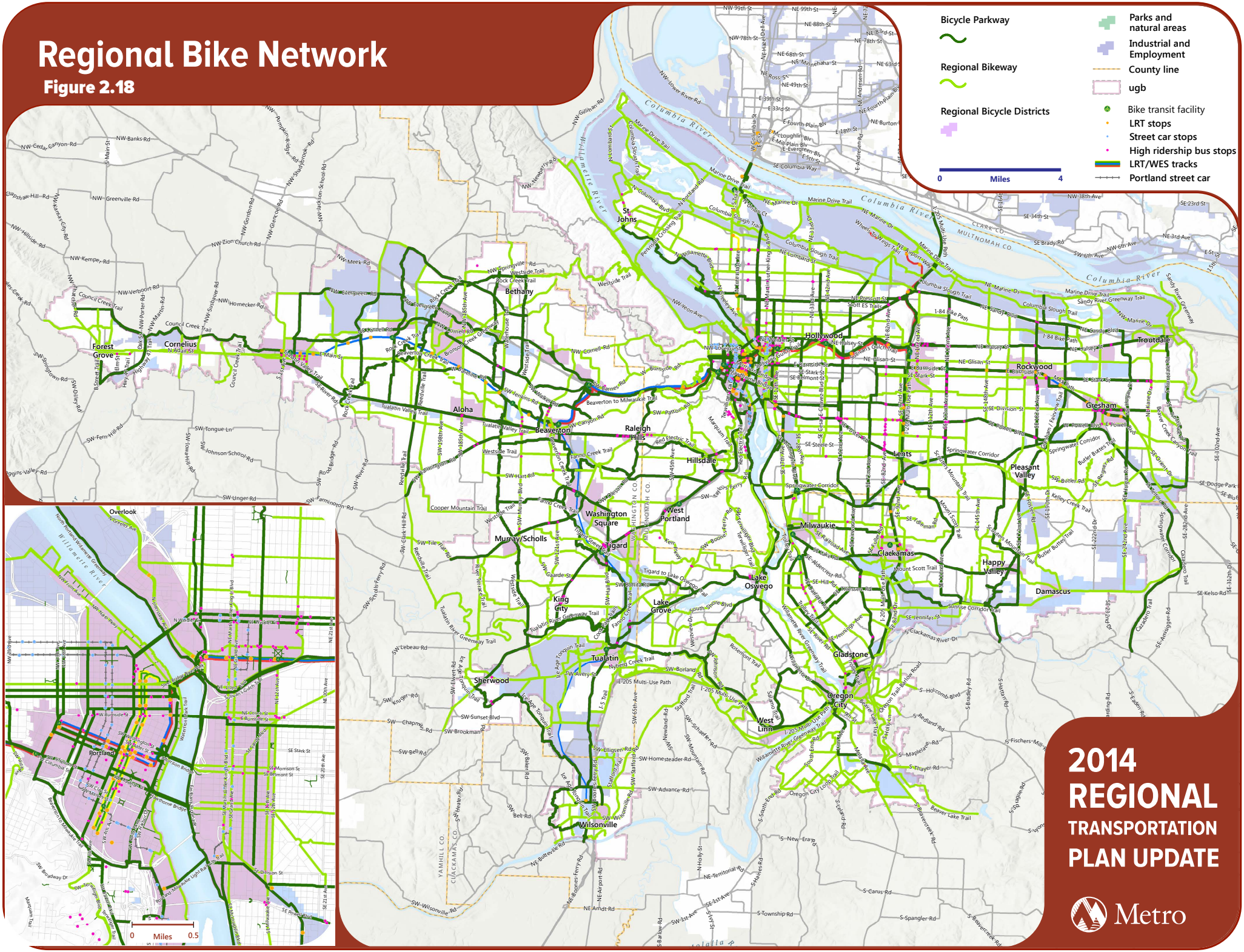
Low-volume streets often provide access to 2040 Target Areas as well as residential neighborhoods, complementing bicycle facilities located on arterial streets. Though these routes are often less direct than arterials, attributes such as slower speeds and less noise, exhaust and interaction with vehicles, including trucks and buses, can make them more comfortable and appealing to many cyclists. Recent research suggests that providing facilities on low-volume streets may be a particularly effective strategy for encouraging new bicyclists, which helps increase bicycle mode share in the region.

Regional trails typically provide an environment removed from vehicle traffic and function as an important part of the larger park and open space system in a community and in the region. Trails often take advantage of opportunities for users to experience natural features such as creeks, rivers, forests, open spaces and wildlife habitats, as well as historic and cultural features, with viewpoints and interpretive opportunities. In high use areas, regional trails should be designed to provide separation between bicyclists and pedestrians.

Off-street facilities also complement on-street bikeways, providing access to 2040 Target Areas while providing a travel environment with fewer intersecting streets than on-street bikeways, thereby allowing for faster travel times. This makes off-street facilities especially attractive for serving long distance bicycle trips. Similar to low-volume streets, off-street facilities provide an environment more removed from vehicle traffic, which is appealing to families and new or less confident cyclists.

Regional Bike Network

Figure 2.18



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

2.5.5.1 Regional Pedestrian Network Vision

Successful communities across America are increasingly defined by their walkability. Everyone walks, but too often walking is not a safe and convenient option for getting to work or school or meeting daily travel needs.[15]

Pedestrians play an important role in economic development by supporting commercial activity in centers. The RTP considers walking and bicycling as equals with other transportation modes.

Walking contributes to a healthy lifestyle for young and old alike and walking supports vibrant local economies. Every trip begins or ends with at least a short walk. Transit in particular is integrated with walking.

Walking includes getting around using wheelchairs and other forms of mobility assistance. Safe, ADA-compliant routes are particularly critical for persons who are unable to drive. It is important to remember that sidewalks and pedestrian crossings serve the needs of all mobility levels and should include design elements that help make travel as safe and convenient as possible. Many children, seniors and people with disabilities rely on transit and other elements of the regional pedestrian network.

Regional Pedestrian Network Concept

The Regional Pedestrian Network Concept has been updated based on new information, data and regional input developed in the Regional Active Transportation Plan. The regional pedestrian network is an interconnected network of pedestrian routes that link pedestrian friendly districts and provide access to destinations including transit, schools, jobs, services, shopping areas, parks and natural areas. The regional pedestrian network mirrors the regional transit network reflecting the important relationship of a complete walking network and transit.

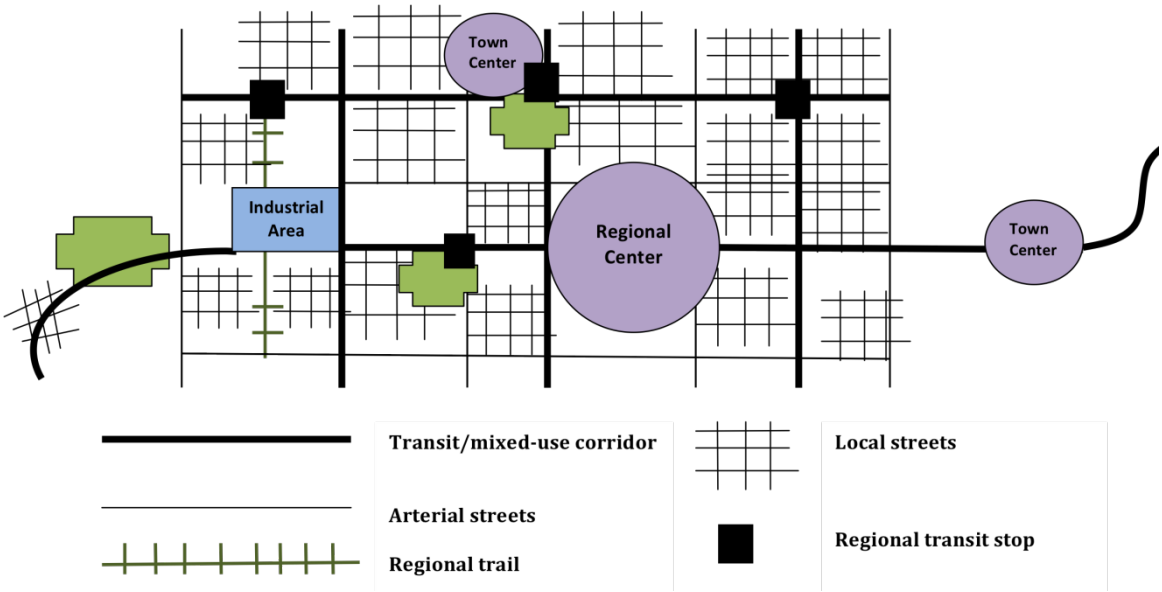
The regional pedestrian network should be complete, direct, safe, comfortable, accessible and enjoyable. People walking should feel welcomed and prioritized. Key elements of the regional pedestrian network concept include complete sidewalks, multi-use paths and trails, safe street crossings at regular intervals, illumination and streetscape details. It must be accessible to everyone regardless of one's ability to walk unassisted.

[15] Given that everyone is a pedestrian, some advocates are choosing to simply use the term "people" instead of "pedestrians."

Pedestrian activities also play a role in economic development by supporting places where people like to visit and live. Walking helps support commercial activity in neighborhoods and centers. The pedestrian network when fully developed helps people get around by safely providing links between destinations such as schools, parks, and employment sites, offers opportunities for active living, helps contribute to environmental health, supports other transportation modes, like transit, makes communities more inviting and provides a travel option that is inexpensive and accessible to most people.

Figure 2.19 shows the components of the regional pedestrian network and their relationship to adjacent land uses.

Figure 2.19
Regional Pedestrian Network Concept



The Region 2040 plan sets forth a vision for making walking safe, convenient and enjoyable to support walking as a legitimate travel choice for all people in the region. The RTP supports this vision with a region-wide network of on-street and off-street pedestrian facilities integrated with transit.

This section describes the policy framework of the Regional Pedestrian Network Concept. The regional bicycle policies have been refined and strengthened to reflect the policies of the Regional Active Transportation Plan. Additionally, the Regional Active Transportation Plan identifies specific actions that Metro, in partnership with cities, counties, agencies and other stakeholders, can take to implement the policies.

Five policies form the foundation of this vision:

1. **Make walking and bicycling the most convenient, safe and enjoyable transportation choices for short trips less than three miles**

2. **Build a well-connected network of pedestrian routes, including safe street crossings, integrated with transit and nature that prioritize seamless, safe, convenient and comfortable access to urban centers and essential daily needs, including schools and jobs, for all ages and abilities**

3. **Create walkable downtowns, centers, main streets and station communities that prioritize safe, convenient and comfortable pedestrian access for all ages and abilities**

4. **Improve pedestrian access to transit**

5. **Ensure that the regional pedestrian network equitably serves all people**

Pedestrian Policy 1. Make walking and bicycling the most convenient, safe and enjoyable transportation choices for short trips less than three miles

As communities seek to emphasize moving people rather than cars, it is important to exploit all travel options including the most basic mode of travel. One in four trips made in America are a mile or less in length, yet only 21 percent of those trips are made on foot. [16]

In addition to being the oldest and cleanest form of transportation, walking is often the quickest and most convenient way to accomplish short trips in urban areas and neighborhoods surrounding community centers. Several characteristics of short auto trips make them especially attractive to replace with walking. In urban areas, short trips greatly contribute to arterial congestion, as well as a disproportionate amount of air pollution (due to cold starts) and crashes.[17]

In a society where over two-thirds of adults are obese or overweight[18], walking can improve both physical and mental health. A one-mile trip is a twenty-minute walk, which is two-thirds of the daily exercise regimen recommended by the U.S. Surgeon General.

Promoting walking as the preferred mode for short trips will help the region achieve the RTP performance target of tripling the share of walking trips by the year 2040. A convenient, safe and enjoyable pedestrian environment includes connected pedestrian routes, complete sidewalks physical separation from autos, safe crosswalks at regular intervals, pedestrian prioritized traffic signals, separation from bicycles on trails, well-lit streets and intersections, pedestrian scale lighting, benches, water fountains, wayfinding, bus shelters, and, ADA-compliant curb ramps.

[16] National Household Travel Survey, 2001, http://nhts.ornl.gov/
[17] Oregon Bicycle and Pedestrian Plan, 1995, http://www.oregon.gov/ODOT/HWY/BIKEPED/planproc.shtml
[18] Center for Disease Control and Prevention, 2012, http://www.cdc.gov/nchs/fastats/overwt.htm

Pedestrian Policy 2. Build a well-connected network of pedestrian routes, including safe street crossings, integrated with transit and nature that prioritize seamless, safe, convenient and comfortable access to urban centers and essential daily needs, including schools and jobs, for all ages and abilities

A well-connected high-quality pedestrian environment facilitates walking trips by providing safe and convenient access to pedestrian destinations within a short distance.

Currently the regional pedestrian network is incomplete and inadequately safe; the sidewalk, crosswalk and trail network accessing transit in particular has gaps in continuity and quality, and few locations provide adequate safe crossing opportunities.

A complete pedestrian system provides a basic building block for economic vitality in centers and other commercially-oriented areas, but when incomplete fails to maximize the connection between transportation and land use that helps contribute to vibrant communities. The existence of gaps prevents the basic system from functioning uniformly throughout the region by inhibiting access to transit, limiting access to centers and other community-level destinations, such as parks and schools. It is important for local jurisdictions to pursue crosswalks meeting the regional spacing guidelines, including at every transit stop, and sidewalks on every street, except expressways and certain low traffic streets, even if they are not defined as part of the regional pedestrian network.

Oregon State statutes and administrative rules establish that pedestrian facilities are required on all collector and higher classification streets when those roads are built or reconstructed. Exceptions are provided where cost is excessively disproportionate to need or where there is an absence of need due to sparse population or other factors.

Emphasis should be given to filling gaps and providing safe crossings of the busiest streets. Access to schools, parks and community centers that are active parts of the local community is important for influencing a healthy lifestyle that includes walking.

Regionally, more attention is needed toward providing safe crossings, particularly of multi-lane arterials, which tend to serve as barriers to walking. Two-thirds of the region's fatal and severe injury pedestrian crashes occurred on arterial roadways, with half occurring on streets with 4-lanes or more. Regional policy calls for safe crossings of streets and controlled pedestrian crossings on major arterials, including features such as markings, medians, refuge islands, beacons, and signals, as appropriate. Crossings should be located at or near all transit stops. Where crossings are not provided, pedestrians will often cross anyway, without the benefit of a safe place to cross. Pedestrian crashes on high-speed arterial streets often result in a fatality or severe injury.

Children need a safe pedestrian environment, especially for walking to and from school and parks.

Regional Pedestrian Policy 3. Create walkable downtowns, centers, main streets and station communities that prioritize safe, convenient and comfortable pedestrian access

The central city, regional and town centers, main streets and light rail station communities are areas high levels of pedestrian activity are prioritized. In these areas, sidewalks, plazas and other public spaces are integrated with civic, commercial and residential development. They are often characterized by compact mixed-use development served by transit. These areas are defined as pedestrian districts in the RTP.

Walkable areas should be designed to reflect an urban development and design pattern where walking is safe, convenient and enjoyable. These areas are characterized by buildings oriented to the street and boulevard-type street design features, such as wide sidewalks with buffering from adjacent motor vehicle traffic, marked street crossings at all intersections with special crossing amenities at some locations, special lighting, benches, bus shelters, awnings and street trees. All streets within these areas are important pedestrian connections.

NW 23rd in Portland is an example of a lively pedestrian district.

Pedestrian Policy 4. Improve pedestrian access to transit

Public transportation use is fully realized only with safe and convenient pedestrian connections, especially safe crossings and facilities that connect stations or bus stops to surrounding areas or that provide safe and attractive waiting areas. Improving walkway connections between office and commercial districts and surrounding neighborhoods provides opportunities for residents to walk to work, shopping or to run personal errands. Buildings need to be oriented to the street and be well connected to sidewalks. Safe routes across parking lots need to be provided. This reduces the need to bring an automobile to work and enhances public transportation and carpooling as commute options.

The experience of people walking and pedestrian access to transit is improved with features such as wide sidewalks with buffering from adjacent motor vehicle traffic, street crossings spaced no more than 530 feet apart–an ideal spacing is 200 to 400 feet where possible (unless there are no intersections, bus stops or other pedestrian attractions), special crossing elements at some locations, special lighting, benches, bus shelters, awnings and street trees

Pedestrian Policy 5. Ensure that the regional pedestrian network equitably serves all people

All people in the region, regardless of race, income level, age or ability should enjoy access to the region's walking and transit networks and the access they provide to essential destinations, including schools and jobs. Currently the regional pedestrian network is incomplete in many areas of the region, including areas where people with low-incomes, people of color and people with low-English proficiency live. Transportation is the second highest household expense for the average American; providing transportation options in areas with low-income populations helps address transportation inequities.

Future planning, design and construction of the networks must include consideration of the benefits and burdens of transportation investments to underserved and environmental justice populations.

Investment programs should set priorities for sidewalk improvements to and along major transit routes and communities where physically or economically disadvantaged populations live.

Regional Pedestrian Network Map and Functional Classifications

This section describes the regional pedestrian network functional classifications shown on **Figure 2.20**, the Regional Pedestrian Network. The regional pedestrian network is composed of on-street and off-street walkways that serve the central city, regional centers, town centers, and other 2040 Target Areas, providing a continuous network that spans jurisdictional boundaries.

The regional pedestrian network has a functional hierarchy similar to that of the regional arterial and throughway network. **Figure 2.20** provides a vision for a future pedestrian network; for a map of existing pedestrian facilities in the region, refer to Chapter 1.

The Regional Pedestrian Network Functional Classifications have been updated based on new changes identified in the Regional Active Transportation Plan. The different functional elements of the regional bicycle network are:

- **Pedestrian Parkways** are a new functional class for pedestrian routes on the regional pedestrian network and the highest functional class. They are high quality and high priority routes for pedestrian activity. Pedestrian Parkways are generally major urban streets that provide frequent and almost frequent transit service (existing and planned). They can also be regional trails. Adequate width and separation between pedestrians and bicyclists should be provided on multi-use trail parkways.

- **Regional Pedestrian Corridors** are the second highest functional class of the regional pedestrian network. On-street Regional Pedestrian Corridors are any major or minor arterial on the regional urban arterial network that is not a Pedestrian Parkway. Regional trails that are not Pedestrian Parkways are classified as Regional Pedestrian Corridors. These routes are also expected to see a high level of pedestrian activity.

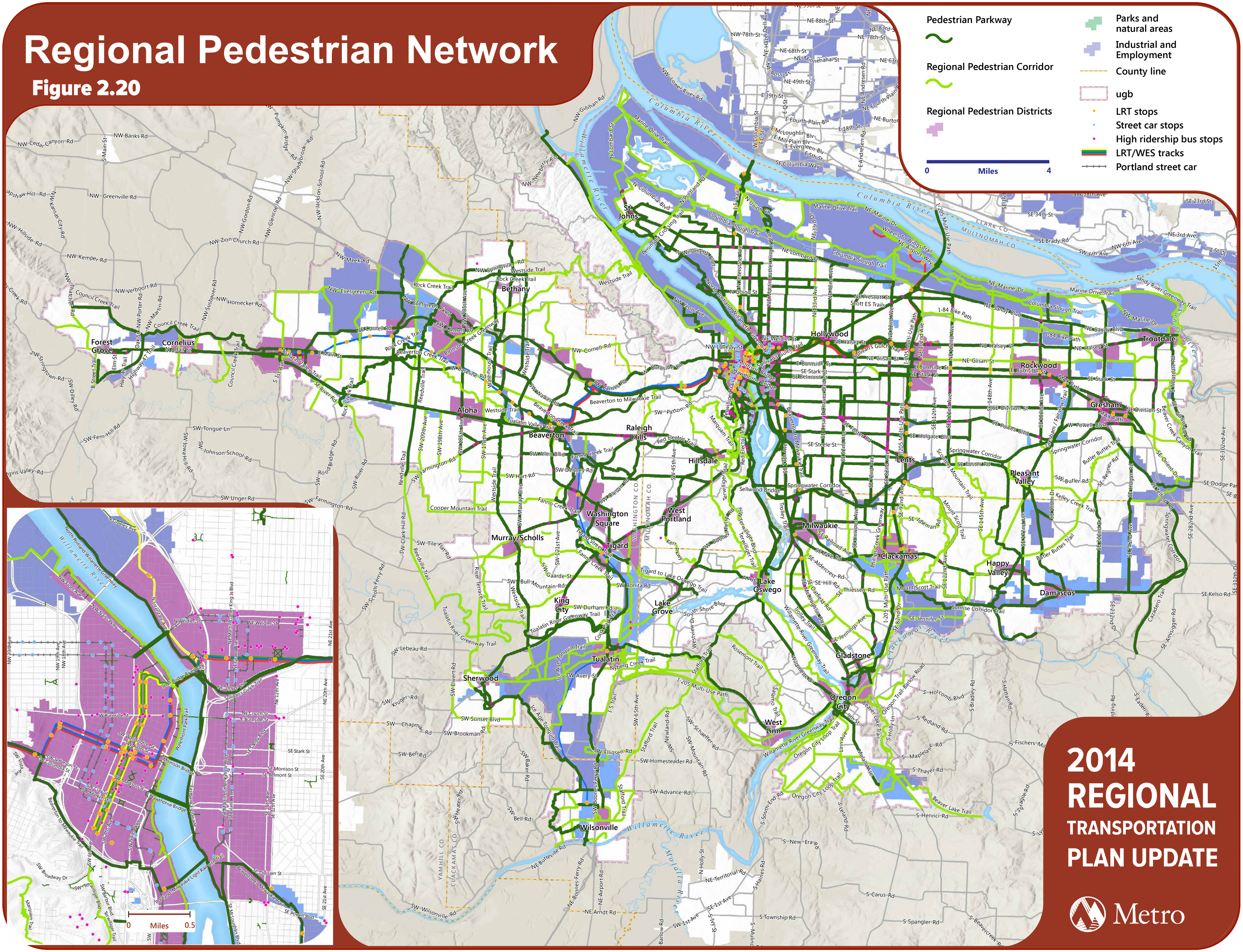
- **Local Pedestrian Connectors** are all streets and trails not included on the regional pedestrian network. Connectors, however, are an important element of the regional pedestrian network because they allow for door-to-door pedestrian travel.

- **Pedestrian Districts** are the Central City, Regional and Town Centers and Station Communities shown on the Regional Pedestrian Network Map. Several station communities along the Portland Milwaukie and the Portland Clackamas light rail lines were added in the network map update. A pedestrian district is an area with a concentration of transit, commercial, cultural, institutional and/or recreational destinations where pedestrian travel is attractive, comfortable and safe. Pedestrian Districts are areas where high levels of walking exist or are planned. Within a Pedestrian District, some routes may be designated as a Pedestrian Parkway or Regional Pedestrian Corridor, however all routes within the Pedestrian District are part of the regional pedestrian network.

Figure 2.20 applies the regional pedestrian network concept on the ground, illustrating how different regional pedestrian facilities work together to form a comprehensive network that would allow people to walk to transit, schools, employment centers, parks, natural areas and shopping. (See http://gis.oregonmetro.gov/RTP/ for zoomable version.

Regional Pedestrian Network

Figure 2.20



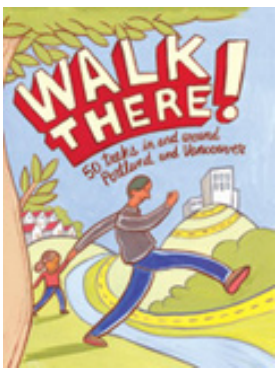
2014 REGIONAL TRANSPORTATION PLAN UPDATE

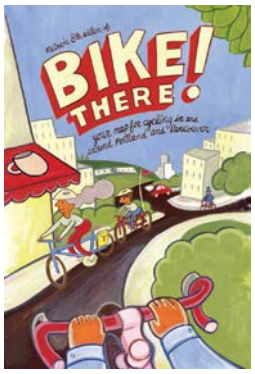
Metro

2.5.6 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSMO) VISION

The overarching theme of the region's Transportation System Management and Operations (TSMO) vision is that the transportation system represents a significant public investment in assets that must be protected and well-managed. Concerns over the social, environmental and financial cost of traditional solutions lend support for an integrated approach to the provision of transportation infrastructure and services where better management of the system has a prominent role.

TSMO is a set of integrated transportation solutions intended to improve the performance of existing and new transportation infrastructure. Through a combination of transportation system management (TSM) and transportation demand management (TDM) systems, services and projects, TSMO addresses transportation goals such as mobility, reliability, safety and accessibility, which have traditionally been achieved via larger scale, expensive infrastructure investments.





Metro also operates the region's demand management programs, which include an educational component to increase awareness of travel choices in the region.

The TSM component typically incorporates advanced technologies to improve traffic operations. TDM promotes travel options and ongoing programs that result in reduced demand for drive alone trips. Together these two transportation management techniques optimize the existing transportation infrastructure.

Four policies form the foundation of this vision:

1. **Use advanced technologies, pricing strategies and other tools to actively manage the transportation system**
2. **Provide comprehensive real-time traveler information to people and businesses**
3. **Improve incident detection and clearance times on the region's transit, arterial and throughway networks**
4. **Implement incentives and programs to increase awareness of travel options and incent change**

The Regional TSMO plan is guided by the following vision, goals and guiding principles:

Vision: The Portland metropolitan region will collaboratively and proactively manage its multimodal transportation system to ensure safe, reliable, efficient, and equitable mobility for people and goods. The region will strive to be a nationally recognized leader for innovative management and operations of its system.

Goal 1: Reliability – Provide reliable travel times for people and goods movement.

Goal 2: Safety and Security – Enhance transportation safety and security for all modes

Goal 3: Quality of Life – Enhance the environment and quality of life by supporting state and regional greenhouse gas and air quality goals

Goal 4: Traveler Information – Provide comprehensive multimodal traveler information to people and businesses.

Guiding Principle 1: Regional Partnerships – Enhance regional partnerships that support collaborative investment and implementation of management and operations strategies that benefit the region.

Guiding Principle 2: System Performance – Monitor transportation system performance and evaluate system management strategies to aid equitable policy and sustainable investment decisions.

Guiding Principle 3: Investment in Ongoing Operations – Provide on-going maintenance and operations to support the transportation system.

When compared to traditional capital investments such as new transit service, roads or additional lanes, TSMO solutions offer high returns for a comparatively low cost, and can delay or remove the need for additional capital-intensive infrastructure. In addition to replacing expensive capital projects, TSMO solutions can also complement them with education and marketing. The City of Portland has found that coupling capital investments in biking, walking and transit infrastructure with programs that encourage and help people to use them can maximize return on investment. TSMO strategies support many regional transportation goals including:

- Improve travel time reliability
- Improve transit on-time arrival
- Improve safety
- Reduce travel delay
- Decrease vehicle miles traveled and drive alone trips
- Reduce fuel use and corresponding air pollution and greenhouse gas emissions

Table 2.9 provides examples of TSMO strategies for each of the investment areas.

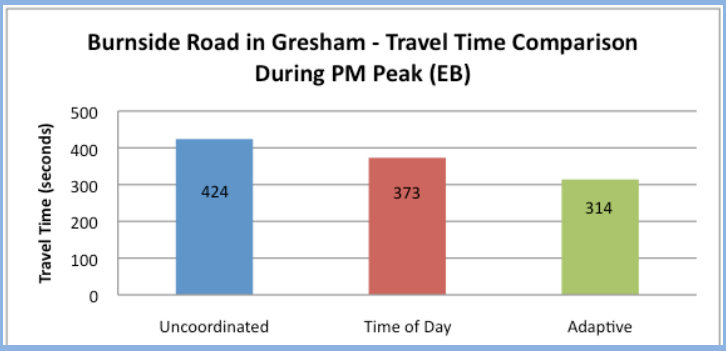
Table 2.9
Examples of TSMO strategies by investment area

Multimodal Traffic Management • Traffic signal coordination • Transit signal priority treatment • Detection and countdown timers for bicycles and pedestrians	**Traffic Incident Management** • Improve surveillance • Expand incident management teams and training
Traveler Information • Real-time traveler information for freeways and arterials • Enhance traveler information tools	**Transportation Demand Management** • Ridesharing • Collaborative marketing (e.g., Drive Less Save more campaign) • Individualized marketing (e.g. SmartTrips program) • Transportation Management Associations • Employer outreach

TSMO Policy 1. Use advanced technologies, pricing strategies and other tools

Multimodal traffic management strategies improve metropolitan mobility by applying technology solutions to actively manage the transportation system. Projects in this area improve arterial traffic management (e.g., traffic signal timings, data collection and performance monitoring), expand transit priority treatments, pursue congestion pricing options, develop access management strategies, and implement active traffic management techniques.

The city of Gresham upgraded traffic signals along East Burnside Road to adaptive signal timing, which adjusts to real-time traffic flow. Average travel time along the corridor decreased by 15 percent as a result, benefiting automobiles, trucks and buses.



Other tools include parking management strategies, which aim to use parking resources more efficiently. Parking management strategies can include parking pricing, shared parking that serves multiple users or destinations, preferential parking or price discounts for carpools and/or short-term parking.

Parking management strategies can include shared parking that serves multiple businesses, timed parking and parking pricing.

When appropriately applied, parking management can reduce the number of parking spaces required in some situations. Implementation of parking management may require changing current development, zoning and design practices, broadening how parking problems and solutions are addressed and activities to improve enforcement and addressing potential spillover impacts. A regional parking management strategy would assist local jurisdictions efforts to implement parking management.

Value pricing—sometimes called congestion pricing —involves the application of market pricing (through variable tolls, variable priced lanes, area-wide charges or cordon charges) to the use of roadways at different times of day. While this tool has been successfully applied in other parts of the U.S. and internationally, it has not been applied in the Portland metropolitan region to date. In 2008, the Oregon Department of Transportation (ODOT) researched the potential effects of tolling/pricing to determine if and how tolling could be applied in Oregon.[19] ODOT will research the application of this tool in the Portland metropolitan region and identify a pilot project to further test this strategy in response to House Bill 2001, which was adopted by the 2009 Legislature.

[19] A series of white papers are available that summarize this research at www.oregon.gov/ODOT/TD/TP/Tolling_Background.shtml

As applied elsewhere, this strategy manages peak use on limited roadway infrastructure by providing an incentive for drivers to select other modes, routes, destinations or times of day for their travels. Reducing discretionary peak hour travel helps the system operate more efficiently improving mobility and reliability of the transportation system while limiting vehicle miles traveled and congestion-related auto emissions. In addition, those drivers who choose to pay tolls can benefit from significant savings in time. Similar variable charges have been utilized for pricing airline tickets, telephone rates and electricity rates to allocate resources during peak usage. In addition, value pricing may generate revenues to help with needed transportation improvements. More work is needed to gain public support for this tool.

TSMO Policy 2. Provide comprehensive real-time traveler information to people and businesses

Real-time traveler information provides travelers accurate and comprehensive information for their route, mode, and time of day choices. Providing centralized real-time and forecasted traveler information is one of the main goals of the TSMO concept. By providing accurate traveler information, system users can make informed travel decisions.

Ideally, this leads to optimal roadway usage, less unnecessary traveler delay, more walking, biking, transit and carpool trips, reduction in vehicle miles traveled and an improved traveler experience. All modes of travel benefit from improved traveler information. Drivers and freight traffic are able to make alternate route choices and avoid congestion; transit users can plan their transit trip with more certainty; and the information shows travelers walking or biking routes that meet their preferences.

In 2008, TripCheck.com received more than 23 million visits. Surveys show that information influenced travel decisions for 60 percent of site visitors.

Traveler information projects expand traveler information to arterial roadways, centralize all real-time data, further expand travel option marketing, improve multimodal traveler data and tools, and enhance data collection capabilities. The information can reach travelers through a variety of interfaces including internet, radio, cell phone, in-vehicle navigation devices, or variable message signs.

Currently, real-time traveler information in the Portland Metro area is provided for most freeways and is distributed via variable message signs, radio, traffic surveillance cameras, Tripcheck.com, TriMet trip planning tools and PORTAL. TriMet provides their schedule and real-time transit data to the public. This open source policy has led to the creation of many beneficial applications by third party developers.

For example, TriMet's Transit Tracker data, which predicts next arrival times for vehicles, can now be accessed through a variety of different mobile device applications. Traveler information is one area where public private partnerships can flourish and benefit from transportation system uses.

TSMO Policy 3. Improve traffic incident detection and clearance times on the region's transit, arterial and throughway networks

Efficient incident management is critical to reducing incident related congestion and restoring capacity as quickly as possible after an incident. Incident management strategies enhance incident management capabilities, increase surveillance for faster incident detection, improve inter-agency communications, and implement active traffic management. Incident management responds to vehicle accidents and breakdowns, as well as weather related issues, to improve traffic operations and restore traffic flow.

Past studies show:

- 20% of all incidents are secondary crashes
- For every 1 minute a primary incident continues to be a hazard, the likelihood of a secondary crash increases by almost 3%.

Active traffic management can:

- reduce primary crashes by 3% to 30%
- reduce secondary crashes by 40% to 50%
- reduce crash severity

Incident management targets safety and reliability. By clearing incidents quickly, the chance of secondary incidents decreases which improves safety. The primary modes that benefit from incident management strategies are automobiles, buses and trucks. Activities that also benefit from these strategies include disaster response, evacuation and security planning efforts.

Incidents that block travel lanes decrease capacity and lead to unreliable travel times as shown in **Table 2.10**. When lanes are blocked due to an incident capacity decreases significantly (even when the incident is on the shoulder) and travelers experience delays.

Table 2.10
Detecting and clearing incidents quickly restores lost capacity

Number of Hwy Lanes	% Facility Capacity Lost by Blockage Type			
	Shoulder	1 Lane	2 Lanes	3 Lanes
2	19%	65%	100%	N/A
3	17%	51%	83%	100%
4	15%	42%	75%	87%

Source: TRB[20]

When implemented with active traffic management techniques, such as variable speed limits and lane management signs, the number and severity of crashes can be reduced.[21]

TSMO Policy 4. Implement market-based incentives and programs to increase awareness and use of travel options

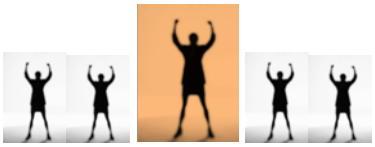
TSMO also manages transportation from the demand side to help residents and employees of the region increase their awareness and use of travel options and reduce their trips made driving alone. Transportation demand management (TDM) strategies increase the share of trips that have a lower impact on the transportation system. TDM projects support rideshare and employer commuter services, expand collaborative marketing campaigns for travel options, and incorporate employer and youth transit pass programs.

Carpooling is one strategy to reduce drive alone trips, supporting the region's efforts to improve mobility throughout the region.

All modes benefit from TDM projects. TDM projects raise general awareness about walking, bicycling and transit use, which increases safety for all users. TDM projects encourage travelers with flexibility to use non-drive alone options, such as walking, biking or vanpooling, or travel during off-peak hours.

By providing travel information and option incentives like employer or youth passes, this will provide incentives for people to adjust their travel behavior from driving to walking, bicycling, and taking transit. Benefits from this

Drive less. Save more. 1 out of 5 Portland residents reduced car trips due to the campaign.



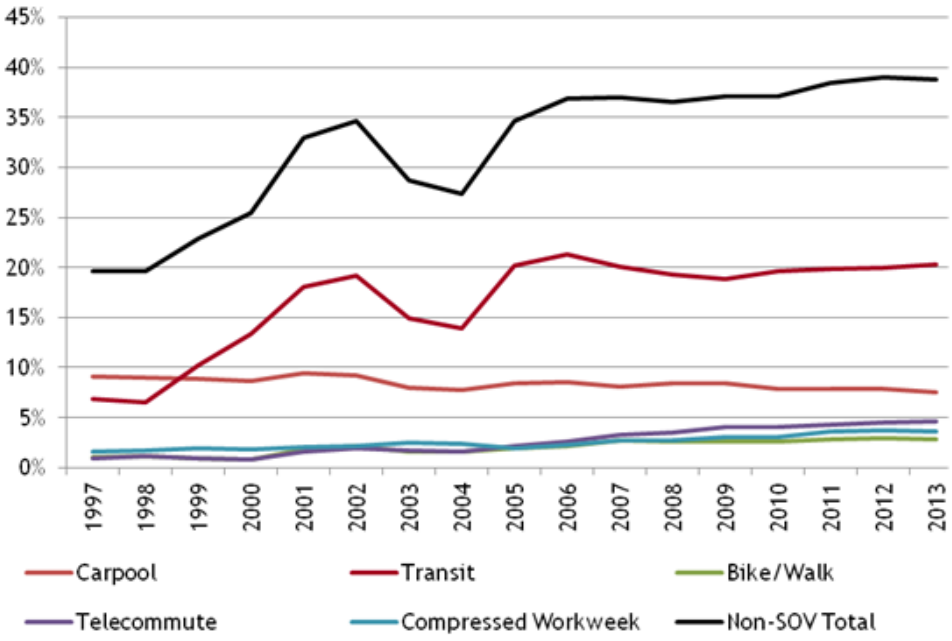
Source: Moore Information, Inc, January 2009

[20] Highway Capacity Manual 2000. *Transportation Research Board, National Research Council, Washington, D.C., 2000.*
[21] Research and Innovative Technology Administration (RITA) Intelligent Transportation Systems Benefits Database. Website: http://www.benefitcost.its.dot.gov/its/benecost.nsf/BenefitsHome (June 2009)

change in travel behavior include healthier people, reduced roadway injuries and fatalities, reduced personal transportation costs, reduced air pollutants, and improved travel times and for other roadway users.

As an example, RTO partners provide services to over one thousand employers throughout the Portland region. Employers may implement travel option programs such as buying transit passes for their employees. Over the last sixteen years, employee commute trips that used non-drive alone modes (transit, bicycling, walking, carpooling/vanpooling, and telecommuting) rose from 20 percent to over 39 percent among participating employers.

Figure 2.21 Effectiveness of Employer-Based Commuter Programs



Employer-based commuter programs have resulted in significant increases in walking, biking and use of transit.

Source: Steer Davies Gleave, March 2014

TDM projects support the 2040 growth concept by encouraging people to make choices that reduce their dependence on cars. As a result, vehicle trips are reduced saving energy and reducing GHG emissions.

2.5.7 TRANSLATING THE VISION INTO REALITY

Implementation of the concepts and policies in this chapter will result in a complete and interconnected transportation system that supports all modes of travel and implementation of the 2040 Growth Concept. These idealized network concepts, along with performance measures in Chapter 4, form the basis for identifying system needs and deficiencies in the regional mobility corridor atlas and the investment priorities in Chapter 3. The policies in this chapter recognize that each element of the transportation system may perform multiple functions, and that each will need to be tailored to fit local geography, respect existing communities and development patterns and protect the natural environment.

The RTP will be implemented through a variety of strategies and actions at the local, regional, state and federal levels. The various jurisdictions in the region are expected to pursue policies and projects that contribute to specific elements of the vision.

Implementation of the RTP will result in a safe, reliable and interconnected transportation system for all modes of travel.

CHAPTER 3

INVESTMENT STRATEGY:

WHAT IS OUR STRATEGY FOR ACHIEVING OUR VISION?

3.1 INTRODUCTION

Federal government spending on transportation infrastructure decreased for the first time in decades with the implementation of MAP-21; while state and local infrastructure needs continued to increase. Yet budgets are shrinking, aging roads and bridges are operating beyond capacity, and our transit systems lack funding to expand.

Traditional approaches to financing transportation projects are not only failing to maintain existing infrastructure, they are wholly inadequate to build new systems to accommodate growth and keep our economy moving.

Long-range transportation plans like the 2014 RTP are required to include estimates of available revenue to support the system of investments recommended in the plan. Predicting the financial future is an uncertain exercise, especially given the economic recession affecting our region and state. The RTP is an expression of the region's desire to make investments in the transportation system with limited public revenues.

Two levels of investment were developed for the 2014 RTP. The first level, the RTP Federal Priorities (also known as the Financially Constrained System), will represent the most critical transportation investments for the plan period.[1]The second level, the "state" RTP Investment Strategy, will represent additional priority investments that would be considered for funding if assumed new or expanded revenue sources are secured.[2]

WHAT OUTCOMES ARE WE TRYING TO ACCOMPLISH?

VIBRANT COMMUNITIES– People live and work in vibrant communities where they can choose to walk for pleasure and to meet their everyday needs.

ECONOMIC PROSPERITY– Current and future residents benefit from the region's sustained economic competitiveness and prosperity.

SAFE AND RELIABLE TRANSPORTATION– People have safe and reliable transportation choices that enhance their quality of life.

LEADERSHIP ON CLIMATE CHANGE – The region is a leader in minimizing contributions to global warming.

CLEAN AIR AND WATER– Current and future generations enjoy clean air, clean water and healthy ecosystems.

EQUITY – The benefits and burdens of growth and change are distributed equitably.

As adopted by the Metro Council and MPAC in 2008.

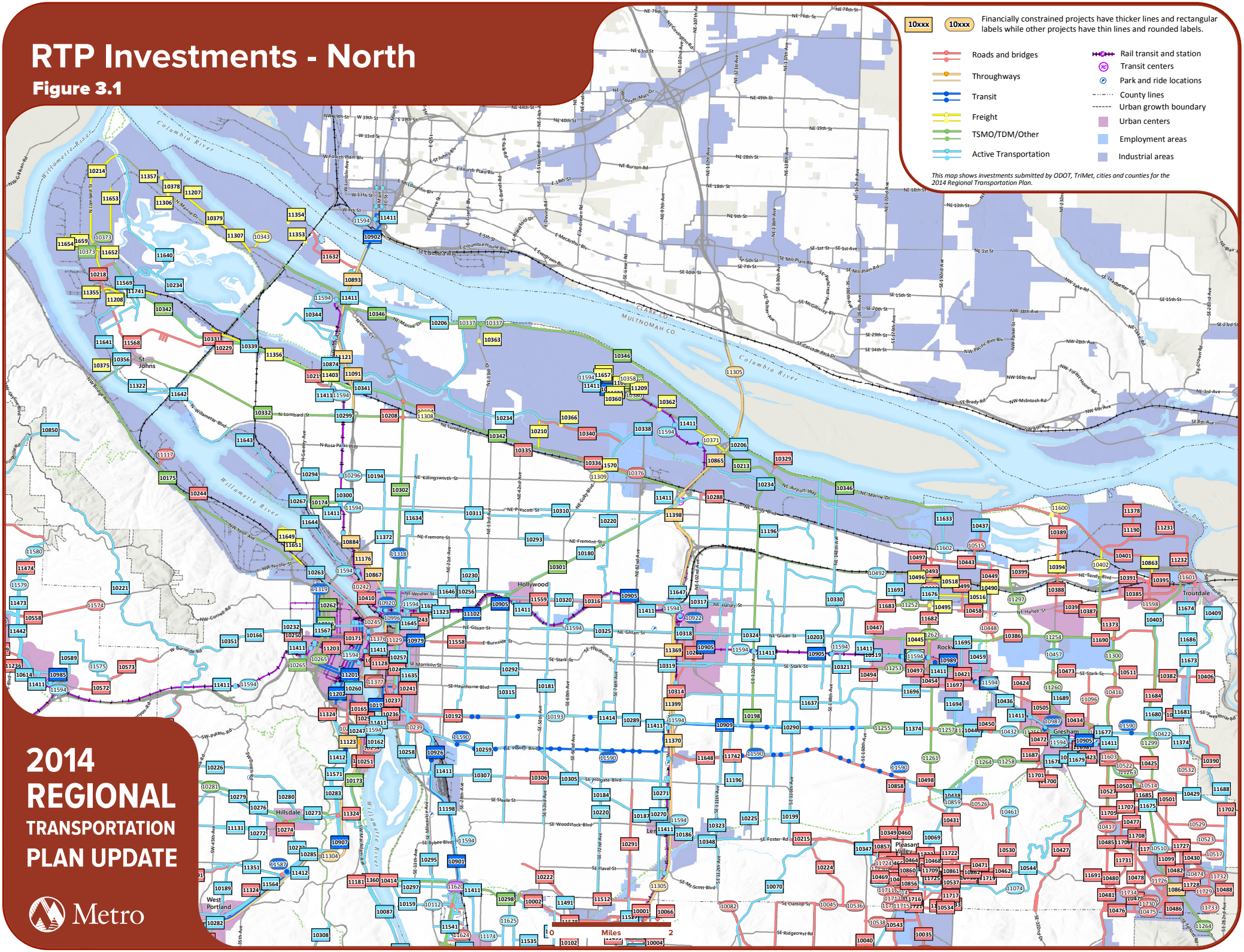
[1] The RTP Federal Priorities will be the basis for findings of consistency with federal metropolitan transportation planning factors, the Clean Air Act and other planning provisions identified in SAFETEA-LU.

Ultimately, for both the federal and state RTP systems of investments, given a finite amount of financial resources, the question is how to spend these limited resources to best accomplish desired outcomes for the region. This chapter discusses the region's investment priorities and details the revenue assumed for the plan period. The goals and draft performance targets described in Chapter 2 provided policy direction for developing the RTP Federal Priorities and RTP Investment Strategy included in the project list in the Appendix and displayed in **Figures 3.1** through **3.4**.

[2] The "state" RTP Investment Strategy will be the basis for findings of consistency with the Statewide Planning Goal 12, the Oregon Transportation Planning Rule and the Oregon Transportation Plan and its components.

RTP Investments - North

Figure 3.1

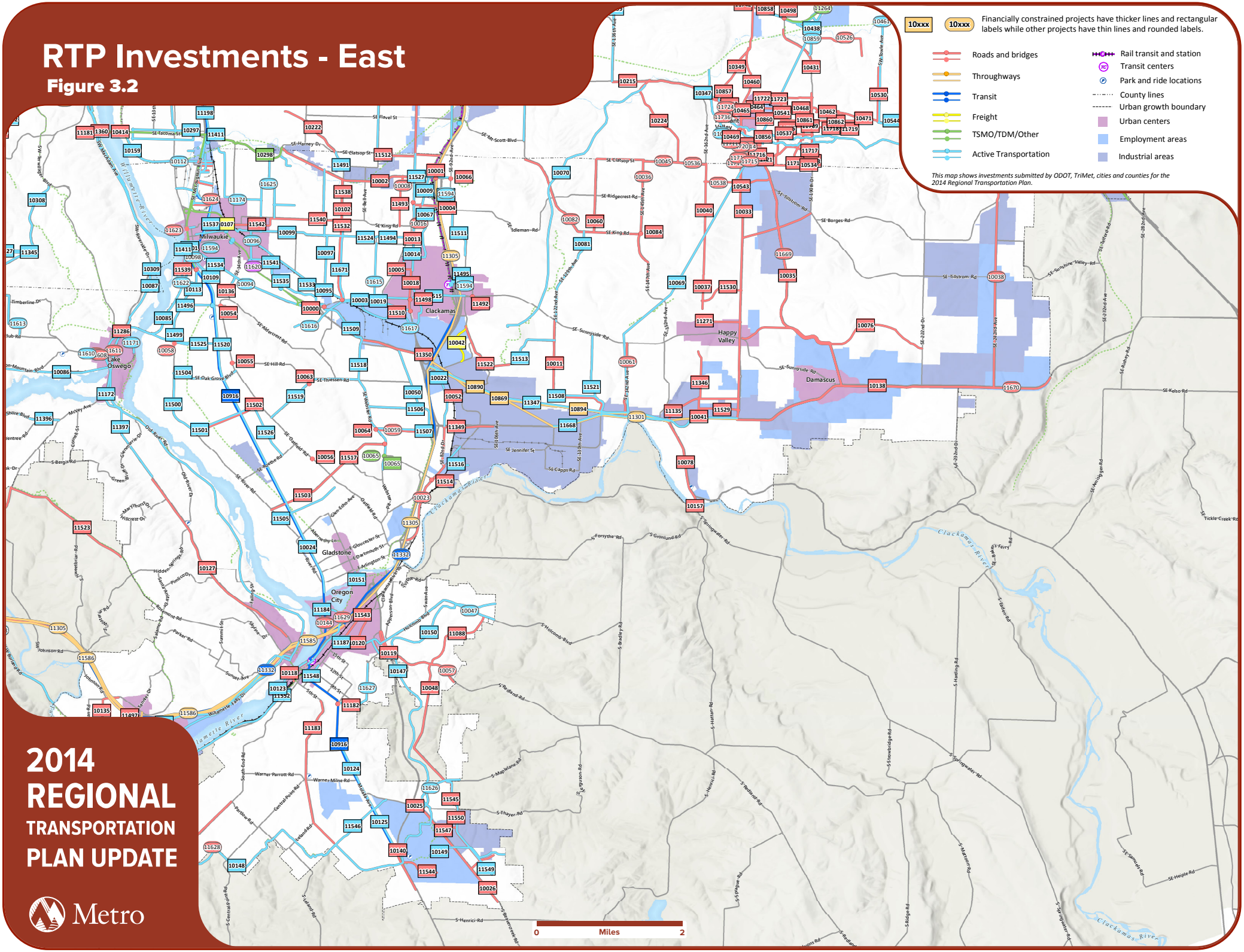


2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

RTP Investments - East

Figure 3.2

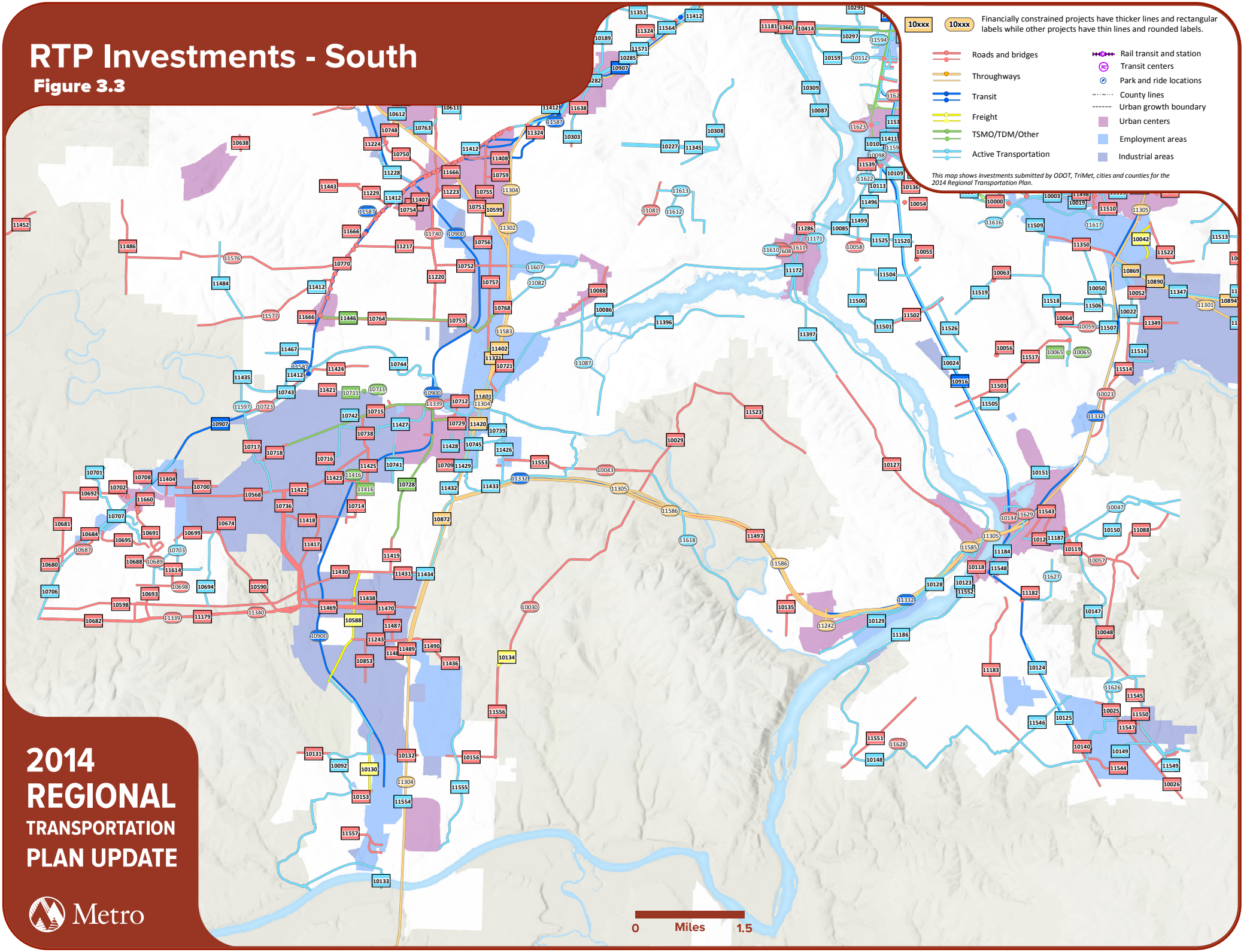


2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

RTP Investments - South

Figure 3.3

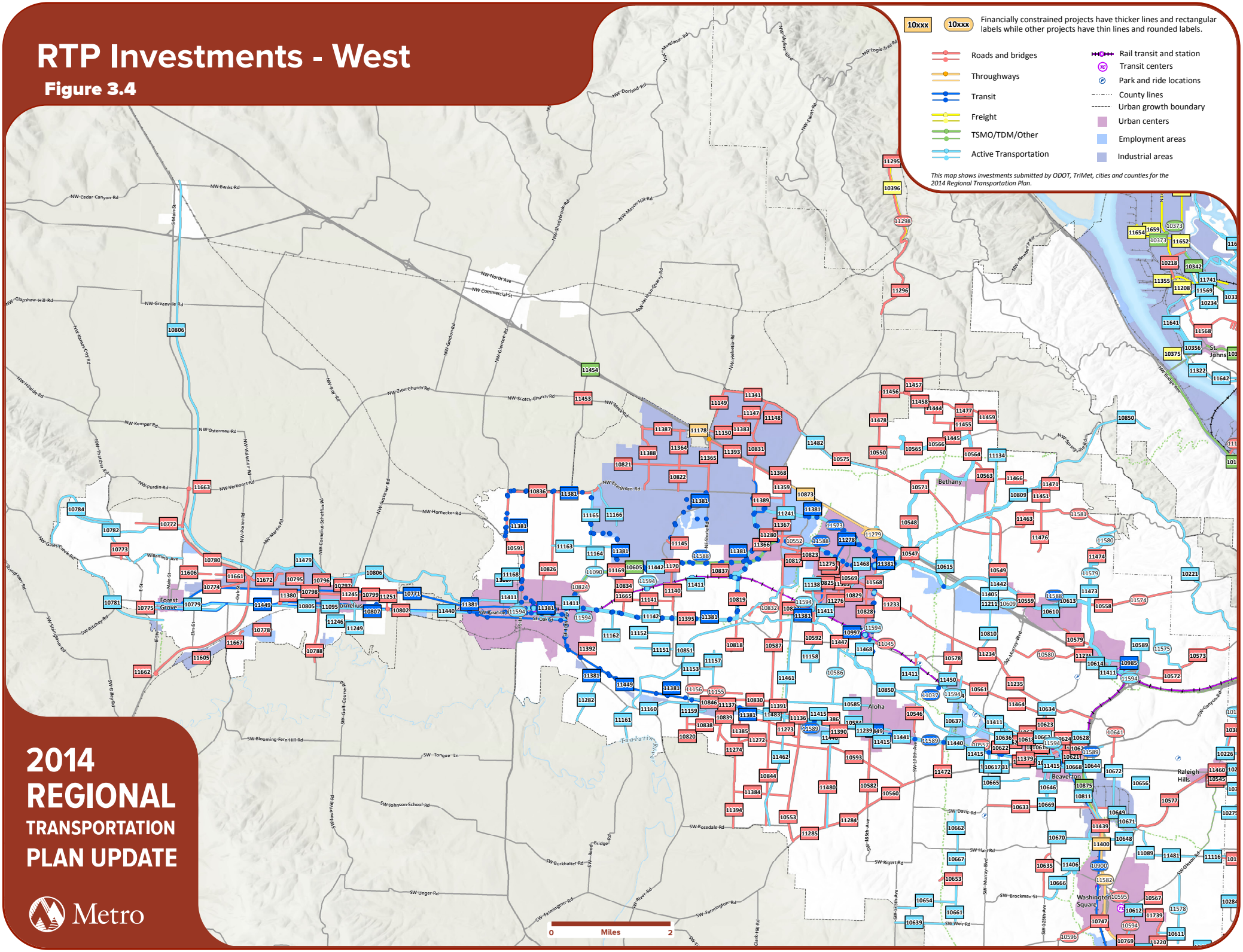


2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

RTP Investments - West

Figure 3.4



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

3.2 WHAT ARE THE REGION'S INVESTMENT PRIORITIES?

The RTP responds to the 2040 Growth Concept through an approach that views the transportation system as an integrated and interconnected system, shifting the emphasis from simply moving vehicles to moving people and goods, providing access, and helping to crate and connect places. The six desired outcomes adopted by the Metro Policy Advisory Committee (MPAC) and the Metro Council are supported by the ten goals of the RTP and become the focal point for identifying investment priorities.

As part of the last RTP, the mobility corridor concept emerged as a new way to think about an integrated transportation system. This concept focuses on the region's network of freeways and highways and includes parallel networks of arterial streets, bicycle parkways, high capacity transit and frequent bus service. The function of this network of integrated transportation corridors is metropolitan mobility – moving people and goods between different parts of the region and, in some corridors, connecting the region with the rest of the state and beyond. These transportation corridors also have a significant influence on the development and function of the land uses they serve.

The RTP community building concept also recognizes the role of transportation in placemaking to achieve the 2040 Growth Concept vision for a strong economy, a healthy environment and communities that serve the needs of all. The concept calls for cultivating great communities by investing in the community assets essential to making downtowns, main streets and employment areas better places to live and work. Typically, these are investments that help revitalize downtowns and main streets or provide critical access to industrial lands and freight intermodal facilities. Planning transportation for community building outcomes will help protect our region's natural and cultural legacy and serve as an economic catalyst for businesses and jobs in these places.

Centers and mainstreets

A diverse, walkable community depends on a transportation infrastructure that provides a variety of ways to get around, serving pedestrians, bicyclists and transit-riders, as well as drivers. The concept emphasizes streetscape retrofits, street connectivity, transit, sidewalks, bicycle and trail connections in downtowns and along main streets to leverage higher density mixed-use development and transit investments such as frequent bus, street car or high capacity transit.

The RTP recognizes the importance of investing in centers and main streets to support the region's economic vitality and commercial activity in these areas.

For example, an attractive, tree-lined main street, complete with wide sidewalks and "street furniture" – benches, bus shelters, trash cans – is a source of community pride and a magnet for walkers, shoppers and tourists. High quality transit service in these areas further supports placemaking objectives and provides important access and circulation.

Industrial and employment areas

In industrial and employment areas, the concept emphasizes providing critical freight access to the interstate highway system to help the region's businesses and industry in these areas to remain competitive. Providing access and new street connections to support industrial area access and commercial delivery activities and upgrading main line and rail yard infrastructure in these areas are also emphasized.

Work force access to industrial and employment areas is also important. Using public transportation investments to leverage desired growth and private investment in 2040 centers, corridors and employment areas contributes to the quality of life and economic vitality of the region.

3.3 WHAT ARE THE CURRENT SOURCES OF REVENUE?

This section describes existing sources of revenues in the Metro region and defines traditional sources of revenues available for the transportation system in the Metro region from the federal, state and local levels.

Federal sources of revenue:

- Interstate Maintenance
- Surface Transportation Program funds
- Congestion Mitigation/Air Quality funds
- Bridge funds
- Transportation Enhancement Funds
- Safety Funds
- High Priority Project funds (earmarks)
- Transit formula and discretionary funds

Federal Sources

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 region's local cities and counties.

The original source of these monies is primarily the federal gas and diesel tax, various truck taxes and funding from the federal general fund. Allocation and distribution of federal funds are accounted for in the Metropolitan Transportation Improvement Program (MTIP). [3]

Some of these revenues are limited by FHWA to a particular purpose, such as for the National Highway System or new High Capacity Transit projects. Most of the funds, however, are flexible in that they can be spent on highways, streets, bikeways, sidewalks, transit capital, transportation system management (TSM), transportation demand

[3] Refer to Chapter 5 for more discussion on the MTIP.

management (TDM) and air quality mitigation programs.

Federal highway trust fund money to the Metro region from 2014 to 2040 will account for:

- *National Highway Performance Program (NHPP)*. These funds are used for preservation (resurfacing, etc.) of the interstate freeway system.
- *Regional Surface Transportation Program (STP) funds*. These funds may be used for virtually any transportation purpose short of building local residential streets.
- *Congestion Mitigation/Air Quality (CMAQ) funds***.** These funds are to assist urban areas to achieve or maintain air quality standards for ground-level ozone and carbon monoxide. Typically, CMAQ funds support biking, walking and transit projects, diesel emission reduction and system or demand management programs.
- *Transportation Alternatives funds***.** These funds are limited to a list of eligible activities relating to biking and walking, preservation of right-of-way, historic preservation, and environmental mitigation for transportation projects.
- *Safety funds***.** A variety of safety funding programs, including the Highway Safety Improvement Program, are available to fund safety improvement projects throughout the Metro region.

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

Transit Formula Funds. For transit-related projects, Congress provides these revenues to the Metro region through the Federal Transit Administration (FTA) to TriMet, South Metropolitan Area Rapid Transit (SMART) in the Wilsonville area and C-Tran.

Transit formula funds are primarily for transit capital purchases such as buses and transit maintenance facilities. As the local transit providers, TriMet and SMART propose and Metro approves requests to the U.S. Department of Transportation for use of these monies. These funds will be used to maintain and replace TriMet'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 capital projects. In this region, these funds 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, TriMet applies to the Federal Transit Administration for transit discretionary funds to build the project. These revenues would only be available to the region if specific transit projects are built; the revenues are not transferable to other uses.

State Sources

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 primarily derives its revenues from:

- Statewide gas taxes;
- Vehicle registration fees; and
- Weight mile taxes on trucks.

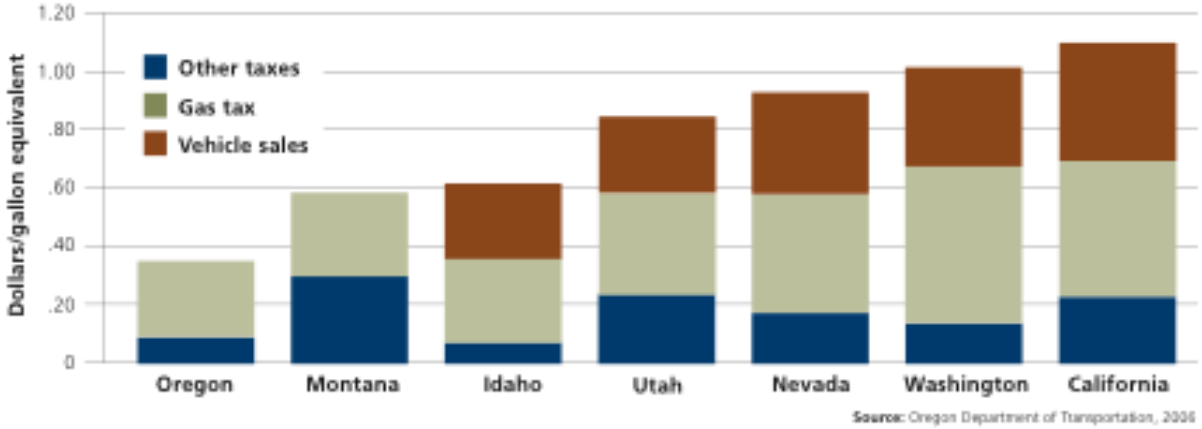
State Sources of Revenue:

- Statewide gas tax
- Vehicle registration fee
- Truck weight mile tax

The general practice of state and local governments is to use trust fund monies they receive by statutory formula predominantly for road and bridge maintenance and preservation of the existing transportation system. Although modernization and expansion projects can be funded through this resource, the amount available is limited.

Figure 3.5 shows Oregon has the lowest combined motor vehicle tax structure in the western United States. After collection costs, approximately 8 percent of the trust fund is dedicated to highway modernization. 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 receive approximately 16 percent. Historically, of the State Highway Trust Funds distributed to ODOT, the department has generally allocated about 28.8 percent of that money to the Metro region.

Figure 3.5
Oregon ranks last compared to other western states in auto taxes and fees collected



As prescribed by state statute, the Oregon Transportation Commission (OTC) distributes the State Highway Trust Fund money to Oregon cities and counties. Trust fund money is distributed to counties based on the number of vehicles registered in that county. The metropolitan portions of Clackamas, Multnomah and Washington counties currently account 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 to Oregon cities.

Local Sources

Many of the cities and counties in the metropolitan region raise other sources of revenue for the operation, maintenance and preservation (OMP) and new construction of 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 Sources of Revenue

- Local portion of State Highway Trust Fund
- Local gas taxes
- Payroll tax
- Transit passenger fares

- **Local Portion of State Highway Trust Fund.** As noted, historically 40 percent of state trust fund revenues are distributed to the cities and counties of Oregon; although there is anticipation that 50 percent of new trust fund revenues would be distributed to cities and counties by formula.

- **Local Gas Tax.** Multnomah County levies a three-cent per gallon gas tax and Washington County levies a one-cent per gallon gas tax. Three cities within the Metro region have implemented a local gas tax. The City of Tigard utilizes a three-cent gas tax, while the City of Milwaukie and City of Cornelius each have a two-cent gas tax. These revenues may be used for road maintenance and road expansion.

House Bill 2001 – The Jobs & Transportation Act, created a moratorium on new local gas taxes until January 2, 2014.

- **Payroll Tax**. TriMet levies a payroll tax of 0.7237 percent ($7.237 over $1000) on all employers in its district (except federal employees and self-employed individuals). TriMet's payroll rate is limited by state statute. Raising TriMet's payroll rate requires action by the state legislature. In May 2009, the Oregon Legislature passed Senate Bill 34 that authorizes TriMet to increase the payroll tax another 0.1 percent once the economy recovers. SMART is funded through a 0.3 percent payroll tax in the Wilsonville area. This revenue is used to support operations and maintenance of the transit systems.

- **TriMet Passenger Fares and Other Revenues.** TriMet passenger fare revenues also support operation of the transit system. SMART is a fareless transit system, except for two routes operating to Salem and downtown Portland.

Development-Based Sources

Development-based sources of transportation funding are fees collected by local governments based on the development of or use of land. These fees provide funding for transportation and other public investments as deemed appropriate by the local government that collects the fees and allocates the revenue. In some cases, the projects receiving these funds are transportation projects of regional significance and, therefore, a portion of these revenues estimated to be spent on regional projects is assumed in this forecast based on historical trends. These include:

Development-Based Sources of Revenue

- System development charges
- Traffic impact fees
- Urban renewal funding
- Developer contributions

- Transportation system development charges (SDCs) levied on new development
- Traffic impact fees (TIFs) on commercial properties
- Urban renewal funding in designated districts
- Developer contributions

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

Special Funds and Levies

A final source of transportation funding for the Metro region is special funds and levies. This category includes:

Other Sources of Revenue

- Property taxes
- Local improvement districts (LIDs)
- Vehicle parking fees
- Port of Portland transportation improvement fund revenues
- Street utility fees
- Washington County Urban Road Maintenance District

- **Property taxes**. General levies such as Washington County's Major Streets Transportation Improvement Program (MSTIP), which was approved by popular election.
- **Local improvement districts (LIDs).** Special districts, such as the Lloyd District in the City of Portland, where a group of property owners agree to provide money, in addition to their regular taxes and development fees, for public improvements and services (including transportation projects) within the district. For example, in the Portland Central Business District, a local improvement district contributed to construction of the Portland Streetcar project.
- **Vehicle parking fees.** This source generates revenues from the City of Portland's public parking garages and on-street parking meters. These revenues contributed to construction of the Portland Streetcar project.
- **Port of Portland transportation improvement fund revenues.** These revenues are derived from passenger facility charges, parking revenues and lease revenues, and are limited to fund projects or services on or benefitting Port property. Investment of these revenues is guided by the annually updated Port of Portland Transportation Improvement Plan (2013), and approval by the Port Commission. These revenues are expected to leverage private investment in transportation projects, particularly from freight railroad companies.
- **Street Utility Fees**. Cities such as Tualatin, Lake Oswego, Wilsonville, Hillsboro, Milwaukie and Wood Village have adopted street maintenance fees that are included in the local sewer and water bill. The fees are based upon the cost to maintain the street system and are used for maintenance activities within each respective jurisdiction.
- **Washington County Urban Road Maintenance District.** The County collects a $0.25 per $1,000 of assessed valuation fee in urban unincorporated Washington County for road maintenance within those areas.

3.4 WHAT'S OUR BUDGET?

The RTP seeks to address both federal and state requirements. To meet federal requirements, the plan must demonstrate "financial constraint," ensuring that the system of projects will not exceed reasonably expected future revenue. The federal RTP is constructed around meeting this requirement. The fundamental state requirement for the RTP is to develop a plan that is adequate to serve planned land uses. The region must have a financing strategy that supports implementation of the plan.

As the revenues identified to comply with the federal requirements of fiscal constraint do not provide enough financial capacity to meet the needs identified in the plan, it is necessary to identify more sources of revenue for the RTP to satisfy state requirements. The following discusses in more detail the amount and sources of revenue in both the federal and state RTP systems.

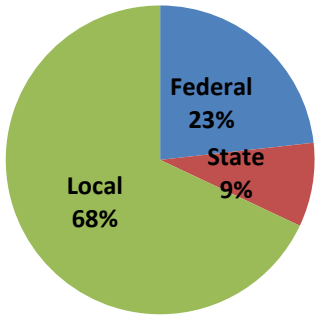
3.4.1 FEDERAL RTP SYSTEM

Federal regulations require that a regional transportation plan (RTP) be financially constrained. Total transportation expenditure levels identified within the RTP must not exceed the total revenue level reasonably expected to be available for the Metro region over the life of the plan; this includes existing revenues and new revenues that may be reasonably anticipated. This requirement ensures that the RTP is financially responsible. In following federal requirements, Metro has identified federal, state and local revenue resources that the region can reasonably expect to receive from now until 2040.

All revenue estimates were developed in consultation with Metro's federal, state, and local agency partners. Preparation of the financial plan included a review of historical data, recent trends and other relevant materials. Previous federal authorization levels also serve as a baseline for future expected revenues.

The following discusses the expected sources of transportation revenue in the Metro region for the federal financially constrained RTP. **Figure 3.6** shows the breakdown of federal, state, and local revenue.

Figure 3.6
Financially Constrained Revenue by Federal, State and Local Sources



Forecasts show nearly $15 billion (for capital projects) of reasonably expected revenue to be available in the Metro region from 2014 – 2040. Of this total $3.4 billion is comprised of federal, $1.3 billion of state and the remaining $10.2 billion is local funds. Local funds account for roughly 68 percent of all of the revenue in the RTP.

The RTP Financially Constrained System revenue forecast is based on amounts identified for seven funding pools:

- ODOT Modernization Funding Pool
- Regional Transit and Programs Funding Pool
- Washington County and Cities Modernization Funding Pool
- Clackamas County and Cities Modernization Funding Pool
- City of Portland Modernization Funding Pool
- Multnomah County and Cities (excl. Portland) Modernization Funding Pool
- Local Willamette River Bridges Funding Pool

A specific array of revenue sources was identified for each of these pools based on the historic use of the revenue sources and financial plans adopted by local governments. Some revenues – for example, the amount of Section 5309 New Start/Small Start Funds depend on the identified high capacity transit (HCT) and streetcar projects.

Also, some revenues are used for several purposes, and simplifying assumptions were made about their use. For example, existing state highway trust fund revenues (state gas tax and registration fees) apportioned to cities and counties were assumed to be solely used for Operations, Maintenance and Preservation (OMP). **Table 3.1** shows the revenue sources included in each funding pool.

Table 3.1:
Modernization/Capital Revenue Sources by Funding Pool

	ODOT Modernization Pool	Regional Transit and Programs Modernization Pool	Local Government& Local WRB Modernization Pools
Existing State and Formula Federal Funds Excluding Federal Funds Allocated to Local Governments	●		
High Priority Projects and Other Federal Discretionary Grants: State Share Allocated to Metro Region	●		
New State Revenue Source: Assumed for Analytical Purposes to be the Metro Region Share of State $15 Vehicle Registration Fee Increase Every 8 Years	●		
Metro Region STP Funds		●	●
CMAQ Funds: Allocation from State		●	
Transportation Enhancement Funds from State		●	
State Support of Transit Capital Programs		●	
5309 Discretionary Bus Grant		●	
5309 Discretionary New/Small Start Grant		●	●
Lottery Funds/Other State Grants		●	●
Transit District General and Federal Formula Funds		●	
Property Tax/Non-Transportation Sources			●
SDC/TIF			●
Franchise Fee			●
Urban Renewal			●
Private Development			●
Special Assessment			●
Metro Region City and County Share of $15 Vehicle Registration Fee Increase Every 8 Years			●
Local Bridge Program (Large/Small)			●
Miscellaneous Local Sources			●
Port of Portland Funds			●
Metro Region City and County Share of Existing Highway Trust Fund and Any Increases to Trust Fund[4]			●

[4] These funds must be used for roadway-related expenses, but can be used for capital or OM&P costs. Historically, the majority of these funds have been used for OM&P. It is included in this table as a potential source for funding capital projects. These funds are not included in the available revenue used for developing the financially constrained system of projects.

Table 3.2 shows the total revenue for each funding pool that meets the federal definition of reasonably expected to be available over the life of the RTP.

Table 3.2
Total Financially Constrained Revenue by Funding Pool (Millions of 2014 $)

Funding Pool	Federal RTP Revenue
ODOT Modernization Funding Pool	$3440.89
TriMet	$3039.54
Metro	$438.47
SMART	$130.27
Clackamas County/Cities Modernization Funding Pool	$1370.31
Washington County/Cities Modernization Funding Pool	$3,316.93
City of Portland & Port of Portland Modernization Funding Pool	$1624.22
Multnomah County/Cities (Excluding Portland) Modernization Funding Pool	$1251.75
Local Willamette River Bridges Modernization Funding Pool	$179.18
TOTAL	**$14971.56**

Columbia River Crossing Funding Assumptions

Of the nearly $15 billion dollars in costs and revenues assumed in the federal RTP, about a quarter can be attributed to one project. Because of the order of magnitude of the Columbia River Crossing (CRC) Project, the following language is offered to describe the basic cost and revenue assumptions. The CRC Project is a collaboration of the Oregon Department of Transportation, Washington State Department of Transportation, Metro, Southwest Washington Regional Transportation Council, TriMet, C-TRAN, and the cities of Portland and Vancouver.

The CRC Project is a national transportation priority as it has been designated a "Corridor of the Future" by the Federal Highway Administration (FHWA). The Project will seek credit support from the FHWA Transportation Finance and Innovation Act (TIFIA) and other appropriate sources. Accordingly, the FHWA has indicated that it is a high priority to address the safety and congestion issues related to the segment of Interstate 5 between Columbia Boulevard north to State Route 500 in Vancouver, Washington.

The Federal Transit Administration (FTA) awards transit capital construction grants on a competitive basis. The CRC project will be submitting an application to the FTA for entry into Preliminary Engineering and eventually for a full funding grant agreement for construction. The Metro region has been highly successful in securing FTA funds and it is

considered reasonable, based on early cost-effectiveness rating analyses that the high capacity transit component of the CRC Project will secure up to $850 million in federal transit funding.

Tolling is another unique source of funding for the project. It would be a substantial transportation demand management tool as well as providing a significant revenue source. The FEIS states that tolls may supply approximately 35% of the capital revenues for the highway element of the project. Toll revenues would support borrowing (bonds and/or loans) and the proceeds of the borrowings would be used for construction costs.

The funding sources for the total project may be summarized as follows (all figures in millions of dollars):

Table 3.3

Columbia River Crossing – Total Project Costs and Revenues (both Oregon and Washington sides)

Costs	Low (Millions of Dollars)	High (Millions of Dollars)
Highway	$2,540	$2,820
Transit	$856	$944
TOTAL	**$3,396**	**$3,764**

Revenue	Low (Millions of Dollars)	High (Millions of Dollars)
Toll Bond Proceeds	$1,140	$1,367
Federal Discretionary Highway	$400	$500
State Funds	$1,047	$1,047
New Starts	$809	$850
TOTAL	**$3,396**	**$3,764**

3.4.2 STATE RTP SYSTEM

As Chapter 5 shows, the federal RTP system of investments built around the financially constrained funding targets falls short in meeting the performance targets for the plan. Oregon state law, however, has different requirements for transportation system plans (TSP). The RTP is the Portland Metro region's TSP. State law requires that TSPs adequately address the needs identified in the plan. The fundamental state requirement for the RTP is to develop a plan that is adequate to serve planned land uses. In addition, the region (through the RTP) and local governments (in local TSPs) must have a financing strategy that supports implementation of the plans.

In 2009, the Joint Policy Advisory Committee on Transportation (JPACT) held policy discussions that focused on what level of investments should be assumed for the state *2035 RTP Investment Strategy* and what potential increases in state and local revenue might be reasonable to pursue for this more aspirational level of investment.

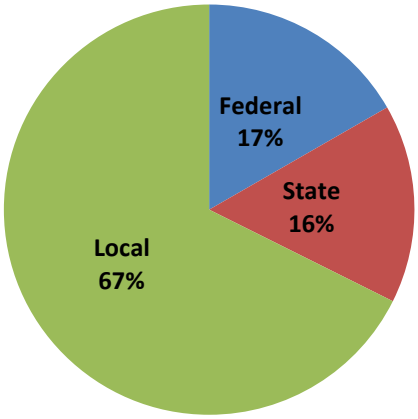
JPACT recommended the following revenue assumptions be used to develop a funding target for the *2035 RTP Investment Strategy*:

- The equivalent of a $2 per year increase in the state vehicle registration fee through 2035
- Creation of a local/regional vehicle registration fee equivalent to $1 per year through 2035
- Increasing local system development charges across the region up to the regional average
- The equivalent of a .02 percent increase in TriMet's payroll tax
- Local street utility fees to fund operations, maintenance and preservation

For the 2014 RTP Update the 2035 RTP Investment Strategy assumptions were used.

In addition to the local revenue sources above, the Washington County Coordinating Committee (WCCC) requested that JPACT add more than $800 million in new state RTP revenue based on continuing their current MSTIP. JPACT endorsed the WCCC's recommendation at its August 2009 meeting. The following discusses the transportation revenue for the State RTP system. **Figure 3.7** shows the breakdown of federal, state, and local revenue.

Figure 3.7
State RTP System Revenue by Federal, State and Local Sources



Forecasts show $9.27 billion of revenue to be available in the Metro region from 2014 – 2040 for the State RTP system. Of this, $1.57 billion is comprised of federal revenue. This increase comes from an assumed federal contribution to the expansion of the region's HCT system. There is $3.62 billion in state revenue with the increase in the state VRF. Local funds decrease to $4.07 billion, accounting for 44 percent of all of the revenue in the State RTP System.

Table 3.4 shows the total revenue for each funding pool for the State RTP system. The totals include both the financially constrained revenue and the additional state and local revenue assumptions endorsed by JPACT.

Table 3.4
Total State RTP System Revenue by Funding Pool (Millions of 2014 $)

Funding Pool	Federal RTP Revenue	State RTP Revenue	Total RTP Revenue
ODOT Modernization Funding Pool	$3440.89	$711.63	$4152.52
TriMet	$3039.54	$1933.68	$4973.22
Metro	$438.47	$0	$438.47
SMART	$130.27	$0	$130.27
Clackamas County/Cities Modernization Funding Pool	$1370.31	$525.63	$1895.94
Washington County/Cities Modernization Funding Pool	$3,316.93	$2153.60	$5470.53
City of Portland & Port of Portland Modernization Funding Pool	$1624.22	$1145.16	$2769.38

Multnomah County/Cities (Excluding Portland) Modernization Funding Pool	$1251.75	$657.27	$1909.02
Local Willamette River Bridges Modernization Funding Pool	$179.18	$ 0	$179.18
TOTAL	**$14971.56**	**$7126.97**	**$21,918.53**

Local jurisdictions and agencies developed lists of projects for the State RTP system based on the increased revenue assumptions and followed the same process used to identify the federal priorities. The goal of the process was to link projects to the investment priorities, emphasizing the linkage between land use and transportation. The following section discusses the RTP projects by mode and cost. See Appendix or the recommended list of investments (project list).

3.5 WHAT INVESTMENT PRIORITIES ARE INCLUDED IN THE FEDERAL AND STATE RTP SYSTEMS?

Based on the funding targets listed above, local jurisdictions and agencies developed lists of projects. Local county coordinating committees managed the project submittals for their county and cities. The City of Portland managed project submittals within the city. The Port of Portland, trails staff, land use staff and parks districts participated in meetings held by their respective county coordinating committees or City of Portland to coordinate their project submittals. ODOT determined state-owned system investments to submit within their funding target in coordination with other local and regional partners. Local agencies were also encouraged to include projects on state-owned facilities within their respective funding targets. Metro, TriMet, and the South Metro Area Rapid Transit (SMART) coordinated to identify transit projects and regional programs to be submitted as part of the regional transit and programs funding target.

Each county, the City of Portland, TriMet, ODOT and Metro submitted a project list with total project costs no greater than their funding target. A separate funding target was identified for the Multnomah County bridges. Multnomah County was responsible for submitting projects for the Local Willamette bridges funding pool. Project lists were created using the six desired outcomes for a successful region and the JPACT-endorsed draft performance targets.

In addition, projects to be emphasized were those that met one or more of the following refinement criteria:

- Make multi-modal travel safe and reliable
- Target investments to support local aspirations and the 2040 Growth Concept
- Provide multi-modal freight mobility and access

- Expand transit coverage and frequency
- Expand active transportation options
- Reduce transportation-related greenhouse gas emissions
- Address transportation needs of underserved communities

The goal of the process was to link projects to the investment priorities, emphasizing the linkage between land use and transportation. The following discusses the RTP projects by mode and cost.

Table 3.5 shows the breakdown of RTP projects in the federal and state systems.

Table3.5
Federal and State RTP Projects[5]

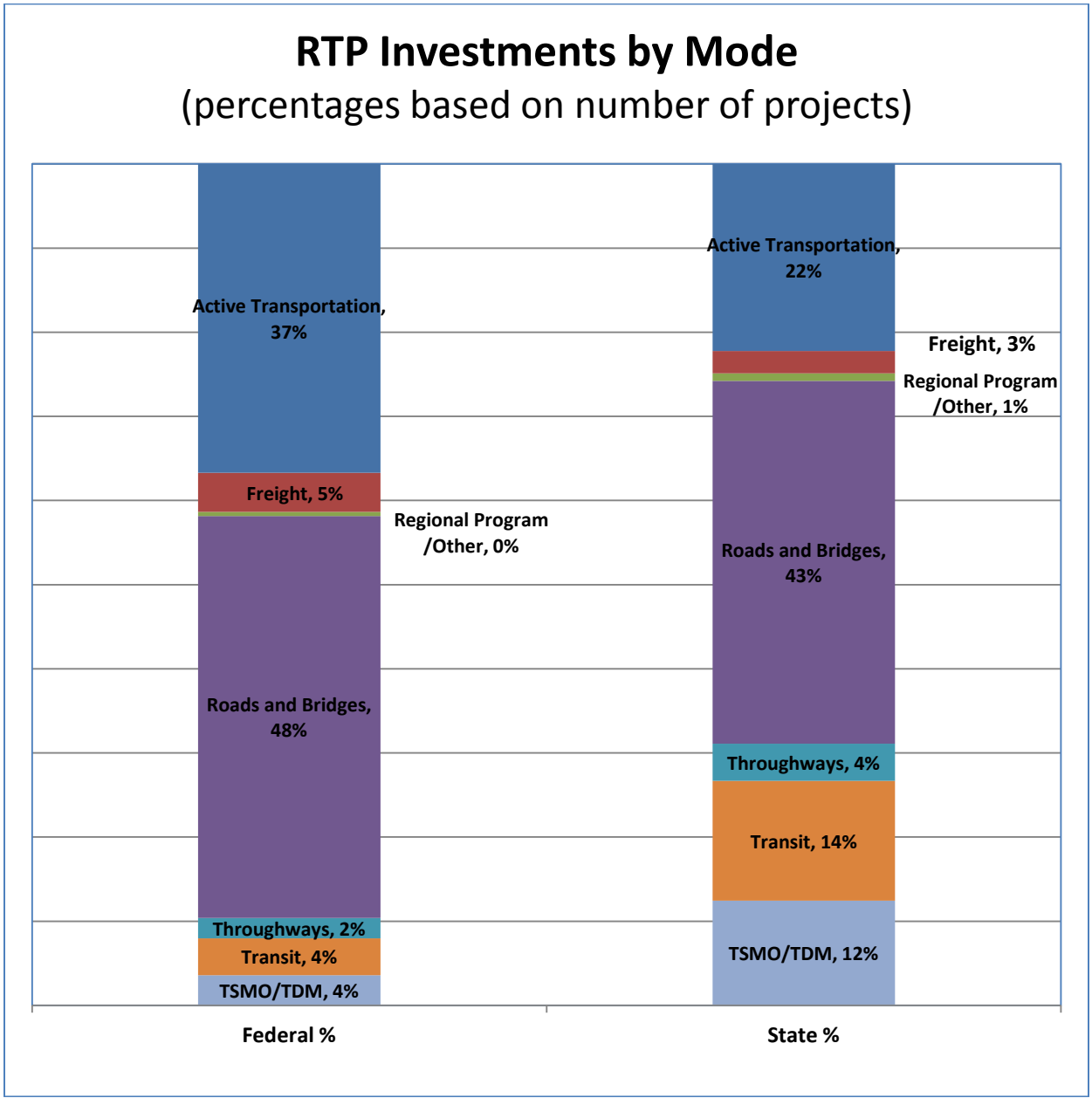
	Total # of Projects	Total Project Costs
Federal System	1,030	$16,026,000,000
State System	225	$6,743,000,000
TOTAL	1256	$22,816,000,000

HCT is a key mobility corridor investment in the RTP, and will help the region meet greenhouse gas emissions.

[5] Total cost rounded to nearest million. A reason that the costs in table 3.5 don't match up exactly with the revenues in Table 3.4 is that some projects that are under construction are required to stay on the financially constrained RTP project list until construction is completed, but their revenues are not included in the assumptions in Table 3.4 (e.g. Milwaukie LRT - $1.495 billion, Sellwood Bridge replacement $264 million)

Figure 3.8 shows the distribution of projects defined by primary investment categories.

Figure 3.8
RTP Investments by Mode (percentages based on number of projects)



Active transportation investments have become a growing focus around the region and comprise over one third of all projects in the plan. Active transportation is considered non-motorized forms of transportation including walking and biking. RTP projects include streets, trails, and districts identified primarily to benefit pedestrian and bicycling. Active transportation investments comprise 37 percent of Federal RTP projects and 22 percent of State RTP projects.

In the RTP system, roads and bridges projects comprise 48 percent of Federal RTP investments and 43 percent of State RTP investments. Road and bridge projects recommended in the investment strategy include arterial street expansions and street reconstructions that are complemented by new connections to maintain access to the regional throughway system and provide circulation and access between the central city, regional centers and town centers.

Some project investments are also focused on maintaining access and connections for national and international rail, air and marine freight to reach destinations within the region's industrial areas. Projects that are aimed at increasing industrial facility access are categorized as freight investments. Freight investments comprise five percent of Federal RTP projects and three percent of State RTP projects. Technology continues to play a critical role in transportation system improvements. More projects are focused entirely around implementing new technology or maximizing existing technology to improve network connectivity. Transportation system management and operations (TSMO) and transportation demand management (TDM) investments comprise four percent of Federal RTP projects and twelve percent of State RTP projects

Projects on the freeway system comprise two percent of Federal RTP projects and four percent of State RTP projects. Strategic throughway capacity was added to maintain regional mobility and enhance access to intermodal industrial areas and facilities where goods move from one transportation mode to another.

Transit investments make up four percent of Federal RTP projects and fourteen percent of State RTP projects. New high capacity transit connections are included in the Federal and State RTP systems. In addition, span-of-service and service frequency upgrades to WES commuter rail, expanded frequent bus service and other transit infrastructure investments are included.

Table 3.6 shows RTP investments broken down by mode and total cost. Roads and bridges account for nearly half of all the projects in the Federal and State RTP systems, but less than a third of total project costs. Throughway investments account for less than three percent of RTP investments, but 26 percent of total project costs. Additionally, transit comprises approximately six percent of RTP investments, but 28 percent of total project costs. Cumulatively, roads and bridges, throughways, and transit projects account for 57 percent of all RTP projects and roughly 84 percent of total project costs.

Table 3.6
RTP Investments by Mode – Federal vs State system[6]

Mode	Federal System Investment by Mode	% of Total Federal Project Cost	State System (Additional) Investment by Mode	% of Total State Project Cost
Active Transportation	$2,077,630,499	13%	$335,317,782	5%
Freight	$663,300,086	4%	$164,818,000	2%
TSMO/TDM	$120,052,562	1%	$146,030,675	2%
Regional Programs/Other	$254,750,000	2%	$11,270,000	0%
Roads and bridges	$5,263,301,661	33%	$1,410,835,883	21%
Throughways	$3,872,911,000	24%	$2,034,385,000	30%
Transit	$3,776,594,400	24%	$2,640,500,901	39%
TOTAL	**$16,028,540,208**	**100%**	**$6,743,158,241**	**100%**

[6] Two levels of investment were developed for the 2014 RTP. The first level, the RTP Federal Priorities (also known as the Financially Constrained System), will represent the most critical transportation investments for the plan period.[6]The second level, the "state" RTP Investment Strategy, will represent additional priority investments that would be considered for funding if assumed new or expanded revenue sources are secured.

Approximately 47 percent of the 1,255 RTP projects fall into the road and bridge category (589 projects), with a total cost under $6.7 billion. This category involves a wide variety of project types: expanding arterials and collectors, new street connections to build a dense street grid, boulevard retrofits, and street reconstruction that includes adding bike lanes and sidewalks. **Table 3.7** and **Table 3.8** show the Federal and State RTP road and bridge projects broken down into these categories.

Table 3.7
Federal RTP Investment Road and Bridge Projects

	# of Federal Projects	% of Federal Roads/ Bridges Projects	% of Federal RTP Projects	TOTAL COST	% of Total Federal RTP Project Cost
Street Reconstruction	177	36%	21%	$1,455,563,544	10%
Bridge/Other	33	7%	4%	$659,991,971	4%
New Connection	141	29%	16%	$1,456,588,191	10%
Street Widening	141	29%	16%	$1,691,157,954	11%
Total Federal Roads/Bridges Projects	**492**	**100%**	**57%**	**$5,263,301,660**	35%

Table 3.8
State RTP Road and Bridge Projects

	# of State Projects	% of State Roads/ Bridges Projects	% of State RTP Projects	TOTAL COST	% of Total State RTP Project Cost
Street Reconstruction	29	30%	8%	$360,278,398	5%
Bridge/Other	10	10%	3%	$183,514,000	2%
New Connection	26	27%	8%	$209,636,439	3%
Street Widening	32	33%	9%	$657,407,046	9%
Total Federal Roads/Bridges Projects	**97**	**100%**	**28%**	**$1,410,835,883**	**19%**

3.6 WHAT ABOUT OPERATING AND MAINTAINING THE SYSTEM?

This section discusses the costs in the Metro region of operating and maintaining the existing and proposed investment priorities for highways, streets and transit.

3.6.1 Federal Requirements for Operations and Maintenance

Federal regulations require that the RTP include a financial plan that compares expected revenue with the costs of proposed transportation investments. Additionally, 23 CFR 450.322(b) (11) requires a comparison of the estimated costs of constructing, maintaining, and operating the total transportation system, including existing and planned investments, over the plan period.[7]

For transportation system operations and maintenance, the 2014 RTP discusses system-level estimates of costs and revenues that are reasonably expected to be available to operate and maintain the Metro region's transportation system. The following discussion is aimed at addressing the issues regarding operations, maintenance and preservation of both the roadway and transit system in the Metro region.

3.6.2 2014 RTP Operations, Maintenance and Preservation Revenue

State highway operations, maintenance and preservation revenue
OMP revenues for the 2014 RTP were derived from a December 2004 ODOT report to help MPOs like Metro develop long range transportation plans[8]. The ODOT report assumes a $0.01 per year increase from 2007 – 2035 in the state gas tax all dedicated to cover growing OMP costs at the state and local level. **Figure 3.9** shows the revenue for OMP of state facilities from 2010 – 2040.[9]

The State Highway Trust Fund (SHTF) revenue generated over the life of plan for cities and counties is roughly $4 billion for the Portland region, based on a 50-30-20 formula distribution by state statute. The state receives 50 percent, counties 30 percent and cities the remaining 20 percent of the SHTF revenue expected. **Figure 3.10** shows the highway and regional street-related revenue from 2010 – 2040.

3.6.3 State, Regional and Local Road-Related OMP Costs

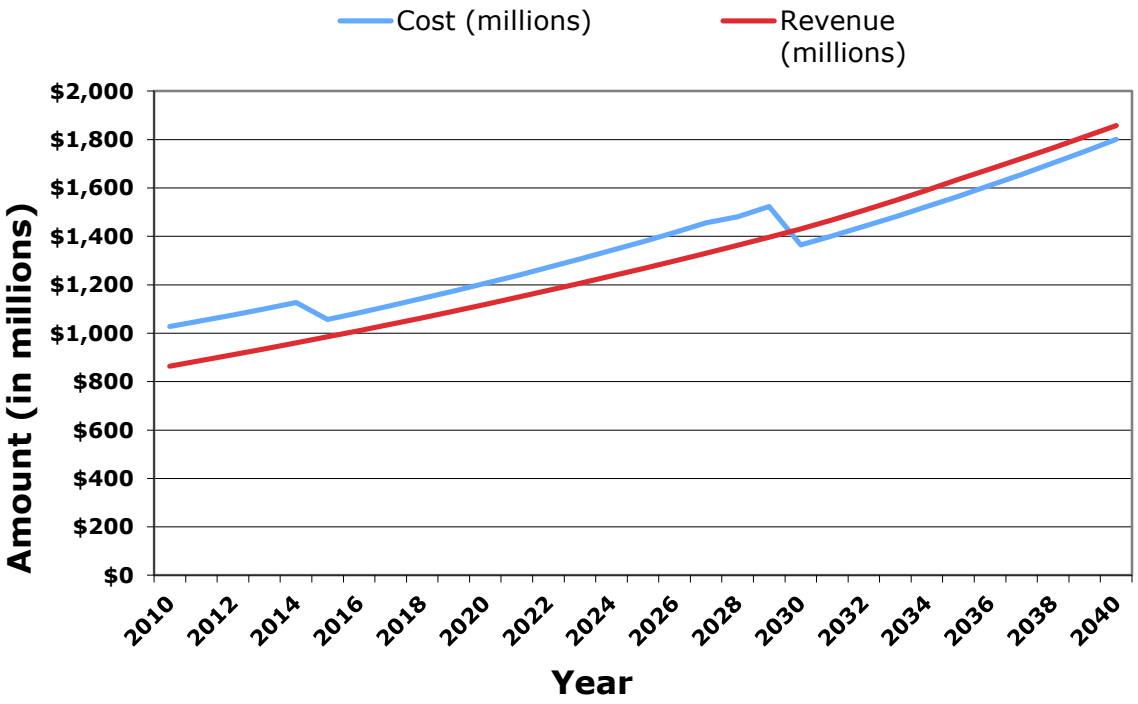
State highway operations, maintenance and preservation costs
While ODOT has a long-range goal of improving state highway pavement condition to 90 percent fair-or-better, funding to meet this goal does not appear to be likely. ODOT OM&P needs were based (with minor adjustments) on Scenario 2 of the 2006 Oregon Transportation Plan. This would maintain pavement condition at the 78 percent fair-or-

[7] "Metropolitan transportation planning process: Transportation plan." 23 CFR 450.322(b) (11).
[8] "Financial Assumptions for the Development of Metropolitan Transportation Plans 2005-2030." ODOT. Dec. 2004
[9] The numbers ODOT produced covered through 2035. The years 2036 to 2040 are projected based on current growth rate.

better level. The financial assumptions contained in this document indicate that even this level will be difficult for ODOT to maintain.

Figure 3.9 shows the highway and regional street-related costs of OMP on the state highway system against expected revenue from 2010 – 2040. These numbers were generated by ODOT as part of a 2005 report to help MPOs across the state develop their RTPs.[10]

Figure 3.9
State Highway Operations, Maintenance and Preservation Costs and Revenues



Estimated non-modernization needs and OM&P costs statewide were $1,028 million in the year 2010, increasing to $1,801 million in the year 2040. Financially constrained revenues forecasted to be available for these costs start at $864 million in 2010 and grow to $1,857 million by 2040.

[10] The numbers ODOT produced covered through 2035. The years 2036 to 2040 are projected based on current growth rate.

Regional street operations, maintenance and preservation costs

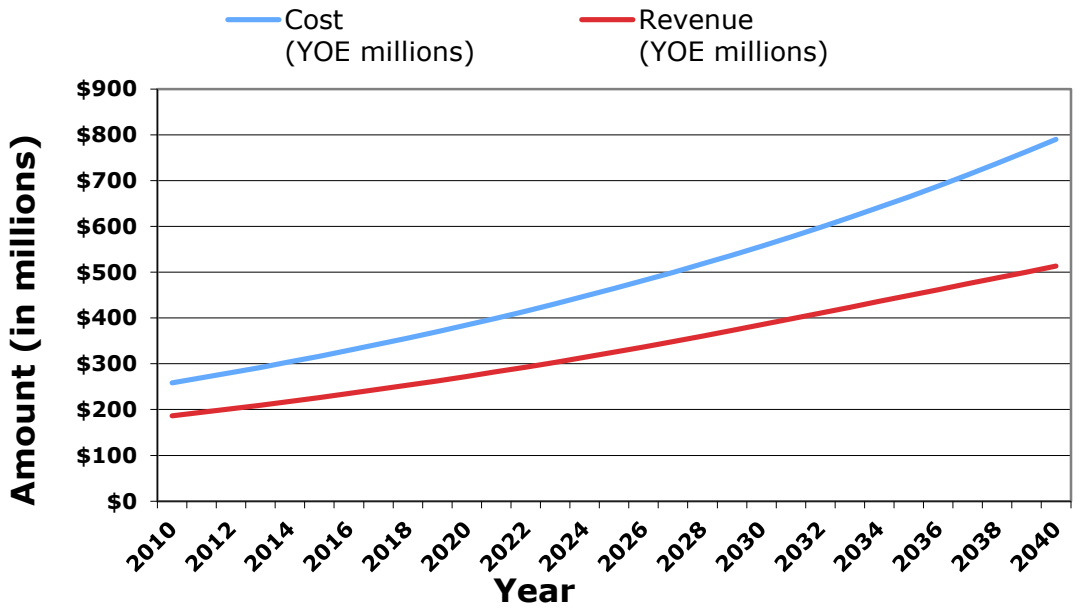
Comprehensive data of the Portland metropolitan region OMP needs is not currently available. While conducting background research for the RTP, Metro staff found a lack of data that prevented effective reporting on asset conditions on regional streets. Additionally, while performing the financial analysis work, a lack of specific operations and maintenance spending information by local jurisdictions was identified.

This RTP is relying on local government survey data that is collected by ODOT as a rough estimate for OMP expenditures. Based upon the information provided by cities and counties, it is estimated that achieving an ideal level of OMP would require an investment of approximately $258 million per year in 2010, increasing to more than $790 million per year by 2040.[11]

Forecasted revenues, in the financially constrained plan, available for local OMP expenditures fall short of this ideal level of OMP revenues, which range from approximately $186 million in 2010 to $513 million in 2040; roughly 70 percent of "ideal" levels. However, this level of investment is fairly steady and represents the level of OMP investment in the regional street system that maintains the system at current conditions. While not ideal, this level of investment meets federal guidelines.

Figure 3.10 shows the roadway-related costs of OMP on the local roadway system against expected revenue from 2010 – 2040.

Figure 3.10 Local Operations, Maintenance and Preservation Costs and Revenues



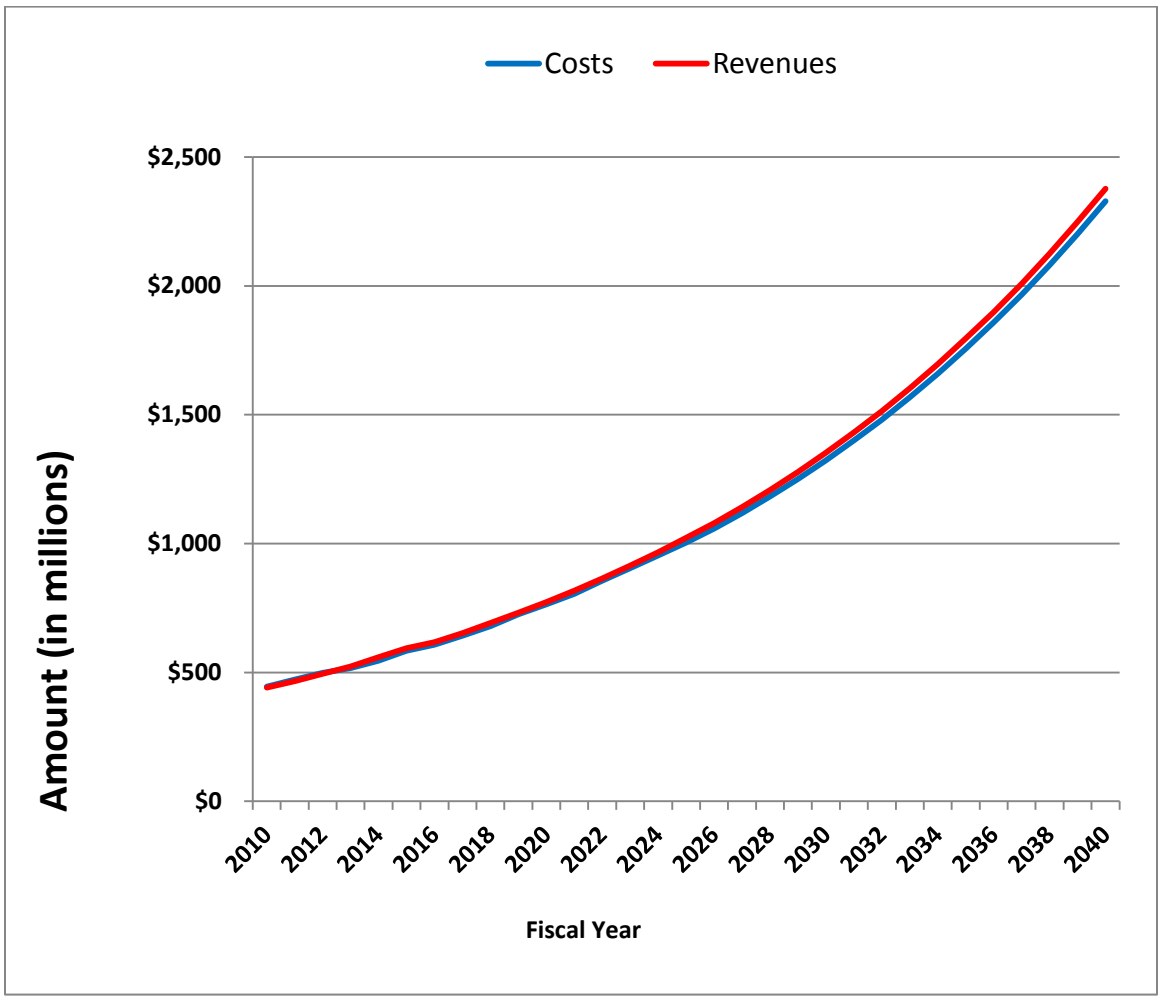
[11] The numbers ODOT produced covered through 2035. The years 2036 to 2040 are projected based on current growth rate.

3.6.4 Transit-Related Operations, Maintenance and Preservation Costs

Transit operations, maintenance and preservation
Increasing TriMet and SMART service by 1 percent each year is assumed in the financially constrained transit system.

Figure 3.11 below shows the transit costs of OMP against expected revenue from 2010 – 2040.

Figure 3.11
Transit Operations, Maintenance and Preservation Costs and Revenues



Operating funds for the regional transit system are declining, making it difficult to maintain existing service levels and replace older bus fleets.

3.7 MOVING FORWARD TO FUND OUR REGION'S PRIORITIES

Federal and state funding for infrastructure investments is not keeping pace with needs, particularly for operations, maintenance and preservation of existing public assets, but also needed expansion of the system. Local revenue sources are being used to fund the majority of RTP investments. State and local government purchasing power has steadily declined.

Federal and state funding is not keeping pace with infrastructure operation and maintenance needs so the majority of RTP investments are funded by local revenue sources.

Until the recent passage of House Bill 2001 that will increase the state gas tax by six cents, the state gas tax had not increased since 1993. This shift in funding has been particularly acute in Oregon, as most states have turned to increased sales tax levies as a stop-gap for coping with the decrease in purchasing power of federal transportation funding. Lacking a sales tax, Oregon has focused on bonding strategies based on future revenue at the state level, but has not developed a long-term strategy. Local governments in Oregon have turned to increased property tax levies, road maintenance fees, system development charges and traffic impact fees to attempt to keep pace.

Diminished available resources mean increased competition for available transportation funds and reduced ability to expand, improve and maintain existing transportation infrastructure. Meanwhile, the region's transportation infrastructure continues to age and requires increasing maintenance. Increased traffic volumes also increase the maintenance needs of regional streets and throughways. Existing maintenance backlogs are expected to grow without new sources of revenues.

New funding strategies, enhanced public and private collaborations and stronger public support for seeking new revenue sources must be developed to maintain existing transportation assets, as well as to pay for major system investments. The region needs a strategy that effectively links land use and transportation investment decisions. Both short-term and long-term strategies are needed to raise new revenues to fund needed investments. Ultimately, the region may decide to develop an action plan to raise these revenue sources in order to more fully implement the 2040 Growth Concept and address more of the needs identified in this plan. The region's economy and livability depend on finding solutions to these issues – and so do future generations of people who will live and work in this region.

CHAPTER 4

PERFORMANCE EVALUATION AND MONITORING:

HOW FAR DO WE GO TOWARD ACHIEVING OUR VISION?

4.1 INTRODUCTION

The 2014 RTP purposefully lays out a set of policies, projects, and programs intended to achieve the region's vision for an integrated land use and transportation system. Performance evaluation of the planned system and monitoring of implementation between plan updates provide valuable information for establishing transportation policy and planning objectives, and for informing transportation investment actions and priorities. While evaluation and monitoring of system performance has long been a part of the RTP development and implementation, outcomes-based evaluation of transportation policy and planning objectives is a more recent trend in transportation planning, occurring since the last major update to the RTP in 2000.[1]

Outcomes-based planning requires performance evaluation of desired outcomes and periodic monitoring to ensure that incremental land use decisions and transportation project development are consistent with the plan vision. Monitoring the effectiveness of transportation investments is challenging. The quality of system performance results from multiple factors, including land use, land supply, cost, availability of capacity, level of transportation options, and demands for travel. Despite the challenges, benefits of an outcomes-based approach to performance evaluation and monitoring include:

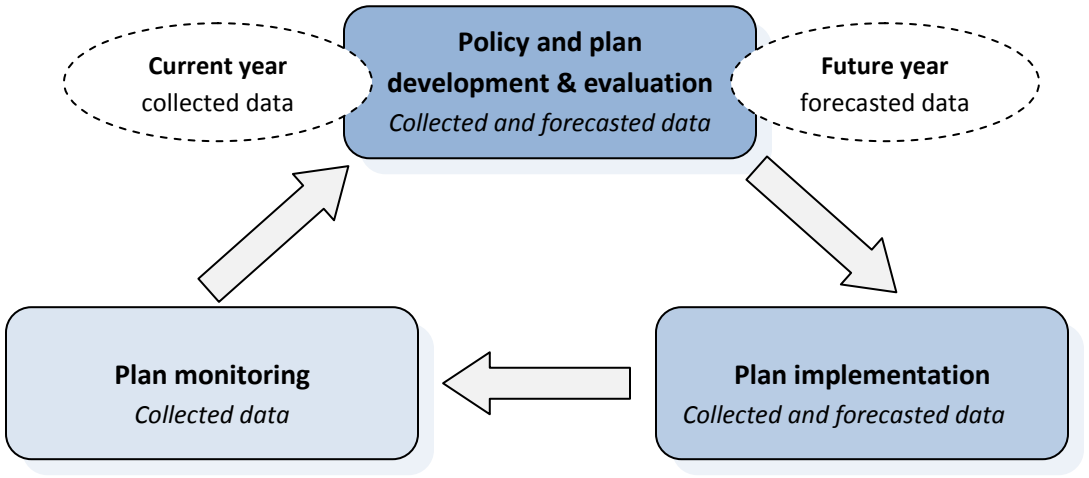
- Measurement of and feedback on the RTP policies and investment priorities submitted by ODOT, TriMet and local agencies;
- Improved communication of needs and priorities, which is especially important given the limited resources available for funding;
- Informed decision-making;
- Increased transparency of the transportation analysis and decision-making process; and
- Increased accountability through periodic reporting.

1 This trend is documented in Transportation Research Board Conference Proceedings 36: Performance Measures to Improve Transportation Systems, August 22-24, 2004.

4.2 RTP PERFORMANCE MEASUREMENT SYSTEM

The performance measurement system, initiated with the last RTP update, established an evaluation and monitoring cycle. The performance measures serve as the dynamic link between RTP goals and plan implementation by formalizing the process of evaluation and monitoring to ensure the RTP advances toward achievement of the region's transportation, land use, economic, and environmental goals. The RTP refers to the cyclical process of plan development and evaluation, plan implementation and monitoring as the Performance Measurement System, as shown in **Figure 4.1**.

Figure 4.1 RTP Performance Measurement System



Through evaluation and monitoring, the region can better understand the extent to which investments in the transportation system achieve desired outcomes and provide the best return on public investments. The performance measurement system also satisfies benchmarks mandated by the Oregon Transportation Planning Rule (TPR) and federal requirements to use performance monitoring as part of the region's Congestion Management Program (CMP). The system will be expanded to fold in coming MAP-21 performance measures.

4.2.1 RTP System Evaluation

The evaluation element of the RTP performance measurement system applies during periodic plan updates, which occur approximately every four years. During these updates, the region revisits its goals and objectives for the transportation system and develops and refines an investment strategy comprised of infrastructure projects and programs submitted by ODOT, TriMet and the local agencies that together help achieve the plan goals.

In previous RTPs, success of the investment strategy was measured narrowly, considering whether the plan met vehicle level of service standards and mode share targets for walking, bicycling, transit use and shared ride. The performance measurement system introduced with the 2014 RTP update adopts performance-based evaluation and substantially broadens the performance measures used to track how well the investment strategy addresses the full set of goals described in Chapter 2.

The RTP plan development and evaluation has two levels: performance targets and investment strategy performance evaluation. As previously described in section 2.3.1, RTP performance targets are the highest order evaluation measures in the outcomes-based policy framework. The performance targets set quantifiable goals for the achieving the region's desired policy outcomes. In comparison, investment strategy evaluation measures changes between current conditions and the set of transportation investments the region has chosen to pursue. There is some overlap between the targets and the measures but they serve different functions. The performance targets are listed in Table 2.3 of Chapter 2.

Table 4.1 lists the RTP performance measures used for plan evaluation, linking them to the RTP goals they support. The investment strategy performance is evaluated at the system-wide level. The performance measures rely on data generated by the regional travel demand forecast model and Metroscope, the regional land use model, to generate current and future year findings.

Table 4.1 RTP System Evaluation Performance Indicators

System Evaluation Measures		RTP Goals									
		Foster Vibrant Communities and Compact Urban Form	Sustain Economic Competitiveness and Prosperity	Expand Transportation Choices	Effective and Efficient Management of Transportation System	Enhance Safety and Security	Promote Environmental Stewardship	Enhance Human Health	Ensure Equity	Ensure Fiscal Stewardship	Deliver Accountability
1.	Vehicle and bicycle miles traveled (total and per capita)	●		●		*Unable to predict/forecast system safety. To be addressed in plan monitoring.*	●	●			*Unable to predict/forecast accountability. To be addressed in plan monitoring.*
2.	Total delay and cost of delay on the regional freight network in mid-day and PM peak		●		●						
3.	Motor vehicle and transit travel time between key origin-destinations for mid-day and 2-HR PM peak	●	●	●	●						
4.	Congestion - Location of throughways, arterials, and regional freight network facilities that exceed RTP motor vehicle-based level of service thresholds in mid-day and 2-HR PM peak		●		●						
5.	Mode share and non-drive alone trips system-wide, by mobility corridor and for central city and individual regional centers (*Number of daily walking, bicycling, shared ride and transit trips and % by mode)*	●		●	●		●	●			
6.	Transit productivity *(transit boarding rides per revenue hour)* for High Capacity Transit (HCT) and bus	●		●						●	
7.	Number and percent of households within ½-mile of regional trail system			●			●	●	●		
8.	Environmental justice measure (under development)			●					●		
9.	Tons of transportation-related air pollutants (e.g. CO, ozone, and PM-10)			●			●	●			
10.	Tons of transportation-related greenhouse gas emissions (e.g. CO_2)			●			●				
11.	Percent of projects that intersect high value habitat areas	●					●				
Additional land use-related measures to be developed as part of the *Making the Greatest Place.*											

4.2.2 RTP System Monitoring

Between plan updates, a system monitoring program periodically assesses how well the region's transportation system is functioning in order to inform implementation decisions. Funding decisions made for state, regional, and local improvement programs can benefit from current and readily available data about the performance of the transportation system.

The RTP system monitoring also serves as a key element of the region's Congestion Management Process (CMP). The CMP emphasizes monitoring and evaluating regional system performance as a way to better diagnose and address congestion. It requires a "coordinated program for data collection and system performance monitoring to assess the extent of congestion, to contribute in determining causes of congestion and evaluate the efficiency and effectiveness of implemented actions."

The great challenge for establishing and maintaining a monitoring program has been the availability of data. Historically, collecting and managing data has been expensive and difficult. With advancements in intelligent transportation systems in the region, more and better data is available today and will continue to grow with implementation of data collection projects identified in the Regional Transportation System Management and Operations (TSMO) plan.

The RTP system monitoring program reports out current conditions using observed data for each of the 24 mobility corridors. A system performance report is prepared every two years in advance of the allocation process for regional flexible funds and future RTP updates. **Table 4.2** lists recommended performance monitoring measures.

Table 4.2 — Sample RTP System Monitoring Performance Measures

1.	Vehicle and bicycle miles traveled (total and per capita)
2.	Average trip length by mobility corridor
3.	Motor vehicle and transit travel time between key origin-destinations for mid-day and PM peak
4.	Congestion - Location of throughways, arterials, and regional freight network facilities that exceed RTP motor vehicle-based level of service thresholds in mid-day and PM peak
5.	Travel time reliability on throughways
6.	Average incident duration on throughway system
7.	Number and share of average daily shared ride, walking, bicycling and transit trips region wide, by mobility corridor and for the Portland central city and individual regional centers
8.	Transit productivity (transit boarding rides per revenue hour) for High Capacity Transit and bus
9.	Percent of regional pedestrian system completed region-wide and by 2040 centers and RTP transit-mixed-use corridor
10.	Percent of regional bicycle system completed region-wide and by mobility corridor
11.	Number and percent of households and jobs within 30 minutes of central city, regional centers, and key employment/industrial areas for mid-day and PM peak
12.	Number of fatalities, serious injuries and crashes per vehicle miles traveled for all modes of travel region-wide
13.	Average household combined cost of housing and transportation
14.	Tons of transportation-related air pollutants (e.g. CO, ozone, and PM-10)

4.3 2014 RTP PERFORMANCE EVALUATION FINDINGS

This section details the performance evaluation findings that compare the four investment systems: 2010 Base Year, 2040 No Build, 2040 RTP Federal Priorities, and the 2040 RTP Investment Strategy for eleven performance measures. The geographic extent of the evaluation is the Metro's urban growth boundary (UGB), which excludes Clark County.

As a frame of reference for the differences between 2010 and 2040, the following table provides information about the base and future year demographic changes inside the UGB.

	2010	2040	% change
Population	1,483,506	2,080,456	40%
Households	597,083	886,970	49%
Employment	755,337	1,185,794	57%

1. Vehicle and bicycle miles traveled

Data source: Metro travel forecast model

Description: System-wide evaluation of average weekday (AWD) total and per person vehicle miles traveled (VMT) and bicycle miles traveled.

Target direction: For vehicles, reduce AWD total VMT and VMT per person as compared to the 2040 No Build scenario. For bicycles, increase total miles traveled and VMT per person as compared to the 2040 NB scenario.

Findings: Total AWD VMT decreases between 2010 and 2040 for all investment systems. VMT for both the Federal Priorities System and the RTP Investment Strategy decreases more than the No Build.

With regard to AWD BMT, both the Federal Priority System and the RTP Investment Strategy modeled a significant increase in bicycle miles traveled over 2010 (89%) and a slight increase over the 2040 No Build (13%) options.

VMT	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Total	19,226,604	25,699,002	25,307,208	25,261,656
Per person	13.01	12.39	12.20	12.18

BMT	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Total	444,616	745,907	839,476	825,693
Per person	0.30	0.36	0.40	0.40

2a. Total traffic delay on the regional freight network

Data source: Metro travel forecast model

Description: Evaluates traffic delay for freight movement using the regional freight roadway network in the one-hour mid-day travel period and in the two-hour pm rush hour. Figure 2.15 provides a map of the regional freight system which includes the roadway network. The hours of delay are reported for both trucks and autos.

Target direction: Reduce growth in total delay on the regional freight network in the 1-hour mid-day and 2-hour pm peak as compared to the 2040 No Build scenario.

Findings: Between 2010 and 2040, traffic delay on the regional freight network increases significantly for all investment scenarios. However, when compared with the 2040 No Build both 2040 RTP investment systems show a slower pace of growth in delay in each travel period. In the 1-hour mid-day the 2040 Federal Priorities System traffic delay is 27% less than the 2040 No Build and the 2040 RTP Investment Strategy traffic delay is 38% less than the 2040 No Build. In the 2-hour pm peak, 2040 Federal Priorities System and the 2040 RTP Investment Strategy delay is less than the than 2040 No Build by 37% and 45%, respectively.

Travel period	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Mid-day (12-1 PM) Total Hours of delay	212	1,351	987	839
Trucks	16	149	95	81
Autos	196	1,202	891	757
PM peak (4-6 PM) Hours of delay	3,712	19,154	12,008	10,530
Trucks	123	860	525	455
Autos	3,589	18,294	11,483	10,074

*Vehicle Hours of Delay (VHD) is the time accrued above the travel time at v/c=0.9

2b. Total cost of traffic delay on the regional freight network

Data source: Metro travel forecast model

Description: Evaluates average cost of delay for freight movement in the one-hour mid-day travel period and in the two-hour pm rush hour. Values of time are taken from ODOT report *The Value of Travel-Time: Estimates of Hourly Value of Time for Vehicles in Oregon in 2011.*The cost of delay takes into account both auto and truck delay that occurs on the regional freight network. Auto value of time is calculated at $23.68 per hour. The value of time for trucks include both time of the driver as well as operating expenses. The travel forecast model distinguishes medium and heavy trucks. Medium trucks are identified as two-axle, six-tire, single-unit vehicles (Class 5). The value of time for medium trucks is calculated at $22.53 per hour. Heavy trucks are vehicles with 3 or more axle single unit or trailers (Class 6 and above). The value of time for heavy trucks is calculated at $31.80 per hour. The travel forecast model allocates 35% of trucks to medium category and 65% to heavy category. All values are held constant for both 2010 and 2040.

Target direction: Reduce growth in cost of delay (in constant dollars) on the regional freight network in the 1-hour mid-day and 2-hour pm peak as compared to the 2040 No Build scenario.

Findings: In 2040, the cost of delay on the regional freight network increases over five fold compared to the 2010 Base Year. However, implementation of the 2040 RTP Federal Priorities or the 2040 Investment Strategy results in a 27% - 38% decrease in the cost of delay for the mid-day peak period compared to the 2040 No Build strategy. For the 2-hour pm peak travel period the 2040 RTP Federal Priorities or 2040 Investment Packages reduce cost of delay by 37% -45% compared to the 2040 No Build.

Travel period	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Mid-day (12-1 PM) Cost of delay	$5,098	$32,713	$23,812	$20,239
PM peak (4-6 PM) Cost of delay	$88,500	$457,760	$286,909	$251,545

3a. Motor vehicle travel time between key origin-destinations

Data source: Metro travel forecast model

Description: Evaluates mid-day and pm peak travel time between 20 regional origin-destination pairs.

Target direction: Reduce motor vehicle travel times between key origin-destinations.

Findings: With the exception of the Central City to Vancouver corridor, motor vehicle travel time increases for all three 2040 systems compared to the 2010 Base Year, for both travel periods and all origin-destinations. Pm peak travel time grow at a faster pace the mid-day travel times. A number of origin-destination pairs demonstrate a significant increase in travel time including Milwaukie to Clackamas Regional Center, Milwaukie to Oregon City, Gateway to Oregon City, Sunset Industrial

Area to PDX, Gateway to Oregon City and Washington Square to Oregon City over the 2010 travel times. Overall, the 2040 Federal Priorities and RTP Investment Strategy decrease motor vehicle travel time when compared to the 2040 No Build system. Central City to Vancouver shows a significant improvement in travel time due to a planned throughway and transit investment in the corridor. The 2040 RTP Investment Strategy has slightly shorter travel times than the 2040 RTP Federal System, but differences are negligible.

Auto travel time between origin-destination pairs (in minutes)	**2010 Base Year**		**2040 No Build**		**2040 RTP Federal Priorities System**		**2040 RTP Investment Strategy**	
	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)
Central City to Beaverton (Pioneer Square to Beaverton central via Sunset/217)	16.1	19.0	17.8	21.5	17.7	20.6	17.6	20.4
Central City to Hillsboro (Pioneer Square to First Main via Sunset/Shute)	31.1	35.3	33.9	38.5	33.4	36.8	33.5	36.6
Central City to Tigard (Pioneer Square to Main via Sunset/217)	22.4	27.1	25.3	32.7	24.9	30.7	23.8	29.0
Central City to Vancouver SOV* (Pioneer Square to Vancouver transit center via I-5)	16.1	22.4	18.5	32.3	16.0	20.3	16.0	20.0
Central City to Vancouver HOV* (Pioneer Square to Vancouver transit center via I-5) – No HOV mid-day	N/A	18.6	N/A	25.6	N/A	17.5	N/A	17.5
Central City to Gateway (Pioneer Square to Gateway transit center via I-84)	13.1	16.2	14.5	19.5	14.7	17.6	14.6	17.2
Central City to Gresham (Pioneer Square to City Hall via I-84/207th/223rd)	24.4	28.6	26.9	34.3	26.9	31.6	26.8	31.1
Gateway to Gresham (Gateway transit center to City Hall via 102nd/Division	14.7	15.7	15.5	18.8	15.2	17.3	15.1	16.8
Central City to Milwaukie (Pioneer Square to Milwaukie transit center via McLoughlin)	14.4	17.8	15.3	21.3	15.4	20.2	15.4	19.7
Milwaukie to Clackamas regional center (Milwaukie transit center to CTC via 224/82nd)	8.1	8.9	9.3	11.1	8.9	10.9	8.9	10.9
Washington Square to Oregon City (WS to Main in OC via 217/I-5/I-205)	22.2	29.0	26.0	39.6	25.9	37.9	24.4	34.1

Auto travel time between origin-destination pairs (in minutes)	2010 Base Year		2040 No Build		2040 RTP Federal Priorities System		2040 RTP Investment Strategy	
	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)	Mid-day (12-1)	PM Peak (4-6)
Gateway to Oregon City (Gateway transit center to Main in OC via I-205)	17.8	22.1	20.7	28.8	21.0	28.2	21.3	28.2
Beaverton to Hillsboro (Beaverton Central to First/Main via TV Hwy)	17.3	19.8	19.7	23.0	18.9	21.4	19.0	21.5
Beaverton to Washington Square (Beaverton Central to WS via 217)	6.4	7.8	7.3	10.5	7.0	9.6	7.0	9.6
Terminal 6 to I-205 (via Marine/Portland Rd/Columbia/US 30 to I-205/Sandy interchange	18.4	20.1	19.8	23.5	20.1	22.2	20.0	21.8
Terminal 6 to St. Helens Rd (via Lombard/St. Johns Bridge to US 30)	11.8	11.9	12.3	12.8	12.2	12.4	12.1	12.4
PDX to Gateway (Airport Way/I-205 to Gateway transit center)	9.0	9.6	9.6	11.5	9.6	10.9	9.6	11.0
Milwaukie to Oregon City (via McLoughlin)	12.0	14.1	13.1	18.0	13.2	17.8	13.2	17.8
Sunset Industrial Area to PDX (US 26/Shute to I-405/I-84/I-205 to Airport Way	37.6	43.8	43.7	57.8	43.0	52.7	42.9	52.2
Clackamas Industrial Area to Rivergate (via I-205 to Columbia/Marine Dr)	32.0	34.3	34.9	39.7	35.5	38.6	35.5	38.4

Note: * HOV is available only from 3:00 to 6:00 PM

3b. Transit travel time between key origin-destinations

Data source: Metro travel forecast model

Description: Evaluates mid-day and pm peak transit travel times between 18 origins and destinations across the region.

Target direction: Reduce transit travel times between key origin-destinations.

Findings: In general, there are modest increases in transit travel times during the pm peak travel period from 2010 Base Year to the 2040 Federal Priorities System. In corridors where significant new transit service was added in the 2040 RTP Federal Priorities and RTP Investment Strategy systems (i.e. high capacity transit service to Tigard, Oregon City, Tualatin, Milwaukie, Forest Grove, Gresham and Vancouver WA), there is significant travel time savings over the 2040 No Build option.

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Central City West				Central City East				Rivergate Industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	N/A	N/A	N/A	N/A	8.4	8.6	8.5	8.5	49.7	55.0	N/A	N/A
Central City East	7.2	7.7	8.3	8.2	N/A	N/A	N/A	N/A	41.9	46.4	N/A	N/A
Rivergate Industrial	40.5	45.9	N/A	N/A	34.8	36.2	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	35.2	35.2	36.1	36.1	27.4	27.4	27.7	27.7	76.8	77.6	N/A	N/A
Gateway RC	22.3	22.2	22.5	22.5	14.0	14.0	14.1	14.1	63.4	64.2	N/A	N/A
Gresham RC	45.0	43.9	45.3	45.2	36.6	35.7	36.6	36.6	85.9	85.8	N/A	N/A
Troutdale	65.0	67.2	61.0	61.2	59.2	62.0	56.4	56.7	109.2	113.1	N/A	N/A
Clackamas TC	38.0	38.0	38.0	38.0	29.5	29.5	29.5	29.5	78.9	79.7	N/A	N/A
Clackamas Industrial	54.8	58.4	51.6	49.6	46.2	49.9	43.1	41.0	95.6	100.0	N/A	N/A
Oregon City	53.5	51.3	52.6	53.7	64.7	60.8	63.8	50.9	111.0	107.2	N/A	N/A
Wilsonville	59.4	66.5	55.8	55.0	71.2	75.1	68.5	66.7	108.8	122.2	N/A	N/A
Tigard	36.4	40.1	27.8	28.4	46.0	47.9	35.7	36.0	92.2	99.0	N/A	N/A
Tualatin Industrial	29.8	35.5	37.9	37.9	41.5	45.9	45.8	45.5	85.3	93.9	N/A	N/A
Beaverton	21.8	21.9	21.8	21.8	31.3	31.1	31.5	31.5	79.2	81.5	N/A	N/A
Sunset Industrial	39.7	40.1	39.7	39.7	49.4	49.5	49.4	49.4	97.1	99.7	N/A	N/A
Hillsboro	45.1	45.4	45.1	45.1	54.9	54.7	54.9	54.9	102.5	105.0	N/A	N/A
Forest Grove	73.9	77.0	74.9	72.5	83.6	86.4	84.7	82.2	131.3	136.7	N/A	N/A
Vancouver CBD	19.7	22.0	16.9	16.8	30.9	32.7	21.9	21.9	51.0	49.7	N/A	N/A

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Portland International Airport				Gateway Regional Center				Gresham Regional Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	35.7	35.7	36.5	36.5	22.6	22.7	22.6	22.6	45.3	44.0	45.3	45.3
Central City East	27.7	27.7	27.7	27.7	14.1	14.4	14.1	14.1	36.6	35.5	36.6	36.6
Rivergate Industrial	69.9	71.4	N/A	N/A	50.9	52.4	N/A	N/A	75.1	75.4	N/A	N/A
Portland Airport	N/A	N/A	N/A	N/A	13.5	13.5	13.7	13.7	39.8	38.3	39.3	39.3
Gateway RC	13.3	13.3	13.7	13.7	N/A	N/A	N/A	N/A	22.6	21.1	22.6	22.6
Gresham RC	43.4	42.5	43.8	41.3	22.6	21.7	22.6	22.6	N/A	N/A	N/A	N/A
Troutdale	62.9	59.6	52.9	52.0	44.4	45.9	40.0	36.3	20.0	22.7	21.7	19.8
Clackamas TC	36.1	36.1	36.5	34.0	15.3	15.3	15.3	15.3	41.6	40.1	34.6	34.0
Clackamas Industrial	52.8	56.4	50.1	45.5	32.0	35.6	28.9	26.8	58.3	60.5	48.3	45.5
Oregon City	75.2	79.2	72.6	55.4	52.5	58.4	52.4	36.7	80.6	83.2	70.8	55.4
Wilsonville	105.9	108.6	104.3	98.4	87.2	90.5	84.2	81.3	111.9	113.1	108.7	105.3
Tigard	79.2	80.2	73.6	71.2	60.9	62.1	53.4	53.5	85.27	84.7	78.0	78.1
Tualatin Industrial	73.8	80.8	82.8	80.3	58.2	63.8	62.8	59.1	79.9	85.3	87.2	83.3
Beaverton	58.4	58.0	59.2	59.2	45.3	45.5	45.5	45.1	68.1	66.8	68.1	68.1
Sunset Industrial	83.6	84.0	84.6	82.1	63.4	63.9	63.4	63.4	86.0	84.9	86.0	86.0
Hillsboro	89.1	89.3	90.1	87.6	68.8	69.1	68.8	68.8	91.4	90.2	91.4	91.4
Forest Grove	117.8	121.0	119.9	116.9	97.6	100.8	98.6	96.2	120.2	121.9	121.2	118.8
Vancouver CBD	63.6	65.9	57.1	54.6	45.1	47.4	37.4	37.3	69.7	70.6	61.5	61.5

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Troutdale Town Center				Clackamas Regional Center				Clackamas Industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	71.1	77.1	68.2	65.3	37.3	37.3	37.3	37.3	63.7	55.2	54.9	47.7
Central City East	61.4	66.5	59.6	58.9	29.5	29.5	29.5	29.5	59.9	47.4	47.1	39.9
Rivergate Industrial	103.6	110.2	N/A	N/A	71.7	73.2	N/A	N/A	102.2	91.1	N/A	N/A
Portland Airport	59.6	58.8	53.2	50.6	36.2	36.2	32.7	32.7	66.7	54.1	50.3	43.1
Gateway RC	41.1	42.5	38.1	35.3	15.3	15.3	15.3	15.3	45.7	33.2	32.8	25.6
Gresham RC	19.3	20.3	20.8	18.2	45.3	44.5	33.9	33.6	74.6	62.4	51.5	43.9
Troutdale	N/A	N/A	N/A	N/A	68.1	67.6	53.5	50.9	92.1	89.7	71.1	61.3
Clackamas TC	66.6	62.8	57.7	53.4	N/A	N/A	N/A	N/A	19.8	12.9	10.1	6.6
Clackamas Industrial	83.0	83.2	71.3	64.9	9.2	12.9	9.9	7.8	N/A	N/A	N/A	N/A
Oregon City	103.6	111.3	93.8	74.8	29.8	35.6	32.4	17.7	53.6	29.7	31.0	10.6
Wilsonville	137.4	145.3	129.5	123.9	96.3	106.7	95.3	63.2	119.9	116.1	108.6	56.1
Tigard	109.0	119.4	101.4	98.9	80.4	77.2	68.0	53.0	108.9	95.1	85.5	45.9
Tualatin Industrial	105.1	116.2	111.5	108.2	73.4	79.2	78.1	40.6	98.0	97.2	95.6	33.5
Beaverton	93.8	100.5	91.3	88.3	67.3	67.4	63.6	63.6	99.5	85.3	81.1	54.3
Sunset Industrial	112.0	120.0	109.1	106.2	85.2	85.6	81.4	81.4	117.5	103.5	99.0	79.6
Hillsboro	117.4	125.3	114.6	111.6	90.7	90.9	86.9	86.9	122.9	108.8	104.5	85.1
Forest Grove	146.2	157.0	144.4	139.0	119.4	122.6	116.7	114.3	151.7	140.5	134.3	114.5
Vancouver CBD	93.6	101.2	88.6	85.5	65.3	67.6	55.1	55.1	93.1	85.5	72.7	65.5

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Oregon City Regional Center				Wilsonville Town Center				Tigard Town Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	40.9	53.8	54.9	46.9	64.0	70.8	56.7	56.7	36.8	32.9	28.2	28.2
Central City East	55.3	63.2	66.7	52.3	75.9	78.1	79.6	72.6	49.8	42.6	38.8	38.8
Rivergate Industrial	87.5	99.7	N/A	N/A	107.5	123.4	N/A	N/A	79.6	82.6	N/A	N/A
Portland Airport	83.6	84.4	75.9	55.5	105.0	105.2	107.9	81.2	82.7	73.1	68.1	68.1
Gateway RC	60.5	63.4	58.5	38.0	91.7	92.0	93.0	63.7	67.6	59.6	53.7	53.7
Gresham RC	93.4	92.6	77.1	56.3	114.8	113.9	106.1	82.0	92.5	81.9	69.9	69.4
Troutdale	113.3	118.0	96.7	73.7	134.6	137.5	125.7	99.3	111.5	105.0	90.6	87.8
Clackamas TC	30.2	33.2	33.2	19.0	105.0	105.0	107.6	40.9	77.2	64.6	68.2	52.4
Clackamas Industrial	37.3	40.2	34.9	12.4	111.1	119.6	121.2	56.2	93.9	87.5	81.8	45.7
Oregon City	N/A	N/A	N/A	N/A	60.2	66.1	66.2	41.6	73.9	81.3	79.2	33.8
Wilsonville	46.2	55.5	54.5	46.5	N/A	N/A	N/A	N/A	33.0	33.3	33.0	254
Tigard	72.8	84.8	78.1	35.8	24.3	24.9	21.8	22.8	N/A	N/A	N/A	N/A
Tualatin Industrial	70.7	85.2	80.5	23.3	15.6	15.8	15.1	14.6	6.8	6.8	10.9	7.39
Beaverton	70.9	80.5	83.0	44.2	33.0	33.2	32.5	31.7	11.3	10.8	11.6	11.5
Sunset Industrial	88.9	98.8	100.9	69.5	65.5	66.1	65.0	57.1	432	43.6	43.2	35.7
Hillsboro	94.3	104.1	106.3	75.0	71.0	71.4	70.5	62.5	48.6	48.9	48.6	41.1
Forest Grove	123.1	135.8	136.1	104.4	99.8	103.1	100.2	92.0	77.4	80.6	78.4	69.7
Vancouver CBD	64.6	73.8	86.5	74.7	82.2	94.3	89.6	89.4	57.2	53.4	49.2	49.2

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Tualatin Industrial Area				Beaverton Regional Center				Sunset Industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	34.7	40.6	46.2	43.5	21.9	21.8	21.9	21.9	40.22	40.3	40.2	40.2
Central City East	39.5	45.6	58.6	53.9	30.8	30.7	31.1	31.1	49.4	49.3	49.4	49.4
Rivergate Industrial	73.1	84.8	N/A	N/A	67.5	73.1	N/A	N/A	86.9	92.8	N/A	N/A
Portland Airport	70.6	89.5	90.4	82.9	57.8	57.8	58.8	58.8	79.9	79.9	80.1	80.1
Gateway RC	56.0	68.0	76.6	57.1	44.8	44.6	45.1	45.1	63.4	63.3	63.4	63.4
Gresham RC	80.5	98.1	91.5	75.4	67.6	66.5	67.6	67.6	86.0	85.0	86.0	86.0
Troutdale	104.4	115.2	109.1	92.8	88.1	90.2	85.2	85.8	107.4	109.6	104.4	105.4
Clackamas TC	70.6	76.4	82.7	38.1	62.7	62.5	62.5	62.2	82.4	82.3	81.6	81.6
Clackamas Industrial	87.3	96.7	96.3	31.5	79.5	82.9	76.1	55.6	99.1	102.6	95.3	76.9
Oregon City	82.2	87.4	86.4	19.5	77.9	75.0	76.1	43.6	97.4	94.7	95.2	64.9
Wilsonville	26.2	26.5	26.2	18.9	42.8	43.1	42.8	35.5	64.9	65.4	64.2	56.8
Tigard	8.9	9.2	11.6	9.1	14.0	13.4	16.2	13.3	35.8	35.4	37.2	34.4
Tualatin Industrial	N/A	N/A	N/A	N/A	16.6	16.6	16.6	16.6	38.7	38.9	37.9	37.9
Beaverton	17.4	17.4	17.4	17.1	N/A	N/A	N/A	N/A	17.7	17.8	17.7	17.7
Sunset Industrial	50.0	50.4	49.9	42.4	16.7	16.7	16.7	16.7	N/A	N/A	N/A	N/A
Hillsboro	55.4	55.7	55.4	47.9	22.2	22.0	22.2	22.6	5.5	5.3	5.5	5.8
Forest Grove	84.2	87.3	85.2	77.3	50.9	53.7	52.0	44.9	34.2	37.0	35.3	34.2
Vancouver CBD	49.9	57.9	66.2	62.8	43.8	46.0	43.0	42.7	63.3	65.6	62.2	62.1

Transit travel times between origin-destination pairs in 2-hour PM Peak (in minutes)

Destination	Hillsboro Regional Center				Forest Grove Town Center				Vancouver City Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	44.7	44.8	44.7	44.7	78.1	81.1	79.8	72,9	21.6	30.2	30.4	30.4
Central City East	53.9	53.8	53.9	53.9	87.3	90.1	88.9	82.0	31.3	39.8	22.6	22.6
Rivergate Industrial	91.4	97.3	N/A	N/A	124.8	133.6	N/A	N/A	44.9	42.7	N/A	N/A
Portland Airport	84.4	84.4	84.6	84.6	117.7	120.6	119.6	109.7	65.8	74.3	54.1	54.1
Gateway RC	67.9	67.8	67.9	67.9	101.2	104.1	102.9	96.0	52.0	60.6	40.4	40.4
Gresham RC	90.5	89.5	90.5	90.5	123.8	125.8	125.5	128.6	75.6	83.2	62.9	62.9
Troutdale	111.9	114.1	108.9	109.9	145.3	150.4	121.2	136.8	90.4	102.2	83.3	83.3
Clackamas TC	86.9	86.8	86.1	86.1	120.2	123.1	134.8	113.2	65.1	73.7	55.9	55.9
Clackamas Industrial	103.6	107.1	99.7	81.4	137.0	143.4	134.8	106.6	81.9	94.1	69.5	69.5
Oregon City	101.9	99.2	99.7	69.4	135.3	135.5	103.7	94.6	83.3	90.0	86.4	86.4
Wilsonville	69.4	69.9	68.6	61.3	102.7	106.2	76.7	86.4	87.6	104.4	89.9	89.9
Tigard	40.3	39.9	41.7	38.9	73.7	76.2	77.4	64.4	66.2	78.4	60.8	60.8
Tualatin Industrial	43.2	43.4	42.4	42.4	76.6	79.7	57.7	67.6	59.6	73.9	70.9	70.9
Beaverton	22.2	22.3	22.2	22.5	56.2	58.6	65.71	46.6	51.1	59.7	56.9	56.9
Sunset Industrial	4.5	4.5	5.1	5.0	37.9	40.8	39.6	34.7	69.0	77.9	74.7	74.7
Hillsboro	N/A	N/A	N/A	N/A	24.3	27.2	26.0	21.6	74.4	83.2	80.2	80.2
Forest Grove	24.4	27.3	26.2	19.0	N/A	N/A	N/A	N/A	103.2	114.9	110.0	110.0
Vancouver CBD	67.8	70.1	66.7	66.6	101.2	106.4	101.7	93.6	N/A	N/A	N/A	N/A

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Central City West				Central City East				Rivergate Industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	N/A	N/A	N/A	N/A	8.3	8.4	8.4	8.4	N/A	N/A	N/A	N/A
Central City East	7.8	8.2	8.3	8.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	35.2	35.2	36.1	36.1	27.4	27.4	27.7	27.7	N/A	N/A	N/A	N/A
Gateway RC	22.3	22.2	22.5	22.5	14.1	14.1	14.1	14.1	N/A	N/A	N/A	N/A
Gresham RC	45.0	43.9	45.0	44.9	36.6	35.7	36.6	36.6	N/A	N/A	N/A	N/A
Troutdale	66.1	66.9	60.2	60.0	59.2	60.7	54.6	55.4	N/A	N/A	N/A	N/A
Clackamas TC	38.0	38.0	38.0	38.0	29.5	29.5	29.5	29.5	N/A	N/A	N/A	N/A
Clackamas Industrial	54.3	56.9	54.9	50.9	45.8	48.4	46.4	42.4	N/A	N/A	N/A	N/A
Oregon City	51.8	54.4	54.4	53.7	62.9	63.9	63.1	51.1	N/A	N/A	N/A	N/A
Wilsonville	59.1	59.9	48.4	53.3	69.6	70.9	59.7	66.1	N/A	N/A	N/A	N/A
Tigard	35.3	37.0	28.2	28.5	46.7	48.1	37.2	37.1	N/A	N/A	N/A	N/A
Tualatin Industrial	59.6	61.1	37.9	37.9	70.5	73.8	46.1	45.8	N/A	N/A	N/A	N/A
Beaverton	21.7	21.8	21.8	21.8	31.0	30.9	31.5	31.5	N/A	N/A	N/A	N/A
Sunset Industrial	39.7	40.1	39.7	39.7	49.4	49.5	49.4	49.4	N/A	N/A	N/A	N/A
Hillsboro	45.1	45.4	45.1	45.1	54.9	54.7	54.9	54.9	N/A	N/A	N/A	N/A
Forest Grove	77.2	78.7	78.0	74.6	86.9	88.1	87.8	84.3	N/A	N/A	N/A	N/A
Vancouver CBD	19.7	22.2	31.6	31.6	34.1	39.9	21.9	21.9	N/A	N/A	N/A	N/A

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Portland International Airport				Gateway Regional Center				Gresham Regional Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	35.7	35.7	36.5	36.5	22.5	22.6	22.7	22.6	45.3	44.0	45.9	45.3
Central City East	27.7	27.7	27.7	27.7	14.2	14.3	14.1	14.1	36.6	35.5	36.6	36.6
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	N/A	N/A	N/A	N/A	13.5	13.5	13.7	13.7	43.6	42.1	43.8	42.3
Gateway RC	13.3	13.3	13.7	13.7	N/A	N/A	N/A	N/A	22.6	21.1	22.6	22.6
Gresham RC	43.4	42.5	43.8	42.3	21.6	21.7	22.6	22.6	N/A	N/A	N/A	N/A
Troutdale	63.3	64.1	51.8	54.6	45.0	45.6	38.0	36.4	19.6	20.0	20.2	18.3
Clackamas TC	36.1	36.1	36.5	35.0	15.3	15.3	15.3	15.3	45.3	43.9	33.6	33.4
Clackamas Industrial	52.3	55.0	53.4	47.9	31.5	34.2	32.2	28.2	61.6	62.8	50.5	46.4
Oregon City	74.9	75.5	77.1	56.1	52.0	54.7	55.9	36.4	84.0	83.3	75.5	54.5
Wilsonville	103.0	103.9	93.4	97.8	85.0	85.9	74.5	80.6	112.9	112.3	92.8	104.1
Tigard	81.1	81.8	74.5	73.4	62.9	63.3	55.5	55.3	90.9	90.3	73.0	73.2
Tualatin Industrial	101.4	104.9	82.8	81.4	84.6	88.2	64.0	52.3	111.0	113.2	81.9	72.0
Beaverton	58.4	58.0	59.2	59.2	45.2	45.3	45.5	45.5	68.1	66.8	68.1	68.1
Sunset Industrial	83.6	84.0	84.6	83.1	63.4	63.9	63.4	63.4	86.0	84.9	86.0	86.0
Hillsboro	89.1	89.3	90.1	88.6	68.8	69.1	68.8	68.8	91.4	90.2	91.4	91.4
Forest Grove	123.2	122.6	123.0	114.2	100.9	102.5	101.8	98.3	123.5	123.6	124.3	120.9
Vancouver CBD	65.3	70.2	57.1	55.6	48.3	53.8	38.5	38.0	76.1	80.3	66.0	64.5

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Troutdale Town Center				Clackamas Regional Center				Clackamas industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	71.8	72,8	65.9	65.4	37.3	37.3	37.3	37.3	133.2	59.4	61.7	48.3
Central City East	58.5	60.3	55.1	54.9	29.5	29.5	29.5	29.5	125.4	51.6	53.9	40.5
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	63.3	63.1	54.1	53.2	36.2	36.2	36.5	35.0	132.1	58.3	60.9	46.0
Gateway RC	43.0	43.7	37.1	37.0	15.3	15.3	15.3	15.3	111.2	37.3	39.7	26.3
Gresham RC	19.2	19.6	20.1	18.2	44.6	44.5	36.6	34.9	140.5	66.5	61.0	45.9
Troutdale	N/A	N/A	N/A	N/A	68.1	70.4	58.3	52.7	164.0	92.4	82.4	63.7
Clackamas TC	69.0	64.9	56.7	55.0	N/A	N/A	N/A	N/A	55.9	12.1	9.4	6.5
Clackamas Industrial	85.3	83.8	73.6	67.9	8.8	11.4	9.4	6.9	N/A	N/A	N/A	N/A
Oregon City	107.2	108.0	101,2	76.1	29.2	32.0	33.2	15.1	125.1	33.4	37.3	8.7
Wilsonville	132.2	135.2	127.2	123.1	103.2	97.4	92.7	55.4	199.2	116.6	116.1	48.9
Tigard	107.9	112.3	97.5	97.5	79.3	71.6	72.1	44.7	175.2	93.7	96.5	38.3
Tualatin Industrial	133.6	138.3	107.2	93.6	103.5	95.7	81.8	31.1	199.4	117.7	106.2	24.6
Beaverton	94.1	95.3	88.2	88.0	67.2	67.3	67.3	55.1	163.1	89.4	91.7	46.7
Sunset Industrial	112.5	113.9	106.1	105.9	85.2	85.6	85.2	83.7	181.1	107.7	109.6	72.1
Hillsboro	118.0	119.2	111.5	111.4	90.7	90.9	90.7	89.2	186.6	113.0	115.0	77.5
Forest Grove	150.0	152.5	144.5	140.8	122.7	124.2	123.6	115.6	218.6	146.3	148.0	101.7
Vancouver CBD	99.8	107.1	84.5	84.3	66.9	73.5	58.9	57.4	162.8	95.5	83.3	68.4

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Oregon City Regional Center				Wilsonville Town Center				Tigard Town Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	52.5	55.0	55.0	55.0	81.7	82.3	47.8	49.3	35.8	30.2	28.2	28.2
Central City East	65.6	63.3	63.6	48.9	95.0	96.8	86.0	74.6	49.1	48.3	40.0	39.9
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	79.8	79.7	80.0	54.4	124.3	123.8	114.0	85.8	78.5	75.3	69.3	69.3
Gateway RC	58.9	58.7	58.8	34.6	110.6	110.1	99.5	66.1	64.7	61.6	55.1	55.1
Gresham RC	88.2	87.9	80.2	54.3	134.2	132.6	110.3	85.7	88.3	84.1	69.3	68.9
Troutdale	110.5	112.4	101.6	72.0	153.7	156.6	130.0	103.5	107.8	108.6	90.0	87.8
Clackamas TC	28.6	30.6	31.7	14.4	125.1	108.9	113.7	35.8	79.2	60.6	69.4	45.4
Clackamas Industrial	35.8	36.7	36.7	8.2	141.4	135.3	130.6	54.5	95.5	87.0	86.4	39.3
Oregon City	N/A	N/A	N/A	N/A	89.2	92.6	91.9	42.7	70.9	74.2	72.0	31.5
Wilsonville	56.9	58.6	71.2	40.8	N/A	N/A	N/A	N/A	46.8	46.5	37.6	26.0
Tigard	70.8	74.2	71.9	30.1	65.1	68.5	62.0	25.8	N/A	N/A	N/A	N/A
Tualatin Industrial	91.3	97.0	76.5	16.5	53.6	56.3	54.4	17.9	15.9	18.1	11.0	7.4
Beaverton	81.8	83.0	83.1	38.5	80.5	84.9	83.9	35.0	19.4	21.0	20.0	11.5
Sunset Industrial	99.8	101.4	101.0	63.9	114.1	118.9	118.3	60.3	45.9	47.8	43.1	35.7
Hillsboro	105.3	106.7	106.4	69.4	119.6	124.2	123.7	65.8	51.3	53.1	48.6	41.45
Forest Grove	137.3	140.0	139.3	93.5	151.7	150.2	156.7	89.9	83.4	89.1	84.4	62.7
Vancouver CBD	77.4	92.6	85.0	83.4	99.7	103.8	108.1	107.8	53.9	55.9	61.8	61.8

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Tualatin Industrial Area				Beaverton Regional Center				Sunset Industrial Area			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	68.4	63.3	44.9	42.7	21.9	21.9	21.9	21.9	40.2	40.3	40.2	40.2
Central City East	81.8	84.7	55.4	53.2	31.1	30.6	31.1	31.1	49.4	49.3	49.4	49.4
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	108.9	112.2	91.2	82.9	58.8	57.8	58.8	58.8	83.6	83.6	84.6	83.1
Gateway RC	95.8	99.0	69.3	51.4	45.1	44.6	45.1	45.1	63.4	63.3	63.4	63.4
Gresham RC	118.7	120.9	84.2	71.1	67.6	66.5	67.6	67.6	86.0	85/0	86.0	86.0
Troutdale	140.8	144.8	103.9	88.8	86.2	90.4	84.9	86.2	111.0	111.4	107.5	107.1
Clackamas TC	110.3	93.1	82.0	31.2	56.4	63.7	64.1	56.4	86.1	86.1	86.1	84.6
Clackamas Industrial	126.5	119.5	99.0	25.0	49.1	82.6	81.0	49.1	102.4	105.0	103.	73.4
Oregon City	93.9	99.4	80.1	17.3	41.4	79.9	79.8	41.4	99.4	101.9	101.9	65.7
Wilsonville	38.6	41.0	28.6	19.3	35.9	70.0	61.0	35.9	91.4	95.9	96.1	60.2
Tigard	15.3	17.0	16.3	8.8	13.0	20.6	20.1	13.0	45.0	46.4	45.8	37.2
Tualatin Industrial	N/A	N/A	N/A	N/A	16.6	39.7	37.9	16.6	61.7	65.5	63.6	40.9
Beaverton	35.8	39.2	37.2	17.1	N/A	N/A	N/A	N/A	17.7	17.8	17.7	17.7
Sunset Industrial	69.4	73.2	63.6	42.4	16.7	16.7	16.7	16.7	N/A	N/A	N/A	N/A
Hillsboro	74.9	78.5	69.1	47.9	22.3	22.0	22.2	22.3	5.5	5.3	5.5	5.8
Forest Grove	107.0	114.4	103.7	72.0	40.0	55.3	55.1	40.0	37.5	38.6	38.4	34.4
Vancouver CBD	84.9	88.2	70.8	71.6	48.4	47.5	44.3	48.4	66.6	69.6	66.3	69.7

Transit travel times between origin-destination pairs in 1-hour mid-day (in minutes)

Destination	Hillsboro Regional Center				Forest Grove Town Center				Vancouver City Center			
Origin	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Central City West	44.7	44.8	44.7	44.7	77.1	78.7	78.3	69.7	17.7	21.0	28.8	29.1
Central City East	53.9	53.8	53.9	53.9	86.3	87.7	87.5	78.9	44.8	46.4	22.6	22.6
Rivergate Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portland Airport	88.1	88.1	89.1	87.6	120.5	122.0	122.7	106.6	84.3	71.7	57.8	56.3
Gateway RC	67.9	67.8	67.9	67.9	100.3	101.7	101.4	92.9	70.3	73.6	44.2	42.7
Gresham RC	90.5	89.5	90.5	90.5	122.9	123.4	124.0	115.4	93.2	96.5	68.0	66.3
Troutdale	115.5	115.9	112.0	111.6	147.9	149.8	145.6	134.0	108.5	113.4	85.3	83.7
Clackamas TC	90.6	90.5	90.6	89.1	123.0	124.4	124.2	104.6	83.7	87.0	59.6	58.1
Clackamas Industrial	106.9	109.5	107.5	77.9	139.3	143.4	141.1	96.9	100.0	105.9	76.5	71.0
Oregon City	103.9	106.4	106.4	70.2	136.3	140.3	139.9	89.2	100.2	106.4	84.8	83.4
Wilsonville	95.9	100.3	100.6	64.7	132.3	134.2	123.7	83.7	107.5	111.6	85.0	88.4
Tigard	49.5	50.9	50.3	41.6	85.9	84.8	83.8	61.0	83.7	88.6	62.7	63.7
Tualatin Industrial	66.2	70.0	68.1	45.4	102.6	103.9	101.6	64.4	108.0	112.7	72.4	73.1
Beaverton	22.2	22.3	22.2	22.3	55.7	57.3	56.8	42.3	69.6	72.9	58.0	57.3
Sunset Industrial	4.5	4.5	5.2	5.0	36.9	38.4	38.0	34.1	87.5	91.2	75.8	75.1
Hillsboro	N/A	N/A	N/A	N/A	23.3	24.8	24.5	20.1	93.0	96.5	81.3	80.6
Forest Grove	24.0	25.2	24.8	17.7	N/A	N/A	N/A	N/A	125.1	129.8	114.2	110.1
Vancouver CBD	71.1	74.1	70.8	74.2	103.5	108.0	104.4	96.2	N/A	N/A	N/A	N/A

4. Congestion - Location of throughways, arterials, and regional freight network facilities that exceed threshold for the interim regional mobility policy[2]

Data source: Metro travel forecast model

Description: Identifies number of network miles and locations within the urban growth boundary (UGB) that exceed the interim regional mobility policy for congestion in the mid-day and pm peak. Note that the mileage calculation is based on the length of the modeled network link associated with the point of congestion. It does not include the length of the queuing that occurs as a result of the congested link.

Target direction: Reduce total miles of throughways and arterials that exceed the interim regional mobility policy thresholds for congestion.

Findings: All three 2040 systems increase the number of congested network miles of congestion over 2010. In 2040, network miles of congestion in the region are reduced (13-46%) in each travel period in the 2040 Federal Priorities system compared to the 2040 No Build. Overall, the 2040 Investment Strategy shows the lowest number of congested network miles; 37-58% lower than the 2040 Federal Priorities System.

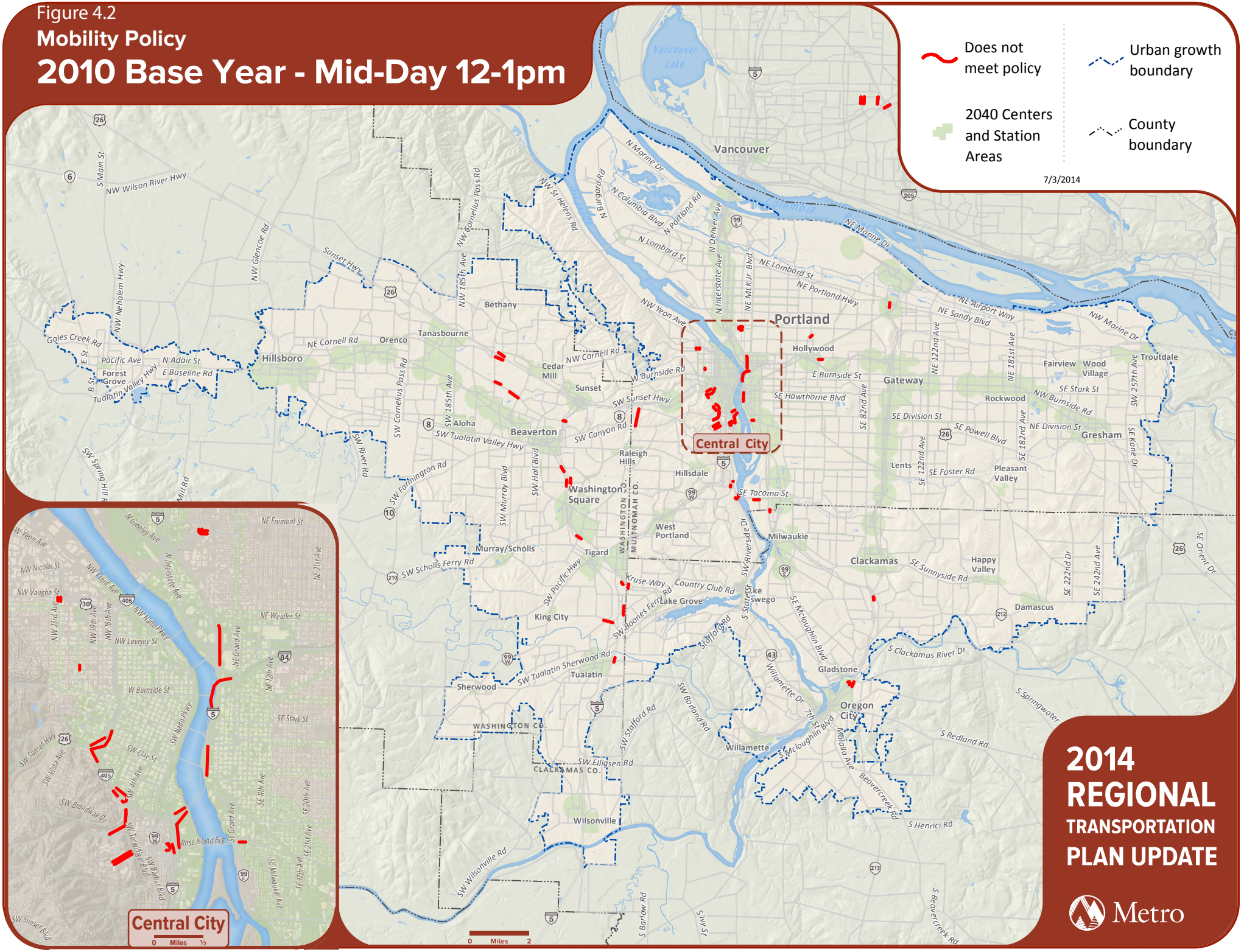
Location	2010 Base Year		2040 No Build		2040 RTP Federal Priorities System		2040 RTP Investment Strategy	
	Mid Day (12-1)	PM-Peak (4-6)	Mid Day (12-1)	PM Peak (4-6)	Mid Day (12-1)	PM Peak (4-6)	Mid Day (12-1)	PM Peak (4-6)
Network miles within UGB exceeding policy	10.25	15.65	44.12	121.4	38.25	65.73	27.81	51.47

[2] See Chapter 2, Table 2.4 Interim Regional Mobility Policy

Figure 4.2

Mobility Policy

2010 Base Year - Mid-Day 12-1pm



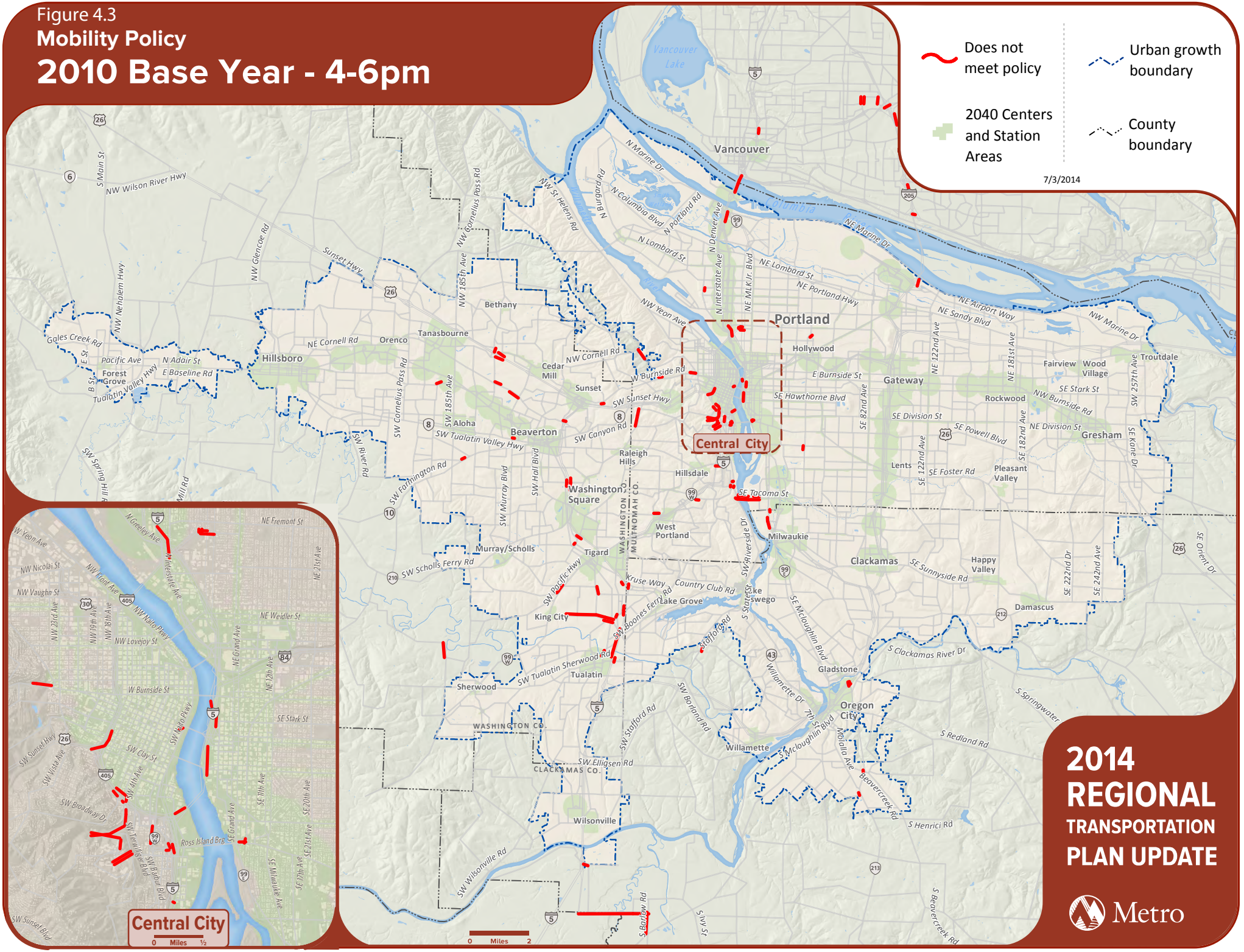
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.3

Mobility Policy

2010 Base Year - 4-6pm



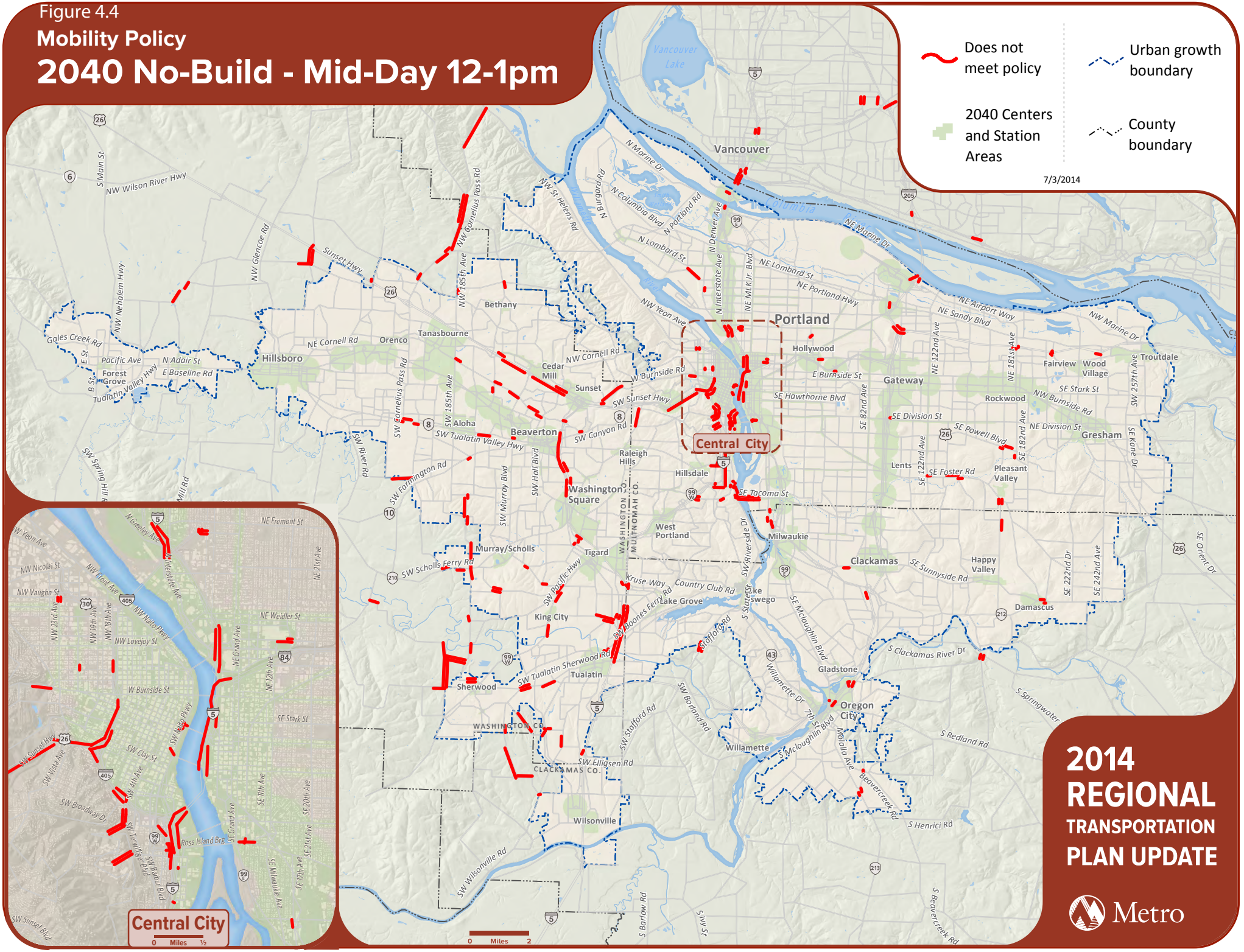
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.4

Mobility Policy

2040 No-Build - Mid-Day 12-1pm



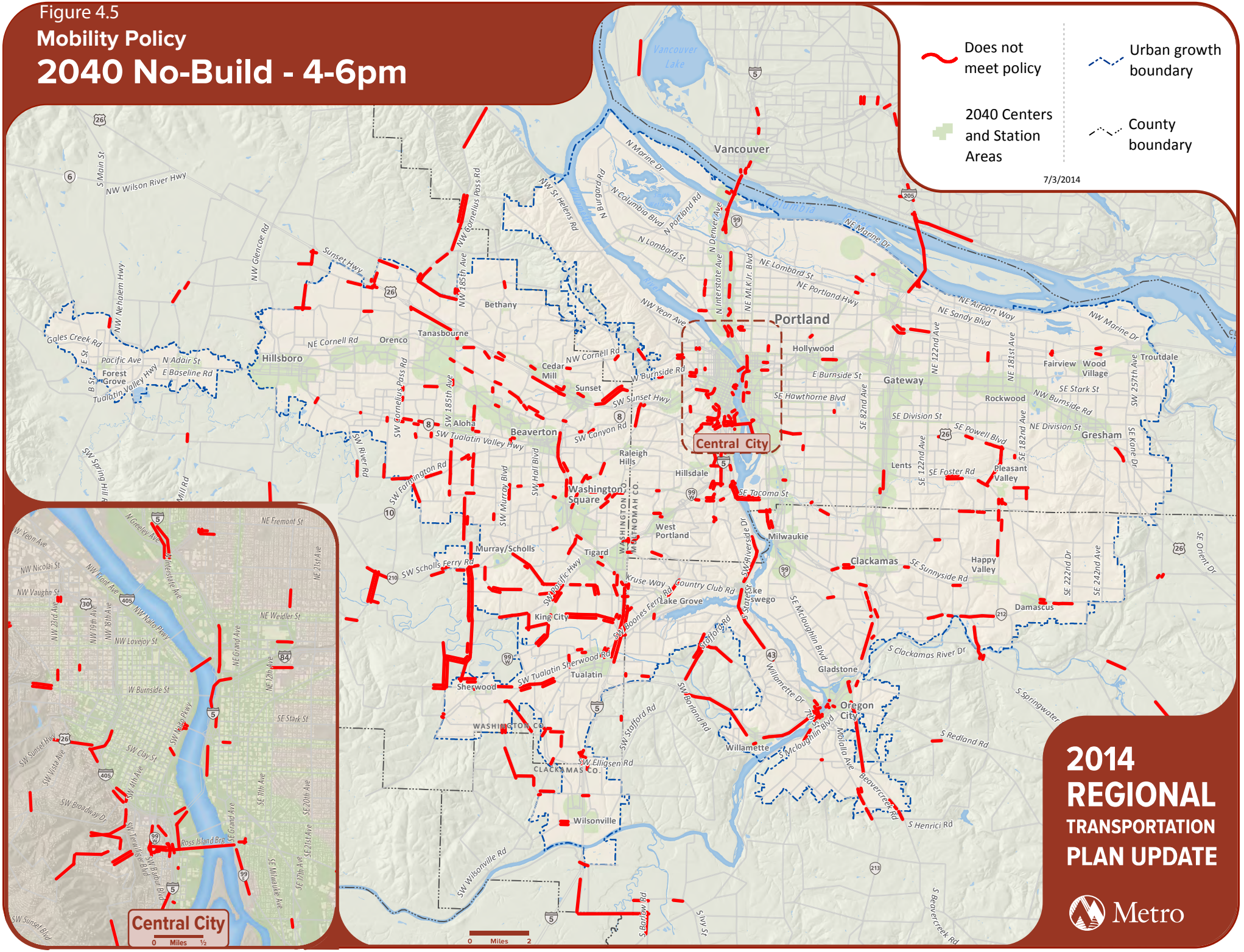
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.5

Mobility Policy

2040 No-Build - 4-6pm



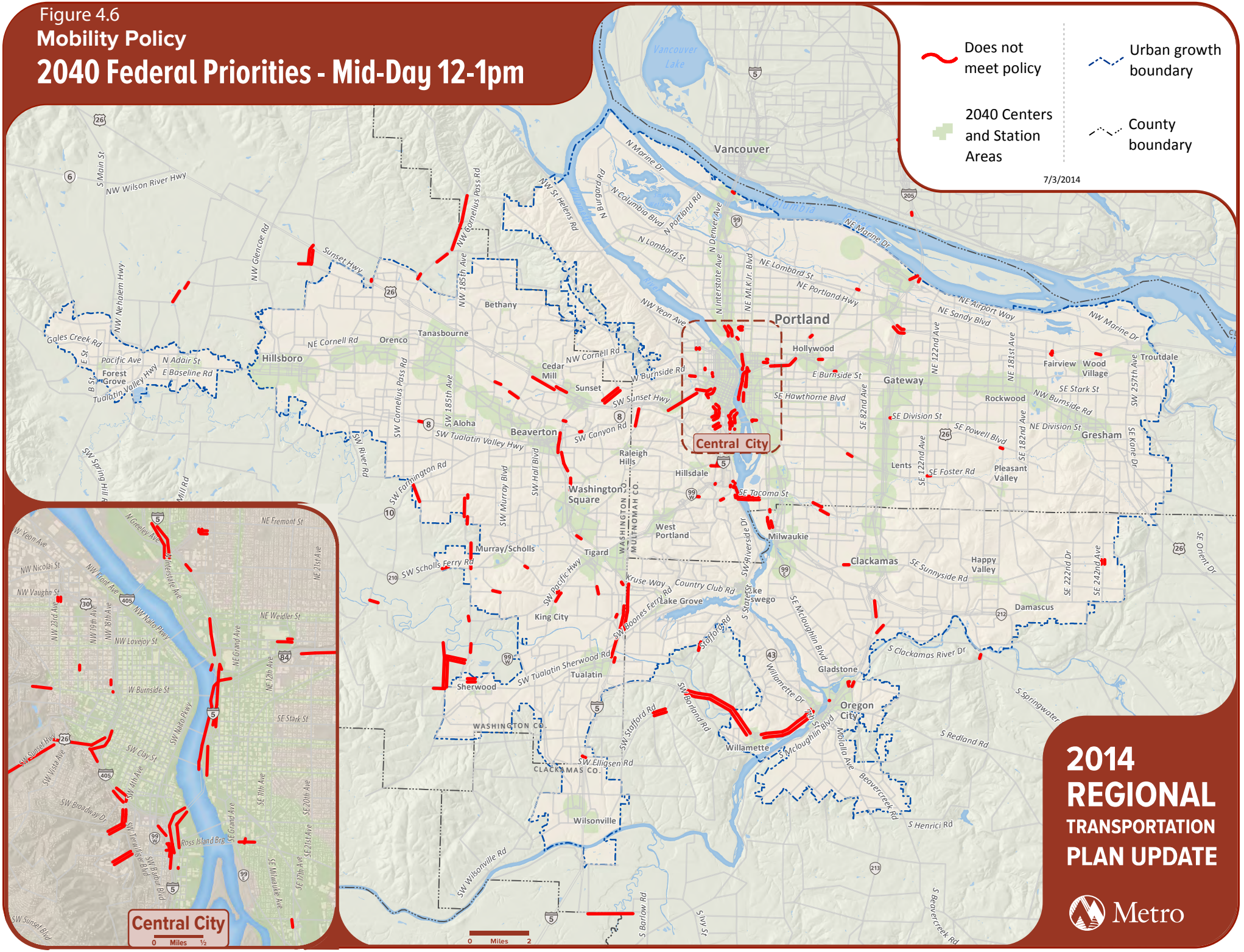
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.6

Mobility Policy

2040 Federal Priorities - Mid-Day 12-1pm



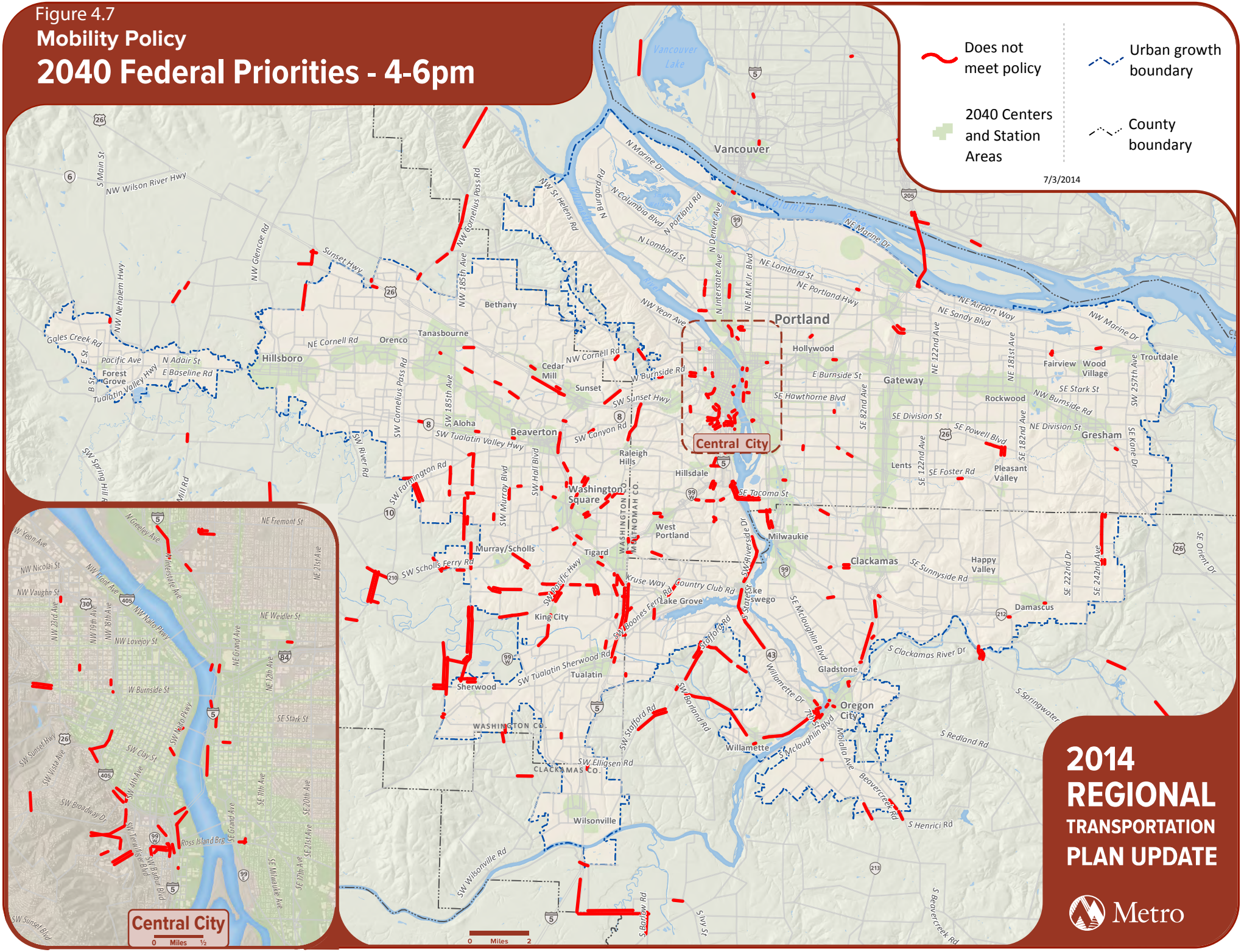
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.7

Mobility Policy

2040 Federal Priorities - 4-6pm



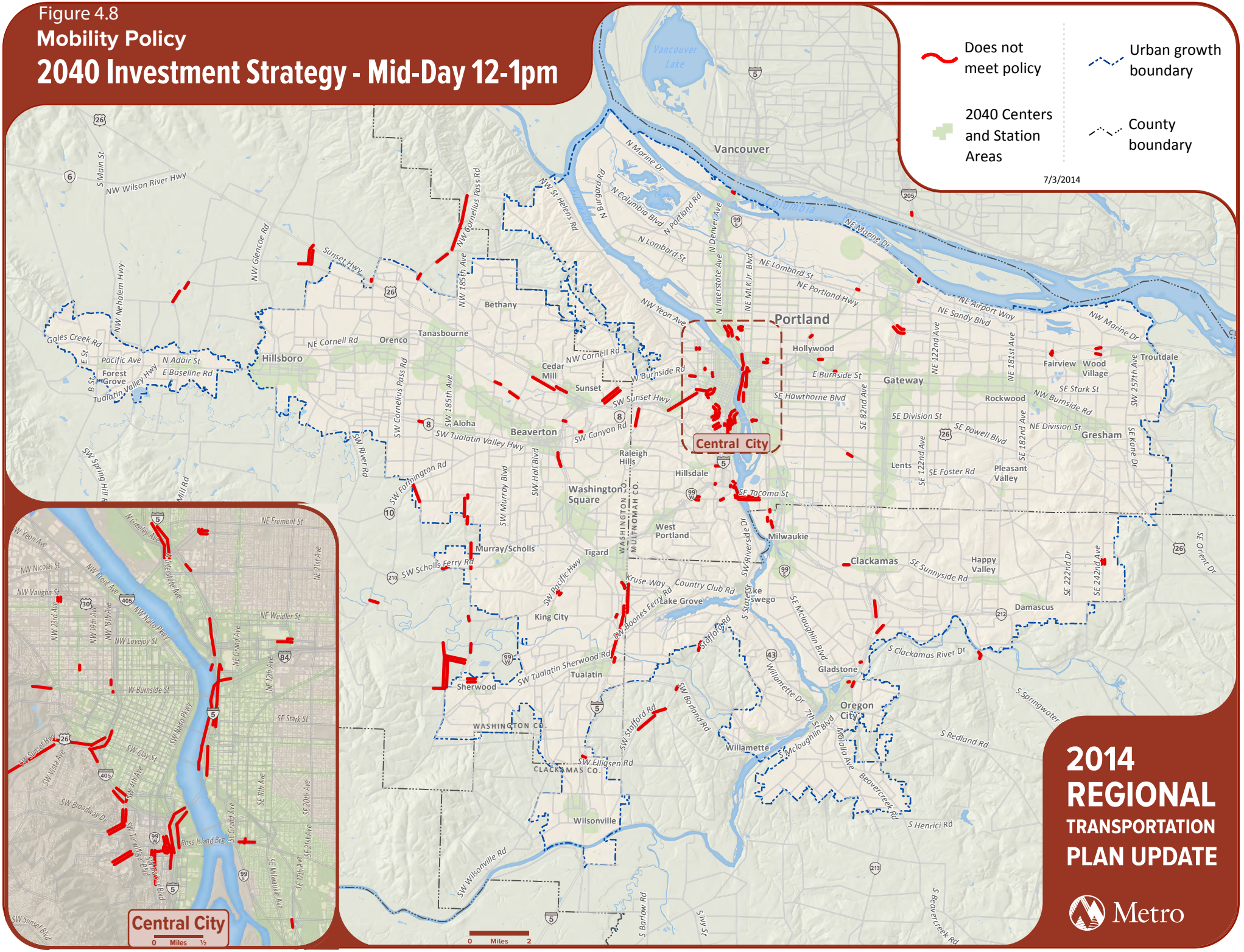
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.8

Mobility Policy

2040 Investment Strategy - Mid-Day 12-1pm



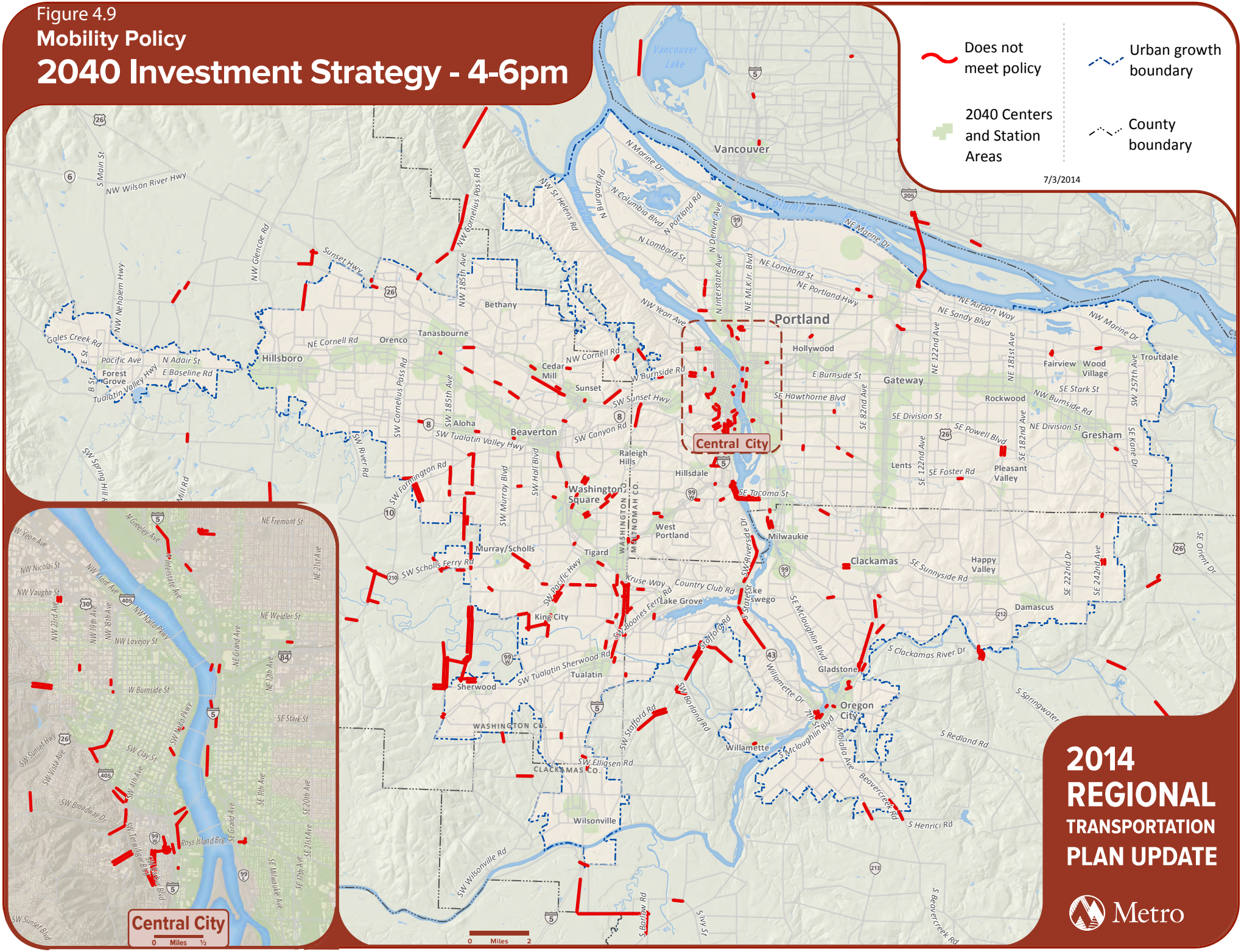
2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

Figure 4.9

Mobility Policy

2040 Investment Strategy - 4-6pm



2014 REGIONAL TRANSPORTATION PLAN UPDATE

Metro

5. Mode share for walking, bicycling, transit and shared ride (non-drive alone mode share)

Data source: Metro travel forecast model

Description: Evaluates percent of non-drive alone trips (daily walking, bicycling, shared ride and transit trips) at multiple levels (system-wide, central city and individual regional centers). The data is categorized by 'trips within' and 'all trips'. 'Trips within' encompasses all trips that occur within the center or corridor. 'All trips' encompasses trips to, from and within the center or corridor.

Target direction: Increase non-drive alone mode share.

Findings:

System-wide and Centers

In 2040, system-wide non-drive alone mode share grows slightly from the 2010 Base Year. When compared to the 2040 No Build, both 2040 RTP investment systems slightly increase the percentage share of non-drive alone trips. The data shows an increase in non-drive alone trips for all centers in both 2040 RTP Investment systems and the No Build.

System-wide non SOV mode share	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Within the UGB	54.9%	54.8%	56.5%	57.0%
Total Region	55.4%	55.6%	57.8%	58.5%

Centers Non SOV mode share	2010 Base Year		2040 No Build		2040 RTP Federal Priorities System		2040 RTP Investment Strategy	
	Trips Within*	All Trips**	Trips Within*	All Trips**	Trips Within*	All Trips**	Trips Within*	All Trips**
Portland central city	78%	63%	78%	64%	83%	71%	83%	72%
Amberglen regional center	63%	51%	62%	50%	65%	53%	66%	53%
Beaverton regional center	66%	52%	69%	53%	73%	56%	74%	57%
Clackamas regional center	64%	52%	66%	52%	70%	55%	70%	55%
Gateway regional center	64%	52%	68%	54%	70%	57%	71%	58%
Gresham regional center	62%	52%	64%	53%	66%	56%	66%	56%
Hillsboro regional center	63%	53%	62%	51%	65%	53%	65%	54%
Oregon City regional center	61%	49%	61%	49%	63%	50%	63%	51%
Vancouver, WA central business district	65%	51%	66%	52%	67%	54%	68%	54%
Washington Square regional center	65%	50%	65%	49%	68%	51%	68%	52%

6. Transit productivity

Data source: Metro Travel Forecast Model and area transit agencies

Description: Evaluates average weekday (AWD) transit boarding rides per revenue hour for high capacity transit and bus combined.

Target direction: Increase AWD transit boarding rides and revenue hours of service

Findings: Total boardings and revenue hours of transit service both increase dramatically between 2010 and 2040 for all investment strategies. The Federal Priorities System and the 2040 RTP Investment Strategy both increase significantly in total boardings and revenue hours of service over the 2040 No Build reflecting the addition of new high capacity transit and expanded bus service.

Transit productivity	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Total Boardings	447,529	699,242	1,015,462	1,183,147
Revenue Hours	5,669	6,456	8,085	10,447
AWD transit boardings/revenue hour*	79	108	126	113

*For the entire region including transit agencies serving Clark, Clackamas, Multnomah and Washington counties

7. Homes within ½ mile of the regional trail system

Data source: Metro RLIS

Description: Evaluates household access to regional trail system by number and percent of homes.

Target direction: Increase access to regional multi-use trail system.

Findings: In the 2010 base year nearly 29% of households in the Metro area are within ½ mile of a regional trail. This % increases greatly in both the 2040 Federal Priorities as well as the 2040 RTP Investment strategy, while is decreases in the 2040 No Build.

	2010 Base Year		2040 No Build		2040 RTP Federal Priorities System		2040 RTP Investment Strategy	
Regional trail system	# of HH	% of HH	# of HH	% of HH	# of HH	% of HH	# of HH	% of HH
	172,400	28.9%	240,615	27.1%	440,274	49.6%	443,697	50.0%

8. Environmental justice performance measure (Under Development)

Data source: Metro RLIS and U.S. Census

Description:

Target direction:

Findings:

9. Tons of transportation-related air pollutants

Data source: DEQ and Metro

Description: Evaluates levels of carbon monoxide (CO), nitrogen oxide (NOX), volatile organic compounds (VOC), and particulate matter (PM10).

Target direction: Decrease pounds of air pollutants.

Findings: All three 2040 systems show a significant reduction of CO, NOX, VOC and PM10 compared to both summer and winter Base Year measurements.

Type of pollutant (in tons)	2010 Base Year		2040 No Build		2040 RTP Federal Priorities System		2040 RTP Investment Strategy	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Carbon monoxide (CO)	331,177	448,264	172,460	290,047	172,303	289,665	173,330	290,876
Nitrogen oxide (NOX)	96,197	84,786	20,699	17,305	20,605	17,309	20,692	17,400
Volatile organic compounds (VOC)	21,070	20,038	6,144	5,506	6,008	5,413	5,981	5,396
Particulate matter 10 exhaust (PM10)	2,910	3,304	670	1,141	666	1,137	669	1,141

10. Tons of transportation-related greenhouse gas (GHG) emissions

Data source: DEQ and Metro

Description: Evaluates level of carbon dioxide (CO_2), a primary greenhouse gas pollutant.

Target direction: Decrease tons of transportation-related CO_2.

Findings: All three systems will increase tons of transportation GHG emissions from 2010 Base Year levels, but both the 2040 Federal Priorities and 2040 Investment Strategy show reductions in GHG emissions from the 2040 No Build.

Carbon dioxide (in tons, measured in summer)	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Transportation-source GHG emissions	13,698	15,175	14,991	15,012

11. Percent of new transportation projects that intersect high value habitat areas

Data source: Metro Regional Land Inventory System (RLIS)

Description: Evaluates impact of transportation investments on Regional Conservation Strategy high value habitat areas.

Target direction: Decrease transportation impacts on high value habitat areas.

Findings: There is a similar % of projects in the 2040 Investment Strategy as in the 2040 Federal System that intersect high value habitat areas.

	2010 Base Year	2040 No Build	2040 RTP Federal Priorities System	2040 RTP Investment Strategy
Number of projects that intersect high value habitat areas	N/A	N/A	254	311
Percent of projects that intersect high value habitat areas	N/A	N/A	24.7%	24.8%

4.4 2040 RTP OTHER POTENTIAL ENVIRONMENTAL IMPACTS

In addition to system evaluation measures #8 – #11, Metro has updated its environmental impact analysis from the last RTP. This system level analysis responds to federal requirements to discuss potential environmental mitigation activities and potential areas to carry out these activities. A summary of this analysis is presented below.

4.4.1 Methodology

Metro identified the potential areas of conflict between the proposed RTP project and protected environmental features identified in the planning area. Using Geographic Information System (GIS) mapping software, different environmental features of the planning area were overlaid with the projects identified in the pool of projects identified for the RTP. It is important to note that the

potential alignments for proposed projects are conceptual until more detailed project development work is conducted.

4.4.2 Regionally Significant Fish and Wildlife Habitat Inventory Analysis

This analysis used the Regional Conservation Strategy's high value habitat as its basis. The Regional Conservation Strategy is intended to serve as a framework for efforts to conserve biodiversity within the greater Portland-Vancouver region. Data was developed from 2010 to 2013 by the Intertwine – a broad coalition of public, civic, private, and nonprofit organizations. The analysis considered many features, including existing vegetation, wetlands, habitat patch size and shape, and the presence of roads. High Value areas ranked in the top one-third of all areas because of the type, location, and size of their habitat.

Metro intersected the RTP projects with the high value habitat areas. The results can be found in system evaluation measure #11 earlier in this section.

It is important to note that the potential alignments for proposed projects are conceptual until more detailed project development work is conducted. Projects that intersect high value areas should consider mitigation strategies as well as alignment options that avoid the resource area during future project development. See RTP project list in Appendix for flagging of projects that intersect high-value habitat areas.

4.4.3 Air Quality Analysis

Metro estimates future carbon monoxide, precursors of smog (volatile organic compounds and oxides of nitrogen) and carbon dioxide emissions from cars and trucks operating within the greater Portland air shed to the year 2040 using EMME/2 modeling software and MOVES 2010, the latest model approved by the U.S. Environmental Protection Agency (EPA). The emissions analysis demonstrates that the Portland area meets both Federal and State air quality standards. The results of this analysis can be found in system evaluation measure #9 earlier in this chapter. See the 2014 Regional Transportation Plan and 2014-2018 Metropolitan Transportation Improvement Program Air Quality Conformity Determination for the detailed analysis.

4.4.4 Tribal Lands Analysis

Metro reviewed tribal lands data available from the Bureau of Indian Affairs to identify potential federally recognized tribal lands in the planning area. None were identified within or adjacent to the Metro planning area.

4.4.5 Environmental Justice Analysis

As an entity utilizing federal funds, Metro is responsible for successful integration of environmental justice (EJ) standards into its transportation program and planning activities. Any program or activity receiving federal financial assistance cannot discriminate against people based on race, color, national origin, age, sex, disability, religion or income status nor prohibit a person from

participating in regional activities. RTP investments were programmatically evaluated to the census geographies of identified Environmental Justice Communities (including people of color, low-income people, older adults, young people, and people with limited English proficiency). Results will be reported in system evaluation measure #8 (still being developed at this time) earlier in this chapter. For more details, including maps, see the 2014 Regional Transportation Plan and 2015-2018 Metropolitan Transportation Improvement Program Environmental Justice and Title VI Report.

CHAPTER 5

IMPLEMENTATION:

HOW DO WE IMPLEMENT OUR STRATEGY?

5.1 FRAMEWORK FOR CHANGE: SETTING A NEW COURSE FOR TRANSPORTATION

Over the past year, Metro worked with state and local government partners as well as residents, community groups, and businesses to develop the 2014 Regional Transportation Plan. The result of that work is a plan that responds to transportation needs and demands based on our shared community values and the outcomes we are trying to achieve as a region. The policies, projects and strategies in this plan also address federal, state and regional planning requirements.

The RTP is moving away from a single measure of success to an outcomes based planning framework.

The plan sets a new course for future transportation decisions and implementation of the 2040 Growth Concept. The plan takes into account the changing circumstances and challenges we face and addresses them directly, adopting new approaches that distinguish this plan from past RTPs. Central to this plan are innovative approaches such as strong links between community aspirations and transportation investments and multi-pronged regional mobility corridor strategies to maximize operations on existing highways, roads and transit networks and strategically expand the transit and roadway system.

This RTP is moving away from a single measure of success and has adopted an outcomes-based planning framework with an emphasis on desired outcomes and measurable performance. Policies have shifted from primarily using roadway level-of-service to a broader system completion policy to define system needs.

Through its policies, projects and strategies, the 2014 RTP aims to attract jobs and housing to downtowns, main streets and employment areas. It seeks to increase the use of public transit, improve the safety, convenience and appeal of bicycling and walking, and reduce miles traveled and emissions by cars and trucks in the metropolitan region. It also seeks to increase the safety, reliability and efficiency of the roadway and transit systems for all users. When we measure our performance, we find we have some successes, but overall the RTP falls short of meeting all of the performance targets set forth in Chapter 2.

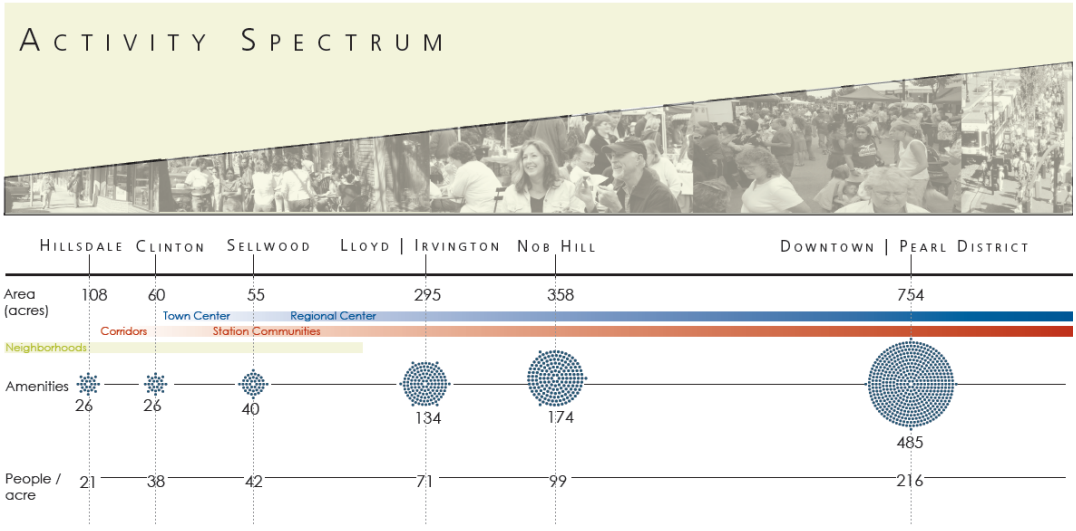
To continue making progress toward the goals and vision of the plan, the region must take additional steps. The plan will be implemented through a variety of strategies and actions at the local, regional, state and federal levels. The various jurisdictions in the region are expected to pursue policies, projects and strategies that contribute to specific elements of the vision.

Implementation of this plan will require a cooperative effort by all jurisdictions responsible for transportation planning in the region, and will involve:

- Adoption of regional policies and strategies in local plans.
- A concerted regional effort to secure needed funding to build planned transportation facilities needed to serve a growing region.
- Focusing strategic investments and system management policies that leverage 2040 Growth Concept implementation and preserve the function of the region's mobility corridors.
- Periodic updates of the plan to respond to development trends and the associated changes in travel demand.
- Incorporating land use and transportation needs and solutions identified in each mobility corridor strategy in local plans.
- Ongoing monitoring for consistency of changes to local transportation system plans (TSPs) and local Comprehensive Plans and land use designations with the RTP and other agency plans, including the Oregon Department of Transportation's Oregon Highway Plan and four-year State Transportation Improvement Program (STIP), the Oregon Department of Land Conservation and Development's Transportation Planning Rule (TPR), and TriMet's Transit Implementation Plan (TIP).

5.2 Implementation of the Community Building Strategy

In an effort to better understand how and where local communities intend to grow and how the region can support them, Metro asked local cities and counties to summarize their aspirations for how their communities will develop and function over the next few decades. The aspirations reflect the communities' priorities for redevelopment, the values that guide their decisions and the challenges and barriers they anticipate to achieving these aspirations. The activity spectrum illustrated below provided a tool for local governments to consider the type and level of activity they would like for regional and town centers, station communities, corridors and main streets in their community.



The community building strategy described in Chapter 2 recognizes the important role of transportation in placemaking to achieve the 2040 Growth Concept vision. The concept calls for cultivating great communities by investing in the community assets essential to making downtowns, main streets and employment areas better places to live and work. Typically, these are investments that help revitalize centers and main streets or provide critical access to industrial lands and freight intermodal facilities.

The activity spectrum provides a tool to identify community building investments needed to serve centers and main streets, the RTP emphasizes streetscape retrofits, building new street connections, transit, completing missing sidewalks, bicycle and trail connections in downtowns, centers and along main streets to leverage higher density mixed-use development and transit investments such as frequent bus, street car or high capacity transit.

In industrial and employment areas, the RTP emphasizes providing critical freight access to the interstate highway system and protecting interchange capacity to help the region's businesses and industry in these areas remain competitive. This means strategically adding road capacity to arterials and building new street connections in these areas, in addition to providing access to support commercial delivery activities and upgrading main line and rail yard infrastructure.

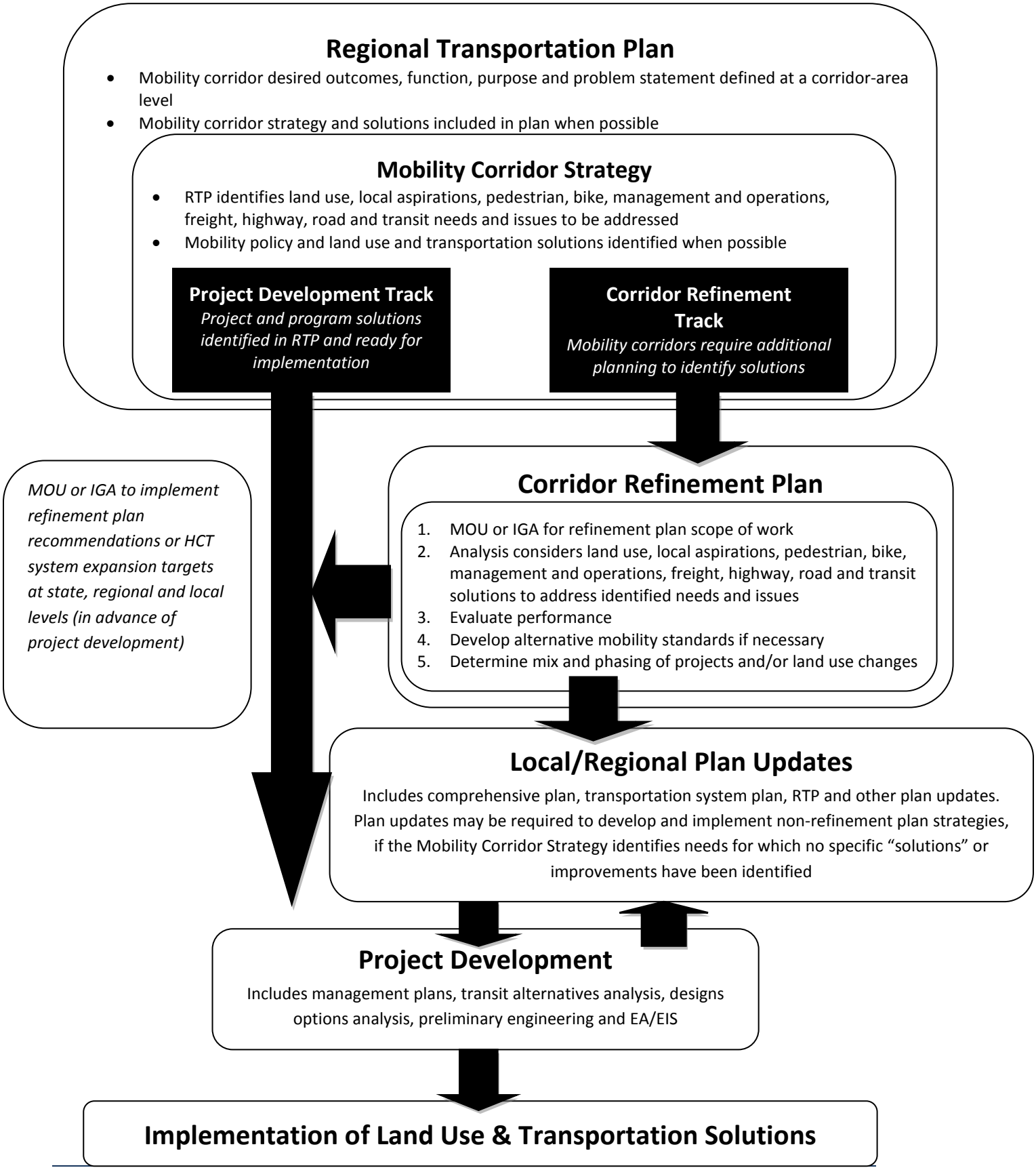
Achieving all of these aspirations requires different types and amounts of investments by local governments, Metro and the private sector in order to achieve on-the-ground results. More work is being done to better understand what is needed to fulfill these aspirations. Metro summarized the needs identified by local governments for 16 different types of investments in five community design types described in the 2040 Growth Concept: central city (Downtown Portland), corridors, employment areas (including industrial areas), town centers and regional centers in an Investment Matrix. Many of these community building investments will be defined through local transportation system plans and other local plans, connecting back to community aspirations for these areas. The Investment Matrix will inform local and regional policy and investment decisions and longer-term efforts to refine tools that assist with the achievement of these aspirations.

5.3 Implementation of the Mobility Corridor Strategy

The RTP Appendix details the needs and strategies for all 24 of the regional mobility corridors. The idea of a mobility corridor strategy emerged to better ground the outcome-based policy framework of the RTP and to demonstrate compliance with state TPR requirements. The strategies are scoping tools to document land use and transportation needs, functions for all modes, and potential solutions for each mobility corridor. Mobility corridors that have uncertainty surrounding transportation needs, modes, function and potential solutions require a corridor refinement plan.

Figure 5.1 shows the framework for how the mobility corridor strategy will be incorporated into the RTP or developed through a corridor refinement plan.

Figure 5.1 – How A Mobility Corridor Strategy Is Developed and Implemented



5.3.1 Corridor Refinement Planning

The State of Oregon Transportation Planning Rule (TPR) section 660-012-0020 requires that transportation system plans (TSPs) establish a coordinated network of planned transportation facilities adequate to serve regional transportation needs. The RTP is the region's TSP. Section 660-012-0025 of the TPR allows a Metropolitan Planning Organization (MPO) to defer decisions regarding function, general location and mode as long as it can be demonstrated that the refinement effort will be completed in the near future.

If a TPR determination cannot be made based on the information available, a mobility corridor would need a corridor refinement plan as defined by the TPR. A corridor refinement plan includes the following steps:

- MOU or IGA for refinement plan scope of work
- Analysis that considers land use, local aspirations, pedestrian, bike, management and operations, freight, highway, road and transit solutions
- Evaluate performance
- Develop alternative mobility standards, if necessary
- Determine mix and phasing of projects and/or land use changes needed to address function and needs
- Local and/or regional plan updates and MOU or IGA to implement refinement plan recommendations at state, regional and local levels
- HCT system expansion targets policy MOU, if applicable.

This process represents a change in how mobility corridors are planned for and analyzed to more comprehensively consider land use, management, walking and biking solutions in addition to traditional transit and highway-focused analyses. The refinement plan will result in a wide range of strategies and projects to progress through project development and implementation at the local, regional and/or state levels.

Individual project and program solutions identified in the RTP may move forward to project development at the discretion of the facility owner/operator. The MOU or IGA from a corridor refinement plan is intended to provide more accountability and to formalize agreements across implementing jurisdictions on moving forward to implement the corridor refinement plan recommendations. This is particularly important in corridors with multiple jurisdictions.

Mobility Corridors Recommended for Future Corridor Refinement Plans
The main objective of the RTP mobility corridor work program was to gather information to help define the need, mode, function, performance standards, and general location of facilities within each mobility corridor consistent with the TPR. The needs assessment was developed based on the

RTP policy framework and was used to guide the identification of projects and programs during the RTP system development phase.

Under the mobility corridor concept framework, when determinations of needs, modes, functions, and scope and general location of solutions cannot be made, the mobility corridor needs a refinement plan. Corridor refinement plans are intended to be multi-modal evaluations of possible transportation solutions, including land use solutions.

Using the results of the mobility corridor work program, the RTP has identified a list of mobility corridors that do not meet the outcomes performance standards of the RTP and do not fully answer questions of mode, function and general location. These corridors need refinement planning and are listed in **Table 5.1**. In addition, most potential HCT Corridors identified in the Regional HCT Plan are likely to require Corridor Refinement Plans to resolve issues of changes in transit function and any associated changes in vehicular or freight rail function and performance standards of existing transportation facilities.

Table 5.1
Mobility Corridors Recommended for Future Corridor Refinement Plans

Mobility Corridors #2 and #3 - Portland Central City to Wilsonville and Sherwood, which includes I-5 South[1]
Mobility Corridor #4 - Portland Central City Loop, which includes I-5/I-405 Loop
Mobility Corridors #7, #8 & #9 - Clark County to I-5 via Gateway, Oregon City and Tualatin, which includes I-205
Mobility Corridor #24 - Beaverton to Forest Grove, which includes Tualatin Valley Highway

5.3.1.1 Portland Central City to Tigard (Mobility Corridor #2)

This corridor provides access to the Central City and to neighborhoods and commercial areas in the inner southwest quadrant of the region. Barbur Boulevard is identified as a multi-modal facility with potential light rail or Rapid Bus, as well as serving a regional role for motor vehicle, bicycle and pedestrian systems. I-5 in this corridor is a Main Roadway route for freight and a Principal Arterial for motor vehicles extending southward beyond the region.

Segments of both Barbur Boulevard and I-5 in this corridor experience significant congestion and poor service levels, especially from the Terwilliger interchange northward. However, high capacity transit service along Barbur Boulevard and other expanded bus services are expected to experience promising ridership levels. Significant localized congestion occurs along the intersecting street segments of Bertha, Terwilliger and Capitol Highway/Taylors Ferry roads. Broad street cross-sections, angled intersections and limited signalized crossing opportunities along Barbur Boulevard create traffic safety hazards and inhibit walking to local destinations and access to transit services.

A corridor refinement plan was proposed in the last RTP to address the following in coordination with corridor refinement planning for Mobility Corridor #3 and project development activities for Mobility Corridor 20:

[1] In coordination with project development activities for Mobility Corridor #20.

- Regional and local transit services and facilities needed to serve the Barbur corridor within the RTP planning horizon.
- Possible new locations or relocations for I-5 on-ramps and off-ramps and street connections across the freeway right-of-way.
- Opportunities for new or improved local street connections to Barbur Boulevard.
- Added capacity on parallel arterials, and arterial street connectivity, consistent with the regional street design concept and regional street system design concept.
- Facilities to improve bicycle and pedestrian safety along Barbur Boulevard and access to transit services and local destinations.
- Provide additional overcrossings in West Portland town center to improve local circulation and interchange access management
- Traffic management and intelligent transportation system improvements along I-5, Barbur Boulevard and other parallel arterials within the corridor.
- Potential mainline freeway improvements, including possible southbound truck climbing lanes.
- Identify and implement safety and modernization improvements to I-5 defined by the Portland Central City to Tigard Corridor Refinement Plan.

Southwest Corridor Plan

To address the potential for High Capacity Transit and other needs in this mobility corridor and the I-5/Highway 99W corridor between Tigard and Tualatin/Sherwood, Metro, in collaboration with local partners, ODOT and TriMet, developed the Southwest Corridor Plan. The Southwest Corridor Plan is a comprehensive approach to achieving community visions through integrated land use and transportation planning. The plan incorporates existing local land use visions, such as the Barbur Concept Plan, the Tigard High Capacity Transit Land Use Plan, Linking Tualatin and the Sherwood Town Center Plan.

During the summer of 2012 local partners in the Southwest Corridor Plan developed a wide range of alternatives that included improvements in roadways, transit, bicycle and pedestrian facilities, parks and natural areas, and regional trails. Later the range of alternatives was narrowed based on land use priorities and the ability to serve a high capacity transit investment in the corridor. In July 2013, the Southwest Corridor Plan Steering Committee recommended a shared investment strategy, identifying key investments in roadways, active transportation, parks, trails and natural areas, as well as specific options for high capacity transit to be studied further in the refinement phase. To better understand and refine high capacity transit in the corridor, the Southwest Corridor Plan Steering Committee directed Metro to study in more detail:

- two potential transit modes: light rail and bus rapid transit;

- between 50 and 100 percent of the bus rapid transit alignment being in exclusive right of way;
- a transit line that connects Portland to downtown Tualatin, via Tigard.

Based on the shared investment strategy, the refinement phase for potential high capacity transit connections between Portland, Tigard and Tualatin will be completed by the summer of 2014. During the refinement phase, project partners will further narrow the high capacity transit design options that came out of the initial phase of the Southwest Corridor Plan and move forward the most promising options for further study under the National Environmental Policy Act (NEPA).

5.3.1.2 Tigard to Wilsonville (Mobility Corridor #3)

This mobility corridor provides the major southern access to and from the central city. The corridor also provides important freight access, where Willamette Valley traffic enters the region at the Wilsonville "gateway," and provides access to Washington County via OR 217.

In 2002, a joint ODOT and Wilsonville study[2] concluded that in 2030 widening of I-5 to eight lanes would be required to meet Oregon Highway Plan and RTP mobility standards, and that freeway access capacity would not be adequate with an improved I-5/Wilsonville Road interchange. The appropriate improvements in this corridor are unclear at this time. However, I-5 serves as a critical gateway for regional travel and commerce, and an acceptable transportation strategy in this corridor has statewide significance. Projections for I-5 indicate that growth in traffic between the Metro region and the Willamette Valley will account for as much as 80 percent of the traffic volume along the southern portion of I-5, in the Tualatin and Wilsonville area.

A corridor refinement plan is proposed to address the following in coordination with corridor refinement planning for Mobility Corridor #2 and project development activities for Mobility Corridor #20:

- Effects of widening I-205 on the I-5 South corridor
- Effects of the I-5 to 99W Connector study recommendations on the N. Wilsonville interchange and the resultant need for increased freeway access
- Effects of peak period and mid-day congestion in this area on regional freight reliability, mobility and travel patterns
- Ability of inter-city transit service, to/from neighboring cities in the Willamette Valley, including commuter rail, to slow traffic growth in the I-5 corridor
- Ability to maintain off-peak freight mobility with capacity improvements
- Potential for better coordination between the Metro region and Willamette Valley jurisdictions on land-use policies

[2] I-5/Wilsonville Freeway Access Study, DKS Associates, November 2002

- Effects of a planned long-term strategy for managing increased travel along I-5 in the Willamette Valley
- Effects of UGB expansion and Industrial Lands Evaluation studies on regional freight mobility
- Effects to freight mobility and local circulation due to diminished freeway access capacity in the I-5/Wilsonville corridor
- Identify and implement safety and modernization improvements to I-5 defined by the Tigard to Wilsonville Corridor Refinement Plan in phases totaling over $600 million
- I-5/OR217 Interchange Phase 2: SB OR217/Kruse Way Exit – Complete interchange reconstruction: Braid SB OR 217 exit to I-5 with Kruse Way exit, approximately $50 million
- I-5/OR217 Interchange Phase 3: SB OR217 to I-5 NB Flyover Ramp – Complete interchange reconstruction with new SB OR217 to NB I-5 flyover ramp - $30 million

In addition, the following design elements should be considered as part of the corridor refinement plan:

- Peak period pricing and HOV lanes for expanded capacity
- Provide regional transit service, connecting Wilsonville to the central city
- Provide additional freeway access improvements in the I-5/Wilsonville corridor to improve freight mobility and local circulation
- Add capacity to parallel arterial routes, including 72nd Avenue, Boones Ferry, Lower Boones Ferry and Carman Drive
- Add overcrossings in vicinity of Tigard Triangle and City of Wilsonville to improve local circulation
- Extend commuter rail service from Salem to the Portland Central City, Tualatin transit center and Milwaukie, primarily along existing heavy rail tracks
- Additional I-5 mainline capacity
- Provision of auxiliary lanes between all I-5 freeway on- and off-ramps in Wilsonville.

5.3.1.3 Portland Central City Loop (Mobility Corridor #4)

In 2005, the I-5/405 Freeway Loop Advisory Group (FLAG) completed its review of the near- and long-term transportation, land use, and urban design issues regarding the I-5/405 Freeway Loop. Appointed by Mayor Vera Katz and the ODOT Director in 2003, the 24-member group developed and evaluated concepts to address identified transportation issues and needs. The concepts represented a range of options that included modest improvements within existing right-of-way, a

One-Way Loop System, and a full tunnel that would connect the Freeway Loop to I-84 and Sunset Highway. The three concepts were evaluated against the region's proposed transportation system, along with projected employment and household growth, for the year 2030.

In completing its initial review, FLAG found that additional master planning work is needed to identify, prioritize and fund specific projects, and that short-term or interim investments should move forward while the master planning work is being completed. FLAG recommended that planning on I-84/I-5 interchange and the I-5 elements of South Portland Plan contemplated in the area of the interchange of I- 405 and I-5 may proceed independent of the Master Plan with the understanding that the final plan for any such project would be consistent with the Master Plan. In addition, the study recommended advancing a corridor refinement plan to begin to identify short-term and long-term investments and a recommended scope, problem statement and set of principles:

Scope

- Develop an overall Freeway Loop Corridor Refinement Plan that will guide public investment for improvements to the I-5/405Freeway Loop.
- Develop a phasing strategy for implementation of the Master Plan. Include the currently approved Regional Transportation Plan improvements as well as new elements.
- Identify and pursue a funding strategy.

Proposed Purpose Statement

Improvements to the I-5/4-5 Freeway Loop must address long-term transportation and land use needs in a system-wide context. Because the movement of people and goods is a vital economic function, changes must be considered in relation to local, regional, and statewide geographies. Freeway Loop improvements should enhance, not inhibit, high-quality urban development, and should function as seamless and integral parts of the community.

Proposed Principles

These objectives will guide the selection and evaluation of options in the next phase:

- Maintain or enhance transportation performance, including highway and transit performance.
- Support a multi-modal strategy for automobiles, transit, trucks, bicycles, and pedestrians.
- Support trade and freight movement to facilitate regional and state economic development.
- Support local, regional, and state land use plans.
- Ensure regional accessibility to and from the Central City to reinforce its significant statewide, regional, and national economic role.

- Support economic activities and new investments in the Central City and in adjacent industrial areas.
- Improve the quality of the built environment and connections across facilities.
- Avoid or minimize negative impacts on the natural environment.
- Evaluate facility improvement costs relative to the distribution of benefits and impacts.
- Develop strategies that can be implemented in phases.

As directed by the FLAG's recommendations, planning proceeded on the I-84/I-5 section of the Loop under the N/NE Quadrant and the I-5 Broadway-Weidler Interchange Improvement Planning process. The key recommendations from the adopted 2012 N/NE Quadrant Plan include:

- Preserving and enhancing Lower Albina by protecting the working harbor and increasing land use flexibility that promotes a mix of uses on historic Russell Street and greater employment densities;
- Protecting historic neighborhoods and cultural resources;
- Concentrating high density development in the Lloyd District, with a focus on new residential development that will add activity and vibrancy to the district;
- Providing amenities, such as parks, street improvements and green infrastructure to support and encourage new development;
- Improving regional access and local street safety and connectivity for all modes;
- Encouraging sustainable development that supports the Lloyd EcoDistrict and goals for improved environmental health;
- Future changes to zoning and building height regulations that implement the plan goals.

Key recommendations for the I-5 Broadway-Weidler Plan include:

- Adding auxiliary lanes and full-width shoulders to improve traffic weaves and allow disabled vehicles to move out of traffic lanes;
- Rebuilding structures at Broadway, Weidler, Vancouver and Williams and adding a lid over the freeway that will simplify construction, increase development potential and improve the urban environment;
- Moving the I-5 southbound on-ramp to Weidler to improve circulation and safety;

Improving conditions for pedestrian and bicycle travel by adding new connections over the freeway and safer pedestrian and bicycle facilities in the interchange area.

5.3.1.4 Clark County to I-5 via Gateway, Oregon City and Tualatin (Mobility Corridors #7, 8 and 9)

Improvements are needed in this corridor to address existing deficiencies and expected growth in travel demand in Clark, Multnomah and Clackamas counties. Transportation solutions in this corridor should address the following needs and opportunities:

- Provide for some peak period and off-peak mobility and reliability for longer trips
- Preserve freight mobility from I-5 to Clark County, with an emphasis on connections to Highway 213, Highway 224 and Sunrise Corridor
- Maintain an acceptable level of access to the Oregon City, Clackamas and Gateway regional centers and Sunrise industrial area
- Maintain acceptable levels of access to PDX, including air cargo access
- Adding general purpose lanes to I-205 should be considered to meet state and regional policies, to bring the freeway up to three through lanes in each direction in the southern section from Oregon City to I-5. Interchange improvements, auxiliary lanes and other major operational improvements such as ramp improvements and other weaving area improvements in the corridor should also be considered. Specific projects to be considered to meet identified needs include: Southbound truck climbing lanes from Willamette River to 10th St. interchange, over $20 million; Interchange improvements at locations including: Division/Powell, Airport Way, OR213, OR 212/224, Sunrise, Johnson Creek Boulevard and others, totaling over $250 million; Auxiliary lanes, northbound and southbound in the following locations: Airport Way to Columbia Blvd., Columbia Blvd. to I-84, I-84 to Glisan, Glisan to Division/Powell, Division/Powell to Foster, Foster to Johnson Creek Boulevard, OR 212/224 to Gladstone, Gladstone to OR 99E, averaging $20 million each; totaling over $200 million; Widen to 6 lanes from Stafford Interchange to Willamette River, over $40 million; Widen Abernethy Bridge to 6 lanes plus auxiliary lanes, over $100 million; Improvements needed on OR 213 (82nd Avenue) include bicycle/pedestrian and streetscape improvements, totaling over $30 million.

Potential transportation and land use solutions in this corridor should evaluate the potential of the following design concepts:

- Auxiliary lanes added from Airport Way to I-84 East
- Consider express, peak period pricing or HOV lanes as a strategy for expanding capacity
- Relative value of specific ramp, overcrossing and parallel route improvements
- Eastbound HOV lane from I-5 to the Oregon City Bridge
- Truck climbing lane south of Oregon City

- Potential for rapid bus service or light rail from Oregon City to Gateway
- Potential for extension of rapid bus service or light rail north from Gateway into Clark County
- Potential for refinements to 2040 land-use assumptions in this area to expand potential employment in the sub-area and improve jobs/housing imbalance
- Potential for re-evaluating the suitability of the Beavercreek area for urban growth boundary expansion, based on ability to serve the area with adequate regional transportation infrastructure
- Provide recommendations to the Bi-State Coordination Committee prior to JPACT and Metro Council consideration of projects that have bi-state significance.

5.3.1.5 Beaverton to Forest Grove (Mobility Corridor #24)

A number of improvements are needed in this corridor to address existing deficiencies and serve increased travel demand. One primary function of this route is to provide access to and between the Beaverton and Hillsboro regional centers. Tualatin Valley Highway also serves as an access route to Highway 217 from points west along the Tualatin Valley Highway corridor. As such, the corridor is defined as extending from Highway 217 on the east to Forest Grove to the west, and from Farmington Road on the south to Baseline Road to the north. The following should be addressed as part of a corridor refinement plan:

- Develop an access management plan as part of a congestion management strategy
- Implement TSM and other interim intersection improvements at various locations between Cedar Hills Boulevard and Brookwood Avenue
- Relative trade-offs of a variety of capacity and transit improvements, including:
    a. Improvements on parallel routes such as Farmington, Alexander, Baseline and Walker roads as an alternative to expanding Tualatin Valley Highway
    b. Arterial improvements from Cedar Hills Boulevard or Murray Boulevard to Brookwood Avenue or Baseline Road in Hillsboro
    c. A limited access, divided facility from Cedar Hills Boulevard or Murray Boulevard to Brookwood Avenue, with three lanes in each direction and some grade separation at major intersections
    d. Transit service that complements both the function of Tualatin Valley Highway and the existing light rail service in the corridor
- Evaluate impacts of the principal arterial designation, and subsequent operation effects on travel within the Beaverton regional center

- Evaluate motor vehicle and street design designations of TV Highway as part of the plan to determine the most appropriate classifications for this route

- Transportation System Management – signal interconnects – from Beaverton to Aloha and Aloha to Hillsboro, over $4 million; transit service improvements to provide frequent bus service.

The TV Highway Corridor Plan (TVCP) is a "mobility corridor refinement" plan completed in June 2013. The TVCP studied the Beaverton to Hillsboro portion of the Beaverton to Forest Grove mobility corridor between Cedar Hills Boulevard (Beaverton Regional Center) and SE 10th Avenue/Maple Street (Hillsboro Regional Center). The northern boundary of the study area was Baseline Road/Jenkins road and the southern boundary was Farmington Road, Oak Street, Davis Street and Allen Boulevard. There are still two outstanding sections of the corridor left to be studied: within Beaverton (OR 217 to SW Cedar Hills Blvd) and from Hillsboro (west of SE 10th Avenue/Maple Street) to Forest Grove.

The TVCP was a joint effort between ODOT, Metro, the City of Hillsboro, the City of Beaverton and Washington County that focused an examination of the transportation system to identify needs and improvements for all modes of transportation. A number of improvements have been identified in this corridor to address existing deficiencies and safety concerns and serve increased travel demand.

A long-term transit solution for Tualatin Valley Highway has yet to be identified. In advance of this transit study additional land area is to be preserved for Business Access Transit (BAT) / High Capacity Transit (HCT) uses. This land area is not intended to be used for general purpose through lanes. Development along Tualatin Valley Highway shall consider opportunities so as to not preclude a future Business Access and Transit lane in the westbound direction, and to not preclude Bus pullouts in the eastbound direction.

<u>RTP Design and Functional Classifications.</u>
Early in the project, the TVCP PG gave policy direction to maintain the design and function of TV Hwy as an urban arterial that will not exceed motorized vehicle capacity of two through travel lanes in each direction. Consistent with this decision, proposed actions along TV Hwy will be developed during subsequent refinement planning and design work to maximize the use of the typical 100 feet to 107 feet of existing right-of-way (ROW) to serve multimodal travel. Additionally, the RTP Arterial & Throughway map and System Design Classification maps are amended. TV Highway will be changed from "Principal arterial" to "Major Arterial" on the Arterial & Throughway map. It will be changed from "Throughway" to "Regional Street" on the System Design map.

The TVCP recommendations fall into 3 categories: 1) Near Term Actions, 2) Opportunistic Actions, and 3) Longer Term Refinement Planning Needs.

Near Term Actions

The proposed improvements described below will address existing needs, including multimodal system completeness and safety, and can reasonably be expected to be completed within the next 15 years with a strong commitment from one or more of the partner agencies that have jurisdiction over subject transportation facilities.

- Complete detailed multi-agency study to determine future potential for high capacity transit solutions within the Tualatin Valley Highway corridor
- Improve bus stops along Tualatin Valley Highway
- More frequent bus service
- Add street lighting on Tualatin Valley Highway
- Improve Tualatin Valley Highway pedestrian crossings
- Complete Planning and Conceptual design for a Multi-use path
- Fill gaps in sidewalks and add landscape buffers along Tualatin Valley Highway
- Add directional way finding signs
- Complete the (currently discontinuous and narrow) bike lanes on Tualatin Valley Highway
- Improve bike crossings of Tualatin Valley Highway
- Develop continuous east-west parallel bike routes north and south of Tualatin Valley Highway
- Public community rail safety education
- Support and promote employer incentive programs to reduce driving
- Improve signal timing, transit prioritization and traffic operations monitoring
- Signal prioritization for transit
- Adaptive signal control ("smart signals" that adjust timing to congestion levels)
- Improve operations at signalized intersections along Tualatin Valley Highway
- Intersection modification to address safety and mobility
- Left-turn signal improvements

Opportunistic Actions

Understanding that funding opportunities (whether public funding or public funding in combination with private sources) may arise for transportation improvements within the TVCP Project Area to work towards to meet the goals and objectives of the TVCP, while attempting to:

- Encourage private contributions by developers to implement the near term improvements, including reserving ROW for future transportation improvements *(City of Hillsboro, City of Beaverton, Washington County).*
- Acquire the ROW to develop a westbound business access transit (BAT) lane as redevelopment opportunities arise on Tualatin Valley Hwy. The City of Hillsboro may also require all half-street improvements be constructed to include the set-back curb, planter strip, and sidewalk improvement to create an amenable environment for future transit solutions on Tualatin Valley Highway. This redevelopment should be consistent with ODOT standards.
- As projects arise from appropriate categories examine whether opportunities are available to use other funds to leverage this funding (e.g., safety) *(ODOT, consulting with partners).*

- As land use and transportation system conditions change and near term improvements are completed, consider the opportunity to update this adaptive corridor management strategy *(all partners).*
- Improve existing north-south routes for all modes to reduce travel demand on Tualatin Valley Highway and congestion at intersections. Improvements to roadways such as Brookwood Avenue, Century Boulevard, Cornelius Pass Road, 209th Avenue, 198th Avenue, 185th Avenue, and 170th Avenue would provide the greatest benefit to the overall transportation system. Five improvements on 198th Avenue south of Tualatin Valley Highway are scheduled in the next five years through Washington County's Major Streets Transportation Improvement Program. The other three corridors will require a more opportunistic approach, including working with developers of South Hillsboro to help improve 209th Avenue *(City of Hillsboro, City of Beaverton, Washington County).*
- Improve east-west connectivity (such as those proposed in the upcoming South Hillsboro UGB development mitigation) in addition to the near term actions proposed in South Hillsboro such as the Kinnaman and Rosa Road extensions *(City of Hillsboro, City of Beaverton, Washington County).*
- Complete the bicycle and pedestrian system in the TVCP Project Area to increase connectivity and access.
- Examine transit service for enhancements and improvements in the near term improvements list to leverage added service or other capital enhancements. TriMet has submitted two Statewide Transportaton Improvement Program (STIP) applications (Highway 8 Corridor Safety and Access to Transit) for improved safety, active transportation, access to transit and transit operations by improving bus stops, constructing landing pads, enhancing crossings, and installing signal priority on Cornell Road, Evergreen Parkway, and 229th Avenue, and on TV Hwy between 110th Avenue in Beaverton and SW 209th Avenue in Hillsboro. Specifically, for the first STIP application, TriMet intends to install concrete landing pads between the sidewalk and curbs at 50 bus stops, rapid flash beacons (RFBs) with striping at 3 non-signalized crossing locations, and transit signal priority at 3 intersections. For the second application (between 110th Avenue and SW 209th Avenue on TV Hwy), the project would build bus stop landing pads and shelters to connect bus stops to sidewalks. RFBs would be installed at non-signalized crossings near bus stops. Signal priority and operational treatments at key intersections would decrease travel times.
- Reduce vehicle turn movements to/from driveways on TV Highway. This would improve safety and mobility of pedestrians, bicyclists, and motorists on TV Hwy. Further access consolidations are recommended in conjunction with other property redevelopment.

<u>Long Term Refinement Planning Needs</u>

The refinement plan was unable to adequately address some longer term planning aspirations for the corridor. The following should be addressed as part of a future corridor refinement plan:

- The preferred location (e.g. on or adjacent to Tualatin Valley Highway) and most viable transit mode (e.g., bus rapid transit, express bus service, light rail, streetcar, or commuter rail) and amount of right-of-way needed for a long-term HCT solution for Tualatin Valley Highway. This transit alternative analysis study may explore enhanced signal operations for transit and/or the viability of a Business Access Transit (BAT) lane in appropriate locations.

- The location of a multi-use pathway parallel to Tualatin Valley Highway.
- The location of new local street connections, in concert with access management along Tualatin Valley Highway.
- While grade separated intersections are not included in the plan, it is recognized that in the long term, all tools should be considered to maintain acceptable intersection performance to serve future transportation and community needs.

5.3.2 Project Development

Transportation improvements where need, mode, function and general location have already been identified in the RTP and local plans for a specific alignment must be evaluated on a detailed, project development level. This evaluation is generally completed at the local jurisdictional level or jointly by affected or sponsoring agencies, in coordination with Metro. The purpose of project development planning is to consider project design details and select a project alignment, as necessary, after evaluating engineering and design alternatives, potential environmental impacts and consistency with applicable comprehensive plans and the RTP. The project need, mode, function and general location do not need to be addressed at the project level, since these findings have been previously established by the RTP.

Once the RTP or corridor refinement plans have established mode, function, general location, and identified potential solutions, project development is needed to clearly define a set of projects. The TPR defines project development as, "implementing the transportation system plan by determining the precise location, alignment and preliminary design of improvements included in the TSP based on site-specific engineering and environmental studies," (660-012-005 (36)). Using the TPR definition the following activities would be considered project development related activities:

- Design Options Analysis (DOA)
- Management plans
- Transit Alternatives Analysis (AA)
- Environmental Impact Statement/Environmental Assessment (EIS/EA)

The mobility corridor strategies in the Appendix identify the relevant project development activities within each corridor. A summary of project development activities is provided for the following corridors for reference:

- Columbia River Crossing Project
- Sunrise Project and Sunrise Jobs and Transportation Act Project
- I-5/99W Connector Study Recommendations and Implementation (Tigard to Sherwood - Mobility Corridor #20)

- East Metro Connections Plan (Gresham/Fairview/Wood Village/Troutdale to Damascus – Mobility Corridor #15)
- TV Highway Corridor Plan (Beaverton to Forest Grove - Mobility Corridor #24)

5.3.2.1 Columbia River Crossing Project (Mobility Corridor #1 – Portland Center City to Clark County)

This heavily traveled route is the main connection between Portland and Vancouver. The Metro Council has approved a Locally Preferred Alternative for the Columbia River Crossing Project (CRC). It creates a multi-modal solution for the Interstate 5 corridor between Oregon and Washington to address the movement of people and freight across the Columbia River. A replacement bridge with three through lanes in each direction, reconstructed interchanges, tolls priced to manage travel demand as well as provide financing of the project construction, operation and maintenance, light rail transit to Vancouver, and bicycle and pedestrian investments have been identified for this corridor.

More generally in the I-5 corridor, the Portland Metro region should:

- Consider the potential adverse human health impacts related to the project and existing human health impacts in the project area, including community enhancement projects to address environmental justice
- Consider managed lanes
- Maintain an acceptable level of access to the central city from Portland neighborhoods and Clark County
- Maintain off-peak freight mobility, especially to numerous marine, rail and truck terminals in the area
- Consider new arterial connections for freight access between Highway 30, port terminals in Portland and port facilities in Vancouver, Washington
- Maintain an acceptable level of access to freight intermodal facilities and to the Northeast Portland Highway
- Address freight rail network needs
- Develop actions to reduce through-traffic on MLK and Interstate to allow main street redevelopment
- Inform and coordinate with the Regional Transportation Council (RTC) and the Bi-State Coordination Committee prior to JPACT and Metro Council consideration of projects that have bi-state significance

5.3.2.2 Sunrise Project and Sunrise Jobs and Transportation Act Project (Mobility Corridor #12 -Clackamas to Rock Creek Junction and Mobility Corridor #13 – Rock Creek Junction to US 26))

In July 2009, the Sunrise Project's Policy Review Committee (PRC) selected a Preferred Alternative, shown in Figure 5.2. The Preferred Alternative is Alternative 2 as studied in the SDEIS with Design Options C-2 and D-3 and a portion of Design Option A-2 (Tolbert Overcrossing).

The Federal Highway Administration (FHWA), the Oregon Department of Transportation (ODOT), and Clackamas County have completed the Final Environmental Impact Statement (FEIS) for the Sunrise Project. On February 22, 2011, the FHA signed a Record of Decision (ROD) that approves the $1.4 billion Sunrise Corridor Preferred Alternative. The Sunrise Project mainline is an approximately five-mile, east-west oriented, limited-access highway from I-205 to the Rock Creek Junction in Clackamas County.

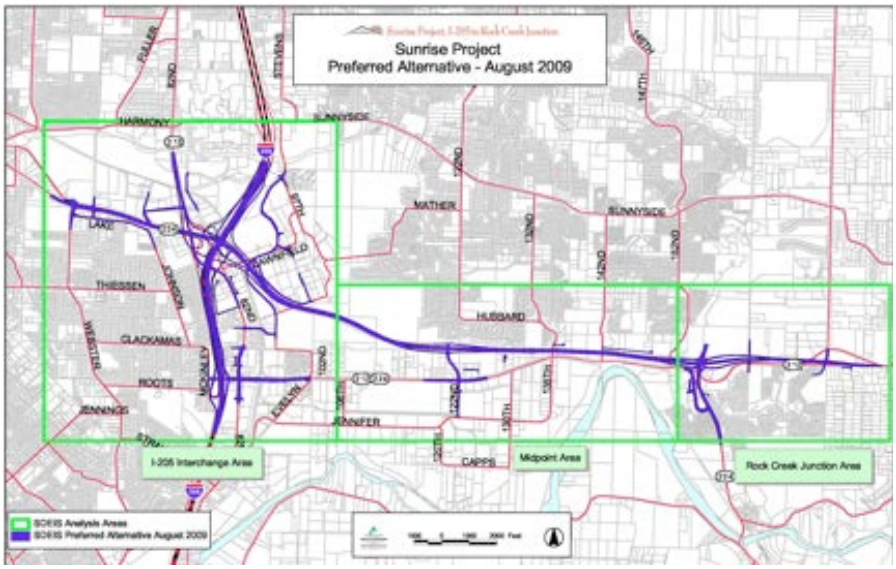
A detailed description of the Sunrise Project Preferred Alternative is included in the Appendix. The RTP includes some phases of the projects in the preferred alternative and updates **Figures 2.5 and 2.7.**

The purpose of the Sunrise Jobs and Transportation Act (JTA) Project is to address congestion and safety problems in the OR 212/224 corridor by building a new 2.5 mile road from I-205 to 122nd Avenue (as part of the larger Sunrise Project mainline) and improving local roadway connections to the Lawnfield Industrial District. The Oregon Legislature approved $100million through the Jobs and Transportation Act (JTA) to fund this first phase of the larger Sunrise Corridor Preferred Alternative.

Construction for the JTA phase of the Sunrise Project will be completed in the summer of 2016 and includes the following elements:

- A new two-lane highway (one lane each direction) from the Milwaukie Expressway (OR 224) at I-205 to SE 122nd Avenue at OR 212/224.
- A new I-205 overcrossing to connect 82nd Drive and 82nd Avenue.
- Tolbert Road overcrossing of the UPRR from Minuteman Way to 82nd Drive
- Reconstruction of Lawnfield Road from 97th to 98th to reduce grades
- Extension of Minuteman Way from Mather Road to Lawnfield Road
- Bicycle and pedestrian improvements in the area including two separated shared use paths from I-205 to Lawnfield Road and from Mather Road to 122nd Avenue.
- Intersection improvements at 122nd Avenue and OR 212/224.
- Intersection improvements at 162nd Avenue and OR 212.

Figure 5.2
Sunrise Project Preferred Alternative



5.3.2.3 I-5/99W Connector Study Recommendations and Implementation (Tigard to Sherwood - Mobility Corridor #11)

Between 2006 and 2009, the I-5/99W Corridor Study identified a number of improvements in this corridor to support access to 2040 land uses, address existing deficiencies and serve increased travel demand. One primary function of this route is to connect the Washington Square Regional Center to the cities of Tigard, Tualatin and Sherwood, and provide access to the Tualatin/Sherwood Industrial Area and Tualatin National Wildlife Refuge. This corridor also connects Wilsonville's industrial land with markets to the north and south via I-5. This corridor provides shortline heavy rail access to the region from the Willamette Valley and connects agricultural areas to the interstate highway system in this region. This mobility corridor also serves as a secondary gateway to the region, connecting communities in Yamhill County and the Central Oregon Coast to the Portland metropolitan region.

The study found the corridor will rely on transportation connections through north Wilsonville. These connections impact the existing system and I-5 interchanges in Wilsonville for which capacity is critical to serve the corridor, local mobility, and the region.

In February 2009, the I-5/99W Connector Project Steering Committee (PSC) was unable at the end of its process to reach a unanimous recommendation for the I-5/99W Corridor Study as required by the PSC Partnership Agreement in order to forward a Recommended Corridor Alternative to the RTP. However, there was unanimous agreement on some aspects of the Connector that could be reflected in the RTP:

- Identify projects for inclusion in the RTP with minimal extra conditions, particularly the extension of SW 124th from SW Tualatin Sherwood Road to the I-5/North Wilsonville Interchange,

- Identify conditions to be met before a new Southern Arterial is implemented to ensure integration with surrounding land use and transportation plans, particularly an I-5 South Corridor Study,

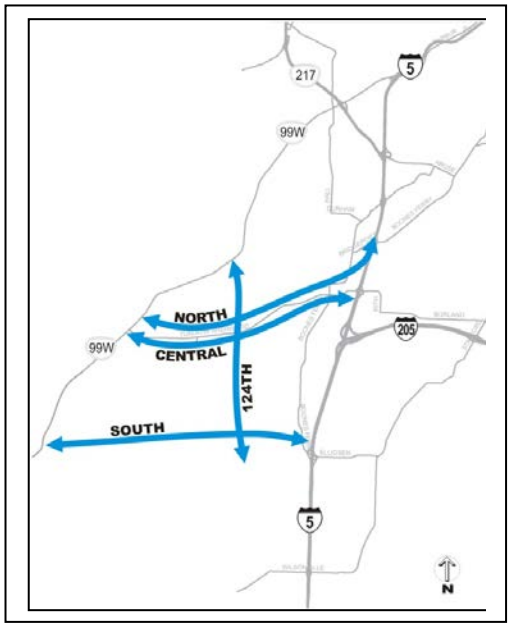
- Determine an incremental phasing plan to ensure the projects with the most benefit that can reasonably be built within the 20-year horizon be included in the RTP Financially Constrained list. The sequencing of affordable improvements should be done in a manner that does not create new transportation problems or liabilities for the vitality of affected jurisdictions.

The recommendations for the I-5/99W Corridor Study proposed for inclusion in the RTP are based upon the conclusions reached by the Project Steering Committee (PSC) as follows:

- The 3 options consisting of a new limited access expressway from I-5 to OR 99W (2 alignments north of Sherwood and 1 alignment south of Sherwood) were unacceptable due to high impact on the natural and built environment, the need for extensive improvements to I-5, and the high cost and concern about the potential for induced growth to Yamhill County.

- The option focused on expanding Tualatin-Sherwood Road was unacceptable due to the very large size it would need to be and the resulting impacts on the Tualatin and Sherwood Town Centers.

- The recommended alternative (then referred to as "Alternative 7") is based upon the principle that it is preferable to spread the traffic across three smaller arterials rather than one large expressway. The analysis concluded this approach could effectively serve the traffic demand, would provide better service to urban land uses in the Tualatin/Sherwood area, especially industrial lands, and could be built incrementally based upon need to serve growth and revenue availability. The overall concept is structured around a Northern, Central and Southern arterial providing east-west access between OR 99W and I-5 with an extension of SW 124th providing north-south connectivity (see diagram).



The I-5/99W Corridor Study recommended a variety of transportation investments to improve the area's road, transit, bicycle, pedestrian and trail networks and to distribute traffic across a network of three arterials so that no single route would function as a defacto through "connector." The RTP places additional conditions on the "Three Arterial" recommendation and implementation.

The City of Wilsonville raised objections to the Southern Arterial component throughout this process. The City is very concerned about growing I-5 congestion and the City's dependence on

effective access to the two I-5 interchanges. The City is concerned that the Southern Arterial connecting into the I-5/North Wilsonville interchange will significantly increase traffic and impair that access.

When the PSC considered the recommendation, the Clackamas County Commission representative introduced a series of amendments to the conditions to ensure that the Southern Arterial would be examined in greater detail to:

- evaluate alignment options and their environmental impact;
- integrate the proposal with the concept plan and transportation system plan for the newly expanded UGB area and any new Urban Reserves that are designated in the area;
- address any requirements that may result from adoption of an exception to Goal 14 (if needed) for an urban facility outside the UGB;
- integrate the proposal with a Tigard to Wilsonville Corridor Study (Corridor #3) to ensure these east-west arterials and I-5 itself could effectively function together; and
- determine the most appropriate approach to connecting the Southern Arterial to I-5, including options for an interchange at the I-5/North Wilsonville interchange or consideration of extending the Southern Arterial across I-5 to Stafford Road east of I-5, thereby providing better access to I-205.

The Project Steering Committee acknowledged many significant issues to be addressed before the Southern Arterial can proceed to construction, and approved eight conditions unanimously. The detailed conditions can be found in the Appendix.

Typically, there is a need to transition from a "planning" level of detail to a "project" level of detail, which involves better definition of alignments and designs and consideration of impacts on the natural and built environment and how to mitigate those impacts. The conditions proposed by the Project Steering Committee add the need to integrate the recommendation with land use planning for recent UGB expansion areas and potential Urban Reserves (then still to be defined) and emphasize the importance of integrating the overall system for the area with an I-5 corridor strategy.

Since the completion of the I-5/99W Connector Study, Washington County led the Basalt Creek Transportation Refinement Plan along with Metro, ODOT, and the Cities of Tualatin and Wilsonville. The purpose of this refinement plan was to determine the major transportation system to serve the Basalt Creek Planning Area. The plan sets the stage for land use concept planning and comprehensive plan development for the Basalt Creek area. The need to plan for the future transportation system was driven by future growth in the Basalt Creek area itself as well as almost 1000 acres of future industrial development targeted for surrounding areas.

This plan refined the recommendations from the I-5/99W Connector Study and the Regional Transportation Plan, generally for the area between a future 124th Avenue on the west, I-5 on the east, Tualatin-Sherwood Road on the north, and the I-5/Elligsen interchange area on the south.

As a result of this planning effort, the partners unanimously agreed to a set of roadway improvements including the extension of SW 124th Avenue, a new east-west roadway between that extension and Boones Ferry Road, a new I-5 overcrossing to the east, a new overcrossing of I-5 at Day Road, and several upgrades to the existing roadway network between Tualatin and Wilsonville.

Based on these efforts the RTP places additional conditions on the "Three Arterial" recommendation and implementation, as reflected in the phasing strategy outlined below. In endorsing the 2014 RTP project list, the Washington County Coordinating Committee acknowledged that the conditions from the existing RTP regarding the I-5/99W connector still apply (January 7, 2014 Washington County letter).

Short-term phasing strategy (2008-2017)

- In 2009, the section of the Northern Arterial between Lower Boones Ferry Road and Tualatin/Herman Road over the Tualatin River and through Tualatin Community Park was removed from the RTP due to a lack of community support. Since then, Tualatin identified a series of projects to improve mobility and accessibility in northern Tualatin. All of those projects are included in this RTP and listed in this phasing strategy.

- Study impacts on the Southern Arterial due to the Northern Arterial removal and Tualatin-Sherwood mobility limitations; include impacts to the I-5 interchanges in Wilsonville and the connecting transportation system.

- Identify transit improvements, specifically east-west connections between Tualatin and Sherwood, through TriMet's Service Enhancement Plan.

- Upgrade existing streets to two lanes with turn lanes, traffic signal timing, bike lanes and sidewalks, including Herman Road, and 95th Avenue/Boones Ferry Road (RTP Projects #10715, #10718, #11488).

- Add lane to SB I-205 to SB I-5 interchange ramp and extend acceleration lane and add auxiliary lane on SB I-5 to Elligsen Road. (RTP Project #10872).

- Conduct more detailed project planning from Tualatin-Sherwood Road to I-5 / North Wilsonville interchange to support its operation as an industrial access route and begin construction of a two-lane extension of SW 124th Avenue (RTP Project #10736: 124th Avenue). The planning work will further consider potential impacts on the existing development and the natural environment. It will also include more detailed definition of the design and alignment to mitigate impacts and to integrate with land use and transportation plans for the area.

- Improve intersection at Tonquin Road and Grahams Ferry Road (RTP Project # 11438).

- Continue ITS improvements to Tualatin-Sherwood Road (RTP Project #11446).

- Conduct more detailed planning to meet all of the conditions (shown in Appendix) placed on the new Southern Arterial project, including:

1. Conduct the I-5 South Corridor Refinement Plan (includes I-5 from Portland to Tigard, I-5 from Tigard through Wilsonville including the I-5 Boone Bridge, and OR 99W from I-5 through Tigard and Sherwood) and land use planning for areas recently added to the urban growth boundary and any land designated as urban reserves. These planning efforts will include opportunities for further public participation and input.

2. Conduct more detailed project planning on potential Southern Arterial impacts on existing development and the natural environment to develop more detailed definition of the design and alignment to mitigate impacts and coordinate with land use and transportation plans for the area, including integration with land use plans for UGB expansion areas and Urban Reserves, conducting the I-5 South Corridor Refinement Plan, including Mobility Corridors 2, 3 and 11, and resolution of access between I-5 and the southern arterial with no negative impacts to I-5 and I-205 beyond the forecast No-Build condition, addressing NEPA to determine the preferred alignment and addressing any conditions associated with land use goal exception for the southern arterial. This planning effort will include opportunities for further public participation and input.

   In the recommended alternative, Tualatin-Sherwood Road is sized in the recommended alternative based upon the expectation there will be a Southern Arterial and will fail due to insufficient capacity without a Southern Arterial and further expansion is incompatible with the plans for the Tualatin and Sherwood Town Centers. If the Southern Arterial is dropped through future studies, there is a major unresolved issue addressing east-west travel through this area. The RTP will need to be amended to direct the Corridor Refinement Plan effort for corridors #2, 3 and 11 to address this need. The need would go unaddressed until completion of that corridor refinement plan, or the next RTP update.

Medium-term phasing strategy (2018-2024)

- Widen existing streets to four lanes with turn lanes, traffic signal timing, bike lanes and sidewalks, including Tualatin-Sherwood Road, Roy Rogers Road and Boones Ferry Road (RTP Projects #10568, #11487, #10708).

- Widen and improve sidewalks and bike lanes on Day Road between Grahams Ferry Road and Boones Ferry Road; improve structural integrity for increased freight traffic (RTP Project # 11243).

Longer-term phasing strategy (2025-2032)

- Widen Boones Ferry Road between Lower Boones Ferry Road and Martinazzi Avenue to add capacity for vehicles as well as bikes and pedestrians across the Tualatin River (RTP Project #10712).

- Improve the roadway network in north Tualatin, including improvements to Cipole and Teton (RTP Projects #10717 and #10738).

- Realign and widen Tonquin Road between Grahams Ferry Road and Oregon Street (RTP Project # 10590).
- Widen 124th Avenue from 2-lanes to 5-lanes with bike lanes and sidewalks between Tualatin-Sherwood Road and Grahams Ferry Road (RTP Project # 11469).
- Construct a new 5-lane east-west arterial with bike lanes and sidewalks between Grahams Ferry Road and Boones Ferry Road (RTP Project # 11470).
- Construct I-5 ramp improvements at the Boones Ferry / Elligsen Road (RTP Project # 11489).
- Widen Boones Ferry Road to 5-lanes with bike lanes and sidewalks between the new east-west arterial and Day Road (RTP Project #11487)

Longer-term phasing strategy (2033-2040)

- Purchase right-of-way for the Southern Arterial (RTP Project #10598).
- Extend new 4-lane Day Road overcrossing over I-5 from Boones Ferry Road to Elligsen Road (RTP Project #11490).
- Extend new 4-lane overcrossing over I-5 from Boones Ferry Road to 65th and Stafford Road (RTP Project # 11436).

Construct the Southern Arterial between Highway 99W and 124th Avenue when all the project conditions have been met (RTP Project # 11339 and 11340 not in the Federal Fiscally Constrained Project List).

5.3.2.4 Gresham/Fairview/Wood Village/Troutdale to Damascus (Mobility Corridor #15)

The East Metro Connections Plan (EMCP) is a "mobility corridor refinement" plan which completed recommendations in June 2012. A mobility corridor refinement plan aims to better integrate land use, community and economic development, environmental and transportation goals when identifying projects along major transportation corridors. EMCP project partners include the cities of Fairview, Gresham, Troutdale and Wood Village, Multnomah County, ODOT, and Metro. Additional participating entities include Damascus, Portland, Clackamas County, the Port of Portland and TriMet.

This two year effort has analyzed present and future transportation needs and opportunities and has prioritized solutions/projects for project implementation.

Transportation Projects as Investment Packages
Proposed bundles of projects or "investment packages" have been grouped by the following three primary themes:

1. **North/south connections** - Proposed projects improve the arterial road network connecting I-84 and US 26 and provide for regional mobility needs as well as access to key

destinations in the plan area. Projects developed on designated freight routes will be developed to accommodate freight, and be designed accordingly.

2. **Downtowns and employment areas** - Proposed projects improve way-finding, mobility and access to downtowns and jobs.

3. **Regional mobility** - Proposed projects capitalize on previous investments by making the existing system smarter and more efficient through changes to signal timing, signage, enhanced transit service, and multimodal connections. Consistent with the Regional High Capacity System Plan, EMCP recommends advancing an alternative analysis for the Powell/Division transit corridor. EMCP also recommends the designation of a new regional multimodal connection between the Sandy River and the Springwater Corridor Trail.

The following summarizes the intent and overview of types of projects for each of the corridor segments based on the primary theme that they support.

1. North/south connections

181st/182nd safety corridor: 181st/182nd is an important community street. Projects will provide safety improvements in known areas of high crash rates and improve safe routes to schools in the Centennial School District. Consistent with transit analysis, this includes a recommendation to improve transit consisting of frequent service between Sandy and Powell boulevards and the elimination of the need to transfer between bus routes along this road.

182nd/190th connections to Clackamas County: Pleasant Valley is an important area for future residential and commercial development. Additionally, future population and employment growth in Clackamas County, including Happy Valley and Damascus, means that road connections to the south are important connections. Leveraging Clackamas County's 172nd/190th Corridor Project, targeted improvements to the road network in Pleasant Valley along Highland/190th will create opportunity for economic and residential development.

Eastman/223rd connections: Projects address future traffic growth with targeted north-south roadway capacity investments along 223rd/Eastman, including at Stark/223rd and Eastman and Powell. This area connects to existing industrial employment sites, including the Port of Portland's Gresham Vista (former LSI site) site. Projects will also address future needs on Glisan between 201st and Fairview Parkway. For example, projects to better coordinate the signal timing at intersections along Eastman/223rd will provide needed capacity improvements.

242nd connections to Clackamas County: Hogan/242nd is an important north/south connection from employment hubs in the Columbia Cascade River District, north central Gresham industrial, the Gresham Regional Center, and Springwater to Clackamas County and central Oregon. Projects along this arterial address future growth with additional roadway capacity, particularly south of Powell, along with opportunities for access and safety enhancements to the existing conditions. This includes intersection improvements at Glisan and Stark, including signal coordination.

Southeast gateway: The triangle of US 26, Burnside and Powell is an important gateway for the City of Gresham, east Multnomah County and the Portland Metropolitan region, providing an essential connection north to I-84, west to I-205, and south and east to Mt. Hood and central Oregon. Projects address several identified needs at the gateway, including

242nd/Hogan/Burnside. Projects address future capacity needs, safety (this area is one of the highest crash areas), way-finding and needed pedestrian improvements (there are sidewalk gaps and challenging crossings in this area, particularly along US 26). Way-finding treatments should be integrated with the adopted Mt Hood Scenic Byway route to bring people into the Gresham Regional Center, a vital commercial area.

257th safety, walking and biking connection: Projects create safe and attractive pedestrian crossings along 257th, particularly along the stretch between Reynolds High School and Mt Hood Community College. They will complete the sidewalk improvements along Stark adjacent to the college.

2. Downtowns and employment areas

Rockwood/181st: Projects include targeted bicycle and pedestrian improvements on 181st between I-84 and Stark, and Stark between 181st and Burnside to improve access to the important commercial areas in Rockwood. Projects improve safety and activate the arterial for businesses and walking.

Gresham Vista Business Park: The Port of Portland's November 2011 purchase of one of the area's largest shovel-ready employment sites is an immediate opportunity to bring jobs and revenue to East Metro communities. Projects increase mobility along the north/south and east/west arterials and improve access to industrial employment land.

Downtown Gresham/Civic: There are important public investments to support the vision of Downtown Gresham. Projects include boulevard treatments along all of Burnside and redevelopment opportunities along this important street. Projects better connect Main City Park, the Springwater Corridor Trail and Johnson Creek to Downtown Gresham. Sidewalk and streetscape projects in Downtown improve walking, window shopping and branding of Downtown Gresham as a unique place. Consider an urban renewal area for Downtown.

Pleasant Valley: Projects develop the necessary public infrastructure for development of Pleasant Valley town center consistent with the Pleasant Valley Community Plan.

Catalyst for Springwater District: Projects help develop the necessary public infrastructure for private investment and jobs in this regionally significant employment area. Projects include a new interchange on US 26 and an extension of Rugg Road to connect US 26 and Hogan, as well as collector street improvements to provide needed access for future jobs and employment.

Halsey main street implementation: Halsey is an important main street that connects the downtowns of Fairview, Wood Village and Troutdale. Projects implement features of the Halsey Street Concept Design Plan (2005), a joint effort of Fairview, Wood Village, Troutdale, and Multnomah County. Projects include realizing Halsey as a 2-lane road with median/turn lane, full bike lanes, sidewalks and pedestrian crossings. Projects support the downtown visions for the three cities and help attract commercial development.

Downtown Troutdale: Projects support future development of the urban renewal area in Downtown Troutdale, creating local road connections to the urban renewal area site and extending the regional trail system along the Sandy River from Troutdale Reynolds Industrial Park into Downtown Troutdale. Projects allow for future private investment and job growth in Downtown.

Downtown Fairview and Wood Village: Projects on Fairview Avenue between I-84 and Arata Road improve access, provide needed safety and multi-modal improvements. Projects also improve connections between Arata Road and Halsey.

3. Regional mobility

Sandy River to Springwater multi-modal connection: Projects provide multi-modal connections from Downtown Troutdale to Mt Hood Community College and the Springwater Corridor Trail. Projects connect neighborhoods to commercial areas and Mt Hood Community College. This area is one of the most significant gaps in the 40-mile loop regional trail network, and connections will encourage tourism to areas along the Springwater Corridor Trail and Sandy River.

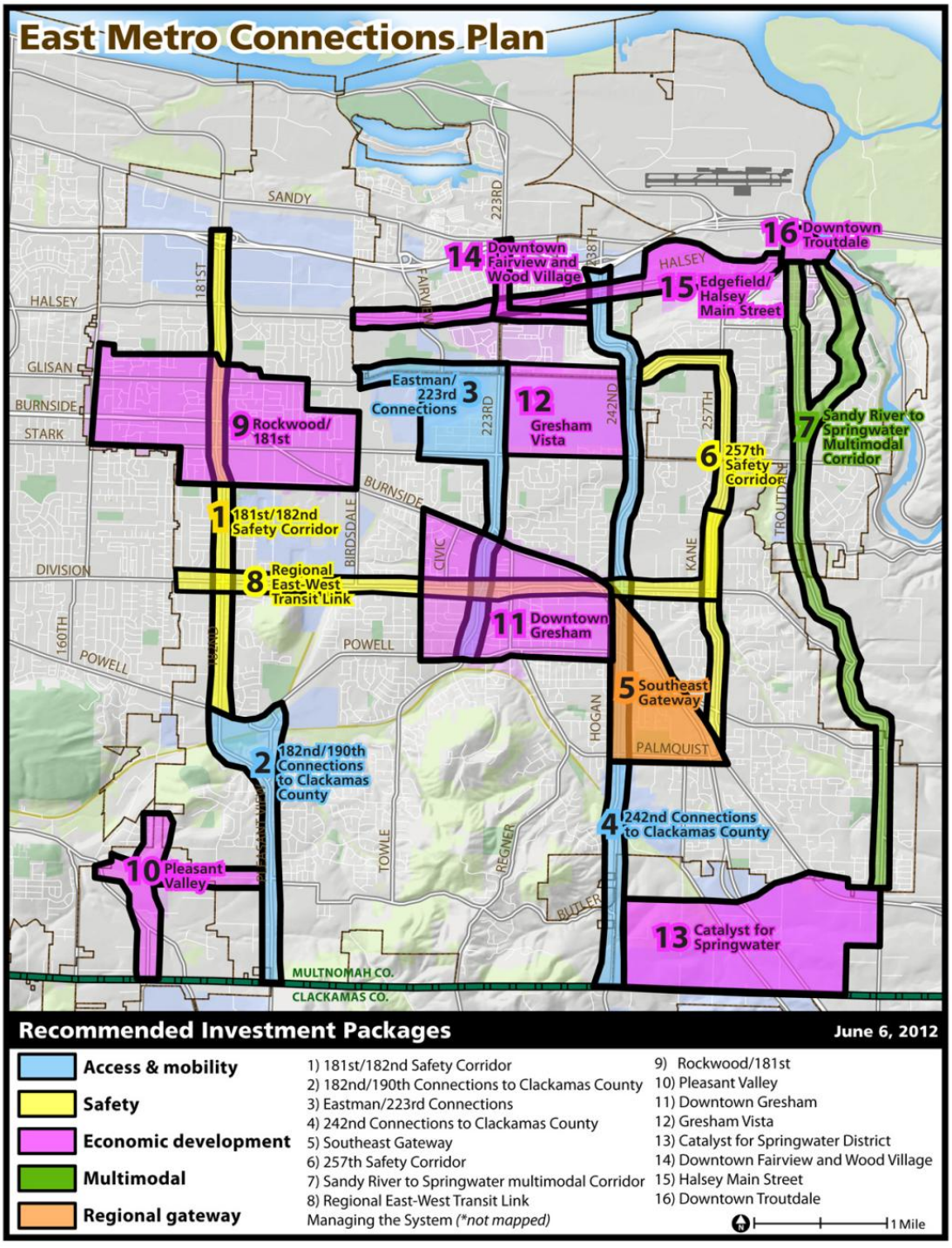
Managing the existing system (Transportation Systems Management and Operations/ Intelligent Transportation System Tools): There are opportunities to improve the current roadway network and enhance the performance of the transportation system using technology that coordinates signal timing and provides "real-time" information. Projects address congestion at intersections through the coordination of signal timing. Improvements to adaptive signal timing along 181st/182nd, Burnside, and Kane Drive. Other projects include signage, messaging and other techniques that improve way-finding and traffic flow. Signal coordination projects can provide as much as a 10% capacity increase to the roadway. Other projects include signage, messaging and other techniques that improve way-finding and traffic flow. Near-term investments include better signage and messaging on US 26 and coordinated signal improvements along all north-south arterials.

Regional east-west transit link: Projects improve east-west transit that connects Mt Hood Community College, Downtown Gresham, Portland and South Waterfront's Innovation Quadrant. Division is one of the top transit corridors for ridership in the region. Projects include enhanced bus/bus rapid transit and safety, and pedestrian and bike improvements (sidewalks, medians, crossings, access management) to make Division a great street for transit and walking. Enhancements along this corridor create the potential for even greater ridership demand. Enhanced bus service can provide additional service to Downtown Gresham and the Civic Neighborhood, a vital commercial area. Gresham will continue street improvements for sidewalks and other features to make walking and access to transit easier. The phase I recommendation is to pursue a transit alternative analysis along the Powell/Division Corridor.

Recommended RTP system map changes:

The project recommended changes to RTP system maps, including Arterial & Throughways, Freight and System Design. These changes were incorporated into the RTP through amendments adopted in June 2013.

Figure 5.3
East Metro Connections Recommended Investments (**as Recommended by the project's Steering Committee)**



5.4 CONGESTION MANAGEMENT PROCESS

The 2007 SAFETEA-LU federal transportation legislation updated requirement for a Congestion Management Process (CMP) for metropolitan planning organizations (MPOs) in Transportation Management Areas (TMAs – urban areas with over 200,000 in population), placing a greater emphasis on management and operations and enhancing the linkage between the CMP and the long-range regional transportation plan (RTP) through an objectives driven, performance-based approach. MAP-21[3] retains the CMP requirement while enhancing requirements for congestion and reliability monitoring and reporting.

A CMP is a systematic approach for managing congestion that provides information on transportation system performance. It recommends a range of strategies to minimize congestion and enhance the mobility of people and goods. These multimodal strategies include, but are not limited to, operational improvements, travel demand management, policy approaches, and additions to capacity. The region's CMP will continue to advance the goals of the 2014 RTP and strengthen the connection between the RTP and the Metropolitan Transportation Improvement Program (MTIP). A "Roadmap" of the region's CMP can be found in the Appendix.

The goal of the CMP is to provide for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies. The CMP seeks to address current and future congestion challenges through an eight-step process. **Table 5.2** lists the CMP steps and how the region's planning and investment activities implement the CMP.

Table 5.2
Congestion Management Process (CMP) Steps and associated RTP / MTIP Activities

CMP Steps	RTP/MTIP Activities
Step 1: Develop Congestion Management Objectives	2014 RTP (Chapter 2), Regional Transportation System Management and Operations Plan, and Regional Travel Options Strategic Plan
Step 2: Identify Area of Application	2014 RTP and Mobility Corridor Atlas
Step 3: Define System or Network of Interest	2014 RTP and Mobility Corridor Atlas
Step 4: Develop Performance Measures	2014 RTP Performance Targets (Chapter 2) and Performance Evaluation and Monitoring (Chapter 4)
Step 5: Institute System Performance Monitoring Plan	2014 RTP and Mobility Corridor Atlas
Step 6: Identify and Evaluate Strategies	2014 RTP and Mobility Corridor Atlas
Step 7: Implement Selected Strategies and Manage Transportation System; and	MTIP
Step 8: Monitor Strategy Effectiveness[4]	Mobility Corridor Atlas

[3] The Moving Ahead for Progress in the 21st Century Act (MAP-21) is a funding and authorization bill passed in 2012 which governs United States federal surface transportation spending.
[4] USDOT, "An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning." Pg. 1-1. Feb. 2008.

The RTP and MTIP are the region's framework for defining and advancing CMP implementation. The CMP is also implemented by local jurisdictions as required by the Regional Transportation Functional Plan, section 3.08.220. The RTP mobility corridors frame the area of interest and network of interest. The Mobility Corridor Atlas identifies congested areas and identifies multimodal strategies to mitigate the congestion. Where more motor vehicle capacity is appropriate, the CMP will include additional system and demand management strategies to ensure the capacity investment is effectively managed to get the most value from the investment.

Building upon the performance measures in the RTP, the CMP provides a framework for data collection and plan monitoring for system performance with the Mobility Corridor Atlas as the reporting vehicle. The data is used to help assess various strategies for managing congestion by the region's partner agencies to implement appropriate strategies into on-going or new projects in those corridors. As strategies are implemented, a follow-up assessment will be conducted to determine the effectiveness of the improvements.

5.5 METROPOLITAN TRANSPORTATION IMPROVEMENT PROGRAM

An important tool for implementing the RTP is the Metropolitan Transportation Improvement Program (MTIP). The MTIP schedules and identifies funding sources for projects of regional significance to be built during a four-year period. Federal law requires that all projects using federal funds be included in the MTIP. This section describes the role of the MTIP in regional planning and its relationship to the RTP.

5.5.1 The Role of the MTIP in Regional Planning

In developing the MTIP, the region gives top priority to strategic transportation investments that leverage and reinforce the urban form outlined in section 2.2, of this plan. The MTIP is approved by JPACT, the Metro Council and the Governor of the State of Oregon. The MTIP is then incorporated, without change, into the State TIP (STIP), which integrates regional and statewide improvement plans. The MTIP is updated every two years.

The TIP is fiscally constrained and includes only those projects for which resources are reasonably available. Projects are grouped by funding category, with project costs not to exceed expected revenue sources. The MTIP financial plan is not comprehensive; it covers only federal funds for capital improvements, and does not include operations, maintenance and preservation or local funds for capital costs of local streets and facilities.

It is the responsibility of the cities, counties, ODOT, TriMet and the Port of Portland to implement necessary improvements to the regional system, as well as those needed for local travel. These agencies are eligible to receive federal funds allocated through the MTIP process for projects included in the RTP. The TIP is prepared by Metro in consultation with these agencies. Inter-regional coordination throughout the planning and programming process will help to ensure that improvement projects are consistent with regional objectives and with each other.

Projects included in the MTIP must also be included in the RTP financially constrained system. The revenue assumptions used to develop the RTP financially constrained system are defined in Chapter 3. Projects included in the RTP financially constrained system are identified in the Appendix. However, while the financially constrained system should provide the basis for most MTIP funding decisions, other projects from the RTP may also be selected for funding.

In the event that such projects are proposed for funding, the RTP financially constrained system would need to be amended to include the project or projects. To amend projects into the financially constrained system, continued financial constraint must be demonstrated by identifying additional revenues or removal of other projects from the financially constrained system. Except in the case of exempt projects (as defined by the federal and state conformity rules), such actions also require an air quality conformity determination.

5.5.2 Developing the MTIP

The MTIP development process is initiated by Metro with an update to the MTIP policies. The policies direct how the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council intend to coordinate the funding allocation processes administered by Metro for regional flexible funds (RFF) and for funds administered by the ODOT and public transit agencies Tri-Met and SMART. The policy document also describes how the funding allocation processes address federal regulations for the allocation of federal transportation funds.

Applications and proposals for funding from these funds must be included in the financially constrained Regional Transportation Plan. JPACT and the Metro Council consider the MTIP for final approval. Upon adoption by the Council, the MTIP is submitted to the Governor of Oregon for approval as part of the State Transportation Improvement Plan (STIP).

5.6 PROCESS FOR AMENDING THE RTP

5.6.1 RTP Policy, System Map and Compliance Criteria Amendments

When Metro amends policies or system maps in Chapter 2 of this plan, it will evaluate and adopt findings regarding consistency with the Regional Framework Plan. Decisions on amendments made at this level are land-use decisions for need, mode, corridor, general scope and function of a proposed project. Subsequent land-use decisions on final project design and impact mitigation will be needed prior to construction. Such analysis to evaluate impacts could lead to a “no-build” decision where a proposed project is not recommended for implementation, and would require reconsideration of the proposed project or system improvements. As such, amendments at this level shall be reviewed through the post-acknowledgement process. However, a decision on an amendment to the Regional Transportation Plan should not foreclose or appear to foreclose full and fair consideration of all relevant statewide planning goal issues at such time that specific projects and programs are adopted by a local jurisdiction.

It is Metro's responsibility to adopt findings based on project need, mode, corridor, general scope and function of projects proposed in the Regional Transportation Plan. The affected jurisdiction is

responsible for preparing the specific local plan amendments and findings related to specific location, project design and impact mitigation and for scheduling them for hearing before the governing body in time for action by that body by the time required.

5.6.2 RTP Project Amendments

The RTP establishes a comprehensive policy direction for the regional transportation system and recommends a balanced program of transportation investments to implement that policy direction. However, the recommended investments do not solve all transportation problems and are not intended to be the definitive capital improvement program on the local transportation system for the next 20 years.

Rather, the RTP identifies the projects, programs or further refinement studies required to adequately meet regional transportation system needs during the planning period. Local conditions will be addressed through city and county TSPs, and will require additional analysis and improvements to provide an adequate transportation system. This chapter anticipates such refinements, particularly given the degree to which this RTP has been updated from previous plans. Similarly, refinements to the RTP may result from ongoing corridor refinement plans, NEPA studies or other area studies. The following processes may be used to update the RTP to include such changes:

1. Major amendments: These are amendments that come from NEPA processes, Corridor Refinement Plans or other studies and involve additions or deletions of projects or a significant change in scope of the project location or function. As the findings for need for an amendment are produced, they will be recommended by a resolution of JPACT and the Metro Council. These amendments must be incorporated into the RTP, consistent with the Public Engagement Guide (adopted in November 2013) and Federal and State Air Quality Conformity Procedures.[5]

2. Other amendments resulting from local TSPs: new roadway, transit, bikeway, pedestrian, freight and demand management projects necessary to meet the objectives of the RTP shall be accompanied by findings describing the consideration of transportation strategies as described in Metro Code section 3.08.220.A, and a description of the public process used to define the project.

   The amount of information required to demonstrate consistency with the RTP shall be commensurate with the scope of the project. Such additions will be amended into the RTP as part of the project update process described in this section. Operations, maintenance and safety improvements are deemed consistent with the policy intent of the RTP if (a) they are needed to serve the travel demand associated with Metro's adopted population and employment forecasts, and (b) they are consistent with affected jurisdictional plans.

3. Amendments resulting from updates to the Regional Framework Plan or related functional plans.

[5] State Conformity rule 340-252-0060 describes required consultations on air-quality determinations, including required public involvement.

5.7 IMPLEMENTATION ACTIVITIES TO BE ADDRESSED POST-RTP ADOPTION

5.7.1. Local Plan Implementation

Local plans and projects will be updated to implement the outcomes-based RTP and Regional Transportation Functional Plan (RTFP). The RTFP directs how city and county plans will implement the new RTP through their respective comprehensive plans, local transportation system plans (TSPs) and other land use regulations. All of the actions included in the RTFP will help the region begin proactively addressing climate change, improve mobility and support other desired outcomes.

The TPR includes provisions for local TSPS to be updated within one year of adoption of the final RTP, but allows for the RTP to determine a schedule for local plan compliance. A schedule for local transportation system plan updates is available at www.oregonmetro.gov/tsp. The local plan updates are phased appropriately to support local desires for completing plan updates in a timely manner, in coordination with other planning efforts and to take advantage of state funding opportunities.

5.7.2 Alternative Mobility Standards

The RTP establishes an outcomes-based framework and includes new policies, tools and actions to guide future planning and investment decisions. To successfully implement this approach to supporting the region's efforts to create jobs, sustain economic prosperity, use land efficiently and address climate change, the region needs new tools to evaluate and diagnose our transportation system. Traditional volume-to-capacity based mobility standards are still useful for managing traffic on major throughways, for examples, but new tools will be needed to inform the outcomes-based RTP:

- **The 2040 Growth Concept vision for land use and transportation must continue to evolve through community planning to achieve desired regional outcomes; yet institutional and fiscal barriers exist.** Jurisdictions considering plan amendment proposals for compact development in regional and town centers that exceed current height or density limits are sometimes constrained by traditional volume-to-capacity standards from amending local plans or zoning codes, even when proposed developments are clearly a step toward local planning aspirations and regional outcomes.

- **Existing volume-to-capacity-focused mobility standards only tell part of the story.** A more comprehensive framework of measures is needed to define success and guide investments and actions needed to support local implementation of the 2040 Growth Concept vision.

- **Benefits and impacts of different actions are not always fully understood or accounted for.** Current analysis tools are limited in their ability to fully quantify the benefits of individual actions (e.g., timing traffic signals, providing financial incentives and civic infrastructure in

downtowns, building sidewalks and bike facilities, etc.), yet we know these actions can help improve mobility in the region and support other desired outcomes.

A series of actions to meet these analytical challenges are recommended for Metro, ODOT and other regional partners over the next few years to support the outcomes identified in the 2040 Growth Concept and meet statewide goals for compact development patterns, mobility and greenhouse gas emissions.

2010 Recommended Actions

- **Retain current mobility standards**, subject to future refinement. **(June 2010)**
- **Adopt revisions to the Regional Transportation Functional Plan (June 2010) and Urban Growth Management Functional Plan (December 2010)**

  Metro's functional plans direct how local governments implement regional policies, recognizing that "one size does not fit all." Any new functional plan actions should allow for flexibility and varying local aspirations, circumstances, and readiness, but ensure regional policies are being implemented consistently through local transportation system plans (TSPs), comprehensive plans and codes. The following revisions are recommended:

  Transportation Functional Plan provisions **(June 2010)**

  - Require TSPs, mobility corridor strategies and corridor refinement plans to implement the new RTP policies for system management and operations, bike, pedestrian, transit, safety, freight, and connectivity, consistent with state and federal policies (e.g., Congestion Management Process and Oregon Highway Plan (OHP), Major Improvements Policy 1G).
  - Require TSPs, mobility corridor strategies and corridor refinement plans to include transportation system management and operations (TSMO) strategies and projects, consistent with the regional TSMO plan.
  - Allow local governments to identify alternative mobility standards, as set forth in OHP Policy 1F3, in collaboration with ODOT and Metro, through TSP updates, corridor refinement planning, concept planning or other planning efforts.
  - Allow an automatic 30 percent trip reduction credit for plan amendments in areas that have adopted a minimum level of "best practices" actions.
  - Provide a list of "best practice" actions that will automatically qualify for 30 percent trip reduction credit and other actions that could allow for additional credit if implemented.
  - Clarify RTP amendment process and procedures, including public involvement and notification requirements.
  - Require adoption of parking management plans in centers and along high capacity transit corridors.

Proposed Urban Growth Management Functional Plan revisions **(December 2010)**

- Require adoption of property-line boundaries for 2040 designated land uses through a public process.
- Require that a mix of land uses be allowed in 2040 centers, main streets and along transit corridors.
- Require limitations on new auto-oriented uses in centers.
- Require limitations on large-format retail near interchanges, unless allowed by an adopted Interchange Area Management Plan.

- **Adopt multi-modal mobility corridor strategies (June 2010)**

  The strategies in the Appendix define the vision and planned system for each of the region's 24 mobility corridors. The strategies have been tailored for each corridor to support adopted land use plans and corridor function(s) and include management, operations and capital investments to support all modes of travel.

- **Adopt findings (June 2010)**
  - Document the extent of congestion in the region. (Chapter 5)
  - Demonstrate that the region has "done the best we can" to improve highway performance as much as feasible for purposes of meeting state requirements and OHP Policy 1F5.
  - Allow the RTP State System to serve as the "reasonably likely" system of improvements and "baseline condition" for local governments to use to assess the traffic impacts of plan amendments to determine if a plan amendment has a "significant effect" on state facilities. This requires local government and TriMet concurrence.
  - Document evidence for automatic 30 percent trip reduction credit for plan amendments.

- **Develop best practices checklist** for determining consistency of local plans with the RTP. **(June 2010)**

- **Request amendments to the Transportation Planning Rule** to define an automatic 30 percent credit for plan amendments in areas that have adopted certain "best practices" actions. **(June 2010)**

- **Request ODOT to engage Metro region** and other MPOs, cities, counties and interested stakeholders **in the mobility standards research** Project #716 that is underway. **(June 2010)**

2011-12 Recommended Actions

- **Metro and regional partners consider development of alternative mobility standards for individual corridors through refinement plans, concept planning and TSP updates.**

- **Metro updates Best Practices in Transportation System Design Toolkits/Livable Streets Handbooks** in collaboration with ODOT and other regional partners.

- **Metro and regional partners continue model enhancements and develop data collection and performance monitoring system**, to better understand the relationship between compact urban form, transportation policies and investments, greenhouse gas emissions, health outcomes and combined housing/transportation costs.

- **Metro and regional partners complete greenhouse gas scenarios planning as required by House Bills 2001 and 2186 (2009 Session) and Senate Bill 1059 (2010 Session)**, and identify implementation recommendations for the Metro region.

- **The Oregon Transportation Commission (OTC) works with Metro and other stakeholders to develop and implement a jurisdictional transfer strategy** for regional and district highways, and provide funding to upgrade facilities prior to, or in conjunction with, the transfer of ownership to local governments.

- **The OTC and the Land Conservation and Development Commission (LCDC) work with Metro and other stakeholders to conduct a comprehensive and coordinated review and update to the Transportation Planning Rule, Oregon Highway Plan and mobility standards**, and state procedures manuals and guidelines to more fully integrate the Oregon Transportation Plan policies and state greenhouse gas goals.

- **The OTC and LCDC work with Metro and other stakeholders to develop State Greenhouse Reduction Strategy and Toolkit** for local governments.

2014 Update on Recommended Actions

- In 2011 the Oregon Highway Plan was amended to allow alternative mobility standards, though the traditional volume-to-capacity standard remains the default unless an alternative is developed by a jurisdiction and adopted by the OTC. The City of Portland and Washington County are exploring alternative mobility standards under these provisions.

- In 2011 the Transportation Planning Rule (TPR) was amended to create Multimodal Mixed-Use Area (MMA) designations, an option for jurisdictions planning for increasing housing or jobs within an urban center to avoid triggering traditional volume-to-capacity traffic standards that might otherwise block desirable development. Several jurisdictions in the Metro region are exploring MMA designations for their Region 2040 centers.

5.7.3 Climate Smart Communities Scenarios Project (Regional Greenhouse Gas Scenario Planning as directed by House Bill 2001)

During the 2010 update to the Regional Transportation Plan (RTP), the reduction of greenhouse gas (GHG) emissions gained prominence at the regional, state, and national/international levels. Prior to the update, the 2007 Oregon Legislature established statewide goals to significantly reduce the state's greenhouse gas emissions to a 75 percent reduction below 1990 levels by 2050. The goals applied to all emission sectors, including energy production, buildings, solid waste, and

transportation. Federal climate legislation, with targets and commensurate planning requirements to reduce GHG emissions remained pending in Congress.

House Bill (HB) 2001[6], adopted in 2009, directs the Oregon Department of Transportation (ODOT) and the Department of Land Conservation and Development (DLCD) to help the state's metropolitan areas conduct land use and transportation scenario planning to reduce GHG emissions from light vehicle travel. HB 2001 also requires Metro to use scenario planning to develop and adopt a preferred scenario that accommodates planned population and job growth – to the year 2035 - and reduces GHG emissions from light vehicles. Sections 37 and 38 of House Bill 2001 are intended to ensure a statewide goal for GHG emissions is being addressed in local and regional land use and transportation plans.

House Bill 2001 also directed the Oregon Land Conservation and Development Commission (LCDC) to establish a performance target for reducing light-duty vehicle GHG emissions through rulemaking in 2011.

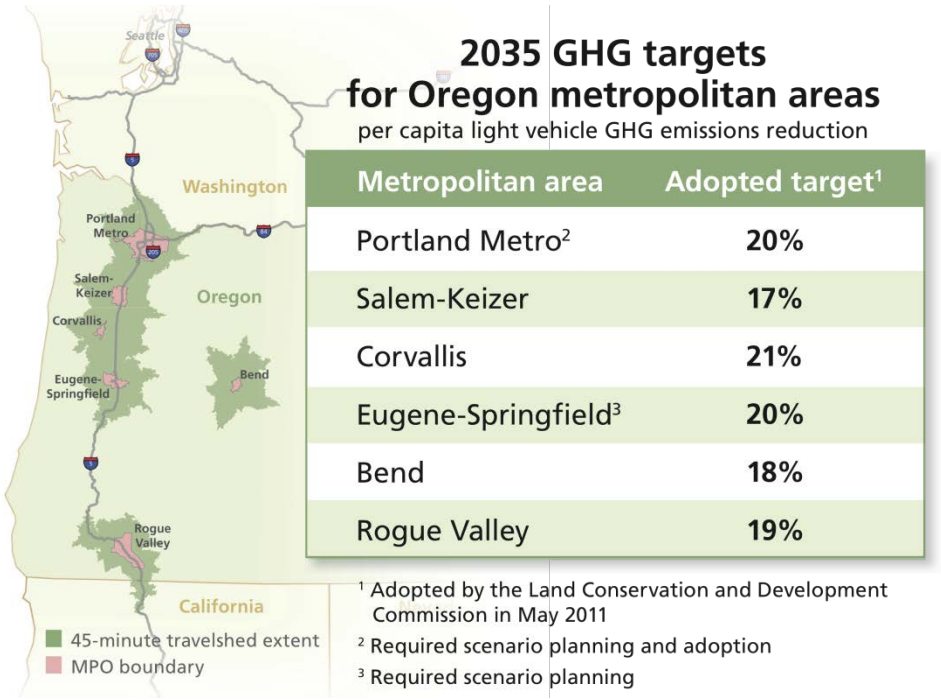
Metropolitan Scenario Planning

Metropolitan scenario planning is part of a broader effort to significantly reduce the state's "carbon footprint." In 2007, the Oregon Legislature adopted goals to significantly reduce the state's greenhouse gas emissions, to 75% below 1990 levels by the year 2050. Since 2007, state agencies, led by the Oregon Global Warming Commission, have been working with communities, businesses and other stakeholders to evaluate the most promising ways the state can reduce greenhouse gas emissions.

HB 2001 directs the Portland and Eugene-Springfield metropolitan areas to conduct scenario planning aimed at reducing GHG emissions. Through scenario planning each metropolitan area is evaluating ways that changes to land use patterns and transportation, in combination with other investments and actions, can reduce greenhouse gas emissions from light vehicle travel (i.e. passenger cars and light trucks). ODOT has provided funding and technical modeling assistance for scenario planning and DLCD has provided general technical support. HB 2001 requirements for the Portland and Eugene-Springfield areas differ:

- Metro is required to develop, select and implement a preferred scenario for the Portland metropolitan region that meets state established greenhouse gas emission reduction targets.
- Eugene-Springfield is required to develop, and select a preferred scenario considering greenhouse gas emission reduction targets, but is not required to implement this scenario.

[6] Chapter 865, Oregon Laws 2009.



2035 GHG targets for Oregon metropolitan areas

per capita light vehicle GHG emissions reduction

Metropolitan area	Adopted target[1]
Portland Metro[2]	20%
Salem-Keizer	17%
Corvallis	21%
Eugene-Springfield[3]	20%
Bend	18%
Rogue Valley	19%

[1] Adopted by the Land Conservation and Development Commission in May 2011

[2] Required scenario planning and adoption

[3] Required scenario planning

In May 2011, LCDC set per capita light duty vehicle GHG emissions reduction targets for each of Oregon's six metropolitan areas.[7] In November 2012, after consulting with local governments, Metro, and other stakeholders, the Commission adopted administrative rules directing Metro to guide Metro's scenario planning effort – the Climate Smart Communities Scenarios Project.[8]

The rules are designed to use scenario planning as a collaborative tool to inform the region's already well-established process for coordination of regional planning decisions. In general terms, Metro is expected to conduct scenario planning in conjunction with an update to the regional framework plan, which sets forth the region's long-term land use and transportation vision and guides regional planning and implementation efforts. A preferred approach will then be adopted by Metro and implemented by Metro and local governments as they update regional and local land use and transportation plans. The rules:

- Direct Metro to adopt a preferred land use and transportation scenario by December 31, 2014.
- Describe how Metro will adopt and implement a preferred scenario:
    - The preferred scenario will be adopted through an amendment to the Regional Framework Plan; and
    - The scenario in the framework plan will be implemented through amendments to the Regional Transportation Plan (RTP) and Metro's Functional Plans, as necessary.
- List factors and considerations that Metro must address as it develops and evaluates

[7] The Eugene-Springfield area is conducting scenario planning aimed at developing a preferred scenario by the end of 2014. The Corvallis and Bend areas are developing work plans to conduct a strategic assessment to evaluate performance of a base year (2010) and adopted plans.

[8] The adopted rules can be accessed at: http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_660/660_044.html.

alternative scenarios.

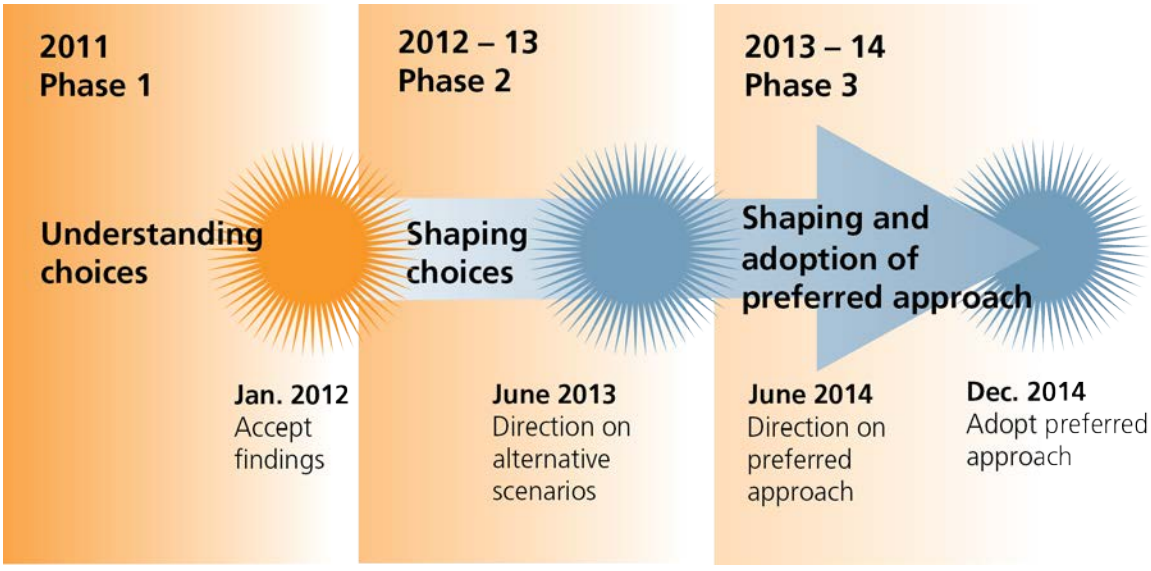
- Describe how Metro is to coordinate its work with cities, counties, state agencies and others.
- Describe how LCDC will review and approve Metro's preferred scenario:
    - LCDC will review Metro's Framework and Functional Plan amendments "in manner of periodic review."
- Describe the process for implementation by cities and counties:
    - Local governments will amend their plans and ordinances as necessary to carry out Metro's functional plan.
- Direct Metro to monitor and report progress in implementing the plan and to update the preferred scenario over time in coordination with other major plan updates.

CLIMATE SMART COMMUNITIES SCENARIOS PROJECT

Metro launched the Climate Smart Communities Scenarios (CSCS) project in January 2011 to respond to House Bill 2001. [9] While the CSCS project is directed to address GHG emissions reduction targets for light vehicles, Metro is considering impacts on public health, the economy, the environment and social equity as part of the planning effort. The scenario planning effort has strategically engaged local, regional and state officials, community and business leaders, and interested members of the public and further developed data and tools to support GHG emissions reduction planning and implementation efforts in the region.

The project has three phases. **Figure 5.4.** identifies key milestones for each phase.

Figure 5.4 Key milestones from Climate Smart Communities Project



[9] Project information can be accessed at: http://www.oregonmetro.gov/climatescenarios.

Phase 1 was completed in early 2012 and focused on understanding the region's choices. A key product of Phase 1 was the Strategy Toolbox, which reviewed the latest research on the range of potential GHG reduction strategies, their effectiveness at reducing emissions and other benefits they could bring to the region, if implemented. [10] Most of the strategies identified are already being implemented to varying degrees across the region to realize community visions and other important economic, social and environmental goals. Examples include: providing schools, services and shopping near where people live, improving transit service, building new street connections, using technology to manage traffic flow, encouraging electric cars and providing safer routes for walking and biking.

Metro then evaluated a wide range of options for reducing GHG emissions by testing 144 different combinations of land use and transportation strategies (called "scenarios") to learn what it would take to meet the region's reduction target. [11] Phase 1 found that current regional and local plans and policies – if realized and in combination with state agency assumptions for cleaner fuels and more fuel-efficient vehicles – provide a strong foundation for meeting the state target. However, current funding is not sufficient to implement adopted local and regional plans.

Metro concluded that a key to meeting the target would be the various governmental agencies working together to develop partnerships and make strategic community investments to encourage development that both supports adopted local and regional plans and reduces GHG emissions.

Phase 2 began in January 2012 and concluded in

Principles Guiding the Climate Smart Communities Scenarios Project

In order to meet state goals and the region's broader set of desired outcomes, Metro's greenhouse gas scenario planning work has been guided by the following principles:

- **Regional collaboration and partnerships.** Addressing the climate change challenge will take a regional approach and partnerships in the public and private sectors, requiring meaningful policy and investment discussions with elected leaders, stakeholders and the public. It is only by working together and combining resources that we can hope to make real progress and be successful.
- **Healthy environment, healthy people and healthy economy.** Environmental and community health and economic vitality are not mutually exclusive -- with strategic planning, innovation and investment, the region can achieve these desired outcomes.
- **Continued leadership on the integration of land use and transportation.** National studies continue to show that a compact urban form coupled with expanded travel choices are key to reducing greenhouse gas emissions. Land-use and transportation policy-makers must work together to provide leadership and commit to strategies that will enhance this integration at the local, regional and state levels.
- **Build on past successes and existing efforts and innovation.** The scenarios analysis will build on the innovative policy and technical work from the *Making the Greatest Place* initiative, the 2010 Regional Transportation Plan and local efforts to implement the 2040 Growth Concept and community plans. Scenarios will be based on agreed-upon assumptions for land use and development patterns, transportation, user fees and technological advancements related to vehicle fleets and fuels.

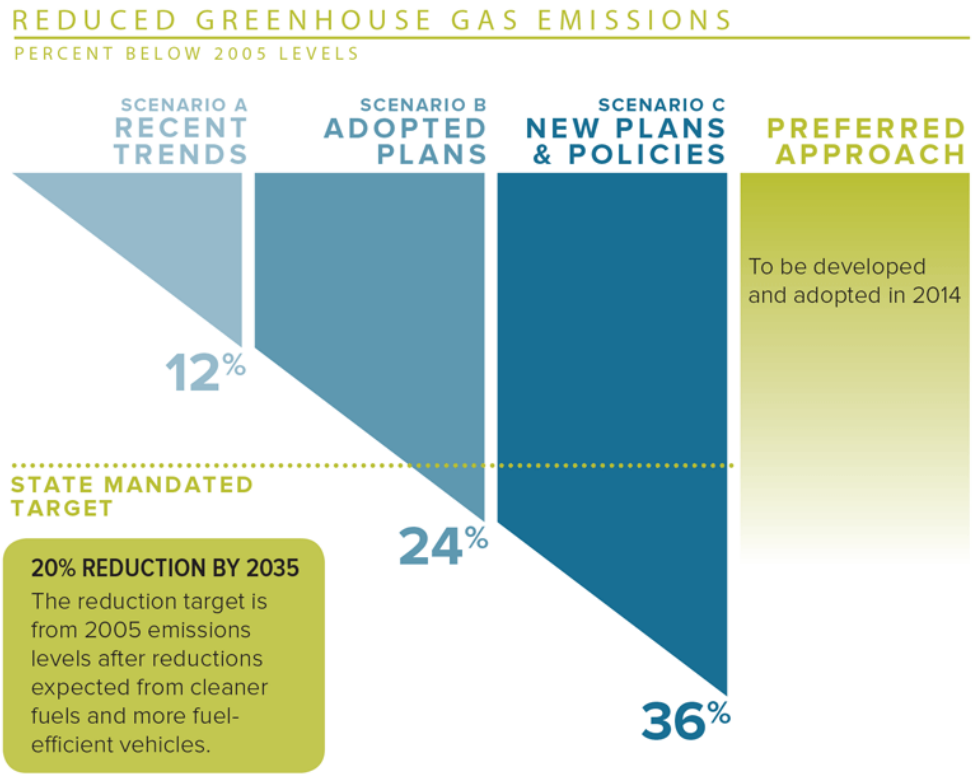
[10] The Strategy Toolbox Report can be accessed at: Phase 1 Strategy Toolbox Report.
[11] Phase 1 Findings can be accessed at: Phase 1 Findings Report.

October 2013. This phase focused on shaping and evaluating the region's choices for supporting local community visions and meeting the state GHG emissions reduction target. Metro undertook an extensive consultation process by sharing the Phase 1 findings with the local cities, counties and coordinating committees, regional advisory committees, and state commissions. In addition, Metro convened workshops with community leaders working to advance public health, social equity, environmental justice and environmental protection in the region. A series of discussion groups were held in partnership with developers and business associations across the region. More than 100 community and business leaders participated in the workshops and discussion groups. Eight case studies were produced to spotlight local government success stories related to strategies implemented to achieve their local visions that also help to reduce GHG emissions. An on-line survey helped gauge public awareness of and support for GHG reduction goals, strategies being considered to reduce emissions, and willingness to take personal action. Through these efforts, Metro concluded that its 2040 Growth Concept and the locally adopted land use and transportation plans that implement it provide the foundation for further scenario development and analysis.

The second phase began in 2012 and concluded in October 2013. In this phase, Metro created three scenarios and the criteria to be used to evaluate them based on Phase 1 research and modeling, early Phase 2 stakeholder input, and guidance from regional advisory committees. Scenario A (Recent Trends) reflects the results of implementing adopted plans to the extent possible using existing revenues. Scenario B (Adopted Plans) relies on raising additional revenues, as called for in the Regional Transportation Plan. Scenario C (New Plans and Policies) reflects the results of pursuing new policies, additional revenue and targeted investments to more fully achieve adopted and emerging plans. Both Scenario B and C require new funding and investments in infrastructure.

Locally-adopted land use and transportation plans across the region served as the foundation for each scenario. The criteria developed to evaluate and compare the scenarios addressed costs and benefits not only in terms of GHG reductions, but also across fiscal, public health, environmental, economic and social equity outcomes. The Phase 2 evaluation was conducted over the summer and fall of 2013. Initial results indicate that Scenario A would not meet the state's 2035 GHG reduction target while both Scenario B and Scenario C would exceed the target. The results are shown in **Figure 5.5.**

Figure 5.5 Greenhouse Gas Emissions Results from Phase 2 Scenarios Evaluation



The results of the Phase 2 scenario alternatives analysis demonstrate that implementation of the 2040 Growth Concept, the Regional Transportation Plan and locally-adopted zoning, land use and transportation plans and policies make the state-mandated greenhouse gas emissions reduction target achievable – if we make the investments and take the actions needed to implement those plans.

The analysis also demonstrated there are potentially significant long-term benefits that can be realized by implementing adopted plans and new policies and plans, including cleaner air, improved public health and safety, reduced congestion and delay and travel cost savings that come from driving shorter distances and more fuel efficient vehicles.

Phase 3 of the project (November 2013 to December 2014) involves the development of a preferred approach for adoption by the Metro Council and defining how best to implement it. Current efforts are focused on reporting the results of the Phase 2 scenarios evaluation to community and business leaders, local governments, state agencies and the public. Local government and public input will inform the Metro Council's direction on what investments and actions should be included in a draft preferred approach in May 2014. This work will build on and advance existing efforts to implement the 2040 Growth Concept, the RTP, and locally-adopted land use and transportation plans.

It is expected that the preferred approach will be a hybrid of investments and actions from the

three tested scenarios in Phase 2, while relying on adopted local land use plans and visions as its foundation. The final adoption process in fall 2014 will include extensive public review and consultation with local governments and state and regional partners.

The Metro Council is scheduled to consider adoption of a preferred approach in December of 2014. The final action will be in the form of an amendment to the Regional Framework Plan. The action is also expected to describe a general course of action for achieving the GHG emissions reduction target through policies, investments and actions at the state, regional and local levels, and include recommendations to state agencies and commissions, the 2015 Legislature, and amendments to the RTP. Recommendations directed at the RTP will be addressed through the 2018 RTP update.

In early 2015, Metro will submit the preferred approach to the Land Conservation and Development Commission in the manner of a periodic review. According to OAR 660-044, following Metro's plan amendment and LCDC review and order, Metro is required to adopt functional plan amendments, if necessary, that require local cities and counties to implement the preferred approach.

5.7.4 Greater Portland Pulse

As the region increasingly shares similar desired outcomes, the need to use similar performance measures increases. To take advantage of this, Metro has been and continues to be engaged in an effort with PSU's Institute of Metropolitan Studies to deliver a coordinated regional approach to generating performance indicators that can provide a shared lens for tracking how the region is doing socially, economically and environmentally. The mission of this partnership is to use data and dialogue to encourage coordinated action. For the economy, education, health, safety, the arts, civic engagement, environment, housing and transportation, the Greater Portland Pulse data shows where the region is successful and where it's lagging. The performance indicators are also a road map for public and private action and can inform investment decisions, such as those made through the RTP and MTIP. More information on this project can be found at www.portlandpulse.org.

5.7.5 Community Investment Strategy

The attractiveness of life in our region is both a competitive advantage and a challenge. By 2040, we anticipate the population will rise dramatically, increasing the need for homes and family-wage jobs.[12] Absorbing rapid growth also strains the infrastructure systems and structures we rely on to

[12] A recent study by United Van Lines showed that Oregon is now the most popular relocation destination in the country.
http://www.oregonlive.com/today/index.ssf/2013/12/oregon_is_no_1_for_attracting.html#incart_river_default

support our communities. Our Greater Portland region is grappling with a significant funding shortfall between what we need and what we can currently afford. We need a regional strategy to fund the infrastructure that protects our quality of life and ensures that our economy remains resilient – today and for future generations.

In 2010, Metro helped organize the Community Investment Initiative (CII) to seek solutions to our growing infrastructure gap, with an emphasis on infrastructure that supports economic activity. The CII has helped to:

- address barriers to development in local communities with the creation of a *Development Ready Communities* tool[13]
- prioritize investments in school facilities with a *Schools Atlas* tool available to districts[14]
- evaluate priority development and infrastructure projects for new funding, potential public-private partnerships and innovative financing

Out of those recommendations came a new regional initiative – Greater Portland Regional Infrastructure Supporting our Economy (RISE) – to secure investment for our communities, our key industries, and priority infrastructure projects that connect us and drive our economy.

Metro will convene public and private partners in RISE to develop the *Prosperity Portfolio,* a regional capital improvement plan comprised of projects and investments of economic significance that benefit the entire region. A clear set of investment priorities will position us to be responsive to opportunities as they arise, be they public or private, federal, state or local.

5.7.6 Regional Transportation Model Enhancements

Network Enhancements

Metro worked closely with jurisdictions to add more detail to the Transportation Analysis Zones (TAZs) used in the travel demand model. Many refinements were also made to existing zone boundaries. The 4-county region is now divided into 2147 TAZs. During this process, the roadway network was reviewed, and the modeled facilities were transitioned from 2005 conditions to represent a new base year of 2010.

Transit Modeling

Metro conducted research with regard to the transit traveler's perception of time. Is the wait time at a fully developed station less onerous than at a street corner? Is the ride on a LRT vehicle more pleasant than on a bus? We statistically quantify these time

[13] The DRC was piloted in Oregon City and will now be employed in other locations under the leadership of the Thriving Cities Alliance.
[14] The Atlas is currently being evaluated for use by the State of Oregon under Senate Bill 540.

perceptions and integrate them into the model. Capturing these time perceptions is important to more confidently estimate transit travel and its potential reduction of VMT. We also incorporated a new park and ride lot choice model algorithm.

Freight Modeling

The Port of Portland and Metro have recently completed an update to the regional Commodity Flow Forecast. The changes in quantities and types of commodities moving throughout the region were estimated and integrated into a revised freight model. Further improvements to the freight model are desired, and we are pursuing funding opportunities to enable additional refinement.

Model Development Activities

Metro is developing a tour based dynamic demand model (DASH). The relevancy of this tool is that it will better reflect the traveler response to congestion (e.g., time of day choices, tour alterations, joint household travel). In addition, the response to pricing is better measured due to more discrete value of time delineations.

Metro has implemented dynamic traffic assignment capabilities using two software platforms. DynusT has been used in a regional application to develop measures of roadway system reliability, and it will soon have an integrated dynamic transit assignment feature. Dynameq has been used in subregional applications. These assignment tools better reflect speed conditions by accounting for intersection delays and queuing effects.

Bicycle and Pedestrian Modeling

Since the last RTP update, Metro partnered with Portland State University (PSU) to develop a bicycle model that was used to forecast bicycle travel within the Active Transportation Plan and the Southwest Corridor Plan. This suite of bicycle modeling tools considers a multitude of network attributes in assessing the relative attractiveness of travel by bicycle between origins and destinations throughout the region.

More work is needed to capture the increased pedestrian mode share that may result due to urban form and amenities. Pedestrian trips are accounted for in the regional travel demand model, but are generally short enough to make a TAZ-to-TAZ network assignment impractical. Metro has again partnered with PSU to support research to improve our capabilities to model pedestrian travel.

Peak Spreading

Metro has developed a peak spreading algorithm that can be applied once a model run has been completed. The method calculates a travel time index (TTI) by comparing peak period travel conditions to free flow travel time on an origin to destination basis and moves trips to adjacent hours for only those zone pairs that have reached the TTI threshold. This process will produce hourly assignments that better reflect the amount of traffic that roadways are capable of handling.

This enhancement will not be applied for the 2014 RTP, but we do expect to incorporate this advancement in the 2018 RTP analysis. In the mean time, the peak spreading assignments and

model run information will be available for use in corridor studies, TSPs and other local planning projects, providing the opportunity for local partners to become more familiar with applying the peak spreading element.

Metro conducted a Household Travel Survey in 2011 which tracked over 6,000 households to understand how factors such as age, income, children, car ownership, and transportation infrastructure characteristics affect travel choices. This more current information has been reflected in our recalibrated travel forecasting model. Additional model enhancements using the new survey are planned.

Regional Travel Behavior Model

Metro conducted a Household Travel Survey in 2011, which tracked over 6,000 households to understand how factors such as age, income, children, car ownership, and transportation infrastructure characteristics affect travel choices. This more current information has been reflected in our recalibrated travel forecasting model. Additional model enhancements using the new survey are planned.

ODOT Statewide Model

ODOT has completed a more detailed set of travel zones for the state which will allow Metro to better predict travel demand at "gateway" points where statewide traffic enters the region. Currently, the regional model simply projects historic traffic volumes on such routes, but is unable to evaluate how congestion, parallel routes, and distribution of employment in and outside the region affects travel demand at these "gateway" locations. Coordination with ODOT has begun, and the results will be considered for the next RTP update.

ODOT GreenSTEP model

The GreenSTEP model was developed by ODOT to estimate and forecast the effects of multiple policies and other influences on the amount of vehicle travel, the types of vehicles and fuels used, energy consumption from vehicle travel, and resulting greenhouse gas (GHG) emissions from the transportation sector. The name, GreenSTEP, is an acronym which stands for Greenhouse gas Strategic Transportation Energy Planning. The model was developed to run at a statewide level and has since been adapted to run at a metropolitan-scale. The model has provided strategic analytical support for a number of state and regional planning efforts, including setting greenhouse gas emissions reduction targets for each of Oregon's metropolitan areas, development of the Oregon Statewide Transportation Strategy Vision and the Oregon10-year Energy Action Plan, and scenario planning being conducted by Metro as part of the Climate Smart Communities Scenarios Project. Further coordination is needed between Metro, ODOT, DEQ and DLCD to determine the future role of GreenSTEP in monitoring the region's progress toward meeting its state-mandated greenhouse gas emissions reduction target, and its relationship to future planning efforts and Metro's existing regional models, tools and enhancement activities. More information about GreenSTEP can be accessed at: http://www.oregon.gov/ODOT/TD/TP/Pages/GreenSTEP.aspx.

5.7.7 Parking Management Policy Refinement

Parking management refers to various policies and programs that result in more efficient use of parking resources. Managing parking works best when used in a complementary fashion with other strategies; it is less effective in areas where transit or bicycle and pedestrian infrastructure is lacking. Parking management is implemented through locally-adopted zoning and development codes.

Planning approaches include conducting assessments of parking supply and use to better understand needs.

On-street parking approaches include spaces that are timed, metered, designated for certain uses or have no restriction. Examples of these different approaches include charging long-term or short-term fees, limiting the length of time a vehicle can park, and designating on-street spaces for preferential parking for electric vehicles, car share vehicles, carpools, vanpools, bikes, public use (events or café' "Street Seats" and freight truck loading/unloading areas.

Off-street parking approaches include providing spaces based on uses, unbundling parking from office/condo purchase or leases, preferential parking (for vehicles listed above), shared parking between land uses (for example, movie theater and business center), park-and-ride lots for transit and carpools/vanpools, parking garages in the center of downtowns and other mixed-use areas that allow surface lots to develop as other uses.

The RTP scenarios analysis, completed in 2008, demonstrated the effectiveness of parking management for helping the region achieve the modal targets in **Table 2.4**. Additionally, the Climate Smart Communities evaluation also found parking management as an effective strategy for helping the region reduce green house gas emissions. More work is needed to determine what parking management strategies should be implemented in this region and where they could be applied (beyond what is currently required in Title 4 of the Regional Transportation Functional Plan.) This effort could define how to tailor the application of these strategies to recognize different levels of development, transit service provision and freight parking needs.

This work could include updating and expanding the existing inventory of parking practices in the Metro region, and developing a parking model code and a parking "best practices" handbook to guide local implementation in the region.

5.7.8 Urban and Rural Reserve Planning and Green Corridor Implementation

Green corridors were adopted as part of the 2040 Growth Concept. The purpose of green corridors is to prevent unintended urban development along these often heavily traveled routes, and maintain the sense of separation that exists between neighbor cities and the Metro region. The green corridor concept calls for a combination of access management and physical improvements to limit the effects of urban travel on the routes on adjacent rural activities.

IGAs are not in place and physical improvements, such as street and driveway closures, landscaping and public signage have not been implemented in any green corridors.

In 2010 and 2011, the elected governing bodies of Clackamas, Multnomah and Washington counties and Metro entered into agreements that determine the location and scale of urban development for the future. These agreements were the result of a two-year region-wide planning effort that identified areas for future urban use and other areas that should remain rural for the next 40 to 50 years. The urban and rural reserve decision provides a more certain framework for transportation improvements along the urban edge. Metro will work with interested local jurisdictions to complete IGAs for green corridors that reflect updated plans for urban and rural reserves.

5.7.9 Funding Strategy for Regional Bridges

The region continues to struggle with a long-term strategy for maintaining major bridges that serve regional travel, particularly local bridges spanning the Willamette River. Currently, Multnomah County has primary responsibility for five of the ten bridges. Within 20 years, four of Multnomah County's five Willamette River Bridges will be 100 years old. The county's capital program for these bridges is estimated to cost $450 million, yet only $144 million in federal, state and county revenues has been identified. All the region's bridges face maintenance challenges that come from age and use.

More work is needed to determine primary financial responsibility for ensuring ongoing operations and maintenance and other transportation needs of regional bridges, given the regional economic importance of keeping the Willamette River Bridges and other regional bridges fully functional in the long-term.

5.7.10 ODOT District and Regional Highways Jurisdictional Transfer Strategy

As ODOT continues to face decreased funding for system operations and maintenance, a significant backlog of multi-modal modernization investments on the ODOT-owned "district and regional highways" continue to grow. These are former highway routes, built before the development of the regional throughway system evolved. They have since evolved into urban arterial streets that connect centers, industrial and employment areas and in many cases, function as regional transit routes.

However, most have a backlog of basic urban improvements that must be addressed in order to fully implement the 2040 Growth Concept. Work is needed to define a long-term strategy for transferring responsibility for these routes to local governments, which are best equipped to build and maintain needed improvements. Some of these routes should also be evaluated for their role as complementary facilities within the context of the regional mobility corridors, and prioritized accordingly for needed multi-modal investments.

5.7.11 Emerging Communities

Emerging communities are areas that have been brought into the urban growth boundary since 1998, that have 2040 land use designations, and that lack adequate transportation and transit infrastructure and financing mechanisms. Additional work is needed to better define the needs of emerging communities and strategies needed to facilitate development in these areas, consistent with the 2040 Growth Concept.

5.7.12 Regional Active Transportation Work Program

A Regional Active Transportation Plan (ATP) was completed in 2014. Development of the ATP provided updates to the bicycle and pedestrian networks, concepts, policies and performance targets in the 2014 RTP.

Funding through June 2015 has been dedicated by the Metro Council to support a regional active transportation work program. The program will focus on implementation activities identified in Chapter 12 of the ATP. Metro will work with local jurisdictions and agencies, ODOT, TriMet, SMART, and other stakeholders on these activities. The implementation activities are coordinated with other Metro transportation planning activities, including activities related to Climate Smart Communities and the regional safety work program, Regional Transportation Options, TSMO, and corridor and freight planning.

5.7.13 Best Design Practices in Transportation

Starting in FY 2015, Metro staff will initiate an update to the Best Design Practices in Transportation, formerly known as the Livable Streets handbook. Recommendations from the Regional Freight Plan and the Regional Active Transportation Plan will be addressed as part of this effort. The update to the guidebooks will incorporate designs for low-volume bicycle boulevards, alternate designs for high volume arterial streets (e.g. cycle tracks) and regional trails. The guidelines will address the added design elements that are needed when these facilities serve as a bicycle parkway route, e.g. bicycle priority treatments and strategies for avoiding bike and pedestrian conflicts, design guidelines for transit and bicycle interaction, especially at transit stops and stations and along light rail and streetcar tracks, and best practices and successful case studies integrating bicycle, pedestrian and freight facilities, especially within constrained roadways, to guide future planning and project development. The outcomes of this process will be incorporated into the next RTP update.

5.7.14 Intercity Passenger Rail and Thruway Motor Coach Service

Current Operations

The Oregon Department of Transportation (ODOT) Rail and Public Transit Division administers the state-supported Amtrak *Cascades* intercity passenger rail service and the related and supporting *Thruway* motor coach service. Passenger rail ridership in Oregon has steadily increased since its beginning in 1994, setting record numbers of riders in 2011, up 5 percent from 2010. ODOT also manages and finances the maintenance of two passenger rail train sets that run in the federally designated Pacific Northwest Rail Corridor (PNWRC).

Planning Efforts

Over the next 20 years, the population in the Willamette Valley is expected to grow by approximately 35 percent, reaching 3.6 million by 2035. During the same period, freight rail volume is expected to grow by 60 percent. These increases will result in rail service demand that exceeds Oregon's available freight and passenger rail capacity in the Willamette Valley.

Rail improvements are needed to provide additional passenger and freight rail capacity and to improve passenger train reliability, frequency and travel times between Eugene and Portland. Current passenger rail service runs on private freight rail lines owned by Union Pacific Railroad (UP) and BNSF Railway Company. To ensure better on time performance, it is essential to eliminate priority at grade crossings, at known conflict points between railroads and traveling public.

The viability of corridor rail service is driven by several key factors. Based on research conducted by the American Association of State Highway and Transportation Officials (AASHTO), approximately 81 percent of all intercity trips greater than 100 miles do not extend beyond 500 miles. Corridor rail service of 500 miles or less between major population centers can eliminate the need to travel on congested highways, as well as to and from airports located in suburban areas. Corridor rail service can also provide transportation to communities not served by regional air carriers, help relieve aircraft congestion at major airports, and can become an attractive mode of transport for business travelers and those taking single day round trips.

The State of Oregon is currently involved in two planning efforts that involve intercity passenger rail, the Oregon State Rail Plan and the Oregon Passenger Rail Project. The Oregon State Rail Plan and the Oregon Passenger Rail Project are separate but coordinated efforts. The Oregon State Rail Plan development is a closely coordinated activity between the Oregon Transportation Commission (OTC), ODOT, the Federal Railroad Administration (FRA), stakeholders and the public. The State Rail Plan will look at policies, priorities, challenges and opportunities for the rail system statewide. The Oregon Passenger Rail Project is studying ways to improve intercity passenger rail service along the Portland to Eugene Corridor and is planning for the 20 year horizon.

The Oregon Passenger Rail Project is more detailed and focuses on important decisions that will be made through a Tier 1 Environmental Impact Statement (EIS) for the Oregon section of the PNWRC. Through the Oregon Passenger Rail Project, ODOT is in the process of studying options for improved passenger rail service between Eugene-Springfield and Portland – a 124-mile segment. The Tier I EIS will help ODOT and the FRA make important decisions that include selecting the general rail alignment, selecting communities where stations would be located, and determining service characteristics (e.g., number of daily trips, travel time objectives, and technologies to be used).

The purpose of the Oregon Passenger Rail Project is to improve the frequency, convenience, speed and reliability of passenger rail service in a manner that will:

- Provide riders with an efficient, safe, equitable and affordable alternative to highway, bus, and air travel;
- Be a cost-effective investment;
- Protect freight-rail carrying capacity;
- Support the ongoing implementation of regional high speed inter-city passenger rail in the PNWRC between Eugene-Springfield metropolitan area and Vancouver, British Columbia;
- Be compatible with the Washington State portion of the PNWRC;
- Promote economic development;
- Avoid or minimize community and environmental impacts; and

- Integrate with existing and planned multi-modal transportation networks.

The project is guided by the Governor-appointed Oregon Passenger Rail Leadership Councils whose members include representatives of Metro, TriMet, and the cities of Portland and Milwaukie. The project is scheduled to be completed in mid-2016 with the issuance of a Record of Decision by the FRA. Upon project completion, the state will be eligible to apply for future federal funding for final engineering and construction, when it becomes available.

Additional Projects

ODOT's Rail Safety unit is working with TriMet and Portland Streetcar on their projects to ensure safety compliance. With federal funding and guidance from the FRA, ODOT is developing preliminary engineering and environmental protocol for three Portland-area railroad projects that could improve passenger train performance if funded in the future.

Willbridge Crossovers – A pair of existing crossover switches connect BNSF Railway's two main tracks 4.3 miles northwest of Portland Union Station, allowing trains moving in either direction to switch from one main track to the other main track. However, the existing turnouts that comprise the crossovers restrict trains using them to 10 mph. This project would replace the old turnouts with longer turnouts that would permit trains to navigate them at 30 to 35 mph, which will help reduce congestion and contribute to improved intercity passenger service, velocity and on-time performance. Plans and the environmental work are due to be completed in 2014.

North Portland Junction – This critical junction on BNSF Railway's Portland-Seattle line provides access to Union Pacific, whose trains share use of BNSF Railway Company's trackage for 140 miles north to the Tacoma area. The turnouts used by UP to enter and leave BNSF Railway's line limit train speed to 10 mph and some freight trains can require up to 10 minutes to transition from one rail line to the other. This project will upgrade the switches, track and signal system to allow UP trains to transit this junction at 25 mph to reduce congestion and reduce freight train interference with the 12 daily passenger trains that currently operate through this facility. Because another key junction called Peninsula Junction is just nine-tenths of a mile south, similar upgrades are being engineered so that Union Pacific trains can maintain a steady 25 mph while passing through both points, while entering or leaving the BNSF Railway line. The preliminary engineering and environmental review will be completed in 2014.

Portland Union Station – This project will support the final design and construction of additional track and building upgrades at Portland Union Station that were identified in 2001 by the Union Station Facility Assessment and Seismic Work Plan. The improvements are expected to increase yard ingress/egress speed to clear the mainline faster for meet/pass benefits and permit faster crossover between tracks, resulting in improved intercity passenger rail service. Plans to overhaul storm water drainage will be developed along with preparations for important support facilities such as potable water and stand-by electrical power to maintain air conditioning, heating and lighting for passenger trains lying over between runs. The proposed renovations will enable current passenger service to operate more efficiently and accommodate forecasted increases in train service. Future construction will reduce congestion and help decrease intercity passenger trip

times, aid on-time performance and passenger safety and accessibility in the station. This project is expected to be completed in mid-2015.

Funding

Amtrak *Cascades*, managed jointly by ODOT, the Washington State Department of Transportation (WSDOT), and Amtrak, provides intercity passenger rail service between Eugene, OR and Vancouver, B.C. Starting in October 2013, the federal government discontinued funding support for intercity passenger rail service through Amtrak (Passenger Rail Investment and Improvement Act of 2008 or PRIIA). Consequently, Washington and Oregon must absorb those costs to maintain the service.

Oregon's portion of the costs for the Amtrak *Cascades* service is covered in part with dedicated funds from the sale of custom license plates and the transportation operating funds for an approximate total of $10.1 million a biennium. With the advent of PRIIA this leaves a shortfall of $18 million a biennium. The state highway fund cannot be used to pay for passenger rail activities.

If permanent funding is not found in the future, service will be reduced to one roundtrip per day or less. If the daily roundtrips are reduced or eliminated, the capital cost required by the host railroad to restore the service at a later date could cost Oregon $50 million or more and over 200,000 riders per year will be forced to find other modes of transportation between Eugene and Portland. The resulting increased highway traffic will likely further exacerbate congestion and have deleterious impact upon greenhouse gas reduction goals.

Oregon's two new Talgo passenger rail train sets would no longer run in Oregon if service is eliminated. An arrangement to sell or lease the trains would need to be pursued, with possible reimbursement of federal funds required.

ODOT will request permanent funding from the 2015 Oregon Legislature in an effort to continue operating the Amtrak *Cascades* service and to improve intercity passenger rail in Oregon.

Funding for final design and construction of the Oregon Passenger Rail project is expected to be a mix of federal, state and other funding. The most recent federal funding for similar passenger rail projects was in 2010 and required a minimum 20 percent state match. A source for the state match has not been identified and would probably require special funding.

5.7.15 Regional Safety Planning Work Program

As part of U.S. DOT's quadrennial certification review of the region's transportation planning practices, Metro received recommendations to better incorporate safety into long-range planning. Between 2009 and 2012, Metro worked with a purpose-built Regional Safety Workgroup composed of local jurisdictions, agencies, and safety specialists to develop a safety work program which culminated in the Regional Transportation Safety Plan (RTSP). The work program included a discussion of ongoing efforts, best practices, and opportunities, crash data analysis, context sensitive solutions, and performance measurement.

The resultant RTSP provides a framework and set of strategies to address the region's transportation safety problems. The goals included in the RTSP replace the previous Safety Performance Target. With the conclusion of the planning work program in 2012, Metro's efforts are focused on incorporating safety, particularly the strategies developed in the RTSP, into all transportation-related activities within our work.

The Regional Transportation Safety Plan made the following recommendations. As part of the 2018 RTP and associated updates to the Regional Transportation Functional Plan, Metro will consider these changes as well as recommendations from the Regional Active Transportation Plan.

Short-Term Recommendations

	Finding	Strategy or Strategies	Actions
All Crashes	***Alcohol and drugs, excessive speed, and aggressive driving are the most common contributing factors in serious crashes. Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes.***	Policies to reduce the prevalence of speeding and aggressive driving on surface streets and to reduce the prevalence of driving under the influence of intoxicants.	• Convene and/or coordinate targeted workgroups of safety professionals (law enforcement, EMS, etc.) to develop targeted strategies to reduce the prevalence of driving under the influence of alcohol and/or drugs, speeding and aggressive driving.
Surface Streets	***Arterial roadways have the highest serious crash rate per road mile and per VMT. 59% of the region's serious crashes, 67% of the serious pedestrian crashes, and 52% of the serious bike crashes occur on arterial roadways.***	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	• Develop systemic performance measures for identifying high severity crash arterials across the region. Use strategies, including the Highway Safety Manual, to address arterial safety, such as medians, speed management, access management, roundabouts and road diets.
Bicycle & Pedestrian	***Serious pedestrian crashes are disproportionately represented after dark. Serious nighttime pedestrian and bicycle crashes occur disproportionately where street lighting is not present.***	A focus on crosswalk and intersection lighting where pedestrian and bicycle activity is expected, as well as programs to encourage use of reflective equipment by pedestrians and bicyclists.	• Research pedestrian/bicycle facility lighting best practices. • Ensure bike routes and crosswalks – marked and unmarked – are adequately lit. • Safety education campaign around "See and be seen." • Further explore bicycle and pedestrian safety and identify projects as part of the Regional Active Transportation Plan currently underway.
	Streets with more traffic lanes have higher serious pedestrian crash rates per mile and per VMT.	Policies to improve the quality and frequency of pedestrian crossings on arterials and multi-lane roadways, as well as enforcement of right-of-way at crosswalks.	• Develop safe crosswalks on arterials and multi-lane roads, generally adhering to the region's maximum local street spacing standard of 530 feet and at all transit stops. • Enforce existing laws through crosswalk enforcement actions.

	Finding	Strategy or Strategies	Actions
	Streets with more traffic lanes have higher serious bicycle crash rates per mile.	Policies to encourage protected bicycle facilities along roadways with high motor vehicle traffic volumes and/or speeds.	• Along high-volume and/or high-speed roadways, where feasible, provide protected bicycle facilities such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes

Long-term Recommendations

	Finding	Strategy or Strategies	Actions
All Crashes	***Increases in vehicle miles travelled (VMT) generally correlate with increases in fatal and serious crashes.***	Policies that limit the need to drive, and therefore limit vehicle-miles travelled.	• Continued support of regional and state policies that seek to reduce VMT, including multimodal facilities, transit, RTO, and TDM.
Surface Streets	***The most common serious crash types on surface streets were rear end and turning. For fatal crashes, the most common types were pedestrian and fixed object.***	Develop more detailed understanding of causes of the most common serious crashes in the region and the effectiveness of countermeasures.	• Develop safety best practices based on the HSM for the region to address the most prevalent crash types. • Further analyze crash types.
	Higher levels of congestion on surface streets are correlated with lower serious crash rates, likely due to lower speeds.	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	• Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013.
	Higher levels of congestion on freeways are correlated with higher serious crash rates, except for severe congestion, which is correlated with lower serious crash rates.	Revisions to state, regional, and local mobility standards to consider safety as equally important, at a minimum, as vehicular capacity.	• Elevate safety to equal importance as mobility in regional policy as part of the next RTP update that will start in 2013.
	Surface streets with more traffic lanes have higher crash rates per road mile and per VMT. This follows trends documented in AASHTO's Highway Safety Manual. Roadway designs that increase speed lead to increased crash severity in the absence of specific safety considerations.	A regional arterial safety program to focus on corridors with large numbers of serious crashes, pedestrian crashes, and bicycle crashes.	• Include safety as an element of the update to the Metro Best Design Practices guidebooks. • Use strategies including Highway Safety Manual strategies to address safety on multi-lane roadways, such as medians, speed management, access management, improved pedestrian crossings, roundabouts, and road diets.
Data	***This report identifies high-level trends in regional crashes, but more detailed work is needed to identify specifically where and why they are occurring in disproportionate amounts.***	More detailed analysis of the causes of serious crashes, pedestrian crashes, and bicycle crashes in the region	• Collect, maintain and analyze ODOT crash data. • Provide regional crash data for use in TSP updates and other requests.

	Finding	Strategy or Strategies	Actions
Additional Research	***The analysis of the relationship between land use, neighborhood design, and safety was inconclusive. More research is needed to establish reliable relationships between land use, neighborhood design, and safety.***	More detailed research on the relationship between land use patterns and safety	• Work with OTREC to develop research project to further explore the linkage between transportation safety, land use and the built environment.

5.7.16 Congestion Management Program Data Collection and Monitoring

The great challenge for establishing and maintaining a monitoring program has been the availability of data. Historically, collecting and managing data has been expensive and difficult. With advancements in intelligent transportation systems in the region, more and better data is available today and will continue to grow with implementation of data collection projects identified in the Regional Transportation System Management and Operations (TSMO) plan.

Starting in 2008, the region approved ongoing funding for implementation, including an annual allocation to fund Portal, the regional transportation data archived, housed and maintained by Portland State University. PSU, in partnership with ODOT, TriMet, Metro and other local agencies, provides data aggregation, maintenance and reporting on the region's roadways and transit systems. Metro will continue to work with ODOT and other regional partners to expand existing data collection and performance monitoring capabilities, in order to evaluate system performance for all modes of travel.

This work includes supporting a data management system to facilitate data collection, maintenance and reporting to support on-going RTP and MTIP monitoring. The performance monitoring will be reported biennially as part of the Regional Mobility Program, consistent with the region's federally-approved congestion management process.

5.7.17 Freight system bottlenecks

As a critical West Coast domestic hub and international gateway for commerce and tourism, the Portland area must maintain well-functioning river ports, rail connections and highways. The Regional Freight Plan and RTP identify a small set of key highway bottlenecks on National Highway System facilities critical to state and regional truck mobility. The plans also note freight rail bottlenecks critical to access the region's ports and intermodal facilities, as well as the need for rail to carry its full share of existing and future commodities efficiently.

In order to address these long standing needs and to increase understanding of their economic importance, the Regional Freight Technical Advisory Committee, with assistance from private sector stakeholders (e.g., through a Regional Freight and Business Task Force), will develop criteria and a methodology for ranking these locations in terms of their freight and business impacts. This can be done by: (a) measuring the extent to which sensitive economic activities are affected by those facilities, and (b) estimating the magnitude of potential economic benefit associated with

making improvements to these facilities, using the best available methods and tools. Information generated through this analysis will be used in future RTP updates to help prioritize investments and may be needed in the future to qualify for certain federal funding categories.

GLOSSARY OF TERMS

Accessibility – The ability or ease to reach desired goods, services, activities and destinations with relative ease, within a reasonable time, at a reasonable cost and with reasonable choices. Many factors affect accessibility (or physical access), including mobility, the quality, cost and affordability of transportation options, land use patterns, connectivity of the transportation system and the degree of integration between modes. The accessibility of a particular location can be evaluated based on distances and travel options, and how well that location serves various modes. Locations that can be accessed by many people using a variety of modes of transportation generally have a high degree of accessibility.

Access management – Measures regulating access to streets, roads and highways from public roads and private driveways. These measures include restrictions on the siting of interchanges, restrictions on the type and amount of driveway and intersection access to roadways, and use of physical controls, such as signals and raised medians, to reduce the impact of connecting road traffic on the main facility.

Active Living - Lifestyles characterized by incorporating physical activity into daily routines through activities such as walking or biking for transportation, exercise or pleasure. To achieve health benefits, the goal is to accumulate at least 30 minutes of activity each day.

Active transportation - Non-motorized forms of transportation including walking and biking.

Active transportation network – Combined network of streets, trails and districts identified on the regional transportation pedestrian and bicycle network maps and identified as pedestrian and bicycle parkways, regional bikeways, regional pedestrian corridors and regional pedestrian and bicycle districts, which include station communities. The active transportation network also includes frequent bus routes, all of which are designated as pedestrian parkways, and high ridership bus stops.

Affordability –See cost-burdened household.

Americans With Disabilities Act (ADA) of 1990 – Civil rights legislation enacted by Congress in 1990 that mandates equal opportunities for persons with disabilities in the areas of employment, transportation, communications and public accommodations. Under this Act, most transportation providers are obliged to purchase lift-equipped vehicles for their fixed-route services and must assure system-wide accessibility of their demand-responsive services to persons with disabilities. Public transit providers also must supplement their fixed-route services with paratransit services for those persons unable to use fixed-route service because of their disability. TriMet's ADA transportation plan outlined the requirements of the ADA as applied to TriMet services, the deficiencies of the existing services when compared to the requirements of the new act and the remedial measures necessary to bring TriMet and the region into compliance with the act. Metro, as the region's metropolitan planning organization (MPO) is required to review TriMet's ADA Paratransit Plan annually and certify that the plan conforms to the Regional Transportation Plan. Without this certification, TriMet is not in compliance with the ADA. ADA also affects the design of

pedestrian facilities being constructed by local governments.

Arterial – A class of street. Arterial streets interconnect and support the throughway system. Arterials are intended to provide general mobility for travel within the region. Correctly sized arterials at appropriate intervals allow through trips to remain on the arterial system thereby discouraging use of local streets for cut-through travel. Arterial streets link major commercial, residential, industrial and institutional areas. Major arterials serve longer distance through trips and serve more of a regional traffic function. Minor arterials serve shorter, more localized travel within a community. As a result, major arterials usually carry more traffic than minor arterials. Arterial streets are usually spaced about one mile apart and are designed to accommodate bicycle, pedestrian, truck and transit travel.

Arterial traffic calming - Designed to manage traffic at higher speeds and volumes, but still minimize speeding and unsafe speeds. Treatments can include raised medians, raised intersections, gateway treatments, textured intersections, refuge islands, road diets, and roundabouts.

Asset management – A systematic process of maintaining, upgrading and operating physical assets cost-effectively. It combines engineering principles with sound business practices and economic theory, and it provides tools to facilitate a more organized, logical approach to decision-making. Asset management provides a framework for handling both short- and long-range planning. It is based on the process of monitoring the physical condition of assets, predicting deterioration over time and providing information on how to invest in order to maintain or enhance the performance of assets over their useful life.

Attainment area – An area considered to have air quality that meets or exceeds the U.S. Environmental Protection Agency (EPA) health standards used in the Clean Air Act.

Barrier – A condition or obstacle that prevents an individual or a group from accessing the transportation system or transportation planning process. Examples include a physical gap or impediment, lack of information, language, education and/or limited resources.

Benchmark – A numerical goal or stated direction to be achieved for which quantifiable or directional targets may be set, assigning a value to what the RTP is trying to achieve. Benchmarks (also known as targets) are expressed in quantitative terms and provide an important measure of progress toward achieving different goals within a timeframe specified for it to be achieved.

Bicycle – A vehicle having two tandem wheels, a minimum of 14 inches in diameter, propelled solely by human power, upon which a person or persons may ride. A three-wheeled adult tricycle is considered a bicycle. In Oregon, a bicycle is legally defined as a vehicle. Bicyclists have the same right to the roadways and must obey the same traffic laws as the operators of other vehicles.

Bicycle boulevards - Sometimes called a bicycle priority street, a bicycle boulevard is a low-traffic street where all types of vehicles are allowed, but the street is modified as needed to enhance bicycle safety and convenience by providing direct routes that allow free-flow travel for bicyclists at intersections where possible. Traffic controls are used at major intersections to help

bicyclists cross streets. Typically these modifications also calm traffic and improve pedestrian safety.

Bicycle comfort index (BCI) - analyzes the auto volumes, auto speeds and number of auto lanes on existing bikeways and within defined 'cycle zones' and assigns a comfort rating to the bikeway. Generally off-street paths receive the highest rating because they are completely separated from auto traffic. Results help identify existing bikeways on the regional bicycle network that could be upgraded to increase bicyclists comfort. Metro's BCI analysis was used in the existing conditions step of developing the ATP. Additional data would be useful to refine the tool.

Bicycle district - an area with a concentration of transit, commercial, cultural, institutional and/or recreational destinations where bicycle travel is attractive, comfortable and safe. Bicycle districts are areas where high levels of bicycle use exist or a planned. Within a bicycle district, some routes may be designated as bicycle parkways or regional bikeways, however all routes within the bicycle district are considered regional. A new concept for the Regional Transportation Plan and added to the regional bicycle network through the ATP. The Central City, Regional and Town Centers and Station Communities are identified as bicycle districts.

Bicycle facilities – A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities, all bikeways and shared roadways not specifically designated for bicycle use.

Bicycle parkway - A bicycle route designed to serve as a bicycle highway providing for direct and efficient travel for large volumes of cyclists with minimal delays in different urban environments and to destinations outside the region. These bikeways connect 2040 activity centers, downtowns, institutions and green spaces within the urban area. The specific design of a bike parkway will vary depending on the land use context within which it passes through. These bikeways could be designed as an off-street trail along a stream or rail corridor, a cycle track along a main street or town center, or a bicycle boulevard through a residential neighborhood.

Bicycle Routes –Link bicycle facilities together into a clear, easy to follow route using way finding such as signs and pavement markings, connecting major destinations such as town centers, neighborhoods and regional destinations.

Bikeable - A place where people live within biking distance to most places they want to visit, whether it is school, work, a grocery store, a park, church, etc. and where it is easy and comfortable to bike.

Bike lane – A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bike-transit facilities - Infrastructure that provide connections between the two modes, by creating a "bicycle park-and-ride," i.e. large-scale bike parking facility at a transit station.

Bikeway – Any road, street, path or right-of-way that is specifically designated in some manner as being open to bicycle travel, either for the exclusive use of bicycles or shared use with other vehicles or pedestrians.

Boulevards – Facilities designated in mixed-use areas (e.g., 2040 centers, station communities and main streets) that are designed to integrate motor vehicles, freight, transit, bicycle and pedestrian modes of travel, with an emphasis on pedestrian, bicycle and transit travel.

Branch railroad lines - Non-Class I rail lines, including short line or branch lines.

Bus Rapid Transit (BRT) - Bus rapid transit service uses high capacity buses in their own guideway or mixed in with traffic, with limited stops and a range of transit priority treatments to provide speed, frequency, and comfort to users. This service typically runs at least every 15 minutes during the weekday and weekend mid-day base periods through frequencies may increase or decrease for individual applications and based on demand.. Stops are generally spaced one-quarter mile apart or more. Most stops have significant and easily identifiable passenger infrastructure, including waiting areas that are weather protected. Additional passenger amenities at stops may include real-time schedule information, trip planning kiosks, ticket machines, special lighting, benches, and bicycle parking.

Capacity – A transportation facility's ability to accommodate a moving stream of people or vehicles in a given place during a given time period. Increased capacity can come from building more streets or throughways, adding more transit service, timing traffic signals, adding turn lanes at intersections or many other sources.

Carbon footprint – A measure of the amount of carbon dioxide (CO2) emitted through the combustion of fossil fuels. This measure is often expressed as tons of carbon dioxide or tons of carbon emitted, usually on a yearly basis.

Carbon monoxide (CO) – An air pollutant that is a highly toxic, odorless and colorless gas, formed in large part by incomplete combustion of fuel. Automobile emissions are the primary source of CO.

Carpool – An arrangement in which two to six people share the use and/or costs, of traveling in privately owned automobiles between fixed points on a regular basis. See also vanpool.

Carsharing – A transportation demand management strategy wherein a group of people share a single vehicle. Benefits of this strategy include reduced vehicle ownership, parking needs and drive-alone trips, as well as improved accessibility. Implementation in the Portland region includes public/private partnerships and a private sector membership organization.

Central city – The downtown and adjacent portions of the city of Portland. See the 2040 Growth Concept map and text.

Chronic disease - An illness that is prolonged, does not resolve spontaneously and is rarely cured completely. Chronic diseases such as heart disease, cancer and diabetes account for seven of every 10 deaths in America. Although chronic diseases are among the most common and costly problems, they are also among the most preventable. Adopting healthy behaviors such as eating nutritious foods, being physically active and avoiding tobacco use can prevent or control the these diseases.

Clean Air Act – The Federal clean air act identifies "mobile sources" (vehicles) as primary sources of pollution and calls for

stringent new requirements in metropolitan areas and states where attainment of federal air quality standards is or could be a problem.

Climate change - Any significant variation in the earth's climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g. changes in ocean circulation); and
- human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.).[1]

Collector street – A class of street. Collector streets provide both access and circulation between residential, commercial, industrial and agricultural community areas and the arterial system. As such, collectors tend to carry fewer motor vehicles than arterial streets, with reduced travel speeds. Collector streets are usually spaced at half-mile intervals, midway between arterial streets. Collectors may serve as bike, pedestrian and freight access routes, providing local connections to the arterial street network and transit system. While the focus for collectors has been on motor vehicle traffic, they are developed as multi-modal facilities that accommodate bicycles, pedestrians and transit.

Community boulevard – These facilities generally consist of two vehicle travel lanes, balanced multi-modal function, narrower right of way than a regional boulevard, landscaped medians, on-street parking, narrower travel lanes than throughways, more intensive land use oriented to the street and wide sidewalks. The right of way ranges from 61 to 98 feet or greater. These facilities are located within the most intensely developed activity centers with development oriented to the street. These are primarily central city and regional centers, town centers, station communities and some main streets.

Community street – These facilities consist of two to four travel lanes, balanced multi-modal function, narrower right of way than regional streets, on-street parking, narrower or fewer travel lanes than regional streets, and residential neighborhood and corridor land uses set back from the street. These facilities provide a higher level of local access and street connectivity than regional streets. They have the greatest flexibility in cross sectional elements. The right of way ranges from 60 to 80 feet or greater.

Commute – Regular travel between home and a fixed location (e.g., work, school).

Commuter rail – Short-haul rail passenger service operated within and between metropolitan areas and neighboring communities. This transit service operates in a separate right-of-way on standard railroad tracks, usually shared with freight use. The service is typically focused on peak commute periods but can be offered other times of the day and on weekends when demand exists and where rail capacity is available. The stations are typically located one or more miles apart, depending on the overall route

[1] http://www.epa.gov/climatechange/basicinfo.html. Accessed on December 17, 2007.

length. Stations offer infrastructure for passengers, bus and LRT transfer opportunities and parking as supported by adjacent land uses. See also Inter-city rail.

Complete streets - A transportation policy and design approach where streets are designed, operated and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.

Concept planning – A planning process to create a blueprint for the future of land brought inside the urban growth boundary for urbanization. The process is required to address the provisions listed in Title 11 of the Urban Growth Management Functional Plan. These provisions include a minimum level of residential units per acre, a diversity of housing stock, an adequate transportation system, protection of natural resource areas and needed school facilities.

Conformity – Process defined by the Clean Air Act to assess the compliance of any transportation plan, program or project with air quality implementation plans.

Congestion - A condition characterized by unstable traffic flows that prevents movement on a transportation facility at optimal legal speeds. Recurrent congestion is caused by constant excess volume compared with capacity. Nonrecurring congestion is caused by incidents such as bad weather, special events and/or traffic accidents.

Congestion Mitigation and Air Quality Improvement (CMAQ) Program – A federal transportation funding program. The MAP-21 provides just over $2.2 billion in CMAQ funding for each year of the authorization-2013 and 2014. While project eligibility remains basically the same, the legislation places considerable emphasis on diesel engine retrofits and other efforts that underscore the priority on reducing fine particle pollution (PM 2.5).

Congestion management process - A federally mandated program directed at the Portland metropolitan region (and other metropolitan areas) to systematically manage traffic congestion. The process provides information on transportation system performance and recommends a range of strategies to minimize congestion and enhance the mobility of people and goods. These multimodal strategies include, but are not limited to, operational improvements, travel demand management, policy approaches, and additions to capacity.

Corridors (2040 design type) – A type of land use that is typically located along regional transit routes and arterial streets, providing a place for somewhat higher densities than is found in 2040 centers. These land uses should feature a high-quality pedestrian environment and convenient access to transit. Typical new developments would include rowhouses, duplexes and one to three-story office and retail buildings, and average about 25 persons per acre. While some corridors may be continuous, narrow bands of higher-intensity development along arterial streets, others may be more nodal, that is a series of smaller centers at major intersections or other locations along the arterial that have high quality pedestrian environments, good connection to adjacent neighborhoods and transit service.

Cost-burdened household– A renter household that spends more than 50 percent of its gross income on housing and transportation expenses. Housing and transportation costs include all expenditures

tracked under those two categories by the U.S. Bureau of Labor Statistics in the Consumer Expenditures Survey.

Cycle track – Bicycle lanes that are physically separated from motor vehicle and pedestrian travel. A cycle track is an exclusive bike facility that has elements of a separated path and on-road bike lane. A cycle track, while still within the roadway, is physically separated from motor traffic and is distinct from the sidewalk. Cycle tracks may be one-way or two-way, and may be at road level, at sidewalk level, or at an intermediate level. They all share in common some separation from motor traffic with bollards, car parking, barriers or boulevards.

Cyclist – Person riding a bicycle.

Deficiency - Capacity or design constraints that limit, but do not prohibit the ability to travel by a given mode or meet thresholds defined in Tables 2.4 (Regional Motor Vehicle Performance Measures) or 2.5 (Non-SOV Modal Targets). Examples include locations where throughway capacity is less than six through lanes and arterial street capacity less than 4 lanes, or that have poor or substandard design features; at-grade rail crossings; height restrictions; bike and pedestrian connections that contain obstacles (e.g., missing curb ramps, distances greater than 330 feet between pedestrian crossings, absence of pedestrian refuges, sidewalks occluded by utility infrastructure, high traffic volumes and complex traffic environments); transit overcrowding or schedule unreliability and high crash locations).

Delay - The additional travel time required by all travelers, as measured by the time to reach destinations at posted speed limits (free-flow speed) versus traveling at a slower congested speed. Delay can be expressed in several different ways, including total delay in vehicle-hours, total delay per vehicle miles traveled (VMT) and share of delay by time period, day of week or speed range.

Developed areas – Areas of the region that are primarily built-up, with most new housing and employment being primarily accommodated through infill, redevelopment and use of brownfields.

Developing areas – Areas of the region containing significant areas of developable and re-developable land, with most new housing and employment being primarily accommodated through a combination of greenfield development, infill and redevelopment.

Disability - The limitation of normal physical, mental, social activity of an individual. There are varying types (functional, occupational, learning), degrees (partial, total) and durations (temporary, permanent) of disability.

Emissions budget – The part of the State Implementation Plan (SIP) that identifies the allowable emissions levels, mandated by the National Ambient Air Quality Standards for certain pollutants emitted from mobile, stationary and area sources. The emissions levels are used for meeting emission reduction milestones, attainment or maintenance demonstrations.

Employee Commute Options (ECO) rules – The Employee Commute Options or "ECO" Program requires larger employers to provide commute options to encourage employees to reduce auto trips to the work site. ECO is one of several strategies included in the Ozone Maintenance Plan for the Portland Air Quality Maintenance Area. ECO applies to employers within the Portland Air

Quality Maintenance Area (AQMA) with more than 50 employees at a work site. Employers must provide commute options that have the potential to reduce employee commute auto trips

Employment areas – Areas of mixed employment that include various types of manufacturing, distribution and warehousing uses, and may include commercial and retail development. Retail uses should primarily serve the needs of the people working or living in the immediate employment area. Exceptions to this general policy can be made only for certain areas indicated in a functional plan.

End-of-trip facilities – Parking facilities and other accommodations that meet the needs of bicyclists, walkers and carpoolers. Examples include parking spaces striped for rideshare vehicles only, bike parking, locker rooms and showers.

Environmental justice (EJ) community – A U.S. Census block group that has a concentration of people living in poverty, people with low-income, people of color, elderly, children, people with disabilities, and other populations protected by Title VI and related nondiscrimination statutes. "Concentration" shall be defined as having two or more socio-economically sensitive populations in a Census Block Group of any of the groups listed above greater than 2.5 times the regional percentage based on the most recent actual census bureau data. This includes minorities, seniors, and people with disabilities, low-income, or who do not speak English.

Environmental justice populations - People living in poverty, people with low-income as determined annually by the U.S. Department of Health and Human Services Low-Income Index, people of color, elderly, children, people with disabilities, and other populations protected by Title VI and related nondiscrimination statutes.

Environmental Protection Agency – The federal regulatory agency responsible for administering and enforcing federal environmental laws, including the Clean Air Act, the Clean Water Act, and the Endangered Species Act.

Equity – In transportation, a normative measure of fairness among transportation system users.

Facility – The fixed physical assets (structures) enabling a transportation mode to operate (including travel, as well as the loading and unloading of passengers). This includes streets, throughways, bridges, sidewalks, bikeways, transit stations, bus stops, ports, air and marine terminals and rail lines.

Equitable access – Equal opportunities low-income residents and people with disabilities to access the regional transportation system.

Federal Highway Administration (FHWA) - The federal agency responsible for administering roadway programs and funds. The FHWA implements transportation legislation approved at the congressional level that appropriates all federal funds to states and local governments.

Federal Transit Administration (FTA) - The federal agency responsible for administering transit programs and funds. The FTA works with state and local governments to select new transit systems for implementation and guides capital, operating, and transit methodology decisions.

Fiscal constraint – Making sure that a given program or project can reasonable expect to receive funding within the time allotted for its implementation.

Fixed-route transit – Regularly scheduled service operating repeatedly over the same street or throughway pattern on a determined schedule.

Forecast – Projection of population, employment or travel demand for a given future year.

Freeway – A design for a Throughway in which all access points are grade separated.

Freight intermodal facility – An intercity facility where freight is transferred between two or more modes (e.g., truck to rail, rail to ship, truck to air).

Freight mobility – The efficient movement of goods from point of origin to destination.

Frequent bus – Frequent bus service offers local and regional bus service with stops approximately every 750 to 1000 feet, providing corridor service rather than nodal service along selected arterial streets. This service typically runs at least every 15 minutes throughout the day and on weekends though frequencies may increase based on demand, and it can include transit preferential treatments, such as reserved bus lanes and transit signal priority, and enhanced passenger infrastructure along the corridor and at major bus stops, such as covered bus shelters, curb extensions, special lighting and median stations.

Gap - Missing links or barriers in the "typical" urban transportation system for any mode that functionally prohibits travel where a connection might be expected to occur. A gap generally means a connection does not exist at all, but could also be the result of a physical barrier such as a throughway, natural feature, weight limitations on a bridge (e.g., Sellwood Bridge), or existing development.

Investments to address system gaps include throughway, rail and stream over-crossings that help meet arterial network concept goals as appropriate; new arterial connections up to four lanes with turn lanes; new collector connections in the central city, regional centers and industrial areas; new bike and pedestrian facilities; regional multi-use trails with a transportation function; new transit service connections, new vanpool connections, individualized travel marketing programs.

Global warming - The increase in the average temperature of the air near the Earth's surface and oceans, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities.2

Greenhouse gases - The six gases identified in the Kyoto Protocol and by the Oregon Greenhouse Gas Mandatory Reporting Advisory Committee as contributing to global warming: carbon dioxide (CO2), nitrous oxide (N2), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFC s), and sulfur hexafluoride (SF6).

Green street, throughway or parking lot - A transportation facility designed to:

[2] http://www.epa.gov/climatechange/basicinfo.html. Accessed on December 17, 2007.

- Integrate a system of stormwater management.
- Reduce the amount of water that is piped directly to streams and rivers.
- Be a visible component of a system of "green infrastructure" that is incorporated into the aesthetics of the community. Make the best use of vegetation for stormwater interception as well as temperature mitigation and air quality improvement.
- Ensure the roadway has the least impact on its surroundings, particularly at locations where it crosses a stream, wildlife corridor or other sensitive area. These facilities include features like street trees, landscaped swales, pervious curb treatments and special paving materials to manage stormwater runoff.

Greenways - Greenways generally follow rivers and streams and may or may not provide for public access. In some cases, greenways may be a swath of protected habitat along a stream with no public access. In other cases, greenways may allow for an environmentally compatible trail, viewpoint or canoe launch site. The greenways that are identified in Metro's regional trails plan do not presently offer public access. Usage of the term "greenway" can be ambiguous because it is sometimes used interchangeably with the word "trail." For example, "Fanno Creek Trail", "Fanno Creek Greenway", and "Fanno Creek Greenway Trail" are used with equal frequency for the same trail. Trail and greenway professional prefer to make the technical distinction that the "trail" refers to the tread or the actual walking service, while the "greenway" refers to the surrounding park or natural corridor. The term is also ambiguous because the City of Portland recently began referring to its bicycle boulevards as "neighborhood greenways." Neighborhood greenways differ from traditional greenways in that they general do not follow an open space corridor aside from local streets.

Habitat conservation areas – Riparian habitat areas within the current urban growth boundary identified by the regional fish and wildlife protection program. Habitat Conservation Areas are to be protected by development standards contained in Title 13 of the Urban Growth Management Functional Plan or through equivalent approaches by local jurisdictions. As new areas are added to the urban growth boundary, highly valued upland habitat areas will also be identified as Habitat Conservation Areas, with their protection level adjusted depending on the area's economic importance to the region.

Health - A condition of complete physical, mental and emotional well-being, not merely the absence of disease.

Health Impact Assessment - A combination of procedures, methods, and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of these effects within the population.

High capacity transit network – High capacity transit is defined by its function: to carry high volumes of passengers quickly and efficiently from one place to another. Other defining characteristics of HCT service include the ability to bypass traffic and avoid delay by operating in exclusive or semi-exclusive rights of way, faster overall travel speeds due to wide station spacing, frequent service, transit priority street and signal treatments, and premium station and

passenger amenities. Speed and schedule reliability are preserved using transit signal priority at at-grade crossings and/or intersections. High levels of passenger infrastructure are provided at transit stations and station communities, including real-time schedule information, ticket machines, special lighting, benches, shelters, bicycle parking, and commercial services. The transit modes most commonly associated with high capacity transit include:

- light rail transit, light rail trains operating in exclusive or semi-exclusive right of way[3]
- bus rapid transit, regular or advanced bus vehicles operating primarily in exclusive or semi-exclusive right of way
- rapid streetcar, streetcar trains operating primarily in exclusive or semi-exclusive right of way
- commuter rail, heavy rail passenger trains operating on exclusive, semi-exclusive or nonexclusive (with freight) railroad tracks.

Other transit modes, such as exclusive track heavy rail or monorail, could be applied in Portland but have generally not been considered due to high costs.

High-occupancy vehicle (HOV) lane – Highway and arterial lanes restricted for use to vehicles carrying more than two passengers with the exception of motorcycles.

[3] Exclusive right of way, as defined by Transportation Research Board TCRP report 17, includes fully grade -separated right of way. Semi-exclusive right of way includes separate and shared rights of way as well light rail and pedestrian malls adjacent to a parallel roadway. Nonexclusive right of way includes operations in mixed traffic, transit mall and a light rail/pedestrian mall.

Highway – A design for a Throughway in which access points are a mix of separate and at-grade.

Housing affordability – See cost-burdened household.

Impervious surfaces – Surfaces that do not allow water to infiltrate into the ground and rely on piped stormwater drainage systems that convey runoff directly to streams. The majority of impervious surfaces are roads, rooftops, sidewalks, parking lots and driveways. A conventional stormwater management approach uses storm sewer pipes beneath the street to quickly convey storm runoff to stream channels that are also managed for stormwater conveyance.

Indicator – Also called performance measure. A measure of how well the transportation system is performing that is used to evaluate the success of the objective with quantitative or qualitative data and provide feedback in the plan's decision-making process. Some measures can be used to predict the future as part of an evaluation process using forecasted data, while other measures can be used to monitor changes based on actual empirical or observed data. In both cases, they can be applied at a system-level, corridor-level and/or project-level. Indicators provide the planning process with a basis for evaluating alternatives and making decisions on future transportation investments. They can also be used to monitor performance of the plan in between updates to evaluate the need for refinements to policies, investment strategies or other elements of the plan.

Individualized marketing – A transportation demand management strategy that provides support programs and customized travel choice information based

on a person's interest-level. Examples include TravelSmart™ and SmartTrips. A TravelSmart™ project in North and Northeast Portland provided transit information, bike and walking maps, guided walks and rides, customized trip planning and in-home assistance to help residents get started walking, biking, or riding transit.

Industrial areas – Areas set aside for industrial activities. Supporting commercial and related uses may be allowed, provided they are intended to serve the primary industrial users. Residential development and retail users whose market area is larger than the industrial area are not considered supporting uses.

Infrastructure –The fundamental physical facilities and systems required to provide a community with services it needs or wants, including transportation and communication systems, power plants, sewer and water treatment systems, and schools, for example.

Inner neighborhoods – Areas in Portland and typically other older cities that are primarily residential, close to central employment and shopping areas, and have smaller lot sizes and higher population densities than in outer neighborhoods.

Intelligent transportation systems (ITS) - The application of a broad range of communications-based information, control and electronics technologies to improve the efficiency and safety of transportation systems. ITS can be integrated into the transportation system infrastructure and in vehicles to help monitor and manage traffic flow, reduce congestion, provide alternate routes to travelers, and improve safety.

Interchange area management plan (IAMP) - A joint ODOT and local government long-term (20+ years) transportation and land use plan to balance and manage transportation and land use decisions in interchange areas. The primary purpose of this planning tool is to protect the function, operations and safety of the interchange, the state highway, and the supporting arterial and local street network. The IAMP uses access management and site design standards for interchange areas to preserve traffic efficiency and function, while ensuring safety for all modes of travel. The standards should include guidelines for pedestrian and bicycle access, access restrictions, gateway treatments at interchanges, use of medians, landscaping minimums, and other design considerations. The IAMPs may use interchange zoning (as a base zone and/or overlay zone) to regulate the type of development that may take place at an interchange or along arterials connecting to the interchange to accomplish these objectives. This plan is required for new interchanges or as part of major changes to existing interchanges.

Intermodal facility – A transportation element that allows passenger and/or freight connections between modes of transportation. Examples include airports, rail stations, marine terminals, and railyards that facilitate the transfer of containers or trailers. See also passenger intermodal facility and freight intermodal facility definitions.

Intercity bus – A mode of transit service that provides connections between cities, towns, and other places typically tens or hundreds of miles away. This type of service generally provides fewer bus stops than provided by local bus routes. Greyhound Bus Lines and private carriers operate inter-city buses. Some local transit systems offer bus lines to nearby cities or towns served by another

transit agency. Intercity bus services provide important travel connections to smaller towns and rural areas that do not have airports or train service. Several private inter-city bus services are currently provided in the region.

Intercity rail – Inter-city passenger rail that is part of the state transportation system and extends from the Willamette Valley north to British Columbia. Amtrak already provides service south to California, east to the rest of the continental United States and north to Canada. These systems should be integrated with other transit services within the metropolitan region with connections at passenger intermodal facilities.

Jurisdiction - Typically refers to a government or quasi-government agency or the authority of a government or quasi-government agency, including, for example, counties, cities, regional agencies, federal and state agencies and federally recognized tribes.

Level of service (LOS) – A tool for evaluating system performance and identifying deficiencies for roadways, transit and other motorized and non-motorized modes of travel. For example, roadway measures of level-of-service often assign criteria based on volume-to-capacity ratios. A qualitative measure describing operational conditions within a traffic stream from a motorist's point of view. A level of service definition describes conditions in terms of speed and travel time, freedom to maneuver, and traffic interruptions. LOS is rated on a scale of A through F:

LOS	Motor Vehicle Traffic Flow Characteristics
A	Virtually free flow; completely unimpeded
B	Stable flow with slight delays; reasonably unimpeded
C	Stable flow with delays; less freedom to maneuver
D	High density but stable flow
E	Operating conditions at or near capacity; unstable flow
F	Forced flow, breakdown conditions
> F	Severe congestion - demand exceeds roadway capacity, limiting volume than can be carried and forcing excess demand onto parallel routes and extending the peak period

Sources: 1985 Highway Capacity Manual (A through F descriptions)

Metro (>F Description)

Light rail transit (LRT) – In this region, Light Rail Transit (LRT) is TriMet's MAX service. It is a system of modern passenger rail cars operating on a fixed guideway within an exclusive right-of-way. LRT serves the Central City and Regional Centers as well as station communities and may serve Town Centers and Corridors. In addition, LRT serves regional public attractions such as the Washington County Fair Grounds, Civic Stadium, the Oregon Convention Center, Oregon Zoo, Metropolitan Exposition Center and the Rose Garden. LRT service typically runs at least every 15 minutes throughout the day. It operates with limited stops and operates at higher speed outside of downtown Portland. MAX is powered by overhead electric lines though some systems in other regions are powered by on-board diesel or electric motors. Main elements include rail vehicles, rail tracks, overhead electric lines, modern rail stations, signal priority at intersections, and integration with transit-oriented development strategies. A high level of passenger infrastructure is provided at transit stations and station communities, including schedule information, ticket machines, special lighting, benches, shelters, bicycle parking and commercial

services. The speed and reliability of LRT can be maintained using transit signal priority at at-grade crossings and grade separation.

Local Bikeways - Trails, streets and connections not identified as regional bicycle routes, but are important to a fully functioning network. Local bikeways are the local collectors of bicycle travel. They are typically shorter routes with less bicycle demand and use. They provide for door-to-door bicycle travel.

Local bus - Local bus lines provide access to public transit within neighborhoods, commercial districts and some industrial areas, and often provide access to 2040 Target Areas and the remainder of the regional transit system. Local transit services are characterized by frequent stops along the route, with stop spaced every 750 to 1000 feet. Service levels vary, but are typically every 30 minutes during the weekday base period in higher-density areas and may be more frequent as demand warrants. Weekend and evening service levels are typically policy, not demand based.

Local government – For the purpose of this plan, this term refers to a city or county within the Metro boundary.

Local Pedestrian Connectors – All streets and trails not included on the regional network. Local connectors experience lower volumes of pedestrian activity and are typically on residential and low-volume/speed roadways or smaller trails. Connectors, however, are an important element of the regional pedestrian network because they allow for door-to-door pedestrian travel.

Local streets – Local streets primarily provide direct access to adjacent land. While Local streets are not intended to serve through traffic, the aggregate effect of local street design impacts the effectiveness of the Arterial and Collector system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the Arterial street network. In the urban area, local roadway system designs often discourage "through traffic movement." Regional regulations require local street connections spaced no more than 530 feet in new residential and mixed used areas, and cul-de-sacs are limited to 200 feet in length. These connectivity requirements ensure that a lack of adequate local street connections does not result in the arterial system becoming congested. While the focus for local streets has been on motor vehicle traffic, they are developed as multi-modal facilities that accommodate bicycles, pedestrians and sometimes transit.

Local transit network – The local transit network provides basic service and access to local neighborhoods and activity centers as well as to the regional and high capacity transit networks. It also offers coverage and access to primary and secondary land-use components. Transit preferential treatments and passenger infrastructure are appropriate at high ridership locations. Sidewalk connectivity and protected crosswalks are critical elements of the local transit network. This network includes local bus, para-transit, streetcar, and tram.

Main roadway route – Designated freights routes that connect major activity centers in the region to other areas in Oregon or other states throughout the U.S., Mexico and Canada.

Main streets – Neighborhood shopping areas along an arterial street or at an intersection,

having a unique character that draws people from outside the adjacent neighborhood. Northwest 23rd Avenue and SE Hawthorne Boulevard in the city of Portland are examples of established main streets.

Maintenance area – Any geographic region in the U.S. previously designated non-attainment pursuant to the Clean Air Act (CAAA) Amendments of 1990 and subsequently designated to attainment subject to the requirements to develop a maintenance plan under section 175A of the CAA as amended.

Major Bus Stop – Major Bus Stops are intended to provide highly visible and comfortable bus stops to encourage greater use of transit. Major Bus Stops include most Frequent Service bus stops, most transfer locations between bus lines (especially when at least one of the bus lines is a frequent service line), stops at major ridership generators (e.g., schools, hospitals, concentrations of shopping or high density employment), and other high ridership bus stops. These stops may include shelters, lighting, seating, bicycle parking, or other passenger amenities and are intended to be highly accessible to adjacent buildings while providing for quick and efficient bus service. Major Bus Stop locations are shown in Figure 2.15.

Marine facility – A facility where freight is transferred between water-based and land-based modes.

Metropolitan Greenspaces Master Plan (1992) - Details the vision, goals and organizational framework of a regional system of natural areas, trails and greenways for wildlife and people in the region, and set the foundation for subsequent bond measures and trail plans.

Metropolitan Planning Organization (MPO) - A regional policy body, required in urbanized areas with populations more than 50,000 and designated by the governor of the state. MPOs are responsible, in cooperation with the state and other transportation providers for carrying out the metropolitan transportation planning requirements of federal highway and transit legislation. In 2007, Oregon had six designated MPOs– Bend, Corvallis, Eugene-Springfield, Medford, Portland and Salem-Keizer.

Metropolitan Transportation Plan (MTP) - A long-range intermodal transportation plan that is developed and adopted through the metropolitan transportation planning process for the metropolitan planning area. The plan guides future regional investments and responds to legal mandates contained in federal legislation such as SAFETEA-LU, the 1990 Clean Air Act. Under federal legislation, the RTP is a MTP.

Metropolitan Transportation Planning Process – A federally mandated decision-making framework used by MPOs to develop metropolitan transportation plans in consultation and coordination with federal, state, regional and local governments, and engagement of other stakeholders with an interest in or who are affected by the planning process. The process also includes opportunities for open, timely and meaningful involvement of the public.

Mini-bus – A transit service vehicle that provides coverage in lower density areas by providing transit connections to 2040 Target Areas or the regional transit system. Mini-bus services, which may follow fixed routes or respond to customer demand, include dial-a-ride, employer shuttles and bus pools. These services typically provide a 60-minute

response time on weekdays. Weekend service is provided as demand warrants.

Minority - A person who is:

A. Black (having origins in any of the black racial groups of Africa);

B. Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

C. Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands);

D. American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition); or

E. Native Hawaiian or Other Pacific Islander (having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands).

Mobility – The ability to move people and goods to destinations efficiently and reliably.

Mobility corridor – Mobility corridors represent sub-areas of the region and include all regional transportation facilities within the subarea as well as the land uses served by the regional transportation system. This includes freeways and highways and parallel networks of arterial streets, regional bicycle parkways, high capacity transit, and frequent bus routes. The function of this network of integrated transportation corridors is metropolitan mobility – moving people and goods between different parts of the region and, in some corridors, connecting the region with the rest of the state and beyond. This framework emphasizes the integration of land use and transportation in determining regional system needs, functions, desired outcomes, performance measures, and investment strategies.

Mobility corridor strategy - A scoping tool to document land use and transportation needs, function and potential solutions for each of the region's 24 mobility corridors**.** A strategy will be included in the RTP for each corridor that includes:

- Integrated statement mobility function and purpose defined at a corridor-area level
- Proposed land use and transportation solutions after consideration of land use, local aspirations, pedestrian, bike, management and operations, freight, highway, road and transit solutions

Modal targets – Targets for increased walking, biking, transit, shared ride and other non-drive alone trips as percentages of all trips. The targets apply to trips to, from and within each 2040 Design Type. The targets reflect mode shares for the year 2040 needed to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.

Regional Modal Targets

2040 Design Type	Non-SOV Modal Target
Portland central city	60-70%
Regional centers Town centers Main streets Station communities Corridors Passenger intermodal facilities	45-55%
Industrial areas Freight intermodal facilities	

Employment areas	40-45%
Inner neighborhoods	
Outer neighborhoods	

Note: *The targets apply to trips to and within each 2040 design type. The targets reflect conditions needed in the year 2040 to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.*

Mode – A type of transportation distinguished by means used (e.g., such as walking, bike, bus, single- or high-occupancy vehicle, bus, train, truck, air, marine).

Mode choice – The ability to choose one or more modes of transportation.

Mode split – The proportion of total person trips using various modes of transportation.

Multi-modal – The movement of people or goods by more than one mode.

Multi-modal level of service - Multimodal level of service (MMLOS) is an analytical tool that measures and rates users' experiences of the transportation system according to their mode. It evaluates not only drivers' experiences, but incorporates the experiences of all other users, such as cyclists and pedestrians.

National Environmental Policy Act (NEPA) – Federal legislation that established a federal environmental policy requiring that any project using federal funding or requiring federal approval, including transportation projects, examine the effects of proposed and alternative choices on the environment before a federal decision is made.

National Highway System (NHS) - Title 23 of the U.S. Code section 103 states that the purpose of the NHS is to provide an interconnected system of principal routes that serve major population centers, international border crossings, ports, airports, public transportation facilities, intermodal transportation facilities, major travel destinations, meet national defense requirements, and serve interstate and inter-regional travel. Facilities included in the NHS are of regional significance.

Network – Connected routes forming a cohesive system.

Nonattainment – A geographic region of the U.S. that the EPA has designated as not meeting air quality standards.

Nonmotorized - Generally referring to bicycle, walking and other modes of transportation not involving a motor vehicle.

Objective- An intermediate, short-term desired outcome or result that is measurable and must be realized within the timeframe of the RTP plan period to reach a longer-term goal.

Off-peak period – The hours outside of the highest motor vehicle traffic period, generally between 9 a.m. and 3 p.m. and between 6 p.m. and 7 a.m.

On-Street Bus Rapid Transit – A version of Bus Rapid Transit (see separate definition in glossary) with limited stops and service at least every 15 minutes during much of the day though frequencies by increase or decrease for individual applications are based on demand. On-Street BRT operates mostly in general purpose traffic lanes, mixed with other traffic, though transit preferential treatments which could include short bus-only lanes and/or queue jumps can be included. Stops are generally spaced one-quarter mile apart or more. Passenger amenities and information is similar to BRT. Due to its flexibility, On-Street BRT can have

attributes that are more like High Capacity Transit or like Frequent Service Bus and may be considered as a mode in either depending on circumstances.

Oregon Transportation Plan – The official statewide intermodal transportation plan that is developed through the statewide transportation planning process by ODOT.

Operator – An agency responsible for providing a service or operating a facility. ODOT is the operator of the state highway system. TriMet is an operator of elements of the regional transit system.

Outer neighborhoods – Areas in the outlying cities that are primarily residential and farther from employment and shopping areas. Outer neighborhoods generally exhibit larger average lot sizes and lower population densities than inner neighborhoods.

Ozone – An air pollutant that is a toxic, colorless gas which is the product of the reaction of hydrocarbons (HC) and oxides of nitrogen (NOx) in the presence of sunlight in the atmosphere. Motor vehicle emissions are the primary source of ozone precursors.

Para-transit - On-demand non-fixed route transit service that serves special transit markets, such as the elderly, people with disabilities or where demand is not sufficient to support fixed-route service. Components of this service are typically owned, operated, scheduled and dispatched by a combination of public and private entities. Vehicles are typically small buses (mini-buses) or vans, but may include contract taxis. Service may be door-to-door or fixed schedule/flexible route and can act as feeder service to the fixed-route transit system.

Park-and-ride – Parking areas or structures that are placed near transit stations or stops to enhance access to transit and other HOV-modes. Transit patrons typically drive private automobiles or ride bicycles to a park and ride facility, where they store their vehicles in facilities designed for that purpose before transferring to transit. Vanpools also use park-and-rides as a common meeting place and sometimes as a destination. Transit services, transit transfer, bicycle parking and passenger drop off and pick-up areas are incorporated in site design. Bicycle and pedestrian access is considered in the siting process of new park-and-ride facilities. Periodic evaluation is needed to determine how park-and-ride facilities can best support regional and local land use goals.

Parking cash-out – A transportation demand management strategy where the market value of a parking space is offered to an employee by the employer. The employee can either spend the money on a parking space, or pocket it and use an alternative mode to travel to work. Measures such as parking cash-out provide disincentives for commuting by single-occupancy vehicles.

Parkway - A design for a Throughway in which access points are a mix of separate and at-grade. They typically have a greener design than a highway, often showcasing and preserves scenic areas and incorporating a parallel park and/or multi-use trail.

Passenger intermodal facilities – Facilities that accommodate or serve as transfer points to interconnect various transportation modes for the movement of people. Examples include Portland International Airport, Union Station, Oregon City Amtrak station and inter-city bus stations.

Passenger rail – Transit systems operating, in whole or part, on a fixed guideway.

Peak period – The period of the day during which the maximum amount of travel occurs. It may be specified as the morning (A.M.) or afternoon or evening (P.M.) peak. Peak periods in the Portland metropolitan region are currently generally defined as from 7-9 AM and 4-6 PM.

Pedestrian – A person on foot, in a wheelchair or in another health-related mobility device.

Pedestrian connection – A continuous, unobstructed, reasonably direct route between two points that is intended and suitable for pedestrian use. Pedestrian connections include but are not limited to sidewalks, walkways, accessways, stairways and pedestrian bridges. On developed parcels, pedestrian connections are generally hard surfaced. In parks and natural areas, pedestrian connections may be soft-surfaced pathways. On undeveloped parcels and parcels intended for redevelopment, pedestrian connections may also include rights-of-way or easements for future pedestrian improvements.

Pedestrian comfort index (PCI)- Uses data such as auto volumes, auto speeds, number of auto lanes, sidewalk existence and width, number of pedestrian crossings on existing roadways and assigns a comfort rating for pedestrians. Results help identify roadways on the regional pedestrian network that could be upgraded to increase bicyclists comfort. Metro has collected and analyzed initial data for the regional pedestrian network but has not created a PCI. Additional data and analysis is needed.

Pedestrian Corridor - The second highest functional class of the regional pedestrian network. On-street regional pedestrian corridors are any major or minor arterial on the regional urban arterial network that is not a pedestrian parkway. Regional trails that are not pedestrian parkways are regional pedestrian corridors. These routes are also expected to see a high level of pedestrian activity, though not as high as the parkways.

Pedestrian district – A comprehensive plan designation or set of land use regulations designed to provide safe and convenient pedestrian circulation, with a mix of uses, density, and design that support high levels of pedestrian activity and transit use. The pedestrian district can be a concentrated area of pedestrian activity or a corridor. Pedestrian districts can be designated within the following 2040 Design Types: Central City, Regional and Town Centers, Corridors and Main Streets. Though focused on providing a safe and convenient walking environment, pedestrian districts also integrate efficient use of several modes within one area, e.g., auto, transit, and bike.

Pedestrian facility – A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, plazas, signs, signals, illumination and benches.

Pedestrian Parkway –A new functional class for pedestrian routes in the Regional Transportation Plan and the highest functional class. They are high quality and high priority routes for pedestrian activity. Pedestrian parkways are major urban streets that provide frequent and almost frequent transit service (existing and planned) or regional trails. Adequate width and separation between pedestrians and

bicyclists should be provided on shared use path parkways.

Pedestrian plaza – A small semi-enclosed area usually adjoining a sidewalk or a transit stop which provides a place for pedestrians to sit, stand or rest. Plazas are usually paved with concrete, pavers, bricks or similar material, and include seating, pedestrian scale lighting and similar improvements. Low walls, planters, or landscaping are often used to separate the plaza from adjoining parking lots and vehicle maneuvering areas. Plazas connect directly to adjacent sidewalks, walkways, transit stops and building entrances. A 150-250 square foot plaza would be considered small.

Pedestrian-scale – An urban development pattern where walking is a safe, convenient and interesting travel mode. The following are examples of pedestrian scale facilities: continuous, smooth and wide walking surfaces, easily visible from streets and buildings and safe for walking; minimal points where high speed automobile traffic and pedestrians mix; frequent crossings; and storefronts, trees, bollards, on-street parking, awnings, outdoor seating, signs, doorways and lighting designed to serve those on foot; all well-integrated into the transit system and having uses that cater to pedestrians.

Performance measures – Also called indicators. A measure of how well the transportation system is performing that is used to evaluate the success of the objective with quantitative or qualitative data and provide feedback in the plan's decision-making process. Some measures can be used to predict the future as part of an evaluation process using forecasted data, while other measures can be used to monitor changes based on actual empirical or observed data. In both cases, they can be applied at a system-level, corridor-level and/or project level, and provide the planning process with a basis for evaluating alternatives and making decisions on future transportation investments. They can also be used to monitor performance of the plan in between updates to evaluate the need for refinements to policies, investment strategies or other elements of the plan.

Person-Trip - Trip made by a person from one location to another, whether as a driver, passenger or pedestrian.

Placemaking – A planning term that refers to the design of a building, transportation facility or area to make it more attractive to--and compatible with--the people who use it.

Posted speed – The posted speed limit on a given street or the legal speed limit, as defined in ORS 811.105 and 811.123 when a street is not posted.

Preliminary design – An engineering design that specifies in detail the location and alignment of a planned transportation facility or improvement.

Principal arterial – These facilities form the backbone of the motor vehicle network. These routes connect over the longest distance and are spaced less frequently than other Arterials or Collectors. These facilities form the primary connections between the central city, regional centers, industrial areas and intermodal facilities, as well as between neighboring cities and the metro region. Principal arterials generally span several jurisdictions and often are designated to be of statewide importance and serve as major freight routes.

Project development – A phase in the transportation planning process during

which a proposed project undergoes a more detailed analysis of the project's social, economic and environmental impacts and various project alternatives. After a project has successfully passed through this phase, it may move forward to right-of-way acquisition and construction phases. Project development activities include: Environmental Assessment (EA)/Environmental Impact Statement (EIS) work, Design Options Analysis (DOA), management plans, and transit Alternatives Analysis (AA).

Public participation – The active meaningful involvement of the public in the development of transportation plans and programs.

Ramp metering – Traffic signal control on an entry ramp to a freeway for regulating vehicle access.

Rail main line – Class I rail lines (e.g., Union Pacific and Burlington Northern/Santa Fe).

Rapid streetcar – Streetcars operating primarily in exclusive right-of-way so that they are able to travel faster and more reliably than streetcars that operate primarily mixed in traffic.

Reasonably direct – A route that does not require likely users to deviate from the most direct path to their destination.

Refinement plan - The Oregon transportation planning rule defines "refinement planning" as resolving at the system-level the need, function, mode, and general location of transportation facilities and improvements. The RTP expands this definition to specifically call out a comprehensive consideration of land use, management, walking and biking solutions in addition to traditional transit and highway-focused analyses. A refinement plan would be conducted for mobility corridors for which the need, function, mode, and general location of transportation facilities and improvements cannot be identified through the RTP. The plan is intended to result in a wide range of strategies and projects to progress through project development and implementation at the local, regional and/or state levels.

Regional Bike-Transit Facility - the hub where the spokes of the regional bikeway network connect to the regional transit network. Stations and transit centers identified as regional bike-transit facilities have high-capacity bike parking and are suitable locations for bike-sharing and other activities that support bicycling. Criteria for identifying locations are found in the TriMet Bicycle Parking Guidelines.

Regional bikeway – Designated routes that provide access to and within the central city, regional centers and town centers. These bikeways are typically located on arterial streets but may also be located on collectors or other low-volume streets. These bikeways should be designed using a flexible "toolbox" of bikeway designs, including bike lanes, cycle tracks (physically separated bicycle lanes) shoulder bikeways, shared roadway/wide outside lanes and bicycle priority treatments (e.g. bicycle boulevards).

Regional boulevard – See "Boulevard". These facilities typically consist of four or more vehicle travel lanes, balanced multi-modal function and a broad right of way. Features highly desirable on regional boulevards include on-street parking, bicycle lanes, narrower travel lanes than throughways, more intensive land use oriented to the street and wide sidewalk features that may include a landscaped

median. The right of way ranges from 80 to 120 feet or greater. These facilities are located within the most intensely developed activity centers with development oriented to the street. These are primarily central city, regional centers, station communities, town centers and some main streets.

Regional bus – Bus service that operates on arterial streets with typical frequencies of 15 minutes during most of the day, though midday headways may drop to 30 minutes. Regional bus may operate seven days per week, but not necessarily based on demand or policy. Stops are generally spaced every 750 to 1000 feet. Transit preferential treatments and passenger infrastructure such as bus shelters, special lighting, transit signal priority and curb extensions are appropriate at some locations such as those with high ridership.

Regional centers – Compact, specifically-defined areas where higher density growth and a mix of intensive residential and commercial land uses exists or is planned. Regional centers are to be supported by an efficient, transit-oriented, multi-modal transportation system. Examples include traditional centers, such as downtown Gresham, and new centers such as Gateway and Clackamas Town Center.

Regional Conservation Strategy for the Greater Portland Vancouver Metropolitan Area, Intertwine and Metro - Identifies high quality land and riparian areas in the region. The strategy was developed by The Intertwine Alliance, Metro and a broad coalition of conservation organizations to pull together 20 years of conservation planning and create an integrated blueprint for regional conservation. The plan will help government, nonprofit and private organizations work together to care for and restore thousands of acres of natural area land and create habitat for wildlife.

Regional destinations –Include the following types of destinations: employment sites with 300 or more employees (includes regional sports and attraction sites such as Oregon Zoo, OMSI, Jen Weld, Rose Stadium); high ridership bus stop locations; regional shopping centers; Major hospitals and medical centers; Colleges, universities and public high schools; Regional parks; major government centers; Social services; Airports; and Libraries.

Regional Flexible Funds (RFF) - Regional flexible funds come from three federal grant programs: the Surface Transportation Program, the Congestion Mitigation/Air Quality Program and the Transportation Alternatives Program. The regional flexible fund allocation process identifies which projects in the Regional Transportation Plan will receive funding. Regional flexible funds are allocated every two years and are included in the Metropolitan Transportation Improvement Program.

Regional trail – linear facilities for non-motorized users that are at least 75% off-street and are regionally significant. Bicycle/pedestrian sidewalks on bridges are also included in this definition. The term "non-motorized" is used instead of "multi-use" or "multi-modal" because some Regional Trails are pedestrian-only. Trails must meet two levels of criteria to be considered "regionally significant." The criteria are adopted by the Metro Council in the *Regional Trails and Greenways Plan*. Regional trails are physically separated from motor vehicle traffic by open space or a barrier. Bicyclists,

pedestrians, joggers, skaters and other non-motorized travelers use these facilities.

While all trails serve a transportation function, not all regional trails identified on Metro's *Regional Trails and Greenways Map* are included in the RTP. The RTP includes regional trails that support both utilitarian and recreational functions. These trails are generally located near or in residential areas or near mixed-use centers and provide access to daily needs. Trails in the RTP are defined as transportation facilities and are part of the regional transportation system. Regional trails in the RTP are eligible to receive federal transportation funds. Trails that use federal transportation funds need to be ADA accessible according to the AASHTO trail design guidelines. There are some pedestrian only trails or trails near sensitive habitat on the RTP network that would most likely not be paved. Regional bicycle connections are planned parallel to pedestrian only regional trails. Colloquially, terms like "bike path" and "multi-use path" are often used interchangeably with "regional trail", except when referring to pedestrian-only regional trails.

Regional Street – See "Street." These facilities consist of four or more vehicle travel lanes, balanced multi-modal function, broad right of way, limited on-street parking, wider travel lanes than boulevards, corridor land uses set back from the street, sidewalks with pedestrian buffering from the street, and a raised landscaped median with turn pockets at intersections. The right of way ranges from 80 to 100 feet or greater. These facilities are located within low-density inner and outer residential neighborhoods to more densely developed commercial corridors and employment centers where development is set back from the street. They can be within main street districts where buildings are oriented toward the street at major intersections and transit stops.

Regional transit network – The network of transit operates primarily on arterial streets. Most services operate at intervals of 15-minute headways or better (all day and weekends when possible). This network also includes preferential treatments, such as transit signal priority and queue bypasses and in some cases exclusive or limited-access lanes. Supportive design treatments and enhanced passenger infrastructure such as covered bus shelters, curb extensions and special lighting are provided at regional transit stops and high ridership locations. This network includes: frequent bus, regional bus, streetcar, transit centers, park-and-ride lots and regional transit stops.

Regional transit stops – Transit stops that provide a high degree of transit passenger comfort and access. Regional transit stops are located at stops on light rail, commuter rail, rapid bus, frequent bus or streetcar lines in the central city, regional and town centers, main streets and corridors. Regional transit stops may also be located where bus lines intersect providing transfer opportunities or serve intermodal facilities, and major destinations such as hospitals, colleges and universities. Regional transit stops may provide real-time schedule information, lighting, benches, shelters and trash cans. Other features may include real time information, special lighting or shelter design, public art and bicycle parking.

Regional transit system - The regional transit system includes light rail, commuter rail, bus rapid transit, frequent bus, regional bus, and streetcar modes.

Regional Transportation Functional Plan – A regional functional plan regulating transportation in the Metro region, as mandated by Metro's Regional Framework Plan. The plan directs local plan implementation of the Regional Transportation Plan.

Regional transportation plan (RTP) - The official multimodal transportation plan that is developed and adopted through the metropolitan transportation planning process for the Portland metropolitan region.

Regional transportation system – The regional transportation system is identified on the regional transportation system map(s) in Chapter 2. The system is limited to facilities of regional significance generally including regional arterials and throughways, high capacity transit and regional transit systems, regional multi-use trails with a transportation function, bicycle and pedestrian facilities that are located on or connect directly to other elements of the regional transportation system, air and marine terminals, as well as regional pipeline and rail systems.

Regionally Significant Industrial Area (RSIA) – 2040 land use designation; RSIAs are shown on Metro's 2040 map. Industrial activities and freight movement are prioritized in these areas.

Regional travel – Longer trips that span the region, including interstate and intrastate travel, but occur within the larger metropolitan area.

Regional Travel Options (RTO)- Metro program guided by a five-year strategic plan, developed with stakeholders, and is funded primarily by grants from the U.S. Department of Transportation. The program includes: a coordinated marketing effort to efficiently use public dollars to reach key audiences; an employer outreach program to save employers and employees money; a regional rideshare program that makes carpooling easier and helps people with limited transit access have options to get around; a grant program that funds partner efforts, such as the BTA Bike Commute Challenge, TMA's work with employers, local transportation options projects, TriMet's regional multi-modal trip planner and Sunday Parkways, to name a few.

Reliability – This term refers to consistency or dependability in travel times, as measured from day to day and/or across different times of day. Variability in travel times means travelers must plan extra time for a trip.

Reload facility – An intermediary facility where freight is reloaded from one land-based mode to another.

Rideshare – A transportation demand management strategy where two or more people share a trip in a vehicle to a common destination or along a common corridor. Private passenger vehicles are used for carpools, and some vanpools receive public/private support to help commuters. Carpooling and vanpooling provide travel choices for areas under-served by transit or at times when transit service is not available.

Right-of-way (ROW) – Land that is publicly-owned, or in which the public has a legal interest, usually in a strip, within which the entire road facility (including travel lanes, medians, sidewalks, shoulders, planting areas, bikeways and utility easements) resides. The right-of-way is usually acquired for or devoted to multi-modal transportation purposes including bicycle, pedestrian, public transportation and vehicular travel.

Road connector – Designated freight route that connects freight facilities or freight generation areas to a main roadway route.

Road diet - one way to reconfigure limited roadway space in a way that allows for the inclusion of wider sidewalks and separated bicycle facilities such as buffered bicycle lanes, which can provide space for all users to operate safely an in their own "zones". Road diets can have multiple safety and operational benefits for autos, as well as pedestrians and cyclists. On existing roadways, separated in-roadway facilities may be implemented by narrowing existing travel lanes, removing travel lanes, removing on-street parking or widening the roadway shoulder. If constraints, such as narrow existing right-of-way, prohibit providing optimally desired bicycle facility widths, then interim facility improvements can be used.

Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) - Signed into federal law in 2005, SAFETEA-LU authorizes the federal surface transportation programs for highways, highway safety, and transit through 2009. SAFETEA-LU refined and reauthorized TEA-21.

Shared roadway – A roadway designed and designated to enable bicyclists and motor vehicles to share travel lanes.

Short trip – In the Regional Active Transportation Plan, generally defined as a one-way trip less than three miles.

Sidewalk – A walkway separated from the roadway with a curb, constructed of a durable, hard and smooth surface, designed for preferential or exclusive use by pedestrians.

Single-occupancy vehicle (SOV) – Motor vehicles occupied by the driver only.

Stakeholders – Individuals and organizations with an interest in or who are affected by the transportation planning process, including federal, state, regional and local officials and jurisdictions, institutions, community groups, transit operators, freight companies, shippers, the general public, and people who have traditionally been underrepresented.

State Highways - State highways are important elements of the regional transportation system, functioning as the most important interstate, inter-regional, intra-regional and urban-rural connections for people and goods movement.

State Implementation Plan (SIP) – Air quality plan produced by the Department of Environmental Quality and required by the federal Clean Air Act. The plan contains procedures to monitor, control, maintain and enforce compliance with the NAAQS and must be taken into account in the transportation planning process. The RTP must conform to the SIP.

State Transportation Improvement Program – The funding and scheduling document for major street, highway and transit projects in Oregon for a four-year period. The document is produced by ODOT, consistent with the Oregon Transportation Plan (the statewide transportation plan) and planning processes as well as metropolitan transportation plans, MTIPs, and processes.

State Transportation Plan - The official statewide intermodal transportation plan that is developed through the statewide transportation planning process. See also Oregon Transportation Plan.

Station Communities - Areas generally within a 1/4- to 1/2-mile radius of a light rail station or other high capacity transit stops that are planned as multi-modal, mixed-use communities with substantial pedestrian and transit-supportive design characteristics and improvements.

Stewardship – A planning and management approach that takes responsibility for actions affecting the natural or built environment and considering environmental impacts and public benefits of actions as well as public and private dollar costs.

Street – A generally gravel or concrete- or asphalt-surfaced facility. The term collectively refers to arterial, collector and local streets that are located in 2040 mixed-use corridors, industrial areas, employment areas and neighborhoods. While the focus for streets has been on motor vehicle traffic, they are designed as multi-modal facilities that accommodate bicycles, pedestrians and transit, with an emphasis on vehicle mobility and special pedestrian infrastructure on transit streets.

Streetcar – Fixed guideway transit service mixed in traffic for locally oriented trips within or between higher density mixed-use centers. Streetcar services provide local circulator service and may also serve as a potent incentive for denser development in centers. Service runs typically every 15 minutes or better and streetcar routes may include transit preferential treatments, such as transit signal priority systems, and enhanced passenger infrastructure, such as covered real-time schedule information, bus shelters, curb extensions and special lighting. Streetcar is distinguished from Rapid Streetcar (defined elsewhere) by it operation in generally mixed-traffic lanes and with relatively short stop spacing.

Surface Transportation Program (STP) – A federal transportation program that provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities.

Sustainable development – Development uses, develops and protects resources in a manner that enables people to meet current needs and provides that future generations can meet future needs, from the joint perspective of environmental, economic and community objectives.

Sustainability – Using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can meet future needs, from the joint perspective of environmental, economic and community objectives. This definition of sustainability is from the 2006 Oregon Transportation Plan and ORS 184.421(4). The 2001 Oregon Sustainability Act and 2007 Oregon Business Plan maintain that these principles of sustainability can stimulate innovation, advance global competitiveness and improve quality of life in communities throughout the state.

System management - A set of strategies for increasing travel flow on existing facilities through improvements such as ramp metering, traffic signal synchronization and access management.

Target – A numerical goal or stated direction to be achieved for which quantifiable or directional targets may be set, assigning a

value to what the RTP is trying to achieve. Benchmarks (also known as benchmarks) are expressed in quantitative terms and provide an important measure of progress toward achieving different goals within a timeframe specified for it to be achieved.

Telecommute – This term refers to a transportation demand management strategy whereby an individual communicates electronically (e.g., telephone, computer, fax, etc.) with an office either from home, or a satellite office located closer to home instead of traveling to it physically.

Throughways – Limited-access facilities that serve longer-distance motor vehicle and freight trips, providing for interstate, intrastate and cross-regional travel. Throughways are classified as a principal arterial and connect major activity centers within the region to one another and to destinations outside the region.

Town centers – Areas of mixed residential and commercial land uses that serve tens of thousands of people. Examples include the downtowns of Forest Grove and Lake Oswego.

Traffic – Movement of motorized vehicles, nonmotorized vehicles and pedestrians on transportation facilities. Often traffic levels are expressed as the number of units moving over or through a particular location during a specific time period.

Traffic calming – A transportation system management technique that aims to prevent inappropriate through-traffic and reduce motor vehicle travel speeds on a particular roadway. Traditionally, traffic calming strategies provide speed bumps, curb extensions, planted median strips or rounds and narrowed travel lanes.

Traffic signal coordination/ synchronization – A process by which a number of traffic signals are synchronized to create efficient progression.

Transit-oriented development – A mix of residential, retail and office land uses designed with transit-supportive characteristics, and typically located near a regional transit stop to support a high level of transit use. The key features may include:

(a) A mixed-use center at the transit stop, oriented principally to transit riders and pedestrian and bicycle travel from the surrounding area;

(b) Relatively high density of residential development near the transit stop that is sufficient to support transit operation and neighborhood commercial uses within the TOD;

(c) A network of roads, and bicycle and pedestrian paths to provide a high level of access to and within the TOD.

Transit/mixed-use corridor – Designated facilities that generally correspond to the 2040 Corridor designation, and are a priority for pedestrian investments. The designation is applied to high-quality regional transit routes that will be redeveloped at densities that are somewhat more than today. These corridors have designs that promote pedestrian travel to enhance access to the regional transit system. These corridors will generate substantial pedestrian traffic near neighborhood-oriented retail development, schools, parks and bus stops.

Transportation Alternatives Program - The Transportation Alternatives Program (TAP) was authorized under Section 1122 of Moving Ahead for Progress in the 21st

Century Act (MAP-21) and is codified at 23 U.S.C. sections 213(b), and 101(a)(29). Section 1122 provides for the reservation of funds apportioned to a State under section 104(b) of title 23 to carry out the TAP. The national total reserved for the TAP is equal to 2 percent of the total amount authorized from the Highway Account of the Highway Trust Fund for Federal-aid highways each fiscal year. The TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

Transportation control measure (TCM) – Strategies that affect travel patterns or reduce vehicle use to reduce air pollutant emissions. These projects, programs or actions are identified in the State Implementation Plan to demonstrate attainment of national air quality standards. The RTP must include these strategies. Examples include HOV lanes, provision of bicycle and pedestrian facilities, telecommuting, rideshare and land use.

Transportation demand - The quantity of transportation services desired by users of the transportation system.

Transportation demand management (TDM) – A general term for any action or set of strategies designed to influence the intensity, timing and distribution of travel in order to make more efficient use of transportation infrastructure and services. Methods may include but are not limited to offering other modes of travel such as walking, bicycling, ride-sharing and vanpool programs, car sharing, providing opportunities to link or "chain" trips together, individualized marketing, and trip-reduction ordinances. Public and private partners of the Regional Travel Options (RTO) Program implement TDM.

Transportation disadvantaged/persons potentially underserved by the transportation system – Individuals who have difficulty in obtaining important transportation services because of their age, income, physical or mental disability.

Transportation Equity Act (TEA-21) - The Transportation Equity Act for the 21st Century was enacted June 9, 1998 as Public Law 105-178. TEA-21 authorizes the federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003. TEA-21 refined and reauthorized ISTEA. See entry for SAFETEA-LU for updated federal transportation authorization.

Transportation facilities – Any physical facility that is used to accommodate the movement of people or goods, including facilities identified in OAR 660-012-0020 but excluding electricity, sewage and water systems.

Transportation Improvement Program (TIP) - The 4-year, specific multimodal program of regional transportation improvements for highways, transit and other travel modes. The TIP consists of projects drawn from the Regional Transportation Plan financially constrained system as well as local plans and programs.

Transportation management area (TMA) – Federally designated urbanized areas over 200,000 population that, among other activities, must have a congestion management program that identifies actions and strategies to reduce congestion and increase mobility.

Transportation management associations (TMA) –Non-profit coalitions of local businesses and/or public agencies, residences such as condo Home Owner Associations all dedicated to reducing traffic congestion and pollution while improving commuting options for employees, residents and visitors.

Transportation service – A service that provides or supports the movement of people and goods, such as intercity bus service and passenger rail service.

Transportation system - Various transportation modes or facilities (aviation, bicycle and pedestrian, throughway, street, pipeline, transit, rail, water transport) serving as a single unit or system.

Transportation system management (TSM) – Strategies and techniques for increasing the efficiency, safety, capacity or level of service of a transportation facility without major new capital improvements. Examples include traffic signal improvements, traffic control devices such as medians, parking removal, channelization, access management, re-striping of HOV lanes, ramp metering, incident response, targeted traffic enforcement and programs that smooth transit operations.

Transportation System Management and Operations (TSMO) – An integrated "toolkit" of programs and strategies that will allow the region to more effectively and efficiently manage existing and new multi-modal transportation facilities and services in the region to preserve capacity and improve security, safety, and reliability. TSMO has two components. The first component (transportation system management) includes strategies that focus on making the infrastructure better serve the users by improving efficiency, safety and capacity of the system. The second component (transportation demand management) includes programs and strategies seeking to modify travel behavior in order to make more efficient use of transportation infrastructure and services and enable the users to take advantage of everything the system has to offer.

Transportation system plan (TSP) – The transportation element of the comprehensive plan for one or more transportation facilities that is planned, developed, operated and maintained in a coordinated manner to supply continuity of movement between modes, and between geographic and jurisdictional areas. The TSP supports the development patterns and land uses contained in adopted community plans. The TSP includes a comprehensive analysis and identification of transportation needs associated with adopted land use plans. The TSP complies with Oregon's Transportation Planning Rule, as described in statewide planning goal 12.

Travel options – The ability range of travel mode choices available, including motor vehicle, walking, bicycling, riding transit and carpooling. Telecommuting is sometimes considered a travel option because it replaces a commute trip with a trip not taken.

Travel time – The measure of time that it takes to reach another place in the region from a given point for a given mode of

transportation. Stable travel times are a sign of an efficient transportation system that reliably moves people and goods through the region.

Travel time contours – An analysis map that depicts the distance a given mode of transportation can travel within a specified travel time from a given point to show relative changes in accessibility over time within the region.

Travel time reliability – This term refers to consistency or dependability in travel times, as measured from day to day and/or across different times of day. Variability in travel times means travelers must plan extra time for a trip.

Trip - A one-way movement of a person or vehicle between two points. A person who leaves home on one vehicle, transfers to a second vehicle to arrive at a destination, leaves the destination on a third vehicle and has to transfer to yet another vehicle to complete the journey home has made four unlinked passenger trips.

Truck terminal – A facility that serves as a primary gateway for commodities entering or leaving the metropolitan area by road.

Undeveloped areas – Areas inside the urban growth boundary that are not currently developed with urban uses, or which are otherwise under-utilized.

Unified Planning Work Program (UPWP) – The management plan for the metropolitan planning program. Its purpose is to coordinate the planning activities of all participants in the metropolitan planning program.

Universal access- Universal access is the goal of enabling all citizens to reach every destination served by their public street and pathway system. Universal access is not limited to access by persons using automobiles. Travel by bicycle, walking, or wheelchair to every destination is accommodated in order to achieve transportation equity, maximize independence, and improve community livability. Wherever possible, facilities are designed to allow safe travel by young, old, and disabled persons who may have diminished perceptual or ambulatory abilities. By using design to maximize the percentage of the population who can travel independently, it becomes much more affordable for society to provide paratransit services to the remainder with special needs.

Universal design – Transportation facilities designed to accommodate all users, including people who rely on mobility aids such wheelchairs and walkers.

Update - TSP amendments that change the planning horizon year and that apply broadly to a city or county and typically entails changes that need to be considered in the context of the entire TSP, or a substantial geographic area.

Urban form – The spatial arrangement of land uses and supporting infrastructures within an urban area. Stating and pursuing urban form objectives generally provides the focal strategy for managing a region's growth

Urban growth boundary – The politically defined boundary around an urban area beyond which no urban improvements may occur. In Oregon, UGBs are defined so as to accommodate projected population and employment growth within a 20-year planning horizon. A formal process has been established for periodically reviewing and

updating the UGB so that it meets forecasted population and employment growth.

Urban Growth Management Functional Plan – A regional functional plan regulating urban development in the Metro region, as mandated by Metro's Regional Framework Plan. The plan addresses such issues as accommodation of projected regional population and job growth, regional parking management, water quality conservation, retail in employment and industrial areas and the regional fish and wildlife protection program.

Urbanized area – A federal designation of an area that contains a city of 50,000 or more population plus incorporated surrounding areas meeting size or density criteria as defined by the U.S. Census.

Vanpool - An organized ridesharing arrangement in which 7 to 15 people regularly commute together in a van. The van may be publicly owned, employer owned, individually owned, leased, or owned by a third party. Expenses are generally shared and there is usually a regular volunteer driver. See also carpool.

Value pricing - A demand management strategy that involves the application of market pricing (through variable tolls, variable priced lanes, area-wide charges or cordon charges) to the use of roadways at different times of day. Also called congestion pricing or peak period pricing.

Volume-to-capacity (v/c) ratio - A measure of potential roadway capacity. A ratio expressing the relationship between the existing or anticipated volume of traffic on a roadway and the designed capacity of the facility. V/C standards set ratios as a minimum operating standard. One of the important characteristics of the v/c ratio is that it does not bias solutions. Deficiencies can be addressed by lowering traffic volumes through demand management, transit, etc. or by increasing capacity through access management, signal timing, adding lanes, etc., or a combination of methods.

Vehicle miles traveled (VMT) – A measurement of the total miles traveled by all vehicles for a specified time period. For purposes of this definition, "vehicles" include automobiles, light trucks, and other similar vehicles used for the movement of people. The definition does not include buses, heavy trucks and trips that involve commercial movement of goods. For regional planning purposes, VMT generally includes trips with an origin and a destination within the MPO boundary and excludes pass through trips (i.e., trips with a beginning and end point outside of the MPO) and external trips (i.e., trips with a beginning or end point outside of the MPO boundary). VMT is often estimated prospectively through the use of metropolitan area transportation models.

Walkable neighborhood - A place where people live within walking distance to most places they want to visit, whether it is school, work, a grocery store, a park, church, etc.

Walkway – A hard-surfaced transportation facility designed and suitable for use by pedestrians, including persons using wheelchairs. Walkways include sidewalks, hard-surfaced portions of accessways, regional trails, paths and paved shoulders.

Walk Score- an online tool that produces a number between 0 and 100 that measures the walkability of any address. Similar tools for transit and bicycling - Transit Score and Bike Score.

Wayfinding- Wayfinding helps people traveling to orient themselves and reach destinations easily. Wayfiding includes signs, maps, street markings, and other graphic or audible methods used to convey location and directions to travelers.

Wide outside lane – A wider than normal curbside travel lane that is provided for ease of bicycle operation where there is insufficient room for a bike lane or shoulder bikeway.

ACRONYMS

ADA Americans with Disabilities Act

ATMS Advanced Traffic Management System

ATP Active Transportation Plan

AQMA Air Quality Maintenance Area

BRT Bus rapid transit

CAAA Clean Air Act Amendments of 1990

CMAQ Congestion Mitigation/Air Quality Program

CMP Congestion Management Program

DEIS Draft Environmental Impact Statement

DEQ Department of Environmental Quality

ECO Employee Commute Options Rule

EPA Environmental Protection Agency

ESA Endangered Species Act

FEIS Final Environmental Impact Statement

FHWA Federal Highway Administration

FTA Federal Transit Administration

HCT High-Capacity Transit

HOV High-Occupancy Vehicle

IAMP Interchange Area Management Plan

ISTEA Intermodal Surface Transportation Efficiency Act of 1991

ITS Intelligent Transportation System

JPACT Joint Policy Advisory Committee on Transportation

LCDC Land Conservation and Development Commission

LRT Light Rail Transit (MAX)

LOS Level of Service

MAP-21 The Moving Ahead for Progress in the 21st Century Act

MCCI Metro Committee for Citizen Involvement

MPAC Metro Policy Advisory Committee

MPO Metropolitan Planning Organization

MSTIP Major Streets Improvement Program

MTAC Metro Technical Advisory Committee

MTIP Metropolitan Transportation Improvement Program

MTP Metropolitan Transportation Plan

NAAQS National Ambient Air Quality Standards

NEPA National Environmental Protection Act

NHS National Highway System

OAR Oregon Administrative Rules

ODOT Oregon Department of Transportation

ORS Oregon Revised Statutes

OTC Oregon Transportation Commission

OTP Oregon Transportation Plan

PE Preliminary Engineering

PEF Pedestrian Environmental Factors

RFP Regional Framework Plan

PSU Portland State University

ROW Right-of-Way

RTC Regional Transportation Council

RTP Regional Transportation Plan

RUGGO Regional Urban Growth Goals and Objectives

SAFETEA-LU Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SIP Oregon State Implementation Plan

SMART South Metro Area Rapid Transit

SOV Single-Occupancy Vehicle

STIP Statewide Transportation Improvement Program

STP Surface Transportation Program

TAZ Transportation Analysis Zones

TCM Transportation Control Measures

TDM Transportation Demand Management

TIP Transit Investment Plan

TMA Transportation Management Area

TMA Transportation Management Association

TOD Transit-Oriented Development

TPAC Transportation Policy Alternatives Committee

TPR Transportation Planning Rule

TriMet Tri-County Metropolitan Transportation District

TSM Transportation System Management

TSMO Transportation System Management and Operations

TSP Transportation System Plan

UGB Urban Growth Boundary

USDOT United States Department of Transportation

VMT Vehicle Miles Traveled

WSDOT Washington State Department of Transportation

ACKNOWLEDGEMENTS

Metro is required to update the Regional Transportation Plan (RTP) every four years. An update of to the RTP cannot be completed without the help of many people representing many disciplines and skills.

Thanks to the following staff and consultants who contributed to the content and production of this report.

Directors

Elissa Gertler, planning director

Steve Wheeler, (former interim) planning director

Robin McArthur, (former) planning director

Jim Middaugh, communications director

John Williams, deputy planning director

Managers

John Mermin, senior planner, RTP project manager

Tom Kloster, transportation planning manager

Janice Larson, creative services manager

Ted Leybold, MTIP program manager

Jamie Snook, transit project manager

Dan Kaempff, regional travel options manager

Patty Unfred, communications manager

Dick Walker, transportation research and modeling services manager

Planning department staff

Anthony Butzek, principal transportation engineer

Grace Cho, assistant transportation planner

Tim Collins, senior transportation planner

Clinton Doxsee, intern

Kim Ellis, principal transportation planner

Matthew Hampton, cartographer/GIS specialist

Jodie Kotrlik, MTIP program administrator

Lake McTighe, senior transportation planner

Brian Monberg, principal transportation planner

Chris Myers, assistant transportation planner

Josh Naramore, (former) senior transportation planner

Deena Platman, principal transportation planner

Phillip Reiker, GIS specialist

Caleb Winter, RTO senior transportation planner

Government affairs and policy development staff

Andy Cotugno, senior policy advisor

Administrative staff

Pamela Blackhorse, administrative specialist

Paulette Copperstone, program assistant

Susan Patterson-Sale, administrative specialist

Jessica Martin, administrative supervisor

Research center staff

Aaron Breakstone, senior researcher and modeler

Sonny Conder, principal researcher and modeler

Jim Cser, associate researcher and modeler

Thaya Patton, associate researcher and modeler

Cindy Pederson, principal researcher and modeler

Bill Stein, senior researcher and modeler

Dennis Yee, economist

Communications staff

Cliff Higgins, communications program supervisor

Peggy Morell, associate public affairs specialist

Council office staff

Beth Cohen, council policy coordinator

Kelsey Newell, (former) regional engagement coordinator

Ramona Perrault, council policy coordinator

Troy Rayburn, regional engagement coordinator

Nikolai Ursin, council policy coordinator

Ina Zucker, council policy coordinator

Office of Metro Attorney staff

Roger Alfred, senior assistant attorney

Allison Kean, general counsel

Creative services and website-maintenance staff

Elizabeth Adams, production coordinator

Lia Waiwaiole, senior public affairs specialist

Danielle Kulczyk, web and social media support

Consultant team

Kalin Schmoldt, JLA Public Involvement, Inc.

Sylvia Ciborowski, JLA Public Involvement, Inc.

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy, and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to providing services, operating venues and making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together, we're making a great place, now and for generations to come.

Stay in touch with news, stories and things to do.

www.oregonmetro.gov/connect

MAKING A GREAT PLACE

Metro