



2018 Regional Transportation Plan

A blueprint for the future of transportation in the greater Portland region

Adopted December 6, 2018

oregonmetro.gov/rtp

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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.

Regional Transportation Plan website: **oregonmetro.gov/rtp**

The preparation of this strategy 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 strategy are not necessarily those of the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

Foreword: from the Metro Council





These are remarkable and challenging times for the greater Portland region. We continue to attract new residents, jobs and industries. Our communities are becoming more culturally diverse, bringing rich cultural activity to neighborhoods. A new generation is growing to adulthood as others move toward retirement. Advances in technology are changing how we connect, how we work, and increasingly, how we travel, move goods and provide services. And we are beginning to recognize longstanding issues facing communities that have been marginalized. This shifting landscape impacts how we use and what we expect from our transportation system.

Every resident and business – those with roots in the region that run generations deep to new residents – have a stake in our system of highways, roads, bridges, sidewalks, bikeways and transit and freight routes. This Regional Transportation Plan is accountable to each of them.

We are facing new and longstanding challenges

The greater Portland region is facing global and regional challenges. As more and more people come to our region to enjoy the things that have contributed to our high quality of life, that high quality of life is at risk. Congestion, maintenance needs and safety issues are expected to grow as a half-million more people join the region by 2040.

At the same time, the climate is changing, and we need to continue to reduce greenhouse gas emissions and work for clean air and clean water. Systemic inequities mean that communities have not equally benefited from public policy and investments, and some perspectives have long been ignored or actively suppressed. The economy is changing, and the pace of technology increasing. Congestion is at an all-time high on our system – a reflection of the pace at which people have moved here as well as where people live relative to where they work. In 2015, only one-third of workers in the region lived and worked in the same city.

Meanwhile, the funding gap between the needs of a growing region and an aging system of highways, transit, roads and bridges and an incomplete network of sidewalks, bikeways and transit routes continues to worsen.

Through the update of this plan, we have built new partnerships to bring new voices to the process and focused our efforts to make more near-term progress on these regional priorities: equity, safety, Climate Smart Strategy implementation, travel options and congestion.



The engagement activities produced more than 19,000 touch points with regional partners, community and business leaders and residents of the region to inform development of the 2018 Regional Transportation Plan.



Learn more about the 2018 Regional Transportation Plan at oregonmetro.gov/rtp.

On behalf of the Metro Council, I want to thank the residents, businesses, community organizations, jurisdictional partners and others who, over the last three years, have contributed to the update of the 2018 Regional Transportation Plan and supporting strategies for safety, transit, freight and emerging technology.

We have a vision for our future – and for how our transportation system will work

The plan sets out a vision that in the 21st century, our region has a continuously improving economy and shared quality of life with the foundation of a safe, reliable, healthy and affordable transportation system. It also builds on the tradition of multimodal investment and creative thinking to create partnerships that develop innovative and equitable solutions to the challenges we currently face now and in the future.

More than $42 billion is planned to be invested in the region's transportation system over the next 25 years to serve our future population of over 2 million people. This Regional Transportation Plan identifies current and future transportation needs, priority investments to meet those needs, and federal, state, regional and local funding the region expects to have available through 2040.

It lays out nearly $27 billion in funding for maintenance, preservation, and operations of the transportation system. More than $15 billion is planned for capital projects that optimize and expand the region's highway and transit systems, improve access to freight destinations, complete gaps in biking and walking connections and regional trails that provide important access to transit, downtowns, schools, services and other community destinations.

Delivering outcomes to build public trust

This plan will help to grow transit coverage, frequency and ridership; improve safety, reliability and mobility for people and products; increase affordable travel options, particularly for people of color and people with low income; and reduce air pollution and greenhouse gas emissions.

Ultimately, the plan will move the region closer towards its vision of creating an equitable transportation system that supports a high quality of life, a prosperous economy and a healthy environment. We look forward to working with our partners to translate this plan into action.

Let's get to work.

Metro Council President Hughes on behalf of the Metro Council



BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF AMENDING THE 2014 REGIONAL TRANSPORTATION PLAN TO COMPLY WITH FEDERAL AND STATE LAW AND AMENDING THE REGIONAL FRAMEWORK PLAN	)))))	ORDINANCE NO. 18-1421 Introduced by Chief Operating Officer Martha Bennett in concurrence with Council President Tom Hughes

WHEREAS, the Regional Transportation Plan (RTP) is the federally-recognized metropolitan transportation plan for the greater Portland region, and must be updated every five years; and

WHEREAS, the RTP fulfills statewide planning requirements to implement Statewide Planning Goal 12 (Transportation), as implemented through the Transportation Planning Rule and the Metropolitan Greenhouse Gas Reduction Targets Rule, and must be updated every 5-7 years; and

WHEREAS, the RTP is a central tool for implementing the Region 2040 Growth Concept, and constitutes a policy component of the Regional Framework Plan; and

WHEREAS, Metro's most recent update to the RTP was completed in July 2014 and was approved and acknowledged by U.S. Department of Transportation and U.S. Environmental Protection Agency on May 20, 2015; and

WHEREAS, in December 2015 the Metro Council and the Joint Policy Advisory Committee on Transportation (JPACT) approved the proposed 2018 RTP work program and public participation plan; and

WHEREAS, from May 2015 through 2018, the Metro Council and Metro staff engaged the public, community, and business leaders, and local, regional and state partners to update the RTP, including its vision, goals, objectives, performance measures, policies, projects and strategies; and

WHEREAS, from June 2017 to March 2018, Metro solicited and evaluated projects from local governments, TriMet, South Metro Area Regional Transit (SMART), the Port of Portland, the Oregon Department of Transportation and eligible parks districts pursuant to the updated vision, goals and guidance included in the solicitation materials; and

WHEREAS, in February 2018, the Metro Council identified key regional priorities – transportation equity with a focus on race and income, safety, travel options, Climate Smart Strategy implementation and managing congestion – to be the focus of the RTP; and

WHEREAS in March 2018, the Metro Council requested that jurisdictions meaningfully review and refine their draft project list to the extent practicable to help make more progress on the key regional priorities; and

WHEREAS, subsequent to evaluation of the revised projects, Metro established the region is making satisfactory progress in implementing the Climate Smart Strategy pursuant to OAR 660-044-0060 and that, while significant progress was made on transit service expansion and the number of transportation safety projects in the RTP, the RTP shows mixed progress on transportation equity and fails to meet mobility standards in the Oregon Highway Plan pursuant to OAR 660-012 and performance targets for reducing freight delay, tripling bike, walk and transit mode share and completing gaps in the regional active transportation network; and

WHEREAS, Metro released the initial draft of the 2018 RTP and Appendices for public review and comment on June 29, 2018; and

WHEREAS, Metro provided a 45-day public comment period on the draft 2018 RTP from June 29 to August 13, 2018, and received comments through September 6, 2018; and

WHEREAS, the Metro Council held a public hearing on August 2, 2018 to accept public testimony and comments regarding the draft RTP and Appendices; and

WHEREAS, Metro staff invited four Native American Tribes, the Federal Highway Administration, the Federal Transit Administration and other federal, state and local resource, wildlife, land management and regulatory agencies to consult on the public review draft RTP and strategies in accordance with 23 CFR 450.316, and convened four separate consultation meetings on August 6, 14 and 21 and September 6, 2018; and

WHEREAS, the Metro Council, JPACT, the Metro Policy Advisory Committee (MPAC), the Metro Technical Advisory Committee (MTAC), the Transportation Policy Alternatives Committee (TPAC), the Federal Highway Administration, the Federal Transit Administration, local government elected officials and staff, business and community leaders, public agencies, private and non-profit organizations and the public, assisted in the development of the 2018 RTP and provided comment on the RTP throughout the planning process; and

WHEREAS, the 2018 RTP sets the foundation for local transportation plan updates, future region-wide planning efforts, regional efforts to seek future funding and the next RTP update, and defines specific activities for Metro and regional partners to take over the next few years to support the outcomes identified through the RTP update; and

WHEREAS, the 2018 RTP policy priorities will set the policy foundation for the 2022-2024 Regional Flexible Fund Allocation (RFFA) and the 2021-2024 Metropolitan Transportation Improvement Program (MTIP) performance-based programming for investments and measuring MTIP progress; and

WHEREAS, JPACT and MPAC have recommended approval of the 2018 RTP and Appendices by the Metro Council; and

WHEREAS, the Metro Council held two additional public hearings on the 2018 RTP and its components identified in Exhibit A, Exhibit B, Exhibit C, and Exhibit D, on November 8 and December 6, 2018; now therefore,

THE METRO COUNCIL ORDAINS AS FOLLOWS:

1. The 2014 Regional Transportation Plan is hereby amended to become the 2018 Regional Transportation Plan (RTP), as indicated in attached Exhibit A and Appendices and the addendum to Exhibit A, attached and incorporated into this ordinance.

2. Chapter 2 (Transportation) of Metro's Regional Framework Plan is hereby amended, as indicated in Exhibit B, attached and incorporated into this ordinance, to reflect the updated Transportation policies in the 2018 RTP in Exhibit A.

3. The "Summary of Comments Received and Recommended Actions," attached as Exhibit C, is incorporated by reference and any amendments reflected in the recommended actions are incorporated in Exhibit A.

4. The Findings of Fact and Conclusions of Law in Exhibit D, attached and incorporated into this ordinance, explain how these amendments comply with the Regional Framework Plan, statewide planning laws and the Oregon Transportation Plan and its applicable components.

5. Staff is directed to submit this ordinance and exhibits to the Land Conservation and Development Commission (LCDC), including Appendix J, which reports the region is making satisfactory progress in implementing the region's Climate Smart Strategy.

6. The 2018 RTP is hereby adopted as the federally-recognized metropolitan transportation plan and shall be transmitted to the U.S. Department of Transportation.

ADOPTED by the Metro Council this 6th day of December, 2018.

APPROUVÉ APPROVED METRO COUNCIL CONSEIL MÉTROPOLITAIN METRO

Tom Hughes, Council President

Attest:

Sara Farrokhzadian, Recording Secretary

Approved as to Form:

Nathan A. S. Sykes, Acting Metro Attorney

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LIST OF TOPICAL AND MODAL STRATEGIES AND PLANS*

	Adoption date
Regional Transportation Safety Strategy	Dec. 6, 2018
Regional Emerging Technology Strategy	Dec. 6, 2018
Regional Freight Strategy	Dec. 6, 2018
Regional Transit Strategy	Dec. 6, 2018
Regional Travel Options Strategy	May 24, 2018
Climate Smart Strategy	Dec. 18, 2014
Regional Active Transportation Plan	July 17, 2014
Regional Transportation System Management and Operations Strategic Plan	June 10, 2010

* All strategies and plans were adopted by the Metro Council and Joint Policy Advisory Committee on Transportation (JPACT).



2018 Regional Transportation Plan

Chapter 1

Toward a Connected Region

December 6, 2018

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PURPOSE

Transportation planning means more than deciding where to build roads, sidewalks, bikeways and transit and freight routes. It's about taking care of what we have and building great communities.



Learn more about the 2018 Regional Transportation Plan at **oregonmetro.gov/rtp**

It's about ensuring that no matter where you are or where you're going, you can have safe, reliable, healthy and affordable options to get there. It's about nurturing a strong economy, advancing equity and protecting the quality of life we all value.

Metro is the metropolitan planning organization (MPO) designated by Congress and the State of Oregon, for the Oregon portion of the Portland-Vancouver urbanized area, serving 1.5 million people living in the region's 24 cities and three counties. As the MPO, Metro formally updates the Regional Transportation Plan every five years in cooperation and coordination with the Oregon Department of Transportation and the region's cities, counties and transit agencies.

The Regional Transportation Plan is a blueprint to guide investments for all forms of travel – motor vehicle, transit, bicycle and walking – and the movement of goods and freight throughout the greater Portland region. The plan identifies the region's most urgent transportation needs and priorities for investment in all parts of the system with the funds the region expects to have available over the next 25 years to make those investments a reality. It also establishes goals and policies to help meet those needs and guide priority investments. More resources will be needed to achieve our vision and address the challenges of a growing, thriving region.

How we respond to these challenges today will set the course for generations to come. Since summer 2015, Metro has been working with local, regional and state partners and the public to update our region's shared transportation vision and investment strategy for the next 25 years. The updated RTP defines a safe, reliable, healthy and affordable transportation system that is environmentally responsible, efficiently moves products to market, and ensures all people can connect to the education and work opportunities they need to experience and contribute our region's economic prosperity and quality of life. The plan laid out in these pages, will take sustained, focused work from every partner in the region.

Chapter organization

This chapter is organized into the following sections:

1.1. Introduction: This section broadly describes the Regional Transportation Plan and trends and challenges facing the region that were the focus of this update.

1.2. Geographic setting: This section describes the geographic context of the Portland-Vancouver metropolitan region.

1.3. Metropolitan transportation planning process: This section describes Metro's role in transportation planning and planning areas of responsibility to address state and federal requirements.

1.4. Process and engagement overview: This section describes the timeline and process for developing the 2018 Regional Transportation Plan.

1.5. What's next moving forward: This section provides a brief introduction to the rest of the plan.

1.1 INTRODUCTION

The 2018 Regional Transportation Plan will help make the case for more investment and funding to build, operate and maintain the regional transportation system we need for all modes of travel.

The 2018 Regional Transportation Plan defines a shared vision and investment strategy that guides investments for all forms of travel to keep people connected and commerce moving throughout the greater Portland region. The plan is updated every five years to stay ahead of future growth and address trends and challenges facing the region.



Our region's economic prosperity and quality of life depend on a transportation system that provides every person and business with access to safe, reliable and affordable ways to get around.

Our region is growing rapidly and straining our aging transportation system. A half-million new residents are expected to live in the Portland region by 2040 – about half from growing families. Our communities are becoming more culturally diverse, bringing rich cultural activity to neighborhoods. A new generation will grow to adulthood as others move toward retirement. Climate change is happening and our system is not prepared for the expected Cascadia Subduction Zone earthquake. We are experiencing technological changes in transportation that could radically alter our daily lives. Housing affordability and safe, reliable and affordable access to education, jobs and other important destinations are of concern.

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, our treasured region and the planet face formidable challenges. The rapid growth and change across our region have exposed and exacerbated longstanding economic and racial inequities, threatening to undermine the broader benefits of economic growth as well as our region's quality of life. These inequities coupled with longer-term concerns around affordability, safety, climate change and growing congestion demand that we do things differently and make this update all the more timely.

The 2018 Regional Transportation Plan update provided policymakers, community and business stakeholders and the public with an opportunity to work together across interests and communities to bring innovative solutions to the challenges facing our changing region. It provided a platform for updating our shared vision for the transportation system and updating our policies, strategies and investment priorities to help ensure people and products can get where they need to go as congestion, safety and maintenance issues increasingly impact our daily lives.

1.2 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.

Figure 1.1 Portland-Vancouver metropolitan region geographic context



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

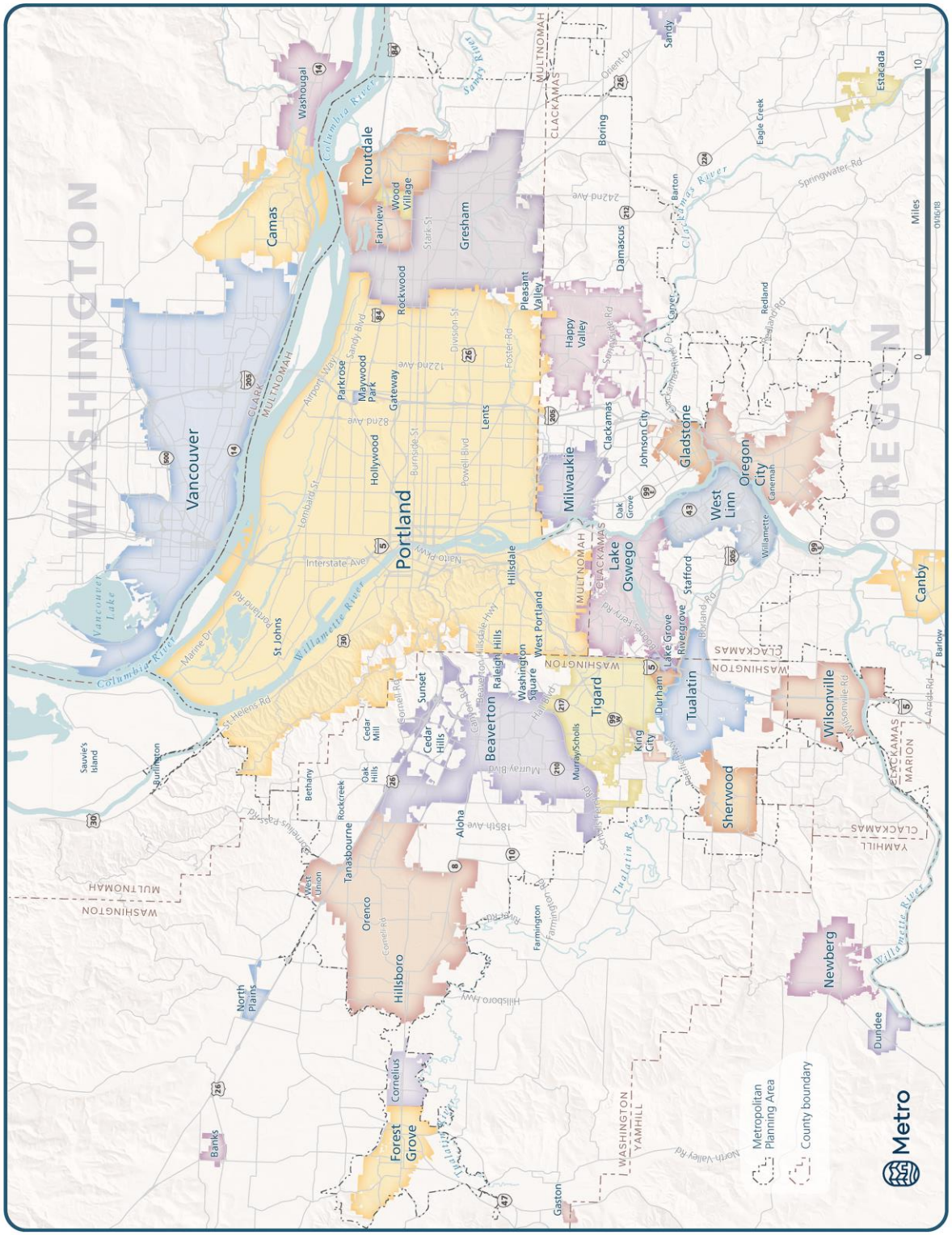
area). Several snow-capped mountains are visible from different vantage points in the region – including Mt. Hood, Mt. St. Helens, Mt. Rainier and Mt. Adams. Within the region, rivers, streams, wetlands, buttes, forest lands, meadows and rolling to steep hillsides dominate the natural landscape. Outside 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 depend 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 24 cities and 3 counties as shown in **Figure 1.2.** Metro's urban growth boundary and jurisdictional boundaries are shown in **Figure 1.5**.

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

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

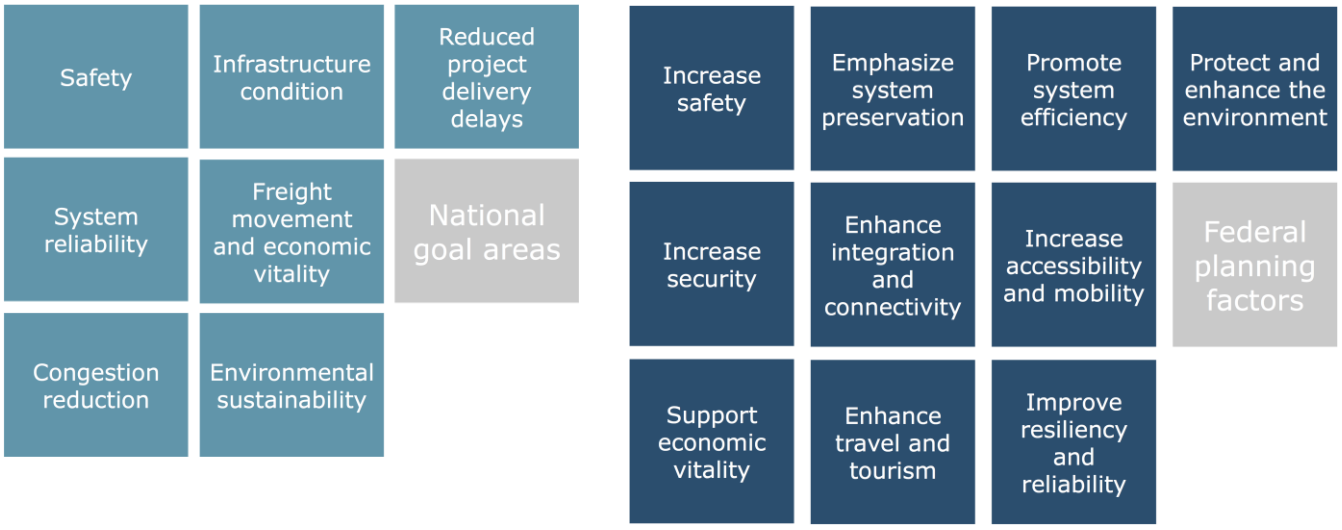


1.3 METROPOLITAN TRANSPORTATION PLANNING PROCESS

Since 1979, Metro has been the metropolitan planning organization (MPO) designated by Congress and the State of Oregon, for the Oregon portion of the Portland-Vancouver urbanized area, covering 24 cities and three counties with a population of 1.5 million. It is Metro's responsibility to meet the requirements of the Fixing America's Surface Transportation (FAST) Act, the Oregon Transportation Planning Rule (which implements Statewide Planning Goal 12), the Oregon Metropolitan Greenhouse Gas Reduction Targets Rule, and the Metro Charter for this MPO area. In combination, these requirements call for development of a multimodal transportation system plan that is integrated with the region's land use plans, and meets federal and state planning requirements.

Metro uses a federally-mandated decision-making framework, called the metropolitan transportation planning process, to guide its regional transportation planning and programming activities. This planning process requires all urbanized areas with populations over 50,000 to have a MPO to coordinate transportation and air quality planning and programming of federal transportation dollars within their boundaries These activities must address the seven national goal areas and consider projects and strategies that address the ten federal planning factors shown in **Figure 1.3**. The national goal areas and planning factors are addressed throughout the RTP and appendices, including the plan's goals and objectives (Chapter 2), policies to guide development and implementation of the plan (Chapter 3), existing system performance (Chapter 4), financing the region's investment priorities (Chapter 5), the region's investment priorities (Chapter 6), expected performance (Chapter 7) and planned implementation and monitoring activities (Chapter 8).

Figure 1.3 National goal areas and federal planning factors



MPOs also have responsibility for maintaining the region's congestion management process and implementing new federal performance-based planning requirements that tied to the national goal areas. MPOs are now required to establish targets related to safety, bridge and pavement

condition, air quality, freight movement, and performance of the National Highway System, and to use performance measures to track their progress toward meeting those targets. **Appendix L** documents the region's approach to addressing the federal transportation performance-based planning and congestion management requirements.

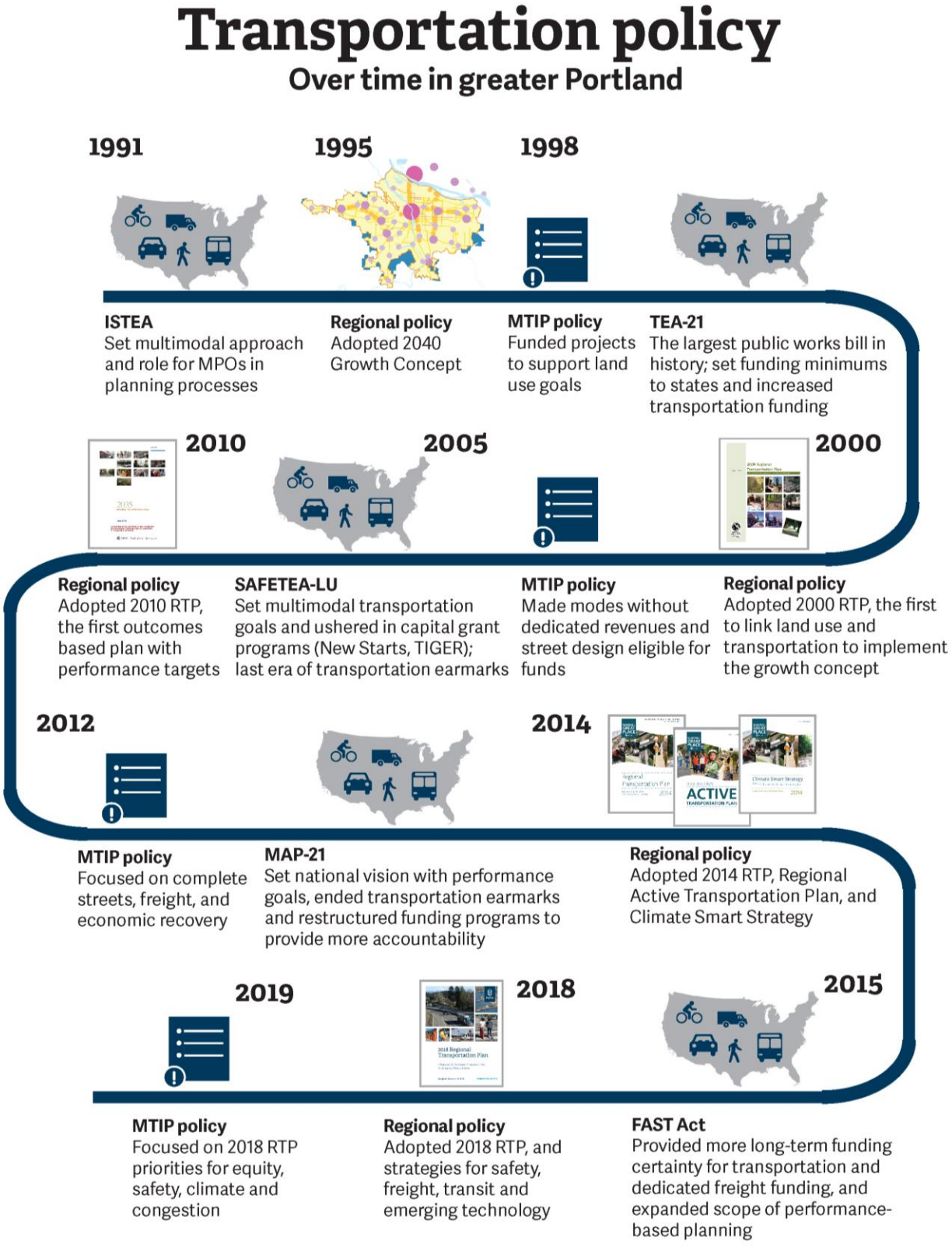
As the designated MPO for the Oregon portion of the Portland-Vancouver region, Metro is responsible for coordinating development of the RTP in cooperation with the region's transportation providers —the 24 cities and three counties in the metropolitan planning area boundary, the Oregon Department of Transportation, Oregon Department of Environmental Quality, Port of Portland, Port of Vancouver, TriMet, South Metro Area Regional 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. Public engagement and consultation efforts that shaped development of the 2018 Regional Transportation Plan are summarized in this chapter with more details provided in **Appendix D**.

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 five years to reflect changing conditions in the region and respond to new federal and state regulatory developments.

Under state law, the RTP serves as the region's regional transportation system plan (TSP), consistent with Statewide Planning Goals and the Oregon Transportation Planning Rule (TPR). State law establishes requirements for consistency of plans at the state, regional and local levels. The RTP must be consistent with the Oregon Transportation Plan, state modal and facility plans that implement the Oregon Transportation Plan, the Oregon Transportation Planning Rule and the Metropolitan Greenhouse Gas Reduction Targets 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.

Figure 1.4 illustrates how federal and regional transportation policies have evolved since the 1990s.

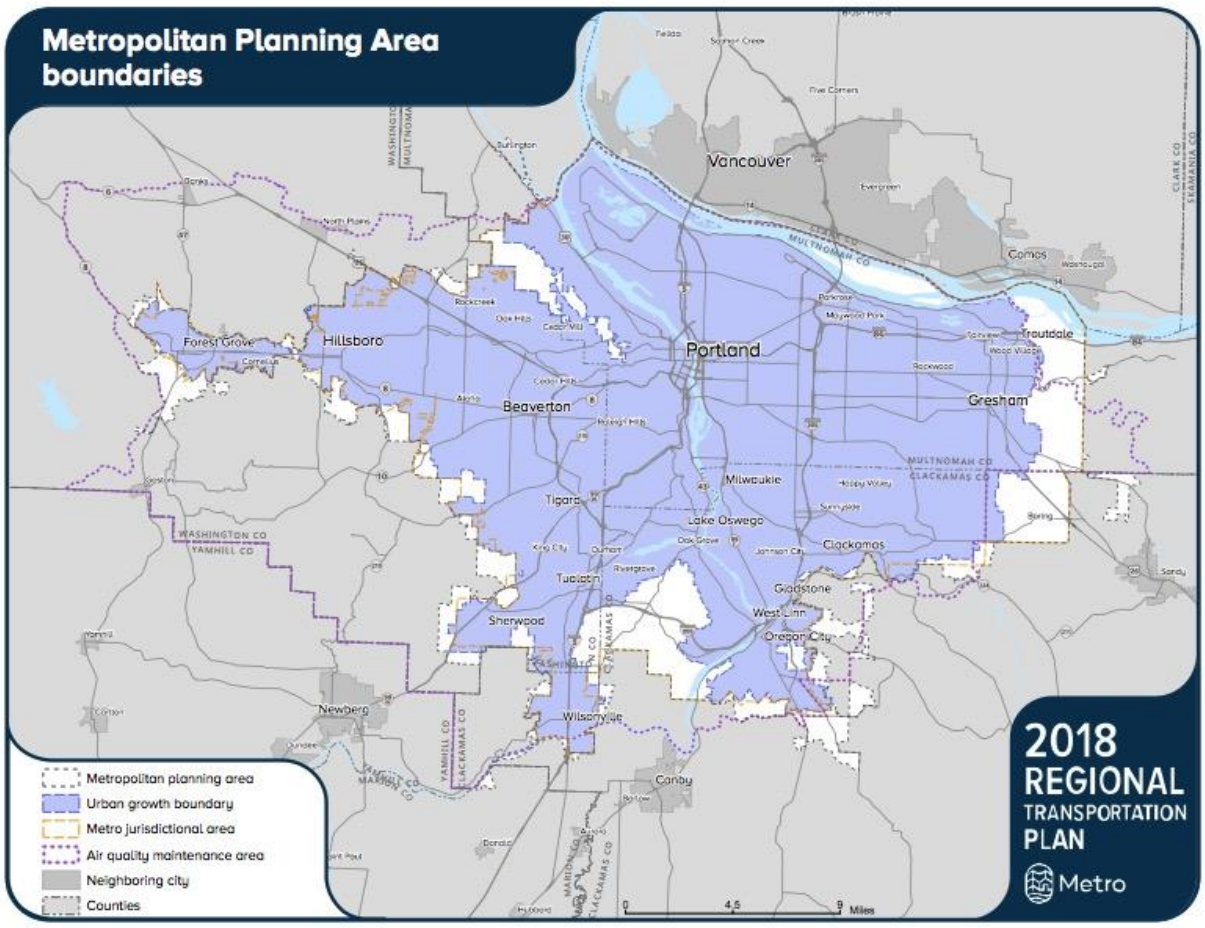
Figure 1.4 How federal and regional transportation policies have evolved since the 1990s



1.3.1 The region has several planning boundaries with different purposes

Federal and state law requires several metropolitan transportation planning boundaries be defined and planned for in the region for different purposes. These boundaries are shown in **Figure 1.5**.

Figure 1.5 Metropolitan planning area boundary



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 greater Portland region's urban growth boundary.

Third, the Urbanized Area (UZA) boundary 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 UZA boundary 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 is the area subject to State Implementation Plan (SIP) regulations. The Portland region's AQMA boundary was developed as part of the ozone and carbon monoxide SIPs, which are pollutants the region had previously violated national air quality standards. In October 2017, the region achieved attainment status under the Clean Air Act Amendments. Reaching this milestone means that transportation conformity no longer is required to be performed in this region. The region continues to comply with other obligations and requirements outlined in the SIPs.

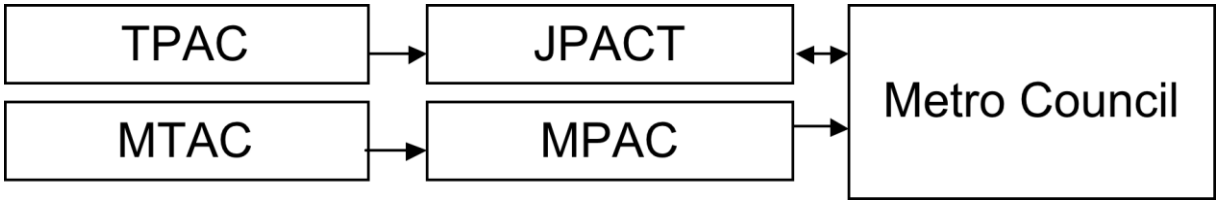
1.3.2 Metro facilitates the metropolitan transportation planning process through Metro's advisory committees

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). Metro also convened seven technical work groups in 2016, 2017 and early 2018 and periodic joint workshops of TPAC and MTAC to shape development of the 2018 Regional Transportation Plan. The work groups included topical experts and representatives from MTAC and TPAC. More than 60 work group meetings were held.

In addition, the Metro Public Engagement Review Committee (PERC) advises the Metro Council on engagement priorities and ways to engage community members in regional planning activities consistent with adopted public engagement policies, guidelines and best practices. The Committee on Racial Equity (CORE) provides community oversight and advises the Metro Council on implementation of the Metro's *Strategic Plan for Advancing Racial Equity, Diversity and Inclusion*. Adopted by the Metro Council in June 2016 with the support of MPAC, the strategic plan leads with race, committing to concentrate on eliminating the disparities that people of color experience, especially in those areas related to Metro's policies, programs, services and destinations.

Figure 1.6 displays the regional transportation decision-making process.

Figure 1.6 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, JPACT and the Metro Council on issues of bi-state significance. Its principal charge is to sustain a regional dialogue, to share information and encourage collaboration. 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 and I-205 corridors.

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.

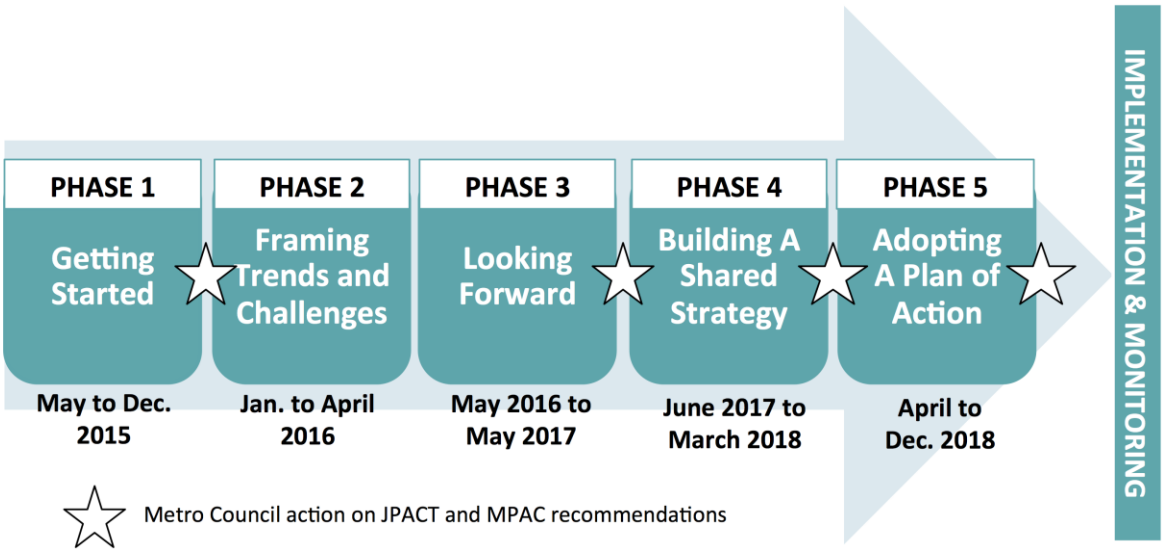


The Bi-State Coordination Committee advises the RTC, JPACT and the Metro Council on issues of bi-state significance. Its principal charge is to sustain a regional dialogue, to share information and encourage collaboration

1.4 PROCESS AND ENGAGEMENT OVERVIEW

The 2018 RTP update was completed in five phases as shown in **Figure 1.7**. From May 2015 to December 2018, the Metro Council and staff engaged the public, community and business leaders and local, regional and state partners to update the Regional Transportation Plan.

Figure 1.7 Timeline and process for development of the 2018 Regional Transportation Plan



Technical work groups and other engagement and planning activities were organized to address the regional challenges that come with a growing region with a focus on implementing the 2014 Climate Smart Strategy and updating the plan to address these policy topics:



Transit



Transportation equity



Finance



Freight



Transportation design



Transportation safety



Performance



Emerging technology

Phase 1: Getting started | May to December 2015

Beginning in summer 2015, the first phase consisted of engaging local, regional, state, business and community partners to prioritize the regional challenges to be addressed in the update and the process for how the region should work together to address them. This engagement included:

- interviews with 31 stakeholders
- discussion groups in partnership with Metro's diversity, equity and inclusion team with communities of color and youth on priorities and issues related to racial equity
- a partnership with PSU's Center for Public Service and 1000 Friends of Oregon to reach underrepresented communities
- a public involvement retrospective that summarized previous feedback from communities of color on transportation planning and project development
- an online survey with more than 1,800 participants to help identify the top transportation issues facing the greater Portland region.

This phase concluded in December 2015 with JPACT and Council approval of the work plan and public participation plan for the update. In addition to implementing the 2014 Climate Smart Strategy, the adopted work plan identified seven policy topics for the Regional Transportation Plan update to focus on – safety, equity, freight, transit, finance, performance, and design. Metro staff formed seven technical work groups to advise staff.

Phase 2: Framing trends and challenges | January to April 2016

The second phase began in January 2016 and concluded in April 2016. In this phase, Metro engaged the public, jurisdictional partners and business and community leaders to document key trends and challenges facing the region as well as priority outcomes for investment in the region's transportation system. This included:

- an online survey with more than 5,800 participants
- a Regional Snapshot on transportation, published in April 2016.



Creating a new dialogue to shape the future we want

From start to finish, the 2018 RTP update was about meaningful engagement with the community, business interests and our elected officials working together to craft a shared vision and investment strategy for our transportation system.



The engagement activities produced more than 19,000 touch points with regional partners, community and business leaders and residents of the region to inform development of the 2018 Regional Transportation Plan.

Also in April 2016, the Metro Council convened members of MPAC, JPACT, state legislators, community and business leaders and other interests from across the region to discuss the key trends and challenges facing the region during the first of four regional leadership forums.

Metro staff also worked with the Oregon Department of Transportation's (ODOT) economist and jurisdictional partners, individually and through a technical work group, to forecast a budget of federal, state and local funds the greater Portland region can reasonably expect by 2040 under current funding trends.

Phase 3: Looking forward | May 2016 to May 2017

From May 2016 to May 2017 technical work and public engagement activities continued to focus on finalizing a shared vision statement for the plan, developing draft strategies for safety, transit and freight, and updating the evaluation framework and measures for evaluating plan performance. The engagement for this phase included:

- a round of follow up discussion groups in partnership with Metro's diversity, equity and inclusion team with communities of color and youth to review actions and priorities for the agency's racial equity strategy
- focus and discussion groups on transportation priorities for communities of color and strategies to improve engagement with underrepresented groups
- an online survey focusing on priorities for communities of color
- an online survey with more than 2,600 participants on investment priorities and funding
- another round of discussion groups with communities of color on hiring practices and priorities related to the Planning and Development department-specific equity plan.



Regional leadership forums

To address the challenges and trends facing our region, the Metro Council convened a series of four regional leadership forums to shape development of the 2018 Regional Transportation Plan.

Forum participants included members of MPAC, JPACT, state legislators, and community and business leaders from throughout the greater Portland region. Working side-by-side, local, regional and state leaders brought the perspectives of their communities and constituents to the conversation around the challenges we are facing, our vision for the future and potential solutions for moving forward together. The discussions shaped the update to the plan's vision, goals, policies and projects.

1. **Exploring Big Ideas for Our Transportation Future** 4/22/16
2. **Building the Future We Want** 9/23/16
3. **Connecting Our Priorities to Our Vision** 12/2/16
4. **Finalizing Our Shared Plan for the Region** 3/2/18

Metro Council also hosted its second and third regional leadership forums. In regional leadership forums 1 and 2, there was consensus that a bold vision and more funding are needed to build a 21st century transportation system. In forum 3, leaders discussed a shared vision for the future transportation system and potential near-term priorities for addressing regional transportation challenges in ways that supported the vision. Participants also identified actions to build a path to future funding.

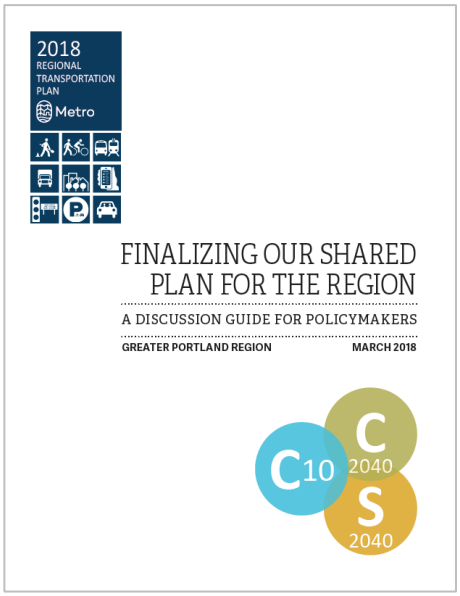
Staff also compiled background information and online resource guide maps to support jurisdictional partners as they updated their investment priorities for further evaluation and public review during Phase 4. In addition, staff launched the RTP Project Hub – an online visual database – for jurisdictional partners to use to update project information and collaborate with other jurisdictions. Phase 3 concluded with Metro Council directing staff to release a call for projects to update the region's transportation near- and long-term investment priorities to support regional goals for safety, congestion relief, affordability, community livability, the economy, social equity and the environment.

Phase 4: Building a shared strategy | June 2017 to March 2018

The fourth phase began in June 2017 with release of a second Regional Snapshot on transportation and the call for projects for jurisdictional partners to update the plan's regional transportation project priorities. Agencies were asked to identify projects that addressed regional needs and challenges, reflected public priorities and maximized progress toward the region's agreed upon vision and goals for the future transportation system.

Local jurisdictions and county coordinating committees worked within a constrained budget and capital funding targets to determine the project priorities to put forward for inclusion in the plan in collaboration with ODOT, Metro, South Metro Area Regional Transit (SMART) and TriMet. All project submissions were required to have come from adopted plans or studies that provided opportunities for public input.

In summer 2017, Metro analyzed three funding scenarios: 10-year constrained project priorities, 2040 constrained project priorities and 2040 strategic project priorities. The analysis tested new and updated outcomes-based system performance measures to evaluate performance of the transportation system as a whole for each scenario to help inform finalizing the plan's project priorities in Phase 5.



Metro staff also prepared an interactive map of proposed projects and lists that was made available on the project website for the public and partners to use to learn more about the projects under consideration. Safety, transit, freight and emerging technology strategies continued to be developed on parallel tracks. Jurisdictions also piloted project-level evaluation criteria on 50 projects; the pilot

project evaluation will be advanced during the next RTP update.

The results of the analysis were released in November 2017. Engagement on the call for projects included:

- a community leaders' forum for feedback on the results
- Metro Councilor briefings to business and neighborhood groups
- an online survey with more than 2,900 participants.

The analysis was also summarized in a larger discussion guide for decision-makers that also relayed key issues and the results of the call for projects. A fourth and final Regional Leadership Forum was held in March 2018 to discuss findings and recommendations from the technical analysis and public engagement to inform finalizing the plan during Phase 5. Leaders participated in table discussions to recommend ways for jurisdictions to refine their draft project lists to better meet the region's shared goals. The recommendations were:

1. **Make more near-term progress on key regional priorities – equity, safety, travel options, Climate Smart implementation and congestion.** Advanc**e** projects that address these outcomes to the 10-year list to improve people's lives by making travel safer, easing congestion, improving access to jobs and community places, attracting jobs and businesses to the region, saving households and businesses time and money, and reducing vehicle emissions.
2. **Make more near-term progress to reduce disparities and barriers that exist for historically marginalized communities.** Advancing projects that improve safety and expand travel options to the 10-year list to reduce disparities and barriers, especially for people of color and lower-income households.
3. **Prioritize projects that focus on safety in high injury corridors.** Advance projects in high injury corridors to the 10-year list and ensure all projects in high injury corridors address safety to reduce the likelihood and severity of crashes for all modes.
4. **Accelerate transit service expansion.** Increase transit service as much as possible beyond Climate Smart Strategy investment levels. Focus new and enhanced transit service to connect transit to underserved communities to jobs and community places, in congested corridors and in areas with more jobs and housing.
5. **Make more near-term progress to tackle congestion and manage travel demand.** Advance lower cost projects to the 10-year list that use designs, travel information, technologies, and other strategies to support and expand travel options and maximize use of the existing system**.** This will help ease congestion and keep people and goods moving safely and reliably. It will be important to ensure that lower income households are not financially burdened by strategies to make road use more efficient.
6. **Prioritize completion of biking and walking network gaps in the near-term.** Advance projects that fill gaps for biking and walking in high injury corridors or that provide connections to transit, schools, jobs and 2040 centers to the 10-year list.

7. **Continue to build public trust through inclusive engagement, transparency and accountability.** Continue engaging the region's diverse communities in the planning and implementation of projects to achieve desired outcomes, including equity, safety, reliability affordability and health. Report back whether projects deliver (or don't deliver) anticipated outcomes and adjust course as needed. Improved participation, transparency and accountability with our investment decisions will help build broad support for more investment in our communities.

The Metro Council directed jurisdictional partners to use these seven recommendations to review and refine their project lists to the extent practicable to help make more progress on these near-term regional priorities – equity, safety, Climate Smart Strategy implementation and congestion. The Metro Council also directed jurisdictional partners to focus their adjustments in the equity focus areas and high injury corridors identified in the RTP.

The RTP financially constrained funding assumptions were updated to reflect new revenues anticipated as a result of House Bill 2017. Jurisdictions worked through coordinating committees in response to the Metro Council's request for project list updates to make more progress on key regional priorities. The recommended projects are described in more detail in Chapter 6. Lists of the recommended projects are in **Appendices A, B and C**.

Phase 5: Adopting a plan of action | April to December 2018

The final phase of the process began in April 2018 and focused on finalizing and adopting the region's investment priorities and strategies recommended through 2040. The 2018 RTP and four strategies for safety, freight, transit and emerging technology were available for public review during a 45-day comment period from June 29 through August 13, 2018.

Engagement activities during the comment period included:

- **Notifications and notices** – Public notices of the comment period were provided to local neighborhood involvement and community outreach offices and community planning organizations in Washington County. Notices were published in the Portland Tribune, Gresham Outlook, Beaverton Valley Times, Tigard Times, Clackamas Review and on the Metro website. Notifications were sent to the RTP interested persons list (nearly 1,900 people) in addition to Metro's four regional advisory committees, their respective interested parties and seven technical work groups that were convened to support development of the draft RTP and strategies. Metro used Facebook and other social media to announce the comment period. Partner agencies and community and business organizations engaged throughout the RTP update posted notifications of the comment period through E-newsletters and other methods to inform their members and interested parties of the comment opportunity.
- **Online survey and public review draft materials** – An online survey, an interactive map of the draft projects and public review drafts of the 2018 RTP, project lists, appendices and four strategies were posted on the 2018 RTP web page at www.oregonmetro.gov/rtp. Members of the public, regional advisory committees, partner agencies and other interested parties were

invited to comment on the draft materials. More than 200 emails and 50 letters were submitted. Nearly 900 people responded to the online survey.

- **Public hearing** – The Metro Council held a public hearing on August 2. Seven people testified on a range of topics.
- **Consultation** – Metro staff invited four Native American Tribes and several federal, state and local resource, wildlife, land management and regulatory agencies to consult on the public review draft RTP and strategies in accordance with 23 CFR 450.316. Metro convened three separate consultation meetings on August 6, 14 and 21. A fourth consultation meeting, with the Confederated Tribes of the Grand Ronde, was held on September 6.

All comments received through August 30 and subsequent consultation meetings are documented in a final public comment report and appendices to the public comment report. In addition, staff summarized more than 350 individual comments proposing specific changes to the draft RTP and four strategies and made recommendations to respond to the proposed changes. MPAC, JPACT and the Metro Council considered public comments received and staff recommended changes prior to taking their final action. The recommended changes adopted by JPACT and the Metro Council to respond to public comments received can be found in **Appendix U**.

MPAC and JPACT both recommended approval of the plan and strategies for safety, transit, freight and emerging technology to the Metro Council in October 2018 with the changes identified in Appendix U. Metro Council held a legislative hearing on November 8 and a final hearing on December 6.

The Metro Council adopted the 2018 Regional Transportation Plan, and strategies for safety, transit, freight and emerging technology on December 6, 2018 as recommended by MPAC and JPACT.



On December 6, 2018 the Metro Council unanimously approved the 2018 Regional Transportation Plan and strategies for safety, transit, freight and emerging technology setting a new foundation for future investment and collaboration. Appendix D provides more information about public engagement activities that shaped the adopted plan and strategies.

1.5 WHAT'S NEXT MOVING FORWARD?

The greater Portland region pioneered approaches to land use and transportation planning in the past, and is uniquely positioned to address the trends and challenges facing the region – 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 and Climate Smart Strategy.

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 building a more equitable and sustainable transportation system that connects people where they want to travel, protects the environment and supports the region's economy.

The updated plan will take sustained, focused work from every partner in the region.



2018 Regional Transportation Plan

Chapter 2

Our Shared Vision and Goals for Transportation

December 6, 2018

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2.0 INTRODUCTION

The 2018 Regional Transportation Plan defines a shared vision for the greater Portland region's transportation system that reflects the values and desired outcomes expressed by the public, policymakers and community and business leaders engaged in development of the plan.

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 and supporting goals, objectives and performance targets that will guide planning and building 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.



Learn more about the 2018 Regional Transportation Plan at **oregonmetro.gov/rtp**

Rapid growth and change across our region have exposed and exacerbated longstanding economic and racial inequities, threatening to undermine the broader benefits of economic growth as well as our region's quality of life. The vision and supporting goals, objectives and performance targets in this chapter aim to better integrate transportation and land use efforts to protect the region's economic prosperity, environmental quality, and quality of life and improve the lives of the people who call this region home.

To achieve our vision for the future, we must work together to address inequities as we build vibrant, walkable and bikeable communities with affordable homes, provide safe, reliable, healthy and affordable transportation choices, address growing congestion, reduce air pollutants, including greenhouse gas emissions, and protect critical natural areas and the irreplaceable farm and forest lands that surround the region.

Achievement of the plan's vision and goals will occur through partnerships, ongoing engagement and implementation of a variety of policies, strategies and actions at the local, regional, state and federal levels. The vision laid out in these pages, will take sustained, focused work from every partner in the region. The various jurisdictions in the region are expected to pursue policies, strategies and projects that contribute to achieving the regional vision and goals of the Regional Transportation Plan to ensure an equitable, prosperous and sustainable future.

Chapter organization

This chapter is organized into the following sections:

2.1 Outcomes-based framework to guide transportation planning and decision-making: The section describes the outcomes-oriented performance-based planning approach the plan uses to link transportation to a broader set of desired outcomes for vibrant communities, a healthy economy, equity and the environment. This approach also responds to more recent federal and state performance-based planning requirements.

2.2 2040 Growth Concept – an integrated land use and transportation vision and strategy: 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 Shared vision for the regional transportation system: This section describes how the RTP will serve a key role in implementing the 2040 Growth Concept and supporting local aspirations for growth.

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



In 2040, everyone in the Portland metropolitan region will share in a prosperous, equitable economy and exceptional quality of life sustained by a safe, reliable, healthy, and affordable transportation system with travel options.

Vision approved by the Metro Policy Advisory Committee, Joint Policy Advisory Committee on Transportation and the Metro Council in May 2017.

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

We know the transportation funding landscape is changing, and building a world-class 21st century transportation system requires steady, long-term investment. But we don't have the resources to invest at the levels needed to address all of the challenges the region faces and achieve our shared vision and goals for the transportation system.

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 the people 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 be accountable for our future choices, ensuring we get the greatest possible return on public investments. Planning also allows us to identify where investments are most needed in order to deliver the vision a plan articulates.

As a major tool for ensuring stewardship of our public investments, the plan identifies needed next steps to achieve each of the six desired outcomes for the greater Portland region, and helps us understand whether we are on the right track.

This 2018 RTP continues to broaden the way that outcomes are used to measure success and define transportation system needs. This plan expands the outcomes-based policy framework adopted in 2010, to include new goals and objectives for transportation equity, safety, reliability and accessibility that were used to evaluate performance of the investments recommended in this plan. These updated goals and objectives (and related performance measures) will also be used to monitor how the transportation system is performing between scheduled plan updates.



Six desired outcomes for the greater Portland region

Equity
The benefits and burdens of growth and change are distributed equitably.

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.

Clean air and water
Current and future generations enjoy clean air, clean water and healthy ecosystems.

Climate leadership
The region is a leader in minimizing contributions to global warming.

– Adopted by Metro Policy Advisory Committee and the Metro Council in 2008.

The plan identifies the responsibility that the Portland region's 24 cities and 3 counties, and multiple state and regional agencies, have to the people of the region, to our environment and to the region's economic prosperity now and for future generations.

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

The plan envisions an interconnected and multimodal transportation system that provides safe, reliable, healthy and affordable travel choices for everyone to get to work, education, community places and nature. Implementation of the plan must ensure that historically marginalized communities, who experience disparities in access, safety, affordability, and other outcomes by the existing system, are equitably served by the interconnected and multimodal transportation system to address these disparate outcomes. In order to ensure that the Plan's multimodal system serves the people of the region, everyone must have meaningful opportunities to participate in development and implementation of the plan, but particularly those communities who have historically been left of decision-making processes to influence the shape of the system.

2. **Planet - Responsibility of the plan to our environment.**

Implementation of the plan should ensure that the multimodal transportation system protects and enhances the region's air and water, critical natural areas and environmental resources and rich cultural legacy.

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

Implementation of the plan should provide a multimodal transportation system that supports a strong and healthy economy and helps the region's businesses and industries remain competitive by providing affordable access to jobs and enabling the exchange of goods and services. 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 limited public funds wisely to sustain the region's economic prosperity, and that prosperity is shared across the region.



People



Planet



Prosperity

The plan has a responsibility to the people of the region, to our planet and to the region's economic prosperity now and for future generations.

These responsibilities and the region's six desired outcomes are prominently interwoven into the RTP goals and objectives, and the policies that support those goals and form the policy foundation for the rest of the plan to ensure transportation decisions support this larger set of responsibilities and the six desired outcomes. The plan calls for making transportation investment decisions based on achieving the multiple outcomes to preserve and enhance the quality of life, our economy and the environment now and for future generations.



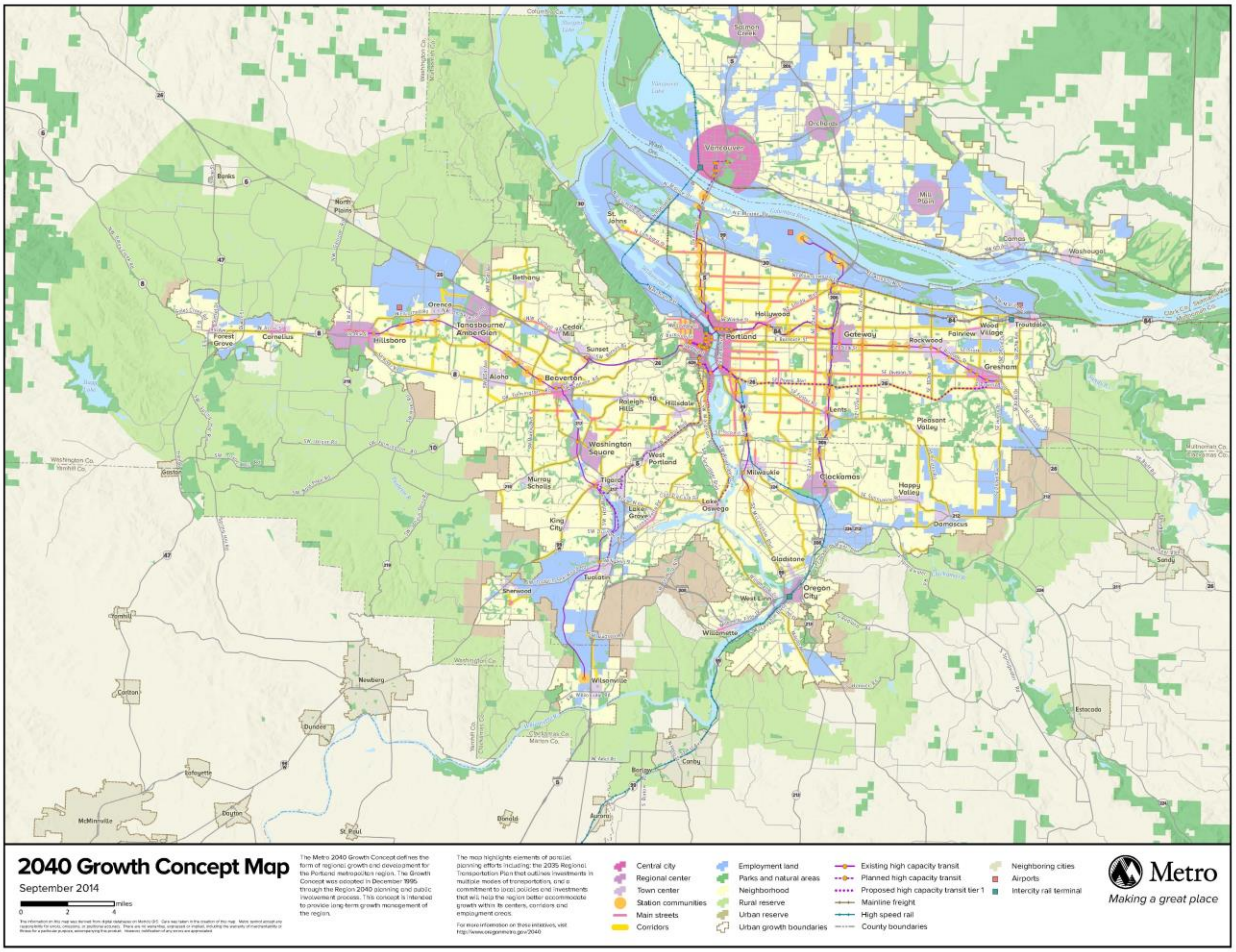
This plan expands the outcomes-based policy framework adopted in 2010, to include new goals and objectives for transportation equity, safety, climate leadership and managing congestion that were used to evaluate performance of the investments recommended in this plan.

2.2 2040 GROWTH CONCEPT – AN INTEGRATED LAND USE AND TRANSPORTATION VISION AND STRATEGY

The 2018 Regional Transportation Plan is a key tool for implementing the 2040 Growth Concept.

In 1995, the greater Portland region adopted the 2040 Growth Concept, the long-range strategy for managing growth that integrates land use and transportation system planning to preserve the region's economic health and livability in an equitable, environmentally sound and fiscally-responsible manner.

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



Shown in **Figure 2.1**, the 2040 Growth Concept includes land use and transportation building blocks that express 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. It concentrates mixed-use and higher density development in urban centers, station communities, corridors and main streets that are well served by transit. It envisions a well-connected street

network that supports biking and walking for short trips. Employment lands serve as hubs for regional commerce and include industrial land and freight facilities for truck, marine, air and rail cargo sites that enable goods to be generated and moved in and out of the greater Portland region. Freight access to industrial and employment lands is centered on rail, the freeway system and other road connections.

Implicit in the 2040 Growth Concept is the understanding that compact development is more affordable, sustainable, livable and fiscally responsible than urban 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 region's transportation system. 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 typically focused in the primary and secondary land uses, referred to as 2040 Target Areas. These are the areas expected to absorb a large share of the region's future growth. The hierarchy also serves as a framework for prioritizing RTP investments. **Table 2.1** lists the 2040 design types based on this hierarchy.

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	• Neighborhoods **Other land uses outside UGB** • Urban reserves • Rural reserves • Neighbor cities

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.

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 Redeveloping and developing 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 multimodal 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 multimodal 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 multimodal 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.

2.3 SHARED VISION FOR THE REGIONAL TRANSPORTATION SYSTEM

Transportation planning and investment decisions and the region's desired land use, social, 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 Regional Transportation Plan vision statement below presents an aspirational view of the future of the region's transportation system to reflects the values and desired outcomes expressed by the public, policymakers and community and business leaders engaged in development of the plan.

> ***In 2040, everyone in the Portland metropolitan region will share in a prosperous, equitable economy and exceptional quality of life sustained by a safe, reliable, healthy, and affordable transportation system with travel options.***
>
> *Approved by the Metro Policy Advisory Committee, Joint Policy Advisory Committee on Transportation, and the Metro Council in May 2017.*

This shared vision for the future provides a benchmark for building a transportation system that serves all people and businesses in the greater Portland region. This vision and supporting goals and objectives will serve as a foundation for identifying investment priorities and policies and measuring progress toward building a transportation system that delivers the outcomes we want.

Outcomes-based goals to realize our vision

To realize our vision for a transportation system that serves all people and businesses, we need goals to keep us focused and moving forward. The RTP goals were first adopted in 2010 after significant engagement with communities, residents, businesses and stakeholders throughout the region. In 2014, the Metro Council and the Joint Policy Advisory Committee (JPACT) approved the addition of a goal to demonstrate climate leadership and reduce greenhouse gas emissions. In 2018, the goals, objectives and related performance measures and targets were refined to address new policies and near-term investment priorities for transportation equity, safety, Climate Smart Strategy implementation and managing congestion.

The outcomes-based RTP goals guide the region's transportation planning and decision-making and include specific objectives and performance targets to help measure the progress we are making toward our vision for the transportation system. The goals, objectives, performance measures and performance targets are presented in the next section.

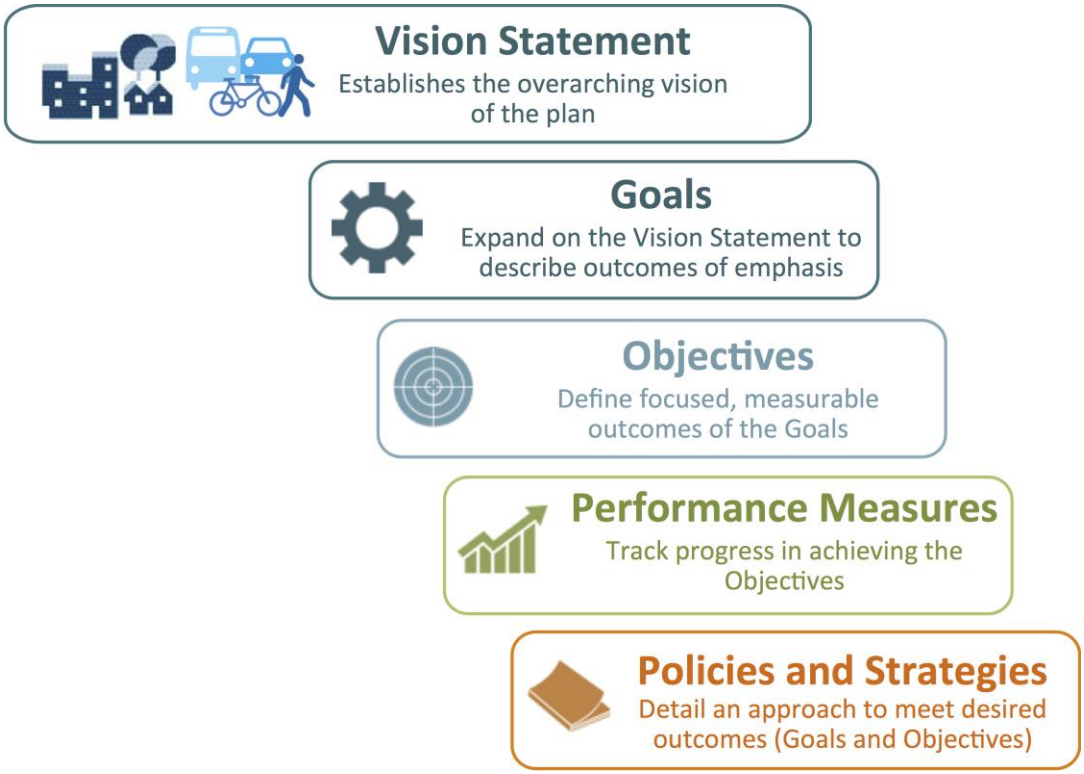
2.4 GOALS, OBJECTIVES AND PERFORMANCE TARGETS

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

Continuing the practice established with the RTP adopted in 2010, this plan includes transportation performance targets that support the outcomes-based framework reflected in the plan's goals and objectives. The goals, objectives and performance targets provided policy direction for developing the investment strategy recommended in Chapter 6. Chapter 7 reports findings on how well the RTP performs across a broad array of measures and relative to the plan's performance targets.

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 and regional policies. They are aspirational and support the region's performance-based planning and decision-making framework shown in **Figure 2.2**.

Figure 2.2 RTP performance-based planning and decision-making framework



The goal areas and objectives integral to the RTP are listed in **Figure 2.3**.

Figure 2.3 RTP goals and objectives – At-A-Glance

Goal 1. Vibrant Communities
Objective 1.1 2040 Growth Concept Implementation
Objective 1.2 Walkable Communities
Objective 1.3 Affordable Location-Efficient Housing Choices
Objective 1.4 Access to Community Places

Goal 2. Shared Prosperity
Objective 2.1 Connected Region
Objective 2.2 Access to Industry and Freight Intermodal Facilities
Objective 2.3 Access to Jobs and Talent
Objective 2.4 Transportation and Housing Affordability

Goal 3. Transportation Choices
Objective 3.1 Travel Choices
Objective 3.2 Active Transportation System Completion
Objective 3.3 Access to Transit
Objective 3.4 Access to Active Travel Options

Goal 4. Reliability and Efficiency
Objective 4.1 Regional Mobility
Objective 4.2 Travel Management
Objective 4.3 Travel Information
Objective 4.4 Incident Management
Objective 4.5 Demand Management
Objective 4.6 Pricing
Objective 4.7 Parking Management

Goal 5. Safety and Security
Objective 5.1 Transportation Safety
Objective 5.2 Transportation Security
Objective 5.3 Preparedness and Resiliency

Goal 6. Healthy Environment
Objective 6.1 Biological and Water Resources
Objective 6.2 Historic and Cultural Resources
Objective 6.3 Green Infrastructure
Objective 6.4 Light pollution
Objective 6.5 Habitat Connectivity

Goal 7. Healthy People
Objective 7.1 Active Living
Objective 7.2 Clean Air
Objective 7.3 Other Pollution Impacts

Goal 8. Climate Leadership
Objective 8.1 Climate Smart Strategy Implementation
Objective 8.2 Greenhouse Gas Emissions Reduction
Objective 8.3 Vehicle Miles Traveled
Objective 8.4 Low and Zero Emissions Vehicles
Objective 8.5 Energy Conservation
Objective 8.6 Green Infrastructure

Goal 9. Equitable Transportation
Objective 9.1 Transportation Equity
Objective 9.2 Barrier Free Transportation

Goal 10. Fiscal Stewardship
Objective 10.1 Infrastructure Condition
Objective 10.2 Sustainable Funding

Goal 11. Transparency and Accountability
Objective 11.1 Meaningful Public and Stakeholder Engagement
Objective 11.2 Performance-Based Planning
Objective 11.3 Coordination and Cooperation

Each goal area that follows is arranged similarly:

- A statement of the **goal** that describes a desired outcome or end state toward which actions are focused to make progress toward the plan's vision.
- **Objectives** that identify a measureable desired outcome and means for achieving a goal to guide action within the plan period.
- Key **performance measures** that are used to evaluate transportation system performance and potential impacts of the plan's investments within the plan period.

Use of performance measures in the Regional Transportation Plan

Performance measures are used in three different ways to support the region's transportation planning and decision-making process.

- **System performance measures** – These are performance measures that are used to predict the future as part of an evaluation process using forecasted data. 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.
- **Regional performance targets** – These are numerical goals or a stated direction of performance to be achieved within a specified time period, assigning a value to what the RTP is trying to achieve. Targets provided policy direction for developing the investment strategy recommended in Chapter 6, and address regional and state policies. Performance of the plan's investment relative to the targets is reported in Chapter 7 to track the region's progress toward the plan's vision and goals. Complementing the regional performance targets, two additional state-mandated performance targets are used in the RTP to track progress reducing drive alone trips and to assess deficiencies on the motor vehicle network.
- **Monitoring and reporting measures and targets** – These are measures used to monitor changes based on actual empirical or observed data between updates to the RTP. Decision-makers can use this information between updates to evaluate the need for refinements to policies, investments or other elements of the plan based on what is learned. Broad sets of multimodal monitoring measures have been identified in support of implementing the region's Climate Smart Strategy (Appendix J) and Congestion Management Process (see Appendix L). Some monitoring measures have targets for purposes of meeting federal performance-based planning requirements.

See Section 7.2 in Chapter 7 for more information about the region's performance-based planning framework.

The individual RTP goals, objectives and key system performance measures for each goal area follows. Several measures relate to multiple goals.

GOAL 1: Vibrant Communities

The greater Portland region is a great and affordable place to live, work and play where people can easily and safely reach jobs, schools, shopping, services, and recreational opportunities from their home by walking, biking, transit, shared trip or driving.



- **Objective 1.1 2040 Growth Concept Implementation** – Focus growth and transportation investment in designated 2040 growth areas (the Portland central city, regional and town centers, corridors, main streets, and employment and industrial areas).
- **Objective 1.2 Walkable Communities** – Increase the share of households in walkable, mixed-use areas served by current and planned frequent transit service.
- **Objective 1.3 Affordable Location-Efficient Housing Choices** – Increase the number and diversity of regulated affordable housing units within walking distance of current and planned frequent transit service.
- **Objective 1.4 Access to Community Places**[1] – Increase the number and variety of community places that households, especially households in historically marginalized communities, can reach within a reasonable travel time for all modes of travel.

Key performance measures



Access to transit



Access to community places

Performance of plan for these measures is reported in Chapter 7.

[1] Community places are defined as key local destinations such as schools, libraries, grocery stores, pharmacies, hospitals and other medical facilities, general stores, parks, greenspaces, and other places that provide key services and/ or daily needs.

GOAL 2: Shared Prosperity

People have access to jobs, goods and services and businesses have access to workers, goods and markets in a diverse, inclusive, innovative, sustainable and strong economy that equitably benefits all the people and businesses of the greater Portland region.



- **Objective 2.1 Connected Region** – Build an integrated system of throughways, arterial streets, freight routes and intermodal facilities, transit services and bicycle and pedestrian facilities, with efficient connections between modes that provide access to jobs, markets and community places within and beyond the region.
- **Objective 2.2 Access to Industry and Freight Intermodal Facilities** – Increase access to industry and freight intermodal facilities by a reliable and seamless freight transportation system that includes air cargo, pipeline, trucking, rail, and marine services to facilitate efficient and competitive shipping choices for goods movement in, to and from the region.
- **Objective 2.3 Access to Jobs and Talent** – Attract new businesses and family-wage jobs and retain those that are already located in the region while increasing the number and variety of jobs that households can reach within a reasonable travel time.
- **Objective 2.4 Transportation and Housing Affordability** – Reduce the share of income that households in the region spend on transportation to lower overall household spending on transportation and housing.

Key performance measures



Access to jobs



Access to industry and freight facilities



Multimodal Travel



Affordability*



Access to bicycle and pedestrian parkways

Performance of the plan for these measures is reported in Chapter 7.

*A performance measure for affordability is not included in the 2018 RTP system evaluation but will be included in future updates to the plan as a method is developed. Observed data is reported in Chapter 7.

GOAL 3: Transportation Choices

People throughout the region have safe, convenient, healthy and affordable options that connect them to jobs, school, services, and community places, support active living and reduce transportation-related pollution.

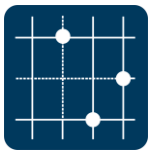


- **Objective 3.1 Travel Choices** – Plan communities and design and manage the transportation system to increase the proportion of trips made by walking, bicycling, shared rides and use of transit, and reduce vehicle miles traveled.
- **Objective 3.2 Active Transportation System Completion** – Complete all gaps in regional bicycle and pedestrian networks.
- **Objective 3.3 Access to Transit** – Increase household and job access to current and planned frequent transit service.
- **Objective 3.4 Access to Active Travel Options** – Increase household and job access to planned regional bike and walk networks.

Key performance measures



Mode share



System completeness



Access to transit



Access to bicycle and pedestrian parkways

Performance of the plan for these measures is reported in Chapter 7.

GOAL 4: Reliability and Efficiency

The transportation system is managed and optimized to ease congestion, and people and businesses are able to safely, reliably and efficiently reach their destinations by a variety of travel options.



- **Objective 4.1 Regional Mobility** – Maintain reasonable person-trip and freight mobility and reliable travel times for all modes in the region's mobility corridors, consistent with the designated modal functions of each facility and planned transit service within the corridor.
- **Objective 4.2 Travel Management** – Increase the use of real-time data and decision-making systems to actively manage transit, freight, arterial and throughway corridors.
- **Objective 4.3 Travel Information** – Increase the number of travelers, households and businesses with access to real-time comprehensive, integrated, and universally accessible travel information.
- **Objective 4.4 Incident Management** – Reduce incident clearance times on the region's transit, arterial and throughway networks through improved traffic incident detection and response.
- **Objective 4.5 Demand Management** – Increase the number of households and businesses with access to outreach, education, incentives and other tools that increase shared trips and use of travel options.
- **Objective 4.6 Pricing** – Expand the use of pricing strategies to manage vehicle congestion and encourage shared trips and use of transit.
- **Objective 4.7 Parking Management** – Manage the supply and price of parking in order to increase shared trips and use of travel options and to support efficient use of urban land.

Key performance measures


Multimodal travel


Multimodal travel times


Congestion


Freight delay


Transit productivity

Performance of the plan for these measures is reported in Chapter 7.

GOAL 5: Safety and Security

People's lives are saved, crashes are avoided and people and goods are safe and secure when traveling in the region.



- **Objective 5.1 Transportation Safety** – Eliminate fatal and severe injury crashes for all modes of travel.
- **Objective 5.2 Transportation Security** – Reduce the vulnerability of the public and critical passenger and freight transportation infrastructure to crime and terrorism.
- **Objective 5.3 Preparedness and Resiliency** – Reduce the vulnerability of regional transportation infrastructure to natural disasters, climate change and hazardous incidents.

Key performance measure

Safety*

* A performance measure for safety is not included in the 2018 RTP system evaluation but will be included in future updates to the plan as a method is developed. Observed data is reported in Chapter 7.

GOAL 6: Healthy Environment

The greater Portland region's biological, water, historic and cultural resources are protected and preserved.



- **Objective 6.1 Biological and Water Resources** – Protect fish and wildlife habitat and water resources from the negative impacts of transportation.
- **Objective 6.2 Historic and Cultural Resources** – Protect historic and cultural resources from the negative impacts of transportation.
- **Objective 6.3: Green Infrastructure** – Integrate green infrastructure strategies in transportation planning and design to avoid, minimize and mitigate adverse environmental impacts.
- **Objective 6.4: Light Pollution** – Minimize unnecessary light pollution to avoid harm to human health, farms and wildlife, increase safety and improve visibility of the night sky.
- **Objective 6.5: Habitat Connectivity** – Improve wildlife and habitat connectivity in transportation planning and design to avoid, minimize and mitigate barriers resulting from new and existing transportation infrastructure.

Key performance measures*

Potential habitat impact

Potential historic resources impact

Potential tribal lands impact

Performance of plan for these measures is reported in Chapter 7.

* There is no performance target for this goal. The purpose of the measures is to identify projects that overlap with high value habitats and other resources so that as projects move toward implementation appropriate avoid, minimize and mitigation strategies can be applied.

GOAL 7: Healthy People

People enjoy safe, comfortable and convenient travel options that support active living and increased physical activity, and transportation-related pollution that negatively impacts public health are minimized.



- **Objective 7.1 Active Living** – Improve public health by providing safe, comfortable and convenient transportation options that support active living and physical activity to meet daily needs and access services.
- **Objective 7.2 Clean Air** – Reduce transportation-related air pollutants, including criteria pollutants and air toxics emissions.
- **Objective 7.3 Other Pollution Impacts** – Minimize air, water, noise, light and other transportation-related pollution health impacts.

Key performance measures

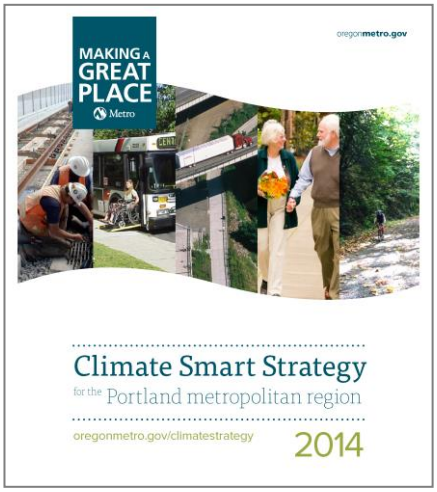
Public health

Clean air

Performance of plan for these measures is reported in Chapter 7.

GOAL 8: Climate Leadership

The health and prosperity of people living in the greater Portland region are improved and the impacts of climate change are minimized as a result of reducing transportation-related greenhouse gas emissions.



- **Objective 8.1 Climate Smart Strategy Implementation** – Implement policies, investments and actions identified in the adopted Climate Smart Strategy, including coordinating land use and transportation; making transit convenient, frequent, accessible and affordable; making biking and walking safe and convenient; and managing parking and travel demand.
- **Objective 8.2 Greenhouse Gas Emissions Reduction** – Meet adopted targets for reducing transportation-related greenhouse gas emissions.
- **Objective 8.3 Vehicle Miles Traveled** – Reduce vehicle miles traveled per capita.
- **Objective 8.4 Low and Zero Emissions Vehicles** – Support state efforts to transition Oregon to cleaner, low carbon fuels and increase the adoption of more fuel-efficient vehicles and alternative fuel vehicles, including electric and hydrogen vehicles.
- **Objective 8.5 Energy Conservation** - Reduce transportation-related consumption of energy and reliance on sources of energy derived from petroleum and gasoline.
- **Objective 8.6 Green Infrastructure** – Promote green infrastructure that benefits both climate and other environmental objectives, including improved stormwater management and wildlife habitat.

Key performance measures



Climate change



Vehicle miles traveled



Climate Smart implementation

Performance of plan for these measures is reported in Chapter 7.

GOAL 9: Equitable Transportation

The transportation-related disparities and barriers experienced by historically marginalized communities, particularly communities of color, are eliminated.



- **Objective 9.1 Transportation Equity** – Eliminate disparities related to access, safety, affordability and health outcomes experienced by people of color and other historically marginalized communities.
- **Objective 9.2 Barrier Free Transportation** – Eliminate barriers that people of color, low income people, youth, older adults, people with disabilities and other historically marginalized communities face to meeting their travel needs.

Key performance measures*



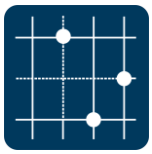
Access to transit



Access to jobs



Access to community places



System completion



Affordability**

Performance of plan for these measures is reported in Chapter 7.

* Key performance measures compare RTP equity focus areas with areas outside RTP equity focus areas.

**Performance measures for affordability are not included in the system evaluation because Metro does not yet have methods or tools to forecast performance for affordability; therefore, observed data is cited.

GOAL 10: Fiscal Stewardship

Regional transportation planning and investment decisions provide the best return on public investments.



- **Objective 10.1 Infrastructure Condition** – Plan, build and maintain regional transportation assets to maximize their useful life, minimize project construction and maintenance costs and eliminate maintenance backlogs.
- **Objective 10.2 Sustainable Funding** – Develop new revenue sources to prepare for increased demand for travel on the transportation system as our region grows.

Key performance measures*



Infrastructure Condition



Sustainable Funding

* There are no system performance measures or targets identified in the 2018 RTP for this goal, but measures will be included in future updates to the plan as measures and a method are developed.

GOAL 11: Transparency and Accountability

Regional transportation decisions are open and transparent and distribute the benefits and burdens of our investments in an equitable manner.



- **Objective 11.1 Meaningful Public and Stakeholder Engagement –** Engage more and a wider diversity people in providing input at all levels of decision-making for developing and implementing the plan, particularly people of color, English language learners, people with low income and other historically marginalized communities.
- **Objective 11.2 Performance-Based Planning** – Make transportation investment decisions using a performance-based planning approach that is aligned with the RTP goals and supported by meaningful public engagement, multimodal data and analysis.
- **Objective 11.3 Coordination and Cooperation** – Improve coordination and cooperation among the owners and operators of the region's transportation system.

Key performance measures*



Meaningful engagement



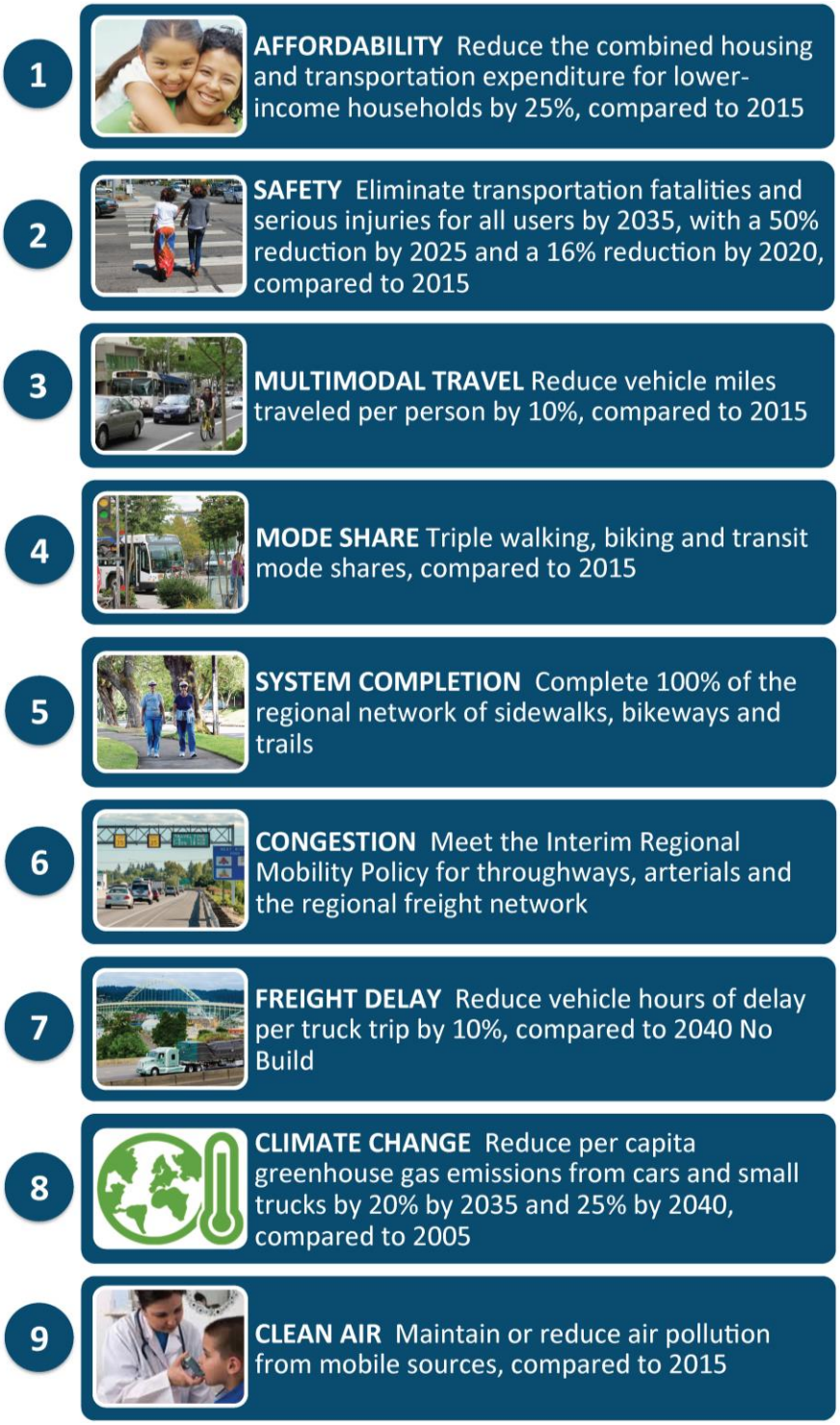
Performance-based planning

* There are no system performance measures or targets identified in the 2018 RTP for this goal, but measures will be included in future updates to the plan as measures and a method are developed.

Regional transportation performance targets

Sown in **Figure 2.4**, nine system performance measures have aspirational targets, providing a basis for measuring expected performance of the plan in the long-term.

Figure 2.4 RTP performance targets – At-A-Glance



All regional performance targets are for the year 2040, unless otherwise specified. The performance targets are the highest order evaluation measures in the performance-based policy framework – providing key criteria by which progress towards the plan goals can be assessed. The aspirational performance targets set quantifiable goals for the achieving the plan's desired policy outcomes within a certain timeframe, though not all goals have targets and several targets address multiple goals.

In comparison, system performance measures are used to evaluate changes between current conditions (in 2015) and future conditions (in 2040) with implementation of the transportation investments identified in the plan. Performance of the plan is reported in Chapter 7. Complementary performance measures identified in **Appendix J** and **Appendix L** have monitoring targets that will help monitor progress towards meeting the RTP goals and objectives in the shorter-term, between and during scheduled updates to the RTP.

Additional state-mandated targets

This section describes additional performance targets that have been used in the RTP since 2000 to determine adequacy of the transportation system and consistency with state requirements.

Regional modal targets

First adopted in 2000, the regional modal targets established in **Table 2.3** are the region's alternative approach for achieving compliance with the requirement in the Oregon Transportation Planning Rule TPR) to reduce per capita vehicle miles traveled and reliance on single-occupant vehicles during the planning period. Approved by the Land Conservation and Development Commission in 2002, the targets are intended to be goals for cities and counties to work toward as they implement the 2040 Growth Concept and Regional Transportation Plan at the local level. The most urbanized areas of the region will achieve higher non-drive alone mode shares than less developed areas closer to the urban growth boundary. Findings of performance are reported in Chapter 7 to measure local progress in reducing reliance on the automobile and demonstrate compliance with the TPR.

Table 2.3 Regional modal targets for 2040

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 Neighborhoods	40-45%

* Applies to non-drive alone trips to, from and within each 2040 design type.

Interim regional mobility policy

First adopted in 2000 and amended into the Oregon Highway Plan in 2002, the interim regional mobility policy reflects a level of motor vehicle performance in the region that JPACT, the Metro Council and the Oregon Transportation Commission (OTC) deemed acceptable at the time of its adoption. Policymakers recognized the policy as an incremental step toward using a more comprehensive set of measures that consider system performance for all modes, as well as financial, environmental and community impacts. This RTP continues that evolution and has defined a broader set of performance measures that can provide a more comprehensive assessment of transportation system performance as reflected in the performance measures identified for each RTP goal, the regional performance targets shown in **Figure 2.4** and the 2040 modal targets in **Table 2.3**.

The interim regional mobility policy in **Table 2.4** shows the minimum motor vehicle performance desired for transportation facilities designated on the Regional Motor Vehicle Network in Chapter 3. Specifically, Table 3.6 reflects volume-to-capacity targets adopted in the RTP for facilities designated on the Regional Motor Vehicle Network as well as volume-to-capacity targets adopted in the Oregon Highway Plan for state-owned facilities in the urban growth boundary. In effect, the policy is used to evaluate current and future performance of the motor vehicle network, using the ratio of traffic volume (or forecasted demand) to planned capacity of a given roadway, referred to as the volume-to-capacity ratio (v/c ratio) or level-of-service (LOS).



Regional Mobility Policy Update

There has been increasing discussion of the role of motor vehicle LOS as a performance metric. The region and local communities across the region have adopted goals such as improving safety for all roadway users (e.g., pedestrians, bicyclists, freight and transit users) and encouraging infill development to implement the 2040 Growth Concept, which often conflict with meeting LOS thresholds.

The region has committed to updating the interim regional mobility policy to better align with the comprehensive set of goals and desired outcomes identified in the RTP. Chapter 8 (Section 8.2.3.1) describes a proposed work plan for considering measures aimed at system efficiency, including people-moving capacity, person throughput and system completeness.

Traditionally, motor vehicle LOS has been used in transportation system planning, project development and design as well as in operational analyses and traffic analysis conducted during the development review process. As a system plan, the RTP uses the interim regional policy to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. LOS is also used to determine consistency of the RTP with the Oregon Highway Plan for state-owned facilities.

Table 2.4 Interim regional mobility policy

Deficiency thresholds for peak hour operating conditions expressed as volume to capacity ratio targets as adopted in the RTP and Oregon Highway Plan.

Locations	Target	Target	
	Mid-day One-Hour Peak [A, B]	PM 2-Hour Peak [A, B]	
		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 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 [C] *(from I-5 South to I-5 North)*	.99	1.1	.99
Other principal arterial routes [D] I-205 [C] I-84 (east of I-205) I-5 (Marquam Bridge to Wilsonville) [C] OR 217 US 26 (west of Sylvan) US 30 OR 8 (Murray Boulevard to Brookwood Avenue) [C, D] OR 47 OR 99W OR 212 [E] OR 224 OR 213 [F]	.90	.99	.99

Table Notes:

A. Unless the Oregon Transportation Commission has adopted an alternative mobility target for the impacted state-owned facility within the urban growth boundary, the mobility targets in this table (and Table 7 of the Oregon Highway Plan) are considered standards for state-owned facilities for purposes of determining compliance with OAR 660-012-0060.

B. The volume-to-capacity ratios in this table (and Table 7 of the Oregon Highway Plan) are for the highest two consecutive hours of weekday traffic volumes. The 2nd hour is defined as the single 60-minute period, either before or after the peak 60-minute period, whichever is highest. See Oregon Highway Plan Action 1.F.1 for additional technical details for state-owned facilities. The mid-day peak hour is the highest 60-minute period between the hours of 9 a.m. and 3 p.m.

C. A corridor refinement plan, which will likely include a tailored mobility policy, is required by the Regional Transportation Plan for this corridor.

D. Two facilities are not designated as principal arterial throughway routes in the RTP, including OR 8 between Murray Boulevard and Brookwood Avenue and portions of 99W, and are proposed to be removed from Table 7 of the Oregon Highway Plan in the next scheduled update.

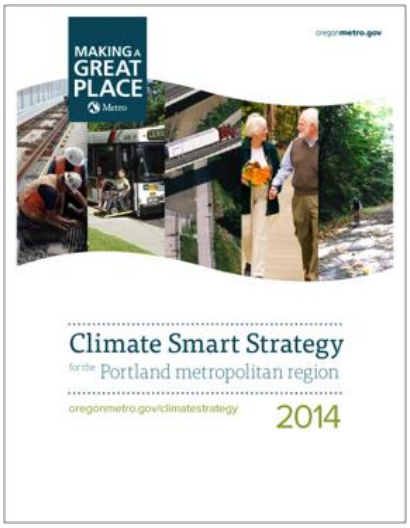
E. OR 212 is designated as a throughway route in the RTP and is proposed to be amended into Table 7 of the Oregon Highway Plan in the next scheduled update.

F. In October 2018, the OTC approved an alternative mobility target that applies to the intersection of OR 213 and Beavercreek Road such that during the first, second and third hours, a maximum v/c ratio of 1.00 shall be maintained. Calculation of the maximum v/c ratio will be based on an average annual weekday peak hour.

Appendix L describes how this information is used in the region's congestion management process and RTP updates to identify needs and inform consideration and prioritization of multimodal strategies and investments to address congestion in the region. See **Chapter 3** for more information about this policy.

Greenhouse gas emissions reduction targets

Oregon has been a leader in addressing global climate change, and the region continues to support the state's strong commitment to reducing greenhouse gas (GHG) emissions. In HB 3543 (2007), the Oregon Legislature adopted statewide GHG reduction targets for all sectors. In HB 2001 (2009) and SB 1059 (2010), the Legislature directed the Land Conservation and Development Commission (LCDC) to conduct rulemaking to adopt targets for reducing transportation-related GHG emissions in Oregon's metropolitan areas consistent with the overall target from HB 3543.



The 2018 Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy.

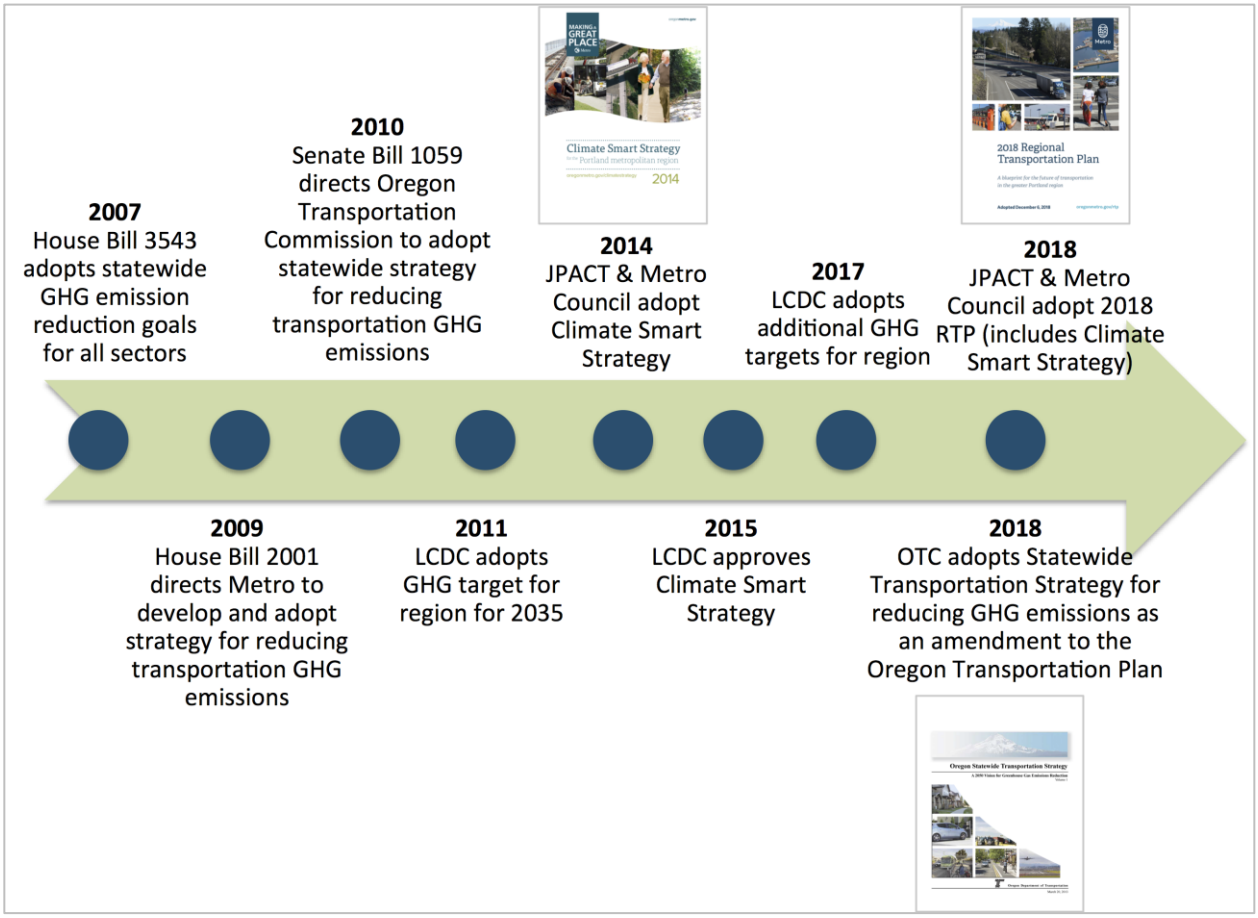
For more information, visit: oregonmetro.gov/climatesmart

Metro's legislative mandate

In 2009, Metro was directed by HB 2001 and by subsequent LCDC rulemaking to develop a plan for meeting its regional GHG reduction target in coordination with the Oregon Department of Transportation (ODOT). After a vigorous and collaborative regional process, this plan – known as the Climate Smart Strategy – was adopted by Metro with broad regional support in 2014 and approved by LCDC in 2015.

A simplified timeline of key climate legislation and related implementation activities is shown in **Figure 2.1**.

Figure 2.5 Oregon legislation drives climate policy and implementation



More information about Oregon's climate policies for reducing greenhouse gas emissions from transportation can be found at https://www.oregon.gov/ODOT/Programs/Pages/OSTI.aspx.

Shown in Table 2.5, the regional targets, first adopted in the Metropolitan Greenhouse Gas Reduction Targets Rule in 2011, were updated in January 2017 to set targets for the years 2040 through 2050 for each of Oregon's metropolitan areas following an assessment of progress to date.

Table 2.5 Greenhouse gas emissions reduction targets [A, B]

Year	Targets for the Portland metropolitan area	Targets for other Oregon metropolitan areas
2035	20%	varies by MPO from 17-20%
2040	25%	20%
2041	26%	21%
2042	27%	22%
2043	28%	23%
2044	29%	24%
2045	30%	25%
2046	31%	26%
2047	32%	27%
2048	33%	28%
2049	34%	29%
2050	35%	30%

Table notes:

A. As adopted in OAR 660-044-0020 of the Metropolitan Greenhouse Gas Reduction Targets Rule, the GHG reduction targets are defined as a percentage reduction in emissions per capita from 2005 emissions levels but not including reductions in vehicle emissions that are likely to result by 2035 from the use of improved vehicle technologies and fuels. The targets were developed using the statewide GreenSTEP model and the Regional Strategic Planning Model (RSPM) developed by ODOT – now termed VisionEval. Metro uses the Environmental Protection Agency's MOVES model for forecasting on-road mobile source greenhouse gas emissions in the region. This transition was anticipated because Metro maintains and implements MOVES to conduct federally-required air quality and other on-road vehicle emissions analysis. More information can be found in **Appendix J**.

B. The year 2005 is specified as a reference year for greenhouse gas reduction targets because more detailed data on emissions and light vehicle travel in metropolitan areas is available for this date than for 1990, the base year set by statute, and because it corresponds better with adopted land use and transportation plans and will thus enable MPOs to better estimate what changes to land use and transportation plans might be needed to achieve the emissions reduction targets. While the targets are specified as a reduction in emissions per capita from 2005 emissions levels, the targets are set at a level that corresponds to the required reduction from 1990 levels to be achieved by the specified year to be on track to meet statewide goals for 2050.

At this time, only the Portland region is required to develop, adopt and implement a plan that meets the targets. The targets are for light-duty vehicle emissions and reflect per capita reductions needed from estimated 2005 greenhouse gas emissions levels after accounting for state assumptions for Oregon's transition to cleaner, low-carbon fuels and more fuel-efficient vehicles. See **Chapter 3** for more information about the region's climate leadership policies guiding RTP and Climate Smart implementation. **Chapter 7** and **Appendix J** report expected performance of the RTP for 2035 and 2040.

The RTP vision, goals, and objectives are addressed throughout the RTP and appendices, including policies to guide development and implementation of the plan (Chapter 3), existing system performance (Chapter 4), financing the region's investment priorities (Chapter 5), the region's investment priorities (Chapter 6), expected performance (Chapter 7) and planned implementation and monitoring activities (Chapter 8).



Achievement of the plan's vision and goals will occur through partnerships, ongoing engagement and implementation a variety of policies, strategies and actions at the local, regional, state and federal levels. The various jurisdictions in the region are expected to pursue policies, strategies and projects that contribute to achieving the regional vision and goals of the Regional Transportation Plan to ensure an equitable, prosperous and sustainable future.

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2018 Regional Transportation Plan

Chapter 3

System Policies to Achieve Our Vision

December 6, 2018

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3.0 INTRODUCTION

Purpose

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 defines a broad range of policies for safety, transportation equity, climate, and emerging technology as well as a vision and supporting policies for each component of the regional transportation system – motor vehicle, transit, freight, bike and pedestrian – and management and operations of the system.



Find out more about the 2018 RTP at **oregonmetro.gov/rtp**.

The policies, if implemented, will help the region make progress toward the overall vision, goals and objectives for the regional transportation system defined in Chapter 2 and address key regional priorities identified during development of the plan – equity, safety, Climate Smart implementation and congestion. They aim to integrate transportation and land use efforts to sustain the region's economic prosperity and quality of life and create a seamless and safe, reliable, healthy and affordable transportation system for all communities.

Together the network visions and policies in this chapter will guide the development and implementation of the regional transportation system, informing transportation planning and investment decisions made by the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council as well as state and local partners.

Chapter organization

This chapter is organized into the following sections:

3.1 Regional transportation system components: This section defines the components of the regional transportation system.

3.2 Overarching system policies: This section defines overarching policies for the regional transportation system related to safety, transportation equity, climate leadership and technology.

3.3 Regional network visions, concepts and policies: This section describes the vision (as defined in each network concept and functional classification map) and supporting policies to guide planning and investment in each part of the regional transportation system. The network concepts establish a vision and supporting policies for 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.

3.1 REGIONAL TRANSPORTATION SYSTEM COMPONENTS

Regional multimodal 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 greater Portland region, including connecting the region to other parts of the state and Pacific Northwest or provides access to and within 2040 Growth Concept centers, main streets, corridors and industrial and employment 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.

Regional Transportation System Components

Regional multimodal transportation facilities and services include the following:

1. Regional System Design and Placemaking
2. Regional Motor Vehicle Network
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

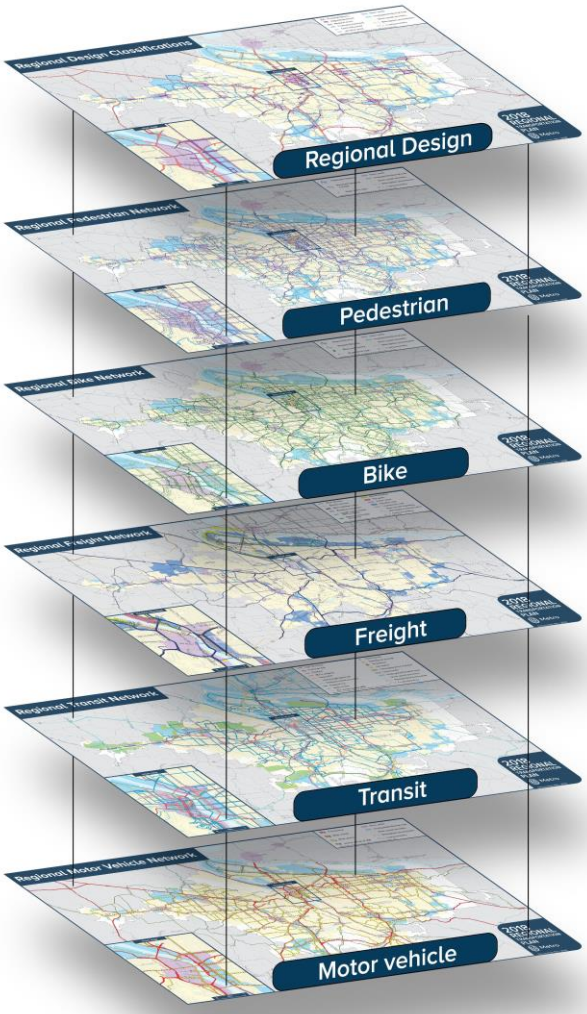
As a result, the regional transportation system is defined as:

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

These facilities are designated on the network maps in this chapter. Together, these facilities and services constitute an integrated and interconnected system that supports planned land uses and provides travel options to achieve the goals, objectives and policies of the RTP.

Regional Transportation System Components



Click on 2018 RTP Regional Network Maps for an online zoomable version of each map.

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

3.2 OVERARCHING SYSTEM POLICIES

This section defines regional transportation system policies related to safety, transportation equity, climate protection and emerging technology.

3.2.1 Safety and security policies

Eliminating traffic related deaths and life changing injuries and increasing the safety and security of the transportation system is a top priority of the Regional Transportation Plan, as is prioritizing safety for people of color, people with low incomes, people with disabilities, people walking, bicycling, and using motorcycles, youth and older adults.

"Serious crashes" are Fatal and Severe Injury crashes combined

Preventing traffic related deaths and severe injuries is a critical public health and equity issue in the greater Portland region. Between 2011 and 2015, there were more than 116,000 traffic crashes resulting in 311 deaths and 2,102 people severely injured. On average, 62 people die each year on the region's roadways and 420 people experience a life changing injury.

Traffic deaths and life changing injuries impact the lives of our families, friends, neighbors and community members. They also have a major economic cost – estimated at $1 billion a year for the region. While the greater Portland region has one of the lowest crash rates in the country, the Regional Transportation Safety Strategy has adopted a Vision Zero target because no loss of life on our roadways is acceptable.

Transportation safety is protection from death or bodily injury form a motor-vehicle crash while engaged in travel.

Individual and public transportation security is protection from intentional criminal or antisocial acts while engaged in trip making.

Individual and public security while traveling is an important part of transportation safety. Unlike serious traffic crashes, the problem of individual and public security is less well documented. However, fears for personal security are often raised by community members in the region. The greater Portland region has the highest reported number of hate crimes in the United States and the tragic, racially motivated attack on a MAX train in 2017 have highlighted that not all people in the region are equally safe and secure while traveling. People walking, bicycling and taking public transit can feel and be especially vulnerable.

3.2.1.1 Regional Transportation Safety Strategy (2018)

The Regional Transportation Safety Strategy ("Safety Strategy") identifies data-driven strategies and actions to address the most common types of crashes and contributing factors.[1] Key findings from the analysis of crash data from 2011-2015 can be found in Chapter 1 of the RTP.[2] More detailed findings are in the 2018 Metro State of Safety Report and the Safety Strategy.[3]

The Safety Strategy recommends **six strategies** to support achieving the region's adopted Vision Zero target for 2035, shown in **Figure 3.1**. Each strategy includes specific actions. The strategies and actions are evidence-based and were identified in response to analysis of crash data in the 2018 Metro State of Safety Report and other sources. Refer to the Regional Transportation Safety Strategy for detailed information on each of the strategies and specific actions.

Figure 3.1 Regional transportation safety strategies



[1] The Regional Transportation Safety Strategy, adopted in December 2018, is a topical plan and appendix of the Regional Transportation Plan.
[2] Oregon Department of Transportation crash data.
[3] The Regional Transportation Safety Strategy is a topical plan of the Regional Transportation Plan. The 2018 Metro State of Safety Report is an appendix of the Safety Strategy.

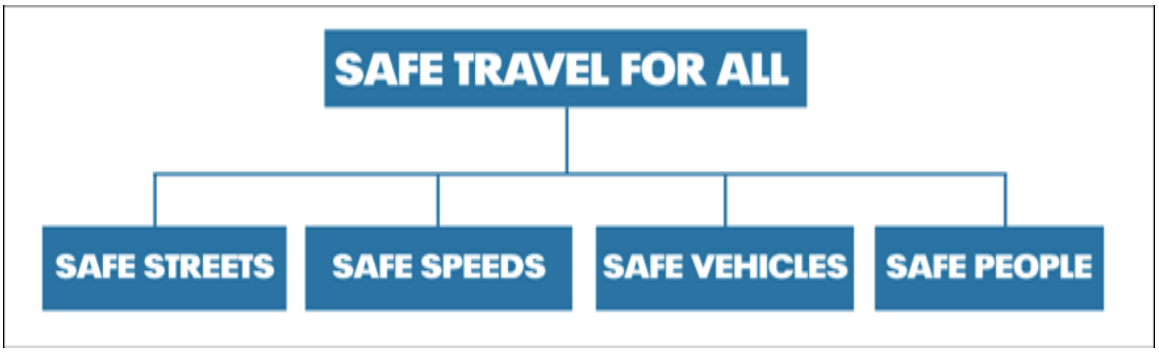
3.2.1.2 Using the Safe System approach

The Safety Strategy employs a Safe System approach with the goal of zero fatal and severe injury traffic deaths. The Safe System approach originated in Sweden and now other countries and many U.S. cities are using the framework. Similar frameworks are Vision Zero (Sweden), Toward Zero Deaths (U.S.), Road to Zero Coalition (National Safety Council), Safe System (New Zealand), and Sustainable Safety (Denmark).

The Safe System approach involves a holistic view of the transportation system and the interactions among travel speeds, vehicles, road users and the road itself. It is an inclusive approach that prioritizes safety for all user groups of the transportation system - drivers, motorcyclists, passengers, pedestrians, bicyclists, and commercial and heavy vehicle drivers.

Consistent with the region's long-term safety vision, it acknowledges that people will make mistakes and may have road crashes—but the system should be designed so that those crashes should not result in death or serious injury. Design emphasizes separation – between people walking and bicycling and motor-vehicles, access management and median separation of traffic – and survivable speeds.

Figure 3.2 Components of the Safe System approach



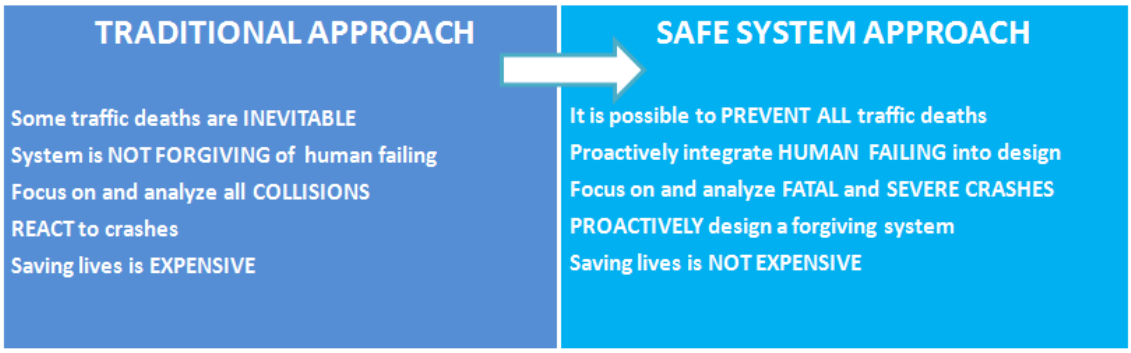
Source: Vision Zero Network

The Safe System approach is focused on preventing all fatal and severe injury crashes. It recognizes that the responsibility for crash prevention resides not only with roadway users but with transportation professionals and decision makers. The Safe System approach has been shown to be more effective in reducing traffic deaths and severe injuries than more traditional approaches that focus on all crashes.[4]

The Safe System approach focuses on the following key guiding principles that shape how transportation safety is addressed.

[4] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths, World Resources Institute, Global Road Safety Facility (2017)

Figure 3.3 Guiding principles of the Safe System approach



Source: Metro

Refer to the Regional Transportation Safety Strategy for detailed information on the Safe System approach.

3.2.1.3 Regional high injury corridors and intersections

Analysis in the 2018 Metro State of Safety Report found that a majority of serious crashes occurred on arterial roadways. Metro developed a methodology to identify which roadways in the region had the highest number of serious crashes (acknowledging that not all arterial roadways are designed the same and some roadways will have more safety issues than others). Refer to the Glossary for a description of the methodology used to identify the regional high injury corridors and intersections.

The analysis found that sixty percent of fatal and severe injury crashes occur on just six percent of the region's roadways. These roadways are identified as regional high injury corridors and intersections. They are also where we tend to travel the most, where we run to catch the bus, cross the street to get to schools and shops, ride our bikes or drive.

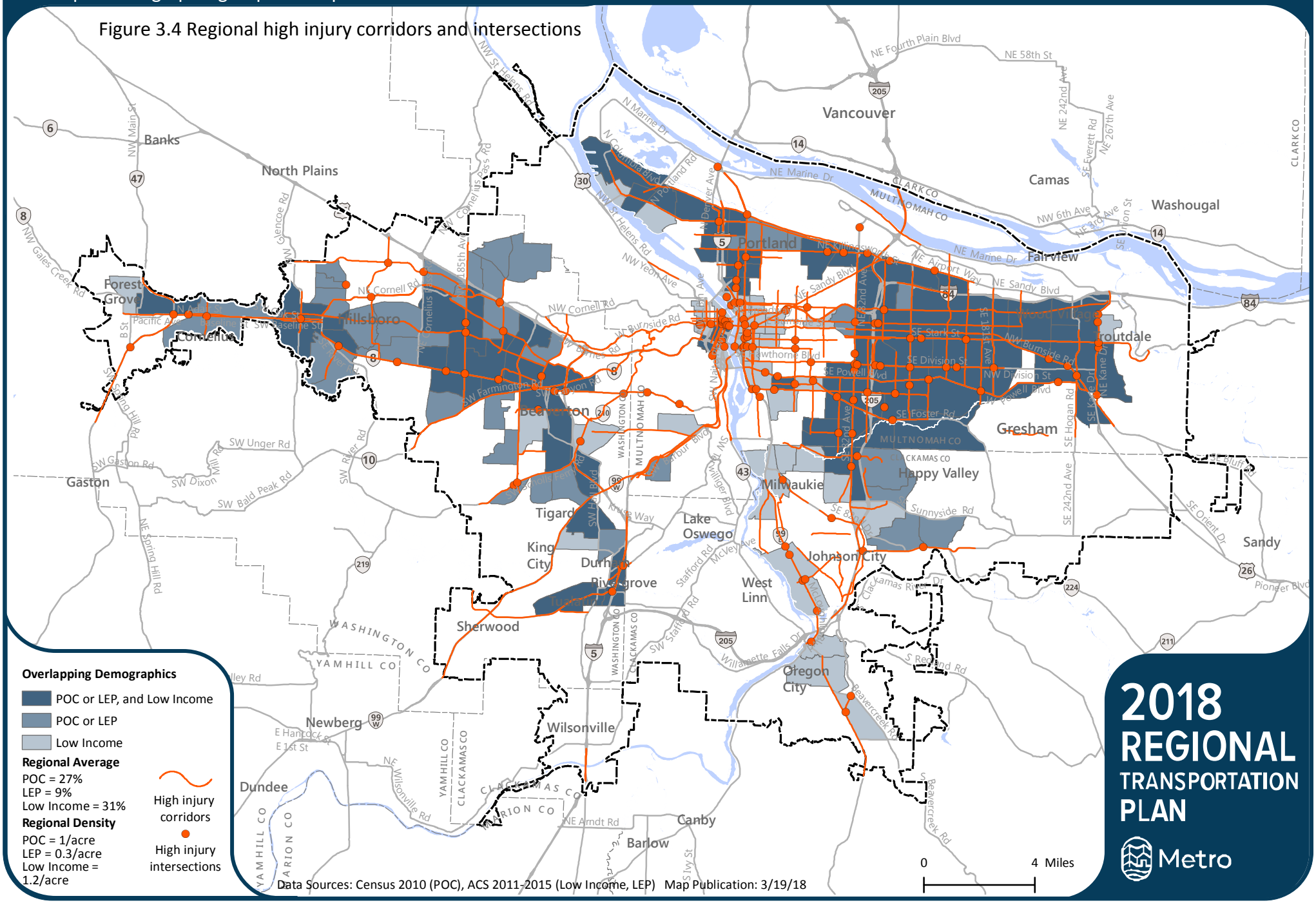
A majority of the high injury corridors and intersections – and a majority of pedestrian deaths and severe injuries – are in areas with higher concentrations of people of color, people with low incomes and English language learners. Implementing policies and actions to increase transportation safety and personal security for these community members, along with other vulnerable users, such as people walking and bicycling, will make the transportation system safer for all users.

Figure 3.4 shows the map of regional high injury corridors overlapping with communities of color, English language learners, and lower-income communities. The regional high injury corridors and intersections are identified to help prioritize safety near term investments. Metro will update this map every five years. In the interim, other safety investments may be identified that warrant priority based on other data and analysis.

High Injury Corridors Overlapping Communities of Color, English Language Learners, and Lower-Income Communities

This map shows the overlap of regional high injury corridors and road intersections with census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and English language learners. Census tracts where multiple demographic groups overlap are identified.

Figure 3.4 Regional high injury corridors and intersections



2018 REGIONAL TRANSPORTATION PLAN

Metro

3.2.1.4 Safety and security policies

Regional Transportation Safety and Security Policies reflect the policy framework of the Regional Transportation Safety Strategy. Implementation of the policies supports achieving the regional Vision Zero target for 2035 and making travel in the region safer and more secure for all people.

Regional Safety and Security Policies

Policy 1	Focus safety efforts on eliminating traffic deaths and severe injury crashes to achieve Vision Zero.
Policy 2	Prioritize safety investments, education and equitable enforcement on high injury and high risk corridors and intersections, with a focus on reducing speeds and speeding.
Policy 3	Prioritize investments that benefit people with higher risk of being involved in a serious crash, including people of color, people with low incomes, people with disabilities, people walking, bicycling, and using motorcycles, people working in the right-of-way, youth and older adults.
Policy 4	Increase safety for all modes of travel and for all people through the planning, design, construction, operation and maintenance of the transportation system, with a focus on reducing vehicle speeds.
Policy 5	Make safety a key consideration in all transportation projects, and avoid replicating or exacerbating a known safety problem with any project or program.
Policy 6	Employ a Safe System approach and use data and analysis tools and performance monitoring to support data-driven decision-making.
Policy 7	Utilize safety and engineering best practices to identify low-cost and effective treatments that can be implemented systematically in shorter timeframes than large capital projects.
Policy 8	Prioritize investments, education and enforcement that increase individual and public security while traveling by reducing intentional crime, such as harassment, targeting, and terrorist acts, and prioritize efforts that benefit people of color, people with low incomes, people with disabilities, women and people walking, bicycling and taking transit.
Policy 9	Make safety a key consideration when defining system adequacy (or deficiency) for the purposes of planning or traffic impact analysis.

Safety Policy 1. Focus safety efforts on eliminating traffic deaths and severe injury crashes to achieve Vision Zero.

To reach the goal of eliminating deaths and severe injuries from traffic crashes, this policy directs safety related efforts to focus on fatal and severe injury crashes, as opposed to all crashes. Focusing on serious crashes is a key tenant of the Safe System approach. It entails identifying where serious crashes occur and focusing on those locations, identifying the risk factors involved in serious crashes and addressing and eliminating those risks, focusing enforcement and education on high risk behaviors that lead to serious crashes and less or no enforcement or education on low risk behaviors. When enforcement is used precautions must be implemented to ensure equitable actions and outcomes.

Safety Policy 2. Prioritize safety investments, education and equitable enforcement on high injury and high risk corridors and intersections, with a focus on reducing speeds and speeding.

This policy directs safety investments, education and equitable enforcement to be prioritized on the corridors where the most serious crashes have occurred or have a risk of occurring (due to identified risk factors such as lack of roadway separation or excessive speeding). This policy approach, prioritizing corridors where deadly crashes are or could occur, more effectively uses limited resources where the most serious issues are. Additionally, this policy emphasizes the systemic approach to safety to addresses known safety risk factors corridor wide to prevent serious crashes from occurring in the future.

Safety Policy 3. Prioritize investments that benefit people with higher risk of being involved in a serious crash, including people of color, people with low incomes, people with disabilities, people walking, bicycling, and using motorcycles, people working in the right-of-way, youth and older adults.

This policy is based on the Safe System approach of prioritizing safety efforts on people with the highest risk of dying in a traffic crash as a key strategy to eliminating serious crashes overall. This policy also helps implement Metro's Strategic Plan for Advancing Equity, Diversity and Inclusion.

Safety Policy 4. Increase safety for all modes of travel and for all people through the planning, design, construction, operation and maintenance of the transportation system, with a focus on reducing vehicle speeds.

This policy requires that transportation safety be integrated into every aspect of the transportation system. It is a key element of the Safe System approach which takes a systemic and holistic approach. Safe travel speeds is a core element of achieving Vision Zero. Speed limits in Safe System approach are based on aiding crash avoidance and a human body's limit for physical trauma. An unprotected pedestrian hit at over 20mph has a significant risk of death or life-changing injury. A car in a side-on collision can protect its occupants up to around 30mph; a car in a head-on collision up to around 40mph. Establishing survivable speeds on streets where people using different modes at variable speeds and with different levels of physical protection are essential. Additionally, a diversity of users must be taken into account as the system is developed.

For example, people of color, older adults and children may have different needs that must be addressed at every phase.

Safety Policy 5. Make safety a key consideration in all transportation projects, and avoid replicating or exacerbating a known safety problem with any project or program.

While most policies are proactively focused on improving safety, this policy requires that transportation projects and programs clearly evaluate the impacts on all users of the transportation system and do not negatively impact any of those users by either replicating something which has been shown to increase safety problems for roadway users or making a current safety issue worse.

Safety Policy 6. Employ a Safe System approach and use data and analysis tools and performance monitoring to support data-driven decision-making.

The Safe System approach is proven to reduce serious crashes. The approach is based on data driven strategies and actions. Collecting, maintaining and analyzing data on a regular basis is critical to focusing investments where they will be most effective. Additionally, monitoring progress and assessing the outcome of investments in safety is crucial to learning from the past and improving in the future.

Safety Policy 7. Utilize safety and engineering best practices to identify low-cost and effective treatments that can be implemented systematically in shorter timeframes than large capital projects.

Many solutions to improve safety are inexpensive. This policy prioritizes addressing safety problems on a corridor level sooner rather than later to prevent serious crashes from occurring in the future. Rather than postponing safety interventions until a larger and more expensive project can be funded this policy directs that low-cost and effective treatments be implemented first.

Safety Policy 8. Prioritize investments, education and equitable enforcement that increase individual and public security while traveling by reducing intentional crime, such as harassment, targeting, and terrorist acts, and prioritize efforts that benefit people of color, people with low incomes, people with disabilities, women and people walking, bicycling and taking transit.

Individual and personal security while traveling has an important relationship to transportation safety, especially for people of color. Fear of harassment or being targeted can deter people of color from walking, bicycling or using transit and may increase the use of motor-vehicle transportation. Though individual and public security can be challenging to address, a variety of approaches are needed to create a safe and welcoming transportation system, including: collecting data, utilizing crime prevention through environmental design, taking into account a diversity of users when developing and operating the transportation system, educating people to look out for and care for one another, designing security into projects (such as street lighting, visibility, call boxes), equity training for public safety and transportation professionals, and including a wide range of groups in design and decision making.

Safety Policy 9. Make safety a key consideration when defining system adequacy (or deficiency) for the purposes of planning or traffic impact analysis.

This policy specifies that safety data, analytical tools and metrics must be part of the evaluation when defining the adequacy of capacity on the transportation system.

3.2.2 Transportation equity policies

Oregon has a long and unfortunate history rooted in racial bias and exclusion, which has contributed to the greater Portland region having less racial diversity than many other metropolitan regions. As early as 1844, when Oregon was a territory of the United States, acts to exclude Blacks and Mulattoes from Oregon were passed, including the infamous "Lash Law." This law required that Blacks in Oregon be whipped twice a year until he or she left the territory. In 1857, exclusionary laws were voted into the Oregon territory's Bill of Rights. Then in 1859, when Oregon became a part of the union, it was the only state with a racial exclusion law written into a state's constitution. The law, while no longer enforced, remained in the state constitution until 2000.

Through the 1940s, government policies prevented people of color from buying or renting homes outside of designated neighborhoods, while Japanese residents were relocated to internment camps during World War II. Through the 1960s and 70s – or later – real estate agents would discourage non-White clients from homes in White neighborhoods, and banks would often refuse loans for those properties when requested by a person of color. Meanwhile, banks would declare investments in homes in African American neighborhoods or other communities of color too risky and refuse loans for those properties.

Implicit and explicit practices of racial exclusion and bias extended to the development of the transportation system. People of color in Oregon had to pay additional surcharges on car insurance up until 1951. When Interstate 5 opened in the 1960s, the new freeway cut a swath through Portland's established African American neighborhoods, destroying at least 50 square blocks of homes and creating a barrier that still exists today.

Defining terms

Historically marginalized communities
Groups who have been denied access and/or suffered past institutional or structural discrimination in the United States, including: people of color, people with low English proficiency, people with low income, youth, older adults and people living with disabilities

Transportation equity
The removal of barriers to eliminate transportation-related disparities faced by and improve equitable outcomes for historically marginalized communities, especially communities of color

Racial equity
The removal of barriers with a specific focus on eliminating disparities faced by and improving equitable outcomes for communities of color – the foundation of Metro's adopted equity strategy with the intent of also effectively identifying solutions and removing barriers for other disadvantaged groups

Equity focus areas
Census tracts where the rate of people of color, people in poverty and people with low English proficiency is greater than the regional average and double the density of one or more of these populations

Today, communities of color continue to point to issues of racial bias and inequity in enforcement of traffic laws and transit fares. Studies have also shown that drivers in the greater Portland region are significantly less likely to stop to allow an African American pedestrian to safely cross the street. Additionally, people of color are more likely to be victims of traffic fatalities and severe injuries.

The RTP reflects a regional commitment to plan and invest in the region's transportation system to reduce transportation-related disparities and barriers faced by communities of color and other historically marginalized communities, regardless of race, language proficiency, income, age or ability.

The policies in this section provide direction as to how Metro, working in partnership with marginalized communities, jurisdictions and other partners, will prioritize racial and transportation equity in regional transportation planning and decision-making. These policies informed development of the 2018 RTP, including the safety and modal network policies in this chapter, the plan's project priorities in Chapter 6 and implementation activities described in Chapter 8.

Why is a Focus on Racial Equity Important?

The goal of a racial equity focus is to reach a time when race can no longer be used to predict life outcomes and outcomes for all groups are improved. In the transportation context, this means addressing and closing the disparities gap for historically marginalized communities, with emphasis on people of color, English language learners, and people with low-incomes, in areas identified by these communities as priorities for the regional transportation system. These priorities include, but are not limited to: accessibility, mobility, safety, affordability and environmental health.

Like most of the nation, communities in the greater Portland region today are more diverse than in previous generations and, by the year 2045, communities of color are projected to be the majority. Unfortunately, most communities of color in the greater Portland region currently experience the worst economic and social outcomes of any demographic group, due to a long history of persistent, exclusionary and discriminatory policies which have barred communities of color – regardless of income, education, language proficiency or age – from the opportunities extended to many White residents. As a result, the region struggles with racial disparities across nearly every measure of well-being and prosperity, including housing, transportation, access to nature, education and health.

In order for the greater Portland region to be environmentally sustainable and economically prosperous, the region must proactively address racial disparities and tackle the most pervasive challenges not allowing members of the greater Portland region to thrive. Focusing on racial disparities and barriers will help develop and maintain sustainable economic growth by fostering greater racial inclusion and smaller racial income gaps.[5] This, in turn, will allow communities

[5] Treuhaft, S., Blackwell, A.G., & Pastor, M. (2012). America's Tomorrow: Equity is the Superior Growth Model. Retrieved January 2016: www.policylink.org/sites/default/files/SUMMIT_FRAMING_WEB_20120110.PDF

facing the greatest barriers opportunities to flourish, build generational wealth and, ultimately, succeed. Policies, projects and strategies that address these disparities will help other marginalized groups, including lower-income White households, older adults, youth and people with disabilities prosper and flourish.

The greater Portland region's economic prosperity and quality of life depend on an equitable transportation system that provides every person and business in the region with access to safe, efficient, reliable, affordable and healthy travel options and have the fair opportunity to thrive, regardless of their race or ethnicity. Investment in the region's transportation system is one important tool in reducing disparities and barriers experienced by communities of color. But the tool must be intentional and deployed with focus to be successful in reducing racial disparities rather than exacerbating disparities.

With a transportation system focused on mobility and access that addresses the transportation disparities and barriers faced by communities of color, the region's transportation system has the ability to open opportunities that can dramatically improve outcomes for all historically marginalized communities. While on the surface, a focus on racial equity may seem exclusionary, by addressing the most challenging shared barriers faced by those communities, outcomes for other marginalized communities will improve as well.[6]



Metro's Strategic Plan to Advance Racial Equity, Diversity, and Inclusion (Strategic Plan) is a major milestone in the agency's efforts to define, implement and measure equity in the greater Portland region.

3.2.2.1 Metro's Strategic Plan to Advance Racial Equity, Diversity, and Inclusion (2016)

In 2010, the Metro Council adopted equity as one of the region's six desired outcomes. Adopted by the Metro Council in June 2016, Metro's *Strategic Plan to Advance Racial Equity, Diversity, and Inclusion* (Strategic Plan) is a major milestone in the agency's efforts to define, implement and measure equity in the greater Portland region.

The Strategic Plan's purpose is to provide a strategic approach to incorporating equity into policy, decision-making and programs. The Strategic Plan provides clarity and direction to Metro's different lines of business related to integrating and approaching equity in planning, operations, and services.

[6] To learn more about racial equity as an inclusionary strategy to help other marginalized groups (i.e. low-income households, people with disabilities, older adults), see resources, including: Metro's Strategic Plan to Advance Racial Equity, Diversity, and Inclusion or PolicyLink.

The key aspect of the Strategic Plan is its focus and emphasis on deliberately tackling inequities based on race and ethnicity. The Strategic Plan is organized around five long-term goals.

The goals are:

A. Metro convenes and supports regional partners to advance racial equity;

B. Metro meaningfully engages communities of color;

C. Metro hires, trains and promotes a racially diverse workforce;

D. Metro creates safe and welcoming services, programs and destinations; and

E. Metro's resource allocation advances racial equity.

Each goal area has specific objectives and implementation actions associated to each goal some of which are internally focused on Metro practices and some of which are externally focused on how Metro considers and serves the needs of communities of color and will require collaborative effort with partners.

The Strategic Plan builds on the extensive equity work that Metro departments and venues have been conducting for a number of years, including the 2014 Regional Transportation Plan. In developing the 2018 RTP, the region looked for opportunities to further align the goals areas of the Strategic Plan with the goals, objectives, policies, strategies and projects of the region's long-range transportation plan.

3.2.2.2 Transportation equity and the Regional Transportation Plan

In previously adopted RTPs, the focus on transportation equity was primarily limited to:

- looking at where marginalized groups are living in the Portland metropolitan region; and
- looking at how much investment was being made in these aggregated historically marginalized communities in comparison to other parts of the region.

Through the direction from Metro's *Strategic Plan to Advance Racial Equity, Diversity, and Inclusion*, as well as feedback and input provided by community leaders, advocates, and elected officials, and direction from the Metro Council, the role and consideration of equity has been expanded in the RTP. As a result, development of the 2018 RTP included a more extensive transportation equity system evaluation of the long-range financially constrained transportation investment strategy and conducted refinements and added new sections to the 2018 RTP goals, objectives, policies, and implementation actions.

Moving forward, the Strategic Plan provides unified strategic direction to have the RTP place an additional focus on race for the crucial equity work currently underway at Metro, but not at the exclusion of income disparities regardless of race and ethnicity.



The RTP reflects a regional commitment to plan and invest in the region's transportation system to reduce transportation-related disparities and barriers faced by communities of color and other historically marginalized communities, regardless of race, language proficiency, income, age or ability.

3.2.2.3 Regional Transportation Plan equity focus areas

Informed through discussions of the transportation equity work group, regional advisory committees – TPAC, MTAC, JPACT and MPAC – and four Regional Leadership Forums, and direction from the Metro Council, the Regional Transportation Plan focuses on three historically marginalized communities:

- People of Color - Persons who identify as non-White.
- English Language Learners - Persons who identify as unable "to speak English very well."
- People with Lower Income – Persons with incomes equal to or less than 200% of the Federal Poverty Level (2016)

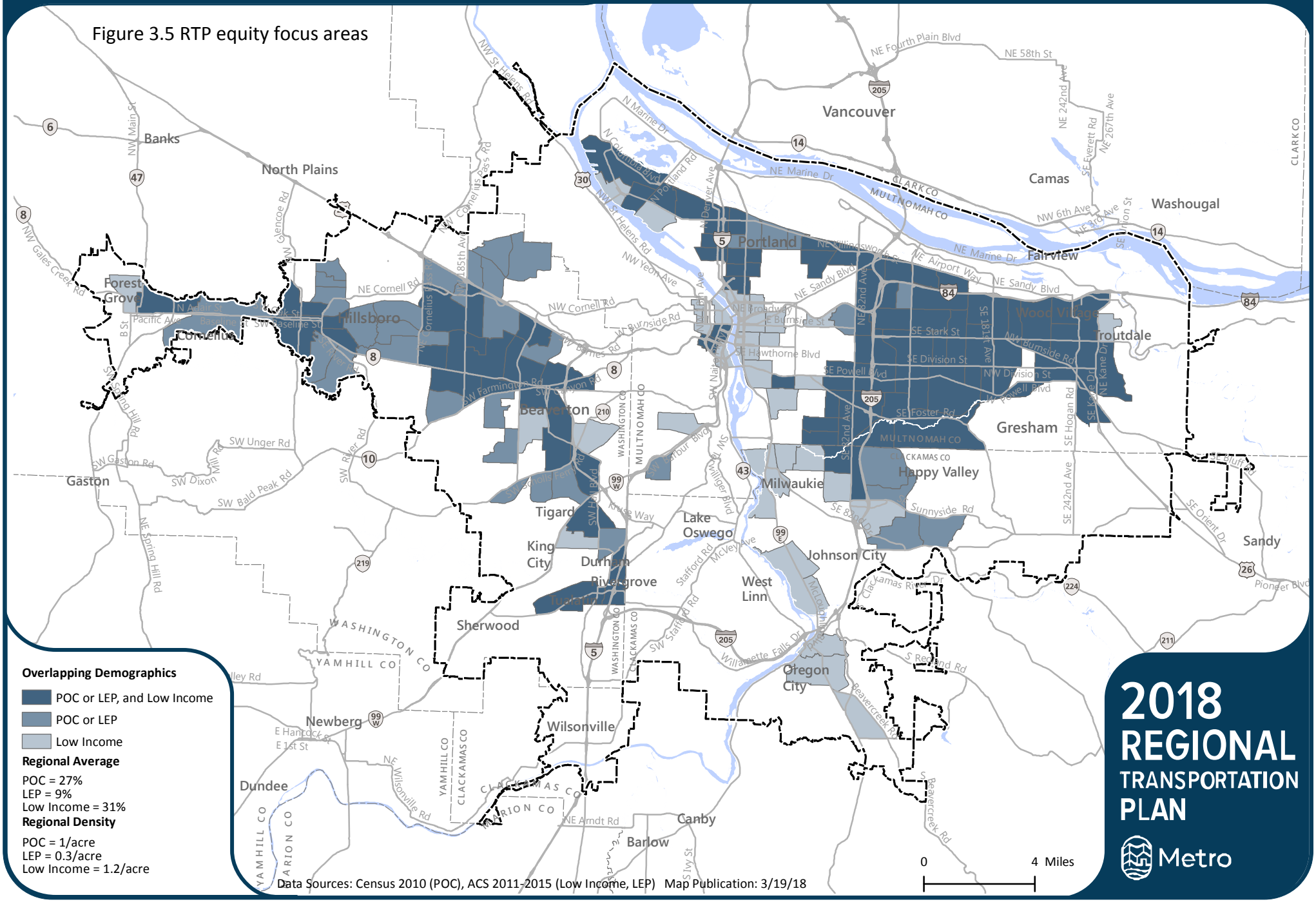
These three communities are the emphasis and focus for the Regional Transportation Plan, but not with exclusivity to the needs of other marginalized communities, including young people, older adults and people living with disabilities.

Figure 3.5 illustrates where different historically marginalized communities reside in the region, based on the best available U.S. Census Bureau and Oregon Department of Education data at the start of the 2018 RTP. The map reflects where there is a significant regional concentration of people of color, people with limited english proficiency and people with lower incomes.

Communities of Color, English Language Learners, and Lower-Income Communities

This map shows census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and English language learners. Census tracts where multiple demographic groups overlap are identified.

Figure 3.5 RTP equity focus areas



3.1.2.4 Transportation equity policies

The Transportation Equity policies in this section aim to eliminate transportation-related disparities and barriers[7] identified by historically marginalized communities as priorities to address through the RTP and regional transportation planning and decision-making processes. The policies provide direction as to how Metro, working in partnership with marginalized communities, jurisdictions and other partners, will prioritize transportation equity in regional transportation planning and decision-making.

Regional Transportation Equity Policies	
Policy 1	Embed equity into the planning and implementation of transportation projects, programs, policies and strategies to comprehensively consider the benefits and impacts of transportation and eliminate disparities and barriers experienced by historically marginalized communities, particularly communities of color and people with low income.
Policy 2	Ensure investments in the transportation system anticipate and minimize the effects of displacement and other affordability impacts on historically marginalized communities, with a focus on communities of color and people with low income.
Policy 3	Prioritize transportation investments that eliminate transportation-related disparities and barriers for historically marginalized communities, with a focus on communities of color and people with low income.
Policy 4	Use inclusive decision-making processes that provide meaningful opportunities for communities of color, people with low income and other historically marginalized communities to engage and participate in the development and implementation of transportation plans, projects and programs.
Policy 5	Use engagement and other methods to collect and assess data to understand the transportation-related disparities, barriers, needs and priorities of communities of color, people with low income and other historically marginalized communities.
Policy 6	Evaluate transportation plans, policies, programs and investments to understand how they address transportation-related disparities and barriers experienced by communities of color, people with low income and other historically marginalized communities and the extent disparities are being eliminated.
Policy 7	Support family-wage job opportunities and a diverse construction workforce through inclusive hiring practices and contracting opportunities for investments in the transportation system.

[7] Transportation-related disparities and barriers identified by historically marginalized communities as priorities to address include safety, access, affordability and community health.

Because the Regional Transportation Equity Policies do not have a separate topical plan, specific implementing actions have been included for each transportation equity policy.

Transportation Equity Policy 1. Embed equity into the planning and implementation of transportation projects, programs, policies and strategies to comprehensively consider the benefits and impacts of transportation and eliminate disparities and barriers experienced by historically marginalized communities, particularly communities of color and people with low income.

Research nationally, statewide and locally demonstrate historically marginalized communities, particularly communities of color, experience a number of transportation-related disparities which creates additional barriers preventing these communities from thriving. These include the following:

- Pedestrian fatality rates for African Americans are 60 percent higher than for non-Hispanic Whites, and 43 percent higher for Hispanics than Whites.
- Nearly 20 percent of African-American households, 14 percent of Latino households, and 13 percent of Asian households live without a car.
- Racial minorities are four times more likely than Whites to rely on transit for their work commute.[8]

Transportation, as a vehicle for mobility and accessibility, plays a significant intersectional role in reducing the disparities gap, but historically, its development and operation has contributed to the disparities gap. The history of using transportation infrastructure projects as an urban renewal mechanism led to the destruction of thriving communities, particularly communities of color across the nation. In Portland, this is no different, where the development of the interstate freeway system displaced communities of color and lower-income homes, most notably the African American community.



To achieve the RTP goal of equitable transportation, embedding equity considerations are essential to each step of the planning and implementation process for transportation projects, programs, policies and strategies.

Since the asphalt and concrete was poured, the lessons learned from the generational impacts of the interstate system on marginalized communities necessitates that to achieve the RTP goal of equitable transportation, embedding equity considerations are essential to each step of the planning and implementation process for transportation projects, programs, policies and strategies. The equity considerations must reflect the priorities these marginalized communities

[8] Statistics from PolicyLink and the Transportation Equity Caucus.

voiced for the transportation, which may include, but not limited to: accessibility, safety, community health, and affordability. To embed equity into planning and implementation requires a paradigm shift as to how transportation is currently planned, built and operated. This includes bringing in unheard voices from project or policy inception all the way through construction to understand the perspective of potential benefits or impacts.

Additionally, transportation investments must consider the different ways in which it can advance equity and not narrow the purview to one dimension. A transportation investment has the ability to provide greater access to support marginalized communities reach educational facilities or new job opportunities, but a transportation investment also offers contracting and hiring opportunities. By embedding equity into transportation comprehensively, a full view and consideration of the benefits and impacts of transportation can be understood and weighed.

Actions to implement Transportation Equity Policy 1:

- Integrate consideration of equity in the planning and implementation of transportation projects, policies and programs by:
    - Formally acknowledging transportation-related disparities experienced by historically marginalized communities in the greater Portland region. This would also acknowledge the history and effect (past and present) of the region's built environment, including the capital construction of the roadway system, has played a role in widening of the disparities gap.
    - Acknowledge and recognize the intersectional role of transportation in alleviating the disparities gap for historically marginalized communities.
- Look closely at different opportunities for how equity considerations can be brought into the transportation discussion, with a focus on outcomes.
- Commit to looking at equity and finding different ways to integrate equity in each step of the transportation planning and implementation process.
    - Continually assess equity impacts at every stage of the process. As the process begins, and throughout, ask who will benefit, who will pay and who will decide; and adjust decisions and policies as needed to ensure equitable impacts.
- Bring in voices from marginalized communities to add perspective and help guide how equity can be embedded in the planning and decision-making process. Also see Transportation Equity Policy 4.

Transportation Equity Policy 2. Ensure investments in the transportation system anticipate and minimize the effects of displacement and other affordability impacts on historically marginalized communities, with a focus on communities of color and people with low income.

A trend observed across many western U.S. cities is that with a severe deficit of housing supply, particularly affordable units, the addition of an economic trigger such as a major transportation investment gentrifies and changes communities. Historically marginalized communities are finding themselves further away from neighborhoods with better transportation options as well as access to numerous jobs and community places. The result has created further stress on the

transportation system to serve displaced historically marginalized communities. Portland is not immune to these trends. Over time, former ethnic and new immigrant neighborhoods near the region's core with great access have gentrified, displacing a number of communities which have an established a history associated with these places. The 2040 growth centers, as appealing and desirable, are not keeping pace with a mix of affordable housing to keep existing residents while transportation investments are being made. Ultimately this creates a vicious cycle of increased transportation access to those who have the financial means to afford travel options and the benefits not born to the existing community.

The success, sustainability and prosperity of the region relies on how well the region manages issue of displacement as infrastructure investments are made. But too often the silos of transportation and land use prevent coming to agreement on creative solutions which can mitigate and proactively address displacement. The greater Portland region is renowned for breaking down the transportation and land use silo, but displacement is a pervasive challenge that requires further collaboration across disciplines and acknowledgement by all transportation professionals that they are part of the solution and not an outside observer. To ensure investment in the transportation system anticipate, affordability impacts and the effects of displacement, planning and implementation of transportation investments must be coordinated with the surrounding land use, take extra care and consideration of the demographic factors in the surrounding area in evaluating the displacement risk, implement land use strategies prior to the transportation investment, engage the historically marginalized communities at risk, and imbed funding commitments.

Actions to implement Transportation Equity Policy 2:

- Focus on capital transportation investments that have proactively developed a compendium of strategies to avoid and minimize involuntary displacement.
    - Demonstrate how intersectional issues of housing affordability and displacement are being addressed proactively in plans and programs prior to capital investment in transportation infrastructure.
    - In compendium, look at the land use solutions and survey what is necessary in land use policy to avoid and mitigate involuntary displacement.
- Collect data and build analysis tools that can assess and monitor transportation and housing affordability issues and share the information to partners in order to help inform capital investment decisions.
- Increase the number of units of regulated affordable housing in proximity to frequent transit service and in 2040 growth centers as well as communities with rich access to travel options, jobs, and community places.[1]

Transportation Equity Policy 3. Prioritize transportation investments that eliminate transportation-related disparities and barriers for historically marginalized communities, with a focus on communities of color and people with low income.

To achieve the RTP goal of equitable transportation, efforts to close the gap marginalized communities experience relative to outcomes the transportation system contributes to is vital.

Transportation outcomes identified as priorities by historically marginalized communities include affordability, safety, access and environmental health. In focusing on reducing the disparities gap, the most progress can be made and resources be deployed more effectively. To focus on eliminating disparities is a paradigm shift in current practices of transportation and means approaching transportation plans, programs, policies and investments under the lens of fairness rather than equality.



In focusing on eliminating the disparities brought on by the transportation system's development and operation, not only will historically marginalized communities see the benefits, but the region will see benefits spread across all communities.

While there is a desire to see the benefits and impacts of transportation distributed equally across everyone, an approach which does not intentionally focus on equitable outcomes does not help close the disparities gap caused by a pervasive system which erected barriers and separated the level of benefit for certain communities over others. Eliminating the disparities gap is also a long-term commitment and significant undertaking as no one project can undo system-wide disparities which have been compounded over years. Nonetheless, in focusing on eliminating the disparities brought on by the transportation system's development and operation, not only will historically marginalized communities see the benefits, but the region will see benefits spread across all communities.

To begin to focus on the disparities gap, it is imperative for marginalized communities to provide the direction and prioritization of which disparities to tackle first and the best methods to do so. Through the development of the 2018 RTP, engagement with historically marginalized communities and a retrospective process of previous engagement efforts elevated the need for the transportation system to provide greater accessibility, be safer for all users, be more affordable for users, and finally not detriment the health and well-being of all communities, but particularly historically marginalized communities as they have shouldered the brunt of environmental impacts.

As a starting point and a way to begin focusing on addressing the disparities gap immediately, an intentional focus is necessary with the prioritization of the allocation of resources to focus on those outcomes that marginalized communities have identified as the priorities for their communities and within their communities in the near- and the long-term. This should also be done with continued engagement through implementation and future prioritization processes to reflect new priorities or other unforeseen issues. *Also see Transportation Equity Policies 4 through 6*.

Actions to implement Transportation Equity Policy 3:

- Commit to and focus on addressing the disparities gap for historically marginalized communities systematically to understand the progress in which transportation alleviates.
  - Define a way of measuring and tracking progress to understand how effectively disparities are being addressed.
- Actively question how the plan, program, policies, strategies, or action being undertaken contributes to reducing and eliminating the disparities gap.
- Actively recognize and put aside implicit partialities and biases.
- More specifically for the outcomes of safety, access, affordability and public health, prioritize the following:
  - Among the multiple priorities for the region's transportation system, prioritize and advance the equity elements of the priority. For example, in looking at a transportation investment focused on safety, advance the element that would benefit communities of color over a general safety benefit.
  - Prioritize building out the active transportation infrastructure network in areas where there are gaps and deficiencies. Focus on completing gaps in communities of color as a means of prioritizing equity. This includes advancing the completion of access to transit in historically marginalized communities.
  - Implement the Regional Travel Options Strategy, including the new Safe Routes to School program, with emphasis to support new partnerships with organizations that serve historically marginalized communities.
  - Prioritize the safety of the transportation system, especially in historically marginalized communities, but focus on addressing the systemic safety issues on high injury corridors which historically marginalized communities traverse. Focus on increasing safety in high-risk locations and on high injury corridors that coincide with higher residential concentrations of historically marginalized communities.
  - Prioritize and focus on increasing active transportation and transit access to jobs and community places (e.g., libraries, pharmacies, grocery stores, schools, etc.) and services for historically marginalized communities. Place an emphasis on connecting historically marginalized communities to middle-wage employment opportunities.
- Focus on different transit solutions transit that serve historically marginalized communities.
  - This may include creative solutions such as community and job connector shuttle services.
  - Focus increase in service on transit routes that serve a significant portion of historically marginalized communities.
  - While not the most productive and efficient from a strict transit management view, consider coverage transit service routes to support historically marginalized communities as they navigate the shifting housing affordability dynamics.
  - Support special needs transportation providers.
- Complement affordable housing and transit-oriented development to support the integration of land use and transportation where historically marginalized communities have the ability to benefit.
  - Ensure the long-term sustainability of programs that make transportation affordable, including the adult low-income fare and student pass programs on transit.
  - Complement and cross-implement the strategies in the *Coordinated Transportation Plan for Seniors and People with Disabilities* in Appendix G.
- Document existing disparities in exposure to transportation related air pollutants and evaluate whether projects reduce or exacerbate disparities.

Transportation Equity Policy 4. Use inclusive decision-making processes that provide meaningful opportunities for communities of color and other historically marginalized communities to engage in the development and implementation of transportation plans, projects and programs.

To achieve an equitable transportation system that eliminates the disparities gaps and barriers experienced by marginalized communities, a meaningful and inclusive decision-making process is critical to understand the perspectives and experiences of historically marginalized communities and build plans, projects, and programs to address these perspectives and experiences.

Meaningful and inclusive engagement takes a significant effort and relies on building relationships and trust with members of marginalized communities, which is a significant change from the conventional practices of public involvement in the transportation sector, which places barriers to being involved. Engagement and inclusion is part of embedding equity by allowing for marginalized communities to be seen, heard and considered, and allow for their needs and priorities to influence the planning and decision-making process.

Actions to implement Transportation Equity Policy 4:

- Shift the burden of outreach and engagement away from marginalized communities to reduce the barriers to participation in public processes for these communities.
    - Transportation professionals should look to reduce the barriers for marginalized communities to participate (e.g. go out into the community, offer language translation and childcare services, provide food and incentives) and reach out to marginalized communities in meaningful ways (e.g. engaging through a community liaison, allowing communities to lead the discussion) and at opportunities to shape and influence transportation plans, policies and program (e.g. not at a perfunctory time).
- Consider resourcing an on-call contract of community outreach liaisons who are trusted members of historically marginalized communities and to help facilitate relationship-building, conversations, and meaningful engagement.
- Set aside resources specifically for meaningfully engaging historically marginalized communities in planning and decision-making processes.

Transportation Equity Policy 5. Use engagement and other methods to collect and assess data to understand the transportation-related disparities, barriers, needs and priorities of communities of color and other historically marginalized communities.



Appendix E documents the transoirtation equity evaluation conducted for the 2018 Regional Transportation Plan – focusing on priority outcomes identified by historically marginalized communities during the engagement process.

To understand the transportation disparities, needs, gaps, and priorities of historically marginalized communities, particularly communities of color, conventional practices of data collection and analysis does not capture and articulate the nature of disparities experienced by different marginalized communities. While national datasets or statewide statistics are able to provide the picture of disparities, to address the disparities gap fully, the lacking data and information gaps at a localized level impacts the ability to assess the performance of transportation plans, programs, and policies on the outcomes and priorities identified historically marginalized communities.

The need to collect more disaggregated data with confidence at a localized scale gives the ability to look in-depth at localized conditions on key transportation outcomes identified as priorities by historically marginalized communities – affordability, safety, access, and environmental health – is necessary to understand the current level of disparities and establish an appropriate baseline. Until the data need is fulfilled, it is imperative to supplement data collection and assessment with engagement to gather the qualitative information directly from historically marginalized communities. The information collected helps to better represent and articulate the disparities experienced and needs of historically marginalized communities to help bring focus.

Additionally, in supplementing engagement as part of data collection, the process helps to confirm needs, gaps, and deficiencies which may have already been identified. In facilitating greater attention to data collection and assessment focused on the needs and priorities of historically marginalized communities, particular communities of color, transportation professionals have further ability and information to plan, program, and implement strategies or actions which can better address the priorities and needs.

Actions to implement Transportation Equity Policy 5:

- Collect data in a manner that facilitates looking at outcomes with an equity lens.
    - Collect localized disaggregated data.
    - Emphasize collecting as much qualitative data as quantitative data.
    - Collect data that is meaningful to historically marginalized communities.
- Appropriately resource data collection and assessment to focus on outcomes with an equity lens.
    - Acknowledge and recognize data collection and assessment methods will be unfamiliar and new for many project managers and likely to be a necessary, but challenging to break convention.
- Appropriately resource the development of a disparities baseline looking at measures of affordability, safety, access, and environmental health to understand the disparities gap between historically marginalized communities, in particular people of color.
- Conduct meaningful engagement with historically marginalized communities to supplement and ground truth data and technical analysis findings.



Conventional practices of data collection and analysis does not capture and articulate the transportation-related disparities, barriers, needs and priorities of communities of color and other historically marginalized communities. Engagement and other methods should be used to supplement and ground truth data and technical analysis findings.

Transportation Equity Policy 6. Evaluate transportation plans, policies, programs and investments to understand the extent to which transportation-related disparities and barriers experienced by communities of color and other historically marginalized communities are being eliminated.

To know and to be accountable to whether transportation plans, programs, policies and strategies are making progress towards eliminating the disparities gap, particularly in access, safety, affordability, community health and any other transportation-related priority identified by historically marginalized communities, evaluation under the lens of what disparities the plans, policies, programs and strategies address is just as crucial as engagement, prioritization and mitigation. The assessment process helps to understand effectiveness, progression, monitoring and accountability in achieving the equitable transportation and other associations RTP goals and objectives. Evaluation also provides transparency towards what to expect as a result.

Actions to implement Transportation Equity Policy 6:

- Resource evaluation methodology development appropriately.
    - Recognize the potential and the necessity to disaggregate and evaluate system-wide as well as by individual project, program or community.
    - Let the evaluation be led, guided and verified by historically marginalized communities and their lived experiences.
    - Ground truth evaluation results through engagement.
- Be willing to use non-standard forms of evaluation.
    - Clearly state assumptions and recognize what the method may be testing and the limitations of the evaluation.
- Set up a long-term feedback loop of evaluation and monitoring.
    - Evaluate at each stage and monitor whether projected outcomes are coming to fruition and/or whether plans, policies, programs and strategies may need additional mitigations or a course correction.

Transportation Equity Policy 7. Support living-wage job opportunities and a diverse construction workforce through inclusive hiring practices and contracting opportunities for investments in the transportation system.

The construction industry has seen tremendous growth in the last ten years and is one of the fastest-growing industries in recent years, outpacing the rest of the economy. The median wage for construction occupations is higher than the median wage across all sectors in the greater Portland region. It is one of the remaining sectors where workers can make a living-wage income without a higher education degree. Yet the industry has an aging workforce and with continued growth, this creates an opportunity to link the region's unemployed and underemployed to apprenticeship programs that lead to careers in the industry.

Construction has historically been a racially homogenous industry, yet labor market data indicates a shortage in skilled talent. Diversifying the construction workforce will not only help create a stronger supply of needed workers for the industry, it will also directly address issues of poverty and economic mobility within communities of color and working families in the region.



Transportation infrastructure projects, in particular, can have a big impact on promoting equitable growth in the region's economy by providing job opportunities for people of color in the construction trades

Transportation infrastructure projects, in particular, can have a big impact on promoting equitable growth in the region's economy by providing job opportunities for people of color in the construction trades. While federal and state laws have provisions which facilitate greater access for minority, women-owned and disadvantaged businesses (MWDBE) to be part of these contracting and construction opportunities, the construction industry has a workforce which is not reflective of demographics. Yet it remains a sector that provides access to living-wage careers for historically marginalized communities, particularly communities of color.

The RTP, is a long-range transportation blueprint for the capital investments needed to accommodate existing needs and future populations and employment growth. An emphasis on the construction workforce is relevant to building out the transportation system equitably and making progress towards reducing the disparities seen among historically marginalized communities in terms of living-wage career opportunities and longer-term income stability and affordability. By focusing public investments to advance contracting and workforce equity in the construction trades, transportation infrastructure projects can help mitigate wealth disparity gaps experienced by historically marginalized communities.

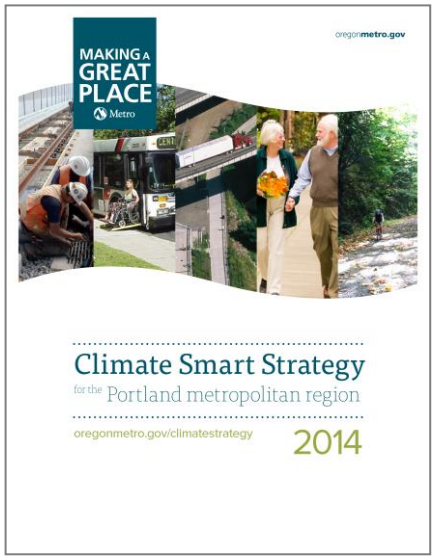
Actions to implement Transportation Equity Policy 7:

- Formalize reporting of minority, women-owned and disadvantaged businesses construction contracts and workforce diversity utilization on all Metro-funded transportation projects.
- For transportation investments programmed within the MTIP, particularly as part of the construction phases, request from partners information about minority, women-owned and disadvantaged business contracting and workforce diversity utilization.
- Through partnership with Metro's Diversity, Equity and Inclusion program, provide information and resources to partners on ways to support and advance equity in contracting and workforce.
- Develop mechanisms to incentivize partners to pursue recruitment and retention strategies on transportation projects that help grow and diversify the construction workforce.
- Encourage apprenticeships with historically marginalized communities as part of contracts.
- Partner with workforce development organizations to improve outreach, share information and leverage resources that support and grow a diverse construction workforce and contracting community.

3.2.3 Climate leadership policies

Climate change may be the defining challenge of this century. Global climate change poses a growing threat to our communities, 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 and quality of life. Our ability to respond will have unprecedented impacts on our lives and our survival.



The 2018 Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy.

For more information, visit www.oregonmetro.gov/climatesmart

Transportation sources account for 34 percent of greenhouse gas emissions in Oregon, largely made up of carbon dioxide (CO_2). Since 2006, the state of Oregon has initiated a number of actions to respond including directing the greater Portland region to develop and implement a strategy for reducing greenhouse gas emissions from cars and small trucks.

3.2.3.1 Climate Smart Strategy (2014)

The Regional Transportation Plan is a key tool for the greater Portland region to implement the adopted Climate Smart Strategy and achieve greenhouse gas emissions reduction targets adopted by the Land Conservation and Development Commission in 2012 and 2017.

As directed by the Oregon Legislature in 2009, the Metro Council and the Joint Policy Advisory Committee on Transportation (JPACT) developed and adopted a regional strategy to reduce per capita greenhouse gas emissions from cars and small trucks by 2035 to meet state targets. Adopted in December 2014 with broad support from community, business and elected leaders, the Climate Smart Strategy relies on policies and investments that have already been identified as local priorities in communities across the greater Portland region. Adoption of the strategy affirmed the region's shared commitment to provide more transportation choices, keep our air clean, build healthy and equitable communities, and grow our economy – all while reducing greenhouse gas emissions.

The analysis of the adopted strategy demonstrated that with an increase in transportation funding for all modes, particularly transit operations, the region can provide more safe and reliable transportation choices, keep our air clean, build healthy and equitable communities and grow our economy while reducing greenhouse gas emissions from light-duty vehicles as directed by the Legislature. It also showed that a lack of investment in needed transportation infrastructure will result in falling short of our greenhouse gas emissions reduction goal and other desired outcomes. The Land Conservation and Development Commission approved the region's strategy in May 2015.

3.2.3.2 Climate Smart Strategy policies

The Climate Smart Strategy is built around nine policies to demonstrate climate leadership by reducing greenhouse gas emissions from cars and small trucks while making our transportation system safe, reliable, healthy and affordable. The policies listed below complement other RTP policies related to transit, biking and walking, use of technology and system and demand management strategies.

Climate Smart Policies

Policy 1	Implement adopted local and regional land use plans.
Policy 2	Make transit convenient, frequent, accessible and affordable.
Policy 3	Make biking and walking safe and convenient.
Policy 4	Make streets and highways safe, reliable and connected.
Policy 5	Use technology to actively manage the transportation system and ensure that new and emerging technology affecting the region's transportation system supports shared trips and other Climate Smart Strategy policies and strategies.
Policy 6	Provide information and incentives to expand the use of travel options.
Policy 7	Make efficient use of vehicle parking spaces through parking management and reducing the amount of land dedicated to parking
Policy 8	Support Oregon's transition to cleaner fuels and more fuel-efficient vehicles in recognition of the external impacts of carbon and other vehicle emissions.
Policy 9	Secure adequate funding for transportation investments that support the RTP climate leadership goal and objectives.

3.2.3.3 Climate Smart Strategy toolbox of potential actions

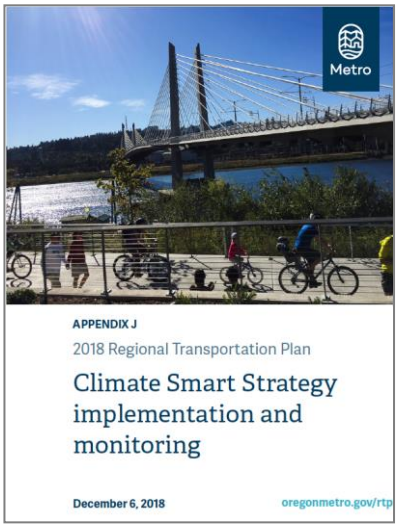
The responsibility of implementation of these policies and the Climate Smart Strategy does not rest solely with Metro. Continued partnerships, collaboration and increased funding from all levels of government will be essential. To that end, the Climate Smart Strategy also identified a comprehensive toolbox of more than 200 specific actions that can be taken by the state of Oregon,

Metro, cities, counties, transit providers and others to support implementation. These supporting actions are summarized in the *Toolbox of Possible Actions (2015-2020)* adopted as part of the Climate Smart Strategy. The actions support implementation of adopted local and regional plans and, if taken, will reduce greenhouse gas emissions and minimize the region's contribution to climate change in ways that support community and economic development goals. The Climate Smart Strategy's *Toolbox of Possible Actions* was developed with the recognition that existing city and county plans for creating great communities are the foundation for reaching the state target and that some tools and actions may work better in some locations than others. As such, the toolbox does not mandate adoption of any particular policy or action. Instead, it emphasizes the need for many diverse partners to work together to begin implementation of the strategy while retaining the flexibility and discretion to pursue the actions most appropriate to local needs and conditions.

Local, state and regional partners are encouraged to review the toolbox and identify actions they have already taken and any new actions they are willing to consider or commit to in the future. Updates to local comprehensive plans and development regulations, transit agency plans, port district plans and regional growth management and transportation plans present ongoing opportunities to consider implementing the actions recommended in locally tailored ways.

3.2.3.4 Climate Smart Strategy monitoring

The Climate Smart Strategy also contained performance measures and performance monitoring targets for tracking implementation and progrss. The purpose of the performance measures and targets is to monitor and assess whether key elements or actions that make up the strategy are being implemented, and whether the strategy is achieving expected outcomes. If an assessment finds the region is deviating significantly from the Climate Smart Strategy performance monitoring targets, then Metro will work with local, regional and state partners to consider the revision or replacement of policies and actions to ensure the region remains on track with meeting adopted targets for reducing greenhouse gas emissions.



Appendix J reports on implementation progress since 2014. The analysis found the 2018 RTP makes satisfactory progress towards implementing the Climate Smart Strategy, but more investment, actions and resources are needed to ensure the region achieves mandated greenhouse gas emissions reductions.

Appendix J reports on implementation progress since 2014, and found the 2018 Regional Transportation Plan makes satisfactory progress towards implementing the Climate Smart Strategy and, if fully funded and implemented, can reasonably be expected to meet the state-mandated targets for reducing per capita greenhouse gas emissions from passenger cars and small trucks (light-duty vehicles) for 2035 and 2040.

The analysis also found that more investment, actions and resources will be needed to ensure the region achieves the mandated greenhouse gas emissions reductions defined in OAR

660-044-0060. In particular, additional funding and prioritization of Climate Smart Strategy investments and policies that substantially reduce greenhouse gas emissions will be needed.

3.2.3.5 Transportation preparedness and resilience

The topic of preparedness and resilience has broad implications across all sectors of the economy and communities throughout the region. Natural disaster can happen anytime, affecting multiple jurisdictions simultaneously. The region needs to be prepared to respond quickly, collaboratively and equitably, and the transportation system needs to be prepared to withstand these events and to provide needed transport for fuel, essential supplies and medical transport. Advance planning for post-disaster recovery is also critical to ensure that communities and the region recover and rebuild important physical structures, infrastructure and services, including transportation – it can make communities and the region stronger, healthier, safer and more equitable.

What are the risks we face?

Climate change, natural disasters, such as earthquakes, urban wildfires and hazardous incidents, and extreme weather events present significant and growing risks to the safety, reliability, effectiveness and sustainability of the region's transportation infrastructure and services. Flooding, extreme heat, wildfires and severe storm events endanger the long-term investments that federal, state, and local governments have made in transportation infrastructure. Changes in climate have intensified the magnitude, duration and frequency of these events for many regions in the United States, a trend that is projected to continue. There is much work going on locally, regionally, statewide and across the country to address these risks.

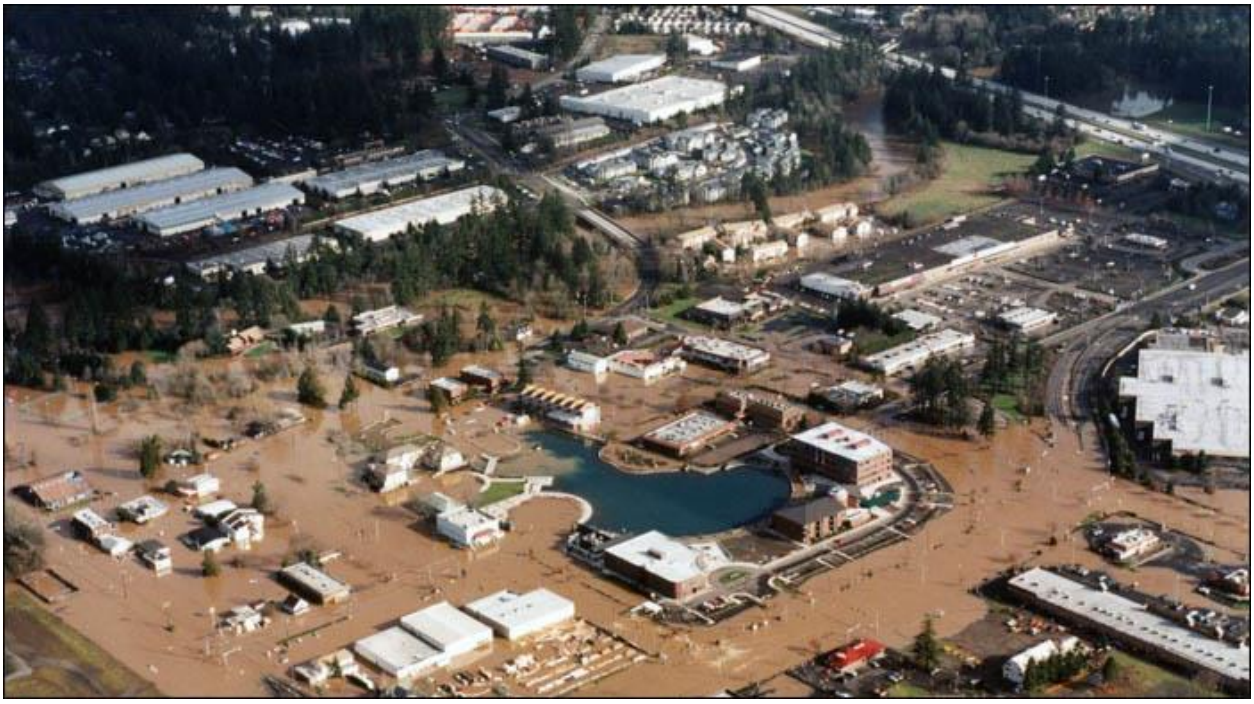
Regional collaboration and disaster preparedness

The Regional Disaster Preparedness Organization (RDPO) is a partnership of government agencies, non-governmental organizations, and private-sector stakeholders in the Portland metropolitan area collaborating to increase the region's resilience to disasters. RDPO's efforts span across Clackamas, Columbia, Multnomah, and Washington counties in Oregon and Clark County in Washington.

According to the 2013 Oregon Resilience Plan, Oregon's buildings and lifelines (transportation, energy, telecommunications, and water/ wastewater systems) would be damaged so severely that it would take three months to a year to restore full service in areas such as the Portland region. More recently, a 2018 report from the Oregon Department of Geology and Mineral Industries (DOGAMI) on the Portland region describes significant casualties, economic losses and disruption in the event of a large magnitude Cascadia subduction zone earthquake.

RDPO
Regional Disaster Preparedness Organization
Unified. Prepared. Resilient.

The Regional Disaster Preparedness Organization (RDPO) is a partnership of government agencies, non-governmental organizations, and private-sector stakeholders in the Portland metropolitan area collaborating to increase the region's resilience to disasters. For more information, visit www.rdpo.net.



While transportation infrastructure is designed to handle a broad range of impacts based on historic climate patterns, more planning and preparation for climate change, earthquakes and other natural disasters and extreme weather events is critical to protecting the integrity of the transportation system and improving resilience for future hazards.

Potential opportunities for future regional collaboration in support of transportation preparedness and resilience include:

- Partner with the RDPO to update the region's designated Emergency Transportation Routes (ETRs) for the five-county area, which were last updated in 2006. These routes are designated to facilitate all-hazards emergency response activities, including those of medical, fire, law enforcement and disaster debris removal in the immediate aftermath of an earthquake or other major event. The project will use data from the DOGAMI study to apply a seismic lens to determine whether the routes have a high likelihood of being damaged or cut-off during an earthquake and determine whether other routes may be better suited to prioritize as ETRs as a result. Some considerations for emergency recovery will also be incorporated into the updated ETR criteria and recommendations for future work. See Chapter 8 (Section 8.2.3.10) for more information.
- Consider climate and other natural hazard-related risks during transportation planning, project development, design and management processes.
- Conduct a vulnerability assessment for the region, documenting climate and other natural hazard-related risks to the region's transportation system and vulnerable populations, and potential investments, strategies and actions that the region can implement to reduce the vulnerability of the existing transportation system and proactively increase the transportation system's resiliency.

- Optimize operations and maintenance practices that can help lessen impacts on transportation from extreme weather events and natural disasters. Examples include more frequent cleaning of storm drains, improved plans for weather emergencies, closures and rerouting, traveler information systems, debris removal, early warning systems, damage repairs and performance monitoring.
- Integrate green infrastructure into the transportation network when practicable to avoid, minimize and mitigate negative environmental impacts of climate change, natural disasters and extreme weather events.
- Protection and avoidance of natural areas and high value natural resource sites, especially the urban tree canopy and other green infrastructure, in slowing growth in carbon emissions from paved streets, parking lots and carbon sequestration and addressing the impacts of climate change and extreme weather events, such as urban heat island effects and increased flooding.
- Avoidance of transportation-related development in hazard areas such as steep slopes and floodplains that provide landscape resiliency and which are also likely to increase in hazard potential as the impacts of climate change increase.

3.2.4 Emerging technology policies

What is Emerging Technology?

Over the past decade, a number of new developments in technology have begun to reshape the way that people travel. Over three-quarters of adults now own a smartphone, often including apps that provide instant access to information on travel choices. A number of new services combine smartphones with social networking, online payment, and global positioning systems to connect people with vehicles and rides. Most auto manufacturers now offer hybrid or electric vehicles, and the cost of these vehicles has been falling, giving more people access to clean transportation options. Soon, vehicles that drive themselves will hit our streets, which could dramatically transform our relationship with cars.

There are so many new technologies shaping transportation that we need a new vocabulary to describe them. We use the blanket term **emerging technology** to encompass all of these new developments, including:

- Advances in vehicle technology, such as **automated vehicles (AVs)** that operate independently of any input from a human driver, **connected vehicles (CVs)** that communicate with each other or with traffic signals and other infrastructure, and **electric vehicles (EVs)** that use electric motors instead of or in addition to gasoline-powered motors.
- **New mobility services** that use smartphones and other new technologies to connect people with vehicles and rides. These services include **ridehailing companies** like Uber and Lyft that connect passengers with drivers who provide rides in their personal vehicles; **car share** services such as Car2Go, ReachNow, ZipCar, and Turo that allow people to rent a nearby vehicle for short trips, **bike share** systems like BIKETOWN that make fleets of bicycles (or electric bikes or scooters) available for short-term rental; and **microtransit** services that tailor schedules and routes to customers' travel needs and operate vans or small buses.

- **Traveler information and payment** services that help people compare different ways of getting around (such as moovel and Google Maps), get detailed information on their mode of choice (TransitApp, Ride Report, Waze), track and share their trips (Strava, MapMyWalk), and pay for trips (TriMet's Tickets app).

Why is it important to plan for emerging technology?

Technology is already transforming how we travel in the greater Portland region. Uber and Lyft, which began serving several cities in the region in 2014, have spurred some of the most visible changes. In the city of Portland, these services now carry far more people in Portland than taxis do, and provided over 10 million rides in 2017. Across the region, 36 percent of the region's residents have used ridehailing, mostly for occasional recreational trips or travel to the airport, but there are signs that Uber and Lyft are becoming increasingly critical modes of transportation. Since Metro last asked people about their travel choices in 2014, the percentage of regular car commuters who say they would take Uber, Lyft, or a taxi to work if they didn't have a car has quintupled, rising from 3 to 16 percent. Meanwhile, the percentage of those who say they would ride transit, carpool, bike, walk or take car share instead of driving fell—particularly for transit, which dropped from 47 to 29 percent.

Other new mobility services are growing as well. Car share services now operate over 1,000 vehicles in the region, and the City of Portland's bike share system, BIKETOWN, launched in July 2016, and carried over 300,000 trips in its first year. There are also over 18,000 electric vehicles registered in the state, with the majority located in the Portland region. The rapid growth of these new options is only a prelude to the transformative changes that will occur when automated vehicles arrive on our streets.

3.2.4.1 Emerging Technology Strategy (2018)

The Emerging Technology Strategy identifies steps that Metro and our partners can take to harness new developments in transportation technology—including automated, connected and electric vehicles; new mobility services like car share, bike share and ride-hailing; and the increasing amount of data available to both travelers and planners—to create a more equitable and livable greater Portland region and meet the goals in the 2018 Regional Transportation Plan.

We can already see how technology is impacting our communities, sometimes for better and sometimes for worse. Many of us now enjoy access to convenient new options, but communities of color and other historically marginalized communities are not getting their fair share of the benefits of innovation. Many people face barriers to using new mobility services, including lack of access to the internet or a bank account, cultural or linguistic barriers, challenges finding wheelchair accessible vehicles, high costs, and discrimination from drivers or companies. A growing body of research also finds that some new mobility services draw people away from transit, and that ride-hailing increases vehicle miles traveled and congestion. This affects everyone who is struggling to get where they need to go on our increasingly congested streets. Metro and our partners need to engage with emerging technologies to make sure that new services create better options for everyone throughout the region.

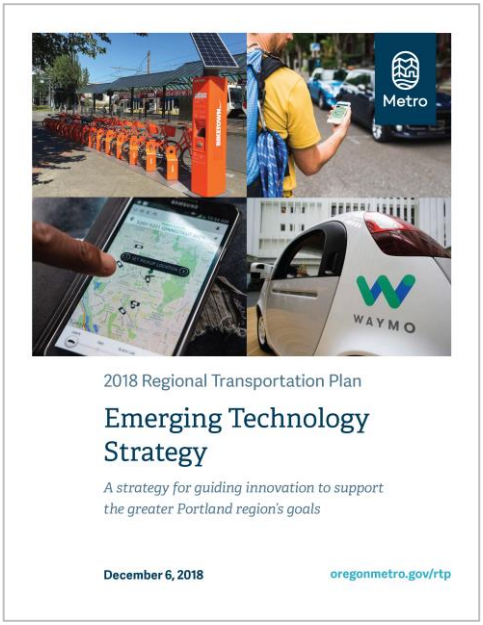
Even more importantly, we need to prepare for sweeping changes to come. Within the next five years—and potentially even the next two years—the first generation of AVs will hit our streets, likely deployed by ride-hailing and freight companies. Ride-hailing and other new mobility services will likely become more popular in smaller cities and suburban areas, and could be widely-used for everyday trips in regional centers. Over the longer term, emerging technologies stand to affect every one of our regional goals, both for better and worse, as summarized in **Table 3.1.**

Table 3.1 How emerging technologies could impact our regional goals

Goal	Promise	Peril
Vibrant communities	We have more space for people instead of vehicles, particularly in regional centers, because vehicles no longer need parking and use less space on the road..	We prioritize moving automated vehicles efficiently over creating space for people. The increased convenience of driving creates less development in regional centers and more in communities outside of the metropolitan area.
Prosperity	New mobility companies bring new jobs to the region, and people are able to spend more time working or at home with families and friends instead of sitting in traffic.	Automation eliminates thousands of jobs, and productivity only increases for people who can do their work from a vehicle.
Choices	Transit becomes more efficient and new mobility services make carpooling the norm.	Driving alone becomes more convenient and new services draw riders away from transit, walking and bicycling.
Reliability	Technology helps to reduce congestion as automated vehicles use roadway space more efficiently, carpooling becomes easier and transit becomes more efficient.	Technoloy increases congestion as driving becomes more convenient, vehicles travel more to move fewer people, there are more conflicts in high-demand areas and delivery vehicles clog local streets.
Safety and security	Autonomous vehicles eliminate crashes due to human error.	More pickups and drop-offs create curbside conflicts and the transportation system is vulnerable to cyberattacks.
Environment	Vehicles become cleaner and more efficient.	Vehicle miles traveled increase, offsetting the benefits of cleaner vehicles, and increased sprawl places pressure on farmland and natural areas.
Health	Cleaner vehicles mean less pollution and better air quality, and bike share provides another active transportation option.	People live more sedentary lifestyles as driving becomes more convenient.
Equity	People who cannot or do not drive have more choices, and new options become more affordable as technology advances.	New services focus on affluent customers, while others face barriers to accessing new technology and services.
Fiscal stewardship	Technology enables more cost-effective pricing, management and operation of the transportation system.	The gas tax and other key sources of transportation revenue dwindle.
Transparency and accountability	Collecting transportation data becomes more efficient.	Private companies withhold data from public agencies and resist oversight.

Source: Emerging Technology Strategy, Metro (2018)

The Emerging Technology Strategy policy framework guides Metro and its partners in navigating sweeping and unpredictable change while focusing on the near-term steps we need to take to address the most pressing issues presented by technology. It includes:

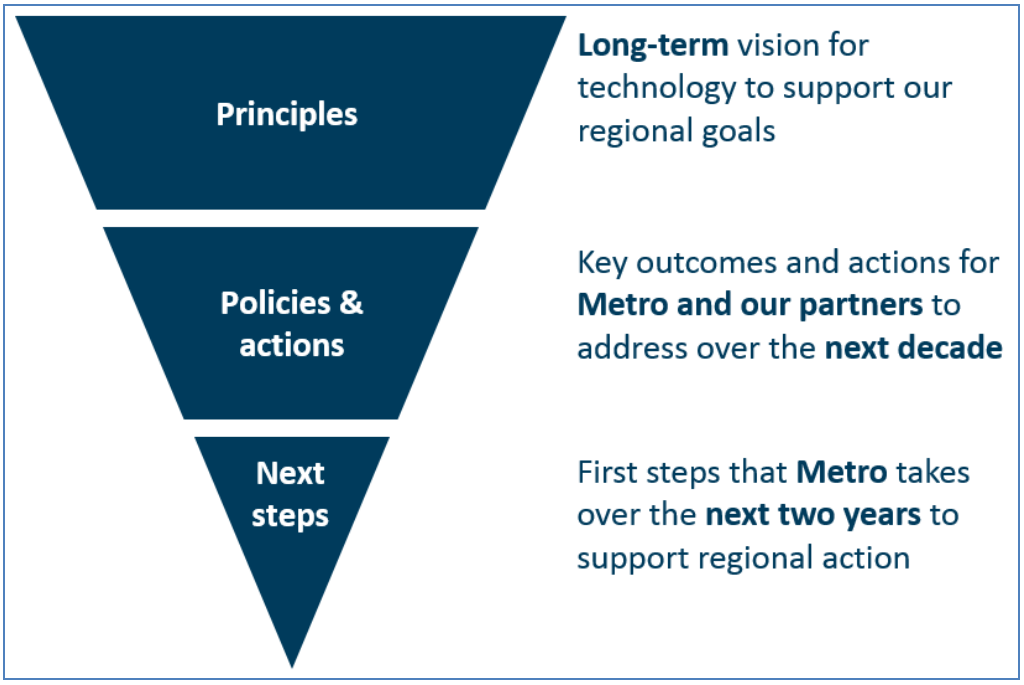


Principles that outline a long-term vision for how emerging technologies can support our regional transportation goals. Principles guide Metro and its partners in planning for and working with emerging technology as it continues to evolve, as well as in identifying companies that share common goals when developing partnerships and pilot projects.

Policies and actions focus on the technology-related issues that Metro and its public agency partners have identified as the most pressing to address over the next decade. Policies describe the outcomes that we want to achieve; actions are steps that we can take to achieve those outcomes.

Next steps, which are in the Implementation chapter of the Emerging Technology Strategy and the Chapter 8 of the Regional Transportation Plan, outline the actions that Metro will take in the next two years to help advance the region's work on emerging technologies.

Figure 3.6 Emerging Technology Strategy policy framework



Source: Emerging Technology Strategy, Metro (2018)

3.2.4.2 Emerging technology principles

The principles below articulate a long-term **vision** for how technology should support the goals of the Regional Transportation Plan. These principles, summarized in **Table 3.2**, guide Metro and its partners in planning for and working with emerging technology as it continues to evolve, as well as in identifying companies that share common goals when developing partnerships and pilot projects.

Table 3.2 RTP goals and corresponding emerging technology principles

RTP goal	Emerging technology principle
Vibrant communities	Emerging technology should support our regional land use vision and enable communities to devote more space to places for people.
Prosperity	Workers whose jobs are impacted by automation should be able to find new opportunities, and emerging technology should create more efficient ways to meet the transportation needs of local businesses and workers.
Choices	Emerging technology should improve transit service or provide shared travel options and support transit, bicycling and walking.
Reliability	Emerging technology should help to manage congestion by promoting shared trips, decreasing vehicle miles traveled and minimizing conflicts between modes.
Safety and security	Emerging technology should reduce the risk of crashes for everyone and protect users from data breaches and cyberattacks.
Environment	New mobility services should use vehicles that run on clean or renewable energy.
Equity	New mobility services should be accessible, affordable and available for all and meet the transportation needs of communities of color and historically marginalized communities.
Fiscal stewardship	Emerging technology companies and users should contribute their fair share of the cost of operating, maintainingand building the transportation system, and new technology should make it possible to collect transportation revenues efficiently and equitably. Public agencies should test new ideas and technologies before commiting to them in order to get the best return on public investments.
Transparency and accountability	Companies and public agencies should collaborate and share data to help make the transportation system better for everyone.

3.2.4.3 Emerging technology policies

This section defines emerging technology policies. Implementation actions can be found in the Emerging Technology Strategy.

Emerging Technology Policies	
Policy 1	Make emerging technology accessible, available and affordable to all, and use technology to create more equitable communities.
Policy 2	Use emerging technology to improve transit service, provide shared travel options throughout the region and support transit, bicycling and walking.
Policy 3	Use the best available data to empower travelers to make travel choices and to plan and manage the transportation system.
Policy 4	Advance the public interest by anticipating, learning from and adapting to new developments in technology.

Emerging Technology Policy 1. Equity
Make emerging technology accessible, available and affordable to all, and use technology to create more equitable communities.

Metro and its partners are responsible for ensuring that the transportation system serves all people, particularly those in the greatest need. New mobility services have the potential to bring more flexible transportation options to historically marginalized communities, but not everyone can access these services. Communities of color face the threat of discrimination from drivers or companies, some older adults and people who speak limited English aren't able to use apps, many low-income people cannot afford costly data plans or lack access to bank accounts and people in wheelchairs often struggle to find accessible shared vehicles. If we can remove these barriers, we can bring better transportation choices to communities of color, night shift workers, people with disabilities, people living in areas that lack frequent transit service and others. We will use new mobility services to create a more just transportation system while helping transportation workers who see their jobs threatened transition to new roles.

What happens if we act	What happens if we don't
• It is easier for historically marginalized people to get where they need to go, especially when other options aren't available. • Transit, which is the most affordable and accessible way to travel, thrives. • Transportation workers find jobs in the new transportation system.	• There are more choices for those who can afford them. • Transit dwindles, especially in the communities that need it the most. • Historically marginalized communities are left behind as technology develops.

Emerging Technology Policy 2. Choices

Use emerging technology to improve transit service, provide shared travel options throughout the region and support transit, bicycling and walking.

Emerging technology has already given people in our region new ways to get around, whether by taking car or bike share, hailing a ride, or simply making it easier for people to learn about and pay for public transportation. However, new mobility services are concentrated in communities where it is already easy to take transit, walk and bike, which creates more congestion and pollution by attracting people away from more efficient modes and clogging streets with vehicles looking for passengers. In order to make the most of emerging technology's potential to reduce congestion and pollution, improve safety and support vibrant communities, we need to use technology to help people to connect to transit, share trips with other travelers or leave their cars at home. We will prioritize and invest in the modes that move people most efficiently and continue to improve convenience and safety for transit riders, pedestrians and bicyclists. This is part of a broader effort, reflected throughout the 2018 update to the Regional Transportation Plan, to improve transit service and create safer, better facilities for bicyclists and pedestrians.

What happens if we act	What happens if we don't
• New mobility services thrive side-by-side with transit, bicycling, and walking. • We move more people in fewer vehicles. • Emerging technology helps to reduce congestion and emissions. • The entire region enjoys new ways to travel.	• New mobility services compete and create conflicts with transit, bicycling, and walking. • Vehicles travel more miles to move fewer people. • Emerging technology increases congestion and emissions. • New options are concentrated in urban areas.

Emerging Technology Policy 3. Information

Use the best data available to empower people to make travel choices and to plan and manage the transportation system.

In today's transportation system, data is as important as infrastructure. Smartphones enable people to instantly book a transit trip or find a new route when they run into traffic, and new mobility companies use real-time data to balance supply and demand. Metro and our partners want high-quality information to be available on all transportation options in the region, and to be presented in a way that allows travelers to seamlessly plan and book trips. We will also develop the data that we need to plan the transportation system – including better data on transit, bicycling and walking as well as on new mobility options – and create systems that allow us to share data among public agencies and better manage and price travel. As we collect better data, we will also develop new policies around how we manage and use data so that we protect personal and competitive information and safeguard this increasingly valuable public resource.

What happens if we act	What happens if we don't
• People can easily compare travel options and pick the one that best meets their needs. • We know how emerging technology is changing transportation patterns. • We can manage congestion as it happens. • We get the best value out of public agency data.	• People rely only on the options that they know or that offer flashy apps. • We have limited insight into how our transportation system is changing. • We are slower to respond to collisions and incidents. • Public agencies waste resources on collecting and sharing data.

Emerging Technology Policy 4. Innovation

Advance the public interest by anticipating, learning from and adapting to new developments in technology.

Planning for a changing transportation system begins with changing how we plan. Our current planning process is designed around infrastructure projects designed to last for 50 years and an unchanging set of transportation services. It can take decades to plan and build a project, and once it is built there is little room for change. This time-intensive, risk-averse approach continues to make sense for major transportation investments, but in order to effectively plan for emerging technology we need to give ourselves opportunities to try new approaches, learn from our experience and adapt so that we can keep up with the pace at which technology is evolving. We will also actively engage new mobility companies alongside large employers, academics and community groups working in the technology arena, to identify opportunities to collaborate and test new ideas and turn our region into a hub for innovation.

What happens if we act	What happens if we don't
• We adapt to changes in technology. • We work together with all stakeholders to identify mutually beneficial policies and projects. • We try new ideas and learn from the results.	• We commit to processes, plans and projects that are increasingly out of date. • We confront big changes with limited resources and partnerships. • We sit on our hands because we feel like we don't know enough to act.

3.3 REGIONAL DESIGN AND PLACEMAKING VISION AND POLICIES

The regional transportation system design, placemaking concept and related policies in this section address federal, state and regional transportation planning mandates with roadway design concepts that support regional and local implementation of the 2040 Growth Concept. The transportation system design and placemaking concept establishes design classifications for the regional throughway and arterial system and design guidelines for the regional transportation system to foster livable communities throughout the region and encourage walking, bicycling and use of transit.

Sustainable, context sensitive and performance-based design of transportation facilities is critical to achieving regional goals and objectives, including Vision Zero, increased transportation options, efficient and reliable travel for all modes, healthy people and environment, security, addressing climate change, sustainable economic prosperity, racial and income equity, vibrant communities, resiliency and fiscal stewardship.

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 2040 Growth Concept supports land use that encourages shorter and fewer trips made by driving. Transportation system design should support the goal of reducing vehicle miles traveled by building and operating streets that are sensitive to the adjacent land use context, the roadway's functional classifications and the different needs and abilities of people traveling.

3.3.1 Streets serve many functions

The transportation system design and placemaking concept acknowledges that streets can serve many, sometimes conflicting functions. Land use context informs some of the functions of streets, for example streets in dense urban centers will look and function differently than streets serving freight intermodal facilities, or streets connecting centers. Highways designed for longer trips and higher motor-vehicle speeds will function differently than streets with many destinations and places.

Regional street and trail design guidelines provide tools to help reconcile conflicts for the safety of all modes of travel and achieve adopted policies and desired outcomes. Trade-offs in street design should be driven by a performance based design approach and consistency with adopted policies.

Functions of streets on the regional transportation system

- Pedestrian access and mobility for people walking and people using a mobility device
- Bicycle access and mobility for people riding bicycles
- Transit access and mobility for people accessing and using transit
- Truck freight access and mobility for moving goods, deliveries and e-commerce

- Auto access and mobility for people driving, ridesharing, automated and driverless vehicles/connected vehicles
- Placemaking and public space
- Nature corridors and stormwater management
- Utility corridors
- Flex zone for auto and bicycle parking, transit stops and stations, ride hailing, loading zones, benches/seating
- Physical activity
- Emergency response

3.3.2 Regional design classifications

Each of the regional modal networks (Pedestrian, Bicycle, Transit, Freight and Motor Vehicle) has a Network Vision Map which identifies the functional classifications for that mode. Functional classifications are hierarchical and describe the volume and type of trips most suited for that facility.

Regional design classifications are assigned to regional streets with the functional classification of throughway or arterial as shown on the RTP Motor Vehicle Network Map. Design classifications are only applied to streets within the metropolitan planning area.

Design classifications provide an overall approach to design for a facility based on its functional classification and adjacent land use context. Refer to **Table 3.3** Regional Design Classifications for an illustration of the concepts associated with each design classification and **Figure 3.7** Regional Design Classification Map to see which design classifications are assigned to arterials and throughways designated on the regional motor vehicle network.

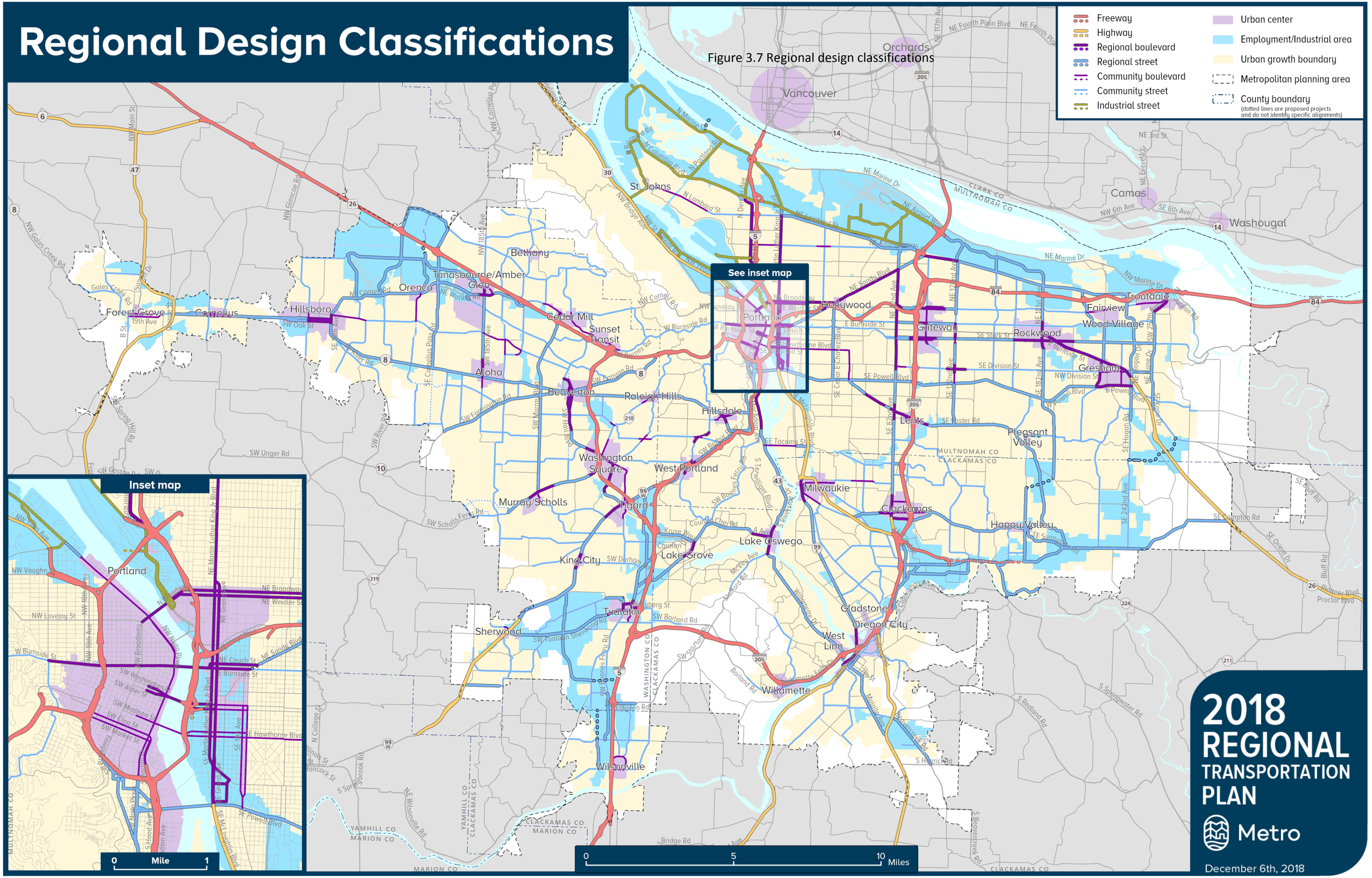
The regional design classifications serve multiple modes of travel in a manner that supports the specific needs of the 2040 land use components they serve.

- **Freeways and Highways Design Classification:** The Freeways and Highways design classifications are applied to completely grade-separated limited-access facilities and primarily limited-access facilities with some at-grade intersections. This design classification is assigned to facilities with the functional classification of throughway. The essential function is throughput and mobility for motor vehicle travel, travel speeds are higher and they serve as main roadway freight routes. These facilities typically have six through lanes plus auxiliary lanes in some places and parking is prohibited. These facilities cross all types of land use components and buildings are rarely oriented towards the facility. Noise and pollution barriers are necessary. Pedestrian and bicycle travel is supported with parallel completely separated multi-use paths within the corridor. Providing for connectivity across these facilities for multi-modal travel is essential. Desirable green infrastrucutre designs to protecct and enhance the natural environment, such as filter and retain stormwater, minimize light pollution and allow wildlife crossings and fish passage.

- **Regional and Community Boulevards Design Classification:** The Boulevard design classification is applied to the segments of major and minor arterials in areas identified with the 2040 land use types of central city, center, station communtiy or main street. The essential function of these streets is transit, bicycle and pedestrian travel and access while balancing motor-vehicle travel and the many other functions of intensely developed areas. Segments that are also designated as freight roadway connectors are designed to serve freight access and movement. These facilities typically have two to four lanes with turn lanes for minor arterials and up to four lanes with turn lanes for major arterials. Medians and access management increase safety for pedestrians and all modes. Speeds are low to moderate. This design classification is applied in the central city, regional centers, station communities, some main streets and town centers. Buildings are oriented towards the street. Connectivity and access are enhanced with medians, roundabouts and protected crossings. Sidewalks are wide and buffered and bikeways are protected. Include green infrastrucuture designs to protecct and enhance the natural environment, such as filter and retain stormwater, minimize light pollution and allow wildlife crossings and fish passage.
- **Regional and Community Streets Design Classification:** The Streets design classification is applied to major and minor arterials that serve as commercial corridors and connect regional and town centers, employment, industrial areas and activity centers, including those identifed on the 2040 land use type map as corridors. The essential function is serving transit and providing pedestrian and bicycle permeability and access while balancing motor-vehicle mobility and other functions. Segments that are also designated as freight roadway connectors are designed to serve freight access and movement. These facilities typically have two to four lanes with turn lanes for minor arterials and up to four lanes for major arterials with turn lanes for major arterials. Medians and access management increase safety for pedestrians and all modes. Speeds are moderate to low. This design classification is applied to 2040 corridors, some main streets, neighborhoods, and some employment and industrial areas. Buildings are usually oriented towards the street, especially at intersections and transit stops. Sidewalks are buffered and bikeways are protected, and if not protected a low stress facility is provided on a parallel facility no less than one block over. Include green infrastrucuture designs to protecct and enhance the natural environment, such as filter and retain stormwater, minimize light pollution and allow wildlife crossings and fish passage.
- **Industrial Streets Design Classification:** Industrial Streets design classification is assigned to streets identified as Intermodal Connectors on the Regional Freight System Map and to streets in 2040 industrial areas. The essential function of these streets is freight access to intermodal facilities, while balancing safety and access to transit. Speeds are moderate to low. Intersections have wider turning radii and lane widths are generally wider than the Boulevard or Streets design classifications. Pedestrian and bicycle travel is supported with completely separated parallel multi-use paths, or sidewalks are buffered and bikeways are protected, and if not protected a low stress facility is provided on a parallel facility no less than one block over. Include green infrastrucuture designs to protecct and enhance the natural environment, such as filter and retain stormwater, minimize light pollution and allow wildlife crossings and fish passage.

Regional Design Classifications

Figure 3.7 Regional design classifications



2018 REGIONAL TRANSPORTATION PLAN

Metro

December 6th, 2018

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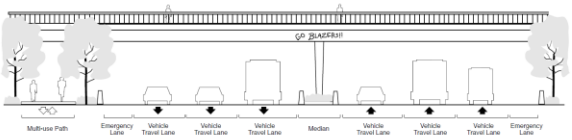
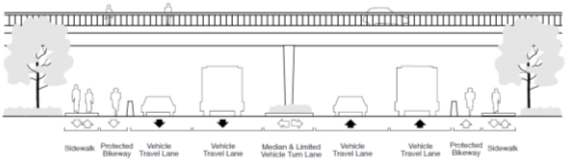
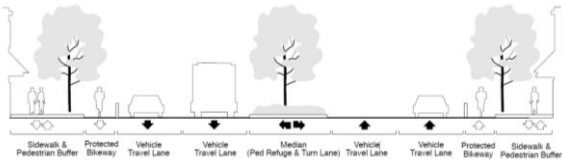
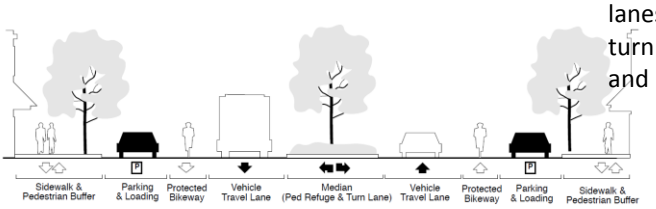
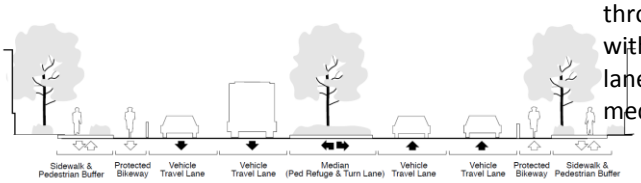
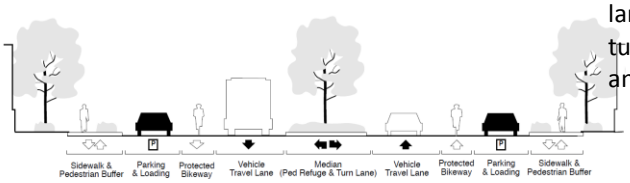
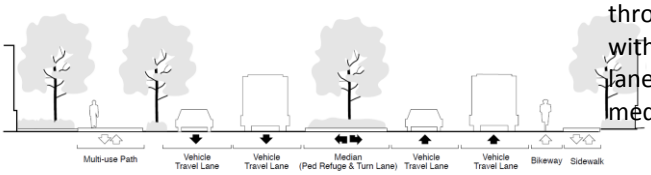
The design concepts promote community livability and reliable travel by balancing all modes of travel and addressing the function and character of adjacent land uses. Linking land use and the physical design of transportation facilities is crucial to achieving state goals to limit reliance on any one mode of travel and to encourage increased walking, bicycling, carpooling, vanpooling and use of transit.

Table 3.3 summarizes design classifications, typical design elements and motor vehicle functions, illustrating how multimodal design elements can be integrated.

Table 3.3 Design classifications for the Regional Motor Vehicle Network

Trip Type(s)	Design Classification 2040 Land Use(s)	Motor Vehicle Functional Classification	Illustrative Design Concept	Typical number of planned travel lanes[9]
Interstate Regional	**Freeway** All	Throughway		6 through lanes (plus auxiliary lanes) with grade separated interchanges
Interstate Regional	**Highway** All	Throughway		Up to 6 through lanes (plus auxiliary lanes) with turn lanes at grade separated intersections
Regional City	**Regional Boulevard** *Central City Regional Center Town Center Station Community Main Street*	Major Arterial		Up to 4 through lanes with turn lanes and median

[9] 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 network connectivity. Major and minor arterial streets can either be 2 or 4 lanes with turn lanes as appropriate.

Trip Type(s)	Design Classification 2040 Land Use(s)	Motor Vehicle Functional Classification	Illustrative Design Concept	Typical number of planned travel lanes[9]
City	**Community Boulevard** *Central City* *Regional Center* *Town Center* *Station Community* *Main Street*	Minor Arterial		2 to 4 through lanes with turn lanes and median
Regional City	**Regional Street** *Corridor* *Industrial area* *Employment Area* *Neighborhood*	Major Arterial		Up to 4 through lanes with turn lanes and median
City	**Community Street** *Corridor* *Industrial Area* *Employment Area* *Neighborhood*	Minor Arterial		2 to 4 through lanes with turn lanes and median
City	**Industrial Street** *Industrial Area* *Employment Area* *Intermodal Facility*	Major Arterial Minor Arterial		Up to 4 through lanes with turn lanes and median

Source: Metro (conceptual cross sections in the table are illustrative only)

3.3.3 Designs for safe and healthy transportation for all ages and abilities

Street and facility designs have a significant impact on the health, safety and economic and environmental sustainability of our communities. Throughways serve interregional and interstate trips and are designed to support safe and reliable motor vehicle travel. Regional arterials serve both regional and local trips and must be designed to support health and sustainability while maintaining mobility and access for all modes. **Table 3.4** identifies the design characteristics of arterials that can promote or hinder health.

Table 3.4 Design characteristics of healthy arterials[10]

Health Promoting Design	Unhealthy Design
Neighborhood asset for access and commerce	Physical barrier that divides neighborhoods
Supports neighborhood social and cultural connections	Exhibits neglect and physical decay
Safe travel speeds for all users	Traffic speeds too high to be safe for all users
Comfortable for all users to cross	Difficult to cross because of design and traffic
Link within pedestrian and bicycle networks	Barrier within pedestrian and bicycle networks
Designed to mitigate noise	Source of noise
Designed to mitigate air pollution	Near-roadway air pollution
Accessible to users of all abilities	Inaccessible to users with disabilities
Supports green infrastructure systems	Impervious paving materials, lack of shade
Contributes to revitalization without displacement	Location of residential and business gentrification

Metro's Designing Livable Streets and Trails handbooks provide design guidance depending on the intended functions of the arterial or throughway, the land uses the facility serves and adopted policy. In the design guidance, consideration is given to various arterial designs, designs for freight, trails, pedestrians, bicyclists and transit and the link between street design and stormwater management. Design decisions, especially trade-offs in situations of limited road right-of-way, should use performance-based design and flexibility in design to achieve desired outcomes.

[10] *Understanding and Improving Arterial Roads to Support Public Health and Transportation Goals,* American Journal of Public Health, August 2017.

Figure 3.8 Metro's Designing Livable Streets handbooks



Regional design guidance identifies design elements that support achieving regional goals, objectives and policies, and recommend design elements such as:

- Universal, age-friendly designs that comply with the Americans with Disabilities Act and take into account people's abilities as they transition through various stages of age and ability, particularly older adults, youth and people living with disabilities
- Traffic calming to safe speeds for all modes of travel
- Protected/buffered separation of pedestrians and bicycle riders from motor vehicles, including freight trucks
- Integration of regional trails with the transportation network
- Placemaking designs
- Designs for freight access
- Designs for enhanced transit and accessible bus stops and stations
- Green infrastructure (see next section)



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.

Where appropriate, traffic calming measures such as narrower travel lanes, compact intersections, landscaped buffers and on-street parking can slow vehicle traffic and reduce crashes involving 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 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.

Street designs that separate people walking and biking from motor vehicle traffic also help reduce exposure to and mitigate the impacts of traffic pollution, particularly in heavily traveled corridors and along streets with multi-family housing. Local jurisdictions are encouraged to consider prioritizing electrification of transit and charging infrastrucuture for passenger vehicles and freight as well as best practices in orienting buildings and designing indoor air systems to minimize pollution exposure.

3.3.4 Designs for stormwater management and natural, historic and cultural resource protection

The effect that transportation infrastructure has on the health of the natural environment, particularly urban waterways and habitat connectivity, is well documented. Transporatation infrastrucutre has the potential to degrade water quality, create barriers to corridors for animal travel and increase air, noise and light pollution. Projects also have the potential to negatively impact cultural and historical resources if not planned and implemented carefully.

Projects should be designed to avoid or minimize impact, or if avoidance is not possible, to maximize enhancement, protection and improvement of natural, community and cultural resources.

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.



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

Existing natural resources inventory data can be used to improve and refine project prioritization and design to improve habitat connectivity, remedy barriers from existing and proposed transportation infrastructure and restore ecological processes.

Impervious surfaces have been linked to flooding and changes in hydrology, the shape of streams, water quality, water temperature and the biological health of waterways. With respect to runoff quality, recent research by the National Marine Fisheries Service and Washington State University points to the high aquatic toxicity of runoff from roadway surfaces. This toxicity is directly proportional to traffic volumes. Stormwater facilities that are vegetated and contain compost-amended soils represent the only currently effective treatment options to address these often unidentified toxic compounds. Such facilities are also required to be prioritized in current National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits across the region.

With respect to runoff quantity, development in the region at increasing density results in less pervious surface available to absorb the combined runoff volumes from transportation surfaces, structures and associated impervious area. Runoff volumes of winter peak flows can more than double from predeveloped conditions in the face of urban development, with associated flow reductions in summer. Climate change is expected to reinforce this pattern. Higher runoff volumes result in channel erosion, aquatic and floodplain habitat degradation, and damage to infrastructure (including transportation infrastructure such as bridges and culverts). Low summer flows reduce the vigor of vegetation that helps stabilize streambanks. Yet more than half of the region, including nearly all of the area west of the Willamette River, has subsurface conditions that do not promote easy infiltration of large volumes of urban runoff.

Regional Green Streets guidelines seek to minimize and mitigate these effects through a combination of retrofits to existing streets and designs for new streets and throughways. This is how the RTP and Metro's Designing Livable Streets and Trails handbooks help ensure protection of salmon and steelhead that were federally protected as endangered species in 1999.

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. When a new structure is built (or an existing one modified) that could damage important wildlife habitat or impede wildlife movement, crossings of all types should be designed appropriately to allow for fish, wildlife, and sometimes people movement at all water levels.

Table 3.5 Examples of gow green infrastructure can help achieve RTP goals

RTP Goal	Examples of how green Infrastrucutre can help achieve RTP goals
Vibrant Communities	Green infrastructure, including trails, parks, street trees, vegetation, and bioswales, contribute to community beautification and public health by connecting people with nature in their daily lives.
Shared Prosperity	Green infrastructure can promote economic growth as a valued public amenity, create construction and maintenance jobs, add to property value, support walkable and bikeable communities, businesses and commercial districts, and lower the costs associated with climate change.
Transportation Choices	Green streets can promote active travel and access to transit by providing enjoyable routes that are shaded and buffered from traffic.
Reliability and Efficiency	Green infrastructure treatments, such as access management and medians with bioswales, can be designed to support reliability and efficiency by reducing crashes and conflicting movements.
Safety and security	Street trees and other green infrastructure can help calm traffic to desired speeds, provide welcoming places that increase security, and improve resiliency and reduce impacts of major storm events.
Healthy Environment	Green infrastructure can enhance and protect the natural environment by supporting clean air and water, filtering stormwater runoff, reducing erosion, protecting, creating and connecting habitat for birds, fish and other wildlife.
Healthy People	Green infrastructure can reduce water, air, noise and light pollution, encourage active lifestyles and link people to trails, parks and nature that enhance human health and well-being.
Climate Leadership	Trees and green infrastructure can support climate adaptation by cooling streets, parking lots and buildings, better managing stormwater and reducing the urban heat island effect. Trees and vegetation can be managed to sequester greenhouse gases to help mitigate climate change.
Equitable Transportation	Clean air and water and access to nature can be improved and habitat can be preserved and enhanced when green infrastructure is provided in historically marginalized communities.
Fiscal stewardship	Protecting the environment and natural resources today can save money for the future and reduce infrastructure construction and maintenance costs.
Transparency and Accontability	All stakeholders can be represented, including those that cannot speak for themselves – wildlife and the natural environment. Performance-based planning includes considering environmental effects throughout the planning process.

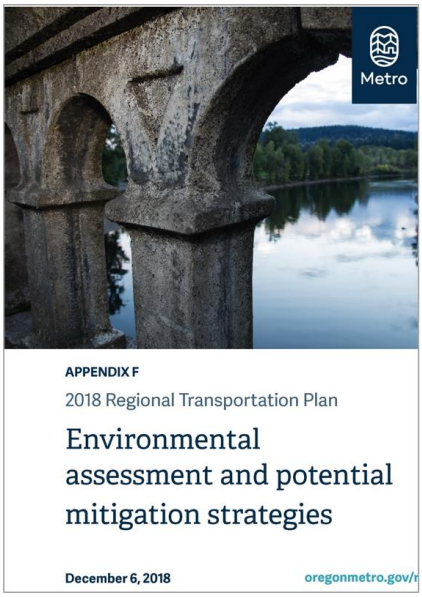
Infrastructure planning and design should first seek to avoid fish and wildlife habitat conservation areas. If that is not practicable, opportunities to minimize or mitigate the effects of transportation infrastructure and services through the application of "green" design treatments should be identified and implemented. Refer to **Appendix F** for examples of mitigation strategies for different environmental resource areas. For example, street trees, vegetated swales and other green street treatments can intercept rainwater and convey stormwater in the public right-of-way, following best practices to minimize light pollution, installing appropriate wildlife crossings, screeing sensitive habitats from noise and light, enhancing vegetation associated with wetlands and waterways for wildlife, limiting fill within wetalnds, constructing bridges or open bottom culverts, creating new wetland areas, and restoring or rehabilitating damaged wetlands and

waterways, using pervious materials and preserving, maintaing or enhancing tree canopy. 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.

Identification of potential transportation impacts during project development is done using Title 3 and Title 13 resource inventory data as a baseline, with acknowledgement that these inventories may be complemented with other publicly-adopted inventories, and additional data such as the Regional Conservation Strategy high value habitat areas or more recent federal or state resource inventories

The following list identifies the types of resource areas considered during development of RTP update to identify potential resource impacts:

- High value fish and wildlife habitat areas and biodiversity corridors
- Threatened and endangered species, including vertebrate species and plants
- Vegetation and wildlife
- Fisheries
- Wetlands and waterways
- Flood hazard areas/floodplains
- Historic resources
- Tribal lands and legacies
- Air quality and greenhouse gas emissions



Appendix F documents the data and methods used to identify potential RTP project impacts on different resource areas and discusses examples of potential mitigation strategies to "avoid, minimize or mitigate" potential impacts.

The "avoid, minimize or mitigate approach" is known as "sequencing" and involves understanding the affected environment and assessing transportation effects throughout the project development process. The sequencing for projects follow this order:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action or project.
- Compensating for the impact by replacing or providing substitute resources or environments.

Refer to **Appendix F** as a source for more information on potential mitigation strategies specific to resource areas.

3.4 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 define a seamless and well-connected regional system of regional throughways and arterial streets, freight networks, transit networks and services and bicycle and pedestrian facilities. The network policies emphasize safety, access, mobility and reliability for people and goods and recognize the community-building and placemaking role of transportation. The network visions, concepts and supporting policies will guide the development, design and management of different components of the regional transportation system.

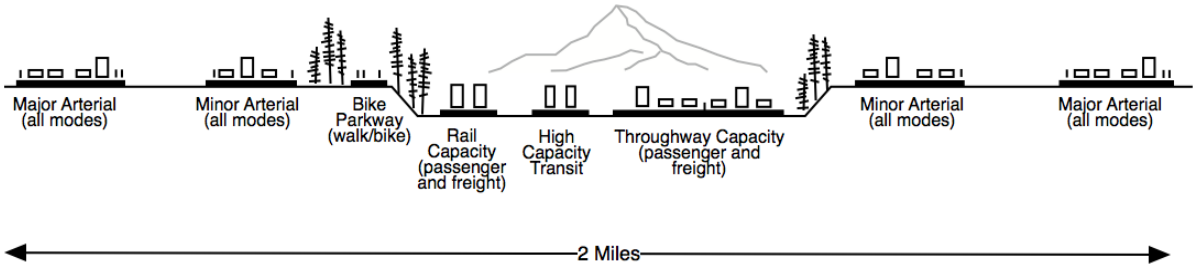
3.4.1 Regional mobility corridor concept

The regional mobility corridor concept integrates throughways, high capacity transit, arterial streets, 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. 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 and are defined by the major centers set forth in the Region 2040 Growth Concept. 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 3.9**.

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.

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. Updates to these strategies will be informed by the Regional Mobility Policy update described in Chapter 8.

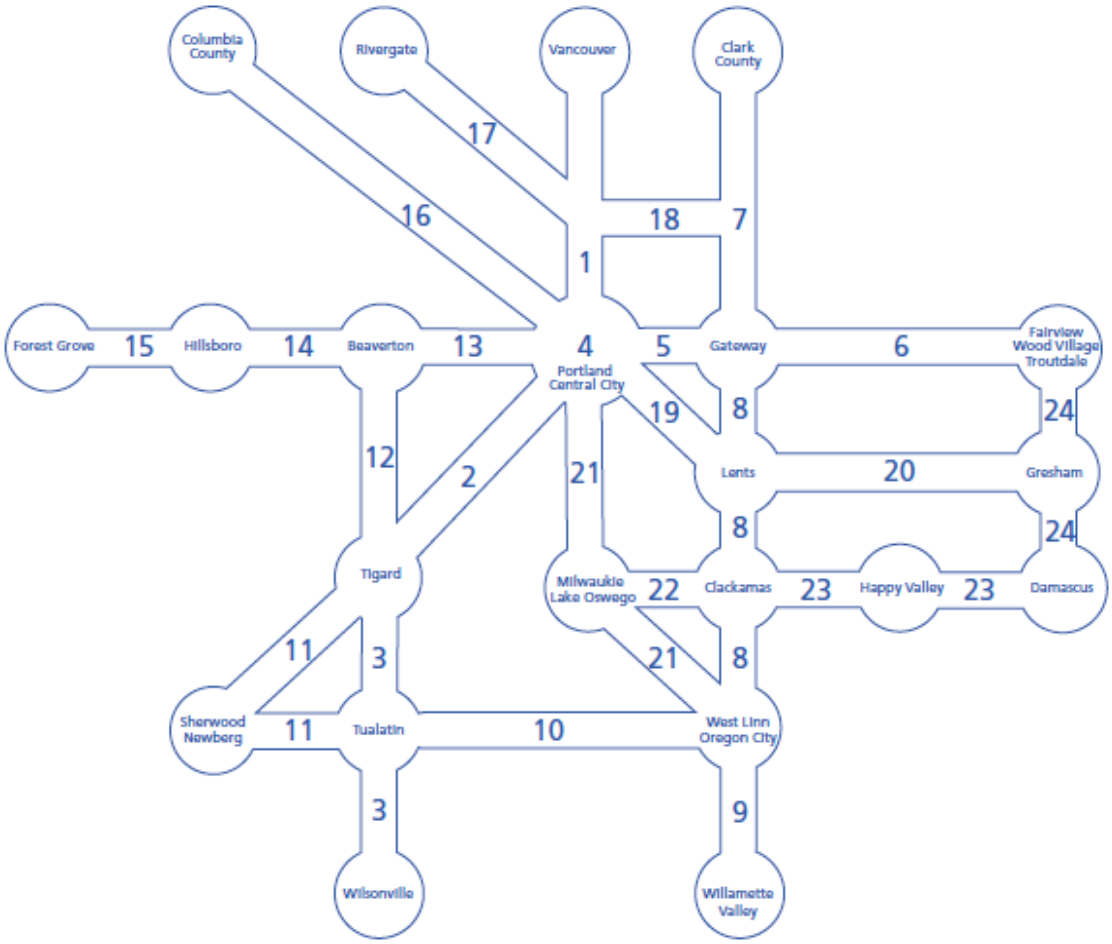
Figure 3.9 Regional mobility corridor concept



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 the Banfield corridor that links the Portland central city to the Gateway regional center.

Figure 3.10 shows the general location of mobility corridors in the region.

Figure 3.10 Mobility corridors in the Portland metropolitan region



3.5 REGIONAL MOTOR VEHICLE NETWORK VISION AND POLICIES

3.5.1 Regional motor vehicle network vision

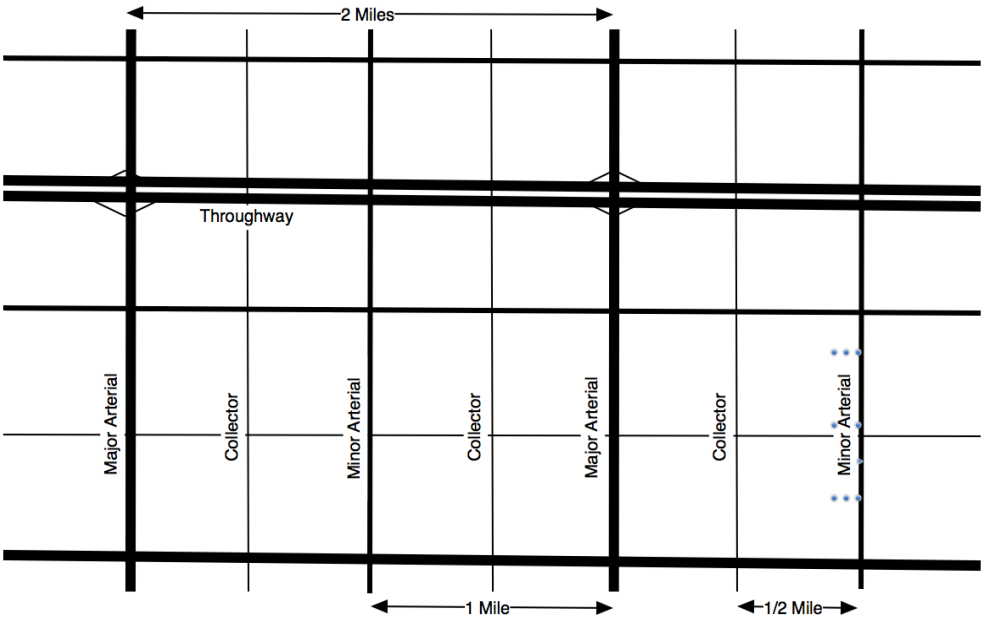
Though our region has changed dramatically over the past century, the shape of the major road network serving our region has not. Most of our regional streets were once farm-to-market roads, established along Donation Land Claim boundaries at half-mile or mile spacing. The region's throughway system 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 Motor Vehicle 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.

3.5.2 Regional motor vehicle network concept

The Regional Motor Vehicle Network Concept shown in **Figure 3.11** illustrates policies for developing a complete and well-connected motor vehicle network that is safe and reliable, provides adequate capacity and supports all modes of travel.

Figure 3.11 Regional motor vehicle network concept



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

3.5.3 Regional motor vehicle network policies

Rather than solely relying on levels of congestion to direct how and where to address bottlenecks and other motor vehicle capacity deficiencies, the regional motor vehicle concept and policies call 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. Increased connectivity improves travel reliability through reducing bottlenecks and congestion hotspots and increasing travel options.



The RTP calls for implementing system and demand management strategies and other strategies prior to building new motor vehicle capacity, consistent with the Federal Congestion Management Process (CMP), Oregon Transportation Plan policies (including Oregon Highway Plan Policy 1G) and Section 3.08.220 of the Regional Transportation Functional Plan (RTFP).

Regional motor vehicle network policies

Policy 1	Preserve and maintain the region's motor vehicle network system in a manner that improves safety, security and resiliency while minimizing life cycle cost and impact on the environment.
Policy 2	Use the Congestion Management Process, Regional Mobility Policy, safety and bike and pedestrian network completion data to identify motor vehicle network deficiencies.
Policy 3	Actively manage and optimize capacity on the region's throughway network for longer, regional, statewide and interstate travel.
Policy 4	Actively manage and optimize arterials according to their planned functions to improve reliability and safety, and maintain mobility and accessibility for all modes of travel.
Policy 5	Strategically expand the region's throughway network up to six travel lanes plus auxiliary lanes between interchanges to maintain mobility and accessibility and improve reliability for regional, statewide and interstate travel.
Policy 6	In combination with increased transit service, consider use of congestion pricing to manage congestion and raise revenue when one or more lanes are being added to throughways.
Policy 7*	Complete a well-connected network of arterial streets ideally spaced at approximately 1-mile apart and planned for up to four travel lanes to maintain transit and freight mobility and accessibility and prioritize safe pedestrian, bicycle and transit access for all ages and abilities using Complete Street design approaches.
Policy 8	Complete a well-connected network of collector and local streets that provide for local circulation and direct vehicle, bicycle and pedestrian access to adjacent land uses and to transit for all ages and abilities.
Policy 9	Minimize environmental impacts of new or improved facilities using Green Street infrastructure design, street trees, wildlife habitat or waterway crossing improvements and other approaches to the extent practicable.
Policy 10	Address safety needs on the motor vehicle network through coordinated implementation of cost-effective crash reduction engineering measures, education, and enforcement.
Policy 11	Incorporate complete street designs for safe and convenient pedestrian and bicycle access for regional and local roadways.
Policy 12	Prior to adding new throughway capacity beyond the planned system of through lanes, demonstrate that system and demand management strategies, including access management, transit and freight priority and congestion pricing, transit service and multimodal connectivity improvements cannot adequately address throughway deficiencies and bottlenecks**.**

*Note for Policy 7: 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 network connectivity. Major and minor arterial streets can either be 2 or 4 lanes with turn lanes as appropriate.

Network connectivity

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

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 motor vehicle 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.

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.



By developing a well-connected network the region can spread traffic across the entire network, reducing the need to overburden a few facilities. This will help reduce bottlenecks and congestion

hotspots, decreasing the need to widen roads and intersections beyond their typical design. Connectivity also supports transit, biking and walking by making trip distances shorter and more direct and convenient. Improved travel reliability is a key overall outcome of from all of these connectivity-oriented strategies.

Typical spacing and planned capacity for arterial streets

As a result, the regional motor vehicle 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 3.12**, the illustrative arterial street network is complemented by a well-connected network of collector streets. This network of arterial and collector streets is multi-modal in design, serving automobiles, motorcycles, trucks, transit, bicycles and pedestrians. The regional arterial street design with median reflects an accepted design that can support safe travel by all of these modes, accommodating urban levels of traffic, while also providing for bicycle and pedestrian travel and safe 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 and Metro's livable street design guidelines, 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. Street design, combined with connectivity help reduce congested hot spots and improve reliability. 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.

Throughways

Throughways generally span several jurisdictions and often are of statewide importance linking the greater Portland 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 8 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 freight 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 functional classification generally corresponds to the Expressways functional classification in the Oregon Highway Plan. There are two types of Throughway designs as described in **Table 3.3**: Freeways - which are limited-access and completely grade separated and Highways, which include a mix of separate and at-grade access points. Throughway interchanges should be 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.



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

Streets designated with an arterial functional classification are shown in **Figure 3.13** and include Boulevard and Streets described in **Table 3.3** and shown in **Figure 3.7**.

Arterial safety

Safety is a primary concern on the regional arterial system, on which approximately 60 percent of the region's fatal and severe injury crashes occur. For this reason, much of the focus for achieving the region's Vision Zero target will fall upon arterial streets. More attention to designs and operational strategies that have been demonstrated to improve the safety 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, with a focus on the region's high injury corridors, and may include:

- proven designs and strategies such as medians, speed management, access management, improved pedestrian crossings and street lighting, replacing intersections with roundabouts, reducing speeds to levels which are safe for pedestrians 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 bike and pedestrian crossings; and
- education initiatives intended to promote safer behavior among all users of the transportation 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.

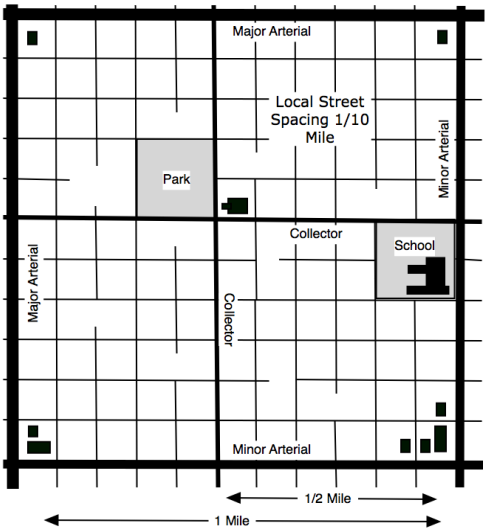
Collector and local street connectivity

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 3.4** (or when they are part of the Regional Bicycle Network or Regional 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 one-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.

Figure 3.12 Collector and local street network concept



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

Shown in **Figure 3.12**, 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.

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. 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 primarily provide direct access to adjacent land uses, and usually between 200-2,000 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.

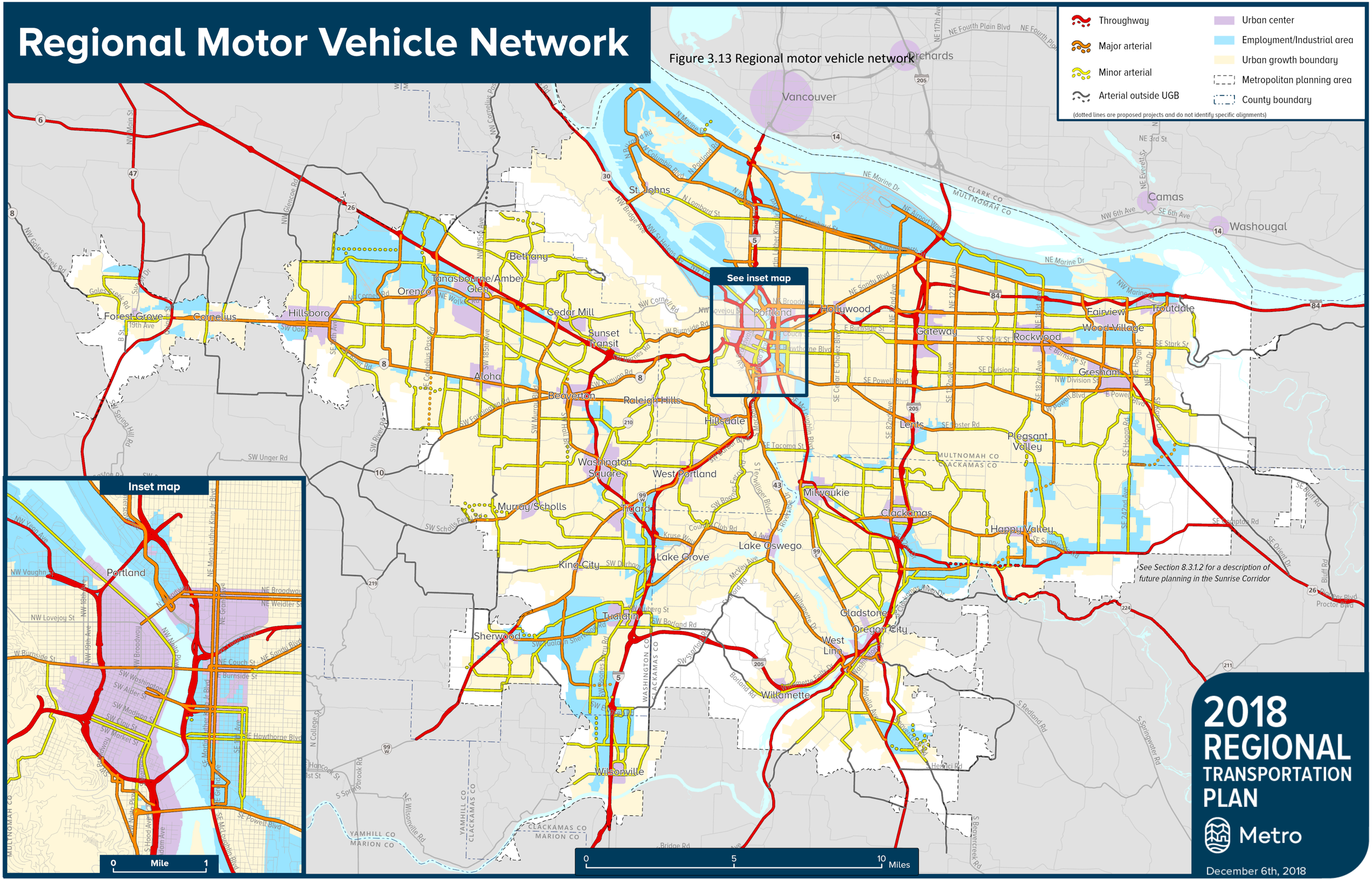
While local streets are not intended to serve through traffic, the local street network serves an important role for supporting bicycle and pedestrian travel. As a result, regional local street connectivity policies require communities to develop a connected network of local streets to increase access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

3.5.3 Regional motor vehicle network classifications and map

The Regional Regional Motor Vehicle Network is shown in **Figure 3.13**. Click on 2018 RTP Regional Network Maps for online zoomable version of map.

Regional Motor Vehicle Network

Figure 3.13 Regional motor vehicle network



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3.5.4 Interim regional mobility policy

First adopted in 2000 and amended into the Oregon Highway Plan in 2002, the interim regional mobility policy reflects a level of motor vehicle performance in the region that JPACT, the Metro Council and the Oregon Transportation Commission (OTC) deemed acceptable at the time of its adoption. Policymakers recognized the policy as an incremental step toward using a more comprehensive set of measures that consider system performance for all modes, as well as financial, environmental and community impacts. This RTP continues that evolution and has defined a broader set of performance measures that can provide a more comprehensive assessment of transportation system performance as reflected in the performance measures and targets defined in Chapter 2.

The interim regional mobility policy in **Table 3.6** shows the minimum motor vehicle performance desired for transportation facilities designated on the Regional Motor Vehicle Network in **Figure 3.13**. Specifically, Table 3.6 reflects volume-to-capacity targets adopted in the RTP for facilities designated on the Regional Motor Vehicle Network as well as volume-to-capacity targets adopted in the Oregon Highway Plan for state-owned facilities in the urban growth boundary. In effect, the policy is used to evaluate current and future performance of the motor vehicle network, using the ratio of traffic volume (or forecasted demand) to planned capacity of a given roadway, referred to as the volume-to-capacity ratio (v/c ratio) or level-of-service (LOS).



Regional Mobility Policy Update

There has been increasing discussion of the role of motor vehicle LOS as a performance metric. The region and local communities across the region have adopted goals such as improving safety for all roadway users (e.g., pedestrians, bicyclists, freight and transit users) and encouraging infill development to implement the 2040 Growth Concept, which often conflict with meeting LOS thresholds.

The region has committed to updating the interim regional mobility policy to better align with the comprehensive set of goals and desired outcomes identified in the RTP. Chapter 8 (Section 8.2.3.1) describes a proposed work plan for considering measures aimed at system efficiency, including people-moving capacity, person throughput and system completeness.

Traditionally, motor vehicle LOS has been used in transportation system planning, project development and design as well as in operational analyses and traffic analysis conducted during the development review process. As a system plan, the RTP uses the interim regional policy to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. LOS is also used to determine consistency of the RTP with the Oregon Highway Plan for state-owned facilities.

Table 3.6 Interim regional mobility policy

Deficiency thresholds for peak hour operating conditions expressed as volume to capacity ratio targets as adopted in the RTP and Oregon Highway Plan.

Locations	Target	Target	
	Mid-day One-Hour Peak [A, B]	**PM Two-Hour Peak [A, B]**	
		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 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 [C] (from I-5 South to I-5 North)	.99	1.1	.99
Other state-owned routes [D] I-205 [C] I-84 (east of I-205) I-5 (Marquam Bridge to Wilsonville) [C] OR 217 US 26 (west of Sylvan) US 30 OR 8 (Murray Boulevard to Brookwood Avenue) [C, D] OR 47 OR 99W OR 212 [E] OR 224 OR 213 [F]	.90	.99	.99

Table Notes:

A. Unless the Oregon Transportation Commission has adopted an alternative mobility target for the impacted state-owned facility within the urban growth boundary, the mobility targets in this table (and Table 7 of the Oregon Highway Plan) are considered standards for state-owned facilities for purposes of determining compliance with OAR 660-012-0060.

B. The volume-to-capacity ratios in this table (and Table 7 of the Oregon Highway Plan) are for the highest two consecutive hours of weekday traffic volumes. The 2nd hour is defined as the single 60-minute period, either before or after the peak 60-minute period, whichever is highest. See Oregon Highway Plan Action 1.F.1 for additional technical details for state-owned facilities. The mid-day peak hour is the highest 60-minute period between the hours of 9 a.m. and 3 p.m.

C. A corridor refinement plan, which will likely include a tailored mobility policy, is required by the Regional Transportation Plan for this corridor.

D. Two facilities are not designated as principal arterial throughway routes in the RTP, including OR 8 between Murray Boulevard and Brookwood Avenue and portions of 99W, which are proposed to be removed from Table 7 of the Oregon Highway Plan in the next scheduled update.

E. OR 212 is designated as a throughway route in the RTP and is proposed to be amended into Table 7 of the Oregon Highway Plan in the next scheduled update.

F. In October 2018, the OTC approved an alternative mobility target that applies to the intersection of OR 213 and Beavercreek Road such that during the first, second and third hours, a maximum v/c ratio of 1.00 shall be maintained. Calculation of the maximum v/c ratio will be based on an average annual weekday peak hour.

The system analysis described in Chapter 7 finds that the region cannot achieve the mobility policy listed in Table 3.6 of the RTP (and Table 7 of the Oregon Highway Plan) within current funding levels or with the mix of investments included in the analysis. Metro and ODOT have committed to regional partners that they will work together to update the interim regional mobility policy to better align with RTP outcomes and advance beyond this traditional mobility performance measure as described in Chapter 8 (Section 8.2.3.1).

3.5.5 Congestion management process

The RTP calls for implementing system and demand management strategies and other strategies prior to building new motor vehicle capacity, consistent with the Federal Congestion Management Process (CMP), Oregon Transportation Plan policies (including Oregon Highway Plan Policy 1G) and Section 3.08.220 of the Regional Transportation Functional Plan (RTFP). In some parts of the greater Portland 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. New technologies are reducing the cost of demand management and new possibilities are emerging with autonomous and connected vehicles.

One component of Metro's Congestion Management Process is a toolbox of congestion reduction and mobility strategies. This toolbox identifies a suite of strategies to manage congestion and address mobility needs prior to utilizing traditional roadway widening and other capacity projects. Prior to adding single occupant vehicle (SOV) capacity, agencies and jurisdictions should give consideration to the various strategies identified in this section, consistent with FHWA direction and RTP and OTP policies. Usually, multiple strategies are applicable within a corridor, while other strategies are intended to be applied region-wide.

The CMP toolbox strategies were assembled to provide a wide range of strategies that could be used to manage congestion region-wide or within congested mobility corridors. They are arranged so that the strategies are considered in order from first to last. Even with the addition of capacity, many of the strategies can be implemented with the project to ensure the long-term management of a capacity project.

The CMP toolbox of strategies is shown in **Table 7.**

Table 3.7 Toolbox of strategies to address congestion in the region

1		**Community design strategies** • Walkable communities and job centers facilitated by compact land use in combination with walking, biking and transit connections • Mixed-used areas and transit-oriented development • Parking management and pricing
2		**Travel Information and Incentives strategies** • Commuter travel options programs • Household individualized marketing programs • Car-sharing and eco-driving techniques • Safe Routes to School programs • Ridesharing (carpool, vanpool) services
3		**System management and operations strategies** • Real-time variable message signs and speed limits • Signal timing and ramp metering • Transit signal priority, bus-only lanes, bus pull-outs • Incident response detection and clearance • Access management (e.g., turn restrictions, medians)
Emerging		**Congestion pricing strategies** • Peak period pricing • Managed lanes • High occupancy toll (HOT) lanes
4		**Active Transportation strategies** • New biking and walking connections to schools, jobs, downtowns and other community places • Bicycle infrastructure (e.g., bicycle racks, lockers and other bicycle amenities at transit stations and other destinations) • Separated pathways and trails
5		**Transit strategies** • High capacity transit • Expanded transit coverage • Expanded frequency of service • Improvements in right-of-way to increase speed and reliability of buses and MAX • Community and job connector shuttles • Park-and-ride lots in combination with transit service
6		**Street and throughway capacity strategies** • Local and arterial street connectivity to spread out travel • Addition of turn lanes at intersections, driveway restrictions and other geometric designs such as roundabouts • Road widening to add new lane miles of capacity (e.g, adding auxiliary lanes, additional general purpose lanes); pricing is considered when adding new throughway capacity in the region

The intent of the CMP Toolbox follows FHWA's direction to consider all available solutions before recommending additional roadway capacity in transportation system planning, corridor refinement planning and subarea studies. **Appendix L** describes how this information is used in the region's process and RTP updates to identify needs and inform consideration and prioritization of multimodal strategies and investments to address congestion in the region.

3.6 REGIONAL TRANSIT NETWORK VISION AND POLICIES

3.6.1 Regional transit network vision

With continued regional growth, come challenges including more congestion, higher housing prices, and constrained access to employment and daily needs. Residents, elected officials, and community organizations view increased transit service as a critical part of the overall solution to these challenges. To achieve the regional vision in the 2040 Growth Concept and Climate Smart Strategy, the Regional Transit Vision is to make transit more convenient, accessible, affordable and frequent for everyone.

What do frequent, convenient, accessible and affordable mean?

Make transit more frequent by aligning frequency and type of transit service to meet existing and projected demand in support of local and regional land use and transportation visions.

Frequent transit service is defined as service that operates at a maximum of 15 minutes intervals, but this isn't the only type of service. Regional and local transit service provides basic service and ensures that most the region's population has transit service available to them; service span and frequencies vary based on the level of demand for the service. Because of limited resources, it is important to ensure that service meets demand. Frequency therefore means aligning the frequency and type of service to meet existing and/or projected demand for an area.

Make transit more convenient and competitive with driving by improving transit speed and reliability through priority treatments and other strategies. Improve transit rider experience by ensuring seamless connections between various transit providers, including transfers, information, and payment. Additionally, cities and counties who own the roads used by bus transit could partner with the transit agencies to implement transit priorities treatments.

In order for people to choose transit over driving, transit must be convenient and reliable. A transit trip needs to get people to their destination at the projected time, and it must be easy to use. Perhaps most importantly, it needs to be a viable option in regards to travel times. This can be accompanied with strategies that prioritize transit (e.g. signal priority and bus lanes) as well as adopting technology that make transit more predictable and user-friendly (e.g. electronic fare and real-time monitoring systems).

Make transit more accessible by ensuring safe and direct biking and walking routes and crossings that connect to stops, as well as improve accessibility for seniors and persons with disabilities to ensure transit is accessible for everyone. Accessibility could also include park and ride facilities and drop off/pick up areas. Expand the system to improve access to jobs and essential destinations and daily needs.

Accessibility refers to two separate but related aspects of transit. One is to ensure that transit is physically accessible to everyone, regardless of age or ability. All transit users must access transit via biking or walking, even if stops are mere feet away. Complete sidewalks and bike paths

improve safety and enhance the experience of using transit and the accessible stations are essential to making transit work for everyone. The first/last mile connection is also an important part of accessibility, as it often represents the best opportunity for people living in less developed areas, rural towns or outlying areas to access our transit system.

The second component of accessibility is to ensure that schools, particularly high schools and colleges, community places, such as grocery stores and medical services, and jobs are accessible by transit. As the region grows, it's crucial to continue to expand community and regional transit service in order to improve access to these daily needs, and encourage employers to locate on existing transit routes.

Making transit affordable is the cornerstone of the other components of our vision. Frequency, convenience, and accessibility are meaningless if transit is not affordable. Additionally, affordability ensures that the transit system is equitable for low income populations, communities of color and those who rely on transit services rather than private automobiles to meet their daily transportation needs.

3.6.2 Regional transit network concept

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 greater Portland region. The South Metro Area Regional Transit (SMART) in Wilsonville also provides regional transit service, connecting Wilsonville to Portland and communities in Washington and Clackamas counties.



TriMet implements the majority of transit service in the RTP in what is called the Transit Investment Plan (TIP). SMART, C-TRAN and other transit providers complement TriMet's service.

Just outside of the greater Portland region, Sandy Area Metro (SAM) and Canby Area Transit (CAT) provide transit service for Sandy and Canby. Bus service in other surrounding areas, all with connections to TriMet and SMART, is also provided by C-TRAN (Clark County, WA), Ride Connection, South Clackamas Transit District (SCTD), Cherriots (Salem, OR), Tillamook County Transportation District (Tillamook, OR), and Yamhill County Transit Area (Yamhill County, OR).

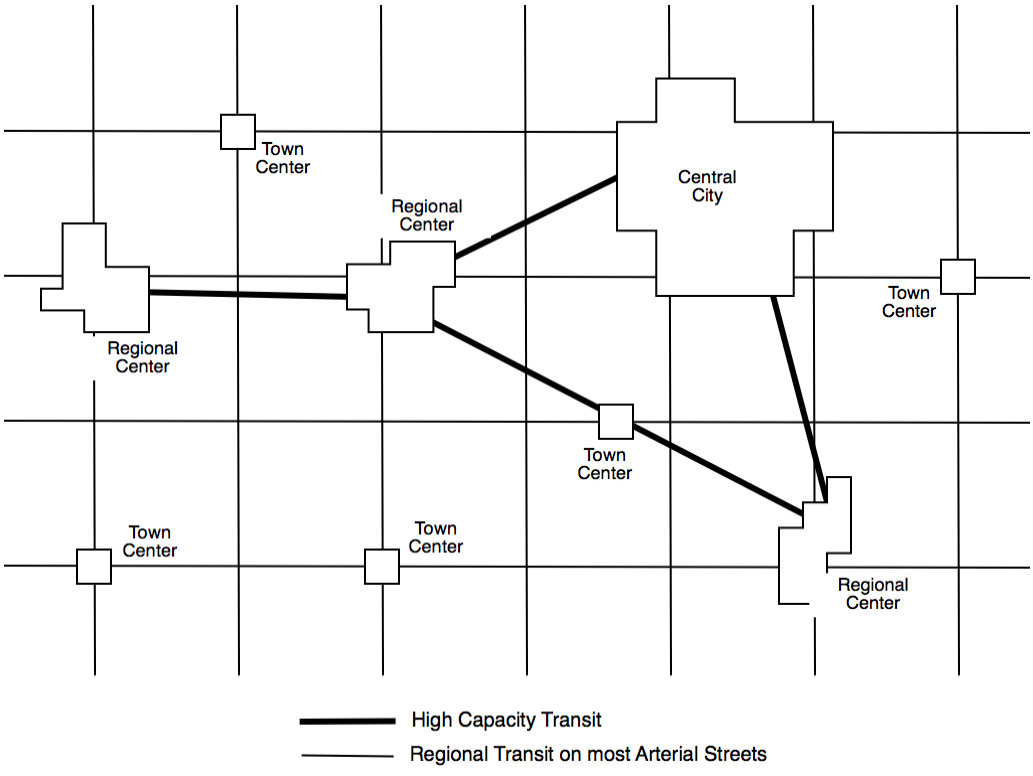
Transit is a partner in supporting the region's 2040 Growth Concept, which calls for focusing future growth in regional and town centers, station communities and 2040 corridors. A regional transit network, coupled with transit-supportive development patterns and policies that support taking transit,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

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

As part of the 2040 Growth Concept, transit is critical to connecting centers.

Figure 3.14 shows how the regional transit system concept would connect the 2040 centers.

Figure 3.14 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 existing and growing communities. Existing land use mixes and future transit-oriented development potential should be considered and incorporated into service and station location decisions.

In order to leverage transit investments, it is important to ensure land uses are transit-supportive and support local and regional land use and transportation plans and visions 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 best can be found in **Table 3.8**.

Table 3.8 Effects of land use strategies on transit service

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

Source: TriMet

Transit-supportive development patterns include:

- A compact urban form that places destinations near transit.
- A mix of uses, and a balance of jobs and housing, that creates a place where activity occurs at least 18 hours a day.
- Locating a mix of services near transit, including grocery stores and medical clinics.
- Locating affordable housing options, particularly for older adults, seniors and people with disabilities, near frequent transit.
- Well-designed streets and buildings that encourage pedestrian travel.
- Streets that can accommodate 40-foot buses.
- Safe and efficient multi-modal interactions at transit stops and stations.
- Safe, direct and convenient pedestrian and bicycle access, within communities and to transit stops and stations.
- Street connectivity with good pedestrian and bike connections to extend the effective coverage of bus and rail service.

- Managed on-street and off–street 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.

3.6.3 Regional transit network functional classifications and map

The Regional Transit Network includes future regional and local bus, enhanced transit concept corridors, high capacity transit and intercity rail, reflecting the region's updated future transit vision. Shown in **Figure 3.16**, the Regional Transit Network map has been updated to include the planned 2009 HCT connections, new enhanced transit concept corridors, streetcar and future transit service as identified by TriMet's Service Enhancement Plans and Wilsonville's Transit Master Plan. The map also highlights areas planned to be served by community-job connector shuttles. Click on 2018 RTP Regional Network Maps for online zoomable version of map.

Our existing and planned system includes a variety of transit modes, each with a special function in the overall system. Local, regional and frequent service bus lines are the backbone of our transit system. The transit providers plan for improving and expanding transit service through service enhancement plans, master plans and through annual service planning.

Our bus system operates in mixed traffic and provides service across the region. Alongside our bus system, we have implemented streetcar and corridor-based bus rapid transit (BRT). These services, along with frequent bus service, can and do include a variety of transit priority treatments. These tend to be more frequent and carry more transit riders than the regional and local bus system. The enhanced transit concept program, new to our region, provides that transit priority to help improve transit speed and reliability above the traditional transit service.

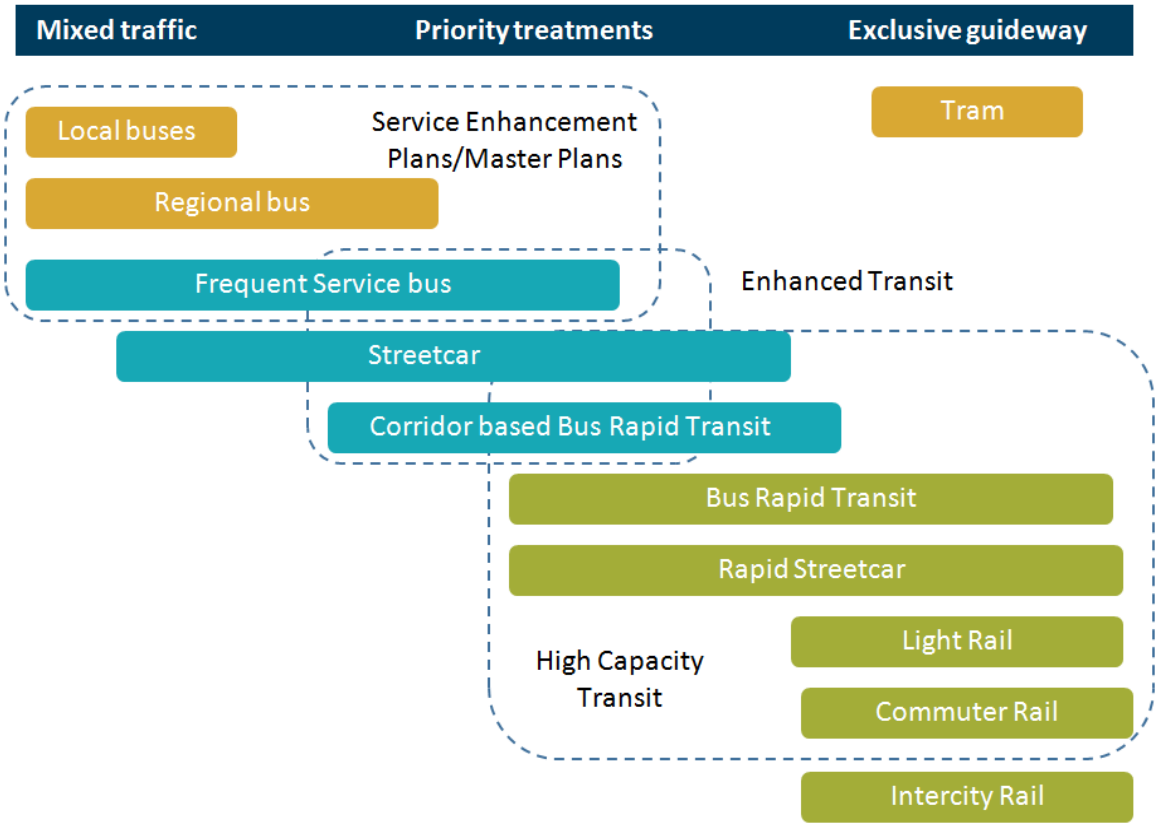
The region's high capacity transit system operates with the majority or all of the service in exclusive guideway. The high capacity transit system is meant to connect to regional centers and carry more transit riders than the local, regional and frequent service transit lines.



The region's high capacity transit system operates with the majority of all of the service in exclusive right-of-way, consisting of five lines over a 60 mile network that serves 97 stations in the city of Portland, and the communities of Beaverton, Clackamas, Gresham, Hillsboro, and Milwaukie; and Portland International Airport .

Figure 3.15 shows the broad transit spectrum that exists or is planned for regional transit system.

Figure 3.15 Regional transit spectrum



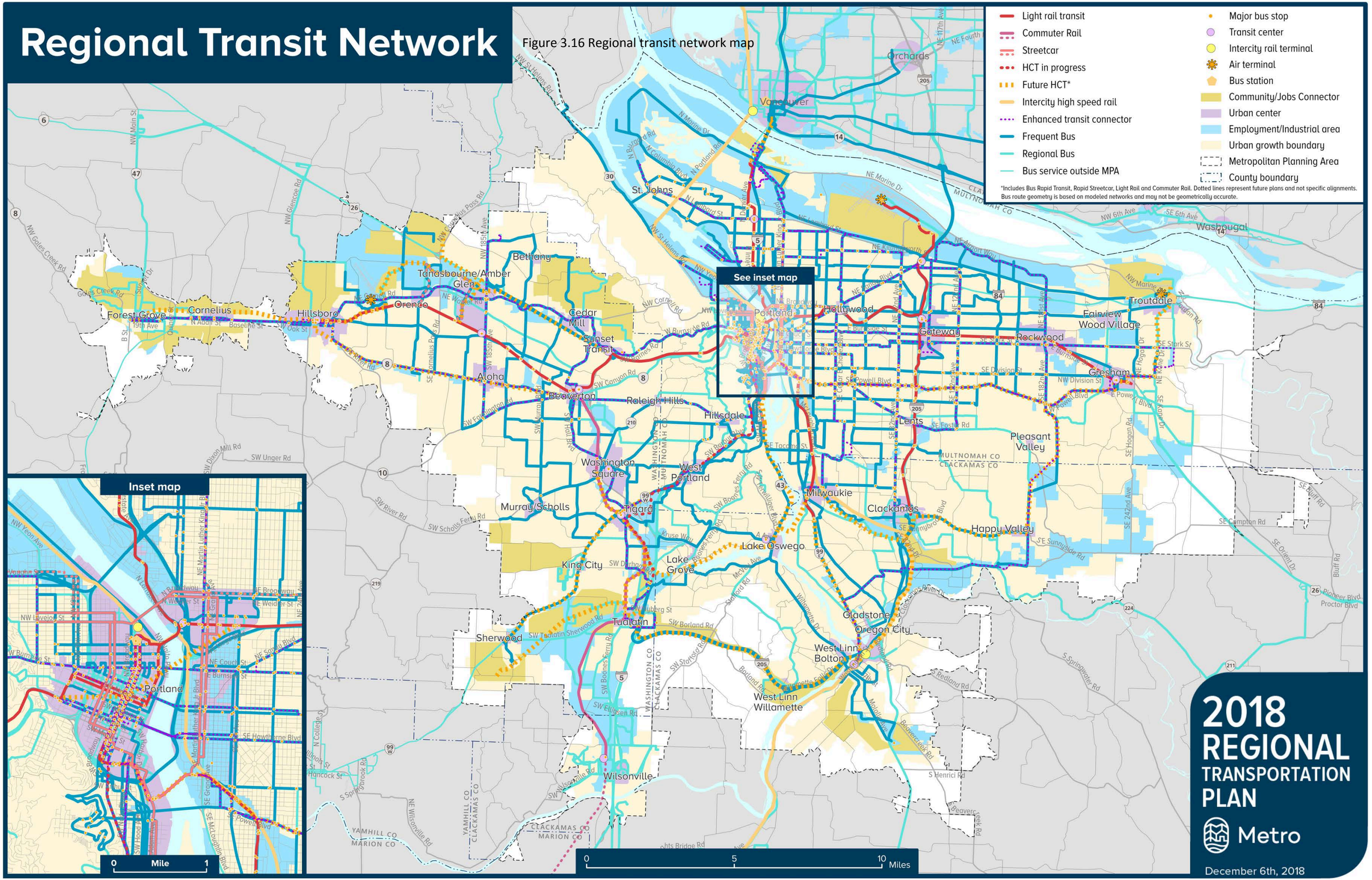
Many variables impact decisions about what type of transit mode and frequencies are most appropriate, including existing and future land uses, transit demand and opportunities and constraints.



Frequent bus routes, like line 57, provide important regional connections between communities and to jobs, medical services and other destinations, and increase access to safe, reliable transportation throughout the region.

Regional Transit Network

Figure 3.16 Regional transit network map



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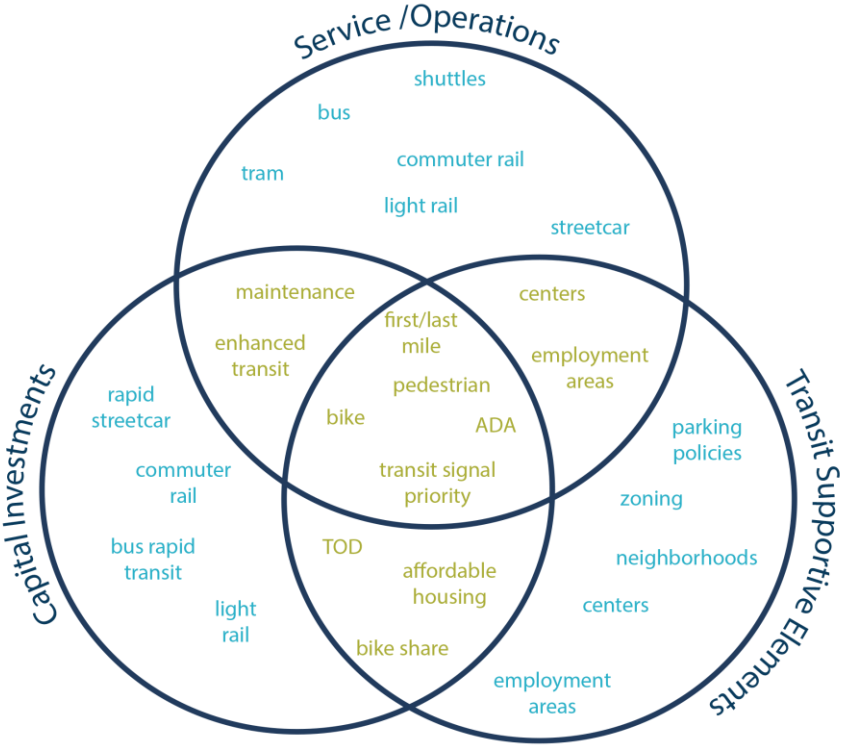
Implementation of the Regional Transit Vision

The Regional Transit Vision will be implemented through improving service, investing in infrastructure, collaborating between transit providers and local jurisdictions and expanding transit supportive elements:

- **Transit service improvements:** local and regional transit service improvements designed to meet current and projected demand in line with local and regional visions and plans.
- **Capital investments in transit:** new enhanced transit strategies such as signal priority, dedicated lanes or high capacity transit options such as bus rapid transit, light rail. commuter rail or high speed rail.
- **Transit supportive elements:** including programs, policies, capital investments and incentives such as Travel Demand Management and physical improvements such as sidewalks, crossings, and complementary land uses.

Figure 3.17 shows the relationships between these different types of investments.

Figure 3.17 Service improvements, capital investments and transit supportive elements



Public agencies and transit providers must collaborate in prioritizing transit investments throughout the region. With the passing of House Bill 2017, the Oregon Legislature identified transit improvements and service expansion as a priority for the state. With this additional funding, the region will be able to significantly increase and expand transit service. This only highlights the need to collaborate between transit providers.

3.6.4 Regional transit network policies

Regional transit priorities are informed by the following policies which aim to provide transit as an attractive, convenient , accessible and affordable travel option for all people in the greater Portland region, optimize existing transit system operations and ensure transit-supportive land uses are implemented to leverage the region's current and future transit investments.

These policies support multiple RTP goals, including goals for climate leadership and clean air, and are an integral part of implementing the Climate Smart Strategy. Expanding our transit system and use of transit in the region will continue to play a significant role in reducing transportation-related air pollutants, including greenhouse emissions. In addition, ongoing efforts to convert bus fleets to low and zero-emissions vehicles will further reduce emissions in the region.

Regional Transit Network Policies

Policy 1	Provide a seamless, integrated, affordable, safe and accessible transit network that serves people equitably, particularly communities of color and other historically marginalized communities, and people who depend on transit or lack travel options.
Policy 2	Preserve and maintain the region's transit infrastructure in a manner that improves safety, security and resiliency while minimizing life-cycle cost and impact on the environment.
Policy 3	Make transit more reliable and frequent by expanding regional and local frequent service transit and improving local service transit options.
Policy 4	Make transit more convenient by expanding high capacity transit; improving transit speed and reliability through the regional enhanced transit concept.
Policy 5	Evaluate and support expanded commuter rail and intercity transit service to neighboring communities and other destinations outside the region.
Policy 6	Make transit more accessible by improving pedestrian and bicycle access to and bicycle parking at transit stops and stations and using new mobility services to improve connections to high-frequency transit when walking, bicycling or local bus service is not an option.
Policy 7	Use technology to provide better, more efficient transit service – focusing on meeting the needs of people for whom conventional transit is not an option.
Policy 8	Ensure that transit is affordable, especially for people who depend on transit.

Transit Policy 1. Provide a seamless, integrated, affordable, safe and accessible transit network that serves people equitably, particularly communities of color and other historically marginalized communities, and people who depend on transit or lack travel options.

The Portland metropolitan region's economic prosperity and quality of life depend on a transportation system that provides every person and business in the region with equitable access to safe, efficient, reliable, affordable and healthy travel options and have the same opportunity to thrive, regardless of their race or ethnicity. With a transportation system focused on mobility and access that addresses the transportation disparities faced by communities of color, the region's transportation system has the ability to open opportunities which can dramatically improve outcomes for people of color. While on the surface, a focus on racial equity may seem exclusionary, but by addressing the barriers faced by those communities, outcomes for other disadvantaged communities will improve as well.

Frog Ferry Passenger River Taxi Service Study

A non-profit group, Friends of Frog Ferry, is pursuing the study of a passenger river taxi service connecting Vancouver, WA with central Portland. Friends of Frog Ferry has compiled an initial business plan and is working to partner with local jurisdictions to evaluate ridership and land development opportunities. Their proposal envisions a project that provides another transportation option and activates the Willamette River.

More information about the study can be found in Chapter 8 and on the project website at frogferry.com.

FRIENDS OF FROG FERRY

A complete and seamless transit system is based on providing frequent and reliable bus and rail transit service during all times of the day, every day of the week. This goes far beyond the responsibility of the transit agencies; it requires actions on behalf of the region and all the jurisdictions. In order to provide frequent and reliable service, the region needs to partner together to invest in transit priority treatments and high capacity transit to ensure that transit can take people where they need to go on time.

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, shared mobility (like Uber and Lyft or Biketown) and private automobiles. Safe and comfortable access to the stations is critical to the riders experience and convenience, but also makes transit fully accessible to people of all ages and abilities. Every transit rider is a pedestrian first, whether it is walking to the station, parking their bike and walking to vehicle or walking from the park and ride to the bus or rail.

Typical fixed route transit service may not make sense for everyone throughout the region. People may often rely on demand-response transit or infrequent buses that provide slow service and are costly to operate. New shared mobility models like microtransit could provide better service at lower cost in these situations. As these options continue to mature, agencies should look for opportunities to supplement demand response and underperforming service with shared mobility. This could provide better service for underserved and transit-dependent residents, and also increase resources available to serve high-demand corridors.

Technology is another tool to actively manage the Portland metropolitan region's transit system. This means using intelligent transportation systems and services to help improve the speed and reliability of transit. It also means taking advantage of the growth in personal technology to efficiently communicate information about transit options.

Transit Policy 2. Preserve and maintain the region's transit infrastructure in a manner that improves safety, security and resiliency while minimizing life-cycle cost and impact on the environment.

While our transit system is still relatively new, it will become increasingly important to invest in upkeep as the system ages. It is critical to ensure that it is well-maintained and to replace or improve outdated parts of our transit system to preserve its efficiency. In addition, the Federal Transit Administration's State of Good Repair program is dedicated maintenance of our transit system includes incorporating industry best practices and recommendations related to reliability and safety and supporting TriMet's implementation of its Service Enhancement Plans to help transit agencies maintain bus and rail systems as part of the federal transportation performance management implementation. These grants are distributed to state and local governments to repair and upgrade rail and bus rapid transit systems that are at least seven years old.

Following the Great Recession of 2008, TriMet delayed new bus purchases for four years because of the resulting decrease in income from taxes. Starting in 2012, TriMet began to replace buses on an accelerated schedule and has since moved away from having one of the oldest fleets in the country to an industry-standard average age of eight years. According to the FTA, the average useful life of a bus is 12 years, or 500,000 miles. Another area of investment for TriMet is the MAX system, parts of which are more than 30 years old. While the FTA's assigned life expectancy for rail cars is 25 years, industry experience reports a 30-35 year lifespan in reality. Nevertheless, the TriMet light rail system will soon be in need of repairs and upgrades.

It's also important that to plan for the future capacity needs of our transit system. As our region grows and ridership on our public transportation system is ever increasing, the region is starting to push the limits of what our existing infrastructure can handle. This creates more transit bottlenecks throughout the region, increasing congestion and decreasing the reliability of our transit system. Some lines already have many buses running behind schedule due to heavy traffic, which leads to unpredictable service. Other lines suffer from overcrowding. Popular lines will always have standees, but some trips have such high ridership that at times, riders are unable to board and must wait for another vehicle. In order to make transit more reliable and convenient, these factors must also be addressed.

Some recent maintenance projects and improvements that TriMet has undertaken include:

- Replacing switches and realigning the trackway at the Rose Quarter
- Replacing switches and reconstructing rail at SW 11th Avenue in Downtown Portland
- Completing design for reconstructing MAX trackway over the Steel Bridge
- Beginning a four-year replacement of overhead power contact wire on the original MAX Blue Line between Cleveland Ave in Gresham to Lloyd Center
- Upgrading and repairing platform areas at Gresham City Hall and Washington Park stations

Other improvement projects include planned upgrades to fourteen (14) MAX Blue Line stations between NE 42nd/Hollywood and Cleveland that include safety improvements and electronic display installations. Pedestrian crossings and shelters are being improved; trees on or near the platform are being removed to make space for lighting and improve the line-of-sight for security cameras.

In addition, TriMet began testing clean fuel buses in 2002 with two diesel-electric hybrids and we currently operate eight hybrids that we began to introduce in 2012. While those buses had some advantages, TriMet ultimately didn't see the performance needed to roll them out system-wide. Through a recent federal grant, as well as support from Portland General Electric, TriMet purchased five electric buses that will soon run on Line 62-Murray Blvd in Beaverton. TriMet continues to look for additional resources for additional testing. While on paper electric buses sound great, TriMet needs to make sure they live up to their promise before rolling them out system-wide. Seeing how these buses operate under real-world conditions will help TriMet assess if these battery-electric buses are a viable and economic option for system-wide expansion.

Whether electricity or hydrogen-powered, cleaner alternative fuels are the future of transit. TriMet's efforts to embark on this test that will move our region one step closer to this vision. In addition, TriMet was just awarded federal funds to purchase additional battery electric buses within the next five years. House Bill 2017 provides an opportunity to further invest in these vehicles as one funding alternative.

Transit Policy 3. Make transit more reliable and frequent by expanding regional and local frequent service transit and improving local service transit options.

Expand regional and local frequent service transit

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.

As mentioned earlier, frequent service transit is defined as wait times of 15 minutes or less from the early morning to late in the evening, seven days a week. Frequency is especially important for making transit more competitive with driving for 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.

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 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)
- Express Bus
- Enhanced Transit elements
- Regional transit centers and stops
- Bicycle stations/parking
- Park-and-ride facilities

Key considerations for investments in frequent service are ridership, productivity, and lines that provide historically marginalized communities access to jobs and other community places. Decisions about transit investments should be assessed with an equity lens to ensure transit access for our most vulnerable communities.

Improve local service transit

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 transit demand, but not enough to support regional or 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.

Providing community and job connector shuttles increases the convenience of transit, particularly for areas without frequent service transit or where traditional transit service is not viable. **C**ommunity and job connector shuttles also expands the reach of transit service across the region, which improves access to jobs and community places and can help facilitate first/last mile

connections where business and or homes are spread out and regional fixed-route bus service is not cost effective.

Demand responsive services

One foundational support of the regional transportation system in both urban and rural areas is the availability of demand-response services. These services provide access to transportation that "fills in the gaps" where fixed-route transit, complementary paratransit, or deviated fixed-route "last mile" shuttle services are not the appropriate or most cost-effective tool to meet the need of low income individuals, seniors or people with disabilities. Because these services operate in the background, as a coordinated addition to the total transportation system, they often go unnoticed. However, they provide a lifeline of service to low-income people who experience barriers to accessing the transportation system. Each year over 500,000 trips are provided on demand-response services throughout the region, and current service is still not enough to meet the existing demand or projected growth in demand concurrent with the region's growing population.

Types of local transit services include:

- Local bus
- Para-transit
- Deviated "On-Demand" routes
- Community and job connector shuttles
- Employer shuttle service
- Community event shuttles
- Tram



The GroveLink bus serves a greater part of the Forest Grove, helping to link residents with downtown locales as well as with TriMet bus line 57.

In order to reach our regional transit objectives local transit service improvements and expansion should be coordinated with TriMet's Coordinated Transportation Plan for Seniors and Persons with Disabilities and the Special Transportation Funds Advisory Committee (STFAC).

Transit Policy 4. Make transit more convenient by expanding high capacity transit; improving transit speed and reliability through the regional enhanced transit concept.

Expand high capacity transit, to serve transit dependent populations and improve system performance between key destinations

High Capacity Transit (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 greater connections between 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 peak hours and 15 minutes during off peak hours. 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, civic art and commercial services.

To optimize and leverage transit supportive land uses, alignments and station locations should 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 by the HCT assessment and readiness criteria described in the implementation chapter of the Regional Transit Strategy).

Types of high capacity transit types, 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 (Majority of service operates in separate and dedicated right of way, defined stations, transit signal priority and short headways)
- On-street bus rapid transit (Substantial transit investment, some separate or dedicated right of way, defined stations, transit signal priority, short headways)
- 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)
- Secure bicycle parking (e.g., bicycle stations or bike & rides)
- Park & ride lots
- Transit centers
- Transit stations

Major infrastructure investments have implications within the communities they are located. Historic data shows that a major HCT investment contributes to both positive and negative outcomes for the communities they serve. It is critical that during the planning for a new HCT investment, a strategy should be developed that considers both the positive and negative impacts of the investment, particularly as it applies to the most at-risk populations. These tend to be people of color, people with lower income, people with limited English proficiency, older adults and youth. Additionally, these populations tend to be our most transit dependent. What this means is that their potential displacement from the economic pressures that the investment

brings, ultimately leads to undermining the long-term effectiveness of the investment. By planning all new HCT lines through an Equitable Development Framework, we can attempt to lessen the negative impacts of the investment, while enhancing the opportunity that these transit-dependent populations benefit from it, by limiting residential and business displacements and gentrification. The framework will vary for each project and should be developed at the time an HCT project is being considered through planning, engineering and construction.

Any HCT planning effort should directly incorporate community in the decision-making process. The process should also be informed and include an assessment of data with an equity lens. Where possible, HCT projects should also enhance the contracting and job training benefits and opportunities for displaced and historically marginalized populations.

The HCT assessment and readiness criteria, described in more detail in Chapter 7 of the Regional Transit Strategy, provides a framework to inform advancing HCT transit projects identified in the RTP and Regional Transit Strategy.

Improve transit speed and reliability through the regional enhanced transit concept

In order to meet the region's environmental, economic, livability and equity goals as we grow over the next several decades, we need to invest more in our transit system, particularly the frequent service bus network. There are many ways to increase transit speed and reliability throughout our system. The region should pursue opportunities as they arise to improve the efficiency of our system to support our transit riders.

The Enhanced Transit Concept (ETC) program is one way to do this, and employs new public partnerships to service treatments that increase capacity and reliability, yet are relatively low-cost to construct, context-sensitive, and able to be deployed quickly throughout the region where needed.

ETC can be implemented through the coordinated investment of multiple partners and has the potential to provide major improvement over existing service or even our region's best frequent service, but less capital-intensive and more quickly implemented than large scale high capacity transit. Investments would serve our many growing mixed-use centers, corridors, and employment areas that demand a higher level of transit service but are not seen as short-term candidates for light-rail, or bus rapid transit.

ETC partnerships could also create more reliable, higher quality transit connections to connect low-income and transit-dependent riders to jobs, school and services. It would allow for a more fine-grained network of higher-quality transit service to complement our high capacity transit investments, relieve transit congestion and grow ridership throughout the region.

Preferential treatments, such as transit signal priority, covered bus shelters, special lighting, enhanced sidewalks, and protected crosswalks are also all fundamental to making the ETC network function at its highest level.

Improving the speed and reliability of our frequent service network could be implemented at the regional scale, along corridors or at "hot spot" locations. **Table 3.9** describes the different types of treatments that have the potential to improve reliability.

Table 3.9 Enhanced transit treatments

Regional	Hotspot
Bus on shoulder	Dedicated bus lane
Transit signal priority and signal improvements	Business access and transit (BAT) lane
Headway management	Intersection queue jump/right turn except bus lane
Corridor	Transit-only aperture
Level boarding	Pro-time (peak period only) transit lane
All door boarding	Multi-modal interactions
Bus stop consolidation	Curb extension at stops/stations
Rolling stock modification	Far-side bus stop placement
Transit signal priority and signal improvements	Street design traffic flow modifications

Transit Policy 5. Evaluate and support expanded commuter rail and intercity transit service to neighboring communities and other destinations outside the region.

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 2009 High Capacity Transit 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:

- **Potential Intercity 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 for this corridor and consider land use planning activities that focus on transit-supportive development around potential future commuter rail station areas.
- **Promising Intercity 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 passed House Bill 2408, which directs ODOT to study the possible extension of commuter rail service from Wilsonville to Salem, which is currently serviced by SMART today.

In addition, the Pacific Northwest Corridor is one of ten corridors shown in **Figure 3.18** identified for potential high-speed rail investments to better connect communities across America,. This corridor provides an important intercity rail connection between Eugene, Oregon and Vancouver, British Columbia.

Figure 3.18 U.S. high speed intercity passenger rail network



Source: U.S. Department of Transportation (April 2016)

More recently, the Oregon Department of Transportation completed its analysis for improved passenger rail service between Eugene-Springfield and Portland – a 125 mile segment of the federally-designated Pacific Northwest Rail Corridor. The results of the study are documented in a Tier 1 Draft Environmental Impact Statement currently under review by the Federal Railroad Administration. Information in the DEIS includes the general rail alignment, communities where stations would be located and service characteristics, such as the number of daily trips, travel time objectives and recommended technologies. In addition, ODOT is looking at ways to improve future commuter rail needs through an update of the Oregon State Rail Plan.

More work is needed to determine what partnerships, infrastructure investments and finance strategies are needed to support improved intercity passenger service to communities outside the

region. 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 of the Regional Transit Strategy.

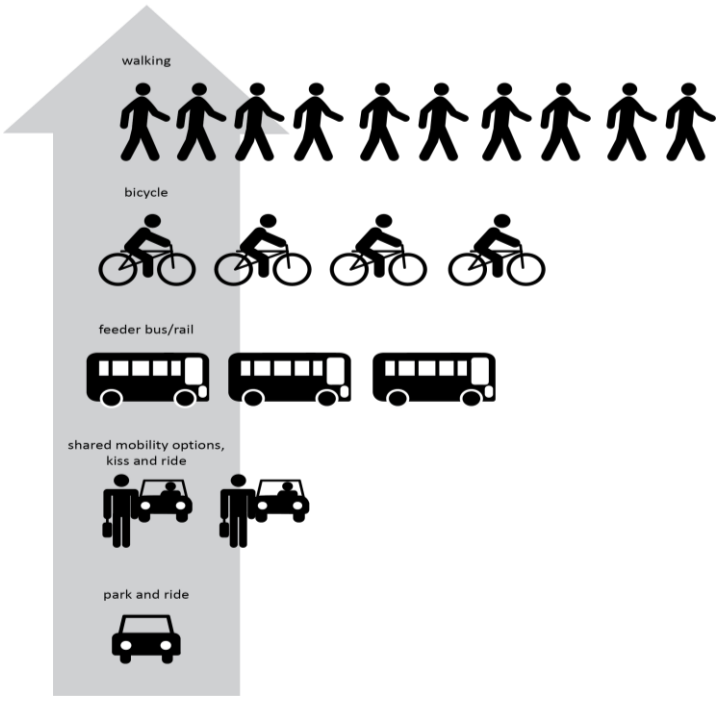
Transit Policy 6. Make transit more accessible by improving pedestrian and bicycle access to and bicycle parking at transit stops and stations and using new mobility services to improve connections to high-frequency transit when walking, bicycling or local bus service is not an option.

Improve pedestrian and bicycle access to and bicycle parking at transit stops and stations

Providing safe and direct walking and biking routes and crossings that connect to transit stops ensures that transit services are fully accessible to people of all ages and abilities. 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 3.19** depicts the region's priorities for providing multi-modal access to the region's transit system. It prioritizes walking and biking to transit and deemphasizes driving 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 and accessible for more people of all ages and abilities, including seniors and people with disabilities. Transit, pedestrian and bicycle travel benefit as improvements are made to each of the modes.

Figure 3.19 Regional transit system access priorities



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, transit tracker information and seating at stops and stations;

- providing bicycle amenities at transit centers such as repair stations and lockers;
- 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 and Transit Tracker;
- co-locate bike and car sharing facilities at transit stations to improve active transportation connections and manage parking demand, which helps to create a safer walking and bicycling environment; and
- linking modal systems in regional and local transportation plans.

Explore new ways to improve connections to high frequency transit

Advances in technology have given rise to new transportation options that make it easier for people to share vehicles and rides and provide a potential first/last miles connection. Many of these options are already widely used in our region:

- In the city of Portland, ride-hailing services Uber and Lyft provided an estimated 10 million rides in 2017. We do not know how many of these were first/last mile connections to transit.
- Car sharing services operate over 1,000 vehicles in the region, and though some of these services have been around for a decade, new models have sprung up, including free-floating car sharing companies like ReachNow and Car2Go that allow people to pick up and drop off a car anywhere within a defined service area.
- The City of Portland's bike share system, BIKETOWN, launched in July 2016, and carried over 300,000 trips in its first year. Many of the bikeshare stations are purposefully co-located at transit stations.
- The City of Portland recently launched a four-month pilot for shared electric scooters (also known as dockless scooters or e-scooters) in summer 2018. In the first three weeks of the pilot these scooters carried close to 100,000 trips. Following the pilot, the City will evaluate how e-scooters contribute to its mobility, equity, safety, and climate action goals. Metro and its public agency partners will be coordinating with Portland to understand how e-scooters support regional goals, whether they are effective at providing first/last mile connections to transit, and if so, what steps transportation agencies could take to make scooters available for these connections.

Other innovations are not yet available in our region, but may be soon:

- Shared electric bikes allow riders to take easier or longer-distance trips than they could on a conventional bicycle.
- Microtransit, which refers to services that use smart phones to allow riders to book trips, collect data to tailor routes that meet riders' needs and serve these routes with vehicles that

are smaller than conventional buses, can be a viable model for communities that don't have high enough ridership for conventional transit to pencil to be cost effective.

These new options, along with conventional shared modes like transit, carpools, and vanpools, are often referred to collectively as "shared mobility." Combining transit and other shared modes can provide better service for travelers while creating better environments around stations. People who might otherwise need to drive to can instead use a combination of shared mobility and transit. In these situations, shared mobility provides more convenient connections to stations, but taking transit for the bulk of the trip keeps the journey more affordable. If more people use shared modes to get to transit rather than driving, it can free up space that might otherwise be used for parking for public spaces, bicycle and pedestrian facilities or development. In order to deliver on this potential, Metro and our partners need to improve connections between shared mobility and transit. There are several actions we can take.

- Dedicate space for shared mobility at transit stations. Accommodating bike share stations or pods of car share vehicles at transit stops makes it easy for transit riders to use these options. Setting aside space for pickups and dropoffs near stations can make it more convenient for people to access options to transit, as well as improve safety by reducing conflicts between modes. At stations with parking, reserving premium spaces for carpools or shared vehicles can provide an incentive for travelers to share trips instead of driving alone.
- Coordinate with shared mobility companies to provide shared connections to transit stations. Several communities already support vanpools or operate shuttles to and from transit stations. Similarly, public agencies can partner with microtransit or carsharing, pooled ride-hailing services or dockless bike/scooter sharing companies to provide new connections to transit and promote the use of these services.
- Make it easy to plan and book transit and shared mobility trips. Smartphone apps are now the most common way for people in the Portland region to access information about their transportation options. At a minimum, transit agencies should make schedule and route information available through their own online tools as well as in general transit feed specification format so that it can be incorporated into apps like Google Maps, TransitApp, and moovel. TriMet's Open Trip Planner Shared-use Mobility project will create a platform to integrate data on transit and shared mobility options so that riders can easily plan multimodal trips. The ability to book and pay for multimodal trips on a single platform could make transit-shared mobility connections even more convenient.

There are two important issues to consider when integrating transit and shared mobility data. The first is ensuring that third-party apps use that data in a way that supports transit. No matter how easy-to-use or informative the apps and websites that public agencies develop are, a significant number of people will get data from third-party apps. The companies that develop these apps often monetize transit data by showing advertisements for ride-hailing services that show how much quicker a rider could reach a destination by paying extra for an Uber or Lyft. These advertisements can draw people away from taking transit, and agencies should consider whether they want to place conditions on the use of transit data by third parties.

The second is maintaining access for the many people who can't access apps or make online payments, which can include low-income people, undocumented people, people with disabilities, or people with limited English proficiency—in other words, many of the same travelers who rely on transit. Phone-based concierge services or cash-based payment services at convenient locations, as well as traditional fare media and schedules, can help these people continue to access transit.

Design and manage designated transit streets to prioritize transit and shared travel. Dedicating transit lanes and rights of way and prioritizing buses at signalized intersection are widely used strategies to help transit vehicles move more quickly. As the region explores congestion pricing, we should consider methods of pricing that reduce tolls for higher occupancy vehicles. More ride-hailing services picking people up and dropping them off means that curb space is increasingly valuable, and the use of global positioning systems on ride-hailing vehicles makes it possible to manage where these vehicles drop people off and pick them up. Agencies can manage the curbside to prioritize ride-hailing services carrying more than one passenger and avoid conflicts with transit vehicles.

Transit Policy 7. Use technologies to provide better, more efficient transit service, including focusing on meeting the needs of people for whom conventional transit is not an option.

Advancements in technology provide opportunities for the region to proactively improve transit service and efficiency.and integraate technological advances in transportation and mobility serves that are supportive of and leverage the use of transitOne key way to do this is through the application of technology to serve areas that are more difficult to serve by traditional transit service.

Our region is home to many people with disabilities who require specialized vehicles and point-to-point service, as well as people who depend on transit but live in communities where fixed-route service does not make sense. These people often rely on demand-response transit or infrequent buses that provide slow service and are costly to operate. New shared mobility models like microtransit could provide better service at lower cost in these situations. As these options continue to mature, agencies should look for opportunities to supplement demand response and underperforming service with shared mobility. This not only provides better service for underserved and transit-dependent residents, but also increase resources available to serve high-demand corridors. Over the longer term,



Transit is a critical option for those in need, the most efficient way to move people along crowded streets, and the backbone of many communities. It is difficult to imagine a positive future for the region without it.

In order to make sure that transit thrives, we need to enhance service on high-ridership lines while piloting new ways to provide transit (like microtransit or using new mobility services to connect to stations) in communities that are challenging to serve with large buses traveling on fixed routes.

autonomous vehicle (AV) technologies have the potential to make transit work more efficiently everywhere, and transit agencies should look for opportunities to test these technologies and understand their potential benefits as they become available.

Transit Policy 8. Ensure that transit is affordable, especially for people who depend on transit.

The cost of transportation burdens many households in the metropolitan region Transportation is usually the second largest share of household costs (after housing) and are particularly burdensome for low-income households who often have the longest distances to travel. It is therefore important to ensure that transit is affordable, particularly for the riders that need it the most (i.e. the riders who do not have access to cars). Ensuring that transit is affordable alleviates the cost of owning automobiles; in the greater Portland region, an individual saves an average of $10,477 annually by switching from cars to public transit (APTA, June Transit Savings Report, 2017).

Low-income households, people of color, people with disabilities, children, older adults and people with limited English proficiency are those most affected by transportation costs because they're historically more transit-dependent than others. As our region continues to grow in both population and diversity, embracing this growing diversity means providing service that is equitable. Using equity as a lens to guide decisions ensures that the transit system benefits those who rely on it the most.

Expanded payment options

TriMet also rolled out the Hop Fastpass, a state-of-the-art electronic fare system for TriMet, C-TRAN, and Portland Streetcar. Riders will be able to choose from a variety of payment options, including a transit-only smart card, contactless bank card, and smartphones with contactless technology built in. One benefit of the Hop Fastpass for low-income riders is a daily and monthly cap on fares paid. Riders who use the system for two full-fare trips will be able to ride the rest of the day for free. Similarly, after using the Hop Fastpass for the equivalent cost of a monthly pass, riders will be able to use the transit system for free for the rest of the month. The Hop Fastpass therefore allows riders to buy daily and monthly passes one installment at a time, making discounts available to those who can't afford the cost of a daily or monthly pass up front.

Reduced fare programs

TriMet has already implemented several programs in order to make transit affordable. Reduced fares are available to youths ages 7-17 and students in high school or pursuing a GED, and children 6 and under ride for free with a paying passenger. High school students in the Portland Public School District can ride for free during the

SMART Fare Programs

SMART routes within the City of Wilsonville are free, while other routes running to Canby, Tualatin, Barbur Transit Center, and Salem charge a fee. SMART also offers a reduced half price pass for older adults (60 years and older), persons with disabilities, Medicare card holders and youth riders (5-17 years old or students to 23 years old with valid student ID).

school year as well by showing their student ID. Honored citizens, which include those over 65, those on Medicare, or those with disabilities are also eligible for reduced fares. Access Transit fare programs help low-income riders, including low-income seniors and riders with disabilities. These programs provide fares to non-profit and community-based organizations at lower to no cost, which are then distributed to clients.

Over the last few years, TriMet has been working toward a reduced fare program for people with limited incomes. A task force of advocates, community members and elected officials recommended a low income fare program where adults at or below 200 percent of the federal poverty level would be eligible for half-priced fare. Implementation of this program means that adults making up to $24,120 a year could take a ride for $1.75, and buy a day pass for $2.50 (the same price as Honored Citizen and Youth fares). Participants would use a reduced fare Hop card similar to an Honored Citizen or Youth card. House Bill 2017 provided the funding to implement the TriMet Low-Income Fare Program.

Partnerships and advocacy

To ensure that transit remains affordable, the region should build partnerships with non-profit and human service providers to support the dissemination of information about these fare programs and to work through ways in which these programs can be more effective. This should also include advocating in the state legislature and to the voters to increase, deepen, and sustain long-term funding for programs which support keeping transit affordable for riders.

Private efforts to study the potential for passenger ferry service

A non-profit group, Friends of Frog Ferry, is pursuing the study of a passenger river taxi service connecting Vancouver, WA with central Portland. Friends of Frog Ferry has compiled an initial business plan and is working to partner with local jurisdictions to evaluate ridership and land development opportunities. Their proposal envisions a project that provides another transportation option and activates the Willamette River.



Source: Friends of Frog Ferry

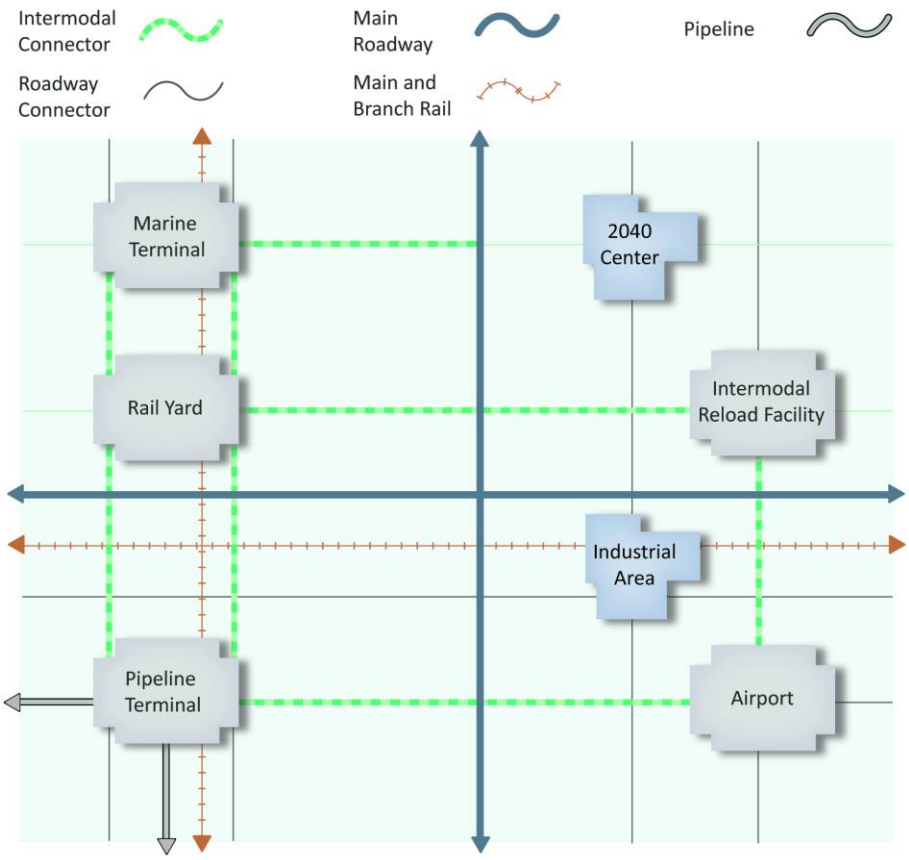
3.7 REGIONAL FREIGHT NETWORK VISION AND POLICIES

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

3.7.1 Regional freight network concept

The Regional Freight Strategy addresses the needs for freight through-traffic as well as regional freight 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. The transport and distribution of freight occurs via the regional freight network, a combination of interconnected publicly and privately owned networks and terminal facilities. The concept in **Figure 3.20** shows the components of the regional freight system and their relationships.

Figure 3.20 Regional freight network concept



Rivers, mainline rail, pipeline, air and truck routes and arterial streets and throughways connect the region to international and domestic markets and suppliers beyond local boundaries. Inside the 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 and heavy vehicle corridors connect industrial areas, marine terminals and pipeline terminals to rail yards and truck terminals. Pipelines transport petroleum products to and from terminal facilities.

3.7.2 Regional freight network policies

The Regional Freight Network Policies reflect the policy framework of the Regional Freight Strategy. Specific actions that Metro, in partnership with cities, counties, agencies and other stakeholders can take to implement the policies are identified in Chapter 8 of the Regional Freight Strategy.

Regional Freight Network Policies

Policy 1	Plan and manage our multimodal freight transportation infrastructure using a systems approach, coordinating regional and local decisions to maintain seamless freight movement and access to industrial areas and intermodal facilities.
Policy 2	Manage the region's multimodal freight network to reduce delay, increase reliability and efficiency, improve safety and provide shipping choices.
Policy 3	Better integrate freight issues in regional and local planning and communication **to** Inform the public and decision-makers on the importance of freight and goods movement issues.
Policy 4	Pursue a sustainable multimodal freight transportation system that supports the health of the economy, communities and the environment through clean, green and smart technologies and practices.
Policy 5	Protect critical freight corridors and access to industrial lands by integrating freight mobility and access needs into land use and transportation plans and street design.
Policy 6	Invest in the region's multimodal freight transportation system, including road, air, marine and rail facilities, to ensure that the region and its businesses stay economically competitive.
Policy 7	Eliminate fatalities and serious injuries caused by freight vehicle crashes with passenger vehicles, bicycles and pedestrians, by improving roadway and freight operational safety.

Freight Policy 1. Plan and manage our multimodal freight transportation infrastructure systems approach, coordinating regional and local decisions to maintain seamless freight movement and access to industrial areas and intermodal facilities.

A comprehensive, systems approach is central to planning, managing, and using 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 the 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.



Freight Policy 2. Manage the region's multimodal freight network to reduce delay and increase reliability and efficiency, improve safety and provide shipping choices.

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.

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.[11] The region's forecasted population and job growth – an additional 917,000 residents and 597,000 jobs to be added

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

between 2010 and 2040[12] – along with the associated boost in the consumption of goods and services are significant drivers of projected increases in local freight volume.

This policy is the first step to improved freight and goods movement operations on the existing system and includes preservation, maintenance and operations-focused projects and associated planning and coordinating activities. It focuses on using the system we have more effectively.

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.



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

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.

Freight Policy 3. Better integrate freight issues in regional and local planning and communication to inform the public and decision-makers on the importance of freight and goods movement issues.

To gain public support for projects and funding of freight initiatives, and to better inform elected officials when making land use and transportation decisions, a program that informs the public is required.

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.

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

Freight Policy 4. Pursue a sustainable multimodal freight transportation system that supports the health of the economy, communities and the environment through clean, green and smart technologies and practices.

This policy deals with traditional nuisance and hot spot issues associated with "smokestack and tailpipe" problems, but it also recognizes the many current contributions and new opportunities for the evolving green freight community to be part of the larger environmental and economic solution set required in these times, including reducing greenhouse gas emissions.

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 innovations and technologies have been developed as part of the Regional Freight Strategy's Technology for Sustainable Freight Transport, as identified in Chapter 6 of the strategy.



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

Freight Policy 5. Protect critical freight corridors and access to industrial lands by integrating freight mobility and access needs into land use and transportation plans and street design.

This policy targets land use planning and design issues that can affect the ability of freight, goods movement and industrial uses to live harmoniously with their neighbors. Freight---sensitive land use planning includes everything from long-range aspirations for freight and industrial lands to short-term and smaller scale design and access issues.

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.

Freight Policy 6. Invest in the region's multimodal freight transportation system, including road, air, marine and rail facilities, to ensure that the region and its businesses stay economically competitive.

This policy focuses on planning and building capital projects and developing the funding sources, partnerships, and coordination to implement them.

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 the Regional Freight Strategy, 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.[13] 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.

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, 2013 exports as a percentage of gross state product.

Freight Policy 7. Eliminate fatalities and serious injuries caused by freight vehicle crashes with passenger vehicles, bicycles and pedestrians, by improving roadway and freight operational safety.

This policy and the potential design solutions focuses on addressing the issue of eliminating fatalities and serious injuries due to freight vehicle crashes with passenger vehicles, bicycles and pedestrians.

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

3.7.3 Regional freight network classifications and map

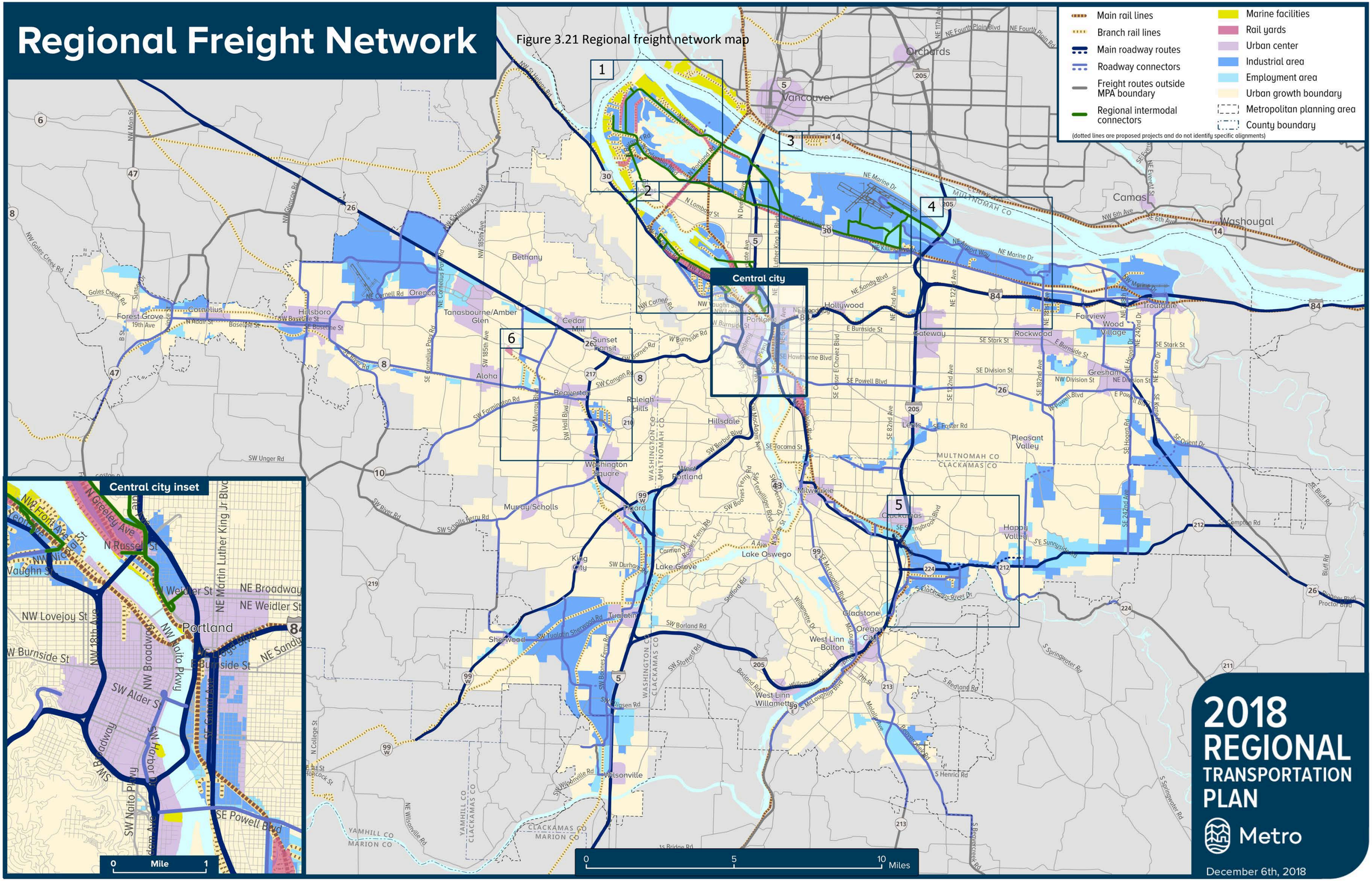
The Regional Freight Network map, shown in **Figure 3.21** applies the regional freight network concept on the ground to identify the transportation networks and facilities that serve the region and the state's freight mobility needs. Click on 2018 RTP Regional Network Maps for online zoomable version of map. The regional freight network has a functional hierarchy similar to that of the regional motor vehicle network. To show the continuity of the freight system in both Oregon and Washington state, the map shows the freight routes in Clark County, north of the Columbia River and rural freight routes designated by Clackamas and Washignton counties that connect to the regional freight network designated within the metropolitan planning area boundary. The Regional Freight Network map also includes six inset maps (brown dotted line boxes) that focus on the key intermodal facilities (marine terminals, rail yards and pipeline facilities) and rail lines to highlight the importance of the rail network, and have better visibility for the rail lines, These inset maps are located on the back side of the main map.

The different functional elements of the regional freght network are:

- **Main line rail –** Class I rail lines (e.g., Union Pacific and Burlington Northern/Santa Fe).
- **Branch line rail –** Non-Class 1 rail lines, including short lines (e.g., Portland and Western Railroad).
- **Main roadway routes –** Designated freights routes that are freeways and highways that connect major activity centers in the region to other areas in Oregon or other states throughout the U.S., Mexico and Canada.
- **Regional Intermodal Connectors –** Roads that provide connections between major rail yards, marine terminals, airports, and other freight intermodal facilities; and the freeway and highway system. Marine terminals, truck to rail facilities, rail yards, pipeline terminals, and air freight facilities are the primary types of intermodal terminals and businesses that the tier 1 and NHS intermodal connectors are serving in the Portland region. An example of a NHS intermodal connector is Marine Drive between the marine terminals (Terminal 5 and 6) and I-5; which in 2014 had over 4,100 average daily trucks. Another NHS intermodal connector is Columbia Boulevard between I-5 and OR 213 (82nd Avenue) which had over 3,500 average daily trucks and is a vital freight connection between the air-freight terminal at Portland International Airport and both I-5 and I-205. These Regional Intermodal Connectors are carrying many more trucks than the typical road connectors on the Regional Freight Network map. They are also of critical importance for carrying commodities that are being exported from and imported into the state and across the country.
- **Roadway connectors –** Roads that connect other freight facilities, industrial areas, and 2040 centers to a main roadway route.
- **Marine faciilties –** A facility where freight is transferred between water-based and land-based modes.
- **Rail yards –** A rail yard, railway yard or railroad yard is a complex series of railroad tracks for storing, sorting, or loading and unloading, railroad cars and locomotives. Railroad yards have many tracks in parallel for keeping rolling stock stored off the mainline, so that they do not obstruct the flow of traffic.

Regional Freight Network

Figure 3.21 Regional freight network map

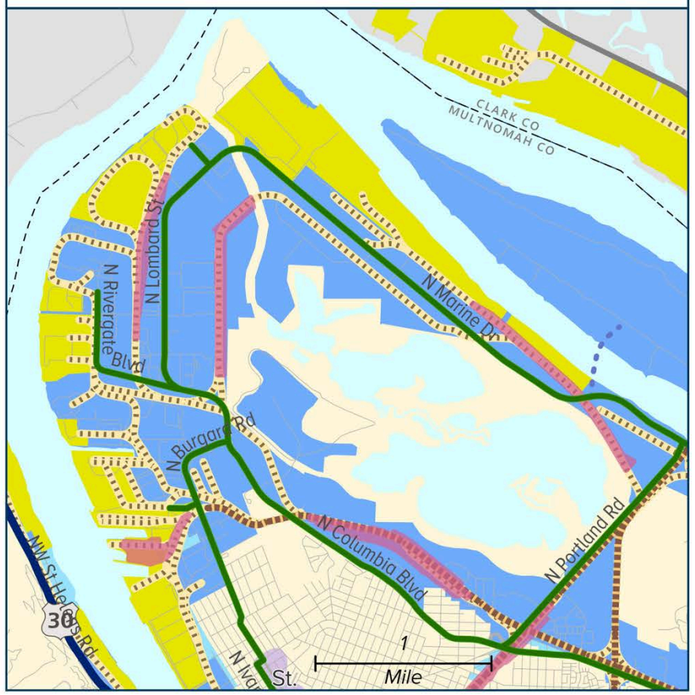


2018 REGIONAL TRANSPORTATION PLAN

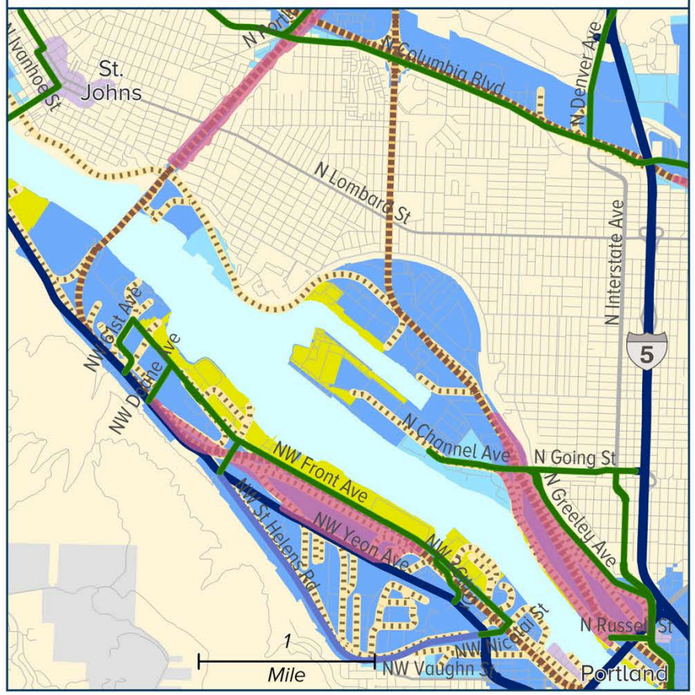
Metro

December 6th, 2018

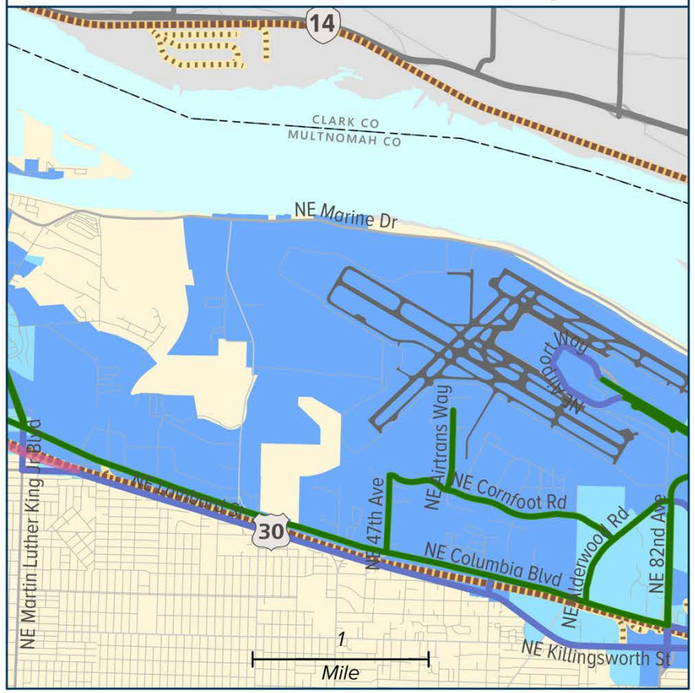
1. North Portland Marine Terminals



2. NW Industrial and Swan Island



3. Portland International Airport



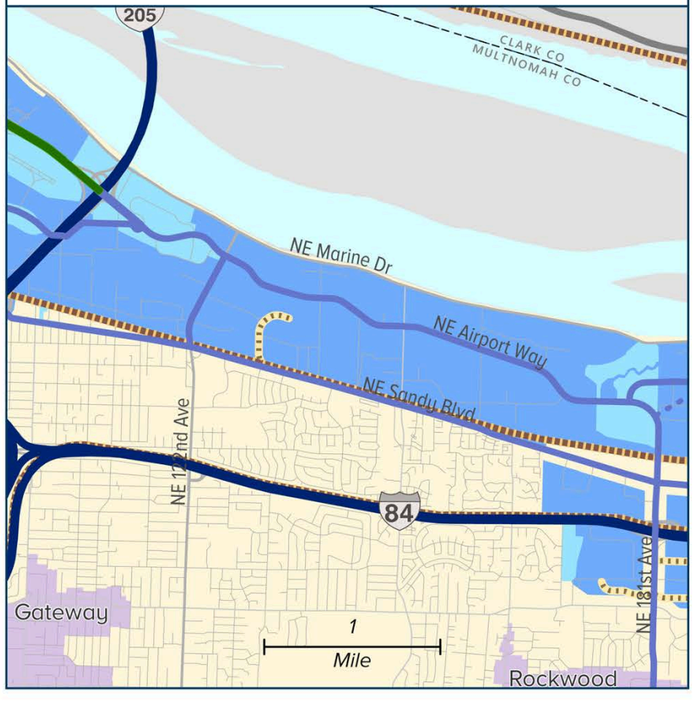
Legend

(dotted lines are proposed projects and do not identify specific alignments)

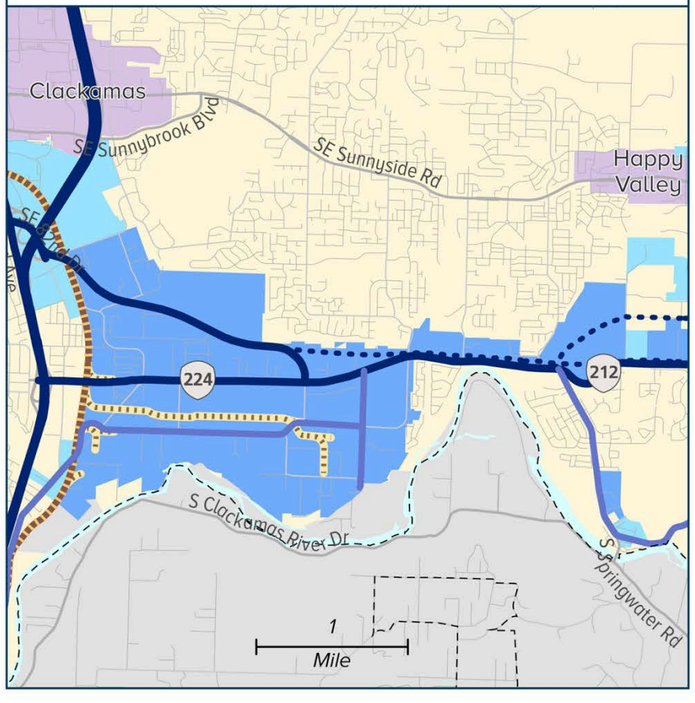
- Main rail lines
- Branch rail lines
- Main roadway routes
- Roadway connectors
- Freight routes outside MPA boundary
- Regional intermodal connectors
- Marine facilities
- Rail yards
- Urban center
- Industrial area
- Employment area
- Urban growth boundary
- Metropolitan planning area
- County boundary

December 6, 2018

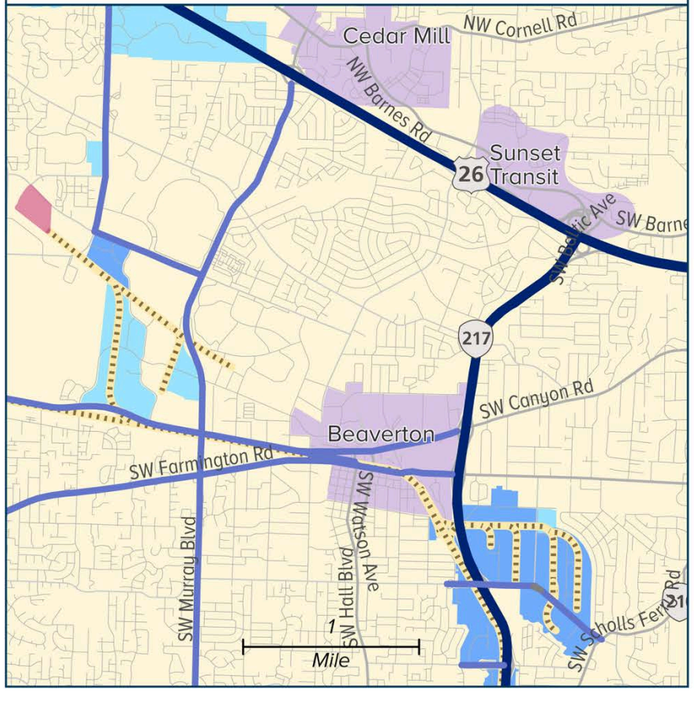
4. Kenton Rail Line/Columbia Corridor



5. Clackamas Industrial Area



6. Beaverton Industrial Area



3.8 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 are 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.

3.8.1 Regional active transportation network vision

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 high capacity and frequent transit. Pedestrian-bicycle districts are urban centers and station communities. The following ten guiding principles were developed in the Regional Active Transportation Plan to guide development of the regional active transportation network.

1. Bicycling, 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 improve safety and balance the needs of 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 living with disabilities, people with low-English-proficiency, youth and older adults.
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 choices 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.[14]



Many people in the region incorporate walking into daily travel. It is important that routes and crossings are safe and comfortable for people of all ages and abilities.

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

3.9 REGIONAL BICYCLE NETWORK CONCEPT AND POLICIES

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.

Section 3.08.140 of the Regional Transportation Functional Plan requires that local jurisdictions include a bicycle plan to achieve the following:

- an inventory of existing facilities that identifies gaps and deficiencies in the bicycle system;
- an evaluation of needs for bicycle access to transit and essential destinations, including direct, comfortable and safe bicycle routes and secure bicycle parking;
- a list of improvements to the bicycle system;
- provision for bikeways along arterials, collectors and local streets, and bicycle parking in centers, at major transit stops, park-and-ride lots and institutional uses; and
- provision for safe crossing of streets and controlled bicycle crossing on major arterials.

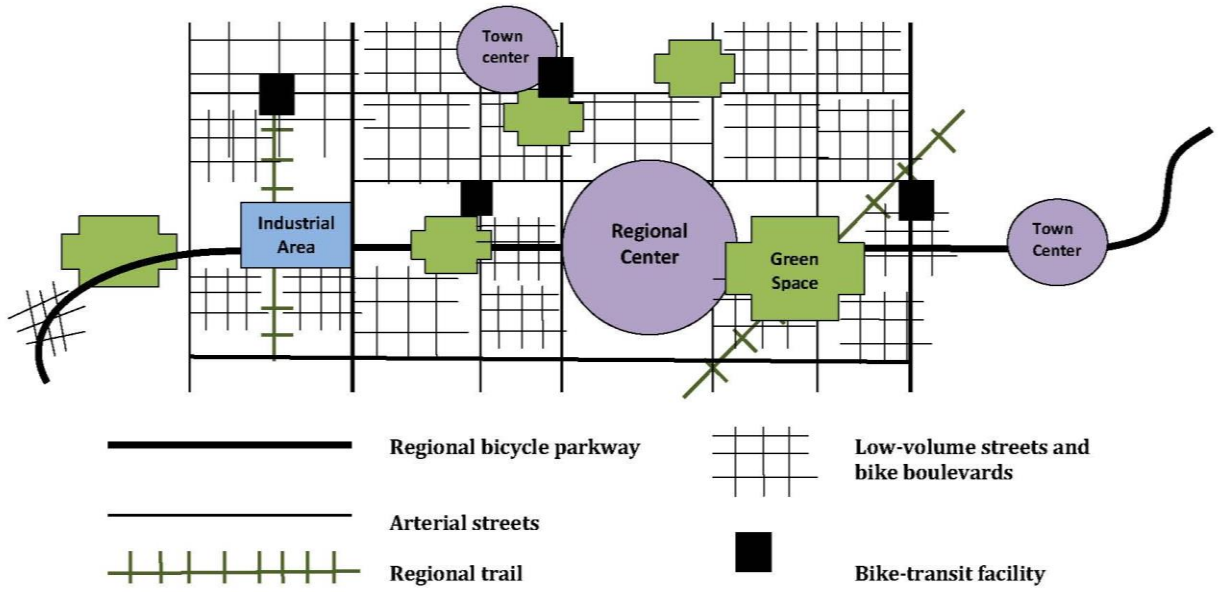
3.9.1 Regional bicycle network concept

The regional bicycle network concept includes:

- A bicycle parkway in each of the region's Mobility Corridors within the MPA boundary to provide transportation options in these corridors.
- 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 3.22 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 3.22 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.

3.9.2 Regional bicycle network policies

This section describes the policy framework of the Regional Bicycle Network Concept. Specific actions that Metro, in partnership with cities, counties, agencies and other stakeholders can take to implement the policies are identified in the Regional Active Transportation Plan.

Regional Bicycle Network Policies	
Policy 1	Make bicycling the most convenient, safe and enjoyable transportation choice for short trips of less than three miles
Policy 2	Complete an interconnected regional network of bicycle routes and districts that is integrated with transit and nature and prioritizes seamless, safe, convenient and comfortable access to urban centers and community places, including schools and jobs, for all ages and abilities.
Policy 3	Complete a green ribbon of bicycle parkways as part of the region's integrated mobility strategy.
Policy 4	Improve bike access to transit and community places for people of all ages and abilities.
Policy 5	Ensure that the regional bicycle network equitably serves all people.

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

The average length of a bicycle trip in the region is about three miles.[15] 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.[16] 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. Emerging technologies such as bike-sharing provide a new toolkit to make bicycling even easier for short trips.

In 2011, the Federal Transit Administration (FTA) established a formal policy on the eligibility of pedestrian and bicycle improvements for FTA funding and defined the catchment area for pedestrians and bicyclists in relation to public transportation stops and stations. The policy recognized that bicycle and pedestrian access to transit is critical, and defined a three mile catchment area for bicycle improvements and a half mile catchment area for pedestrian improvements. [17]

[15] 2011 Oregon Household Activity Survey.
[16] 2011 Oregon Household Activity Survey. Vehicle trips by length for trips wholly within Clackamas, Multnomah, Washington and Clark Counties.
[17] Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law

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 percent since 1995.[18] When bicycling is safe, comfortable, convenient and enjoyable, people have the option of making some of those short trips by bicycle.

Actions to implement this policy can be found in Chapter 12 of the 2014 Regional Active Transportation Plan.

Bicycle Policy 2. Complete an interconnected regional network of bicycle routes and districts that is integrated with transit and nature and prioritizes seamless, safe, convenient and comfortable access to urban centers and community places, 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 increasing access to transit, businesses, schools, and other destinations. Regional trails and 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. The Regional Transportation Functional plan requires local Transportation System Plans include an interconnected network of bicycle routes.

Bicycle Policy 3. Complete 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 in 2007-09 and further developed in the Regional Active Transportation Plan adopted in 2014.

Key experiential aspects that bike parkways embody:

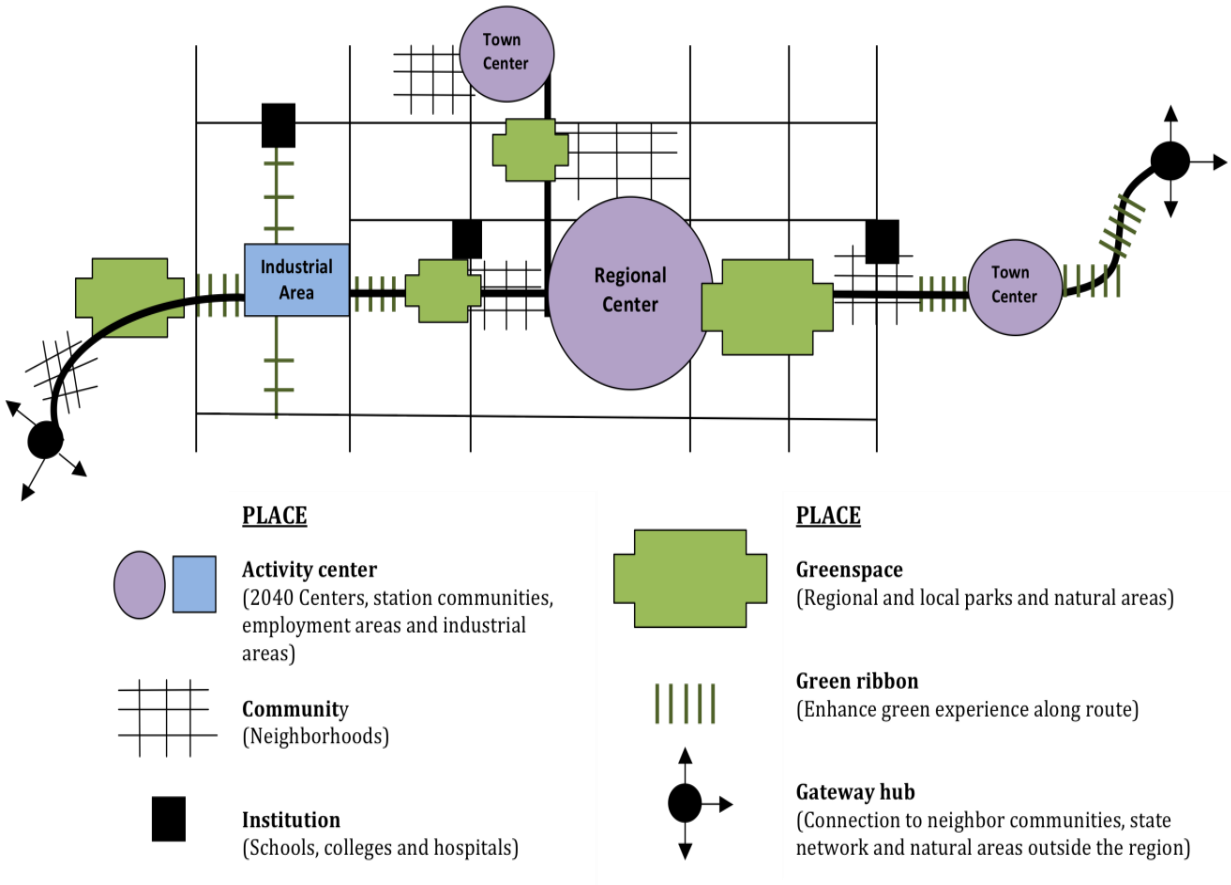
- A green environment with natural features such as trees or plantings (some will already be green, while others will be made greener as part of bike parkway development)
- Comfort and safety provided by protection from motorized traffic
- Large volumes of cyclists traveling efficiently with minimal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

[18] 2011 Oregon Household Activity Survey.

Figure 3.23 illustrates this policy concept in the context of the regional bicycle parkway concept.

Figure 3.23 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 bike access to transit and to community places for people of all ages and abilities.

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.



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

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. The Regional Transportation Functional Plan requires that local transportation system plans evaluate the needs for bicycle access to transit, including secure bicycle parking.

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. In addition to infrastructure, new technologies such as bike sharing increase opportunities for all residents to bicycle. In Portland, the "Biketown for All"" program provides discounted memberships, free helmets and bike safety education to low-income people.

3.9.3 Regional bicycle network functional classifications and map

This section describes the regional bicycle network functional classifications shown on **Figure 3.24**, the Regional Bicycle Network. Click on 2018 RTP Regional Network Maps for online zoomable version of map.

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 3.24** 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.



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

The regional bicycle network has a functional hierarchy similar to that of the regional motor vehicle network. **Figure 3.24** provides a vision for a future bicycle network; for a map of current bicycle facilities in the region, refer to Chapter 4.

The different functional elements of the regional bicycle network are:

- **Regional 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** 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 (and Pedestrian Districts)** include the Portland Central City, Regional and Town Centers and Station Communities. 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.

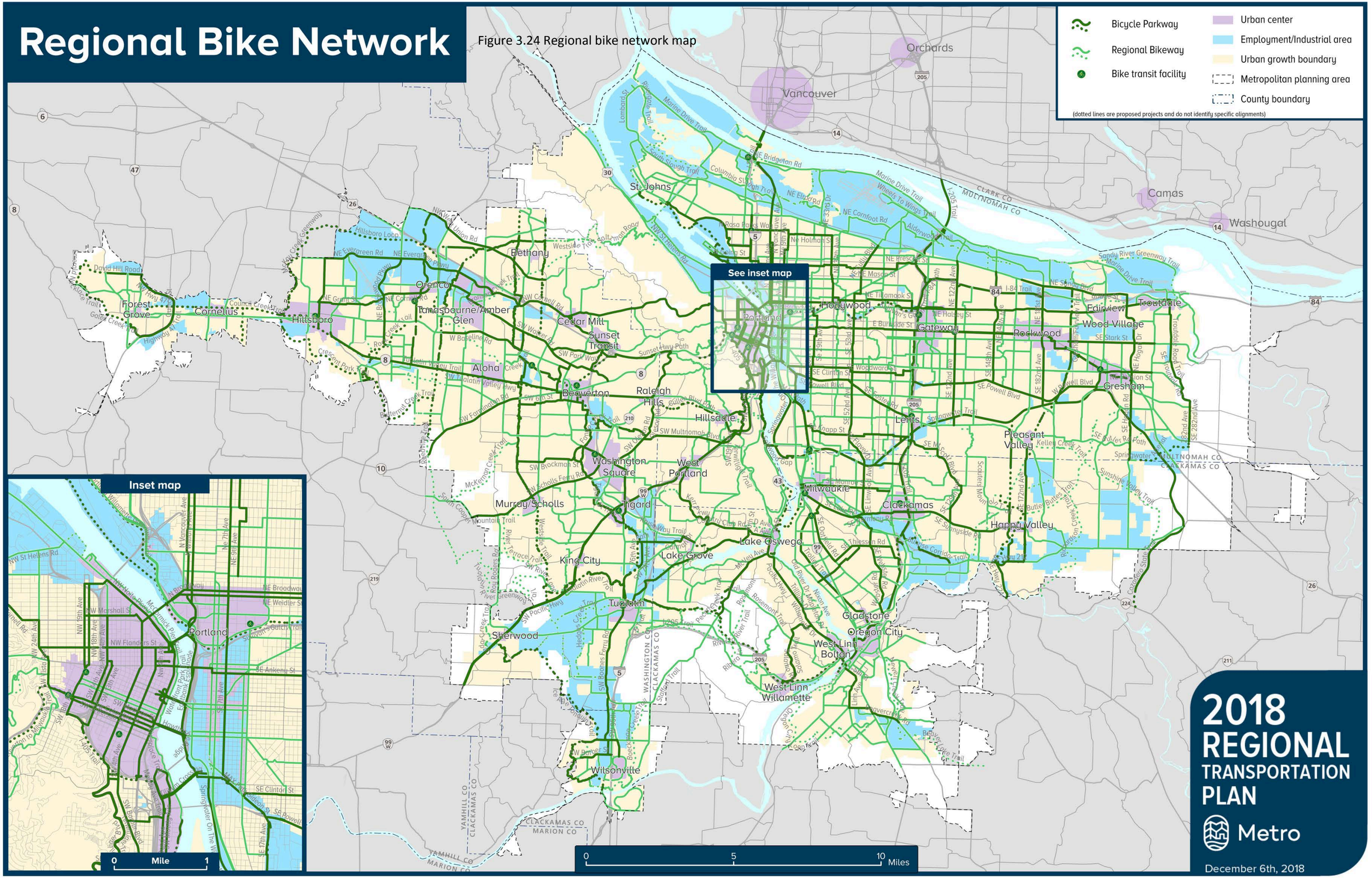
  Which areas are designated as bicycle districts should be considered further in future Regional Transportation Plan and ATP updates. For example, areas around bus stops with high ridership should be evaluated as potential bicycle districts (light rail station areas are currently identified as bicycle 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).

Regional Bike Network

Figure 3.24 Regional bike network map



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Regional Active Transportation Plan (2014)

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.

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.



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.

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 the highest 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.

3.10 REGIONAL PEDESTRIAN NETWORK CONCEPT AND POLICIES

Walking contributes to a healthy lifestyle and supports vibrant local economies. Every trip begins or ends with at least a short walk. Transit in particular is integrated with walking. However, while everyone walks, walking is not a safe or convenient option for everyone in the region. Traffic crashes involving people walking often end in a death or severe injury and pedestrian deaths are rising.

Many streets are not ADA-compliant, sidewalk gaps remain on busy arterial roadways and along bus routes, safe places to cross the street can be few and far between, and lack of street lighting and other gaps make it dangerous and difficult to walk, especially for older adults, children and people with disabilities. In historically marginalized communities, lack of safe walking routes can be worse.



Walkability plays an important role in economic development by supporting commercial activity in centers. The RTP considers walking and bicycling equal with other transportation modes, and prioritizes short walking and bicycling trips.

In the Regional Pedestrian Network Vision, walking is safe and convenient. Section 3.08.130 of the Regional Transportation Functional Plan requires that local jurisdictions include a pedestrian plan to achieve the following:

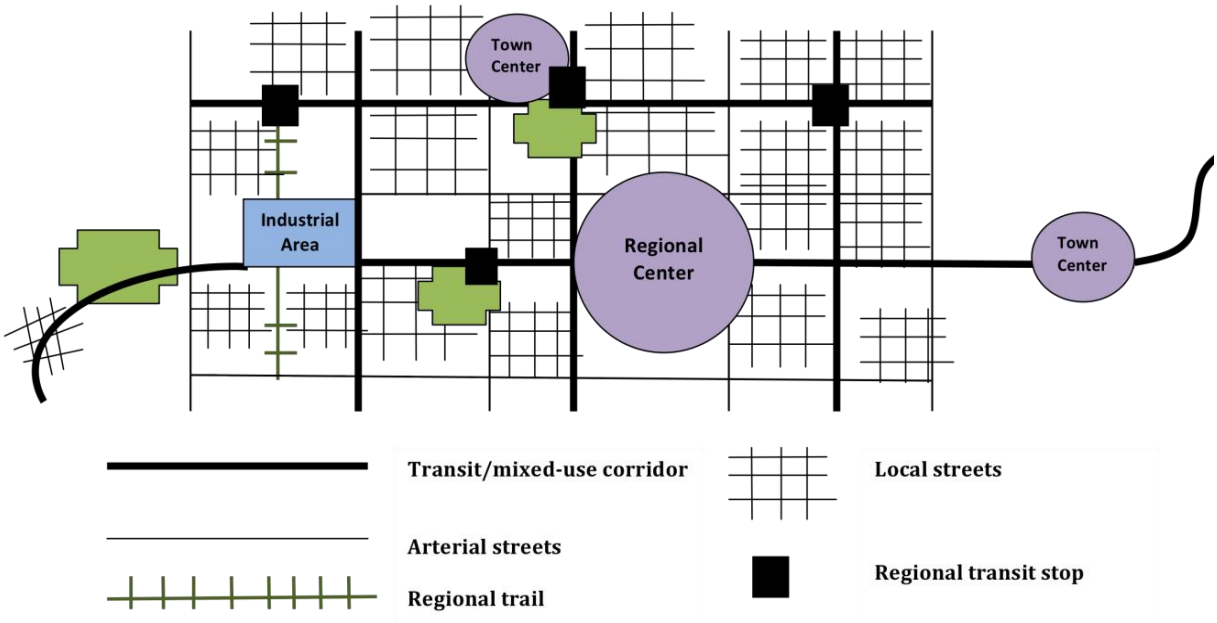
- Sidewalks along all arterials, collectors and most local streets.
- Direct and safe pedestrian routes to transit and other essential destinations.
- Provision of safe crossings of streets and controlled pedestrian crossings on major arterials.
- Safe, direct and logical pedestrian crossings at all transit stops where practicable.
- Crossings over barriers such as throughways, active rail-lines and rivers provided at regular intervals following regional connectivity standards.
- Regional multi-use trails and walking paths are completed.

3.10.1 Regional pedestrian network concept

The Regional Pedestrian Network Concept describes a well-connected grid of streets and multi-use paths connecting to and intersecting through regional and town centers, employment areas, station communities, parks and natural areas and connecting to transit and essential destinations.

Figure 3.25 shows the components of the regional pedestrian network and their relationship to adjacent land uses.

Figure 3.25 Regional pedestrian network concept



The 2040 Growth Concept 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 Regional Transportation Plan supports this vision with a region-wide network of on-street and off-street pedestrian facilities integrated with transit and regional destinations.



3.10.2 Regional pedestrian network policies

Regional pedestrian policies help achieve the Regional Pedestrian Network Vision. Specific actions that Metro, in partnership with cities, counties, agencies and other stakeholders, can take to implement the policies are identified in the Regional Active Transportation Plan.

Regional Pedestrian Network Policies

Policy 1 Make walking the most convenient, safe and enjoyable transportation choice for short trips of less than one mile.

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

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

Policy 4 Improve pedestrian access to transit and community places for people of all ages and abilities.

Pedestrian Policy 1. Make walking the most convenient, safe and enjoyable transportation choice for short trips of less than one mile.

In addition to being the most basic form of transportation, walking is an important form of exercise and is the most popular recrteational activity in Oregon.[19] The average length of a walking trip in the region is about half a mile. Today 15 percent of trips made in an auto are less than one mile. [20] Many of these trips could be made by walking if it were convenient, safe and enjoyable. Fully implementing regional and local plans will help make this possible.

In 2011, the Federal Transit Administration (FTA) established a formal policy on the eligibility of pedestrian and bicycle improvements for FTA funding and defined the catchment area for pedestrians and bicyclists in relation to public transportation stops and stations. The policy recognized that bicycle and pedestrian access to transit is critical, and defined a three mile catchment area for bicycle improvements and a half mile catchment area for pedestrian improvements. [21]

[19] Oregon's 2017 Statewide Outdoor Recreation Survey shows that 83 percent of Oregonians walk on local streets and sidewalks for recreation, making this the most popular recreational activity in the state.
[20] 2011 Oregon Household Activity Survey.
[21] Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law

Ensuring all gaps and deficiencies on the regional pedestrian network have projects identified in the Regional Transportation Plan and including wayfinding, street markings, lighting and other elements that enhance connections and make the pedestrian network consistent, integrated and easy to navigate are key elements to implementing this policy. The Regional Transportation Functional Plan includes specific requirements in the Pedestrian and Transit System Design sections.

Actions to implement this policy can be found in Chapter 12 of the 2014 Regional Active Transportation Plan.

Pedestrian Policy 2. Complete 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 community places, 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 essential destinations. The Regional Pedestrian Network provides the plan for well-connected pedestrian routes and safe street crossings to provide access to transit and essential daily needs. The Regional Transportation Functional Plan requires that local Transportation System Plans include an interconnected network of pedestrian routes.

Section 3.08.130 of the Regional Transportation Functional Plan includes the requirements to provide a well-connected pedestrian system, and 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.

10,000,000,000

Our region will need approximately $10 billion over the next few decades to repair and rebuild our existing infrastructure. To meet the demands of anticipated growth in jobs and housing in the region through 2035, we will need as much as $31 billion in additional funding.

500

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.

60

More than 60 percent of households in the Portland region consist of just one or two people, according to the 2000 census.

Priority should be given to filling gaps and providing safe crossings of the busiest streets with transit and other essential destinations. Deficient facilities in areas of high walking demand are considered gaps.

planning for our future



View of the Tanzanite Line bridge at Oregon Slough.

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

Population growth The world's population is growing, and here at home our population is expanding rapidly. New forecasts show that within the next 25 years, the population of the Portland metro region and adjacent cities will increase from 1.4 million people to about 2.4 million. While this growth brings jobs and opportunity, it also creates new challenges.

After years of warnings, the reality is settling in: there is an energy crisis. High gas prices, "peak oil" and a failure to invest adequately in new, clean energy technologies has started to affect every part of our lives. The question is no longer whether we should respond, but what choices

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

All centers and station areas are Regional Pedestrian Districts. The central city, regional and town centers, main streets and light rail station communities are areas where 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. Sections 3.08.120 (B) (2) and 3.08.130 (B) list requirements for pedestrian districts and new development near transit.

Pedestrian Policy 4. Improve pedestrian access to transit and community places for people of all ages and abilities.

Public transportation use is fully realized only with safe and convenient pedestrian and bicycle 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 Regional Transportation Functional Plan requires that local Transportation System Plans include an evaluation of needs for pedestrian access to transit for all mobility levels, including direct, comfortable and safe pedestrian routes.

Pedestrian access along transit-mixed use corridors is improved with features such as wide sidewalks, reasonably spaced marked crossings and buffering from adjacent motor vehicle traffic.



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

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 language isolation 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.

Section 3.08.120[C] of the Regional Transportation Functional Plan specifies that the needs of youth, seniors, people with disabilities and environmental justice populations including people of color and people with low-incomes must be considered when planning transit.

Regional and local planning, design and construction of the networks must include consideration of the benefits and burdens of transportation investments to underserved and environmental justice populations, and continue to collect data and monitor performance in accordance with section 3.08.010 of the Regional Transportation Functional Plan.

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

3.10.3 Regional pedestrian network classifications and map

This section describes the regional pedestrian network functional classifications shown on **Figure 3.26**, the Regional Pedestrian Network. The regional pedestrian network mirrors the regional transit network reflecting the important relationship of a complete walking network and transit. Frequent transit routes and regional arterials comprise regional pedestrian streets. Regional trails are also part of the regional pedestrian network. Centers and station areas are regional pedestrian districts, and include all streets of all functional classifications and paths within their boundaries.

The regional pedestrian network has a functional hierarchy similar to that of the regional motor vehicle network. **Figure 3.26** provides a vision for a future pedestrian network; for a map of existing pedestrian facilities in the region, refer to Chapter 4.

The different functional elements of the regional pedestrian network are:

- **Pedestrian Parkways** are generally major urban streets that provide frequent and almost frequent transit service (existing and planned). They can also be regional trails.
- **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.
- **Local Pedestrian Connectors** are all streets and trails not included on the Regional Pedestrian Network.
- **Pedestrian Districts** are the Central City, Regional and Town Centers and Station Communities shown on the Regional Pedestrian Network Map. 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. All streets and trails within the Pedestrian District are part of the regional system.

Figure 3.26 applies the regional pedestrian network concept on the ground, illustrating how different regional pedestrian facilities work together to form a comprehensive network that allows people to walk to transit, schools, employment centers, parks, natural areas and shopping. Click on 2018 RTP Regional Network Maps for online zoomable version of map.

Regional Pedestrian Network

Figure 3.26 Regional pedestrian network map

Pedestrian Parkway
Regional Pedestrian Corridor
Major transit stops
Urban center
Employment/Industrial area
Urban growth boundary
Metropolitan planning area
County boundary
(dotted lines are proposed projects and do not identify specific alignments)

See inset map

Inset map

0 Mile 1

0 5 10 Miles

2018 REGIONAL TRANSPORTATION PLAN

Metro

December 6th, 2018

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3.11 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS VISION AND POLICIES

The region's Transportation System Management and Operations (TSMO) policies reflect that the transportation system represents a significant public investment in capital infrastructure that must be protected and well-managed. Concerns about the social, environmental and financial cost of larger-scale capital projects, such as building new lanes, lend support for first managing the current system. Management can restore reliable travel and provide flexibility for travelers to use a variety of travel options.

TSMO is a set of integrated transportation strategies and solutions. Through a combination of transportation system management (TSM), coordinated response from transportation operators and transportation demand management (TDM) services and projects, 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 to help achieve multiple regional transportation goals.

3.11.1 Transportation system management and operations concept

Through the RTP and supporting strategies, such as the regional TSMO Strategy, the region aims to be a nationally recognized leader for innovative management and operations of its system to:

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

Table 3.10 provides examples of TSMO strategies for each of the investment areas and **Figure 3.27** illustrates how some of these strategies are implemented in the communities across the region.

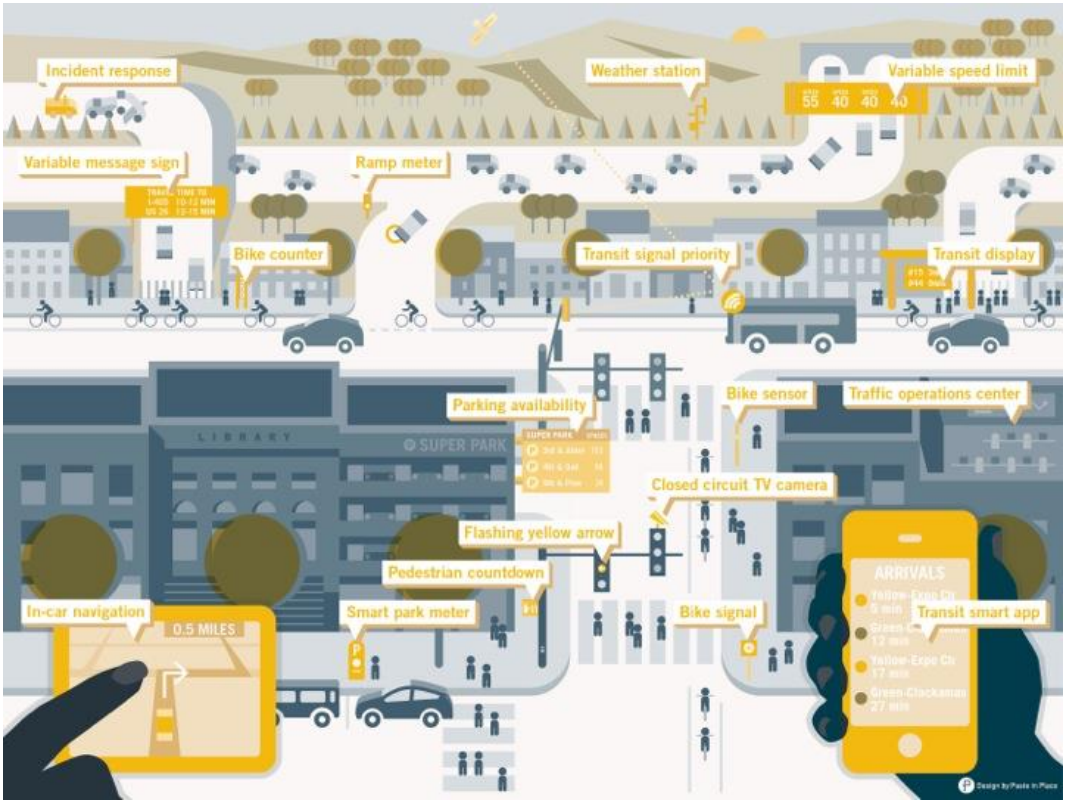


The region continues to seek opportunities to use national best practices in linking planning and operations to improve system efficiency and performance, and demonstrate the cost-effectiveness of the region's toolkit of multimodal system management and operations strategies in solving regional transportation challenges.

Table 3.10 Examples of TSMO strategies and investments

Multimodal Traffic Management • Traffic signal coordination • Transit signal priority treatment • Detection and countdown timers for bicycles and pedestrians
Traveler Information • Real-time traveler information for freeways, arterials and transit • Enhanced multi-modal traveler information tools on mobile devices
Traffic Incident Management • Add and coordinate traffic cameras and other sensors • Expand incident management teams and training
Transportation Demand Management • Carpooling and vanpooling • Collaborative marketing (e.g., development and coordination of regional messaging) • Individualized marketing (e.g. SmartTrips program) • Employer outreach • Wayfinding guidance for bicycling and walking

Figure 3.27 Illustration of transportation system management and operations strategies



3.11.2 Transportation system management and operations policies

Transportation System Management and Operations Policies

Policy 1 Expand use of pricing strategies to manage travel demand on the transportation system in combination with adequate transit service options.

Policy 2 Expand use of access management, advanced technologies, and other tools to actively manage the transportation system.

Policy 3 Provide comprehensive, integrated, universally accessible and real-time travel information to people and businesses.

Policy 4 Improve incident detection and clearance times on the region's transit, motor vehicle networks to reduce the impact of crashes on the transportation system.

Policy 5 Expand commuter programs, individualized marketing efforts and other tools throughout the region to increase awareness and use of travel options.

Policy 6 Build public, non-profit and private sector capacity throughout the region to promote travel options.

Policy 7 Manage parking in mixed-use centers and corridors that are served by frequent transit service and good biking and walking connections to reduce the amount of land dedicated to parking, encourage parking turnover, increase shared trips, biking, walking and use of transit, reduce vehicle miles traveled and generate revenue.

TSMO Policy 1. Expand use of pricing strategies to manage travel demand on the transportation system in combination with adequate transit service options.

Congestion pricing—sometimes called value 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.

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. Successful implementation of pricing often incudes improved transit service. 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.

Through the end of 2018, ODOT conducted a feasibility analysis to explore the options available and determine how congestion (value) pricing could help ease congestion in the greater Portland area. Oregon's House Bill 2017, also known as Keep Oregon Moving, directs the Oregon Transportation Commission to develop a proposal for value pricing on I-5 and I-205 from the state line to the junction of the two freeways just south of Tualatin, to reduce congestion. The State Legislature directed the OTC to seek approval from the Federal Highway Administration no later than December 31, 2018. If FHWA approves the proposal, the OTC is required to implement value pricing. See Chapter 8 for more information about future planning and analysis of this strategy.

TSMO Policy 2. Expand use of access management, advanced technologies and other tools to actively manage the transportation system.

Multimodal traffic management strategies improve metropolitan mobility by applying technology solutions to actively manage the transportation system. Projects in this area improve integrated corridor management (e.g., coordination among operators), 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.

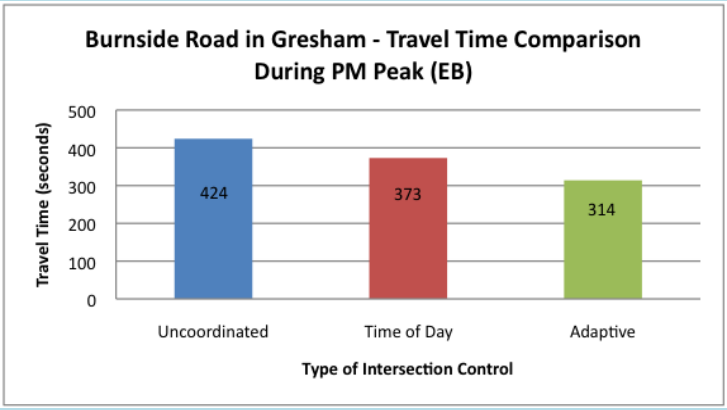
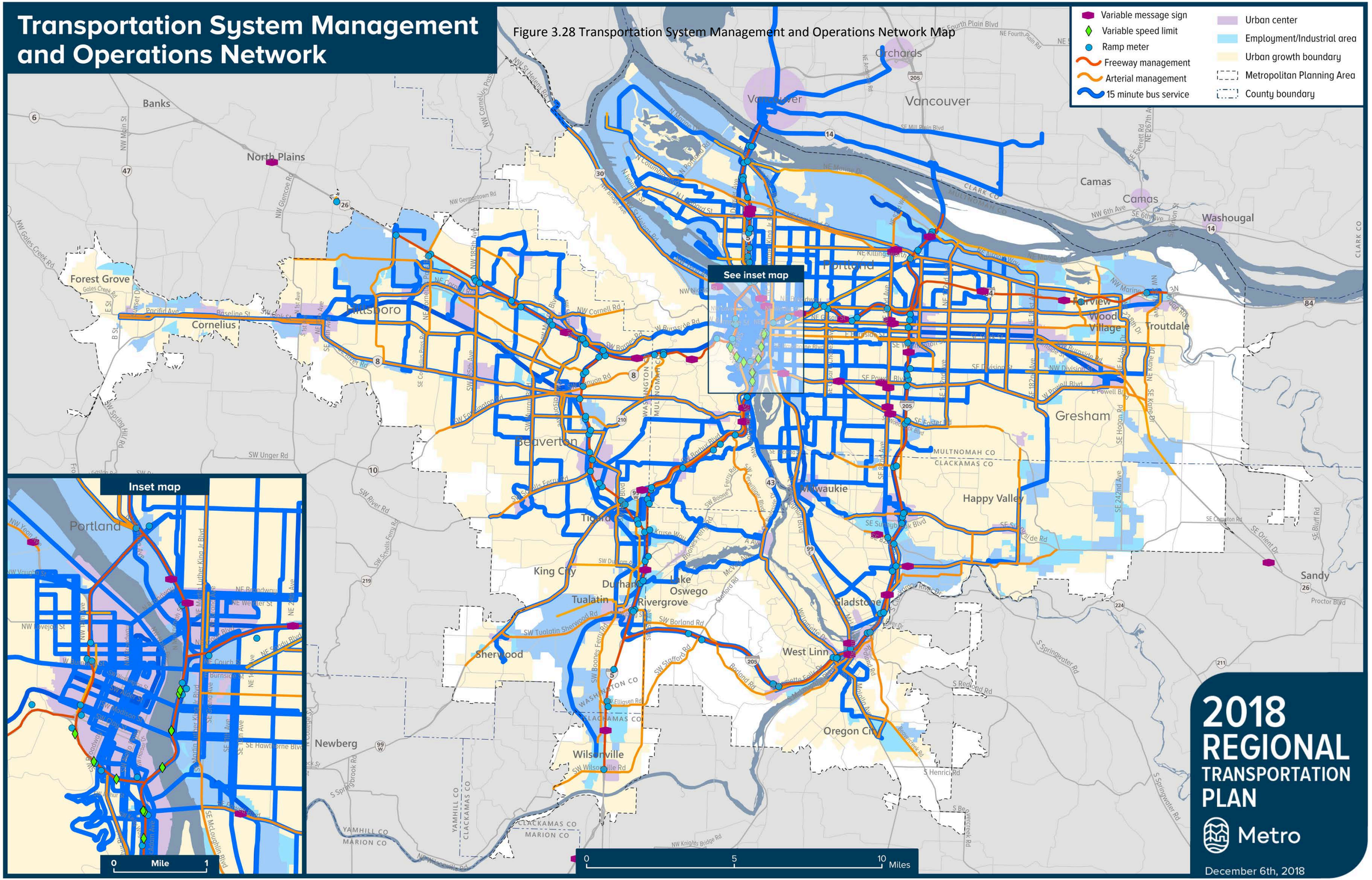


Figure 3.28 shows where some of these strategies are envisioned to be applied in the region to address growing congestion and improve safety, efficiency and reliability of the system.

Transportation System Management and Operations Network

Figure 3.28 Transportation System Management and Operations Network Map



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TSMO Policy 3. Provide comprehensive, integrated, universally accessible real-time travel 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 more informed travel choices.

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.



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.



In 2015, TripCheck.com received more than 32 million visits. Surveys show that information influenced travel decisions for 60 percent of site visitors.

Currently, real-time traveler information in the greater Portland 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 4. Improve traffic incident detection and clearance times on the region's transit, motor vehicle networks to reduce the impact of crashes on the transportation system.



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.

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.

Past studies show:

- 20 percent 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 percent.

Active traffic management can:

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

Incidents that block travel lanes decrease capacity and lead to unreliable travel times as shown in **Table 3.11**. When lanes are blocked due to an incident, capacity decreases significantly (even when the incident is on the shoulder) and travelers experience delays.

Table 3.11 Detecting and clearing incidents on throughways quickly restores lost capacity

Number of throughway lanes	Percent of facility capacity lost by lane 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: Highway Capacity Manual. Transportation Research Board, National Research Council, Washington, D.C., 2000.

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.[22]

TSMO Policy 5. Expand commuter programs, individualized marketing efforts and other tools throughout the region to increase awareness and use of travel options.

Through the Regional Travel Options (RTO) program, 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 shift trips from personal, single occupancy vehicles to alternative travel options by educating and encouraging the public. These travel options include transit, ridesharing[23], bicycling, and walking.



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 strategies. These strategies raise general awareness about transit, ridesharing, bicycling and walking use and encourage or incentivize travelers to use these options. Specific educational efforts tied with infrastructure investments, known as Safe Routes to School, make it easier and safer for children to travel to school. In addition, it creates recognition within children that they have multiple options for how to travel.



RideWise, a program of Ride Connection, provides travel training for older adults and people with disabilities at no cost and is available in Wilsonville through a partnership with SMART.

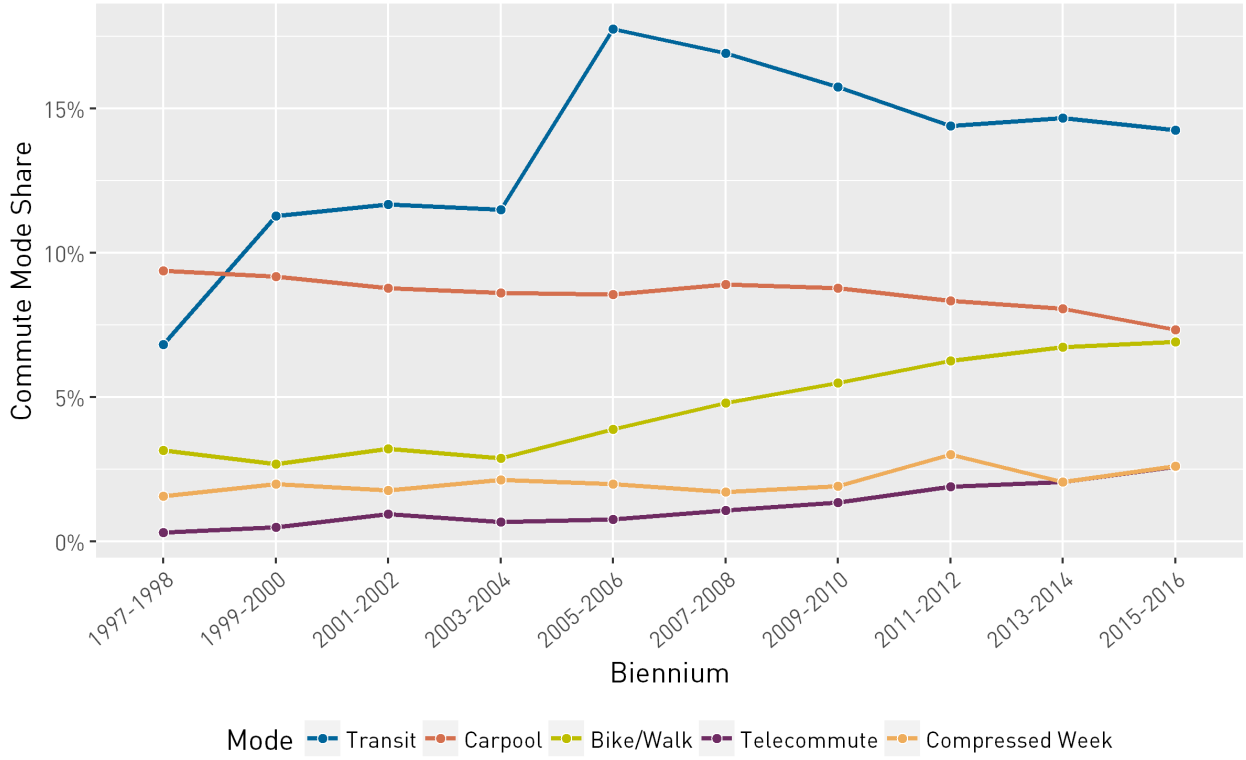
Benefits of using travel options include improved health, reduced roadway injuries and fatalities, reduced personal transportation costs, reduced GHG emissions, and improved travel times for other roadway users.

An example of how TDM efforts are delivered is the region's long-standing program to reduce single-occupant-vehicle commute trips. 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.

[22] Research and Innovative Technology Administration (RITA) Intelligent Transportation Systems Benefits Database. Website: http://www.benefitcost.its.dot.gov/its/benecost.nsf/BenefitsHome (June 2009)
[23] "Ridesharing" in this context means traditional not-for-profit carpooling or vanpooling, not Transportation Network Companies such as Uber or Lyft.

Shown in **Figure 3.29**, over the last eighteen years, employee commute trips that used non-drive alone modes (transit, bicycling, walking, carpooling/vanpooling, and telecommuting) rose from 20 percent to over 32 percent among participating employers.

Figure 3.29 Effectiveness of employer-based commuter programs



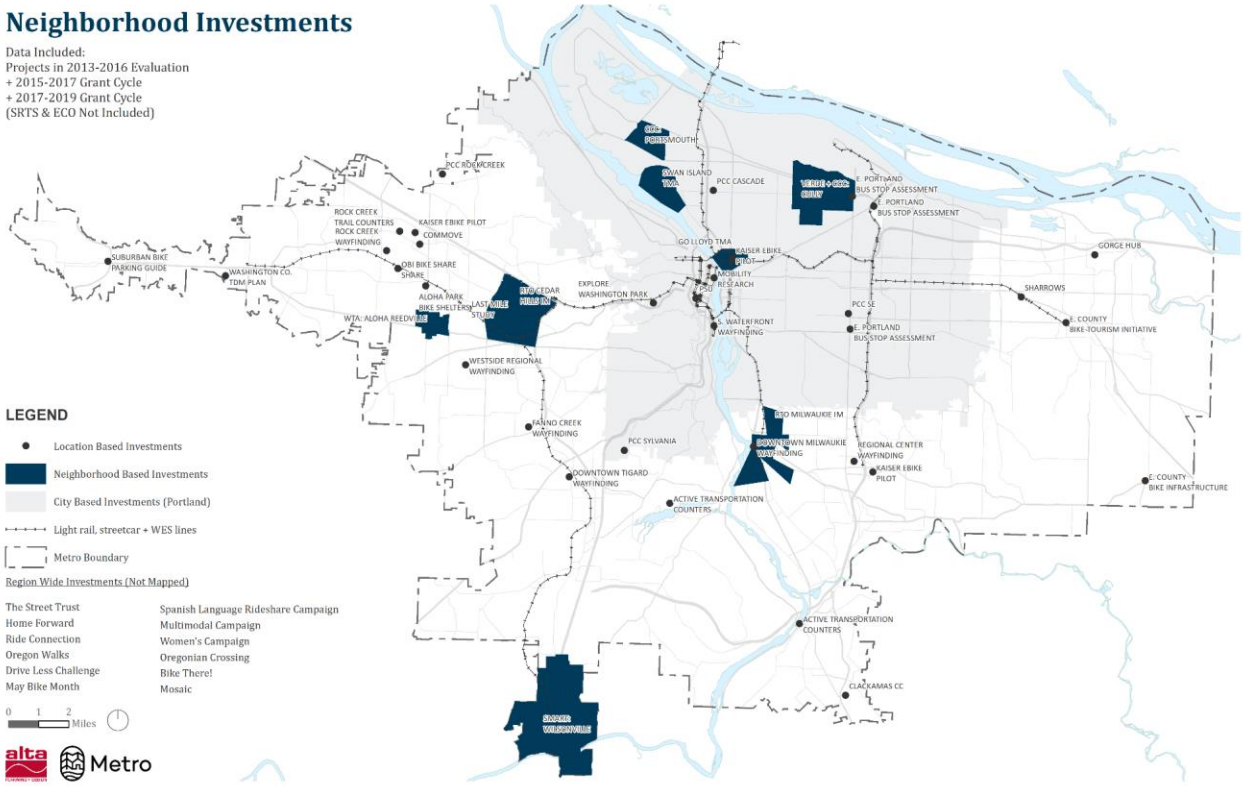
TDM projects support the 2040 growth concept by encouraging people to make choices that reduce their dependence on cars. As a result, vehicle trips are reduced, saving energy and reducing vehicle emissions.

TSMO Policy 6. Build public, non-profit and private sector capacity throughout the region to promote travel options.

Metro leads the region's TDM efforts through the RTO program. The RTO program consists primarily of a series of local efforts, led by regional and local governments, education, and not-for-profit partners. These partners produce educational events and outreach to connect with the public. Their efforts are aimed at encouraging people to use non-SOV travel modes for more of their travel. Metro provides oversight, funding and coordination for the program.

While employer outreach is a region-wide effort, much of the RTO program's efforts have been historically focused within the city of Portland. **Figure 3.30** illustrates where local partnerships have conducted RTO events or programming. The map highlights that RTO efforts are not present in much of the region outside the city of Portland.

Figure 3.30 Local partnerships and investments by Regional Travel Options program



In order to fully realize the benefits of managing demand, additional RTO efforts need to be implemented throughout the region. The needs of historically underserved communities are particularly underrepresented in the current RTO program investments. The RTO Strategy defines goals and objectives that address the need to implement further TDM efforts. Allocation of regional flexible funds ensures that program resources are available to help develop local partners develop new community-based outreach efforts.



Programs offered at the neighborhood level provide the ideal scale for promoting and encouraging greater use of transportation options. A majority of the trips people make throughout the day are for shopping, leisure activities, or recreation, and begin and end at home.

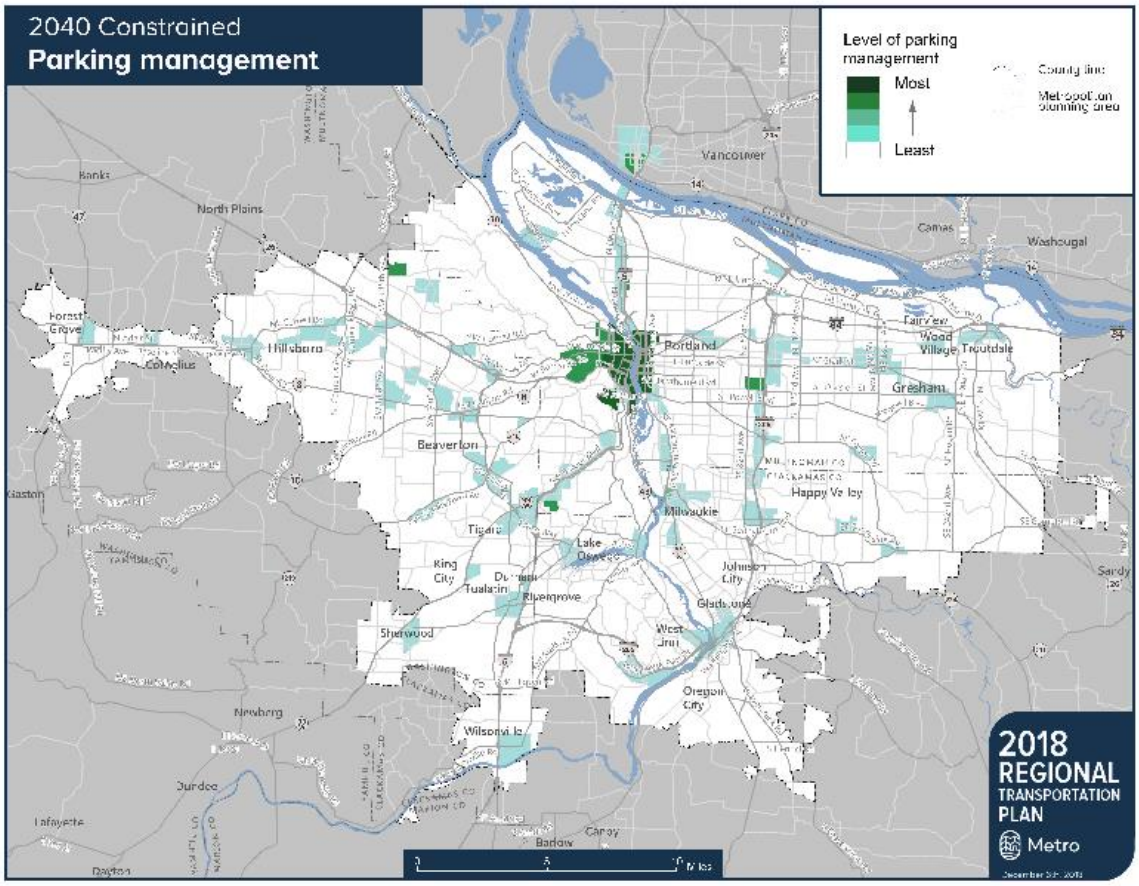
TSMO Policy 7. Manage parking in mixed-use centers and corridors served by frequent transit service and good biking and walking connections to reduce the amount of land dedicated to parking, encourage parking turnover, increase shared trips, biking, walking and use of transit, reduce vehicle miles traveled and generate revenue.

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

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 address potential spillover impacts. A regional parking management strategy would assist local jurisdictions' efforts to implement parking management.

Figure 3.31 shows general locations where parking costs and management strategies were assumed for purposes of the RTP system evaluation. Chapter 8 (Section 8.2.3.14) describes future work to update this policy.

Figure 3.31 Areas assumed to have parking management in the region (2040)



3.12 MOVING FROM VISION TO ACTION

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 and targets in Chapter 2, form the basis for identifying system needs and deficiencies and the investment priorities in Chapter 6. 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 implementing the Regional Transportation Plan.



Implementation of the Regional Transportation Plan will result in a safe, reliable, healthy and affordable transportation system.

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2018 Regional Transportation Plan

Chapter 4

Our Growing and Changing Region

December 6, 2018

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4.1 INTRODUCTION

Our region continues to grow and change

The greater Portland region is an extraordinary place to call home. It is known for its unique communities, a diverse and growing economy and a world-class transportation system. The region is surrounded by stunning natural landscapes and crisscrossed with a network of parks, trails and natural areas within a walk, bike ride or transit stop from home.

Part of the broader Pacific Northwest region, the Portland-Vancouver metropolitan area is one of four international gateways on the West Coast. In this role, the region serves as a freight gateway to domestic and international markets for businesses located throughout the state of Oregon, southwest Washington, the mountain states and the midwest.

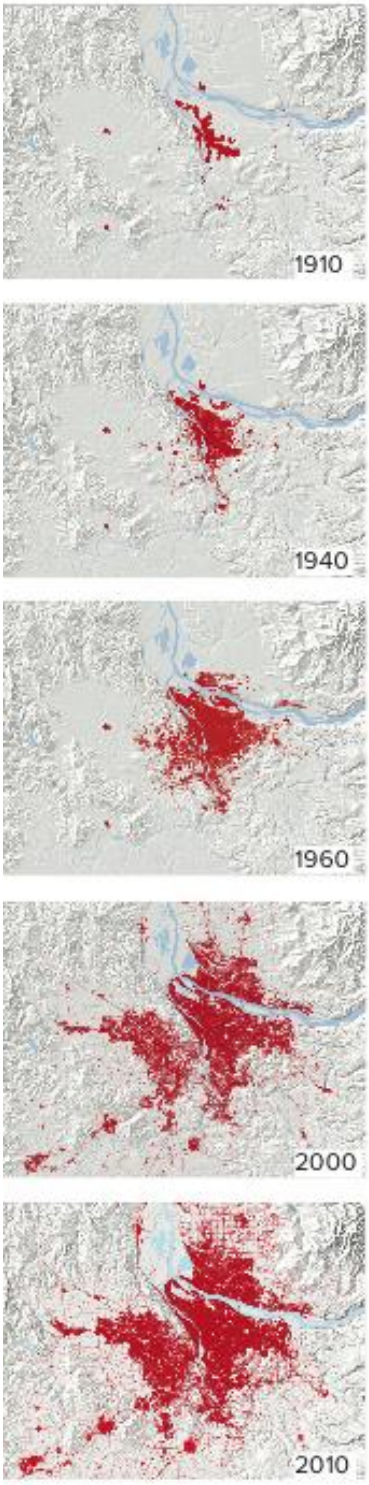
Over the years, communities throughout the region have taken a collaborative approach to planning that has helped make the region one of the most livable in the country.

Every day, the region's 2.4 million people have places to go – to work or school, to doctors and grocery stores and parks and back home again. All these trips, along with our transportation system, knit the region together – from Forest Grove to Troutdale, Vancouver and Portland to Wilsonville and every community in between.

Because of our dedication to planning and working together to make local and regional plans a reality, we have set a wise course for managing growth – but times are challenging. The region is growing, our economy is expanding, and emerging technologies are changing how we do business and get around.

Housing affordability, climate change, racial disparities, traffic deaths and life changing injuries, and traffic congestion demand new kinds of leadership, innovation and thoughtful deliberation and action to ensure our region remains a great place to live, work and play for everyone. In collaboration with city, county, state, business and community leaders, Metro has researched how land use and transportation policies and investments can be leveraged to respond to these complex and interrelated challenges at a regional scale.

Land development, 1910-2010



The region expects to welcome more than 500,000 new residents – about half from growing families – and more than 350,000 new jobs within the urban growth boundary by 2040.

Welcome to the big cities

Since the adoption of the 2040 Growth Concept in 1995, the greater Portland region has moved from a collection of interconnected towns to become a major metropolitan area.

If you include our connected Southwest Washington neighbors, we are the twenty-third largest metropolitan area in the United States, with 2.4 million people living here and using our system of throughways, roads, bridges, transit, bikeways, sidewalks and trails.

Portland, Ore. and Vancouver, Wash. metropolitan area



2.4 million ⇨ 3.1 million
2016 **2040** (projected)

Below is a sample of other metropolitan areas, when they reached 2.4 million people and what 20 years of growth looked like for them.

Phoenix, Ariz. metropolitan area: 2.4 million people by early 1990s



2.2 million ⇨ 4.2 million
1990 2010

San Diego County, Calif.: 2.4 million people by late 1980s



2.5 million ⇨ 3.1 million
1990 2010

Minneapolis-St. Paul, Minn. metropolitan area: 2.4 million people by late 1980s



2.6 million ⇨ 3.3 million
1990 2010

Seattle, Wash. metropolitan area: 2.4 million people by late 1980s



2.6 million ⇨ 3.4 million
1990 2010

Atlanta, Ga. metropolitan area: 2.4 million people by mid-1980s



3.0 million ⇨ 5.3 million
1990 2010

Source: 2014 Metro Urban Growth Report, 1990 and 2010 U.S. Decennial Census and extrapolated estimates



4.1.1 Chapter organization

This chapter provides a snapshot of current regional growth trends and existing conditions and outlines key transportation challenges the plan will address. The chapter also highlights opportunities for building a regional transportation system that reflects our values and vision for the future.

4.1 Introduction: This section introduces the chapter.

4.2 Who we are: This section provides an overview of population growth; demographic changes for race, ethnicity and age; where people live and work; employment growth and jobs.

4.3 How we get around: This section provides a snapshot of how people in the region get around – driving, transit, walking and bicycling.

4.4 How we move goods and services: This section provides an overview of how goods and services move in the region and how the region is competing in a global economy,

4.5 How we keep our environment healthy: This section describes current efforts and strategies to protect historic and cultural resources and keep the air, water and habitat in the greater Portland region healthy.

4.6 How the system is working – challenges and opportunities ahead: This section describes the major challenges the region is facing and the opportunities that each challenge presents to achieve the region's vision for funding the transportation system we need; updating and maintaining aging infrastructure; addressing climate change and air quality; addressing congestion and reliability; eliminating fatal and life-changing motor-vehicle crashes; addressing earthquake vulnerability, security and emergency services; filling gaps in transit, biking and walking connections; addressing housing and transportation affordability and displacement; addressing social inequity and disparities; and proactively addressing technological change.

4.2 WHO WE ARE

The Portland metropolitan 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. By population, Portland is the 23rd largest metropolitan area in the country. The region has about half as many people as Boston and twice as many people as Salt Lake City. The greater Pittsburgh and San Antonio regions are about the same size.

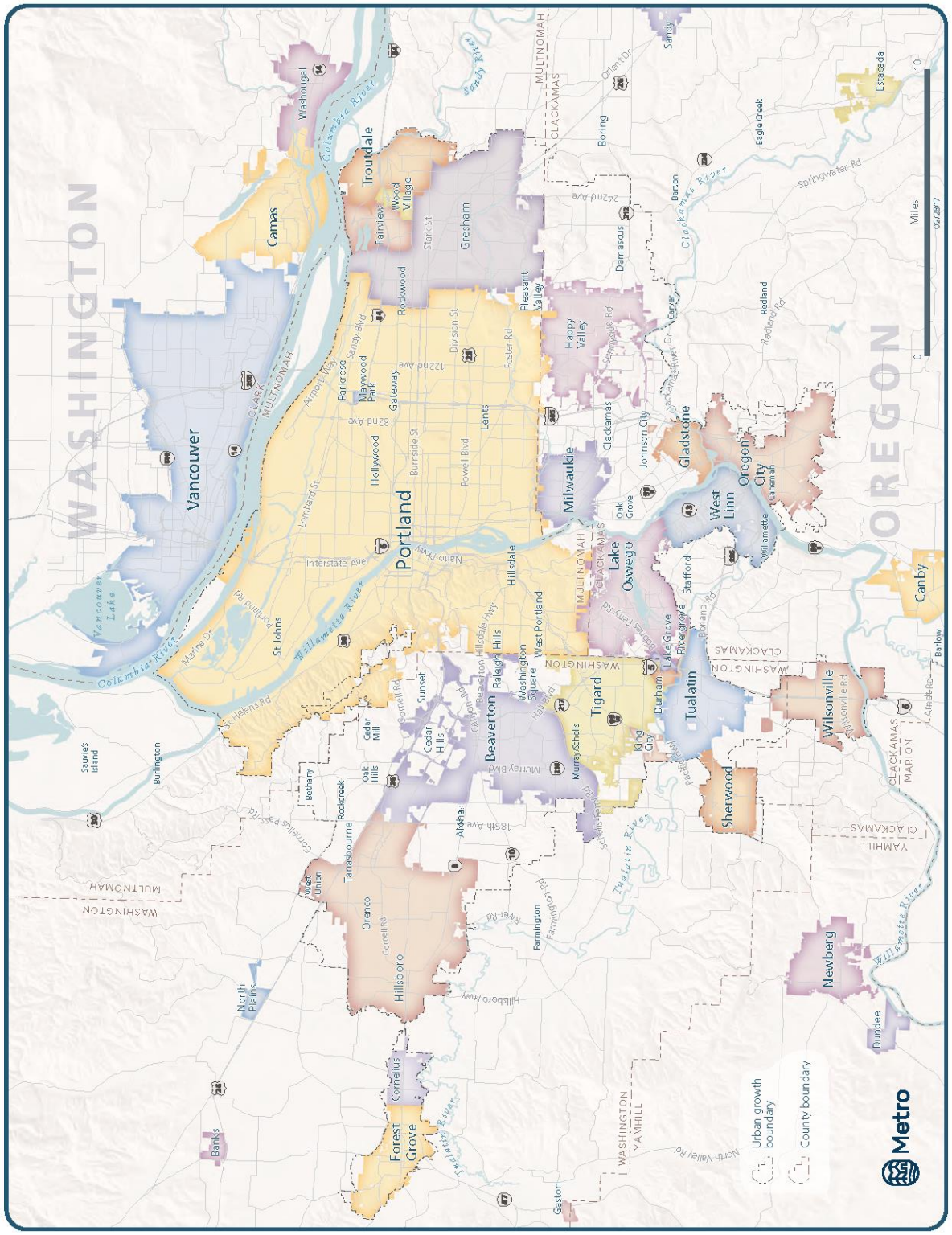
Figure 4.1 Population by metropolitan area, 2017



Source: 2013-2017 ACS 5-year estimates

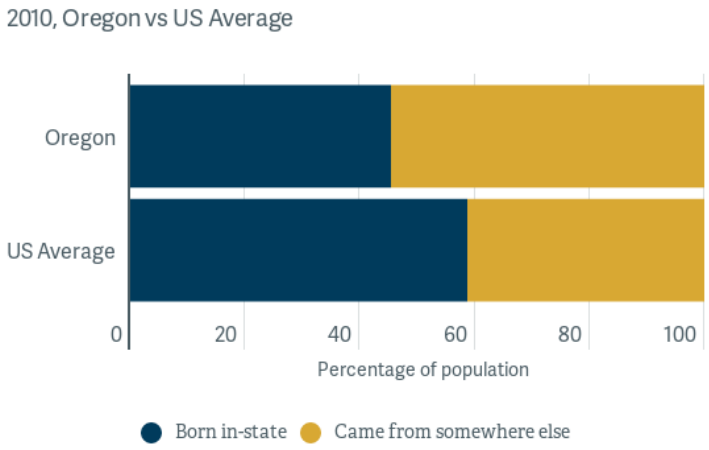
The Oregon portion of the Portland-Vancouver metropolitan region encompasses 24 cities and 3 counties as shown on the next page. Metro's urban growth boundary includes 403 square miles and more than 1.5 million residents.

Figure 4.2 Cities and counties in the greater Portland region, 2018



Our region continues to grow. New forecasts show that between 2015 and 2040, more than 500,000 additional people are expected to live within the region's urban growth boundary.[1] But how much are we growing, and how fast? And where are these new people coming from? In short, many are coming from somewhere else in the country, and it's adding up. Nationally, 68 percent of Americans live in the state where they were born, however in Oregon 51 percent of population came from somewhere else.

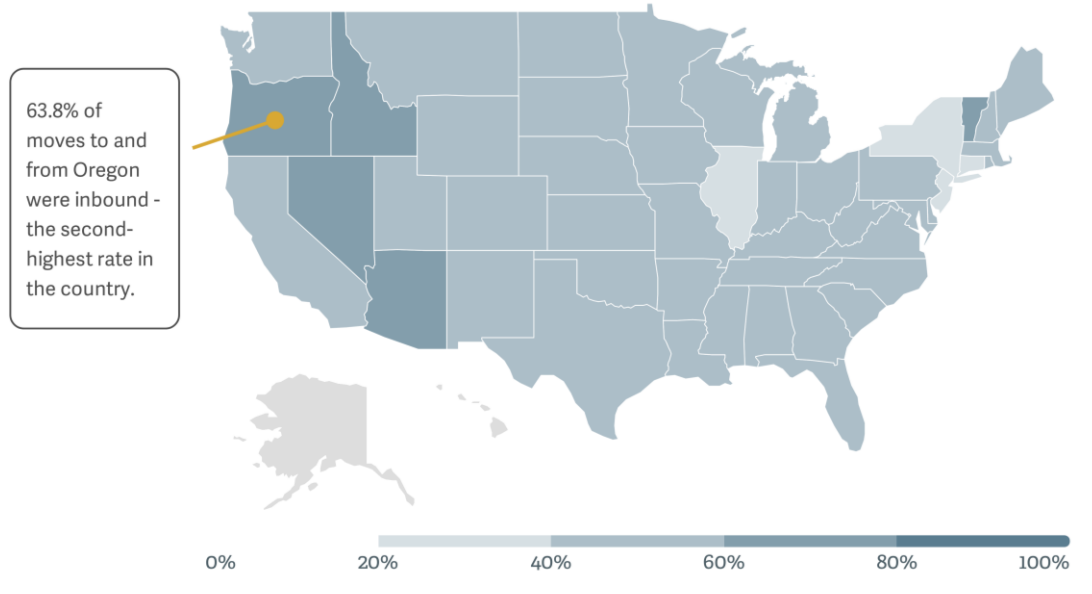
Figure 4.3 Percent of population by location of birth, 2010



Data: *Lifetime Mobility in the United States: 2010*. ACS Briefs, Nov. 2011

Oregon is the number one state for inbound migration for the second year in a row.

Figure 4.4 Top ten states for inbound migration, 2017-2018

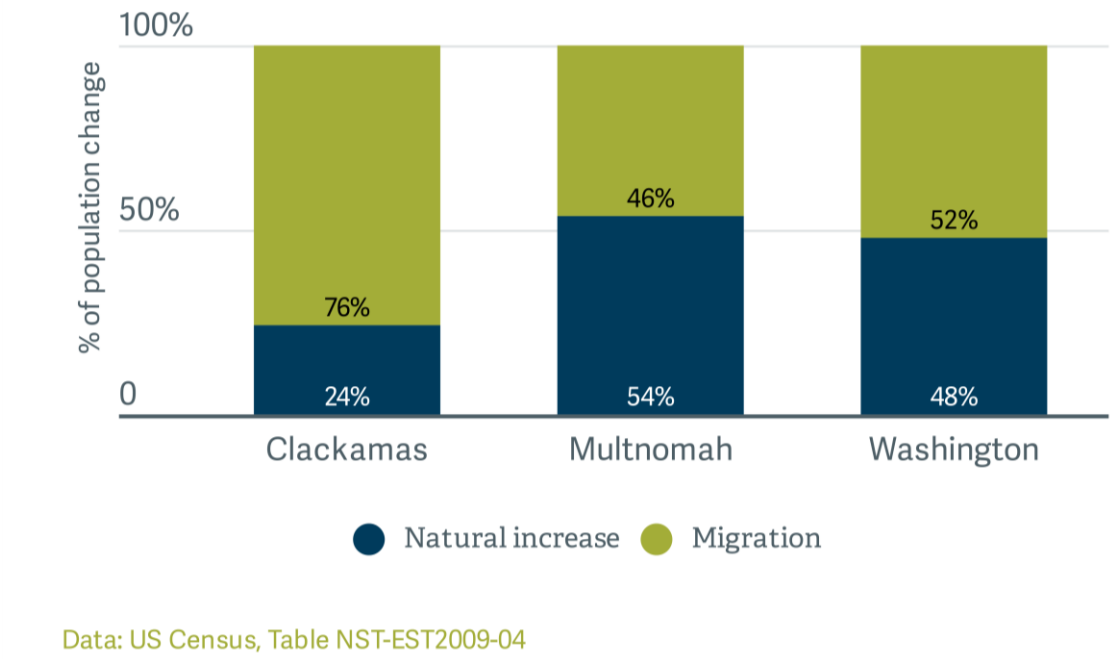


Source: *2018 National Movers Study*. United Van Lines, 2018.

[1] Ordinance No. 16-1371, Metro, October 2016

But different parts of the region are experiencing different sources of growth. For instance, between 2000 and 2009, Clackamas and Washington counties primarily grew due to people moving from other counties around the country. Most of Multnomah County's growth in that period was the result of natural increase – in other words, more people being born than dying in the county, as shown in **Figure 4.5**.

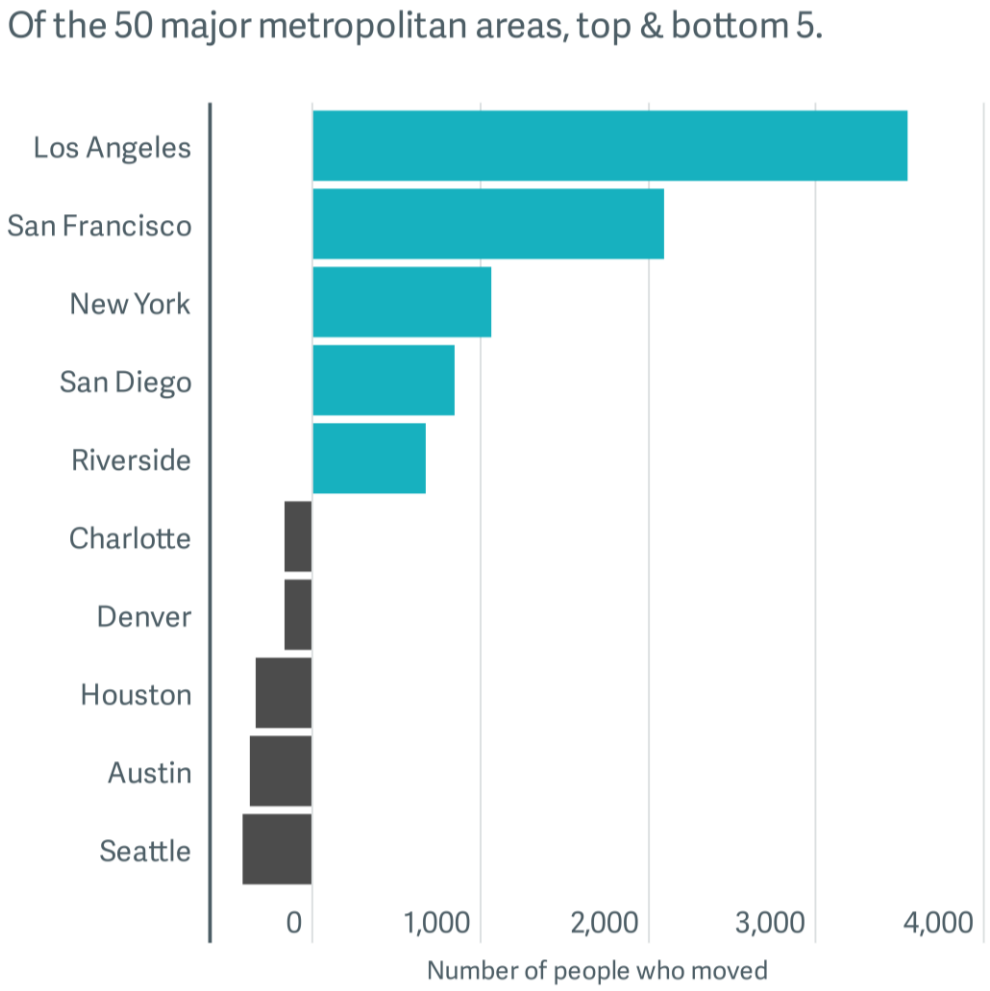
Figure 4.5 Source of population increase in the three counties, 2000-2009



Data: US Census, Table NST-EST2009-04

Most of the people are coming from California. From 2007-08 to 2009-10, four of the top five cities contributing to the Portland region's growth were Californian. (New York City was the only non-Californian city in the top five.) On the other hand, the region is losing people to Seattle, Austin and Houston.

Figure 4.6 Net migration into the 7-county Portland region



Data: IRS Exemptions/courtesy of Josh Lehner, Oregon Office of Economic Activity, 2013.

While this growth brings jobs and opportunity, it also creates new challenges; more people will be using the region's transportation system to get to work, school, shopping and other daily activities. According to the 2011 Oregon Household Activity Survey, the average household in the Portland region makes 9.2 trips per day with an average trip length of 4.4 miles for trips taken by car.

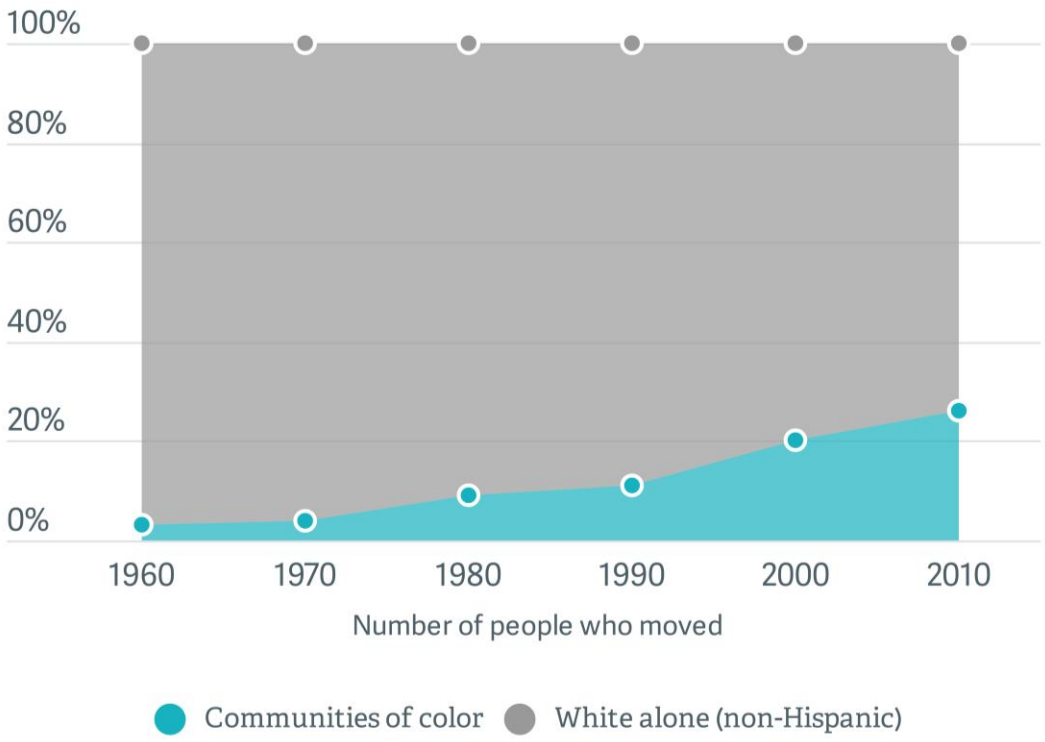
4.2.1 Demographic changes

Our population and communities continue to change. While the greater Portland region historically has had less racial diversity than other American cities, the region increasingly reflects the diversity of the country. However, the specific historic and systemic exclusion of and bias against African Americans is still reflected in the makeup of our population. In 2010, the

population of greater Portland was 71 percent White compared to 64 percent nationally, and 4 percent African American compared to 12 percent nationally.

Also of note is the difference in Hispanic/Latinx population (10 percent for the region, 16 percent nationally) and those whose racial/ethnic identity is not easily categorized by the U.S. Census categories (those grouped as "other": 6 percent for the region, 2 percent nationally). Communities of color are growing in their share of the Portland region's population, and they are less concentrated in Multnomah County than they once were.

Figure 4.7 Communities of color share of population in Portland tri-county area, 1960-2010



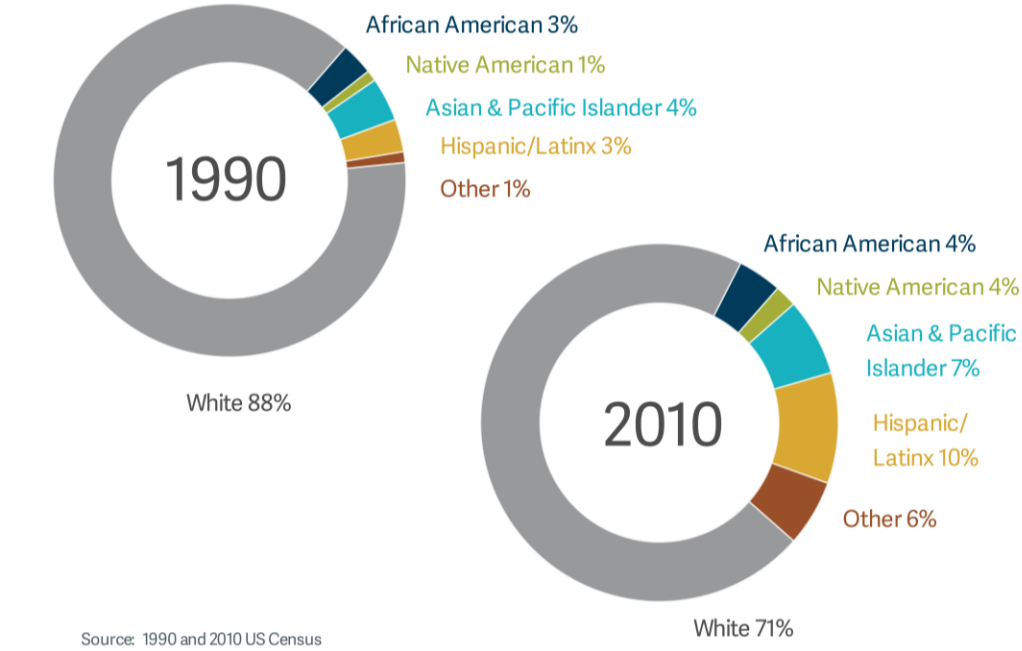
Data: US Census. Note that Census counts did not include Hispanic as a category until 1980.

In 1960, Clackamas and Washington counties had a combined population of 205,275. According to that year's Census, 153 of them were Black and 965 were neither White nor Black. In Multnomah County, about 16,000 people of the county's total population of 523,000 people were Black – the vast majority of the state's 18,000 Black residents. By 2010, Multnomah County had 530,000 White, non-Hispanic residents – about 72 percent of its total population of 735,334 residents. The Black population had grown to 41,000 residents, still the majority of Oregon's 69,000 Black residents but not the overwhelming majority it was four decades earlier.

In 2010, about 220,000 residents of Clackamas and Washington counties identified as Hispanic or a race other than White – about a quarter of their total population. In 1980, the first year the Census reliably tracked Hispanic population figures; there were about 21,000 Hispanics in greater

Portland – about 2 percent of the tri-county population. By 2014, that number was estimated to be 202,000 – close to 12 percent. Overall, communities of color saw their share of greater Portland's population rise from barely 3 percent in 1960 to almost 26 percent in 2010.

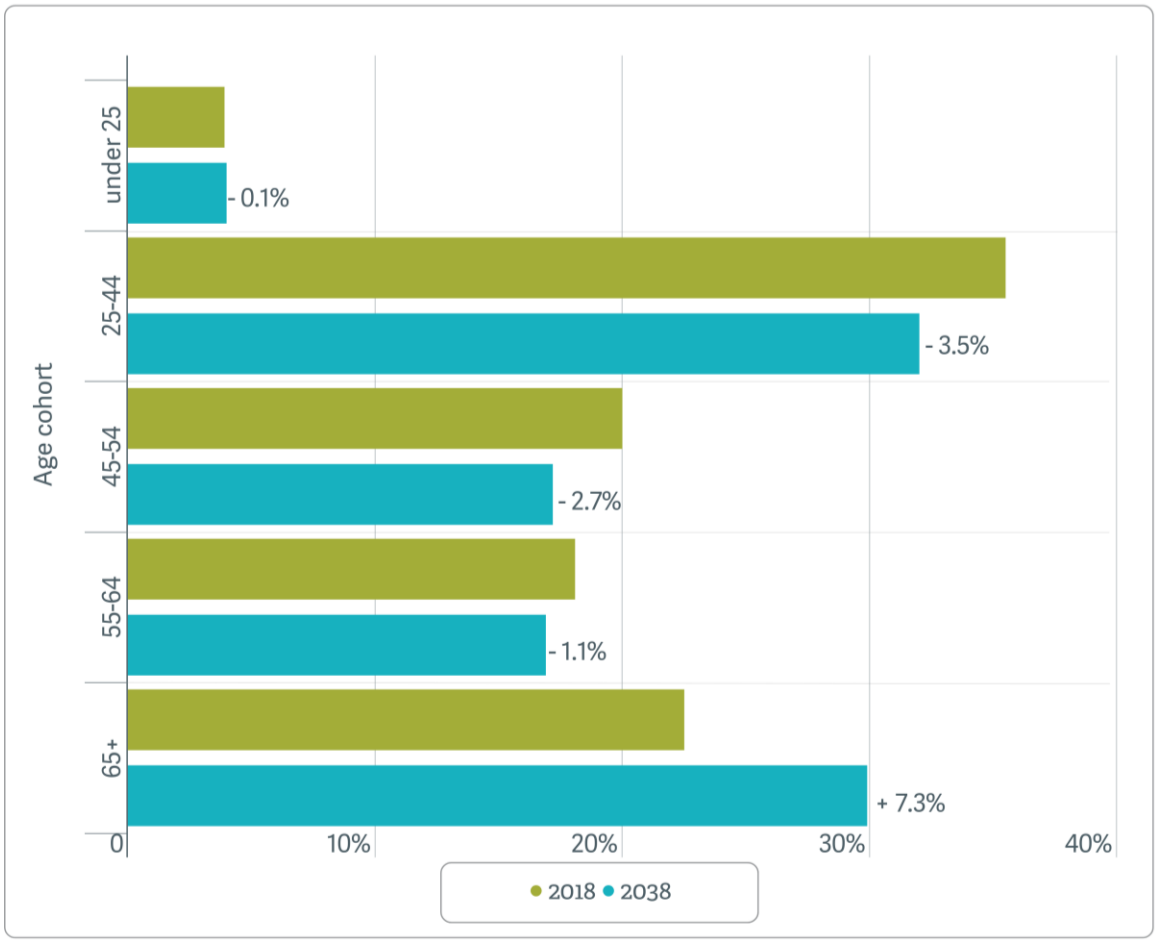
Figure 4.8 Race and ethnicity in the 7-county greater Portland region, 1990 and 2010



Source: 1990 and 2010 US census

In the seven-county Portland-Vancouver-Hillsboro metropolitan statistical area (MSA), which includes the greater Portland area, there will be a significant growth in the older adult (65+ years) population between 2018 and 2038 of over 7 percent, compared to a reduction for other age groups as shown in **Figure 4.9**.

Figure 4.9 Age cohorts as a percentage of total population in the 7-county greater Portland region, 2018 and 2038



Source: 2018-38 Portland-Vancouver-Hillsboro, OR-WA MSA Forecast, Metro Research Center, November 2017

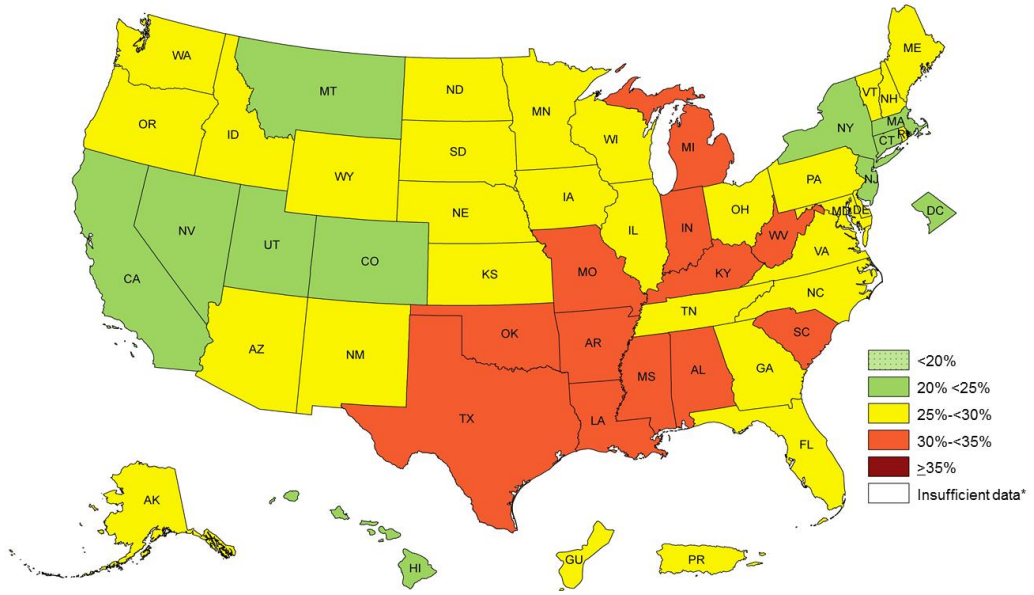
The changing demographics of the region for age follow a national trend of aging – the percent of the population over 65 continues to increase. Today, more than 20 percent of the region's population is over the age of 65. By 2038, nearly 30 percent of the region's population is forecast to be older than 65.

Public health is a growing concern

Interest in the connection between urban planning and active living has continued to grow since 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. We face a trend of rapidly rising

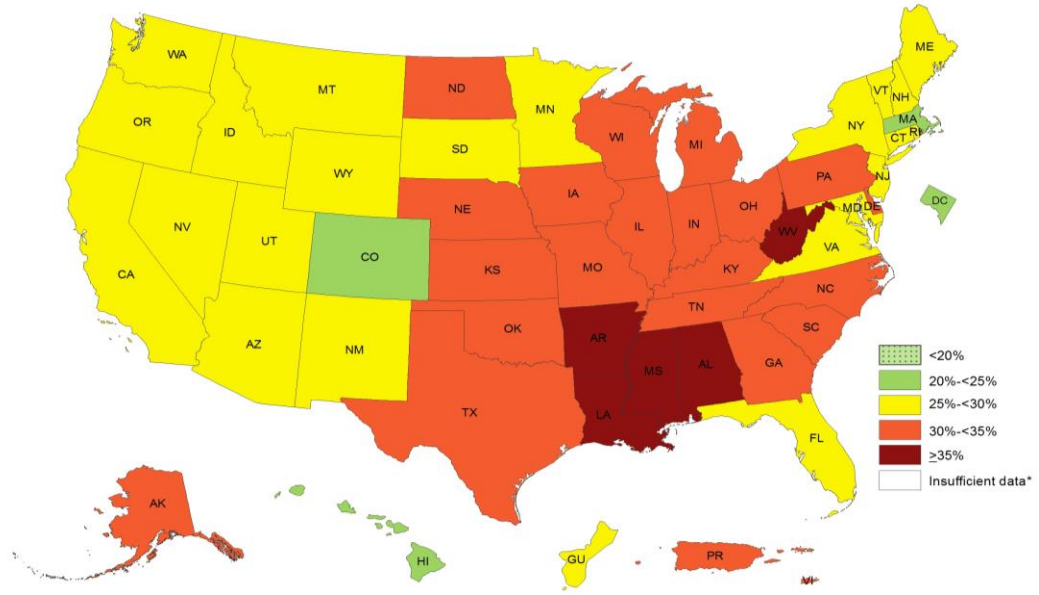
rates of chronic disease associated with obesity, being overweight and sedentary lifestyles, conditions that public health officials now describe as epidemic.

Figure 4.10 Prevalence of self-reported obesity among U.S. adults by state and territory, 2011



Source: Center for Disease Control Behavioral Risk Factor Surveillance System

Figure 4.11 Prevalence of self-reported obesity among U.S. adults by state and territory, 2016



Source: Center for Disease Control Behavioral Risk Factor Surveillance System

In addition, there is a well-established connection between exposure to air pollution from transportation systems and increased risk of chronic diseases such as asthma, stroke, heart disease and cancer that are related to vehicle emissions. National studies have demonstrated these negative health impacts affect people of color and lower-income households disproportionately. See Section 4.5 for more information about air quality.

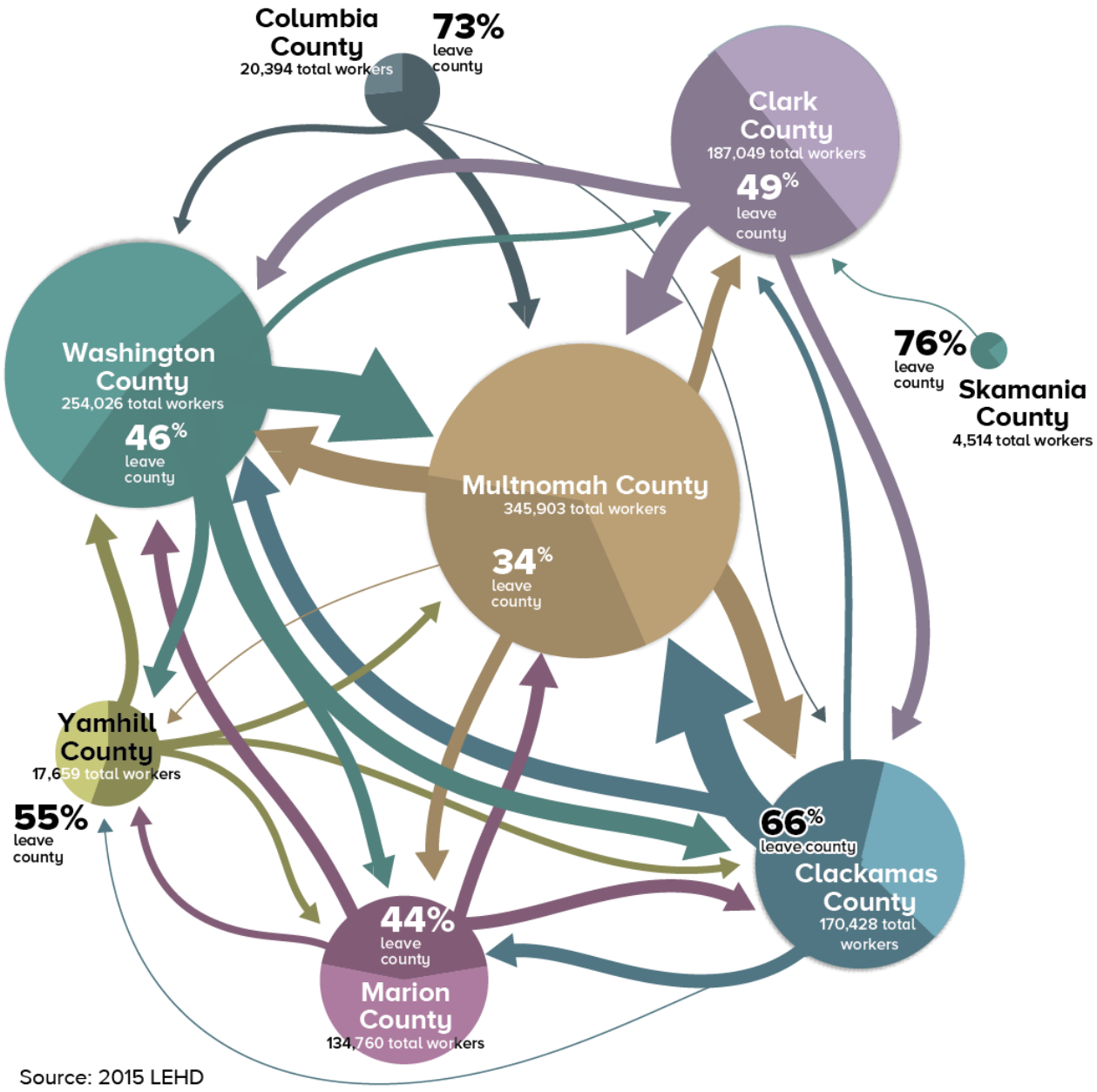
The greater Portland region has long embraced policies to create walkable communities and reduce vehicle miles traveled and related emissions, based on expected land use and transportation benefits. Inclusion of public health goals, objectives and performance measures in the RTP supports ongoing efforts to positively impact public health through transportation planning and design. 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 benefits. The use of health impact assessments and other evaluation tools will be considered moving forward.

4.2.2 Where we live and work

There are differences in where each of us goes every day, providing insight into the region's distribution of housing and jobs as shown in **Figure 4.12**. Take the flow of the daily commute, for example. Multnomah County has the most working residents and the most jobs. According to data from the Census Bureau, two-thirds of working residents in Multnomah County stay in their home county for work. Of those who leave, most head into Washington County, the region's second biggest job center.

For working residents of Clark and Washington counties, it's roughly an even split between working in the county and leaving, with most workers who leave commuting into Multnomah County. Clackamas County sees two-thirds of its working residents commute elsewhere, also mostly to Multnomah County. Washington and Clackamas counties also swap thousands of working residents each day – though not nearly as many commuters as each county send into Multnomah County.

Figure 4.12 Where residents work in the greater Portland region, 2015

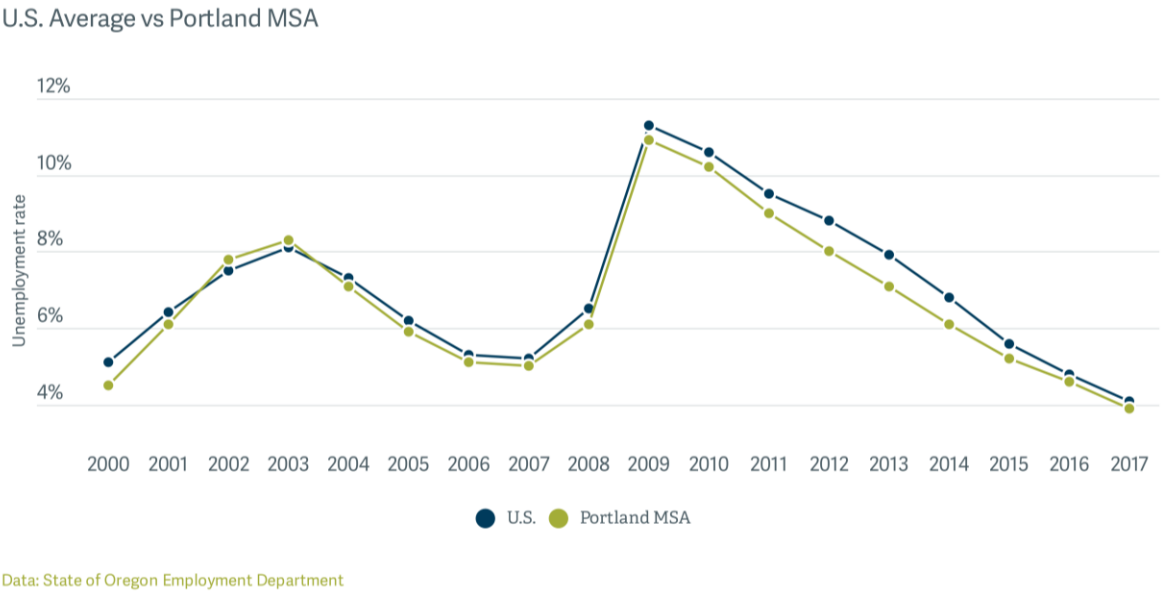


4.2.3 Jobs and a growing economy

The region's economy has been marked by job growth, shifts in job types, and growth in traded sector businesses. The greater Portland region employs over a million workers, the fifth largest workforce on the west coast[2]. Prior to about 2011, the region had higher unemployment rates compared to the U.S. as a whole, but since the recovery, Portland's rates have been more in sync with the rest of the nation.

[2] Greater Portland Work Book, 2013-14

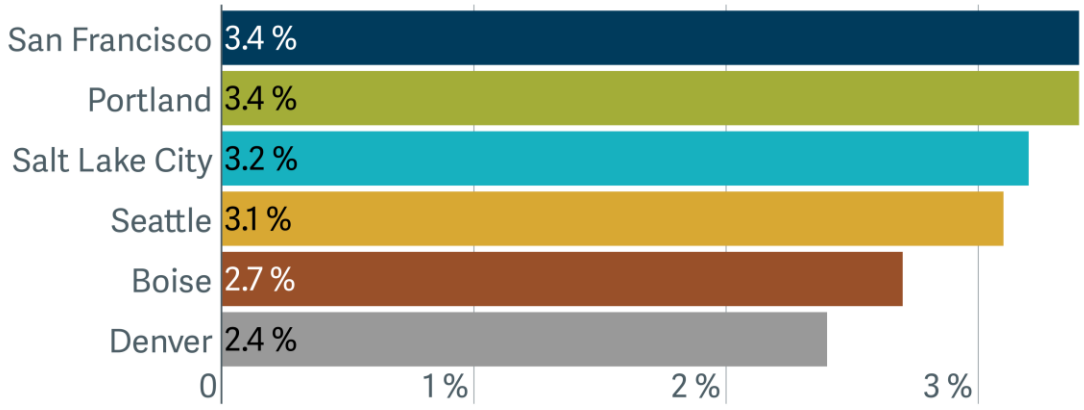
Figure 4.13 Unemployment rate in the greater Portland region, 2000-2017



Data: State of Oregon Employment Department

The region has regained twice as many jobs as it lost in the recession and job growth is up. The region is also attracting a young, highly educated workforce. Over the past year, Portland's growth has been strong – on par with San Francisco as shown in **Figure 4.14**.

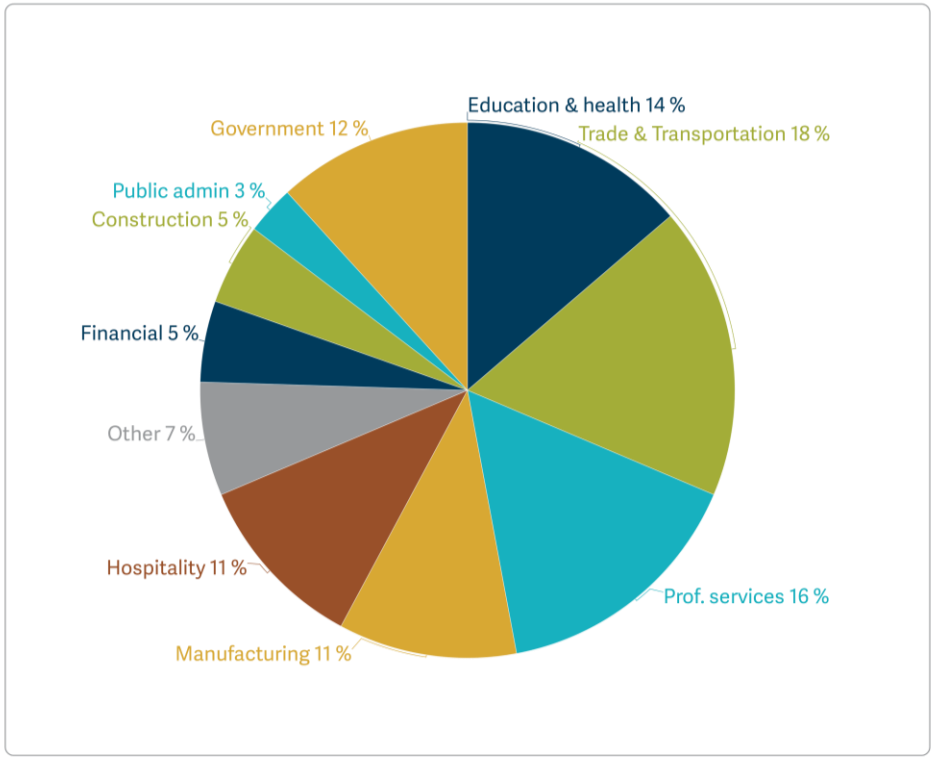
Figure 4.14 Employment growth by metropolitan statistical area, 2014-2015



Data: U.S. Bureau of Labor Statistics

Currently almost half of Portland area residents work in trade and transportation, professional services, and education and health as shown in **Figure 4.15**.

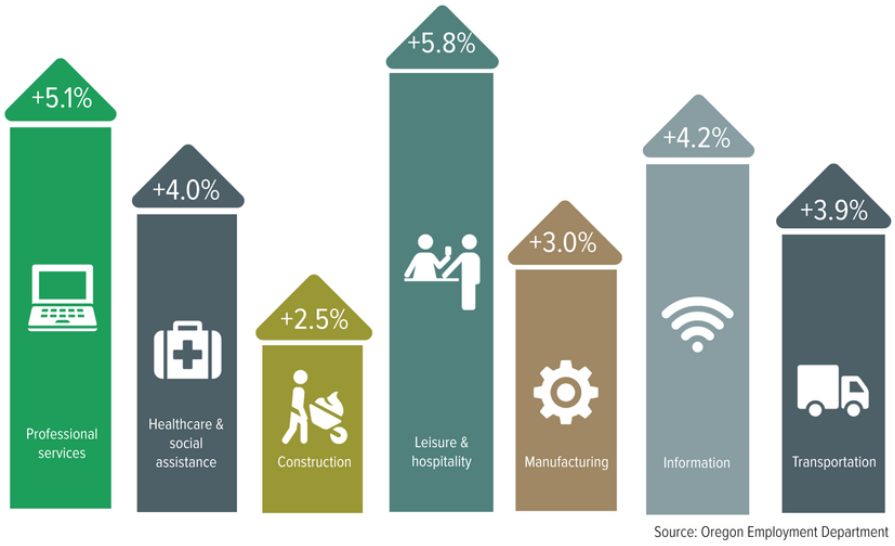
Figure 4.15 Employment by industry for Portland-Vancouver-Hillsboro MSA (Oregon portion only), 2017



Data: State of Oregon Employment Department

Several job sectors are doing exceptionally well in the Portland region, particularly professional and business services and leisure and hospitality. These sectors have been adding workers more quickly than other sectors as the region comes out of the recession.

Figure 4.16 Fastest growing industries in 7-county region, 2014-2015



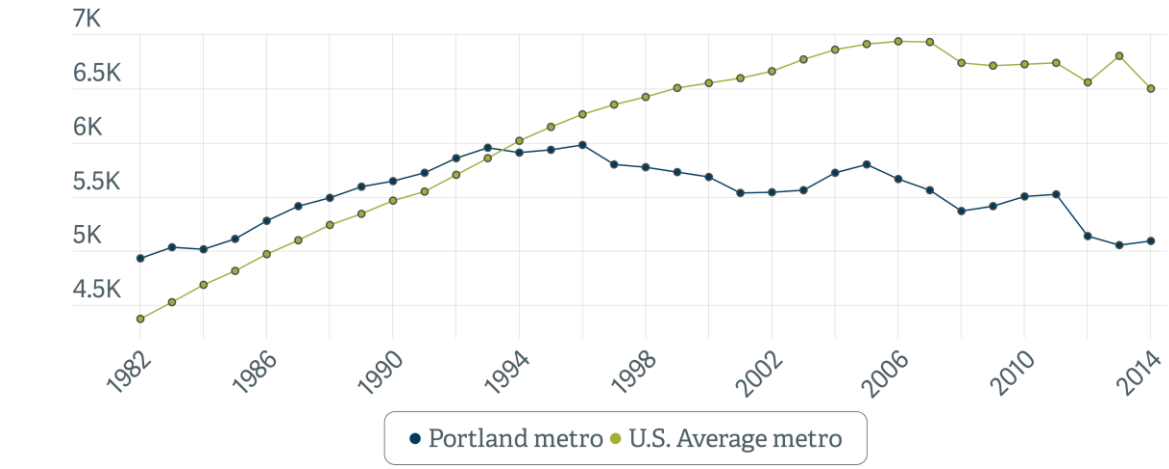
Source: Oregon Employment Department

4.3 HOW WE GET AROUND

4.3.1 Travel

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. On a per-person basis, the Portland region has been driving less since 1996, even as people take about the same number of trips each day. According to the 2015 Texas A&M Transportation Institute's Urban Mobility Report, the region's residents drove just 5,000 miles per person in 2014 – that's nearly 25 percent less than other US metropolitan regions of similar size.

Figure 4.17 Average annual vehicle miles traveled per person, greater Portland region compared to other metropolitan areas, 1982-2014

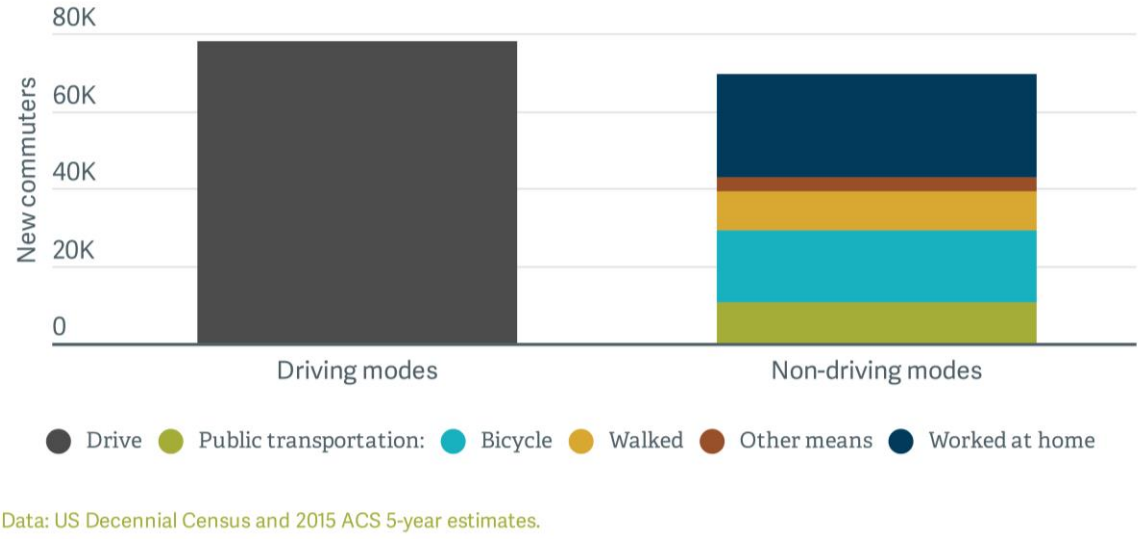


Texas A&M Transportation Institute, Urban Mobility Report

Why are people driving less here? Part of the reason is that people in the Portland region are making different choices about getting around – a reflection of the multimodal options available as defined in the 2040 Growth Concept. US Census estimates from 2014 show that while the national average for drive-alone commuting is 76.4 percent, the Portland region's average was just 70.7 percent, resulting in associated reductions in greenhouse gas and other vehicle emissions for the region.

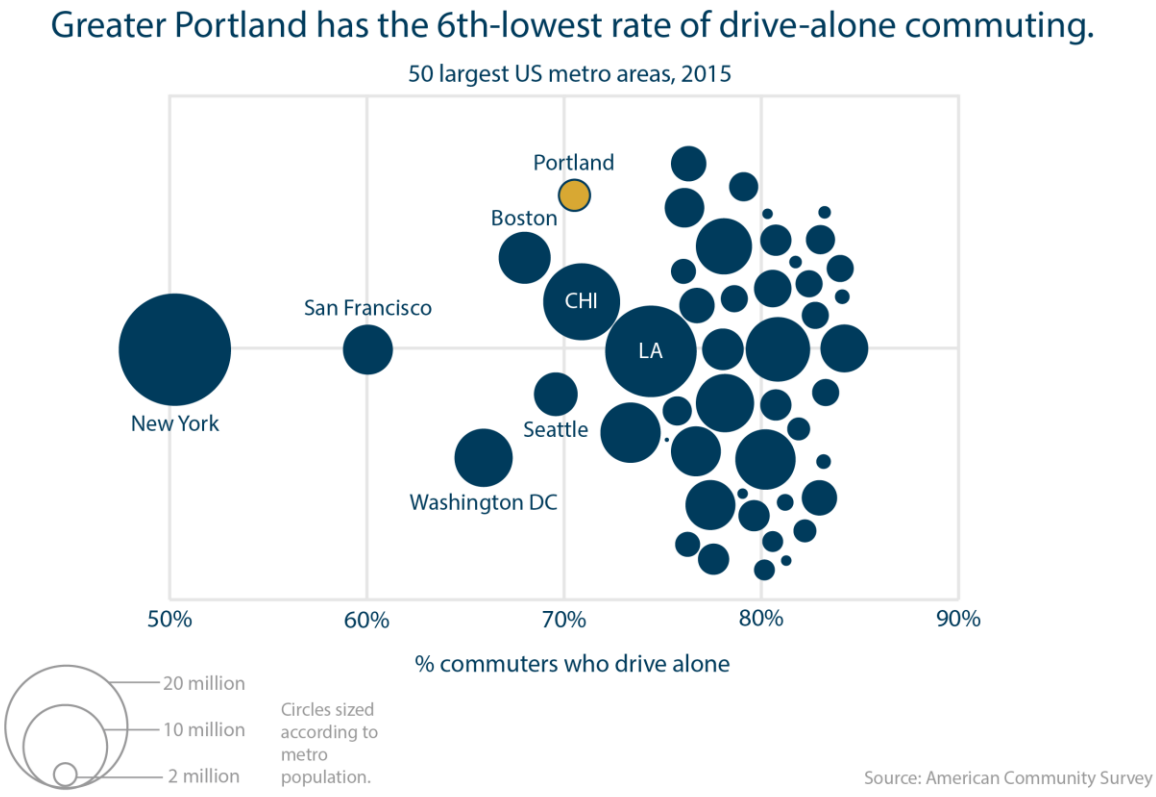
Though a growing population invariably means more commuters, just under half of the workers added since 2000 drive to work alone as shown in **Figure 4.18**. The majority are choosing other modes, or working from home.

Figure 4.18 Mode share of new commuters in the 7-county MSA, 2000-2015



Data: US Decennial Census and 2015 ACS 5-year estimates.

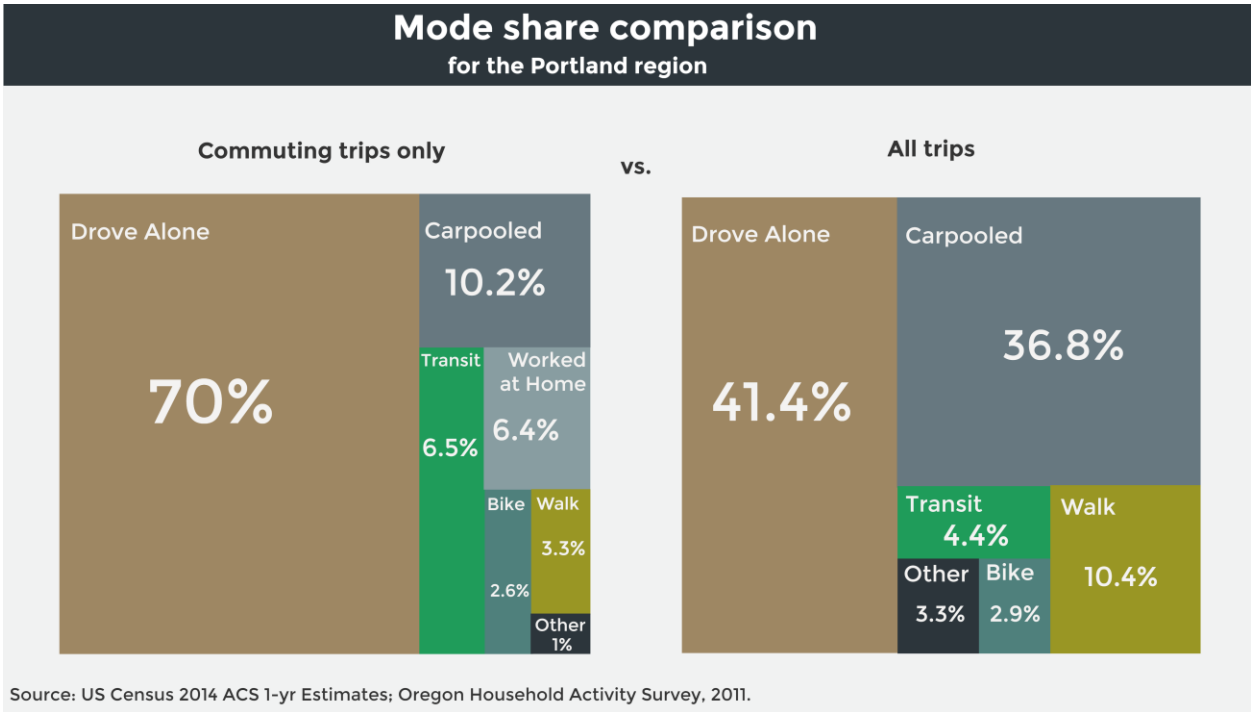
Figure 4.19 Ranking of drive alone commuting in U.S. metropolitan areas, 2015



4.3.2 Mode share

Travel to work has typically been the focus of transportation planning, especially given its prominence in the morning and evening peak periods. However these trips make up a relatively small portion of all the trips taken throughout the region. Nationwide travel for non-work purposes, such as shopping, errands and recreation is growing faster than work travel. In fact, more than 70 percent of the trips taken in the Portland region are for reasons other than school and work.

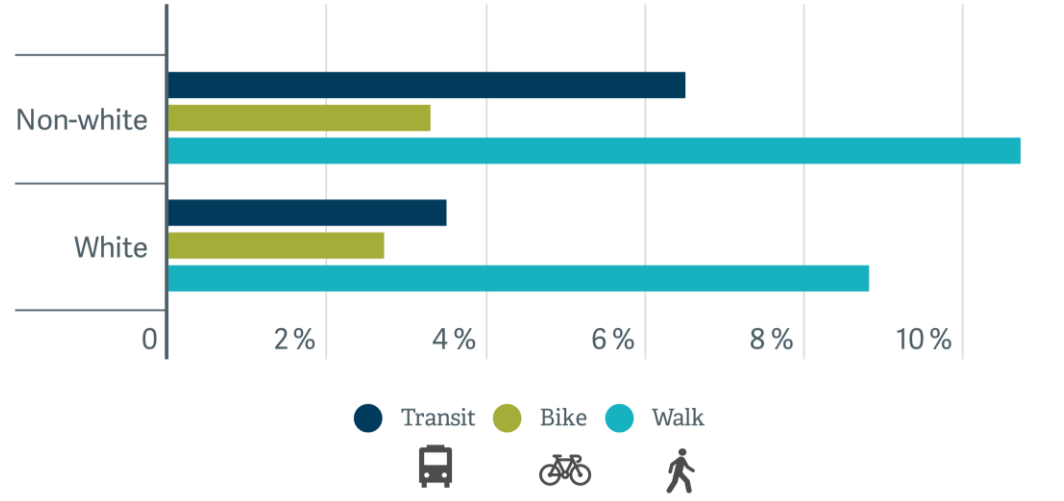
Figure 4.20 Mode share comparison for commute and all trips, 2011



In 2003, Metro's Regional Travel Options (RTO) program started to target non-commute trips during rush hour and throughout the day as a key strategy for addressing congestion and air quality issues in the region.

Driving is the most predominant way for people in the region to get around. In 2015, more than 80 percent of all trips in the greater Portland region were made by motor vehicle. Communities of Color drive less than White residents in the region.

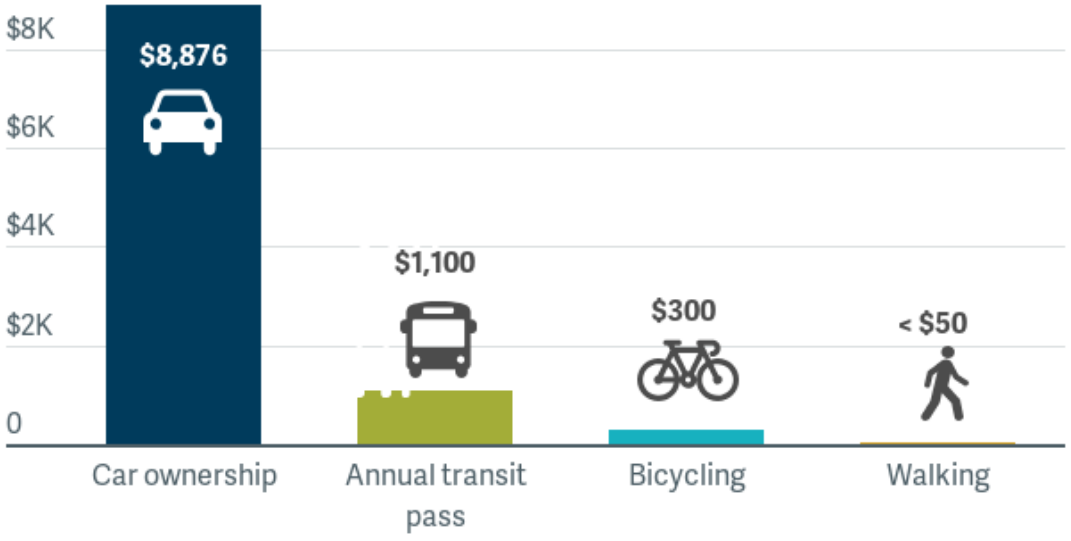
Figure 4.21 Travel modes by non-White and White populations in Oregon, 2011



Source: Oregon Household Activity Survey, 2011

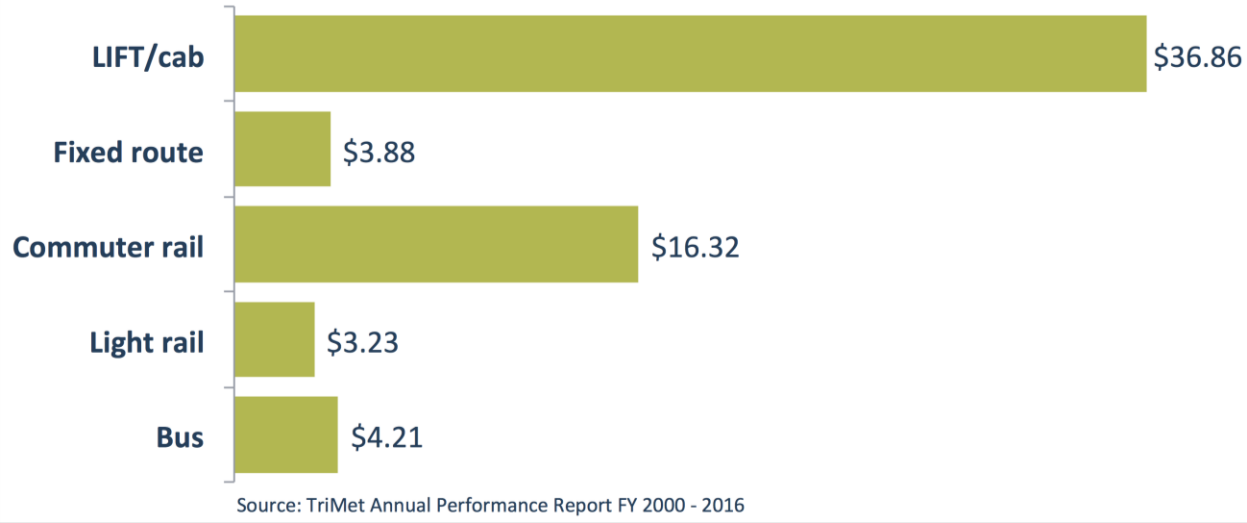
Driving remains the most expensive form of transportation, both for individuals and for society. The average annual cost of owning an automobile is over $8,000 a year. However, fuel is comparatively cheap, and driving remains a convenient and efficient way to travel in the region.

Figure 4.22 Annual transportation costs by mode, 2014



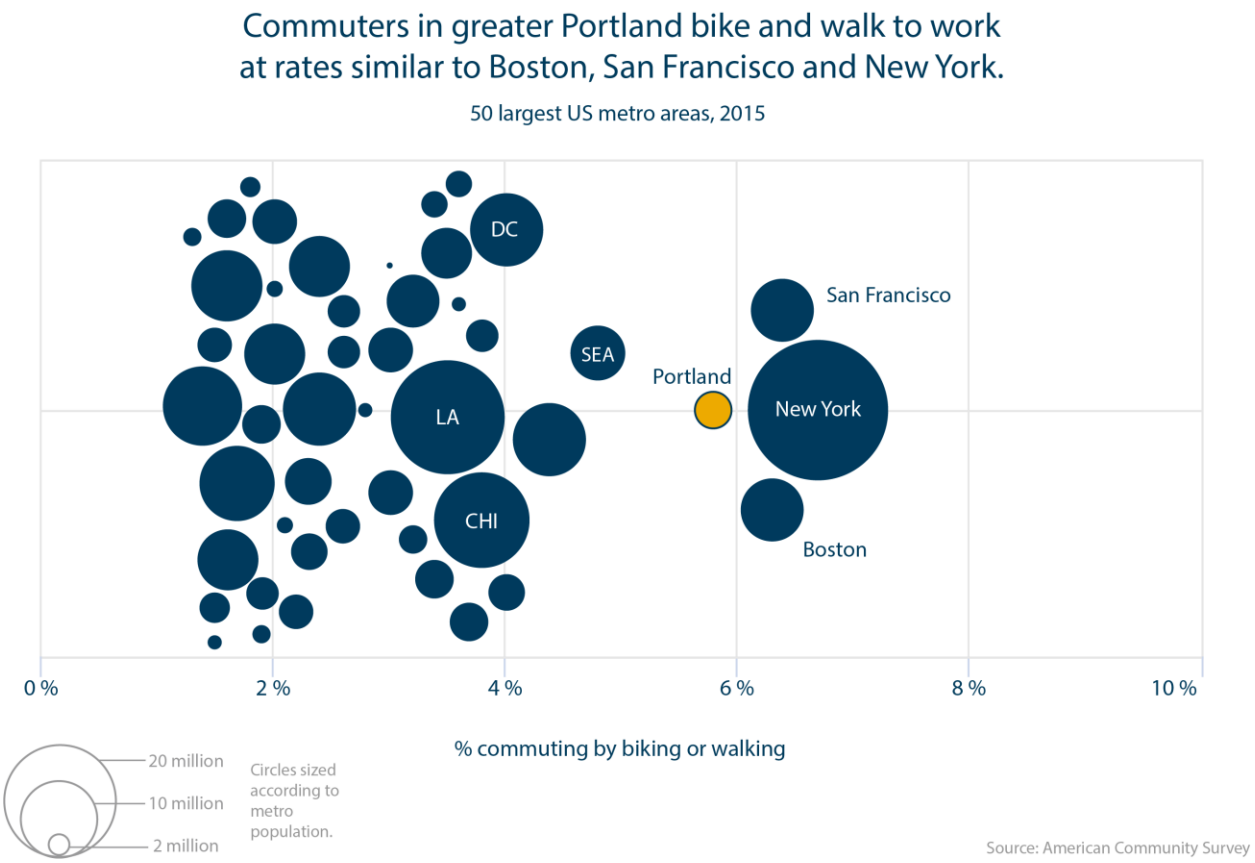
Sources: "Your Driving Costs," AAA, 2014.; TriMet annual transit pass; Todd Litman, Victoria Transportation Institute "Transportation Cost Benefit Analysis II - Vehicle Costs." Note that all costs are estimates.

Figure 4.23 2016 TriMet cost per ride



Walking is the most 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 a part of every trip, even when the rest of the trip takes place on transit, in a vehicle or on a bicycle. Pedestrian activity thrives where the pedestrian facilities are well connected, safe and attractive—meaning well lit, free of debris and in good repair—and where there are frequent protected crossings. Therefore, it is critical that our transportation system supports and encourages walking for short trips.

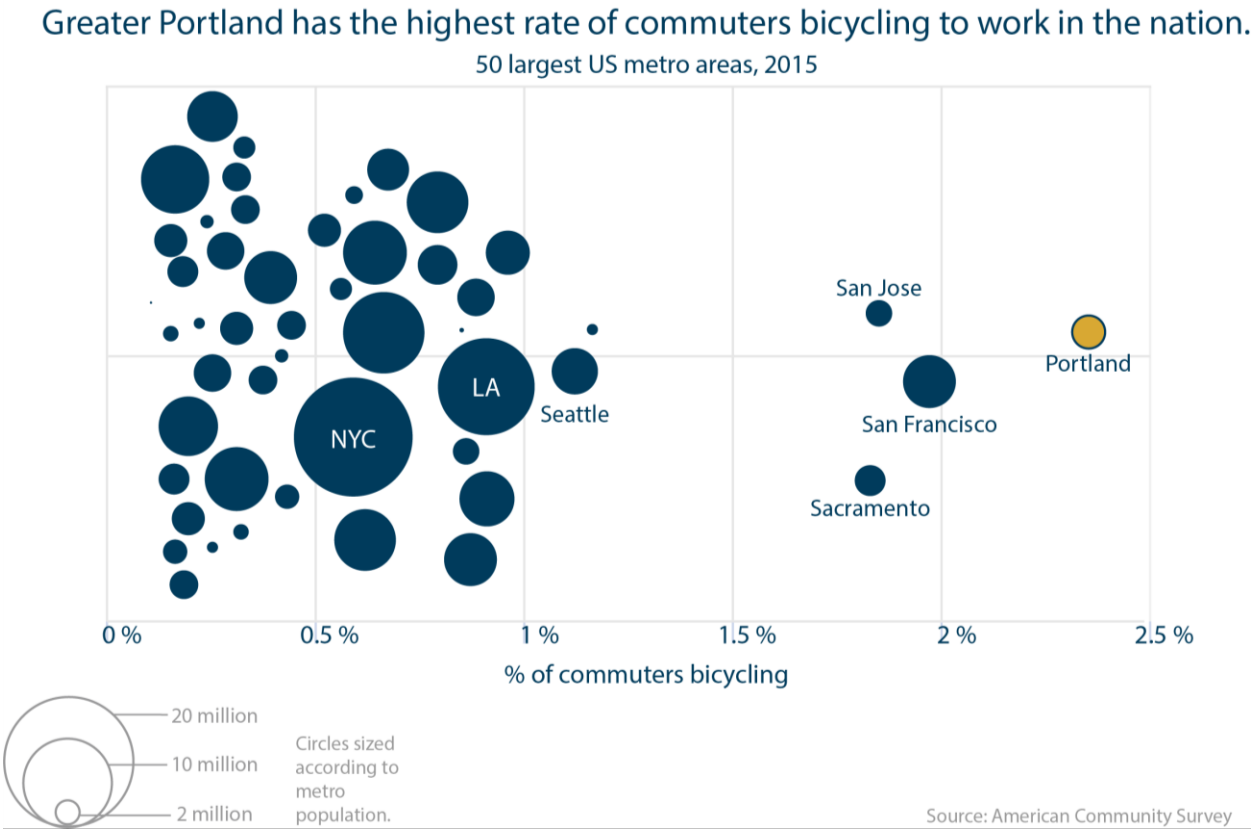
Figure 4.24 Bike and walk commute rates for metropolitan areas, 2015



Bicycling plays an important and growing role in the regional transportation system and the region's economy. Bicycling for transportation grew by 191 percent between 1994 and 2011 adding to the growing demand for improved bicycle facilities.[3] Counts taken across five Portland city bridges reported 18,794 daily bicycle trips—a 128 percent increase over the previous 10 years. Increased ridership is due in part to improved bicycle infrastructure as well as increased recognition of the health benefits of bicycling.

[3] 2011 Oregon Household Activity Survey, Metro.

Figure 4.25 Bike commute rates for metropolitan areas, 2015



Transit - MAX Light rail, WES commuter rail, bus, and Portland Streetcar and supporting infrastructure make up the current regional transit system, which has seen increased ridership. In 2014, people in the Portland region took more than 103 million rides on transit. Although ridership has fluctuated over the last 10 years, weekday transit ridership among the region's major transit services – TriMet, SMART (Wilsonville), C-TRAN (Vancouver and Clark County, WA.) and Portland Streetcar – has grown while the average miles each person drives daily has declined.

Figure 4.26 Transit commute rates for metropolitan areas, 2015

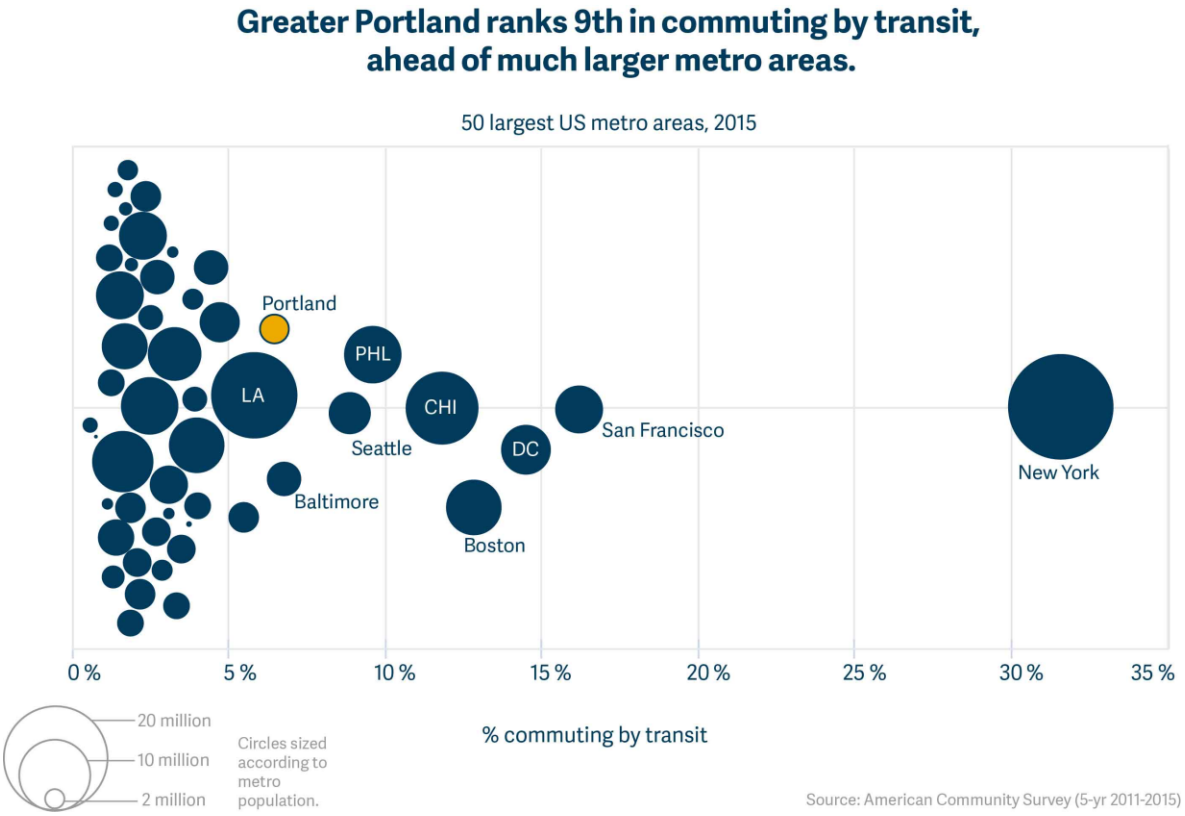


Figure 4.27 TriMet boarding rides per revenue hour compared to other regions, 2015

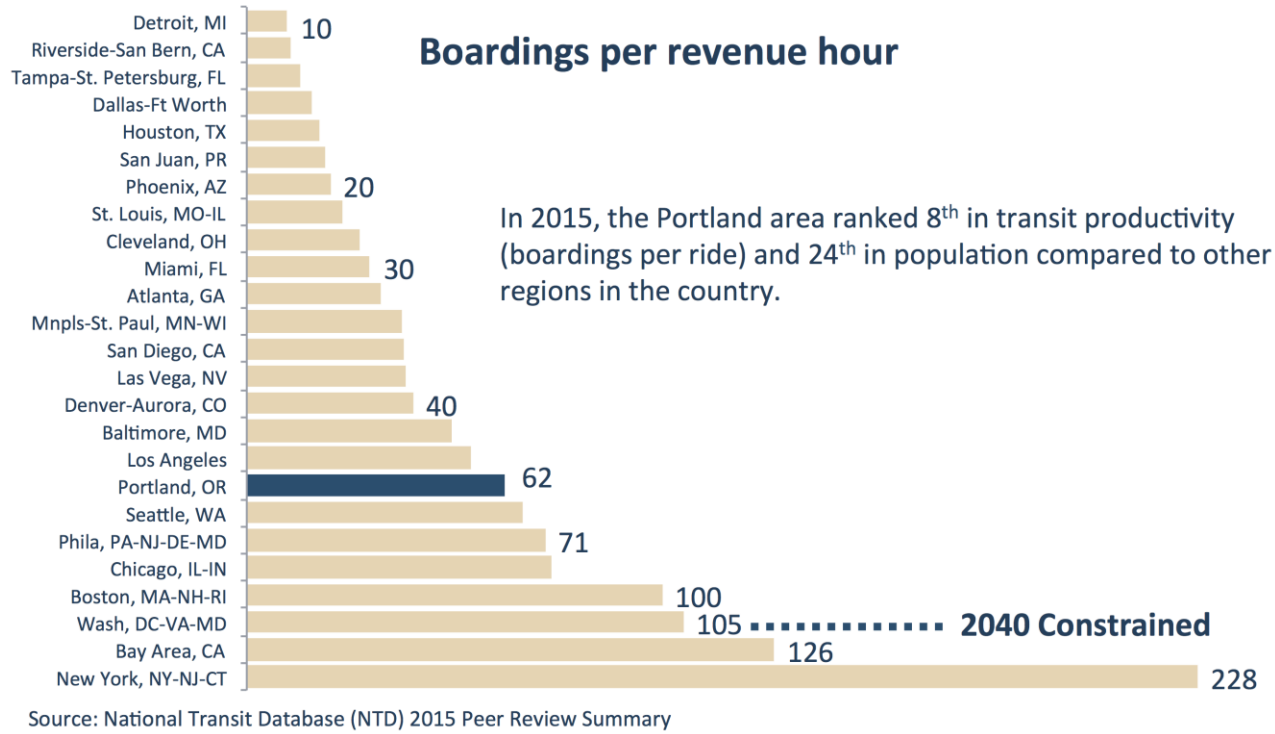
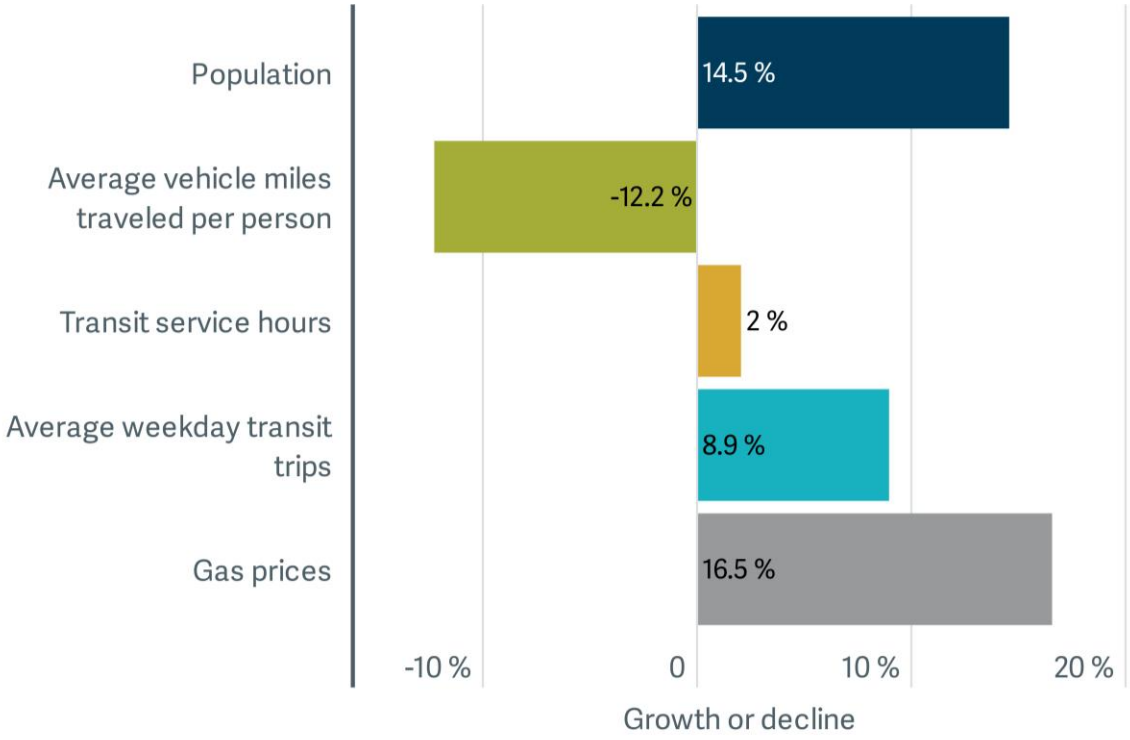


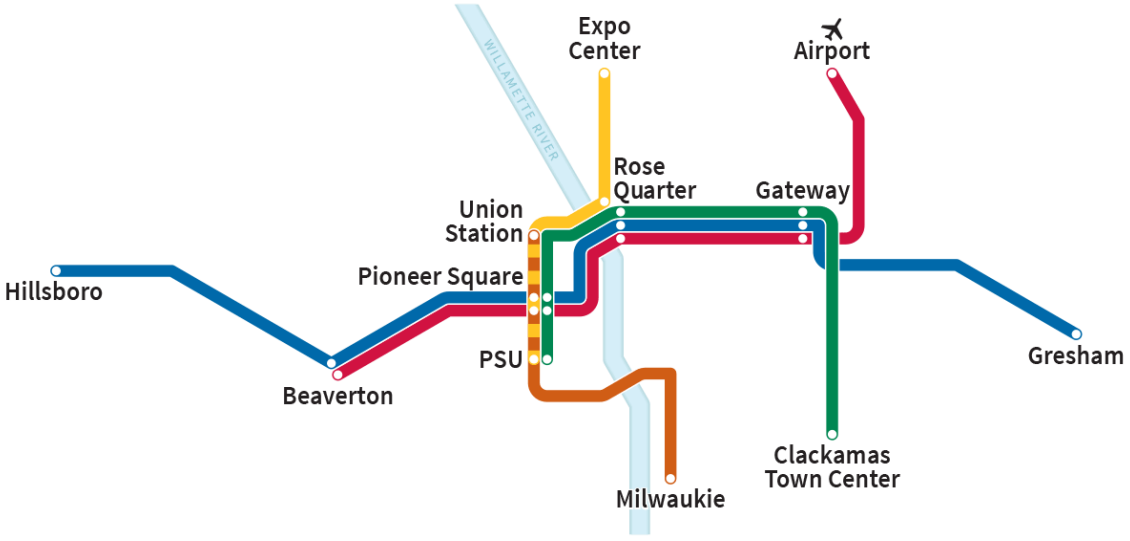
Figure 4.28 Transit ridership compared to other Portland regional trends, 2005-2015



Sources: US Decennial Census, PSU intercensal estimates; Texas A&M Urban Mobility Scorecard; Trimet, Portland Streetcar, Inc., Aerial Tram, and SMART; AAA Fuel Gauge.

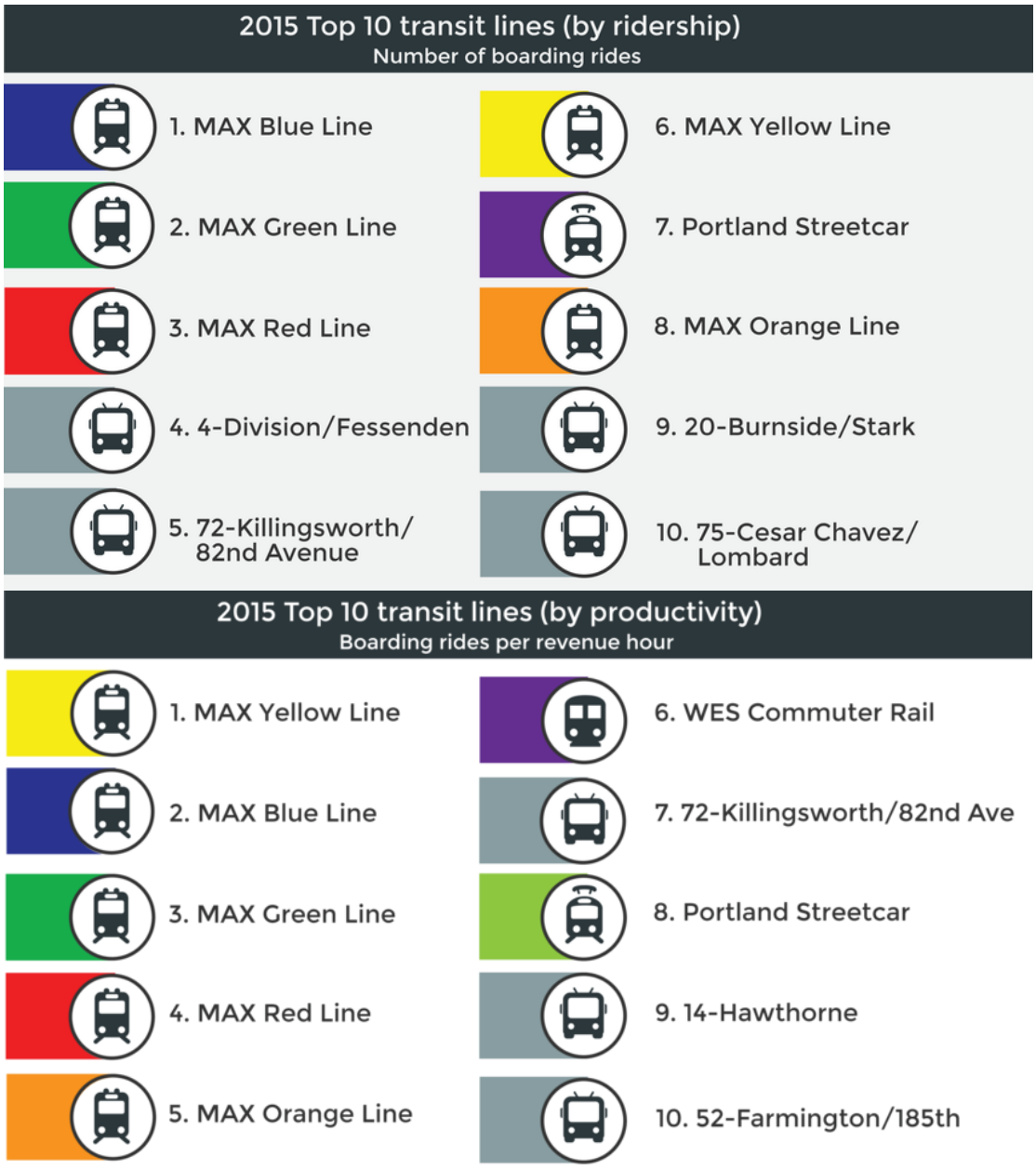
Figure 4.29 shows the MAX system map in 2018.

Figure 4.29 MAX System Map, 2018



As can be seen in **Figure 4.30**, rail transit (light rail, commuter rail and streetcar) carries a big share of the region's transit passengers. For example, although the MAX network only has 88 total track miles compared to the bus network's 822 miles, MAX lines carry almost two-fifths of all transit trips. The Blue MAX line alone carries nearly 60,000 people per day.

Figure 4.30 Top performing transit lines, 2015



Source: TriMet

Effectiveness of employer commuter programs and community and neighborhood programs on changing mode share

Between 1997 and 2006, the TriMet, Wilsonville SMART and transportation management association employer-outreach programs have made significant progress with reducing drive-alone trips. Since 1997, 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.

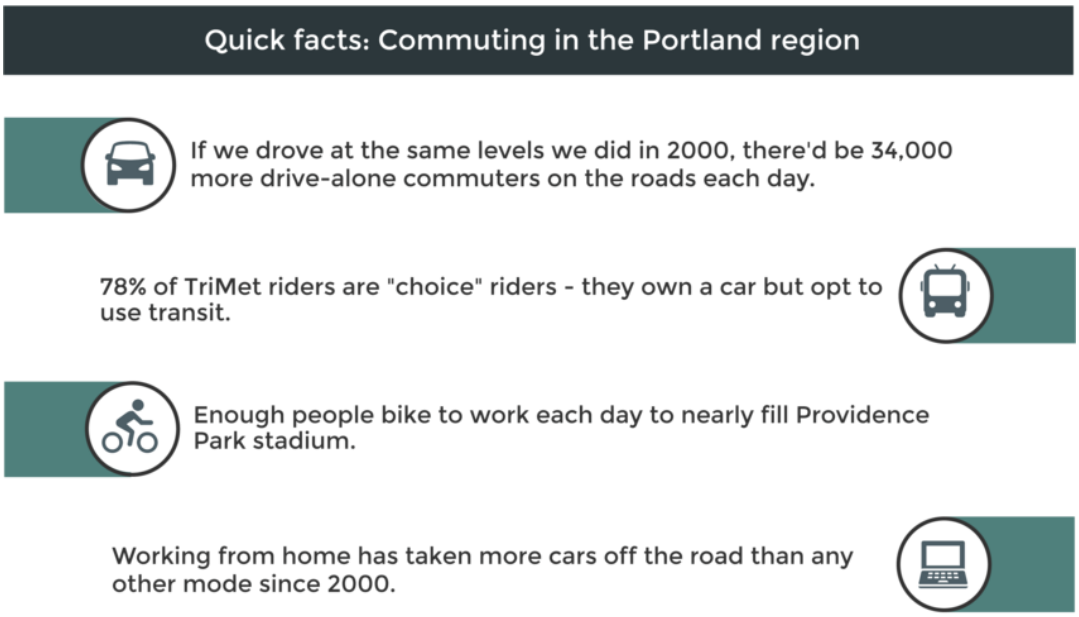
Community outreach programs such as Portland Sunday Parkways and Wilsonville Sunday Streets encourage residents to use travel options by exploring their neighborhoods on foot and bike without competing with motorized traffic. Sunday Parkways events have attracted 119,000 participants, and the Wilsonville Sunday Streets event attracted more than 5,000 participants in 2012.

Other examples of valuable community outreach and educational programs include the Community Cycling Center's program to reduce barriers to biking and Metro's Vámonos program, both of which provide communities across the region with the skills and resources to become more active by walking, biking and using transit for their transportation needs.

In 2004, the City of Portland launched the Interstate TravelSmart individualized marketing project in conjunction with the opening of the MAX Yellow Line. Households that received individualized marketing made nearly twice as many transit trips compared to a similar group of households that did not participate in the marketing campaign. In addition, transit use increased nearly 15 percent during the SmartTrips project along the MAX Green Line in 2010. Follow-up surveys show that household travel behavior is sustained for at least two years after a project has been completed.

In 2015, a unique partnership between Metro, the City of Milwaukie and ODOT engaged residents along the last three stops of the new MAX Orange Line. More than 25 percent of residents participated in the program to learn about new travel options, resulting in a reduction of more than 1.3 million single occupant vehicle miles driven the year after the opening of the line.

Figure 4.31 Quick facts about commuting in the greater Portland region, 2015



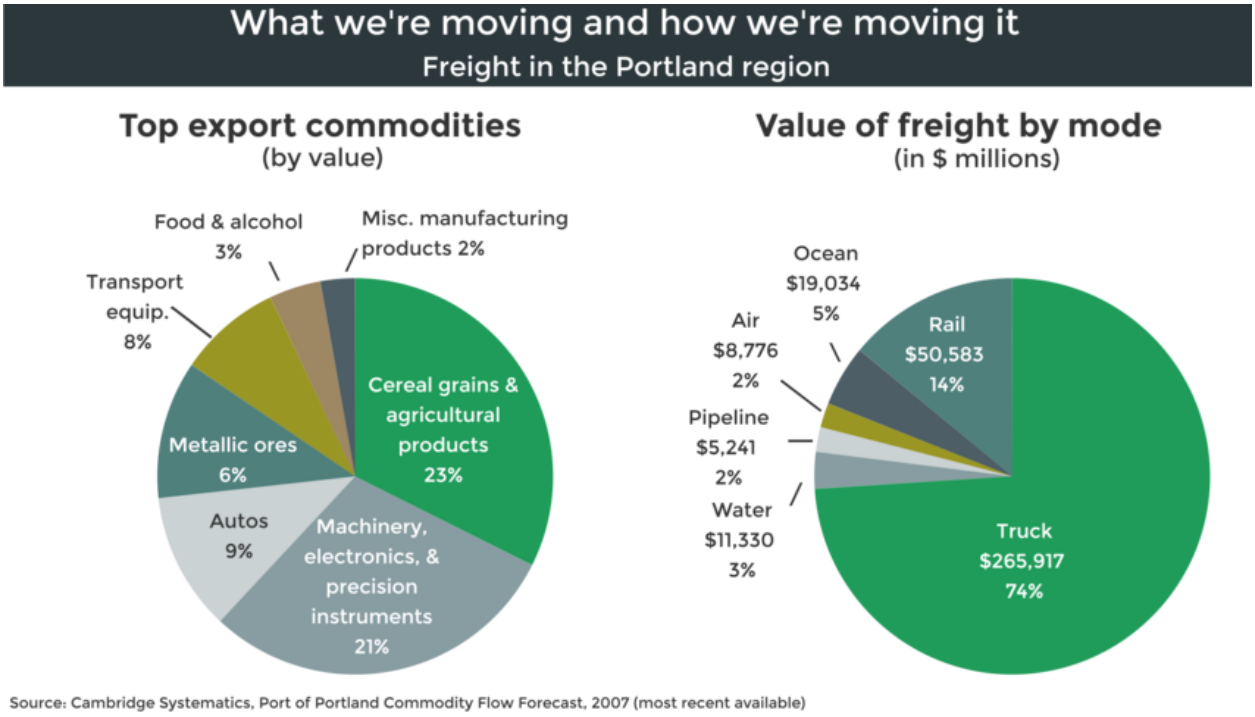
Source: U.S. Census

4.4 HOW WE MOVE GOODS AND SERVICES

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. In comparison with other U.S. metropolitan areas of similar size, Portland's competitiveness is largely dependent on the region's goal as a gateway and distribution center for domestic inland and international markets[4]. The global economy is expanding rapidly, and our region's ability to move products to far-flung markets depends on an efficient transportation system.

With its location on Interstate 5, the West Coast artery of the Interstate Highway System, the greater Portland region is ideally situated to move freight by truck. But with Portland International Airport, two Class 1 railroads (mainline railroads Union Pacific and Burlington Northern/Santa Fe), the southern terminus of the 400-mile Olympic Pipeline, and a location at the confluence of two major rivers with ocean access, the region's freight transportation system is a multimodal network.

Figure 4.32 Freight goods movement in the greater Portland region, 2012

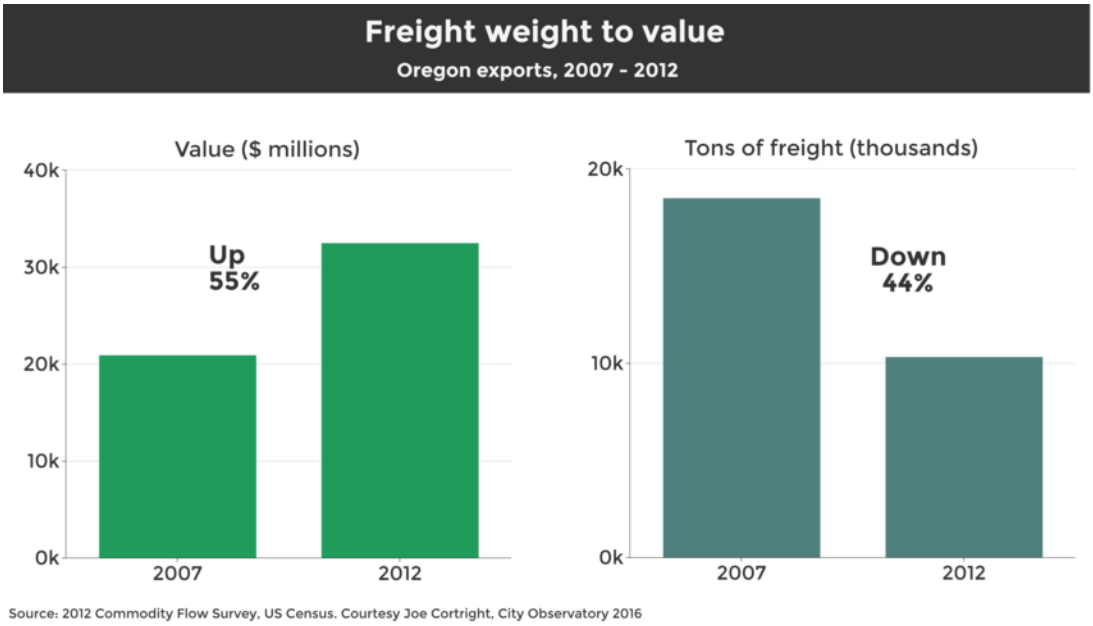


Source: Cambridge Systematics, Port of Portland Commodity Flow Forecast, 2007 (most recent available)

The majority of the region's freight is still moved by truck as shown in **Figure 4.32**. However, as Oregon's economy has shifted from bulk products like farm exports and timber to lighter products like semiconductors, electronics and specialized machinery, the region is moving fewer tons of goods around. But these lightweight products are higher-valued – as a result, the overall value of freight exports increased by 55 percent between 2007 and 2012.

[4] Cost of congestion to the Economy of the Portland Region, November 2015

Figure 4.33 Freight weight to value, 2007-2012



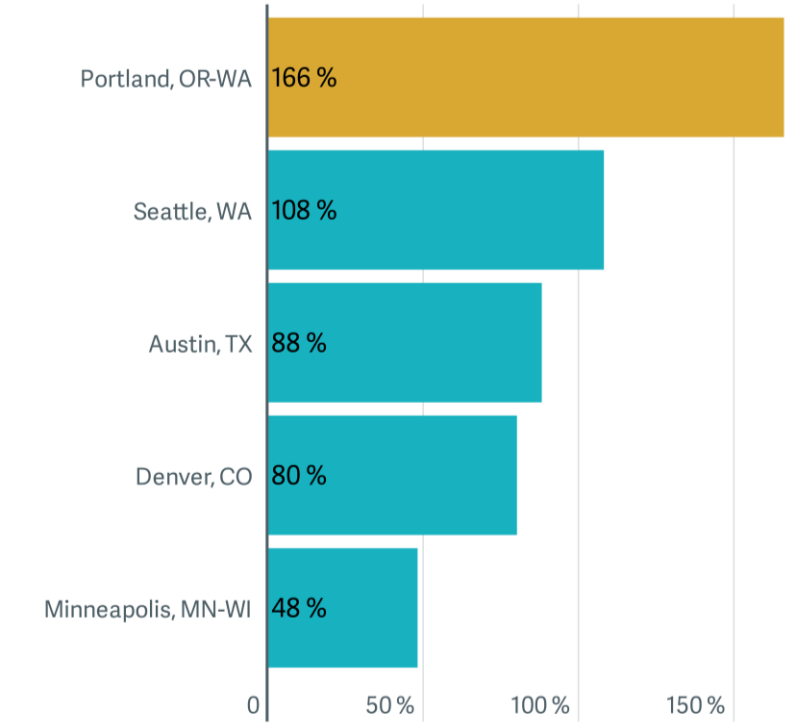
Exports are at the core of the Portland-Vancouver's Metropolitan Statistical Area (MSA) economy. Between 2003 and 2013, the greater Portland region increased its export volume by 166 percent, creating 39,374 direct new jobs for the region. This growth made the greater Portland-Vancouver region the fifth-fastest growing export market among the 100 largest metropolitan areas. In 2013, the region was 13th largest in the U.S. by export volume, with $26.7 billion in exports. [5]



Semiconductors and computer and electronics equipment are among the top exports from the greater Portland area.

[5] *Global Trade and Investment Plan – Greater Portland Global, March 2015*

Figure 4.34 Real export growth by metropolitan statistical area, 2003-2013



Source: Export Nation, Brookings Institute, 2014

4.4.1 Competing in a global economy

"Traded sector" industries that bring new money into the region and enable the rest of the economy to prosper require an efficient transportation system. Portland's economy depends on industries that could locate elsewhere, but have been attracted to the area because of its advantageous trading position. Those industries include semiconductor manufacturers, computer and electronics equipment, wood products, metal products, tourism, publishing, and wholesale distribution activities. Because traded industries depend on the movement of freight, reasonably good transportation access must be maintained if those industries are to remain and grow and in the Portland area in the years to come.

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 and international competition exists. As a result of their exchange earnings, these industries increase spending power within their region or state.

Traded sector industries are the primary enabler of Portland metropolitan economic growth. The Portland region's traded sector industries are anchored by six core clusters. [6] These industries are important drivers of regional economic activity today and are well-positioned to spark future growth.

The six core clusters are defined below:

Clean Technology and Green Cities - Manufacturing, energy production, design, and waste disposal industries related to sustainability and resilience.

Computers and Electronics – Establishments that manufacture computers, computer peripherals, communications equipment, and similar electronics products.

Health Sciences and Technology – Advanced medical device manufacturers, plus related research and development establishments; does not include local hospitals.

Metals and Machinery – Broad array of goods-producing establishments working with heavy metals, ranging from foundries to pump makers to ship builders.

Software and Media – Service establishments writing software, planning and managing computer systems, hosting data, and producing and distributing video and sound recordings.

Sporting Equipment, Apparel, and Design – A unique collection of global apparel companies, personal hardware manufacturers, and various design establishments.

The Regional Freight Strategy provides more information, about the trends and challenges facing freight and goods movement in the region.



Skilled welders are a key labor component for manufacturing companies in the region.

[6] Portland Economic Value Atlas Market Scan (The Brookings Institute) August 2017

4.5 HOW WE KEEP OUR ENVIRONMENT HEALTHY

Choices about how we get around, where we live, and our economy all impact the health of our environment. Metro and the RTP have a role, in partnership with federal, state and local partners in developing and implementing plans and policies that keep our air, water and land healthy for generations to come.

4.5.1 Air quality and climate change

Overall, concentrations of **criteria air pollutants** in the greater Portland region have decreased dramatically over the last 30 years. Through a mix of industrial emissions regulations and transportation emissions reduction strategies, the greater Portland region successfully reduced lead, carbon monoxide and ozone (smog) to meet and maintain federal clean air standards. In October 2017, the region completed the last of its obligations under the Clean Air Act for previous violations of federal air pollution standards.

However, compared to other areas in Oregon, the greater Portland region has the highest risk to the population from **air toxics** due to business and population density. Along with national estimates of air toxics emissions, Portland monitoring studies confirm the presence of air toxics at levels that can cause adverse health effects. [7] A 2012 Oregon Department of Environmental Quality study identified 14 of the 19 pollutants above health-based benchmarks. Eight of the 14 pollutants cause the most risk. The study found that the entire Portland region experiences diesel pollution at concentrations above the state's health benchmark. The study also found that the ten lowest income and ten highest minority census block groups experience more exposure to all sources of air toxics than the average census block group.

Defining terms

Air quality
The degree to which the ambient air is pollution-free, assessed by measuring a number of indicators of pollution.

Criteria air pollutants
Carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. Criteria pollutants are the only air pollutants with national air quality standards that define allowable concentrations of these substances in ambient air.

Air toxics
Also known as toxic air pollutants or hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects.

Greenhouse gases
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).

While the study shows that most air toxics are found throughout the study area, higher concentrations are found in densely populated neighborhoods, near busy roads and highways and in areas with business and industrial activity. [8] Low-income neighborhoods, tribal populations and communities of color that live in urban areas are

[7] Portland Air Toxics Solutions Committee Report and Recommendations, Oregon Department of Environmental Quality, April 2012
[8] Ibid

disproportionately exposed to air pollution, which is a barrier to economic opportunity and security.

For example, as part of the Portland Air Toxics Solutions Study, DEQ used its modeling estimates to conduct an environmental justice analysis of air toxics impacts. The DEQ analysis demonstrated that disproportionate impacts from air toxics do occur for people of color and low-income populations in the greater Portland region, and that different populations are affected by different types of emission sources. In general, DEQ found that the Hispanic/Latino population experienced the highest impacts from residential wood combustion emissions, the Asian population from car and truck emissions, and the African American/Black population from commercial solvent and fuel use emissions. In addition, DEQ found that the general population (all races) living below the poverty level is disproportionally affected by toxic air pollution from cars and trucks.



Healthy people and a healthy environment are goals of the RTP that will guide planning and investment in the region's transportation system.

In addition, according to the 2011 National Air Toxics Assessment, mobile-source air pollution is the largest contributor to cancer risk from air pollution in Multnomah County. The Oregon Department of Environmental Quality is continuing to work with Metro and other stakeholders to address localized hotspot pollution from light and heavy-duty vehicle emissions in the region.

Metro's Climate Smart Strategy responds to a state mandate to develop and implement a strategy to reduce per capita greenhouse gas emissions from cars and small trucks by 2035. In December 2014, after a four-year collaborative process, the Metro Council and JPACT adopted a Climate Smart Strategy that is expected to achieve a 29 percent reduction in per capita greenhouse gas emissions by 2035, if fully funded and implemented, exceeding the state mandated target.[9] The strategy does more than just exceed the state mandated target; it also supports job creation and economic development, saves businesses and households money, helps people live healthier lives, protects clean air and water, and makes the most of the investments already made in the region's transportation system.

The strategy relies on adopted local and regional land use and transportation plans and expected advancements in cleaner, low carbon fuels and more fuel-efficient vehicles. The strategy includes nine key policies that are reflected in Chapter 3. Section 4.7.3 describes the anticipated effects of climate change as well as opportunities and challenges ahead.

[9] Climate Smart Strategy for the Portland metropolitan region, Metro, 2014

4.5.2 Wildlife Habitat and Connectivity



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

Without appropriate intervention and mitigation, transportation corridors create barriers and hazards in wildlife corridors and fish passageways. Several Metro-initiated activities are aimed at restoring habitat or mitigating the effects of the transportation system on the natural environment.

Development of the Regional Conservation Strategy for the greater Portland-Vancouver region reflects an ongoing effort to maintain an inventory of regionally significant fish and wildlife habitat and map ecologically sensitive areas for informing potential environmental impacts of transportation projects. The inventory is used in the RTP to identify and flag future transportation projects that overlap with sensitive fish and wildlife habitat in order to avoid, minimize and mitigate the negative impacts of transportation projects on the natural environment.

It is the goal of the Regional Conservation Strategy to manage the region's resources in a way that:

- Protects the water and air quality of the region
- Provides other important ecosystem services, such as flood control, water storage, and pollination
- Supports—at a minimum—the current level of biodiversity (i.e., the existing range of plants, animals, and wildlife habitats)
- Helps species and habitats recover from historical losses or degradation
- Increases natural systems' resilience and their ability to adapt to an unpredictably changing climate
- Provides opportunities for people to access natural areas for local recreation, research, and appreciation

Figure 4.35 Resource areas considered in RTP environmental analysis

Resource areas included in 2018 RTP environmental analysis

The following list identifies the types of resource areas considered during development of RTP update to identify potential resource impacts:

- Metro Title 13 inventory of regionally significant riparian & upland wildlife habitat, habitats of concern, and impact areas
- Regional Conservation Strategy high value habitat areas (top 25 percent scoring habitat areas)
- ODFW Conservation Opportunity Areas
- ODFW fish passage barriers and fish bearing streams
- NWI Wetlands and Waterways
- FEMA flood hazard areas and floodplains
- National Register of Historic Places historic and cultural resources
- Bureau of Indian Affairs tribal lands
- Air pollutants, including greenhouse gas emissions

See *Appendix F Environmental Assessment and Potential Mitigation Strategies* for more information.

4.5.3 Water Quality

Impervious surfaces have been linked to changes in the shape of streams, water quality, water temperature and the biological health of waterways. About 13 percent of the region is covered by developed land such as pavement and buildings. [10]

With respect to runoff quality, recent research by the National Marine Fisheries Service and Washington State University points to the high aquatic toxicity of runoff from roadway surfaces. This toxicity is directly proportional to traffic volumes. Stormwater facilities that are vegetated and contain compost-amended soils represent the only currently effective treatment options to address these often unidentified toxic compounds. Such facilities must be prioritized in current National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits across the region.

With respect to runoff quantity, development in the region at increasing density results in less pervious surface available to absorb the combined runoff volumes from transportation surfaces, structures and associated impervious area. Runoff volumes of winter peak flows can more than double from predevelopment conditions in the face of urban development, with associated flow reductions in summer. Climate change is expected to reinforce this pattern. Higher runoff volumes result in channel erosion, aquatic and floodplain habitat degradation, and damage to

[10] Regional Conservation Strategy for the Greater Portland-Vancouver Region can be found at regionalconservationstrategy.org.

infrastructure, including transportation infrastructure such as bridges and culverts. Low summer flows reduce the vigor of vegetation that helps stabilize stream banks. Yet more than half of the region, including nearly all of the area west of the Willamette River, has subsurface conditions that do not promote easy infiltration of large volumes of urban runoff.

Because water quality is not addressed directly in the Regional Conservation Strategy mapping, protecting water quality upstream of high value ecosystems, rather than just protecting riparian corridors within high value ecosystems is important. Metro's Parks and Natural Areas Program acquires land to protect habitat and water quality and conduct ongoing performance monitoring of habitat and watershed health.

Metro's design guidance for streets and regional trails provides best practices to create livable streets that avoid, minimize and mitigate the negative impacts of transportation on water, air and habitat. The design guidelines were first developed in 2002. The *Creating Livable Streets, Green Streets* and *Trees for Green Streets* handbooks are currently being updated to reflect best practices associated with street design to lessen impacts on habitat and ecosystems and will include regional trail design guidance, in addition to the current *Wildlife Crossings* and *Green Trails* handbooks. These handbooks along with the newly updated design guidance will be available on Metro's website for easy access. Additionally, the Regional Active Transportation Plan provides *Top 10 Natural Resource Considerations for Trail Planners*. This set of considerations is provided to local jurisdictions that receive funding from Metro for regional trails and reflect best practices to protect habitat.

Future work by Metro and partners could include an inventory of culverts in the region that need repair or replacement to accommodate endangered or threatened fish species. Refer to **Appendix F** for additional detail on strategies to avoid, minimize and mitigate the negative impacts of transportation projects on the natural environment.



4.6 HOW THE SYSTEM IS WORKING – CHALLENGES AND OPPORTUNITIES AHEAD

The following regional transportation challenges were identified through the engagement process during the update of the RTP. The regional investment strategy in Chapter 6 was developed to address these challenges.

- Inadequate funding
- Aging infrastructure
- Climate change and air quality
- Energy efficiency and conservation
- Congestion and reliability
- Fatal and life-changing crashes
- Earthquake vulnerability, security and emergency management
- Gaps in transit, biking and walking connections
- Social inequity and disparities
- Housing and transportation affordability and displacement
- Technological change

4.6.1 Inadequate funding

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.

Oregon auto taxes and fees are the lowest in the nation according to Bankrate.com's most recent Car Cost index. The index lists the annual costs of car ownership for all 50 states. In 2014, Oregon's annual average cost for car ownership was about 31 percent lower than the national average. The largest difference in vehicle costs was for taxes and fees, which the index estimated to be $157 a year, about 85 percent lower than the national average of $1,058.

As of January 2018, Oregon automobile related taxes and fees are the lowest among our neighboring western states as shown in **Table 4.1**. The federal excise gas tax of 18.4 cents per gallon and state/local air emissions fees are excluded from the table. In Oregon, other than the new privilege tax, all motorist taxes and fees are constitutionally dedicated to roads. Other western states place some motorist revenues in their general funds to support non-highway/transit programs, even non-transportation programs. For example, many western states impose both a state sales tax as well as a local option sales tax on automobile purchases. These sales taxes usually generate more revenue than the gas tax on a cents per gallon basis.

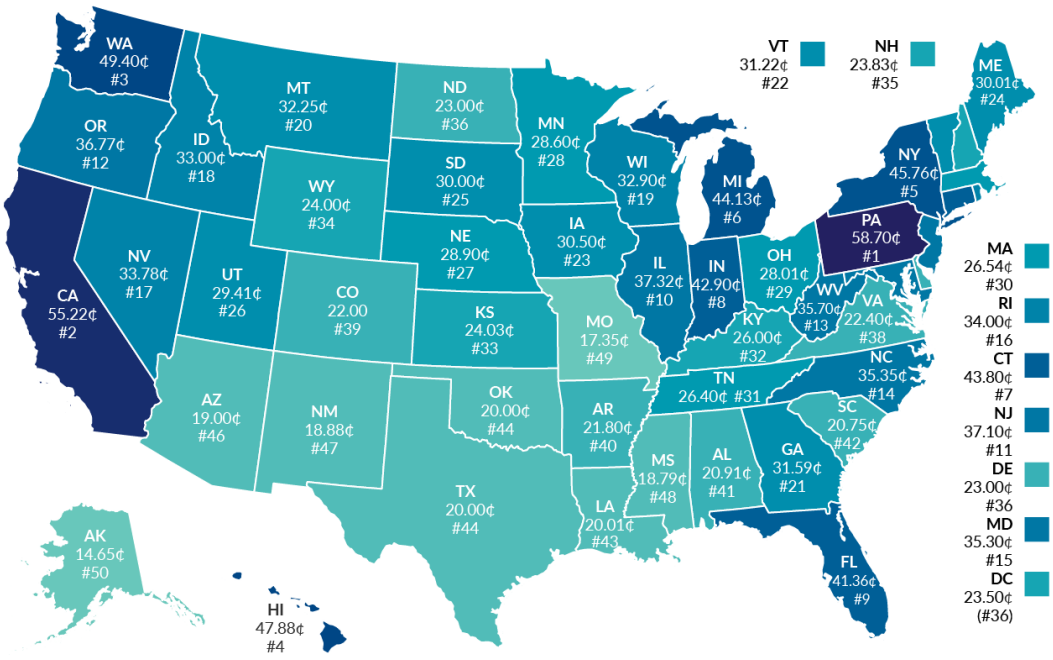
Table 4.1 Comparison of automobile related taxes in western states, 2018

Tax (cents per gallon units)	OR	MT	ID	UT	NV	WA	CA
State gas excise tax	34.1¢	32.3¢	32.0¢	29.4¢	23.0¢	49.4¢	41.7¢
Gas sales & local option taxes	2.5¢	0¢	1.0¢	0¢	10.8¢	0¢	16.6¢
Registration fees	11.8¢	20.0¢	9.3¢	9.5¢	6.8¢	16.8¢	19.6¢
Ad valorem taxes	0¢	4.0¢	0¢	10.0¢	31.2¢	13.1¢	16.2¢
Auto sales taxes	4.0¢	0¢	38.4¢	43.8¢	51.2¢	60.8¢	54.4¢
Title & related fees	3.7¢	0.5¢	0.6¢	0.2¢	1.2¢	2.7¢	0.9¢
Total cents per gallon	56.1¢	56.8¢	81.3¢	92.9¢	124.2¢	142.6¢	149.3¢

Source: Oregon Department of Transportation (January 2018)

Figure 4.36 further illustrates Oregon's relative ranking nationally in July 2018. Pennsylvania's gas tax rate is highest at 58.7 cents per gallon, followed by California (55.22 cpg) and Washington (49.4 cpg). The lowest gas tax rate is found in Alaska at 14.65 cents per gallon, followed by Missouri (17.35 cpg) and Mississippi (18.79). Oregon ranked 12th nationally.

Figure 4.36 Comparison of gasoline taxes and fees in all states, 2018



Notes: These rates do not include the 18.40 cent/gallon federal excise tax on gas. The American Petroleum Institute (API) has developed a methodology for determining the average tax rate on a gallon of fuel. Rates may include any of the following: excise taxes, environmental fees, storage tank taxes, other fees or taxes, and general sales tax. In states where gasoline is subject to the general sales tax, or where the fuel tax is based on the average sale price, the average rate determined by API is sensitive to changes in the price of gasoline. States that fully or partially apply general sales taxes to gasoline are California, Connecticut, Georgia, Illinois, Indiana, Michigan, and New York. D.C.'s rank does not affect states' ranks, but the figure in parentheses indicates where it would rank if included.

Source: American Petroleum Institute.

One of the primary issues with federal and state gas taxes is that they are not indexed for inflation, meaning the nominal value of revenue generated from the gas tax isn't keeping pace with infrastructure funding needs across the country. Indexing gas taxes for inflation is one of the most important actions states can take to create a more stable source of revenue to fund infrastructure maintenance and repair needs for years to come, 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 have not been adequate to support needed maintenance and expansion of transit systems to serve growing populations.

4.6.2 Aging infrastructure – maintaining the system we have

The region's aging infrastructure is deteriorating and requires more maintenance than ever before, similar to other cities and regions across the country. In its 2017 Report Card for America's Infrastructure, the American Society of Civil Engineers gave America a D for roads, stating that 21 percent of the nation's roads were in poor in 2015.[11] The report also estimated that driving on roads in need of repair cost Oregon motorists $285 per year in extra vehicle repairs and operating costs.[12]

The Oregon Department of Transportation, cities, and counties devote nearly all existing state and federal gas tax revenues to operation and maintenance of the existing road system. The federal fuel tax stands at 18.4 cents per gallon on gasoline and 24.4 cents per gallon for diesel; however the tax has not been increased since 1993, when gas was consistently under $1.20 per gallon. If the tax has been indexed to inflation it would be about 30 cents per gallon now.[13]

Comprehensive maintenance data for the region is not currently available. However, with passage of Keep Oregon Moving (HB 2017) the Oregon Legislature made a significant investment in transportation, both statewide and in local communities. With those investments came transparency, accountability and performance requirements. Reporting on the condition of transportation infrastructure and making those reports available to the legislature and public is one of those transparency and accountability measures.

ODOT staff, in coordination with city and county designees, developed a set of uniform condition descriptions and standardized processes for purposes of reporting on the condition of pavement and bridges owned by cities, counties and the state, which were adopted by the Oregon Transportation Commission (OTC) in February 2018. In December 2018, ODOT staff launched a web-based reporting form, allowing local governments to submit condition reports electronically.

Preliminary data was available at the time the 2018 RTP was being finalized and is provided for reference in **Tables 4.2 through 4.5**.

[11] American Society of Civil Engineers. 2017 Infrastructure Report Card, March 2017.
[12] Ibid.
[13] Portland City Club. Portland's Streets, End the Funding Gridlock, City Club of Portland Bulletin, Vol. 98, No. 8, September 9, 2015.

Table 4.2 County-owned bridge conditions

National Bridge Inventory

County	Good	Fair	Poor	Total
Clackamas	44	111	5	160
Multnomah	7	26	3	36
Washington	67	68	16	151
Total	118	205	24	347

Source: Oregon Department of Transportation

Table 4.3 County reported pavement conditions

Paved Federal-Aid System Road Miles

County	Good	Fair	Poor	Total
Clackamas	394	102	15	511
Multnomah	66	38	6	110
Washington	329	57	10	396
Total	789	197	31	1017

Source: Oregon Department of Transportation

Table 4.4 City-owned bridge conditions

National Bridge Inventory

City	Good	Fair	Poor	Total
Beaverton	12	6	0	18
Cornelius	1	0	0	1
Gresham	49	17	6	72
Happy Valley	71	1	0	72
Hillsboro	0	2	0	2
Lake Oswego	3	4	0	7
Milwaukie	0	2	1	3
Oregon City	0	2	0	2
Portland	25	95	2	122
Sherwood	1	0	0	1
Tigard	5	5	1	11
Tualatin	3	0	0	3
Wilsonville	3	2	0	5
Total	173	136	10	319

Source: Oregon Department of Transportation

Table 4.5 City reported pavement conditions

Paved Federal-Aid System Road Miles

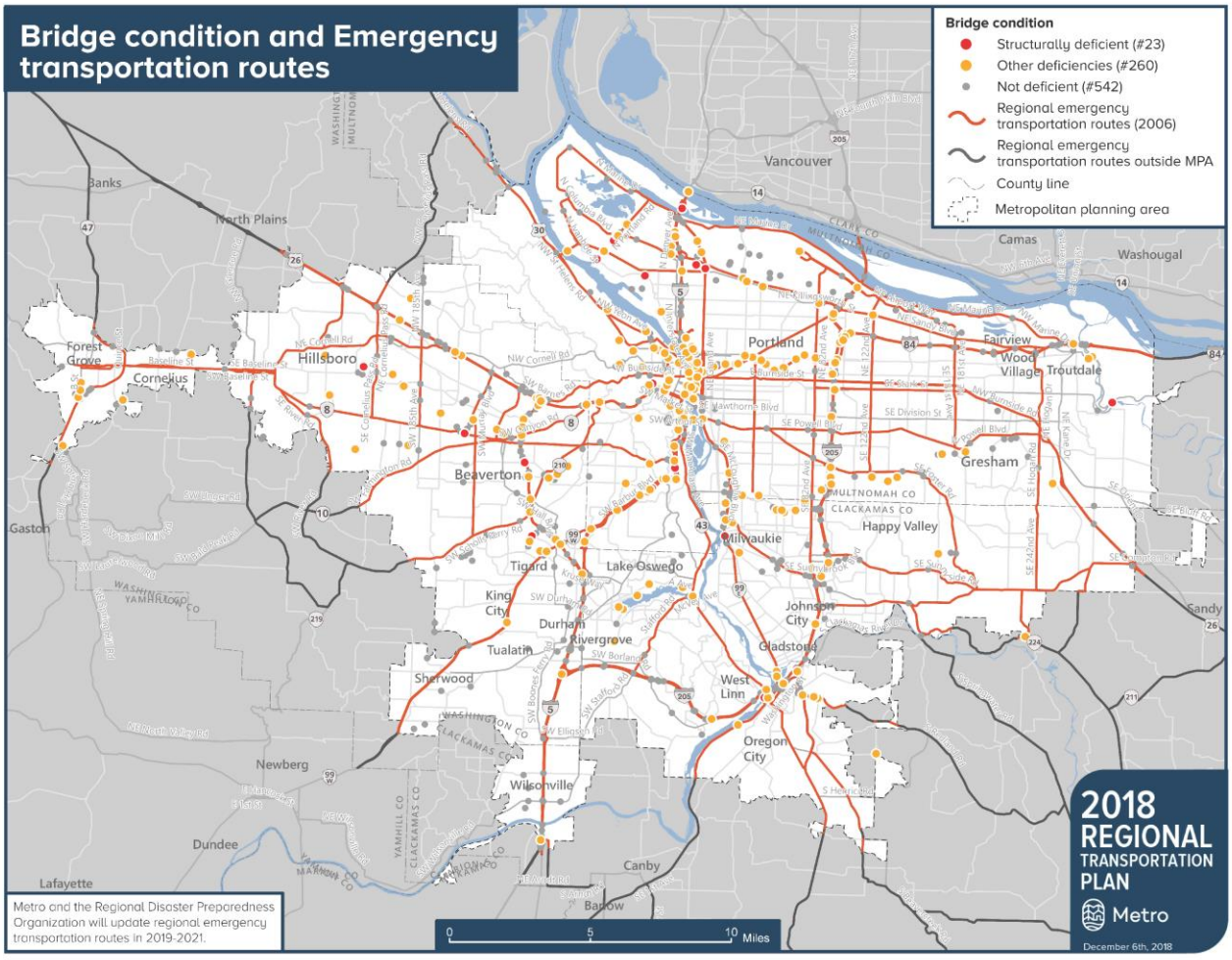
City	Good	Fair	Poor	Total
Beaverton	31	19	4	54
Cornelius	8	3	1	12
Forest Grove	18	4	3	25
Gladstone	4	3	1	8
Gresham	49	17	6	72
Happy Valley	13	1	0	14
Hillsboro	42	11	1	54
King City	0	1	0	1
Lake Oswego	31	5	7	43
Maywood Park	0	0	2	2
Milwaukie	9	3	4	16
Oregon City	27	6	1	34
Portland	174	130	134	438
Sherwood	15	6	0	21
Tigard	19	6	0	25
Troutdale	3	0	0	3
Tualatin	22	1	1	24
West Linn	8	5	4	17
Wilsonville	20	8	2	30
Total	493	229	171	893

Source: Oregon Department of Transportation

The first statewide bridge and pavement condition report will be published by ODOT in 2019, serving as a baseline for comparison and monitoring moving forward. In addition, **Appendix L** to the RTP establishes baseline bridge and pavement condition (and related federal performance targets) for the National Highway System. Metro will continue to coordinate with ODOT to monitor performance measures and targets over time.

An inventory of the region's bridges and the condition rating given to each bridge is shown in **Figure 4.37.**

Figure 4.37 Regional Bridge Condition



4.6.3 Climate change and air quality

Climate change is the defining global challenge of the 21st century. Global climate change poses a growing threat to our environment, public health and our economy, and creates uncertainties for the region.

Documented effects of climate change include: extreme weather events, increase in average annual air temperatures and likelihood of extreme heat events, changes in hydrology, water supply and stream flows, rising sea levels, reduced water quality, changes in wetland ecosystems, increase in breeding grounds for water-borne diseases, shifting rainfall patterns, reduced air quality, increase in wildfire frequency and intensity, increased incidents of landslides, shifts in quality of habitat, shifts in migration patterns and habitat range, and changes to growing seasons such as increased incidents of short-term drought, and the distribution of plants and animals.

Climate change impacts will impact the service life of transportation infrastructure and the more severe storms that are predicted will increase the frequency of flooding and landslides.

Consequent damage to roads, bridges and rail infrastructure will compromise system safety, disrupt mobility and hurt the region's economic competitiveness.

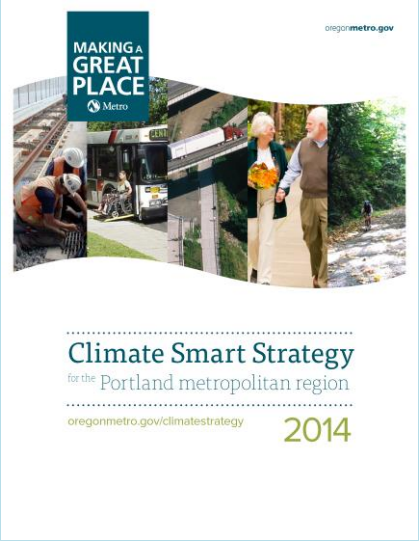
Our ability to respond, not just as the Portland region but as a state, will have unprecedented impact on our lives and our survival. Natural resource protection and enhancement and use of green infrastructure in transportation designs are an part of a holistic approach to climate mitigation and adaptation as described in Section 4.5 and Appendix F. In addition, the region must remain steadfast in its efforts to implement the Climate Smart Strategy and continue to support statewide efforts to reduce greenhouse gas emissions from transportation.

The goal of the region's Climate Smart Strategy is to demonstrate leadership on climate change by meeting adopted targets for reducing greenhouse gas emissions from light-duty vehicles while creating healthy and equitable communities and a strong economy. Adopted by JPACT and the Metro Council in 2014 with broad support, the strategy is built from the land use and transportation plans and visions already adopted by local jurisdictions across the region, creating a diverse and shared vision. It includes making investments to increase active transportation, increase transit and use technology and other strategies to improve safety, reduce traffic delay and make the most of investments we already made in our transportation system.[15]

The Oregon Sustainable Transportation Initiative (OSTI) is an integrated statewide effort to reduce greenhouse gas (GHG) emissions from transportation. A component of this initiative is the *Oregon Statewide Transportation Strategy (STS): A 2050 vision for Greenhouse Gas Emissions Reductions*. Adopted by the Oregon Transportation Commission as amendment to the Oregon Transportation Plan in 2018, the STS describes what it would take for the transportation sector to get as close as possible to the 2050 goal of a 75 percent reduction below 1990 levels of greenhouse gas emissions.[16]

The STS focuses on prevention and mitigation of climate impacts, not adoption activities. It is neither directive nor regulatory, but identifies promising approaches for further consideration by

Regional climate action



The 2018 Regional Transportation Plan is a key tool for the greater Portland region to implement the region's adopted Climate Smart Strategy and the Oregon Statewide Transportation Strategy for Reducing Greenhouse Gas Emissions.

Appendix J reports on implementation progress since 2014. The analysis found the 2018 RTP makes satisfactory progress towards implementing the Climate Smart Strategy, but more investment, actions and resources are needed to ensure the region achieves mandated greenhouse gas emissions reductions.

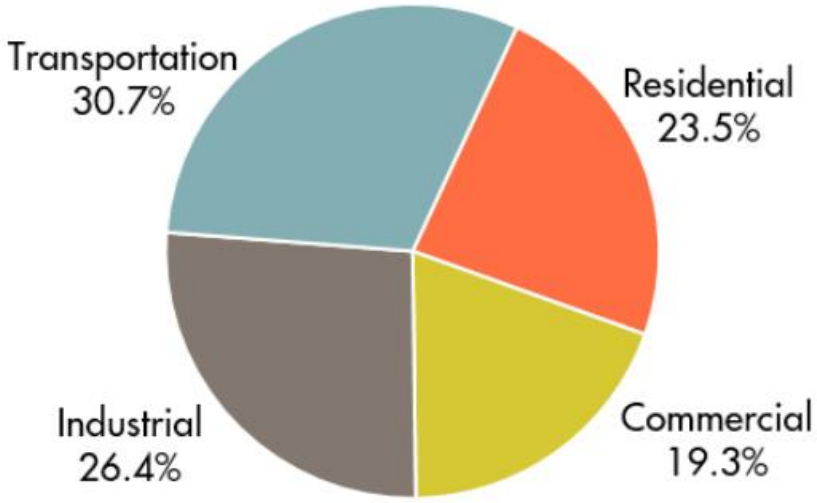
[15] Climate Smart Strategy for the Portland metropolitan region, Metro, 2014
[16] Oregon Statewide Transportation Strategy: A 2050 Vision for Greenhouse Gas Emissions Reduction, Volume 1, Oregon Department of Transportation, March 20 2013

policymakers at the national, state, regional, and local levels without assigning responsibility for implementation. The path forward for the greater Portland region and Oregon will continue to evolve as more planning and analysis work is completed, including monitoring implementation and emissions over time.

4.6.4 Energy efficiency and conservation

Operating vehicles, and building and maintaining roadways, railways, and other transportation corridors, requires significant energy resources. Energy efficiency in the transportation sector merits special attention from the standpoint of energy security and the environment because this sector is almost solely dependent on a single fuel—petroleum—about 98 percent of those fuels are imported into Oregon. Moreover, in 2016, the transportation sector was responsible for about 39 percent Oregon's emissions of greenhouse gases and about 31 percent of Oregon's energy use (representing the largest use of energy in Oregon). [17]

Figure 4.38 Oregon Energy Consumption by Sector, 2016



Source: Oregon Department of Energy, 2018 Biennial Energy Report, Nov. 2018.

While per vehicle fuel consumption and GHG emissions have declined because of improved fuel efficiency and increased adoption of alternative fuels, overall transportation sector fuel consumption, GHG emissions, and vehicle miles travelled (VMT) are rising in Oregon, mainly due to population growth and a growing economy. This makes increased support for walking, biking, transit and other shared travel options, and adoption of electric vehicles necessary to conserve transportation fuels and reduce GHG emissions from the transportation sector.

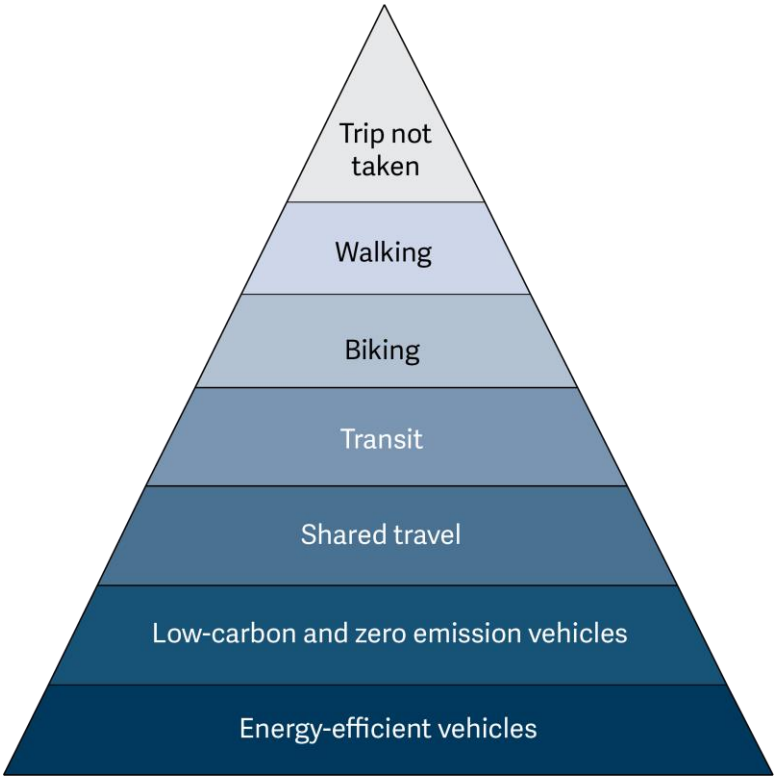
The urgency of addressing climate change and the changing electric grid require a "next level of energy efficiency" to reduce greenhouse gas emissions and reduce the need for new energy supply and associated infrastructure. Transportation electrification will present challenges to this in

[17] Oregon Department of Energy. 2018 Biennial Energy Report. November 2018.

terms of investing in the essential charging infrastructure, and determining how the grid will handle the additional load required to serve this new demand. It will be important that the region invest in solutions that promote greater equity, especially for people historically least served or most impacted by fossil fuel–based transportation systems.

The RTP is required to address energy conservation, efficiency, and transportation options under state and federal law. The region has the ability to significantly affect energy efficiency and conservation efforts through developing efficient land use and transportation plans that reduce automobile trips, vehicle miles traveled and dependency on petroleum-based fuels. Strategies include expanding low-energy travel options and use of transportation system management and operations strategies, programs to promote driving less, buying fuel-efficient vehicles, or using alternative fuels.

Figure 4.39 Energy use by mode

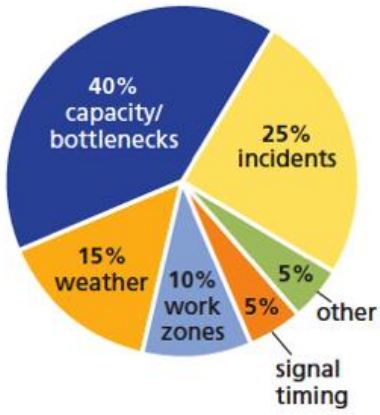


Source: Metro

4.6.4 Congestion and reliability

Congestion has many causes, but mostly results from too much traffic for the physical capacity of a road to handle (bottlenecks) or periodic events like crashes, vehicle breakdowns, road work, storms and special events (parades, major sporting events) as shown in **Figure 4.40**. For drivers, this is usually described as routine congestion, which typically occurs daily, versus traffic incidents that are unexpected and difficult to predict.

Figure 4.40 Causes of congestion in the greater Portland region



Source: FHWA

More than half of all congestion is caused by crashes, breakdowns and other causes that can be addressed using system management and operational strategies.

Drivers can usually plan their day around routine congestion and the typical bottlenecks. Much of the throughway system (our major highways and freeways) is routinely congested during the morning and evening rush hour, and drivers know their trip will be slower during this period. But the traffic incidents and other non-routine events are difficult to plan for, and make it more difficult for drivers to plan commutes or for businesses to plan shipments.

Focusing on system reliability

For this reason, efforts to address congestion in our growing region have started to focus on improving reliability, or the degree to which congestion in a given travel corridor is affected by these non-routine events. Reliability is about predictability and dependability – and being able to count on knowing about how long it will take to get to school, work or activities. Improving reliability means that travelers don't have to budget as much extra time in order to arrive on time at their destinations, even when routine congestion exists on our major throughways.

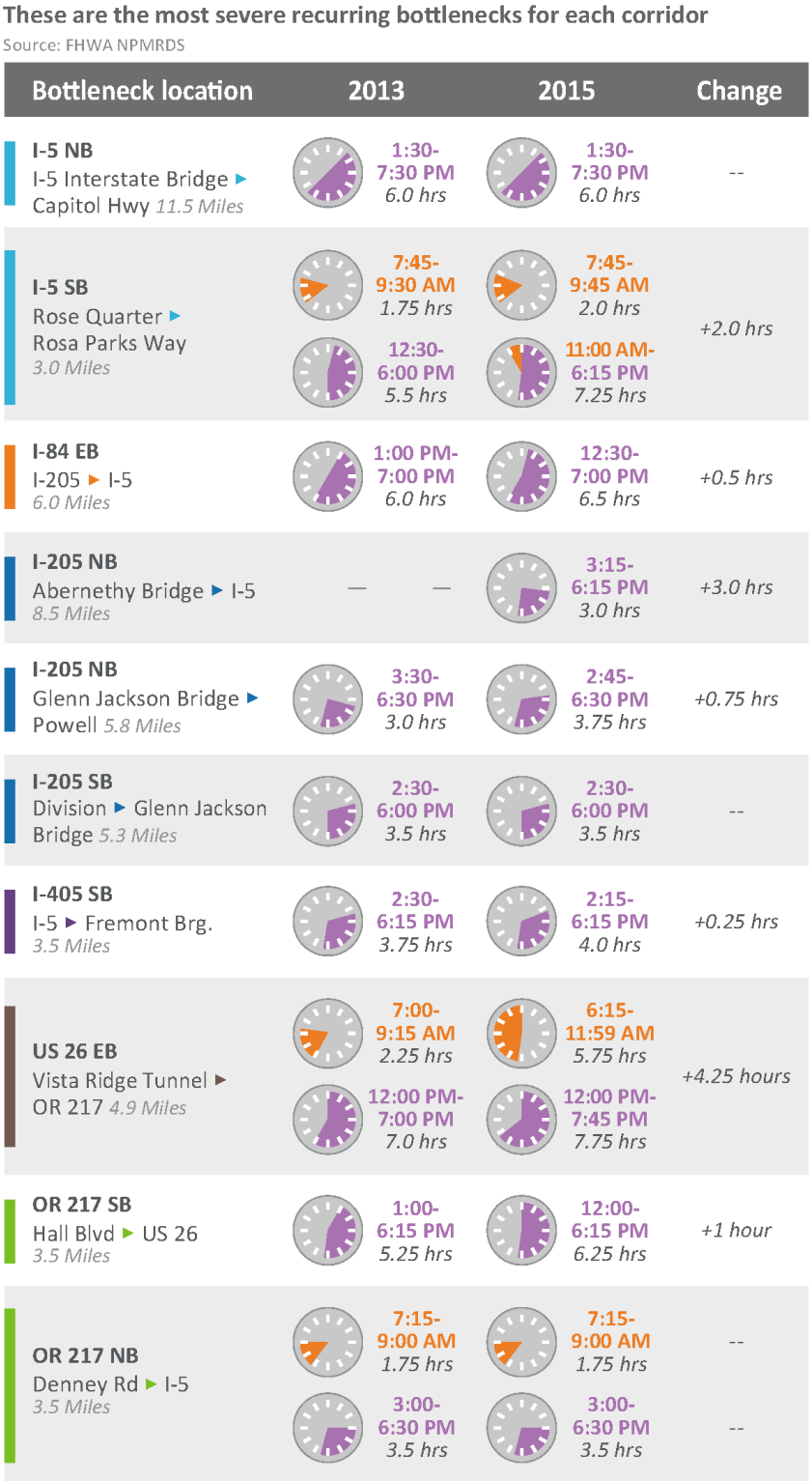
ODOT report shows growth in congestion

ODOT's *2016 Traffic Performance Report* shows what many of us have experienced: traffic congestion in the greater Portland region today can occur at any time of the day or week, and is no longer only a weekday peak hour problem. In 2013, about 11 percent of all travel in the greater Portland region occurred during congested periods. This increased to nearly 14 percent in 2015. This increase in congestion is a reflection of the both the region's continued growth, including our substantial economic rebound from the Great Recession that began in 2008.

Data from the ODOT report for the region's six major throughways (Interstate 5, Interstate 84, Interstate 205, Interstate 405, U.S. 26 and OR 217) shows increasing congestion, decreasing travel speeds, greater delays and unreliable trip times on these major travel routes.

Figure 4.41 shows the top recurring bottlenecks in the region and the change in hours of congestion between 2013 and 2015.

Figure 4.41 Top recurring throughway bottlenecks in the region, 2013 - 2015



Source: FHWA National Performance Management Research Data Set and ODOT

The ODOT report also found that crashes on our throughways are increasing at a rate equal to the increase in congestion, but shows that recent ODOT investments in traveler information signage and adding auxiliary lanes have slowed the rate of crashes at specific bottleneck locations. While not a long-term solution for growing congestion, an auxiliary lane adds capacity in the form of a dedicated lane from an on-ramp to the next off-ramp, helping to reduce crashes caused by drivers merging and weaving between exits.

Congestion on these routes also affects freight in the region, as most of our local goods move by truck today, a trend that is expected in future. With congestion beginning to spread beyond commute periods and into the off-peak in the middle of the day, the ability to move freight during this relatively congestion-free period is being impacted. As the mid-day becomes more unreliable, freight in our region is having more problems meeting delivery schedules, and the cost of shipping is increasing. These shipping costs are typically passed on to businesses and consumers, and could impact the region's competitiveness in the global economy.

Congestion is also affecting the speed and reliability of transit throughout the region

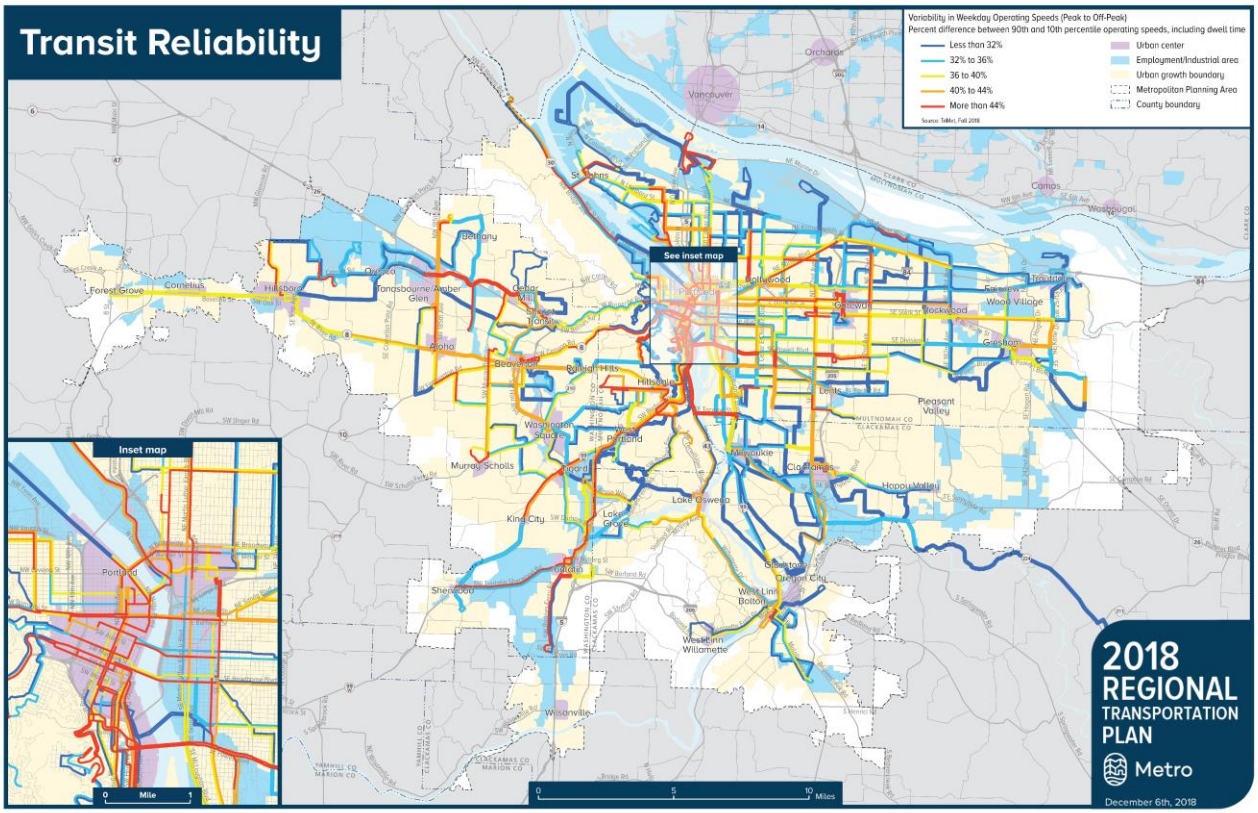
Buses and streetcars are increasingly stuck in traffic, leading to slower average travel speeds, longer travel times and less travel time reliability. Delay to transit is most pronounced during the peak congested times when more vehicles are on the roads. All of this makes bus and streetcar transit less competitive with driving.

Figure 4.42 indicates where buses, and all the people on the bus, experience the most delay during the peak congested time of the day. This map displays bus travel speed variability over the course of the day and helps identify the influence of traffic congestion on delaying transit during typical peak periods. The greater the percentage is, the longer it takes the bus to travel the route segment during peak congested periods versus more free flow traffic conditions. A higher value indicates a higher level of variability and thus a higher delay. The time point segments colored red are where there is the greatest variability and delay to buses.

As of 2018. TriMet spends roughly $1-2 million per year to add more buses to routes just to keep up with published route schedules and account for greater variability and longer travel times to complete a route.[18] Without substantial improvements to the bus and streetcar network, it is very likely that transit service speed and reliability will continue to deteriorate. The Enhanced Transit Corridors (ETC) concept and toolbox of actions identified in Chapter 3 and the 2018 Regional Transit Strategy is a significant first step toward implementing lower cost, flexible, and effective transit priority treatments that will in turn support more transit ridership throughout the greater Portland region.

[18] City of Portland Enhanced Transit Corridors Plan (June 2018)

Figure 4.42 Transit reliability in the greater Portland region, 2018



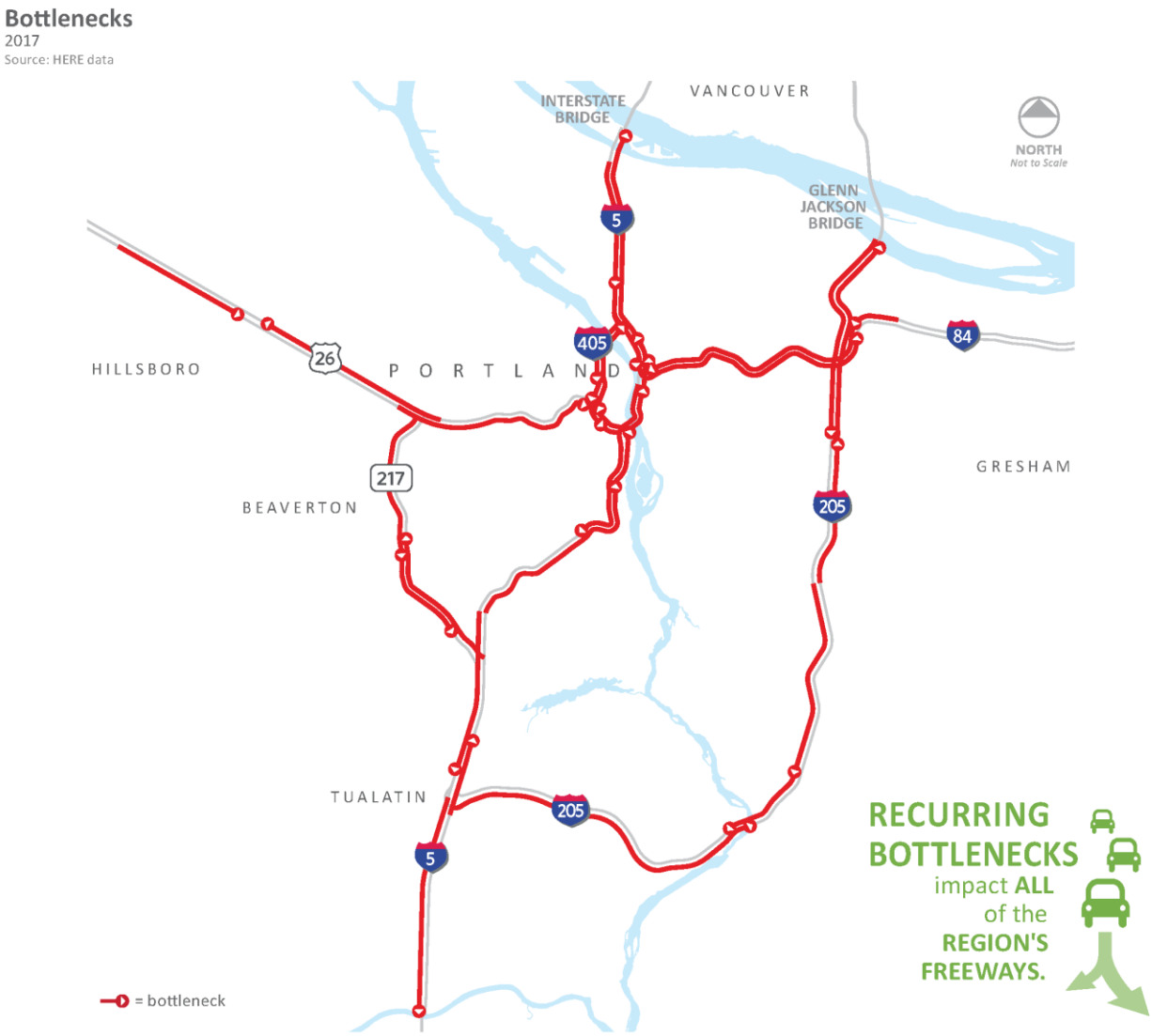
Source: TriMet

Oregon Legislature commits to addressing congestion in the greater Portland region

In 2017, the Oregon Legislature approved HB 2017 (discussed in the next section), which provides funding for additional targeted safety and congestion projects that can help address the issues found in the ODOT report. The Legislature also directed the Oregon Transportation Commission (OTC) to develop a proposal for value pricing on I-5 and I-205 from the Columbia River to the junction of the two freeways in the southern part of the region, with the stated purpose of reducing congestion. The OTC must seek approval from the Federal Highway Administration to implement value pricing no later than December 31, 2018. If FHWA approves, the commission is required to implement value pricing. An ODOT-led study is underway to meet this deadline.

According to rankings released in March 2016 by INRIX, a transportation tracking company, the Portland region's major congestion hotspots are those highways leading to and from downtown Portland, the southern tier highways as well as the two interstate connections to Washington, as seen below.

Figure 4.43 Throughway bottlenecks in the greater Portland region, 2017



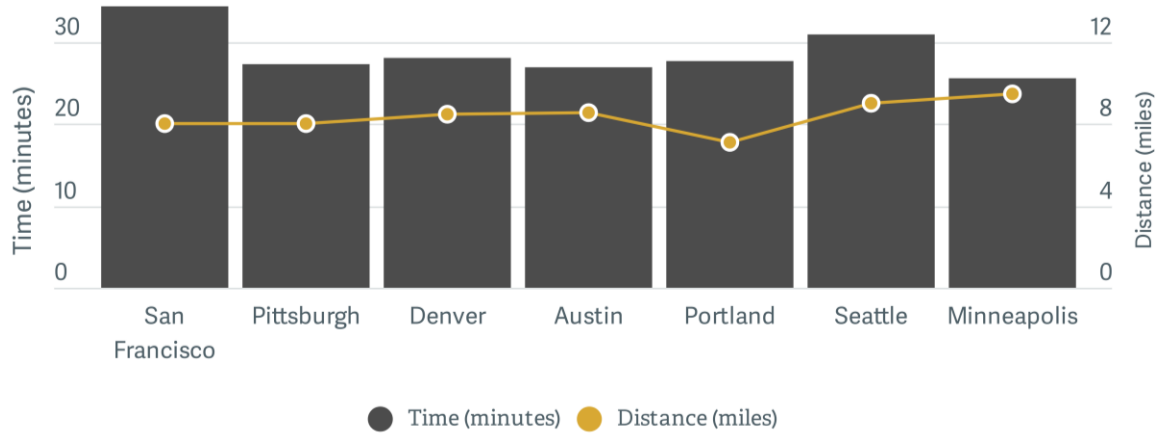
Source: Oregon Department of Transportation, Portland Region 2018 Traffic Performance Report, December 2018.

In 2014, Texas A&M's annual Urban Mobility Scorecard showed the Portland area tied with Austin, Miami, Detroit and Atlanta for 12th place out of 101 regions in yearly delay per auto commuter. The delay per auto commuter is reported as 52 hours per year – exactly the average amount of delay for all 101 cities in the study. The cost of our region's congestion to truck freight was ranked at 16th out of 101 regions, with an estimated annual cost of $375 million.[19]

[19] Texas A&M Transportation Institute 2015 Urban Mobility Scorecard, 2015

Despite such delays, we spend less time commuting to work than people in most other regions. In 2014 the average commute was 26 minutes – about a minute longer than in 2010[20]. The Portland region is tied for fifth-best metro area in the nation for the share of people with a 30-minute commute or better – nearly two-thirds of commuters in the region have a commute under a half-hour. In part that's because people here don't have to travel as far to get to work. The average commute distance in the region is just 7.1 miles.

Figure 4.44 Average commute distance and time for metropolitan areas, 2010-2015



Data: US Decennial Census and 2015 ACS 5-year estimates.

Metro maintains the 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. The Regional Transportation Plan calls for increasing street network connectivity, expanding travel options, and using system and demand management strategies prior to strategic widening of existing roads and throughways to help improve reliability and better connect goods to market and support travel across the region. The CMP is described more in Chapter 8 and Appendix L.

[20] 2014 American Community Survey 1-Year Estimates, Means of Transportation to Work by Selected Characteristics

4.6.5 Fatal and life-changing crashes

Traffic safety affects the greater Portland region on multiple levels. Crashes cause personal tragedy, lost productivity, rising insurance costs, congestion and delay to the movement of people and goods. In addition, safety concerns may prevent people from choosing to walk or bike rather than driving a car. Increasing awareness of safety issues is a first step to improving safety in the region. Efforts to improve transportation safety generally center on preventing traffic crashes that result in severe injury or death.



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

Traffic related deaths and severe injuries are a critical and preventable public health and social equity issue in the greater Portland region. Between 2011 and 2015, there were more than 116,000 traffic crashes resulting in 311 deaths and 2,102 people severely injured.[21]

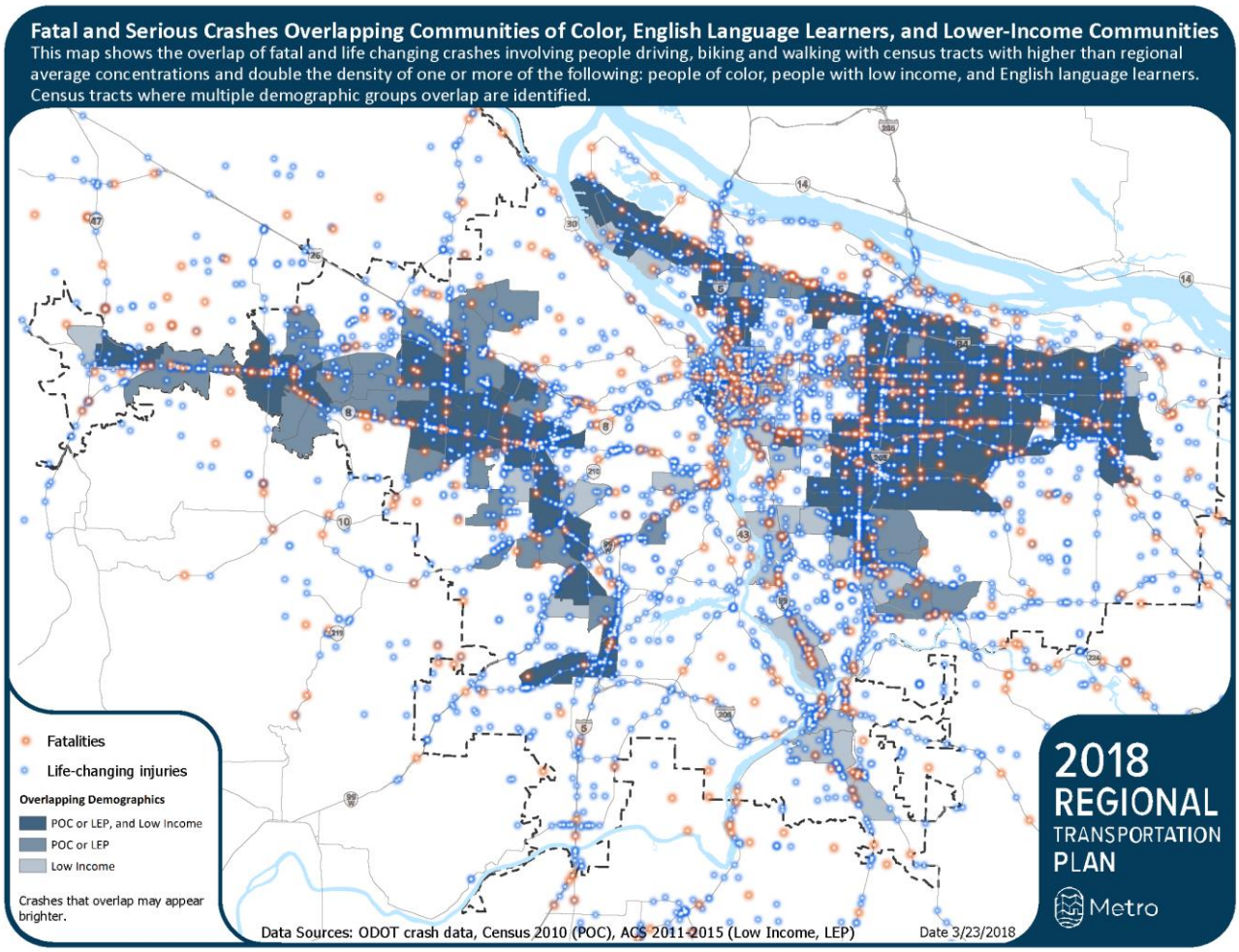
Figure 4.45 provides a map showing the location of fatal and life-changing injuries in the greater Portland region between 2011 and 2015.

Traffic crashes are the leading cause of unintentional injury death for young people ages 5 to 24 in Multnomah, Washington and Clackamas County, and the second leading cause of unintentional injury death for people ages 25 to 84.[22] On average, 62 people die each year on the region's roadways and 420 people experience a life changing injury. Nearly two people are either killed or severely injured every day in our region in a traffic crash; every 10 days a person riding a bike is killed or severely injured; every 5 days a person walking is killed or severely injured.

[21] Metro State of Safety Report (January 2018).

[22] Oregon Death Certificates: Center for Health Statistics, Center for Public Health Practice, Public Health Division, Oregon Health Authority. Accessed March 13, 2018. For 2012-2016. unintentional injuries were the 4th leading cause of death (just about tied for third with cerebrovascular disease/stroke); within the category of unintentional injury deaths, transport injuries are the third leading cause behind falls and poisoning (poisoning includes drug overdoses).

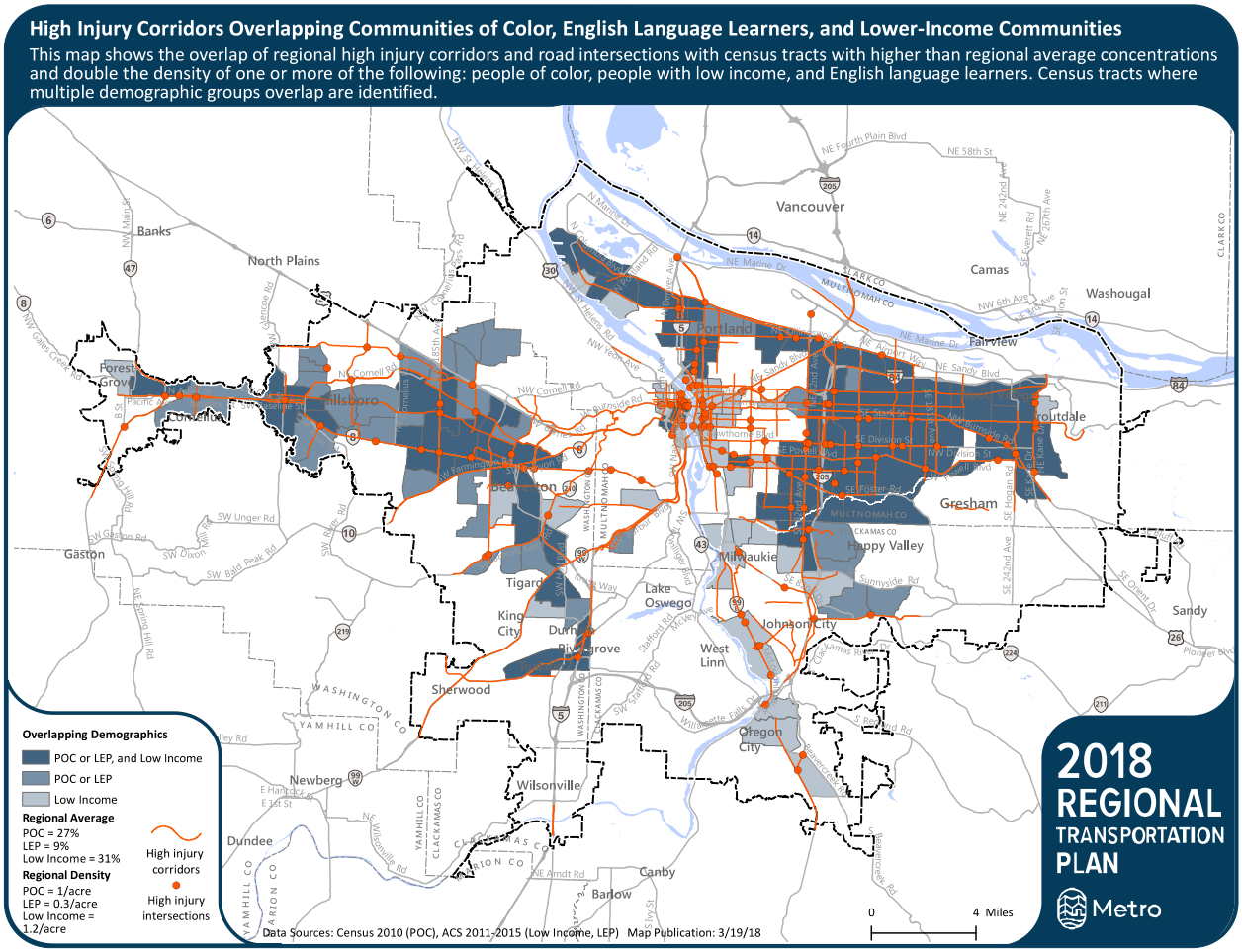
Figure 4.45 Fatal and life changing injuries in the greater Portland region, 2011-2015



Sixty percent of these fatal and severe injury crashes occur on just 6 percent of the region's major streets. These roadways are identified in **Figure 4.46** as Regional High Injury Corridors and Intersections. The Regional High Injury Corridors and Intersections were identified through an analysis of ODOT's crash data for the period from 2011 to 2015.

The high injury corridors and intersections are major travel routes with higher occurrences of fatal and severe injury crashes across all modes of travel. They are also where we tend to travel the most, where we run to catch the bus, cross the street to get to schools and shops, ride our bikes or drive. Furthermore, a majority of the high injury corridors and intersections – and a majority of pedestrian deaths and severe injuries occurred in RTP equity focus areas – areas with higher concentrations of people of color, people with low incomes and English language learners as shown in **Figure 4.46**.

Figure 4.46 High injury corridors and intersections in the greater Portland region, 2011-2015



Analysis in the *Metro State of Safety Report* (2018) and the *Regional Transportation Safety Strategy* (2018) identified the top three challenges that the region faces in eliminating fatal and life-changing injuries:

1. **Traffic deaths are increasing and are disproportionately impacting people of color, people with low incomes and people over age 65.**

   - Serious crashes (fatal and severe injury crashes combined) have fluctuated since 2007, but more recently have been increasing. Initial data from 2016, 2017 and 2018 indicate that the trend is continuing. This is a trend that is also happening at the state and national levels.
   - The regional annual fatality rate by population and vehicle miles traveled (for 2011-2015) has increased compared to the 2012 Metro State of Safety Report.[23]

[23] Fatality rates for traffic related crashes are the proportion of all crashes, person deaths or severe injuries for every 1 million people or every 100 million vehicle miles traveled.

- Your risk of dying in a motor-vehicle involved crash is higher if you are a person of color, are over 65 or have a lower income.[24]
- A majority of Regional High Injury Corridors are in communities with higher densities of people of color, people with low incomes and English language learners.[25]
- A majority of pedestrian deaths are in communities with higher densities of people of color, people with low incomes and English language learners.
- Older drivers are twice as likely to die in a traffic crash. For male drivers age 70 to 79 and female drivers age 75 to 85 and older the share of serious crashes is double that of drivers in other age groups.
- In Oregon, American Indians/Alaska Natives have the highest average rate of vehicle related deaths (5.9 per 100,000) 1.8 times the rate among Whites (3.3 per 100,000), and American Indians/Alaska Natives and Black or African American had the highest hospitalization rate – 52.2 and 46.2 per 100,000, compared to 45.5 for Whites and 20.8 for Asian Pacific Islanders for traffic related injuries.[26] This data is not currently available at the regional level.

2. Traffic deaths are disproportionately impacting people who are walking.

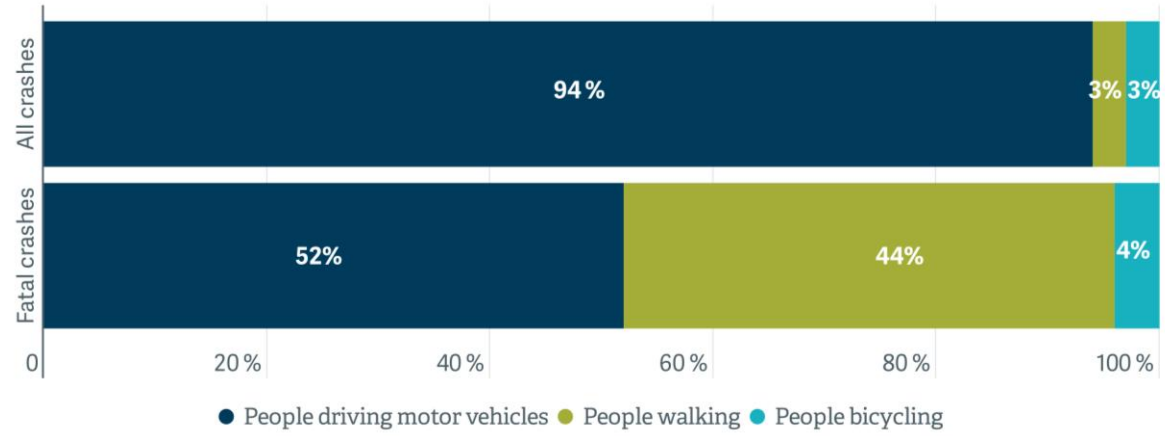
- Auto-only crashes comprise ninety-one percent of all crashes, and thirty-eight percent of all fatal crashes. Pedestrian crashes make up two percent of all crashes, and thirty-six percent of all fatal crashes.
- Pedestrian traffic deaths are steadily increasing, are the most common type of fatal crash, and have the highest severity of any crash type.
- Pedestrian fatalities have steadily increased to 2015 at the local, regional, state and national levels.
- In the region, a pedestrian crash is more than 26 times as likely to be fatal than a crash not involving a pedestrian, and more than 110 times as likely to be fatal as a rear end crash, the most common crash type.
- Roadway design is critical to pedestrian safety. Seventy-seven percent of serious pedestrian crashes occur on arterial roadways in the region. This pattern is seen at the state level as well.

[24] *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010,* Centers for Disease Control and Prevention (2013); *Dangerous by Design*, National Complete Streets Coalition (2016); *Income Disparities in Street features that Encourage Walking,* Bridging the Gap (2012); *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods,* Governing, August 2014; *America's Poorer Neighborhoods Plagued by Pedestrian Deaths*, Governing Research Report (August 2014)

[25] Figure 4.41 shows the overlap of Regional High Injury Corridors and census tracts with both higher than regional average concentration and double the regional density of people of color, people with low income, and/or English language learners.

[26] Oregon Public Health Authority, 2008-2014 crashes

Figure 4.47 All crashes and fatal crashes by mode, 2010-2014



Source: ODOT crash data, 2014

3. A majority of traffic deaths are occurring on a subset of arterial roadways.

- Arterial roadways are the location of the majority of the serious crashes in the region. Sixty-six percent of all serious crashes occur on a roadway designated as an arterial.
- In the region, seventy-three percent of non-freeway serious crashes occur on a roadway designated as an arterial; seventy-seven percent of serious pedestrian crashes occur on a roadway designated as an arterial; sixty-five percent of serious bicycle crashes occur on a roadway designated as an arterial.
- A majority of Regional High Injury Corridors are arterial roadways.
- A majority of the High Injury Corridors and Intersections – and a majority of pedestrian deaths and severe injuries – are in areas with race and income marginalized communities.

Several factors influence the number and severity of injuries from crashes, but some factors stand out from the rest. User behavior is a contributing factor in nearly every crash, from alcohol or drugs to excessive speed and aggressive driving. Driver inattention also plays a major role, although it is difficult to accurately measure its impact. And even as technology has made driving much safer in many respects, it has introduced new challenges. Distracted driving has increased in step with the proliferation of cell phones in society, introducing a relatively new hazard onto the roadways. A 2016 study by the Oregon Department of Transportation shows that between 2000 and 2014, distracted driving contributed to a crash every 2.5 hours and a traffic-related injury every three hours.[27]

[27] *Distracted Driving: An Epidemic – A Study of Distracted Driving Attitudes, Behaviors and Barriers Preventing Change*, prepared for the Oregon Department of Transportation, Southern Oregon University, March 2016

A disproportionate amount of serious crashes occur on arterial streets – high-speed, high-volume streets that have four or more lanes. Per mile travelled, arterial and collector roadways experience more serious crashes than freeways and their ramps. Although these arterials make up only 6 percent of the region's roads, 73 percent of serious and fatal crashes occur on them. Many of these dangerous streets extend through neighborhoods with high concentrations of communities of color and people with low incomes, where people are more likely to be walking, biking or using transit. As a result, these communities also bear a disproportionate amount of the region's serious crashes.



While eliminating traffic related deaths and severe injuries can seem like a daunting goal, partners in the greater Portland region are taking action to address the issue head on. Clackamas County has been a leader in setting aggressive safety targets. The county was the first local government in the state to develop a safety action plan. It uses the Toward Zero Deaths framework. The City of Portland has adopted a Vision Zero for 2025 and developed an ambitious Vision Zero Plan with an equity lens. In 2016, the City of Hillsboro adopted a safety action plan with a target of zero by 2035. Beaverton completed a Transportation Safety Action Plan in 2017 with a goal of zero fatalities and severe injuries by 2035. Washington County has completed a plan with a vision of moving towards zero deaths. In 2016, Oregon adopted its Transportation Safety Action Plan with a target of zero serious crashes by 2035.

4.7.6 Earthquake vulnerability, security and emergency management

In the next 50 years there is a significant risk that Oregon will experience a 9.0 Cascadia Subduction Zone earthquake and tsunami. As noted in the Oregon Resilience Plan, when a large earthquake is triggered within the Cascadia subduction zone, the result will be wide spread disruption of the transportation system. This disruption will make rescue and recovery operations in many areas difficult, if not impossible, and will have an immediate, disruptive impact on the economy. Thus the resilience of the transportation network is considered a key factor for re-establishing other lifelines after a major Cascadia subduction zone earthquake.[28]

The plan's Transportation Task Group assessed the seismic integrity of Oregon's transportation system, including bridges and highways, rail, airports, water ports and public transit systems, examined the special considerations pertaining to the Columbia and Willamette River navigation channels, and characterized the work deemed necessary to restore and maintain transportation lifelines after a Cascadia earthquake and tsunami. Recommendations in the plan for improving

[28] *The Oregon Resilience Plan, Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami,* Oregon Seismic Safety Policy Advisory Committee, February 2013

the resilience of transportation are based on the assumption that incremental improvements will be made over a 50-year timeframe. While these improvements are costly and spread out over a long time period, they must be initiated as a resilient transportation network is critical for re-establishing other lifelines, such as water, electricity, fuel, communication, and natural gas, after the earthquake. As noted in One Oregon: A Vision for Oregon's Transportation System, a $92 billion economic loss can be avoided through a $1.8 billion investment in seismic resiliency.[29]

Terrorist events and natural disasters such as Superstorm Sandy provide good illustrations of the challenges facing metropolitan areas in preparing for and responding to unexpected security incidents or natural disasters. Effective coordination and communication among the many different operating agencies in a region and across the nation is absolutely essential.[30] 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 potentially 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. Formed in 2012, the Regional Disaster Preparedness Organization is coordinating local, state and regional efforts to prepare for emergencies and plan for recovery.

The Regional Disaster Preparedness Organization (RDPO) is a partnership of governmental agencies, non-governmental organizations and private sector stakeholders in the Portland metropolitan region collaborating to increase the region's resiliency to disasters. The RDPO formed in 2012 out of a desire to build upon and unify various regional preparedness efforts in the region including the Regional Emergency Management Group (REMG), the Urban Areas Security Initiative (UASI) Program and several discipline specific coordination groups. The mission of the RDPO is to build and maintain regional disaster preparedness capabilities through strategic and coordinated planning, training and exercising, and investment in technology and specialized equipment.

The RDPO-funded Oregon Department of Geology and Mineral Industries (DOGAMI) Enhanced Earthquake Impact Study (2017) assessed seismic vulnerability of bridges in the region. The Sellwood Bridge and Tillikum Crossing Bridge have been built to be seismically resilient. In addition, planning work is under way for a seismic retrofit of the Burnside Bridge.

[29] *One Oregon: A Vision for Oregon's Transportation System*, May 2016

[30] *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 December 4, 2018 at www.planning.dot.gov/Documents/Securitypaper.htm



The I-5 Bridge crossing the Columbia River that connects Portland to Vancouver is seismically vulnerable,

Figure 4.48 Seismic vulnerability of the region's bridges for Cascadia Subduction Zone quake

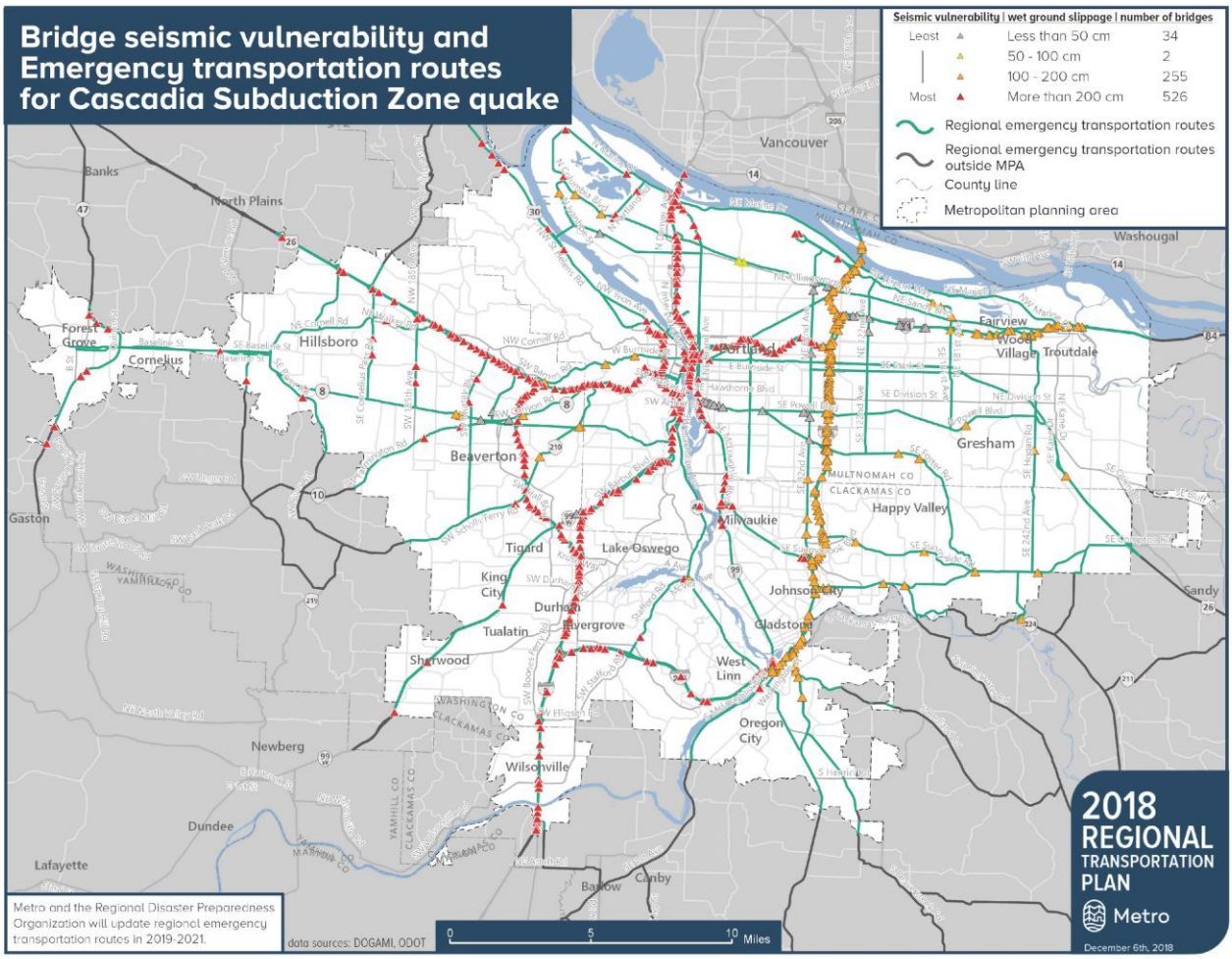
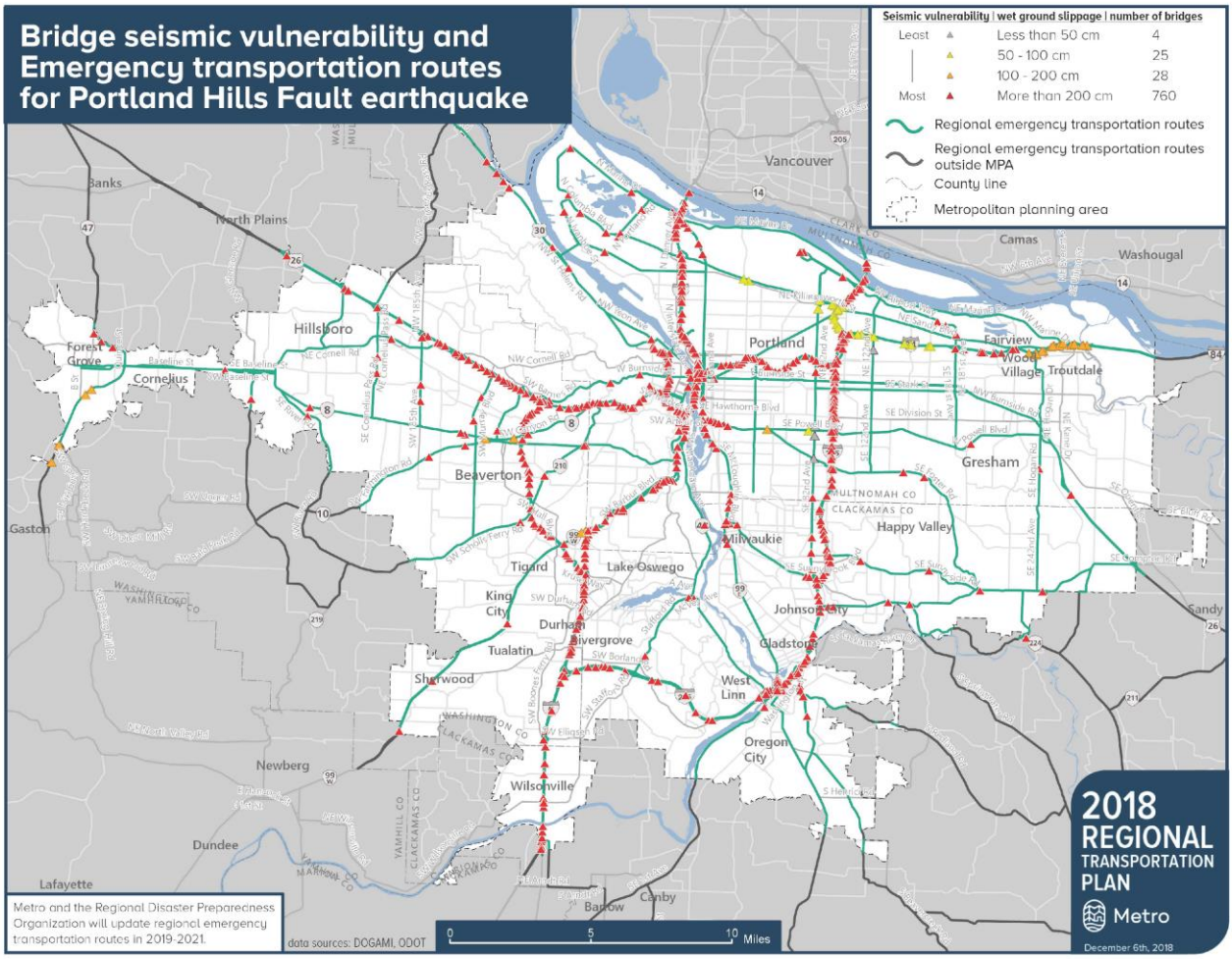


Figure 4.49 Seismic vulnerability of the region's bridges for Portland Hills Fault quake



Chapter 8 of the RTP calls for updating the region's emergency transportation routes (last updated in 2006) and implementing investments to increase resilience of the region's transportation 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 a regional emergency or natural disaster.

The Regional Disaster Preparedness Organization is working with Metro and other local, state and regional agencies to identify critical infrastructure in the region, assess social and security vulnerabilities and develop coordinated emergency response and evacuation plans, among other projects that aim to create a secure, disaster-resilient region.

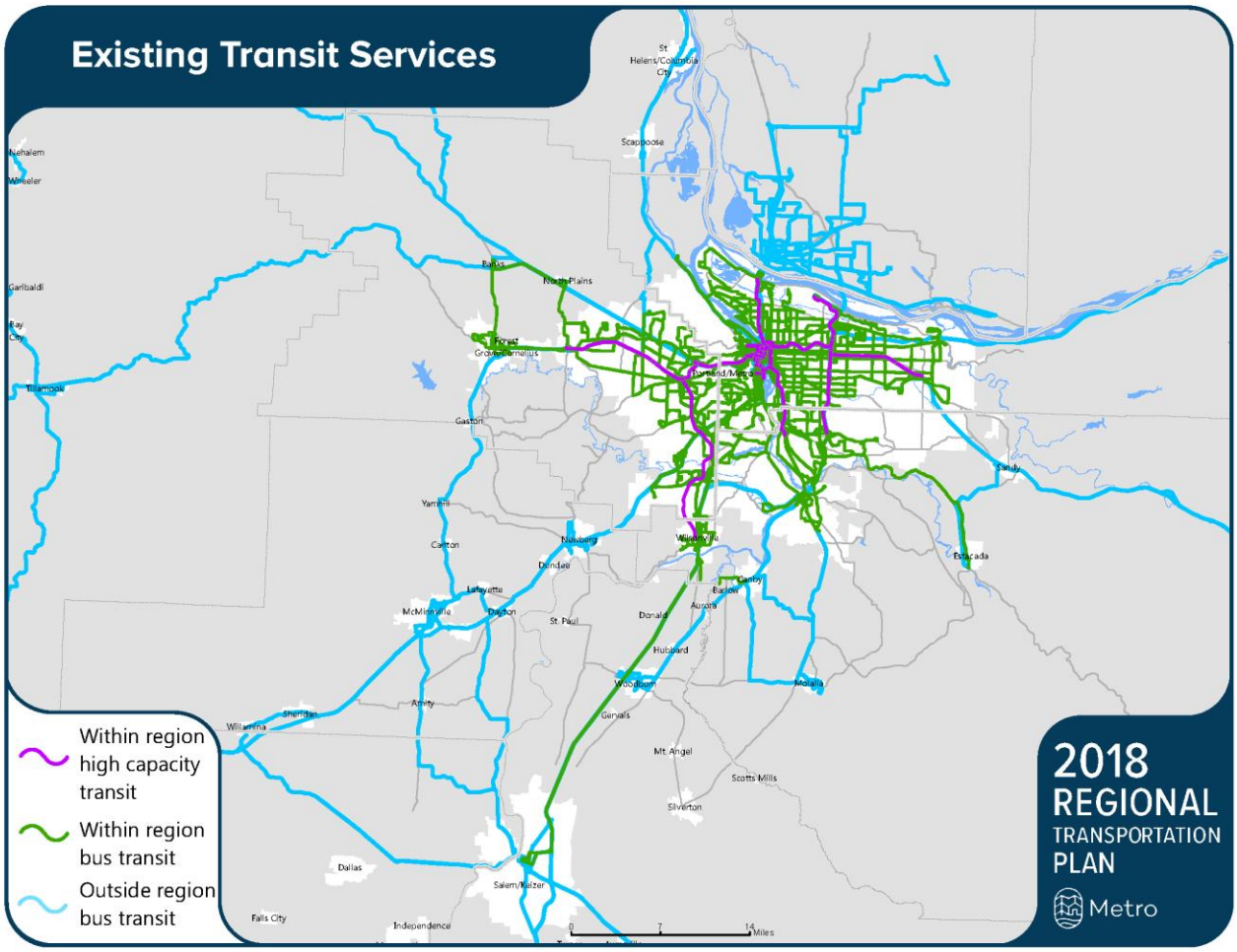
4.6.7 Gaps in transit, biking and walking connections

Increasing transit service is a key component of Metro's Climate Smart Strategy for the Portland metropolitan region. The strategy identified making transit convenient, frequent, accessible and affordable as one of the most promising approaches to meet adopted targets for reducing greenhouse gas emissions from light-duty vehicles while creating healthy and equitable communities and a strong economy. To meet this goal new performance measures to increase the number of jobs and households, including low-income households, within a ¼-mile of 15-minute service or better by 2040 were identified. In addition air quality-related federal laws require consistent transit service growth over time.

The transit system is especially important in ensuring mobility for people with low-income and people of color, who are twice as likely to be frequent transit riders as higher-income persons or White people. It is also critical to ensuring mobility for people who can't drive due to age or disability, or who simply choose not to own a personal vehicle. There are numerous ways to measure the busiest transit lines in the region. Two options are the total number of passengers boarding and the productivity of the line – that is, the number of people boarding for every hour it operates.

Figure 4.50 shows the existing transit system for the greater Portland region and beyond. Adding additional transit lines is part of the region's strategy to addressing the challenge of transit gaps.

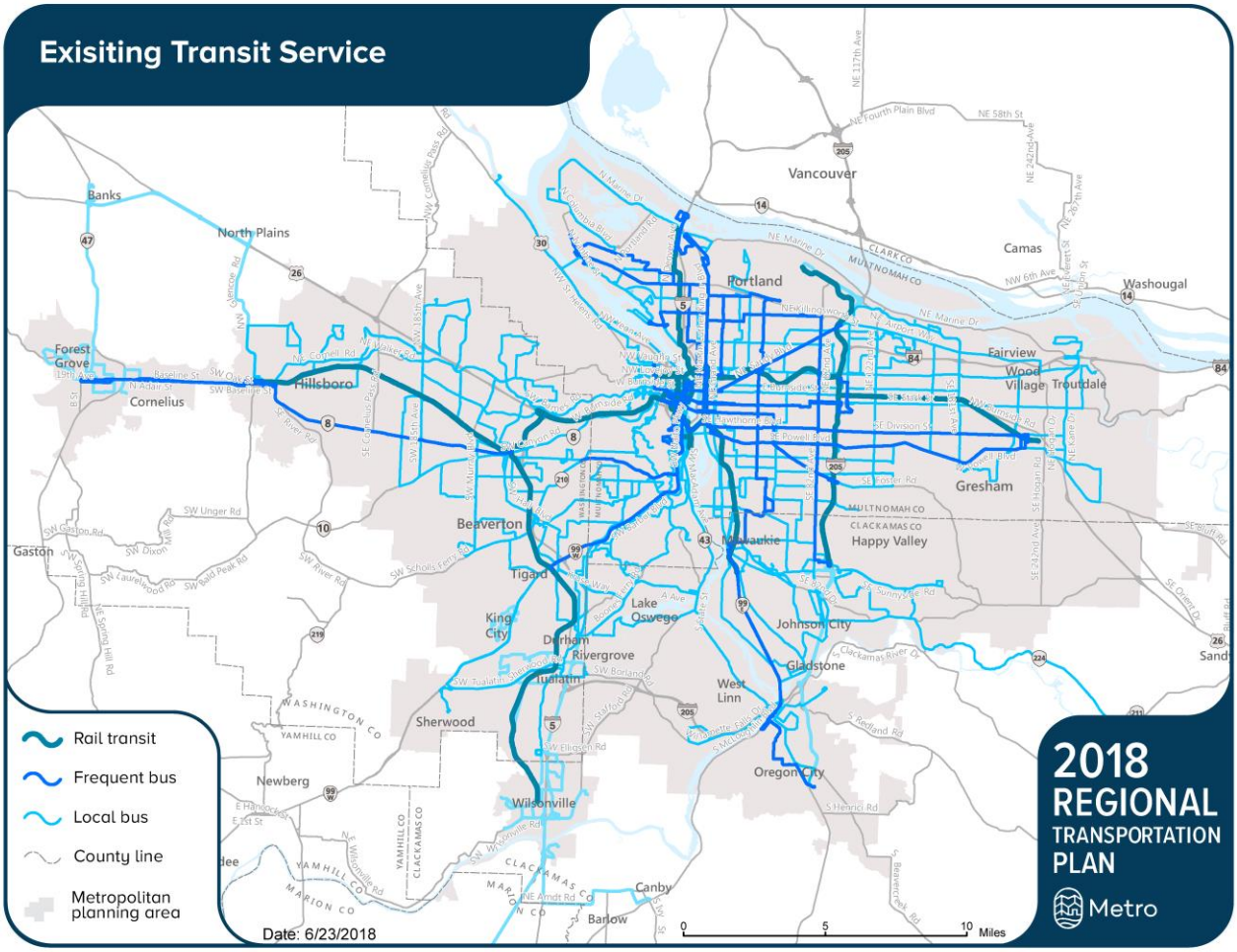
Figure 4.50 Existing transit services in the greater Portland region and beyond



Increasing level of transit service can be just as critical to filling "transit gaps" as is adding new lines.

Figure 4.51 shows existing level of service on the transit system today.

Figure 4.51 Existing transit service, 2018



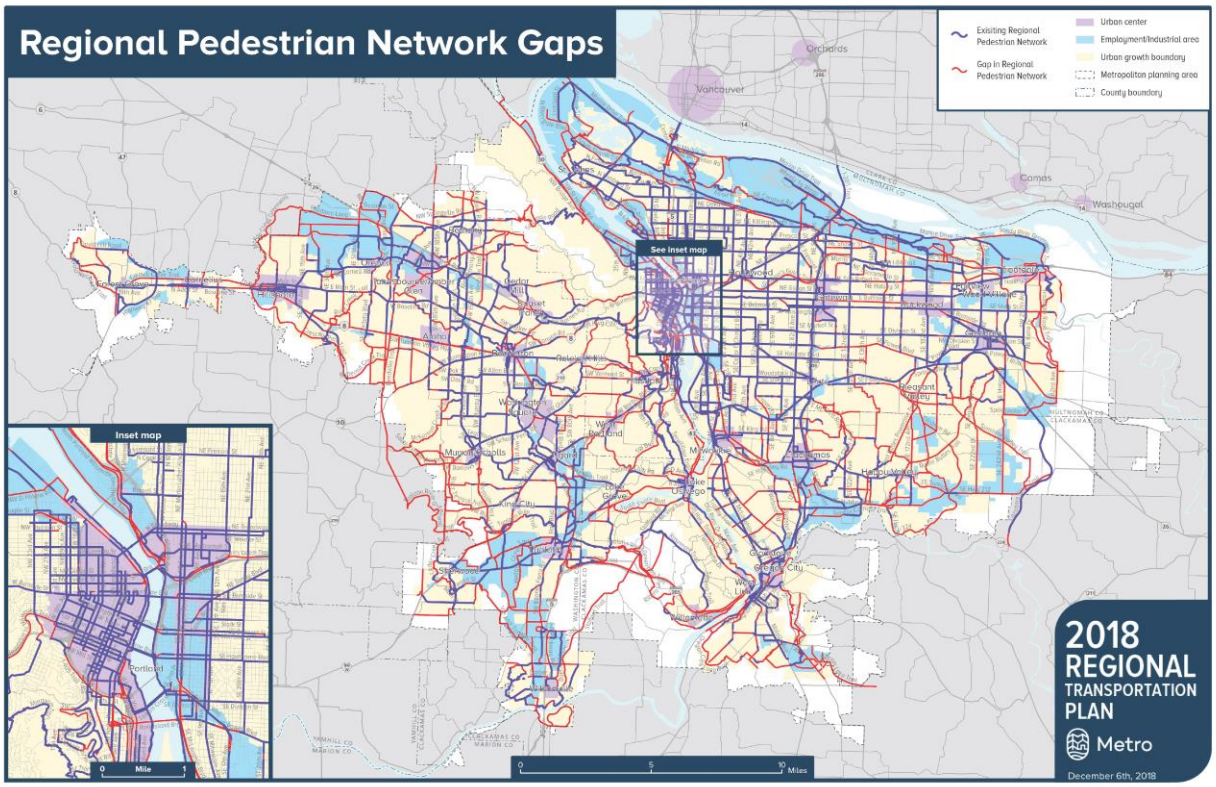
Gaps in sidewalks, bikeways and regional trails are hindering the region's ability to take full advantage of these affordable and healthy forms of transportation. Gaps in walking and bicycling facilities are impacting safety for the region's most vulnerable roadway users and deterring people from using these modes of transportation and from accessing transit.

Table 4.6 Percent of regional active transportation network complete

Planned regional pedestrian network (sidewalks on at least one side of roadway)	60%
Planned regional bicycle network (on-street bikeways)	54%
Planned regional trail network (on the regional bike and pedestrian networks)	36%

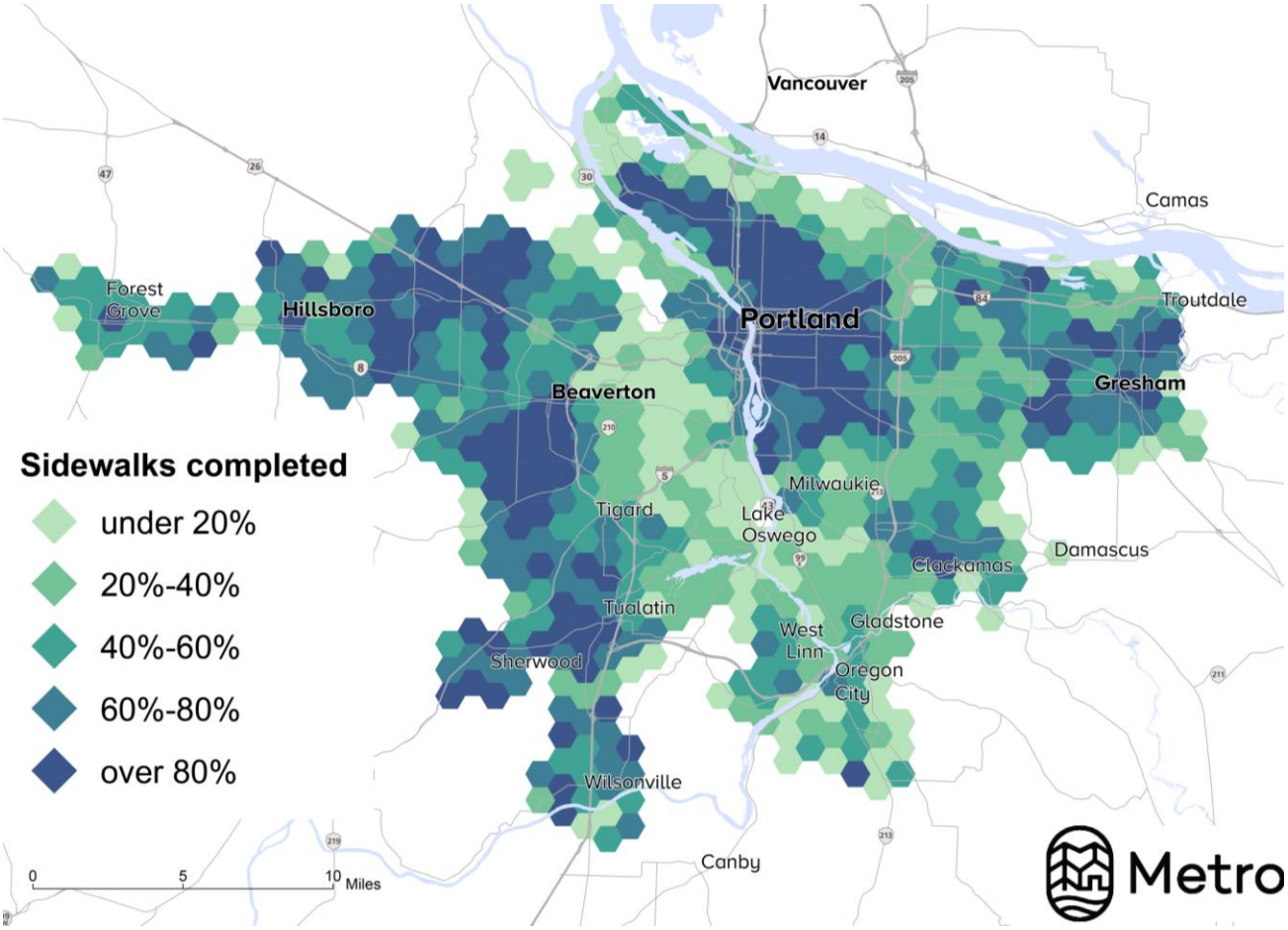
Approximately 60 percent of the planned regional pedestrian system has completed sidewalks on at least one side of the road. The regional pedestrian network inventory was last updated in 2012, and the regional bicycle network inventory was last updated in 2018.

Figure 4.52 Regional pedestrian network gaps, 2012



Significant portions of the region have pedestrian connections while other areas are lacking sidewalks, as seen in **Figures 4.52** and **4.53**.

Figure 4.53 Level of sidewalk completion in the greater Portland region, 2012



Approximately 54 percent of the planned regional bicycle network is complete. However, some existing facilities need to be improved to accommodate higher volumes of bicycle riders or to increase safety and level of comfort to attract more bicycle riders and prevent serious crashes. **Figure 4.54** shows the planned regional bicycle network, existing facilities and gaps that need to be filled.

Figure 4.54 Regional bicycle network gaps, 2016

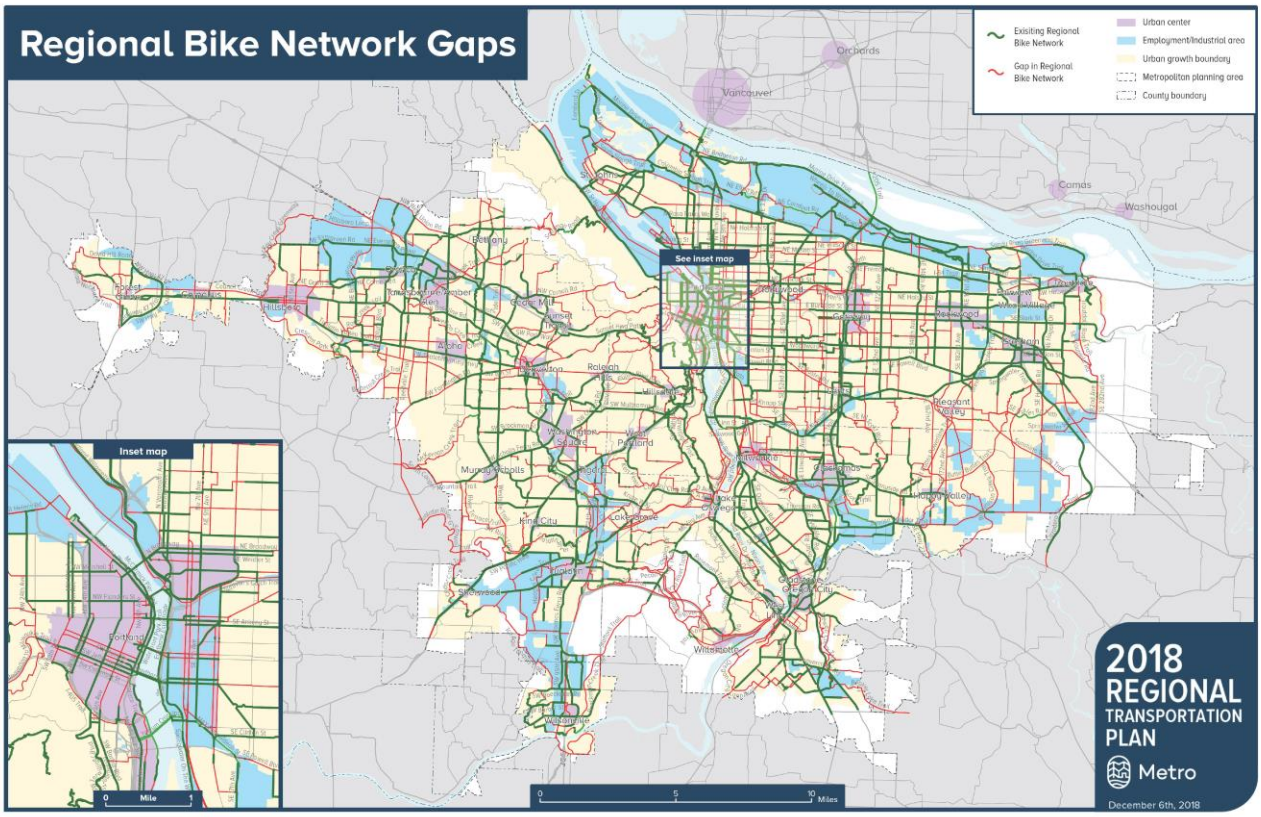
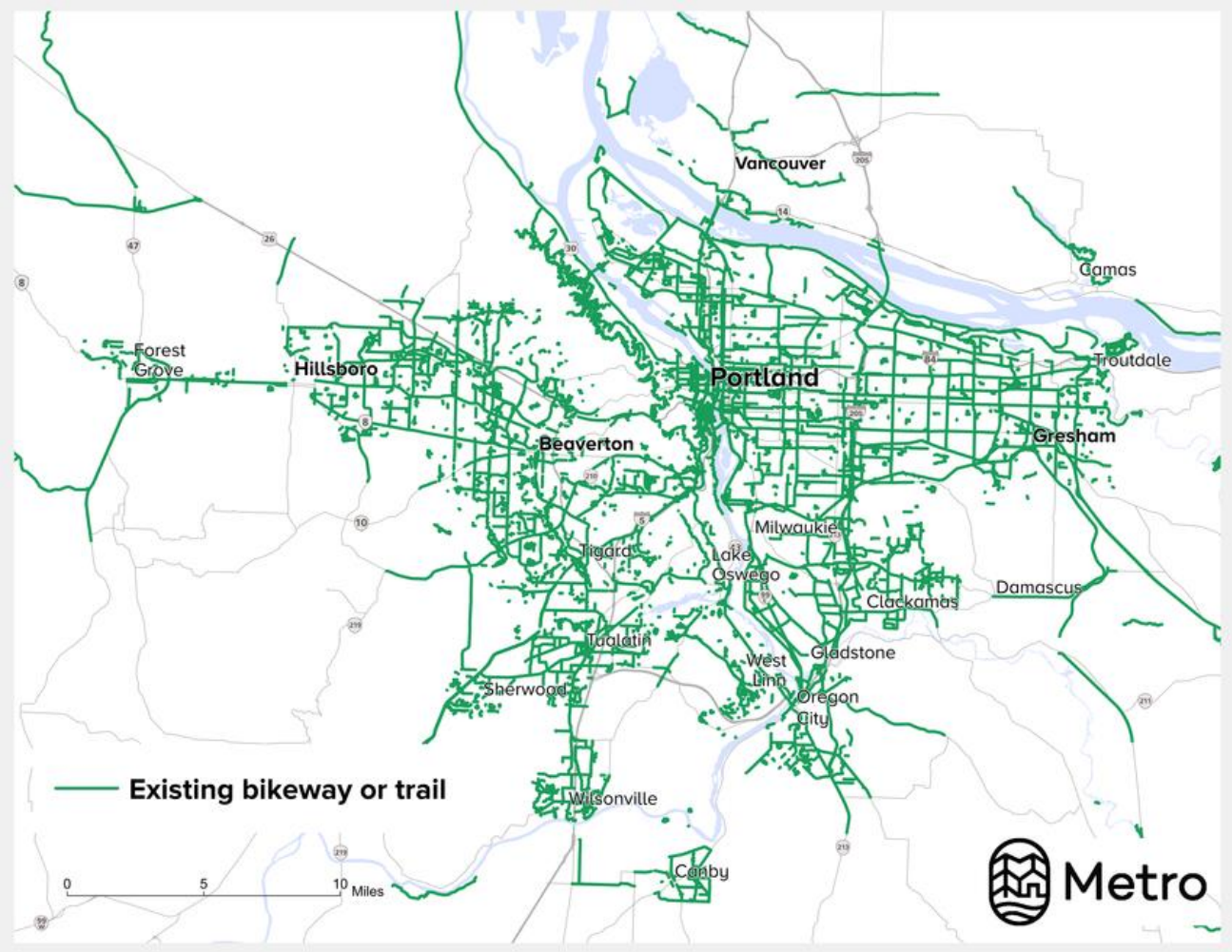


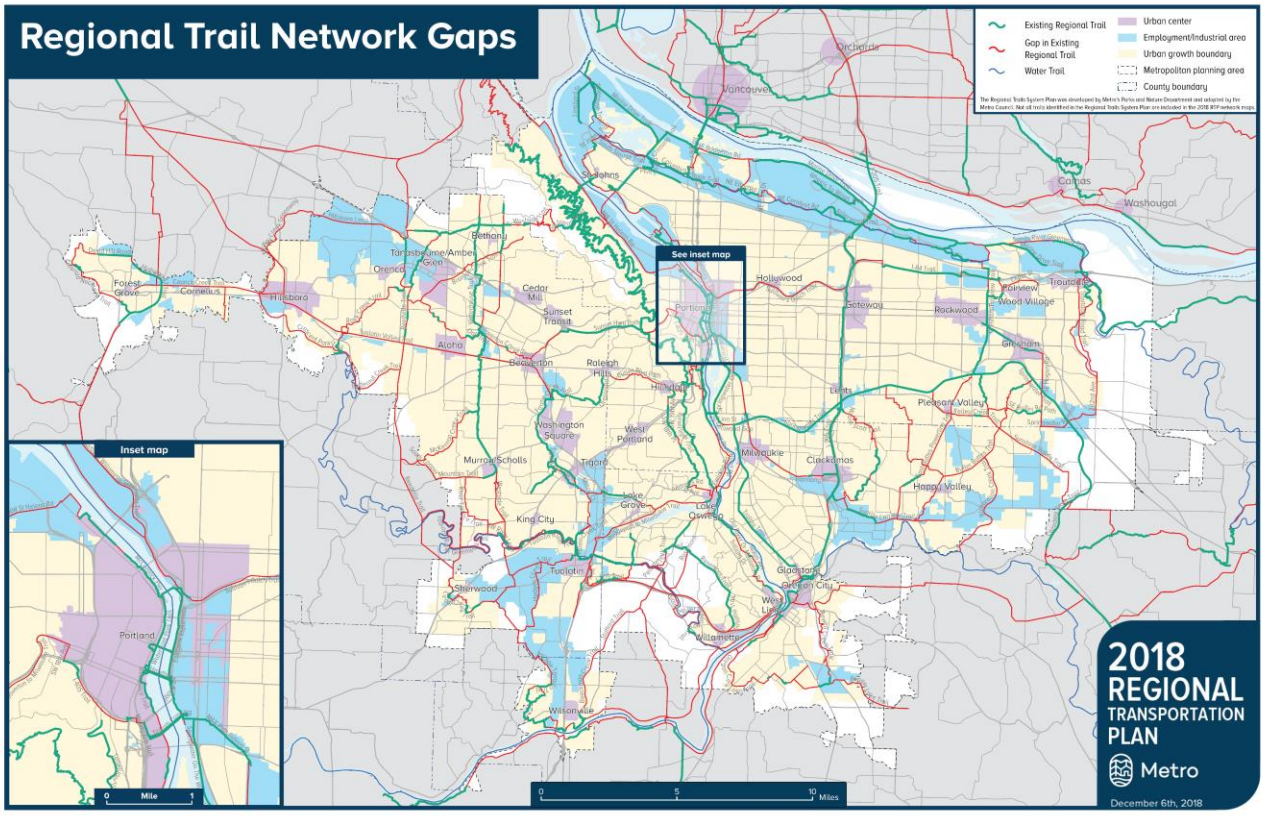
Figure 4.55 shows existing bicycle facilities in the greater Portland region in 2018. Currently, only 36 percent of all arterial roadways in the greater Portland region have bicycle facilities, and only 27 percent of all streets within 2040 centers have bicycle facilities. While demand for bicycling continues to grow the region is not taking full advantage of and supporting this affordable, reliable and healthy form of transportation.

Figure 4.55 Existing bikeways in the greater Portland region, 2018



Regional trails are a critical part of the active transportation network. Trails provide some of the most comfortable and safe facilities for walking and bicycling, especially when designed with Crime Prevention Through Environmental Design principles. Regional trails are challenging to build and often require multiple partners and jurisdictions coordinating. Federal funding regulations can increase costs by up to 30 percent. Currently, approximately 36 percent of the planned regional trail network within the metropolitan planning area boundary is complete.

Figure 4.56 Regional trail existing system gaps



4.6.8 Social inequity and disparities

The 2018 RTP offers opportunities to reduce barriers and disparities faced by communities of color and other historically marginalized communities.

Racial exclusion and bias leading to racial disparities

Oregon's history is rooted in racial bias, which has led to the greater Portland region having less racial diversity than other American cities. The history of Oregon's exclusionary laws dates back to 1848, when the Oregon Territory provisional government made it unlawful for Black people to live in the territory. The 1850 Donation Land Claim Act encouraged White settlers to move to the territory before any attempt was made to have the land ceded by the indigenous people – including the Multnomah, Clackamas, Tualatin and Chinook peoples of what would become the greater Portland region. In 1862, Oregon adopted a law requiring all African American, Chinese and Hawaiian people residing in Oregon to pay an additional annual tax. The Chinese Exclusion Act was passed in 1882 with the support of the state's full congressional delegation. Oregon's tensions around race continued to escalate and by the 1920s, Oregon had the nation's highest per capita membership in the Ku Klux Klan.

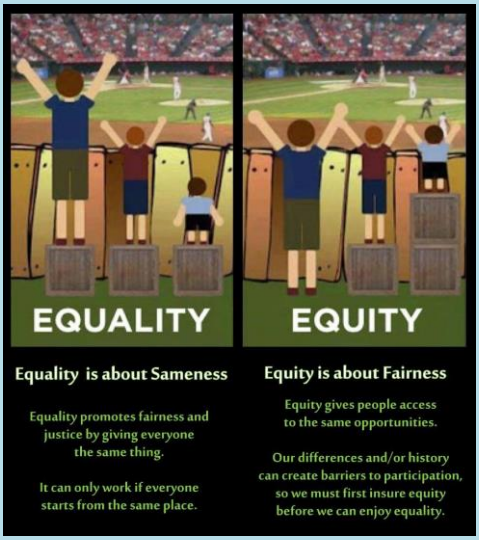
Through the 1940s, government policies prevented people of color from buying or renting homes outside of designated neighborhoods, while Japanese residents were relocated to internment camps during World War II. Through the 1960s and 70s – or later – real estate agents would discourage non-White clients from homes in White neighborhoods, and banks would often refuse loans for those properties when requested by a person of color. Meanwhile, banks would declare investments in homes in African American neighborhoods or other communities of color too risky and refuse loans for those properties.

Implicit and explicit practices of racial exclusion and bias extended to the development of the transportation system. People of color in Oregon had to pay additional surcharges on car insurance up until 1951. When Interstate 5 opened in the 1960s, the new freeway cut a swath through Portland's established African American neighborhoods, destroying at least 50 square blocks of homes and creating a barrier that still exists today.

Today, communities of color continue to point to issues of racial bias and inequity in enforcement of traffic laws and transit fares. Studies have also shown that drivers in the greater Portland region are significantly less likely to stop to allow an African American pedestrian to safely cross the street. Additionally, people of color are more likely to be victims of traffic fatalities and severe injuries.

Figure 4.57 illustrates where different historically marginalized communities reside in the region, based on the best available data from the U.S. Census Bureau and Oregon Department of Education at the start of the 2018 RTP. The map reflects where there is a significant regional concentration of people of color, people with limited english proficiency and people with lower incomes.

As described in Chapter 3, addressing the needs of these three communities is a policy priority for the RTP, but not with exclusivity to the needs of other marginalized communities, including young people, older adults and people living with disabilities.

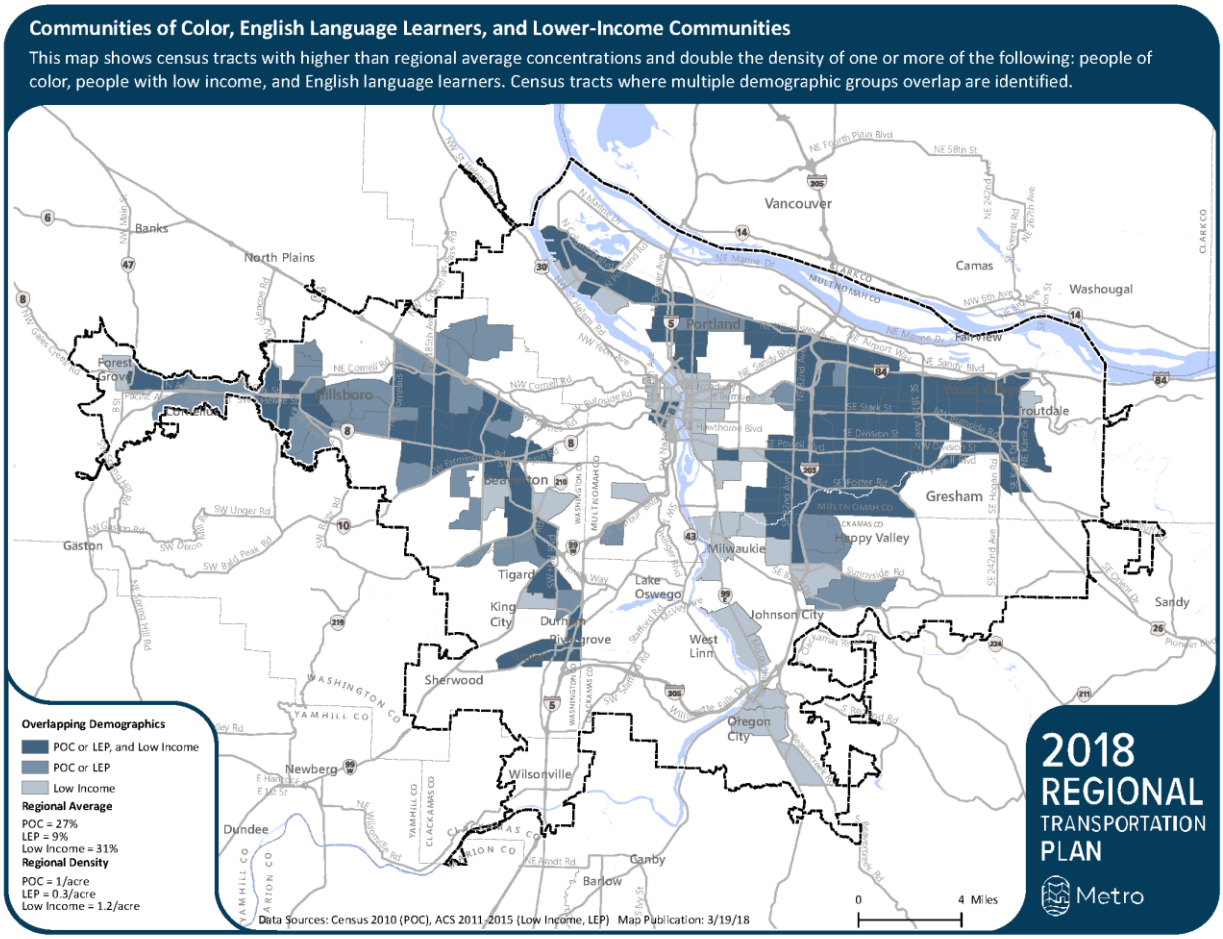


Metro's strategic plan to advance racial equity, diversity and inclusion

In June 2016 with the support of MPAC, the Metro Council adopted an equity plan that leads with race, committing to concentrate on eliminating the disparities that people of color experience, especially in those areas related to Metro's policies, programs, services and destinations. People of color share similar barriers with other historically marginalized groups such as people with lower income, people with disabilities, LGBTQ communities, women, older adults and young people. But people of color tend to experience those barriers more deeply due to the pervasive and systemic nature of racism.

By addressing the barriers experienced by people of color, we will also effectively identify solutions and remove barriers for other disadvantaged groups. The result of this racial equity focus will be that all people in the 24 cities and three counties of the greater Portland region will experience better outcomes.

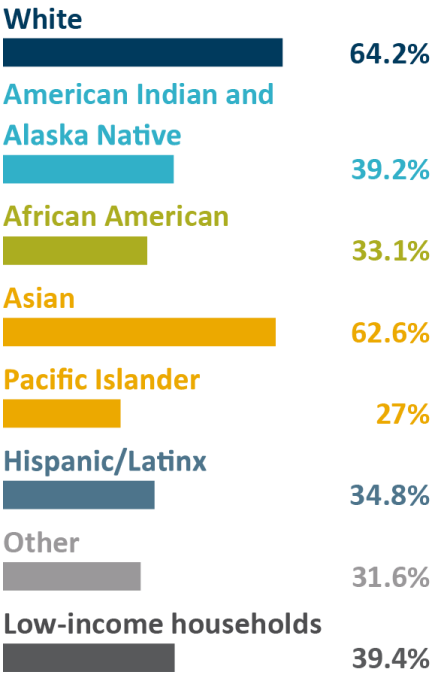
Figure 4.57 RTP equity focus areas



4.6.9 Housing and transportation affordability and displacement

Our region is facing an affordable housing crisis. Homeownership is cited as a key tool in both personal and family wealth development and community stabilization. Not only do people of color face issues of inequity in access to education and pay, the legacy of systemic racism in the region is reflected in current homeownership rates, which differ greatly by race as shown in **Figure 4.58**.

Figure 4.58 Homeownership in the greater Portland region, 2010

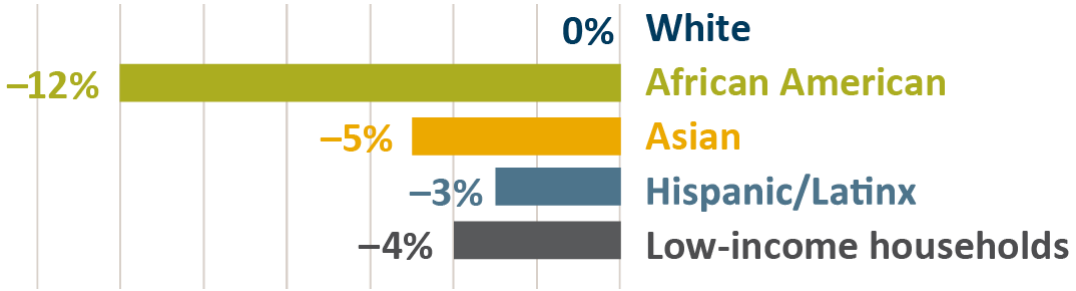


Source: 2010 U.S. Decennial Census

Note: A low-income household is defined as a household making 70 percent of the median family income for the region (approximately less than $50,000 for a 4 person household).

As housing costs increase, families who own homes benefit from increased home value, while people who rent are forced to move farther from job centers and the community resources they rely on, increasing their daily travel cost and time. The result has seen an increase in travel distance that communities of color face when accessing key resources.

Figure 4.59 Access to jobs within typical commute distance by race and ethnicity in the Portland-Vancouver MSA, percent change from 2002 to 2012



Source: Brookings Institute, *The growing distance between people and jobs in metropolitan America*, 2015

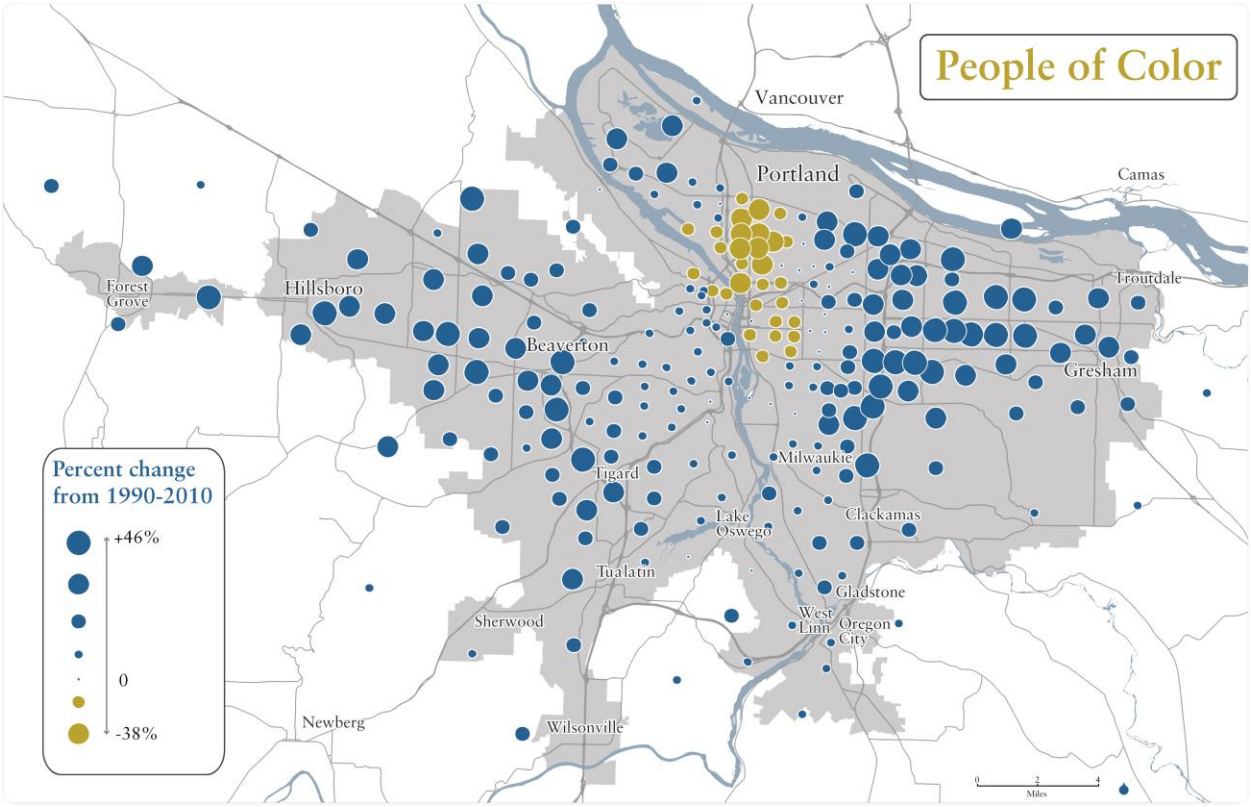
Notes: Original source did not provide information for American Indians or Pacific Islanders. Typical commute distance within the Portland metropolitan region is 7.1 miles.

For example, a 2015 study by the Brookings Institute found that between 2000 through 2012, the number of jobs in a typical commute distance – for the greater Portland region that is 7.1 miles – fell by 1 percent, but for African Americans, Asians, and Latinx the number of jobs fell by 12 percent, 5 percent, and 3 percent during that 12-year period. Whereas for White residents, the number of jobs within a typical commute distance did not change over the past 12 years – as shown in **Figure 4.59.**

Displacement affects communities as much as individuals

Displacement is often seen simply as a consequence of a growing population and an improving economy. Often unrecognized is a history that has concentrated communities of color into specific areas where they built strong community ties. Since these individuals and communities continue to face systemic inequities that limit access to the benefits of an improving economy, they are often priced out of these same areas as others gain stronger purchasing power. Not only does this displacement increase travel time and cost for individuals, it can create a cascading effect on the viability of community resources such as places of worship, community centers and culturally-focused businesses as members, users and customers lose convenient access.

Figure 4.60 Displacement of people of color in the greater Portland region, 1990-2010



Source: 1990 and 2010 U.S. Decennial Census

4.6.10 Technological change

Technology is already transforming the greater Portland region's transportation system. In the City of Portland, ride-hailing services now carry more people than taxis do, providing over ten million rides within the city in 2017. Car share companies including Car2go, ReachNow and Zipcar operate over 1,000 vehicles in the greater Portland region. Some of these companies have been around for a decade, but new models have sprung up, including free-floating car share, which allows people to pick up and drop off a car anywhere within a defined area, and peer-to-peer car share, which makes it easy for neighbors to borrow cars from each other. The City of Portland's bike share system, Biketown, launched in July 2016 and carried over 300,000 trips in its first year, and there are signs that other bike share companies are looking to launch service here soon.

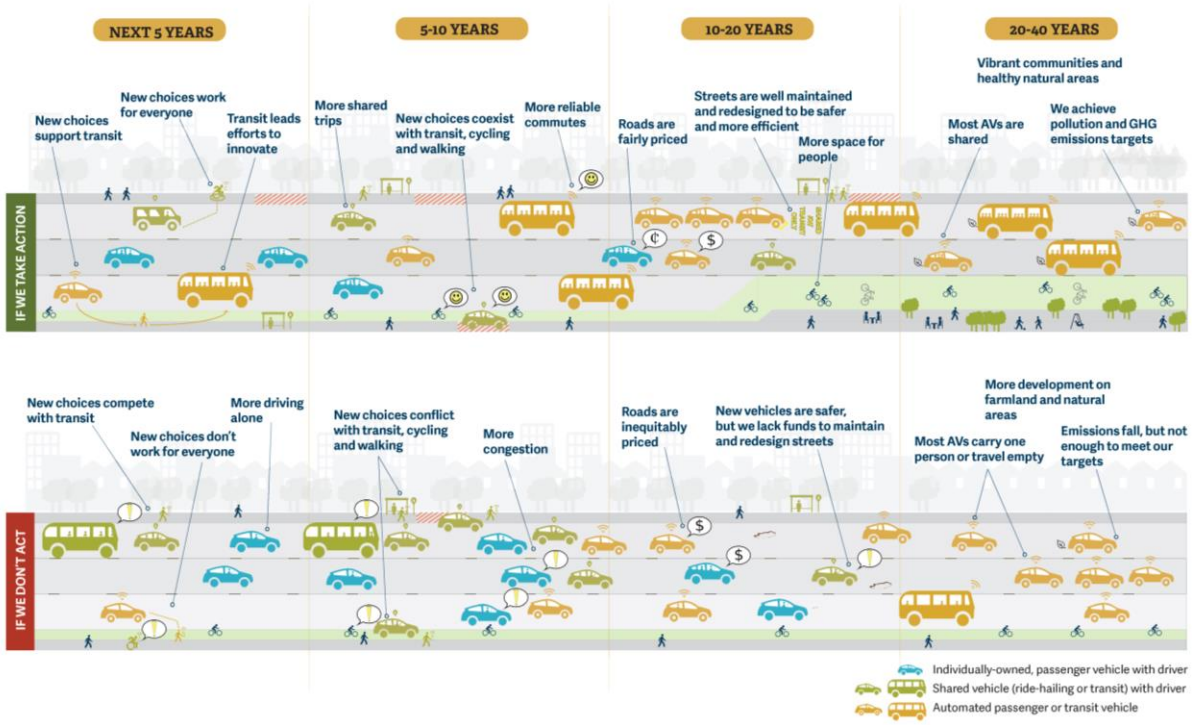
Meanwhile, smartphone apps have become the most popular way for people to get information on their travel choices, while the number of people who get information from other sources declined swiftly over the past three years. People increasingly rely on the real-time information that apps provide to make on-the-go decisions when congestion or a change in circumstances means that they can't take the mode or route that they normally do.

New services like car sharing and ride-hailing are bringing more affordable and efficient options to the region, but some of them may also be competing with transit and increasing congestion. We have new ways to meet the transportation needs of underserved people, but many of these new options are not accessible to all. Surveys conducted by Metro find that a disproportionately large number of frequent ride-hailing users are wealthy and young, while a disproportionately small number are low-income people or people over 45. The impacts are mixed and our information is limited, but it's clear that we're in an era of rapid change, and that public agencies need to act to make sure that emerging technology helps create more equitable and livable communities across the greater Portland region.

Many companies are already testing automated vehicles, and we will likely see these vehicles on the streets of our region within the next five years. Autonomous vehicles will likely accelerate the already-growing use of new mobility services when they arrive. New mobility companies are poised be first to deploy shared autonomous vehicles, which could enable them to cut the cost of trips and serve new users.

These developments will deepen the impacts that technology is already having and affect how some of the most pressing issues facing our region play out. The greater Portland region has inequitable access to safe, reliable, healthy and affordable ways to get around and is experiencing rapid population growth, rising housing costs and increasing congestion. Emerging technology has the potential to help us confront these challenges – transportation equity, congestion, advancing the public interest - or to exacerbate them.

Figure 4.61 How technological change could impact the greater Portland region's future



Source: 2018 Emerging Technology Strategy, Metro

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2018 Regional Transportation Plan

Chapter 5

Our Transportation Funding Outlook

December 6, 2018

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PURPOSE

Metro is the metropolitan planning organization (MPO) designated by Congress and the State of Oregon, for the Oregon portion of the Portland-Vancouver urbanized area, serving 1.5 million people living in the region's 24 cities and three counties. As the MPO, Metro formally updates the Regional Transportation Plan every five years in cooperation and coordination with the Oregon Department of Transportation, Port of Portland and the region's cities, counties, and transit providers.



Learn more about the 2018 Regional Transportation Plan at **oregonmetro.gov/rtp**

The Regional Transportation Plan is a blueprint to guide investments for all forms of travel – motor vehicle, transit, bicycle and walking – and the movement of goods and freight throughout the greater Portland region. The plan identifies current and future transportation needs, investments needed to meet those needs, and what funds the region expects to have available over the next 25 years to make those investments a reality.

As part of development of the RTP, federal regulations require the total cost of projects in the financially constrained list of projects to not exceed the total revenue reasonably expected to be available to the greater Portland region over the life of the plan. This chapter includes information on how the Metro and our partnering agencies reasonably expect to fund the projects included in the plan, including anticipated revenues from the Federal Highway Administration and the Federal Transit Administration, state, regional and local sources, the private sector and user fees.

The RTP financially constrained revenue forecast was developed based on a forecast of expected revenues that was formulated in partnership with the Oregon Department of Transportation, the Port of Portland, cities and counties in the region, TriMet and South Metro Area Regional Transit (SMART). The forecast was developed in consultation with the RTP Finance Work Group.

Chapter organization

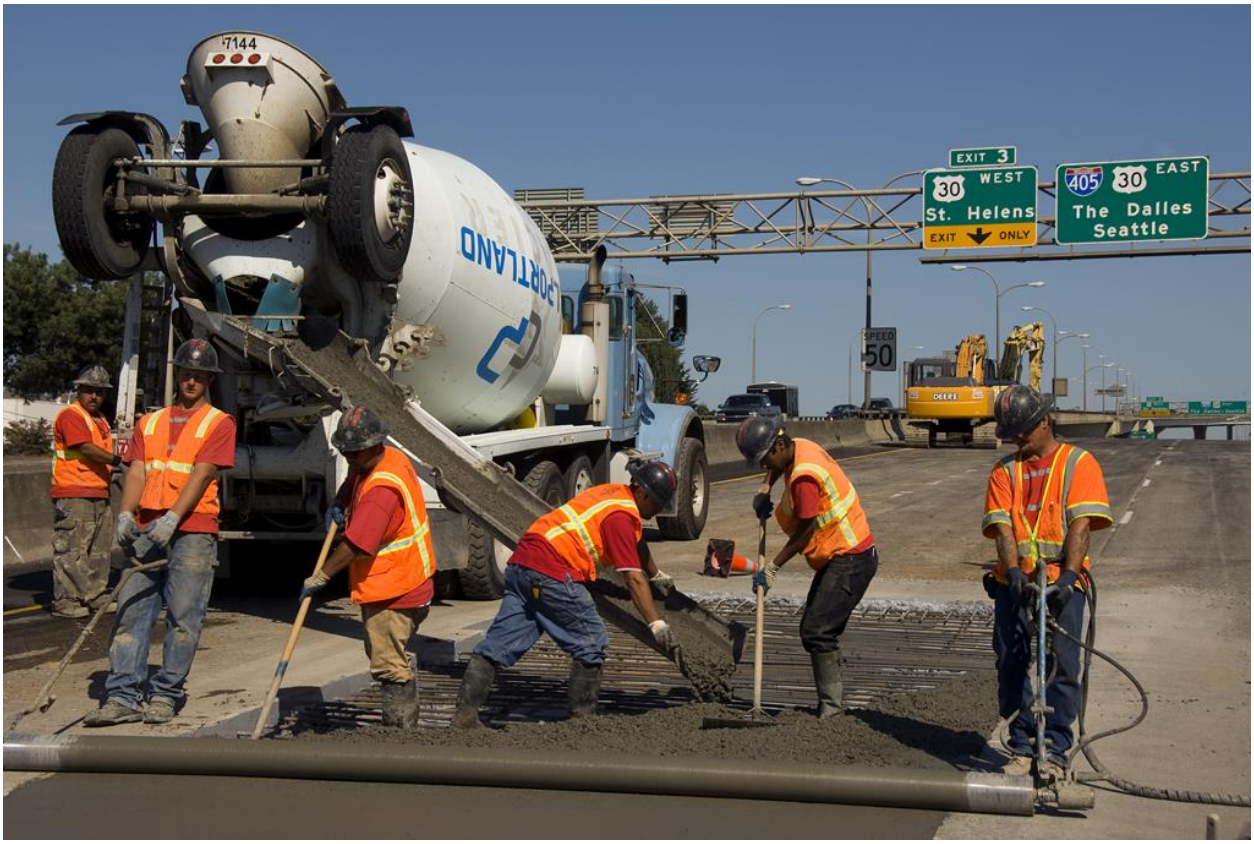
This chapter demonstrates that the RTP is financially constrained, in compliance with federal law and projects identified in Appendix A and Appendix B are "reasonably likely to be funded" for planning purposes, as defined by OAR 660-012-0040 (Transportation Financing Program). It provides an overview of the long-range forecast for both revenues and costs. Details of the long-range forecasts, including key forecast assumptions, can be found in **Appendix H**.

This chapter is organized into the following sections:

5.1. Introduction: This section describes the current outlook for transportation funding in the region and recent commitments by the Oregon Legislature to fund transportation throughout Oregon.

5.2. Sources of revenue and estimated budget for plan investments: This section summarizes forecasted revenue for transportation (capital and operations and maintenance), consistent with federal requirements, and the estimated budget for maintenance and capital investments in the Regional Transportation Plan.

5.3. Demonstration of Financial Constraint: This section compares the forecasted revenue expected to be available for transportation investment in the region and compares it to the cost of adequately maintaining and operating the transportation system and to the cost of new transportation projects included in the plan (see financially constrained list of projects contained in **Appendix A and Appendix B**). This will demonstrate these costs will not exceed forecasted revenues. Projects identified on the financially constrained project list in Appendix A and Appendix B are eligible to receive federal and state funding.



The region's operations and maintenance commitment is significant and consumes approximately 64 percent of the total federal, state, and local revenues identified for the greater Portland region.

5.1 INTRODUCTION

The 2018 Regional Transportation Plan will help make the case for more investment and funding to build, operate and maintain the regional transportation system we need for all modes of travel.

Our nation is investing less in building and maintaining our transportation system today than at any time in in the post-war era. As federal funding for all types of transportation projects declines, the greater Portland region is falling behind in making the investments needed to support our growing population and our vision for a 21st century transportation system.



HB 2017 begins to address the gap in maintenance and transit service funding for our region, but there is still a significant gap in funding for capital investments.

Transportation funding for highways and mass transit has long been primarily a state and federal obligation, financed largely through gas taxes and other user fees such as a vehicle registration fee. The purchasing power of federal and state gas tax revenues is declining as individuals drive less and fuel efficiency increases. The effectiveness of this revenue source is further eroded because the gas tax is not indexed to inflation. These monies are largely dedicated to streets and highways – primarily maintenance and preservation – and, to a limited extent, building more roads.

Although Oregon's HB 2001 Jobs and Transportation Act raised the state gas tax in 2011 by six cents, this revenue source had not increased since 1993. Similarly, the federal gas tax has not increased since 1993. This failure of the state legislature and Congress to keep pace with infrastructure needs has been particularly acute in Oregon, as other states have responded with increases in local and regional sales tax measures to cope with the decrease in purchasing power of federal transportation funding. Lacking a sales tax or other tools, the greater Portland region has focused on bonding strategies based on future revenue and, therefore, has not developed a long-term strategy to fund our transportation system.

We need to complete gaps in our region's transit, walking and biking networks to help expand affordable travel options, yet active transportation currently lacks a dedicated funding source. The transit system has relied heavily on payroll taxes for operations and competitive federal funding for high capacity transit. But the region's demand for frequent and reliable transit service exceeds the capacity of local payroll tax to support it.

Because federal and state funding has not kept pace with infrastructure operation and maintenance needs, a substantial share of funding for future regional transportation investments has shifted to local revenue sources. Local governments in the region (like others in Oregon) have turned to increased tax levies, road maintenance fees, system development charges and traffic impact fees in attempt to keep pace, although some communities have been more successful than

others. Other regions have responded by increasing local investment through local and regional tax measures.

A change in the funding outlook – but more is needed

In recent years, the Oregon Legislature has begun to once again make significant commitments to investment in transportation across all of Oregon's communities. HB 2017, Keep Oregon Moving, increases the gas tax and vehicle title and registration fees over a seven-year period. The motor fuels tax (30 cents per gallon in 2017) increased by 4 cents in January 2018. It will also increase 2 cents in 2020, 2022 and 2024, subject to ODOT meeting accountability and reporting requirements.

The annual registration fees and title fees will be tiered based on vehicle fuel efficiency in order to ensure that more efficient vehicles that pay little gas tax contribute their fair share for use of the roads. In addition, the weight-mile tax on heavy trucks will increase to ensure that trucks pay their fair share for their wear and tear on the roads. All of these funds are constitutionally dedicated to the State Highway Fund and can only be used for roads. In addition, Keep Oregon Moving creates three new taxes.



Approved by the Oregon Legislature in 2017, HB 2017 makes significant commitments to investment in transportation across all of Oregon's communities.

About half of the additional State Highway Fund provided by Keep Oregon Moving will go to local governments, who will receive a 50 percent increase in the amount they get from the State Highway Fund for local road and street maintenance and improvements. Keep Oregon Moving also included a new Safe Routes to School program to provide better ways for children to bike and walk safely to school; this program is funded statewide at $10 million per year initially and grows to $15 million per year and will complement Metro's Regional Safe Routes to School program.

The Legislature also specified a number of projects that will be built around the state, but the majority of the funding coming to ODOT will go to fix bridges and roads, making them safer and resilient to a major earthquake. Several projects are located in the greater Portland region, including the I-5 Rose Quarter Improvement project and adding new auxiliary lanes on OR 217 and I-205 within the city of Portland.

Despite the significance of HB 2017 to Oregon and the greater Portland region, resources remain limited to build the system we need to support our growing economy, labor force and communities. Diminished resources mean reduced ability to improve, enhance and expand infrastructure for a safe, reliable, healthy and affordable system. More funding will be needed to address the region's transportation challenges and build a 21st century transportation system as envisioned in community and regional plans.

5.2 SOURCES OF REVENUE AND ESTIMATED BUDGET FOR PLAN INVESTMENTS

A constrained revenue forecast that meets federal requirements for demonstrating reasonable availability of expected future funding is summarized in **Table 5.1**.

Table 5.1 RTP Constrained Revenue Forecast Summary for 2018 to 2040 (2016$)

RTP Constrained Revenue Forecast Summary for 2018 to 2040 (2016$)		
Revenue Category	**Constrained Revenues**	**Notes**
Federal Highway Administration (FHWA) to Region	$1,802,062,000	
Federal Transit Administration (FTA) to Region	$4,010,744,000	
State Revenues to Transit Needs	$514,617,000	State generated revenues committed to transit purposes
New State Revenues to named capital and OM&P projects (HB 2017)	$695,129,500	Identified by HB 2017 allocation categories in support of capital needs
ODOT Combined Federal/State Revenues for Capital projects	$2,044,974,000	Combined Federal & State for capital/modernization needs. Estimated at the Region 1 level and within the MPO boundary area
ODOT Fix-It (OM&P) Combined Program Revenues	$1,664,485,000	Combined state and federal revenues estimated for MPO area of ODOT Region 1
Subtotal Federal and State Revenues:	$10,732,012,000	Subtotal from all above categories
Local Revenues (counties and cities)	$16,803,628,000	Three counties and cities (all local revenue programs combined)
Local Revenues (Transit)	$19,005,351,000	TriMet and SMART
Total All Revenues (capital and operations, maintenance and preservation, and federally funded planning)	$46,540,990,000	

In 2016 dollars and rounded to the nearest $1,000.

As shown in the previous table, the $46.54 billion in estimated total revenues for the greater Portland region do not represent the actual available revenues for regional system capital improvements. The three counties, cities, TriMet, SMART, ODOT all have to address operations

and maintenance (O&M) needs which reduces the amount of revenue available to address capital needs.

The RTP financially constrained revenue forecast and financial analysis for operations and maintenance costs was based on a thorough evaluation of city and county, ODOT, TriMet and SMART cost projections in consultation with the 2018 RTP Finance Work Group.

The region's operations and maintenance commitment is significant and consumes approximately 64 percent of the total federal, state, and local revenues identified for the greater Portland region. After accounting for the estimated O&M commitment, the constrained revenue forecast is estimated to have $15.17 billion available for capital investments.

Table 5.2 RTP Constrained Revenue Forecast Estimates for Capital Investments for 2018 to 2040 (2016$)

RTP Constrained Revenue Forecast Estimates Summary for Capital Investments for 2018 to 2040		
Revenue Category	Constrained Revenues	Notes
Federal Revenues for Capital projects	$4,526,956,000	
State Revenues for Capital projects	$3,065,433,000	
Local Revenues for Capital projects	$7,573,520,000	3 counties, cities, TriMet and SMART
Total Constrained Revenues for Capital Projects in the RTP for 2018-2040	**$15,165,909,000**	Limits local funds to available funds for capital needs identified by agencies

In 2016 dollars and rounded to the nearest $1,000.

5.3 DEMONSTRATION OF FINANCIAL CONSTRAINT

The RTP is required to demonstrate that the projects and programs included in the plan to address transportation system needs not cost more than reasonably expected revenues to fund them. This is known as financial constraint. The following tables demonstrate project and program costs compared to the forecasted revenues available to pay for them.

To demonstrate financial constraint, **Table 5.3** compares the reasonably expected revenues to the estimated costs of the capital projects included in the plan (see financially constrained list of projects contained in **Appendix A and Appendix B**) and the costs of operating and maintaining the transportation system in the region.

Table 5.3 Demonstration of Financial Constraint: RTP Revenue Forecast Compared to Costs (2016$)

RTP Demonstration of Financial Constraint		
Category	Constrained Revenues	Costs
Capital projects	$15,165,909,000	$15,165,909,000
Operations and Maintenance	$31,375,081,000	$26,971,508,000
Grand Total	$46,540,990,000	$42,137,417,000

In 2016 dollars and rounded to the nearest $1,000.

The revenue forecast demonstrates that $15.17 billion of funding will be available for capital projects in the region during the time period of the plan. This compares to $15.17 billion of costs for projects.

Additionally, $31.36 billion of revenue is expected to be available for operations and maintenance of the transportation system during the time period of the plan. This compares to an estimate of $26.97 billion to operate and maintain the region's transportataion system during that time period.

Tables 5.4 and 5.5 break out these total revenues and costs to road-related and transit-related revenues and costs.

Table 5.4 Road-related Revenue Forecast Compared to Costs (2016$)

Category	Constrained Revenues	Costs
Capital projects	$10,105,109,000	$10,105,109,000
Operations and Maintenance	$13,316,201,000	$13,316,201,000
Grand Total	$23,421,310,000	$23,421,310,000

In 2016 dollars and rounded to the nearest $1,000.

The revenues available for both road capital projects and programs and for road operations and maintenance exceed expected costs for the planning period.

Table 5.5 Transit-related Revenue Forecast Compared to Costs (2016$)

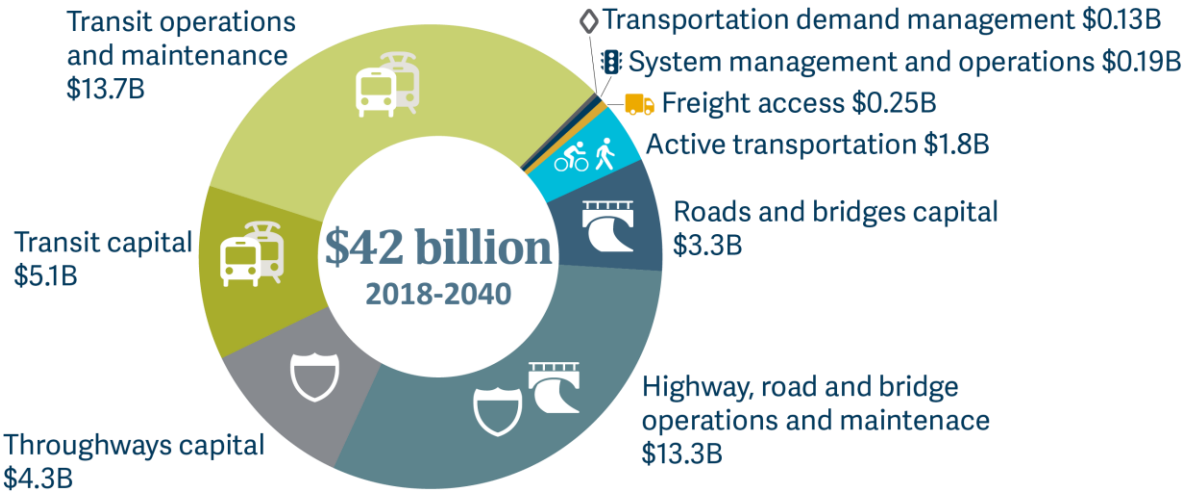
Category	Constrained Revenues	Costs
Capital projects	$5,060,800,000	$5,060,800,000
Operations and Maintenance	$18,058,879,000	$13,655,307,000
Grand Total	$23,119,679,000	$18,716,107,000

In 2016 dollars and rounded to the nearest $1,000.

The revenues available for both transit capital projects and for transit operations and maintenance exceed expected costs for the planning period. Transit operations and maintenance revenues are shown as significantly greater than expected costs primarily because the revenue forecast was able to capture new revenues made available by the Oregon legislature during the 2018 session, after the service planning work for the 2018 RTP needed to be completed. The service planning work was targeted to meet revenue assumptions available prior to the legislative session. The new revenues will be available for transit operations and maintenance and future planning work will account for the additional service those revenues will provide. More detailed information about the forecasting assumptions, sources of funding accounted for and process used to develop the financially constrained revenue forecast can be found in **Appendix H**.

Proposed investments in the regional transportation system are summarized in more detail in Chapter 6. **Figure 5.1** shows the total estimated cost of investments in the financially constrained RTP, including maintenance and operations of the transportation system. Projects identified on the financially constrained project list in **Appendix A and Appendix** B are eligible to receive federal and state funding.

Figure 5.1 2018 Financially Constrained RTP: Total estimated investment by 2040 (2016$)



Source: 2018 RTP Constrained Project List

Source: Metro



2018 Regional Transportation Plan

Chapter 6
Regional Programs and Projects to Achieve Our Vision

December 6, 2018

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6.1 INTRODUCTION

The programs and projects described in this chapter support the long-range vision for the region and will help achieve the six desired outcomes endorsed by the Metro Policy Advisory Committee (MPAC) and approved by the Metro Council in 2008:

- Vibrant communities
- Economic prosperity
- Safe and reliable transportation
- Leadership on climate change
- Clean air and water
- Equity



Six desired outcomes for greater Portland – Adopted by the Metro Council in 2008.

Projects and programs come from adopted local, regional or state planning efforts that provided opportunities for public input.

6.1.1 Addressing our most urgent needs through our investments

We know the transportation funding landscape is changing, and building a safe, reliable and sustainable transportation system requires steady, long-term investment. But, we don't have the resources to invest at the levels needed to address all of the challenges the region faces and achieve our shared vision and goals for the transportation system. Prioritizing where and how to invest limited transportation funding is a key part of developing and implementing this plan.

Prioritizing starts with understanding the challenges we need to address. Regional trends and challenges were identified through the Regional Transportation Plan (RTP) update engagement process. The RTP investment strategy was developed to address these challenges and achieve the investment priorities discussed in the next section. See Chapter 4 for more information on each of the challenges listed below.

- Aging infrastructure
- Climate change and air quality
- Congestion and reliability
- Fatal and life-changing crashes
- Earthquake vulnerability, security and emergency management
- Gaps in transit, biking and walking connections
- Social inequity and disparities
- Housing and transportation affordability and displacement
- Technological change

6.1.2 Chapter organization

This chapter describes how the region plans to invest in the transportation system across all modes, with expected funding, to provide a safe, reliable, healthy and affordable transportation system with travel options.

6.1 Introduction: This section introduces the chapter, including challenges the region is facing that the project lists address.

6.2 What Are the Region's Investment Priorities? This section describes the investment priorities identified through the update of the RTP. The project lists were developed in response to the identified investment priorities, with a focus on advancing near-term regional priorities for improving safety, advancing equity, implementing the Climate Smart Strategy and managing congestion.

6.3 RTP Projects and Programs: This section describes the 2040 Constrained RTP project list, which are the projects and programs that fit within the constrained budget of federal, state and local funds the greater Portland region can reasonably expect through 2040 under current funding trends. The section describes how the project list was developed, and the types and cost of projects (investment categories) that are in the 2040 Constrained RTP list. These projects are referred to as the Constrained RTP list throughout this chapter.

6.4 The 2040 Strategic Project List: This section describes the 2040 Strategic list of projects and programs, which reflect the full list of projects needed to meet the region's transportation needs, but for which funding has not been identified.

6.2 WHAT ARE THE REGION'S INVESTMENT PRIORITIES?

The Regional Transportation Plan (RTP) implements the 2040 Growth Concept through an approach that views the transportation system as an integrated and interconnected system that supports planned land uses, shifting the emphasis from simply moving vehicles to moving people and goods, providing access, and helping to create and connect places. The region's adopted six desired outcomes are supported by goals of the RTP and become the focal point for identifying investment priorities.

During the update of the RTP, regional investment priorities were identified to address the challenges listed in the previous section. These regional transportation investment priorities are described below, and guided the development and refinement of the 2018 RTP investment strategy. In particular, the projects and programs in the RTP investment strategy focused on advancing near-term regional priorities for improving safety, advancing equity, implementing the Climate Smart Strategy and managing congestion.

Regional trends and challenges

Technological change, housing and transportation affordability and displacement, changing demographics and an aging population, and social inequities and disparities are major societal trends and shifts which impact and are impacted by investments in the regional transportation system.

Policies, projects and programs in the RTP seek to address these regional trends and challenges in ways that help achieve the region's six desired outcomes and make progress on near-term regional priorities for improving safety, advancing equity, implementing the Climate Smart Strategy and managing congestion.



6.2.1 Maintaining the system we have

The RTP is an important to tool to help maintain the existing transportation system in a state of good repair. The RTP recognizes the importance of prioritizing maintaining the system we have before building new roadways. Maintenance of the transportation system is the largest transportation cost and it is growing. Maintaining and updating aging infrastructure, retrofitting to address earthquake vulnerability, and providing for security and routes for efficient emergency services are growing concerns across the region.

6.2.2 Implementing the 2040 Growth Concept

Implementing the 2040 Growth Concept is one of the main roles of the RTP. The RTP recognizes the importance of prioritizing transportation investments in the 2040 growth areas to support the region's economic vitality and commercial activity. These are the areas where the greatest growth is planned for and where the most trips will be occurring:

- Portland central city, regional centers and town centers
- Station communities
- Main streets and corridors
- Industrial and employment areas

Transportation investments also play an important role in placemaking, which helps achieve the 2040 Growth Concept vision for a strong economy, a healthy environment and communities that serve the needs of all. Refer to Chapter 1 for more information on the 2040 Growth Concept.

6.2.3 Implementing the Climate Smart Strategy

The 2018 Regional Transportation Plan is a key tool for implementing the adopted Climate Smart Strategy and achieving a new 2040 target adopted by the Land Conservation and Development Commission in 2017. The RTP prioritizes transportation investments that help reduce greenhouse gas emissions from cars and small trucks while making our transportation system safe, reliable, healthy and affordable.

6.2.4 Advancing transportation equity

The RTP is a key tool for implementing Metro's adopted Strategic Plan to Advance Racial Equity, Diversity and Inclusion. The RTP prioritizes transportation investments that will reduce barriers and disparities faced by communities of color and other historically marginalized communities, while making our transportation system safe, reliable, healthy and affordable.

6.2.5 Improving safety

The RTP is a key tool for implementing the adopted Regional Transportation Safety Strategy and achieving a new Vision Zero target to eliminate traffic deaths and life changing injuries by 2035. The RTP prioritizes transportation investments that will move the region as quickly as possible towards Vision Zero, especially in communities of color and other historically marginalized communities that experience disparate impacts from traffic crashes.

6.2.6 Managing congestion

The RTP is a key tool for managing congestion. The RTP prioritizes strategic multi-modal transportation investments that will make travel more reliable on the region's busiest roadways and regional transit routes. While the RTP acknowledges that congestion cannot be eliminated, there are projects and tools that can improve system efficiency, make travel times reliable and expand travel options. Refer to Chapter 4 for more information on congestion and regional highway bottlenecks.

6.2.7 Expanding travel options

The RTP is a key tool for expanding travel options as part of advancing the regional investment priorities identified above. The RTP prioritizes completing gaps in the walking and bicycling networks, increasing safe access to transit, and supporting travel decisions with community, neighborhood, and employment outreach programs. These types of investments are foundational to achieving other desired outcomes such as improving safety and reducing vehicle miles traveled per capita and related greenhouse gas emissions.

Figure 6.1 2018 RTP Investment Strategy

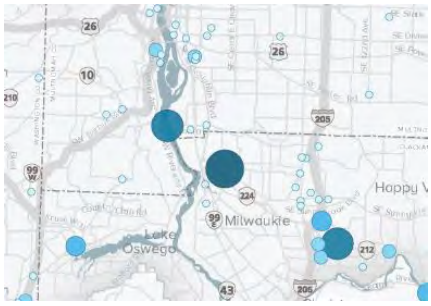


6.3 RTP PROJECTS AND PROGRAMS

The policy sections, in Chapter 2 and Chapter 3, set the vision, goals, objectives, performance targets and policies for the greater Portland region's system of throughways, arterials, bridges, bikeways, sidewalks, and transit and freight routes.

The project lists, described in this chapter and provided in **Appendices A, B and C**, are priority projects from local, regional or state planning efforts that provided opportunities for public input. Projects in the 2027 and 2040 Constrained RTP investment scenarios are eligible for federal or state transportation funding and must be part of the planned regional transportation system.

Did you know?



Since the last update of the RTP in 2014, of the 1,256 projects listed in the RTP, 132 have been built or will be completed by 2019 – a total of $3.15 billion invested in the regional transportation system.

6.3.1 Developing the project lists

To develop the RTP lists of projects and programs, Metro issued a call for projects in Spring 2017 and coordinated with local, regional and state partners to begin updating the region's transportation investment priorities into three separate investment scenarios.

Table 6.1 2018 RTP Investment Scenarios

C10 2018–2027

The 2027 Constrained investment scenario identifies the highest priority projects and programs that the greater Portland region can reasonably expect to fund in the first 10-years of the plan.

C 2040 2018–2040

The 2040 Constrained investment scenario includes all of the projects and programs that fit within a constrained budget of federal, state and local funds the greater Portland region can reasonably expect through 2040 under current funding trends. In order to be eligible for federal or state transportation funding, a project must be included on the 2040 Constrained list.

S 2040 2028–2040

The 2040 Strategic investment scenario includes additional strategic priority investments (not constrained to the budget based on current funding trends) that could be built with additional resources. This is referred to as the 2040 Strategic and are not anticipated to be completed unless new, as of yet identified funding becomes available. For analysis purposes, these projects are assumed to be implemented in the 2028 to 2040 time period.

Working with a financially constrained budget and funding targets, Clackamas, Multnomah and Washington counties and the cities within each county recommended priority projects for their jurisdictions at county coordinating committees. The Oregon Department of Transportation (ODOT), the Port of Portland, TriMet, SMART and other agencies worked with county coordinating committees and the City of Portland to recommend priority projects. The City of Portland recommended projects after reviewing priorities with its community advisory committees. These

projects were provided to Metro to build the draft project lists for technical evaluation and initial public review in winter 2018.

Following the first round of technical analysis, Metro engaged the public, regional policymakers and agencies responsible for developing the project lists in review and discussion of the evaluation findings. Taking into account analysis findings and subsequent public and stakeholder input, regional policymakers then recommended that the Metro Council direct agencies to refine their respective draft list of projects to better meet four near-term regional priorities identified through the fourth (and final) regional leadership forum. The near-term RTP priorities are: improving safety, advancing equity, implementing the Climate Smart Strategy and managing congestion. In Spring 2018, Metro provided a set of seven recommendations to regional partners to guide finalizing the RTP project lists for public review and technical evaluation.

Table 6.2 summarizes the seven overall recommendations identified by policymakers and leaders in the region to guide refinement of the Constrained RTP project lists.

Table 6.2 Seven key recommendations to guide refinement of RTP projects lists

Make more near-term progress on key regional priorities – equity, safety, travel options, Climate Smart Strategy implementation and congestion. Advance projects that address these outcomes to the 10-year list to make travel safer, ease congestion, improve access to jobs and community places, attract jobs and businesses to the region, save households and businesses time and money, and reduce vehicle emissions.	✓
Make more near-term progress to reduce disparities and barriers that exist for historically marginalized communities. Advance projects that improve safety and expand travel options to the 10-year list to reduce disparities and barriers, especially for people of color and households of modest means.	✓
Prioritize projects that focus on safety in high injury corridors. Advance projects in high injury corridors to the 10-year list and ensure all projects in high injury corridors address safety to reduce the likelihood and severity of crashes for all modes.	✓
Accelerate transit service expansion. Increase transit service as much as possible beyond Climate Smart Strategy investment levels. Focus new and enhanced transit service to connect transit to underserved communities to jobs and community places, in congested corridors and in areas with more jobs and housing.	✓
Make more near-term progress to tackle congestion and manage travel demand. Advance lower cost projects to the 10-year list that use designs, travel information, technologies, and other strategies to support and expand travel options and maximize use of the existing system. It will be important to ensure that lower income households are not financially burdened by strategies to make road use more efficient.	✓
Prioritize completion of biking and walking network gaps in the near-term. Advance projects that fill gaps for biking and walking in high injury corridors or that provide connections to transit, schools, jobs and 2040 centers to the 10-year list.	✓
Continue to build public trust through inclusive engagement, transparency and accountability. Continue to engage the region's diverse communities in the planning and implementation of projects to achieve desired outcomes, including equity, safety, reliability, affordability and health. Report back whether projects deliver (or don't deliver) anticipated outcomes and adjust course as needed.	✓

Agencies were requested to refine their respective draft project lists to better achieve the near-term regional transportation priorities. Regional partners updated their project lists accordingly.

Appendix E provides additional information on what changed. Performance of the revised projects and programs was subsequently evaluated and reported, and made available for public feedback during the final public comment period in summer 2018. In Fall 2018, additional project list refinements were recommended and adopted by JPACT and the Metro Council in response to public comments. Metro evaluated performance of the final adopted projects and programs in a third system evaluation that is reported in Chapter 7.

6.3.2 RTP Constrained projects and programs

This section describes the RTP Constrained list of projects and programs – the list of priority investments that the region can reasonably assume it will complete based on funding assumptions described in Chapter 5. **Figure 6.2** shows the general location of projects on the RTP Constrained list of projects region-wide. For an interactive map of the projects visit www.**oregonmetro.gov/rtp**.

Table 6.3 shows the breakdown of RTP projects in the constrained lists by investment category, and provides a quick reference for comparing the relative cost of the 2027 Constrained (investments planned for the first 10-years of the plan period) and full 2040 Constrained investment strategies. The 2040 Constrained costs shown in Table 6.3 include the 2027 Constrained RTP project costs plus estimated costs for additional projects that could be implemented from 2028 to 2040 based on the funding assumptions described in Chapter 5.

Table 6.3 Estimated costs for Constrained RTP Investment Strategy

RTP Capital Costs	C10 2018–2027	C 2040 2018–2040
Transit capital	$3.2 billion	$5.1 billion
Throughways capital	$1.1 billion	$4.3 billion
Roads and bridges capital	$1.6 billion	$3.3 billion
Freight access	$156 million	$254 million
Active transportation	$790 million	$1.8 billion
Technology – system management	$71 million	$189 million
Information – travel options	$51 million	$127 million
RTP Operations and Maintenance Costs	C10 2018–2027	C 2040 2018–2040
Transit operations and maintenance	$5.7 billion	$13.7 billion
Roads and throughways operations and maintenance	$6 billion	$13.3 billion
Total estimated costs (in 2016 dollars)	**$19 billion**	**$42 billion**

Source: 2018 RTP Financially Constrained Project List. Costs are in 2016 dollars and have been rounded.

2018 Regional Transportation Plan

Financially Constrained projects 2018-2040

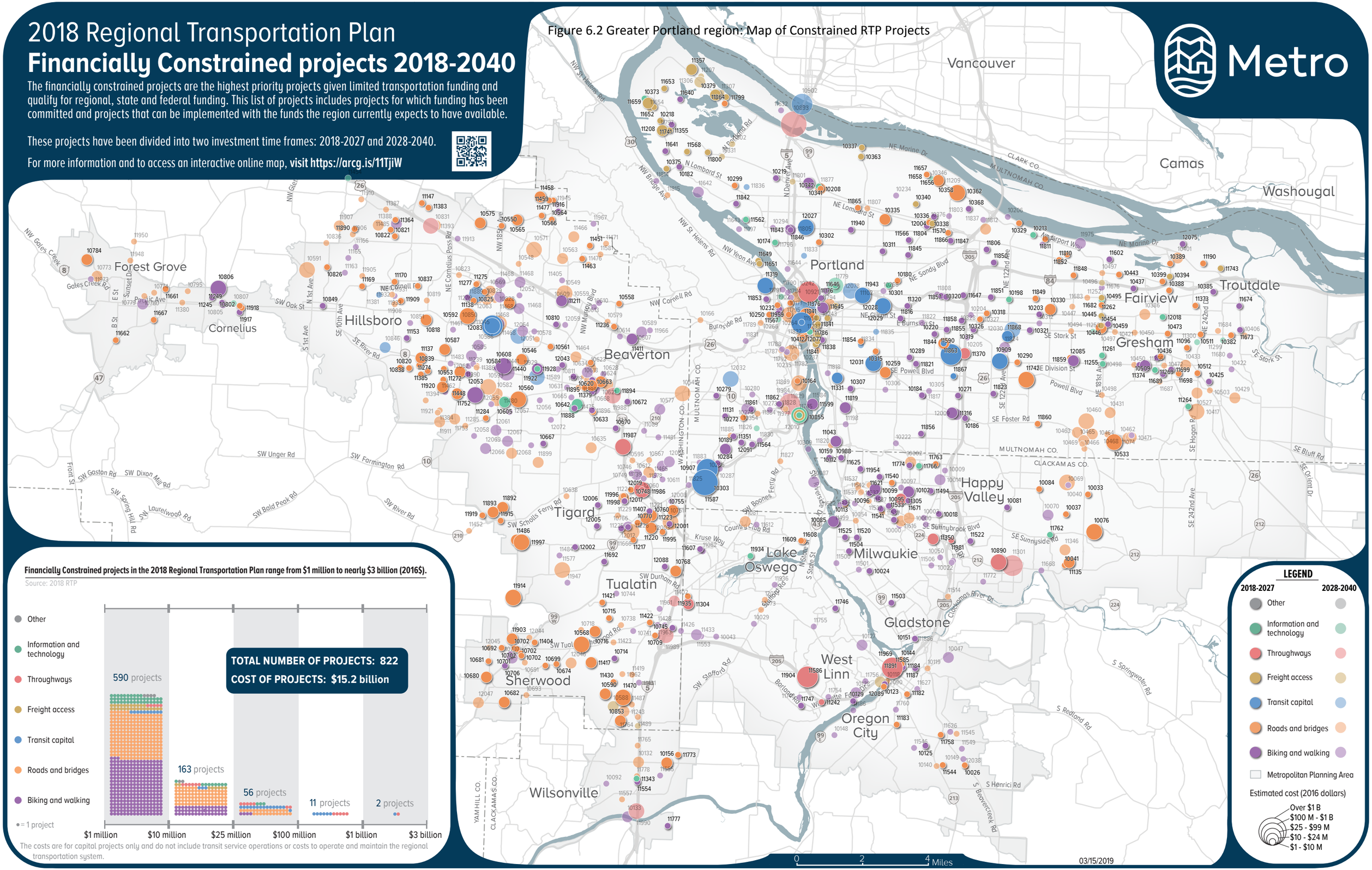
The financially constrained projects are the highest priority projects given limited transportation funding and qualify for regional, state and federal funding. This list of projects includes projects for which funding has been committed and projects that can be implemented with the funds the region currently expects to have available.

These projects have been divided into two investment time frames: 2018-2027 and 2028-2040.

For more information and to access an interactive online map, **visit https://arcg.is/11TjiW**

Figure 6.2 Greater Portland region: Map of Constrained RTP Projects

Metro



Financially Constrained projects in the 2018 Regional Transportation Plan range from $1 million to nearly $3 billion (2016$).

Source: 2018 RTP

TOTAL NUMBER OF PROJECTS: 822

COST OF PROJECTS: $15.2 billion

The costs are for capital projects only and do not include transit service operations or costs to operate and maintain the regional transportation system.

LEGEND

2018-2027	2028-2040
Other	
Information and technology	
Throughways	
Freight access	
Transit capital	
Roads and bridges	
Biking and walking	
Metropolitan Planning Area	

Estimated cost (2016 dollars)

Over $1 B
$100 M - $1 B
$25 - $99 M
$10 - $24 M
$1 - $10 M

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Projects and programs identified in the 2040 Strategic list are not described in this section because funding has not been identified. Refer to **Section 6.4** for costs by project type associated with the strategic list. The 2040 Strategic list of projects can be viewed in **Appendix C.**

Why the Constrained project list matters

In order to be eligible for federal or state transportation funding, a project must be included on the "Constrained" list and must be part of the planned regional transportation system.

The region's operations and maintenance commitment is significant and consumes the majority of federal, state, and local revenues identified for the greater Portland region through 2040 – an estimated $27 billion. The RTP Constrained list of capital projects represents another $15.2 billion in capital investment in the region's transportation system. A well-maintained, complete and efficient transportation system must meet multiple needs and offer options for people, goods and services to get around.

Defining terms

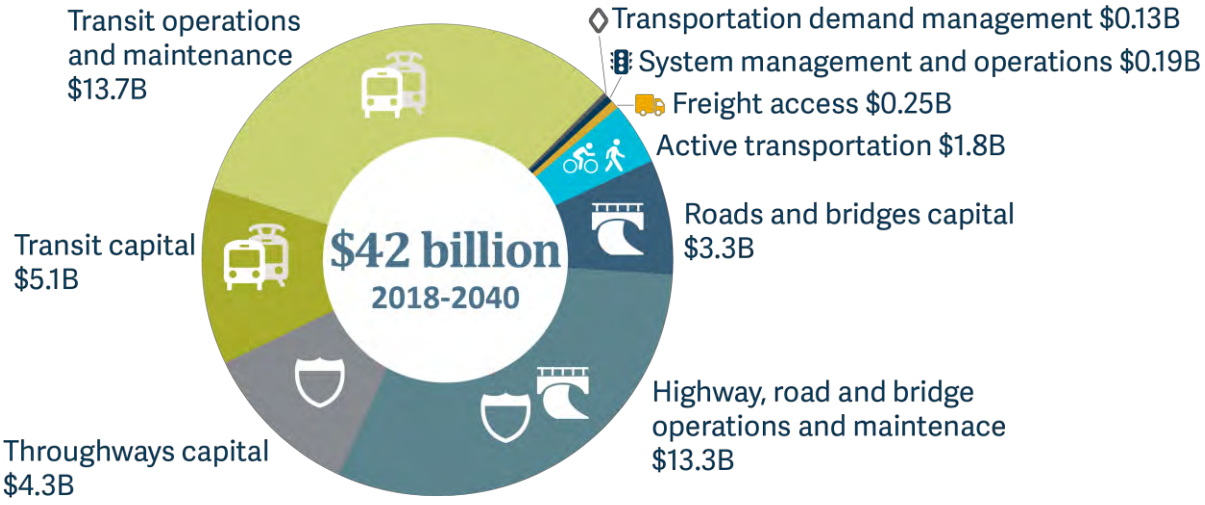
Constrained budget
The budget of federal, state and local funds the greater Portland region can reasonably expect through 2040 under current funding trends – presumes some increased funding compared to current levels

Constrained list
Projects that can built by 2040 within the constrained budget – makes up the federal constrained transportation plan

Strategic list
Additional priority projects that could be achieved with additional resources

Figure 6.3 shows the total estimated cost of the RTP Constrained list of capital projects and estimated operations and maintenance of the transportation system by investment category for the period 2018-2040.

Figure 6.3 Total estimated investment by 2040 (2016$)



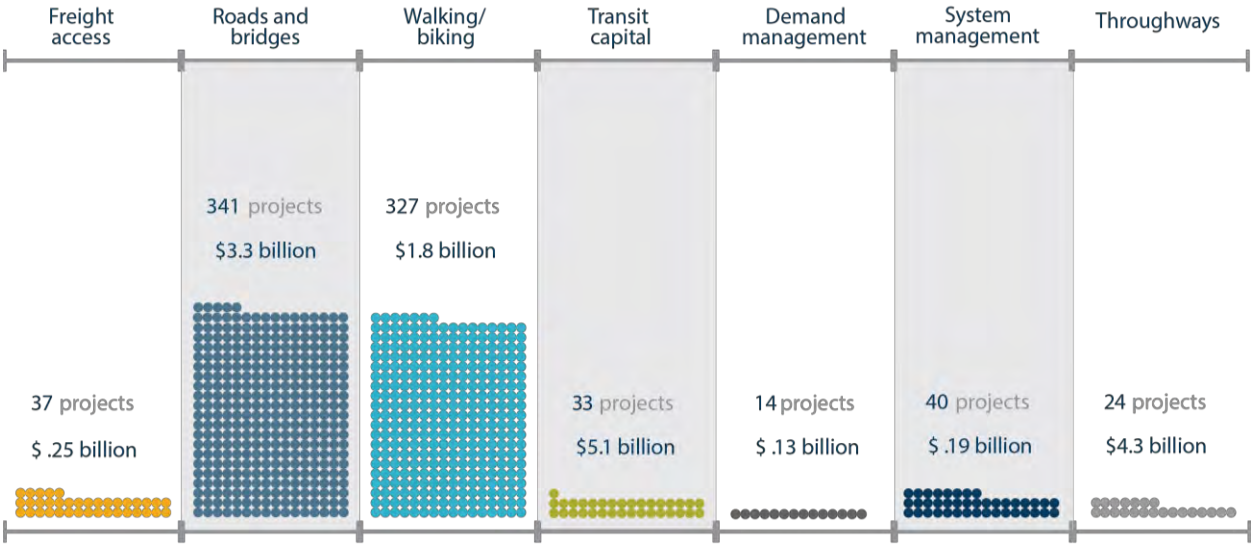
Source: 2018 RTP Financially Constrained Project List. Costs are in 2016 dollars and have been rounded.

The figures that follow show the breakdown of capital projects by cost and number for each investment category, for the region, for the City of Portland and for each of the three counties. A map of the location of all RTP constrained capital projects is also provided for the region, the City of Portland and each county.

Greater Portland region

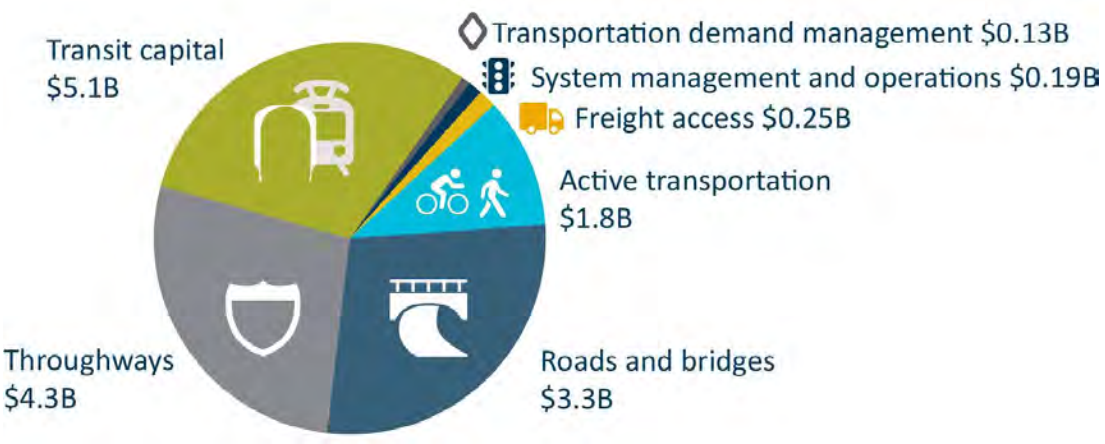
Figures 6.4 and 6.5 show RTP investments broken down by investment category. Roads, bridges, and walking and biking connections comprise the majority of projects in the Constrained RTP project list, though the cost of projects vary greatly.

Figure 6.4 Greater Portland region: Cost and number of Constrained RTP projects by investment category



Source: 2018 RTP Financially Constrained Project List. Costs are in 2016 dollars and have been rounded to the nearest hundred million. Road and transit operations and maintenance costs are not included in the information presented here.

Figure 6.5 Greater Portland region: Cost of Constrained RTP capital projects by investment category

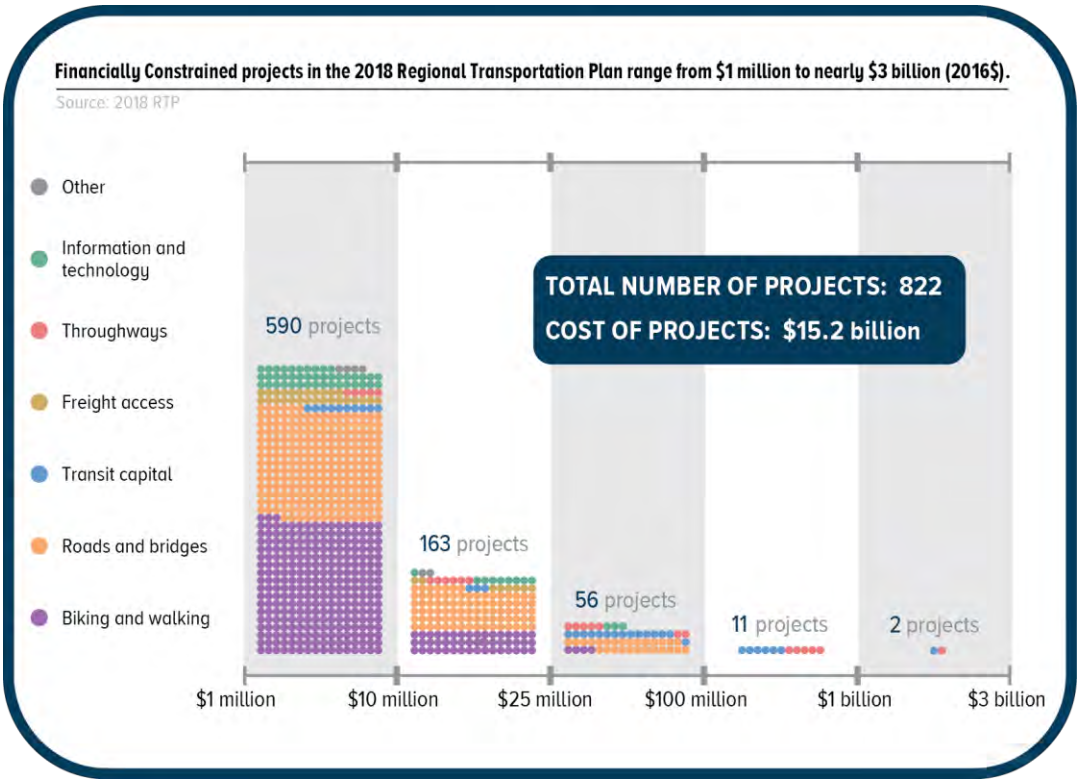


Source: 2018 RTP Financially Constrained Project List. Costs are in 2016 dollars and have been rounded. Road and transit operations and maintenance costs are not included in the information presented here.

Road and bridge projects include "complete street" reconstructions, arterial street connectivity and widening, and highway overcrossings provide mobility and access for all modes of travel. Some projects are also focused on improving access and mobility for national and international rail, air and marine freight to reach destinations within the region's industrial areas and to the regional throughway system. These projects are categorized as freight access investments. Strategic throughway capacity was added to maintain statewide mobility and access to industrial areas and intermodal facilities. Transit capital projects include high capacity transit extensions and implementing regional, corridor or spot-specific projects to improve speed and reliability of bus and streetcar service. Walking and biking projects fill important gaps in sidewalks, bikeways and trails to make biking and walking safe, convenient and accessible for all ages and abilities. 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 system efficiency in the region's major travel corridors.

Projects in the 2018 RTP Constrained list range from $1 million to nearly $3 billion as shown in **Figure 6.6**.

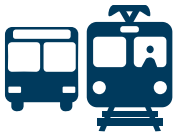
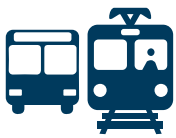
Figure 6.6 Greater Portland region: Cost range of Constrained RTP projects by investment category



Costs are in 2016 dollars and have been rounded. Road and transit operations and maintenance costs are not included in the information presented here.

Table 6.4 identifies the major throughway and transit projects in the RTP.

Table 6.4 Summary of major planned throughway and transit investments

	2027 Constrained	2040 Constrained *(2027 Constrained, plus)*	2040 Strategic *(2040 Constrained, plus)*
Throughways 	• I-5 Rose Quarter Improvement • OR 217 auxiliary lanes (NB and SB) • I-205 Stafford to OR 99E widening (SB) • I-205/Abernethy Bridge widening • OR 224 widening (third WB lane) • I-205 auxiliary lane (in Portland/Glen Jackson Bridge)	• I-5/Columbia River Crossing (with tolling as defined in adopted LPA) • Sunrise Project, Phase 2 • US 26 widening to Brookwood Road • I-5/Boone Bridge SB auxiliary lane • I-5 NB braided ramps from I-205 to Nyberg Road • OR 217 braided ramps • I-205 auxilliary lanes	• Sunrise Project, Phase 3 • I-5/OR 217 Interchange Phase 2 • OR 217 operational improvements and widening • OR 217 auxiliary lane from Denney to Scholls Ferry Road • I-5 auxiliary lanes
High Capacity Transit 	• Southwest Corridor Project • Division Transit Project • MAX Red Line Improvements Project • Central City Transit Capacity Analysis (*combined with Steel Bridge Transit Bottleneck*)	• Portland to Vancouver HCT • Steel Bridge Transit Bottleneck *(combined with Central City Transit Capacity Analysis)*	• HCT extension to Oregon City via McLoughlin Blvd. • HCT on I-205 (Clackamas to Bridgeport) • WES all-day service • WES extension to Salem • Sunset Highway HCT (Sunset Transit Center to Hillsboro Fairplex • HCT extension to Forest Grove
Enhanced Transit Corridors (ETC) 	• Streetcar upgrades on Grand Avenue in Portland • Central City Portals (downtown Portland bridges) • 82nd Avenue ETC (NE Killingsworth Street to SE Clatsop Street) • Powell Boulevard ETC (SE Portland to I-205) • 122nd Avenue ETC (Lents to Parkrose transit center) • Martin Luther King Jr. Boulevard ETC (Portland	• Inner North Portland ETC (Portland Central City to N Lombard Street) • Caesar Chavez ETC (Sandy to Powell) • Lombard Street ETC (St. Johns to MLK Jr. Boulevard) • SE Hawthorne/50th Avenue ETC (Willamette River to SE Powell) • Tualatin Valley Highway multimodal project (Maple Street to 160th Avenue) • Tualatin Valley Highway ETC from Beaverton to	• SE Powell Boulevard ETC • Lombard/Caesar Chavez ETC (St. Johns to Milwaukie town center) • Belmont Street ETC (Portland to Gateway transit center) • Streetcar on Martin Luther King Jr. Boulevard in NE Portland • Streetcar in AmberGlen in Hillsboro • Streetcar to Johns Landing in SW Portland

	2027 Constrained	2040 Constrained *(2027 Constrained, plus)*	2040 Strategic *(2040 Constrained, plus)*
	Central City to N Vancouver Boulevard) • Sandy Boulevard ETC (Portland Central City to Parkrose TC) • 82nd Avenue ETC (Swan Island to Clackamas town center) • Hawthorne Boulevard/Foster Road ETC (downtown Portland to Lents town center) • Streetcar to Montgomery Park in NW Portland	Forest Grove • Beaverton-Hillsdale Highway ETC from Portland to Washington Square • Cornell/Barnes ETC (Sunset transit center to Hillsboro TC) • 185th/Farmington Road ETC (PCC Rock Creek to Beaverton transit center) • E. Burnside/SE Stark Street ETC (Portland to Gresham) • Streetcar on NE Broadway to Hollywood town center	

*Projects marked in red have NEPA work under way or completed. See Chapter 8 (Section 8.3) for a summary of completed and current major project development activities in the region.

ODOT Projects

Figure 6.7 shows the cost of RTP investments submitted by ODOT broken down by investment category. Throughway projects comprise the majority of ODOT's capital projects in the Constrained RTP project list. See Section 6.3.14 for more information on region-wide road operations, maintenance and preservation costs.

Figure 6.7 ODOT: Cost and number of Constrained RTP capital projects by investment category



Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by ODOT. Road, bridge and throughway operations and maintenance costs are not included.

TriMet Projects

Figure 6.8 shows the cost of RTP transit capital and transit operating related capital investments submitted by the TriMet broken down by investment category. TriMet transit capital projects comprise the majority of TriMet's capital project costs in the Constrained RTP project list. See Section 6.3.14 for more information on region-wide transit operations and maintenance costs.

Figure 6.8 TriMet: Cost and number of Constrained RTP capital projects by investment category



Source: 2018 RTP Constrained Project List

Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by TriMet. Transit capital projects submitted by cities and counties and transit operations and maintenance costs are not included.

SMART Projects

Figure 6.9 shows the cost of RTP investments submitted by SMART broken down by investment category. SMART transit service and operations comprise the majority of SMART's projects in the Constrained RTP project list. See Section 6.3.14 for more information on region-wide transit operations and maintenance costs.

Figure 6.9 SMART: Cost and number of Constrained RTP capital projects by investment category



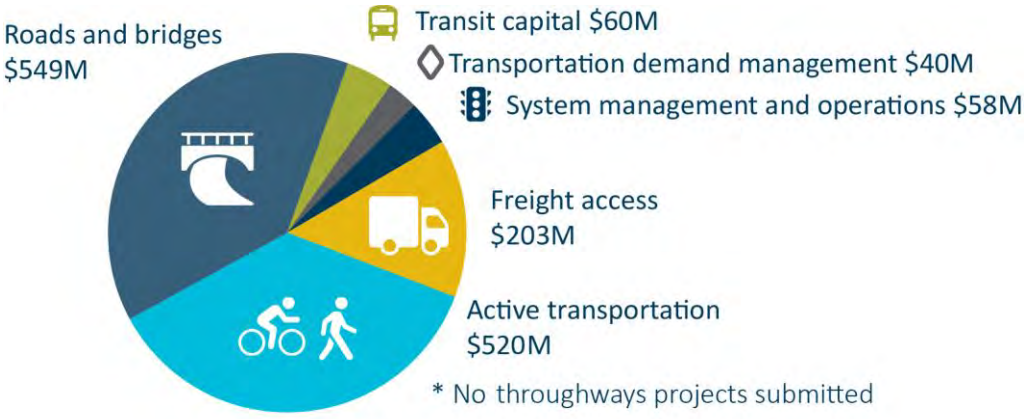
Source: 2018 RTP Constrained Project List

Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by SMART. Transit operations and maintenance costs are not included.

City of Portland Projects

Figures 6.10 and 6.11 show the cost and number of RTP investments submitted by the City of Portland and Port of Portland broken down by investment category. Roads, bridges, and walking and biking connections comprise the majority of projects in the Constrained RTP project list.

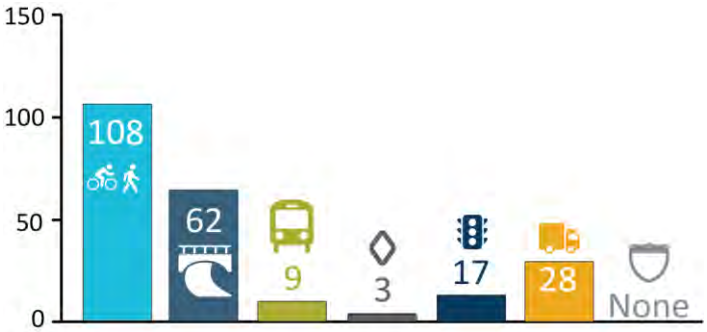
Figure 6.10 City of Portland: Cost of Constrained RTP capital projects by investment category



Source: 2018 RTP Constrained Project List

Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by the City of Portland and the Port of Portland. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.11 City of Portland: Number of Constrained RTP capital projects by investment category



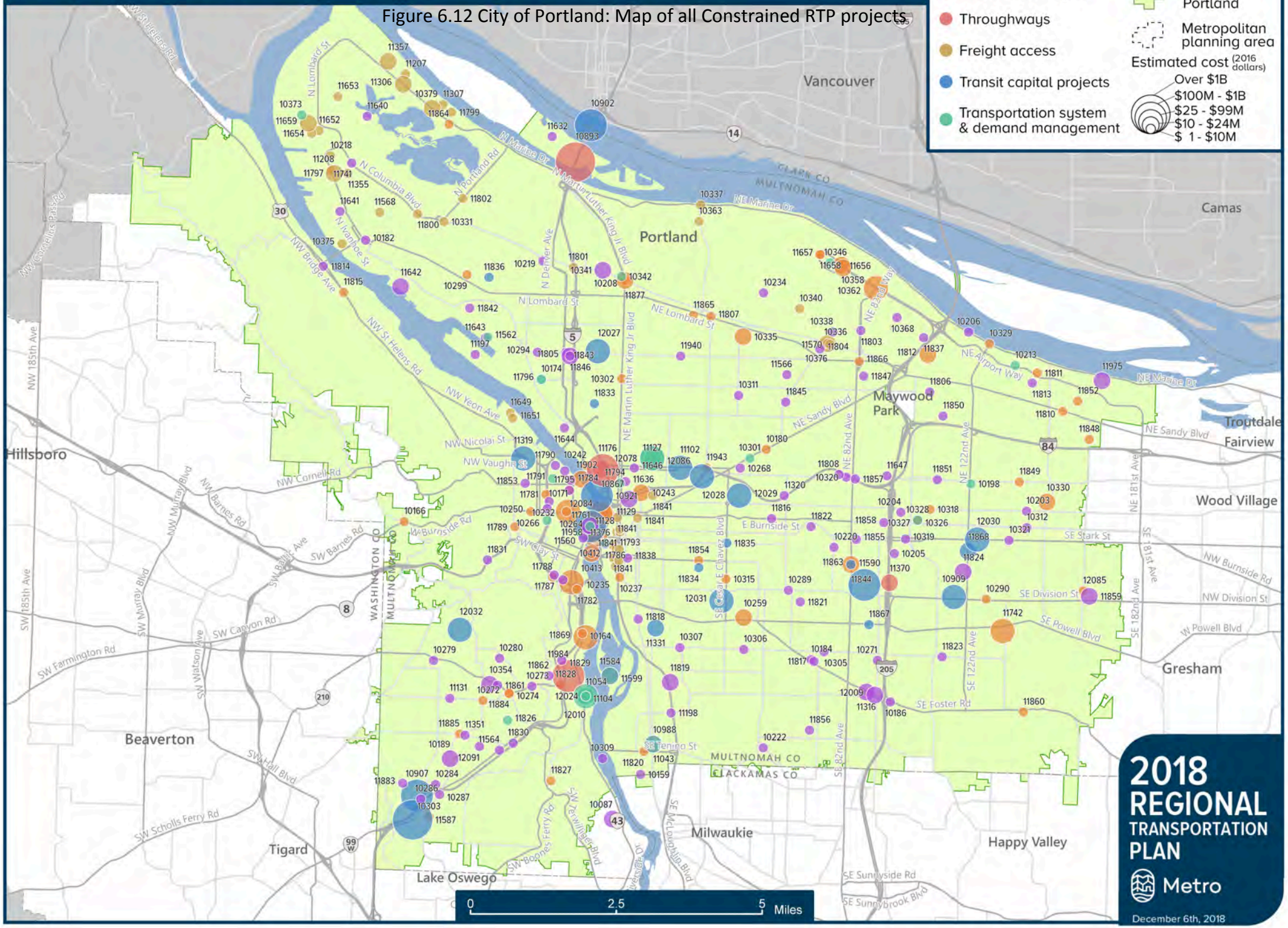
Source: 2018 RTP Constrained Project List

The information includes capital projects submitted by the City of Portland and the Port of Portland. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.12 shows the general location of all Constrained RTP projects located in the City of Portland. The map includes all capital projects submitted.

City of Portland Financially constrained projects

Figure 6.12 City of Portland: Map of all Constrained RTP projects



Clackamas County Projects

Figures 6.13 and 6.14 show the cost and number of RTP investments submitted by Clackamas County and its cities broken down by investment category. Roads, bridges, and walking and biking connections comprise the majority of projects in the Constrained RTP project list.

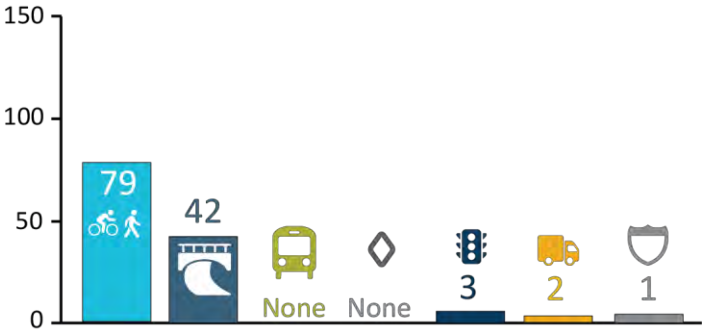
Figure 6.13 Clackamas County: Cost of Constrained RTP capital projects by investment category



Source: 2018 RTP Constrained Project List

Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by Clackamas County and cities in Clackamas County. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.14 Clackamas County: Number of Constrained RTP capital projects by investment category



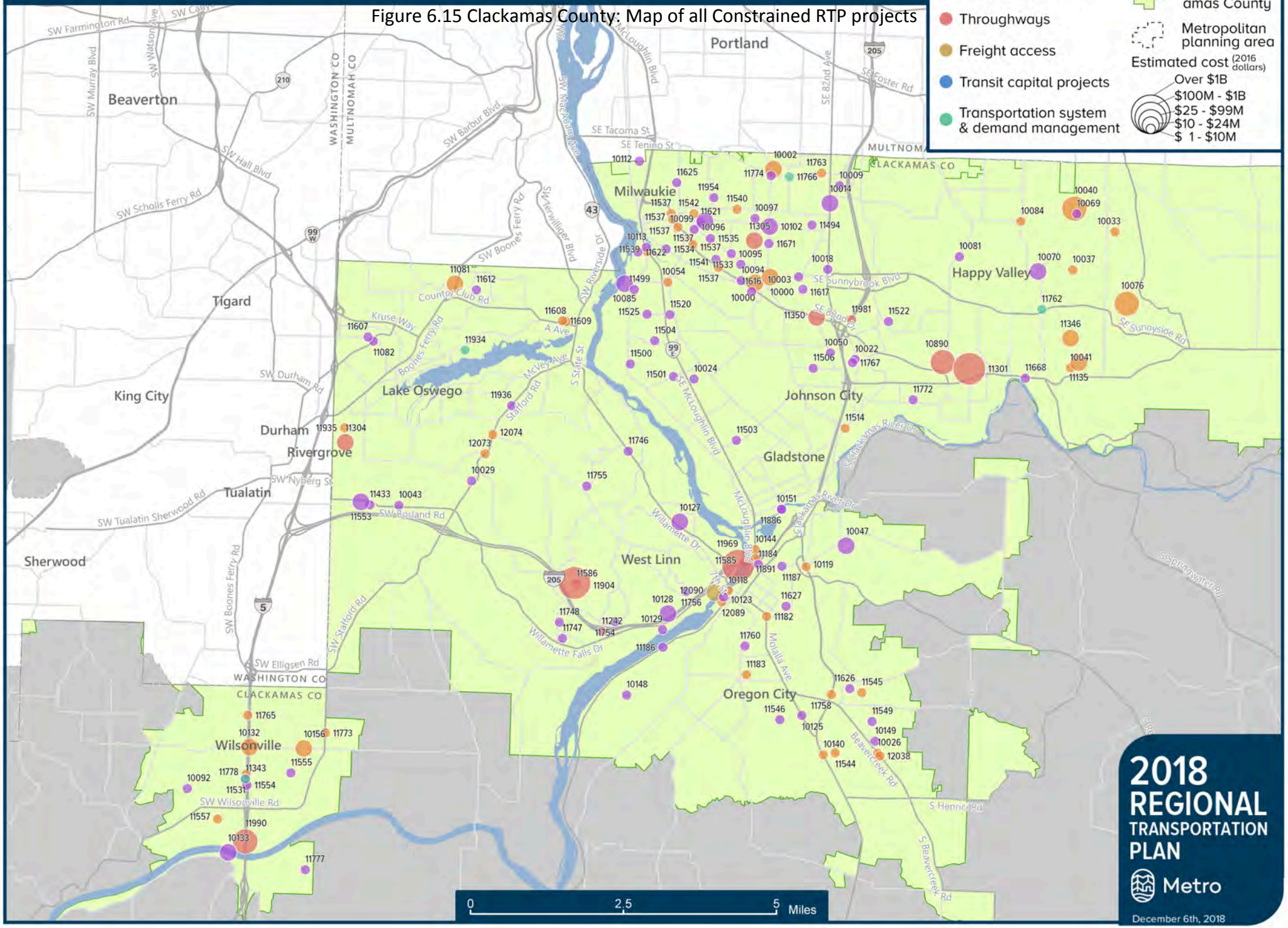
Source: 2018 RTP Constrained Project List

The information includes capital projects submitted by Clackamas County and cities in Clackamas County. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.15 shows the general location of all Constrained RTP projects located in Clackamas County. The map includes all capital projects submitted.

Urban Clackamas County Financially constrained projects

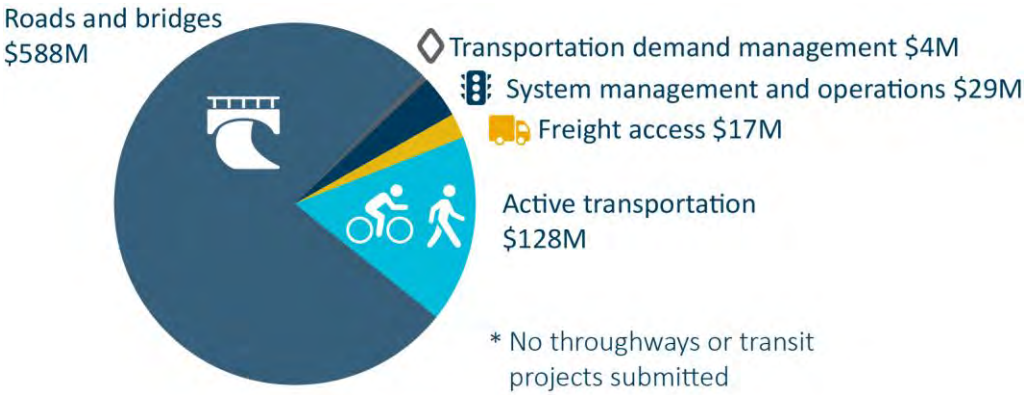
Figure 6.15 Clackamas County: Map of all Constrained RTP projects



East Multnomah County Projects

Figures 6.16 and 6.17 show the cost and number of RTP investments submitted by Multnomah County and its cities (except Portland) broken down by investment category. Roads and bridges projects comprise a majority of costs and number of projects due in large part to the County's six Willamette River bridges.

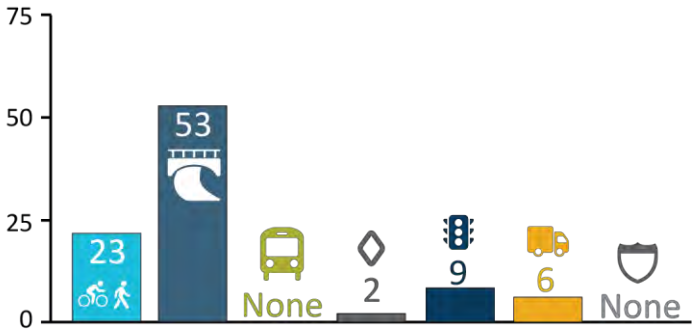
Figure 6.16 East Multnomah County: Cost of Constrained RTP capital projects by investment category



Source: 2018 RTP Constrained Project List

Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by Multnomah County and cities in Multnomah County (except for the city of Portland). Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.17 East Multnomah County: Number of Constrained RTP capital projects by investment category



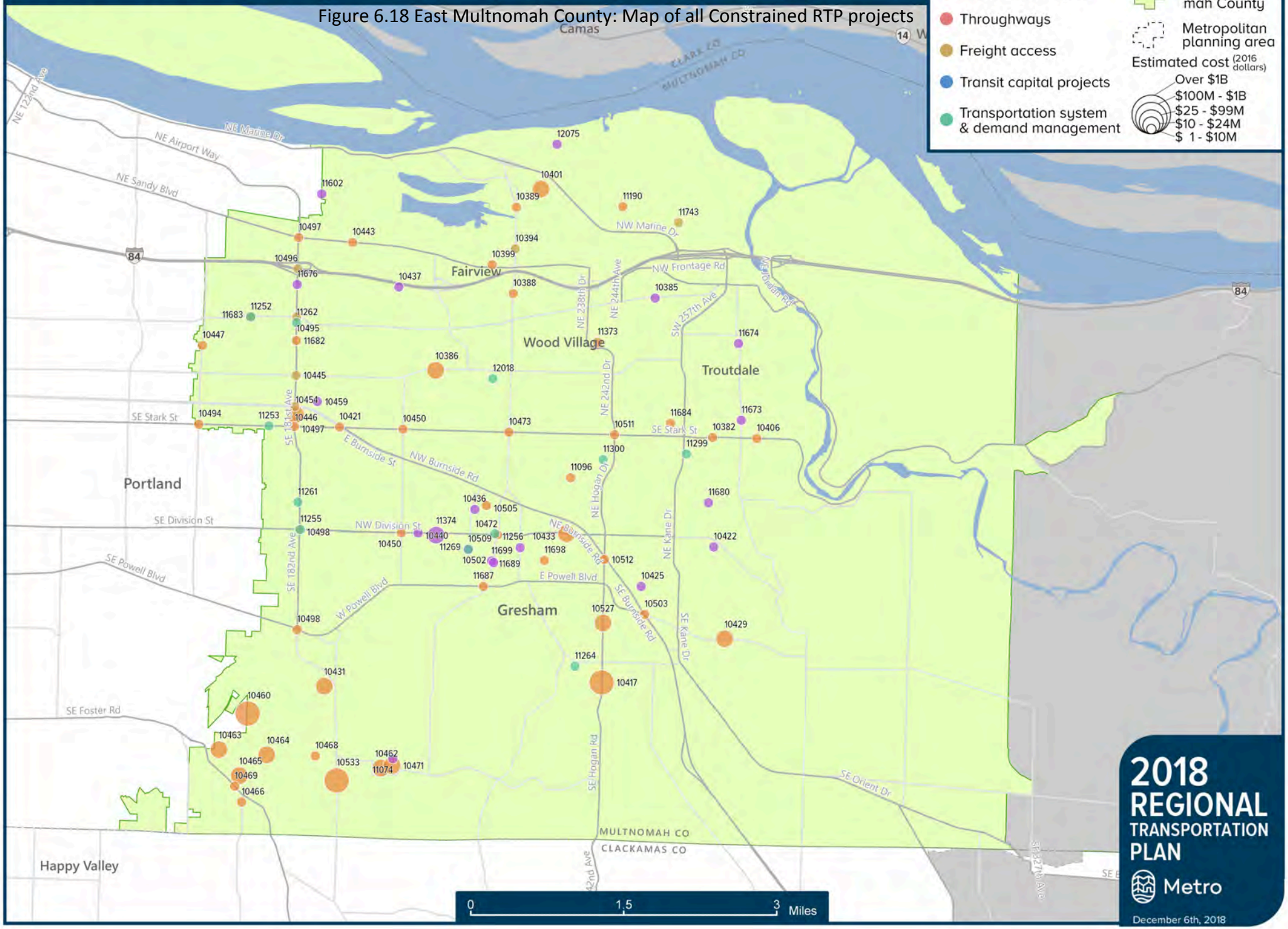
Source: 2018 RTP Constrained Project List

The information includes capital projects submitted by Multnomah County and cities in Multnomah County (except for the city of Portland). Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.18 shows the general location of all Constrained RTP projects located in Multnomah County. The map includes all capital projects submitted.

East Multnomah County Financially constrained projects

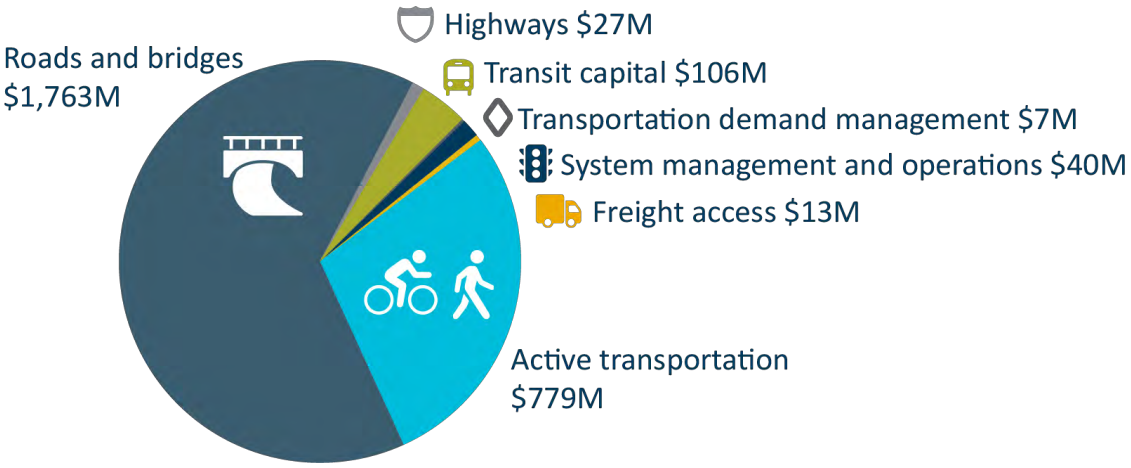
Figure 6.18 East Multnomah County: Map of all Constrained RTP projects



Washington County Projects

Figures 6.19 and 6.20 show the cost and number of RTP investments submitted by Washington County and its cities broken down by investment category. Roads, bridges, and walking and biking connections comprise the majority of projects in the Constrained RTP project list.

Figure 6.19 Washington County: Cost of Constrained RTP capital projects by investment category



Costs are in 2016 dollars and have been rounded. The information includes capital projects submitted by Washington County and cities in Washington County. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.20 Washington County: Number of Constrained RTP capital projects by investment category



Source: 2018 RTP Constrained Project List

The information includes capital projects submitted by Washington County and cities in Washington County. Capital projects submitted by ODOT, TriMet and SMART as well as road and transit operations and maintenance costs are not included.

Figure 6.21 shows the general location of all Constrained RTP projects located in Washington County. The map includes all capital projects submitted.

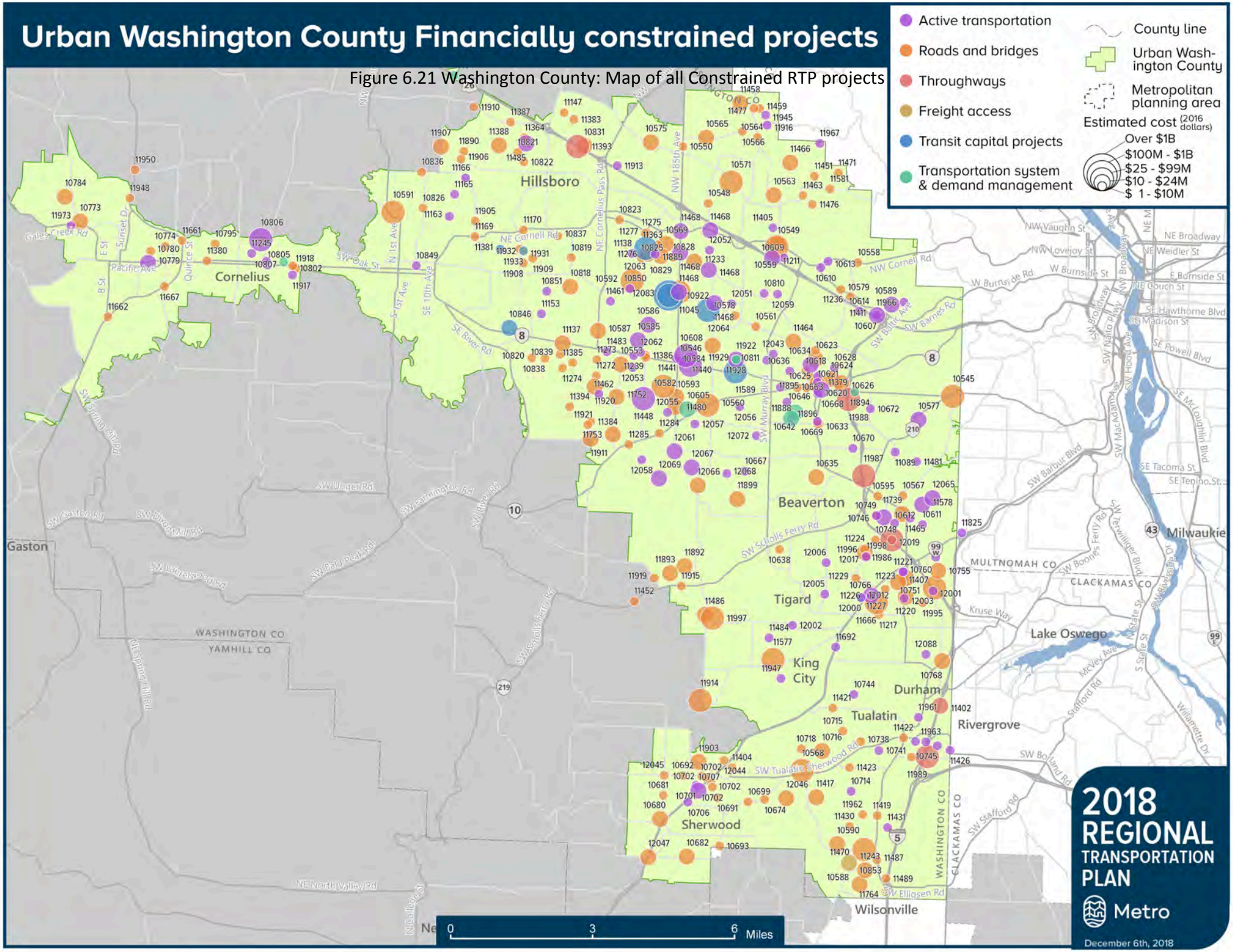


Figure 6.21 Washington County: Map of all Constrained RTP projects

6.3.3 Transit capital projects and planned service

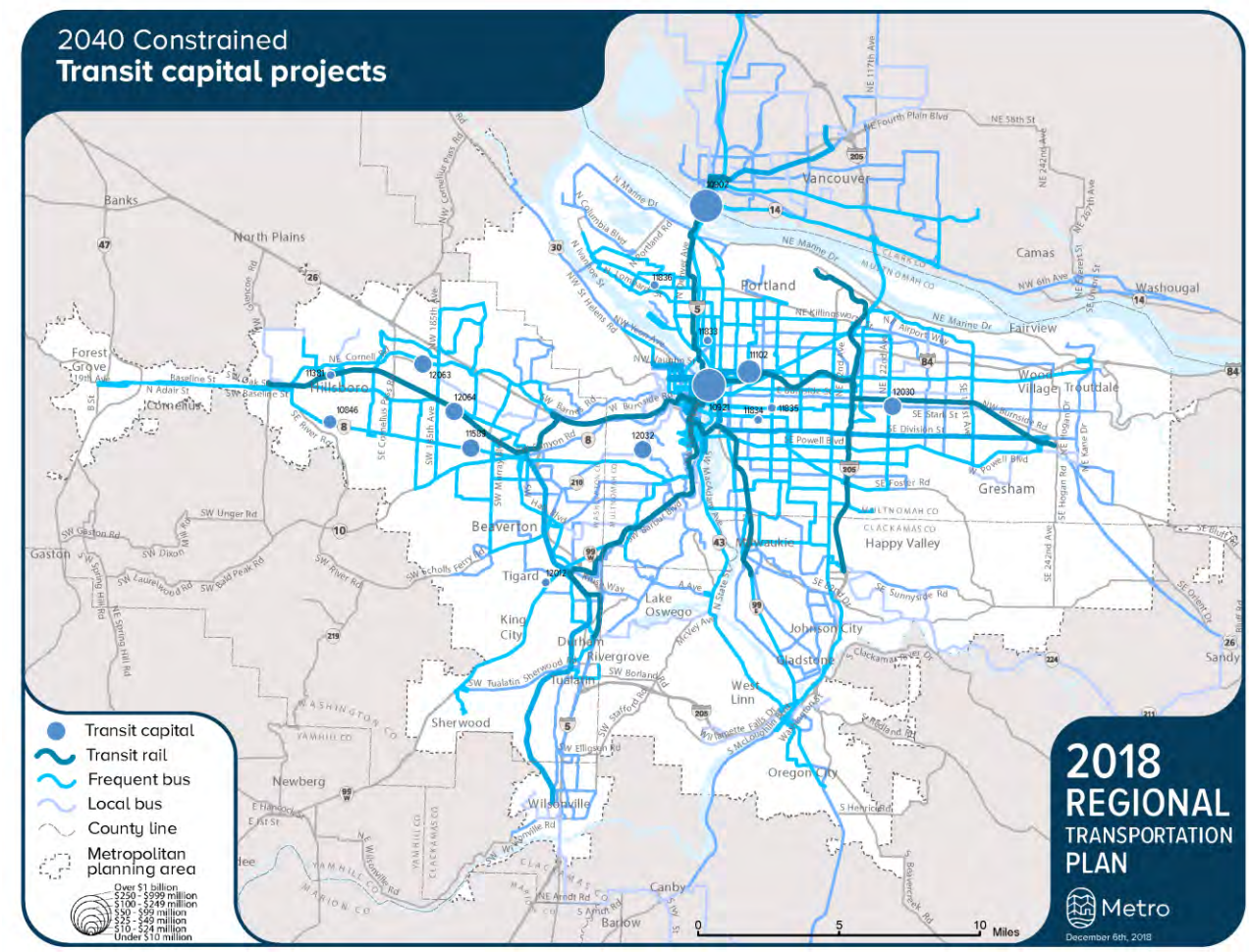
Transit investments make up about one-third of the total cost of the Constrained RTP project list $5.1 billion out of $15.2 billion. As shown in **Table 6.5**, transit capital projects in the 2040 Constrained project list include several enhanced transit corridors and high capacity transit projects. See **Table 6.4** for a listing of major transit capital projects in the RTP.

Table 6.5 Summary of Constrained RTP transit capital projects and planned service

Transit capital projects	C10 2018–2027	C 2040 2018–2040
Number of transit capital projects	18	33
Number of transit capital projects on a high injury corridor	14	26
Daily revenue hours (TriMet and SMART only; excludes C-TRAN)	8,100	9,500
Service expansion	38% increase from 2015	60% increase from 2015
New high capacity transit connections	4 HCT projects, including Division Transit, Southwest Corridor, Red Line extension and the Central City Capacity Analysis	2 additional HCT projects (from 2027 Constrained): HCT connecting Portland to Vancouver, WA, and Steel Bridge improvements
Other service enhancements	9 enhanced transit projects and 1 streetcar extension to Montgomery Park	10 additional enhanced transit projects and 1 streetcar extension to Hollywood (from 2027 Constrained)
Public and private shuttles	More major employers and some community-based organizations work with TriMet to operate shuttles	More major employers and some community-based organizations work with TriMet to operate shuttles
Fares	Reduced fares provided to youth, older adults, people with disabilities and low-income families	Reduced fares provided to youth, older adults, people with disabilities and low-income families
Estimated capital cost in 2016 dollars	**$3.2 billion**	**$5.1 billion**

Figure 6.22 shows the general location of Constrained RTP transit capital projects and planned service.

Figure 6.22 Greater Portland region: Map of Constrained RTP transit capital projects and planned service



6.3.4 Throughway projects

Maintenance and efficient operation of the existing throughway system is critical. Keeping throughways in good repair and using information and technology to manage travel demand and traffic flow help improve safety and boost efficiency of the existing system. With limited funding, more effort is being made to maximize system operations prior to building new capacity in the region. Building a connected roadway network will also preserve the throughway system for longer-distance, freight and transit trips.

Adding lane miles to relieve congestion is an expensive approach and will not solve congestion on its own. However, targeted widening of roads and throughways, along with connectivity and

system and demand management strategies, can help connect goods to market and support travel across the region.

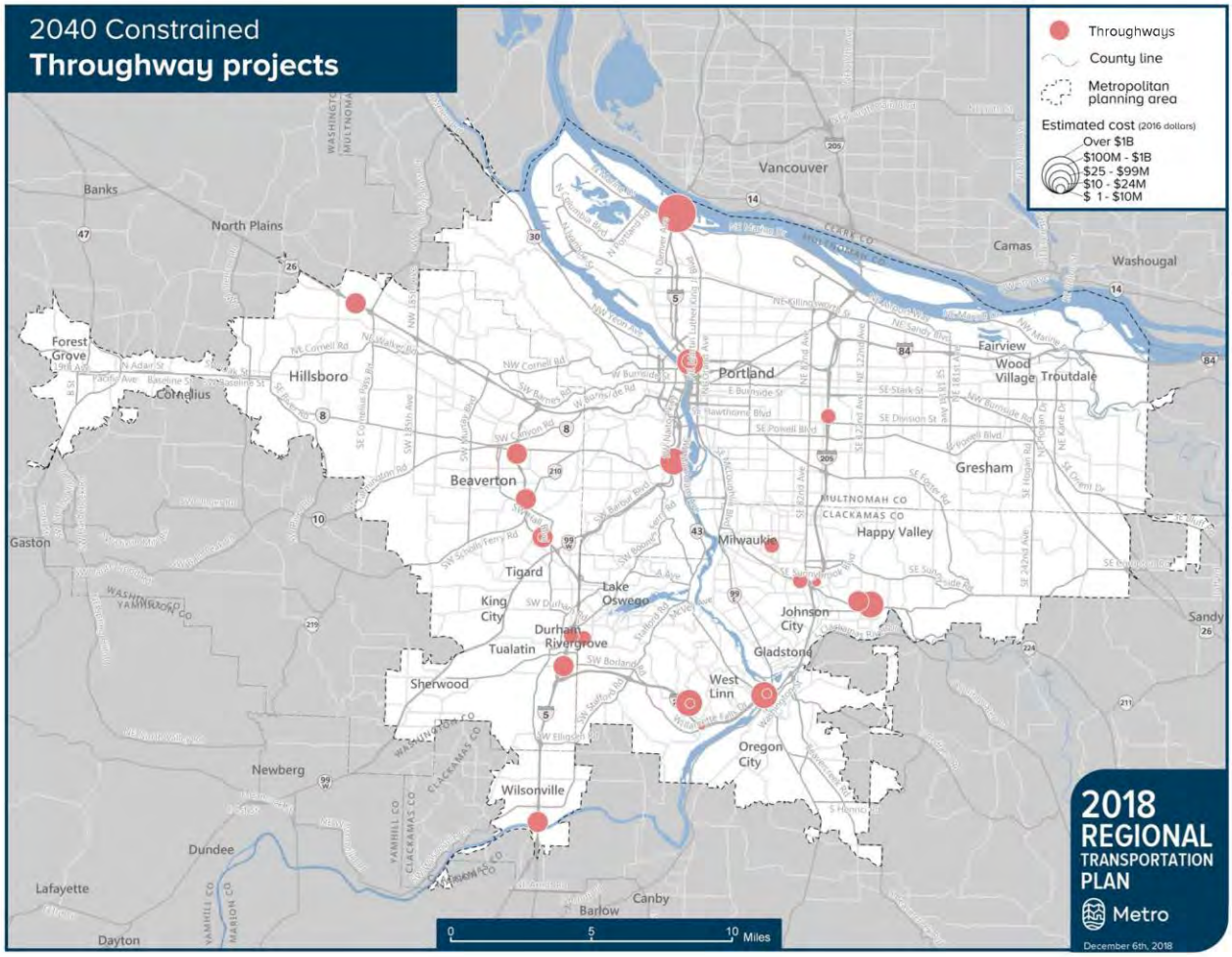
Throughway projects comprise about 3 percent of the total number of capital projects in the Constrained RTP list of projects. Strategic throughway capacity was added to maintain regional mobility and enhance access to industrial areas and intermodal facilities where goods move from one transportation mode to another. **Table 6.6** lists some of the major throughway capital projects in the 2040 constrained list. See **Table 6.4** for a listing of all major throughway projects in the RTP.

Table 6.6 Summary of Constrained RTP throughway projects

Throughway projects	C10 2018–2027	C 2040 2018–2040
Number of throughway projects	16	24
Number of throughway projects with safety benefit	4	7
Number of throughway projects on high injury corridor	13	19
Throughway capacity (including auxiliary lanes)	27 new lane miles	50 new lane miles
New major throughway capacity	I-5 Rose Quarter, I-205 widening, I-205/Abernethy Bridge, OR 217 auxiliary lanes (NB and SB)	I-5 Columbia River Crossing, Sunrise Project Phase 2
Estimated capital cost in 2016 dollars	**$1.1 billion**	**$4.3 billion**

Figure 6.23 shows the general location of Constrained RTP throughway projects.

Figure 6.23 Greater Portland region: Map of Constrained RTP throughway projects



6.3.5 Roads and bridges projects

Nearly 45 percent of all trips in the region made by car are less than three miles, and 15 percent are less than one mile, based on the 2011 Oregon Household Activity Survey. When road networks lack multiple routes serving the same destinations, short trips must use major travel corridors designed for freight and regional traffic, adding to congestion.

There are three key ways to make roads and bridges safe, reliable and connected for people walking, driving, biking and taking transit:

1. **Maintenance and efficient operation of the existing road system.** Keeping the road system in good repair and using information and technology to manage travel demand and traffic flow help improve safety and boost efficiency of the existing system. With limited funding, more effort is being made to maximize system operations prior to building new capacity in the region.

2. **Street connectivity and complete streets.** Building a well-connected network of complete streets including new local and major street connections shortens trips, improves overall network efficiency, improves access to community and regional destinations, and helps preserve the capacity and function of highways in the region for freight and longer trips. These connections include designs that support walking and biking and, in some areas, provide critical freight access between industrial areas, intermodal facilities and the interstate highway system.

3. **Network expansion.** Adding lane miles to relieve congestion is an expensive approach and will not address growing congestion on its own. However, targeted widening of roads and throughways, along with connectivity and system and demand management strategies, can help connect goods to market and support travel in growing areas and across the region.

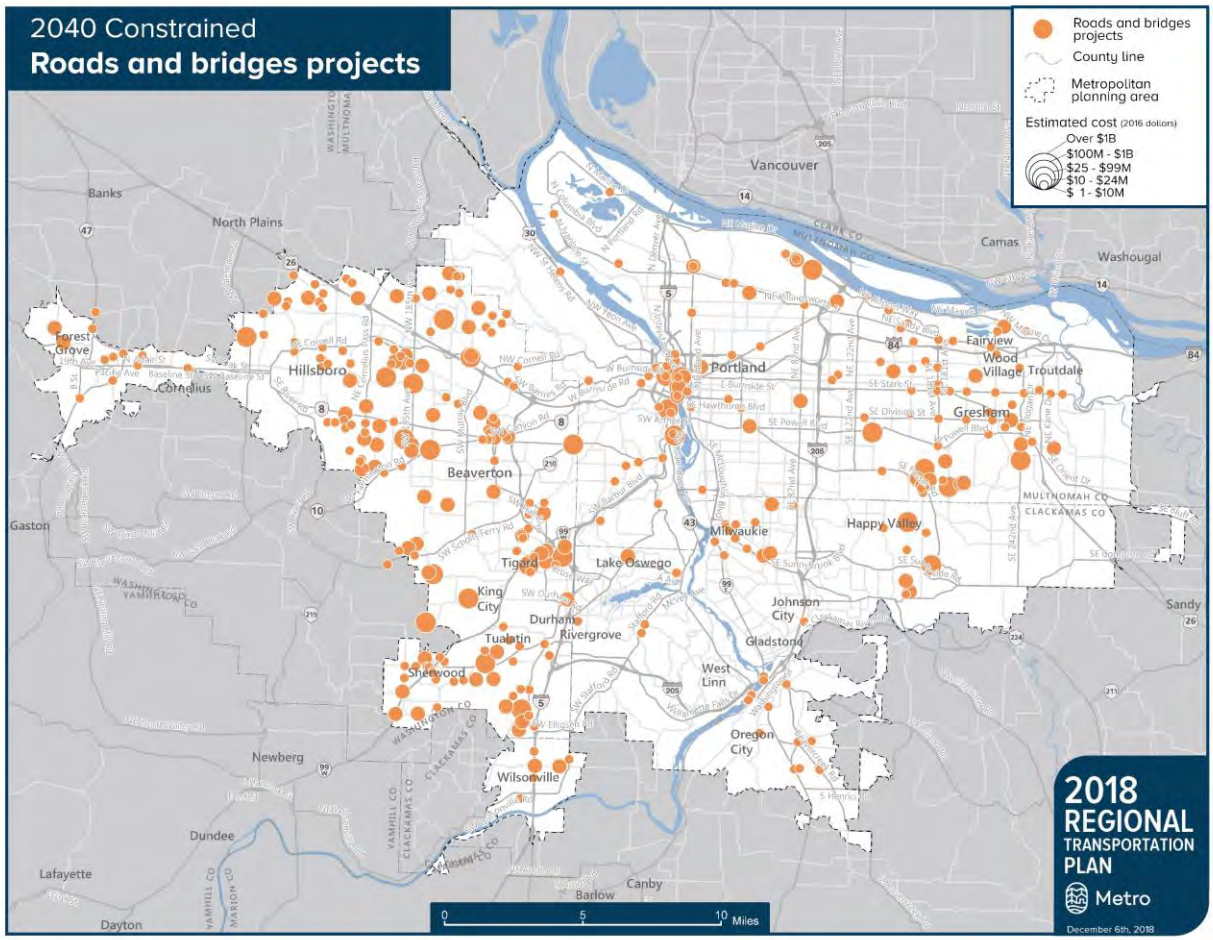
As shown in **Table 6.7**, road and bridges projects comprise about 41 percent of the total number of capital projects in the Constrained RTP list of projects. Road and bridge capital projects include arterial street expansions, "complete street" reconstructions that are complemented by new arterial connections and highway overcrossings to provide mobility and access for all modes of travel.

Table 6.7 Summary of Constrained RTP roads and bridges projects

Roads and bridges capital projects	C10 2018–2027	C 2040 2018–2040
Number of roads and bridges projects	177	341
Number of roads and bridges projects with a safety benefit	102	184
Number of roads and bridges projects on a high injury corridor	105	195
Arterial roadway capacity	167 new lane miles	289 new lane miles
Examples of bridge and new major arterial capacity projects	Tualatin-Sherwood Road, Farmington Road, Sunnyside Road east extension, Basalt Creek Parkway, Willamette River bridges rehabilitation	Earthquake Ready Burnside Bridge, 172nd-190th connector, Rock Creek Blvd., Scholls Ferry Road, Willamette River bridges rehabilitation
Estimated capital cost in 2016 dollars	**$1.6 billion**	**$3.3 billion**

Figure 6.24 shows the general location of Constrained RTP roads and bridges projects.

Figure 6.24 Greater Portland region: Map of Constrained RTP roads and bridges projects



6.3.6 Freight access projects

The greater Portland region is the trade and transportation gateway for Oregon and provides market access for many southwest Washington businesses. Our prosperity is directly tied to the investments we make in our transportation system, including the region's freight infrastructure. These investments make consumer goods readily available to us; provide air, ship, rail and road systems that help our businesses efficiently reach global and domestic marketplaces; and create family-wage jobs across the region.

Freight access projects in the Constrained RTP project list are focused on:

- **Freight reliability and safety.** Facilitate the safe, reliable and efficient movement of goods by better utilizing existing road and freight rail infrastructure and capacity, separating freight traffic from other modes to increase safety and minimize conflicts, and strategically investing in the regional freight network to eliminate road and rail bottlenecks that create serious freight congestion.

- **Freight network connectivity.** Provide shippers with the ability to transfer freight seamlessly between different modes of transportation, as well as efficient access to local freight clusters and delivery points and regional, domestic and global markets.
- **Intermodal freight facilities and connectors.** Invest in intermodal facilities and freight intermodal connectors (e.g., reload facilities, marine ports, rail yards, freight access roads, etc.) that reduce highway demand for freight.
- **Smart technology.** Make use of intelligent transportation systems and emerging technologies to improve traffic flow along goods movement corridors.

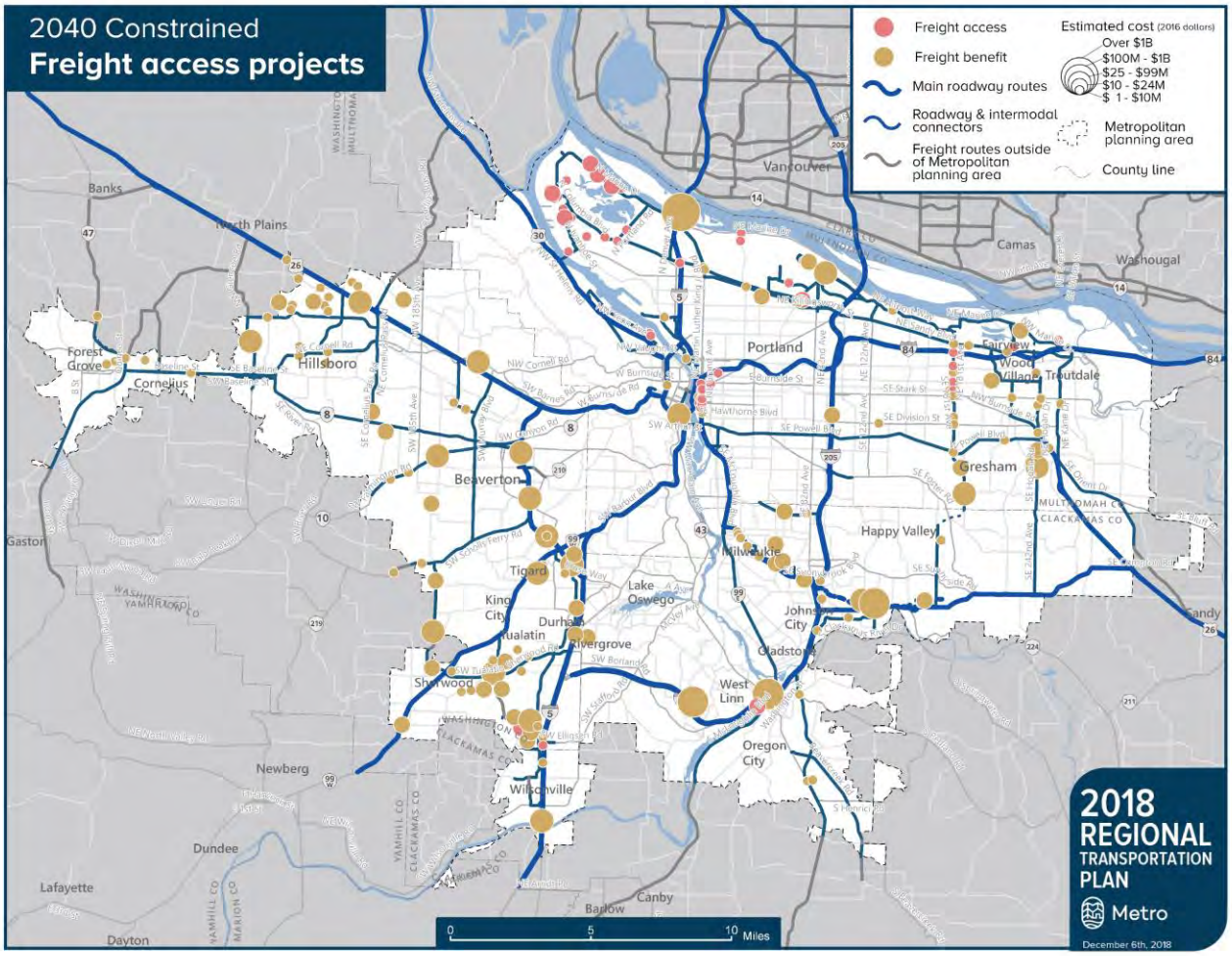
As shown in **Table 6.8**, freight access projects comprise about seven percent of the total number of capital projects in the Constrained RTP list of projects.

Table 6.8 Summary of Constrained RTP freight access projects

Freight access projects	C10 2018–2027	C 2040 2018–2040
Number of freight access projects	25	37
Number of freight access projects with a safety benefit	8	12
Number of freight access projects on a high injury corridor	10	14
Freight network lane miles	61	105
New major freight access capacity projects	Airport Way and 82nd Avenue interchange, Rivergate Blvd. overcrossing, T4 modernization, Marine Drive Improvement Phase 2	Cully Blvd. Grade separation, Columbia Blvd Rail Bridge, Going/Greeley Interchange
Estimated capital cost in 2016 dollars	**$156 million**	**$254 million**

Figure 6.25 shows the general location of Constrained RTP freight access projects.

Figure 6.25 Greater Portland region: Map of Constrained RTP freight access projects



6.3.7 Active transportation projects

Active transportation investments have become a growing focus around the region. Active transportation is considered non-motorized forms of transportation including walking and biking. Making it safe and convenient to walk, ride a bicycle and get to public transit benefits people and the environment in multiple ways. Active transportation is good for business, household pocket books, clean air and water, public health and safe streets.

Approximately 45 percent of all trips made by car in the region are less than three miles and 15 percent are less than one mile, according to the 2011 Oregon Household Activity Survey. With complete walking and biking routes supported by education and incentives, many of the short trips made by car today could be replaced by walking and biking.

RTP active transportation projects focus on four key ways to make biking and walking safe and convenient for people of all ages and abilities in our region:

1. **Fill the gaps.** Completing missing sidewalks, pedestrian crossings, bikeways and multi-use paths creates complete streets and better connectivity; removes barriers; adds routes across highways, railroads and waterways; makes high injury locations safer; and shortens trip distances and travel time.

2. **Design for safety.** Designing bikeways and walking routes with greater separation and buffers from traffic increases safety and reduces the risk of traffic deaths. Making it safer for people walking and biking makes travel safer for all modes.

3. **Meet the demand.** Upgrading high demand bikeways and walking routes and prioritizing active travel in high demand areas provides reliable travel options in congested corridors, reduces the need to drive and increases livability.

4. **Safe Routes to School.** Providing programs and safe walking and biking routes to schools is proven to reduce driving trips and create healthy options for kids.

As shown in **Table 6.9**, active transportation investments comprise about 40 percent of the total number of capital projects in the Constrained RTP list of projects.

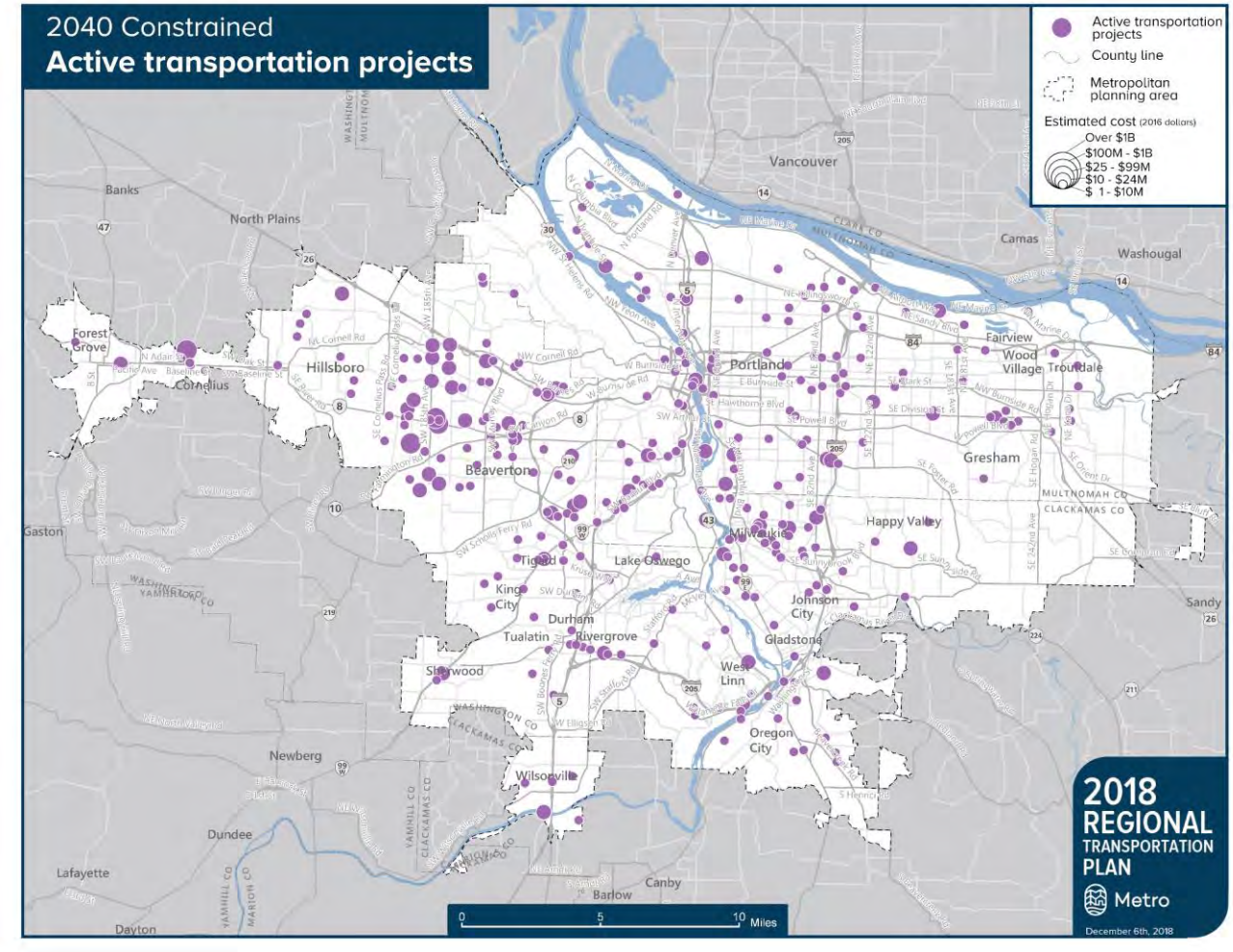
Table 6.9 Summary of Constrained RTP active transportation projects

Active transportation capital projects	C10 2018–2027	C 2040 2018–2040
Number of active transportation projects	157	327
Number of active transportation projects with a safety benefit	151	319
Number of active transportation projects on a high injury corridor	96	186
Sidewalk, bikeway and trail projects*	183 miles added	412 miles added
Examples of active transportation projects	Aloha-Reedville pedestrian Improvements, Council Creek Regional Trail, Division-Midway Connected Centers project, Westside Trail US 26 bridge crossing, Milwaukie Monroe Street Neighborhood Greenway	Lake Oswego to Portland Trail, Reedway bike/pedestrian overcrossing, Washington County pedestrian arterial crossings, East-Buttes Loop Trail
Estimated capital cost in 2016 dollars	**$790 million**	**$1.8 billion**

* This does not include miles of sidewalk and bikeways added by projects in other investment categories.

Figure 6.26 shows the general location of Constrained RTP active transportation projects.

Figure 6.26 Greater Portland region: Map of Constrained RTP active transportation projects



6.3.8 Transportation system management and operations projects

Using technology to actively manage the greater Portland region's transportation system means using intelligent transportation systems and services to reduce vehicle idling associated with delay and help improve the speed and reliability of transit. Nearly half of all congestion is caused by incidents and other factors that can be addressed using these strategies.

Local, regional and state agencies work together to implement transportation system technologies. Agreements between agencies guide sharing of data and technology, operating procedures for managing traffic, and the ongoing maintenance and enhancement of technology, data collection and monitoring systems.

RTP transportation system management and operations projects are focused on:

- **Arterial corridor management.** Advanced technology at each intersection actively manages traffic flow. This includes coordinated or adaptive signal timing; advanced signal operations

such as cameras, flashing yellow arrows, bike signals and pedestrian count down signs; and communication to a local traffic operations center and the centralized traffic signal system.

- **Freeway corridor management.** Advanced technology manages access to the freeways, detects traffic levels and weather conditions, provides information with message signs and variable speed limit signs, and deploys incident response patrols that quickly clear breakdowns, crashes and debris. These tools connect to a regional traffic operations center.
- **Traveler information.** Variable message and speed limit signs and 511 internet and phone services provide travelers with up-to-date information regarding traffic and weather conditions, incidents, travel times, alternate routes, construction and special events.

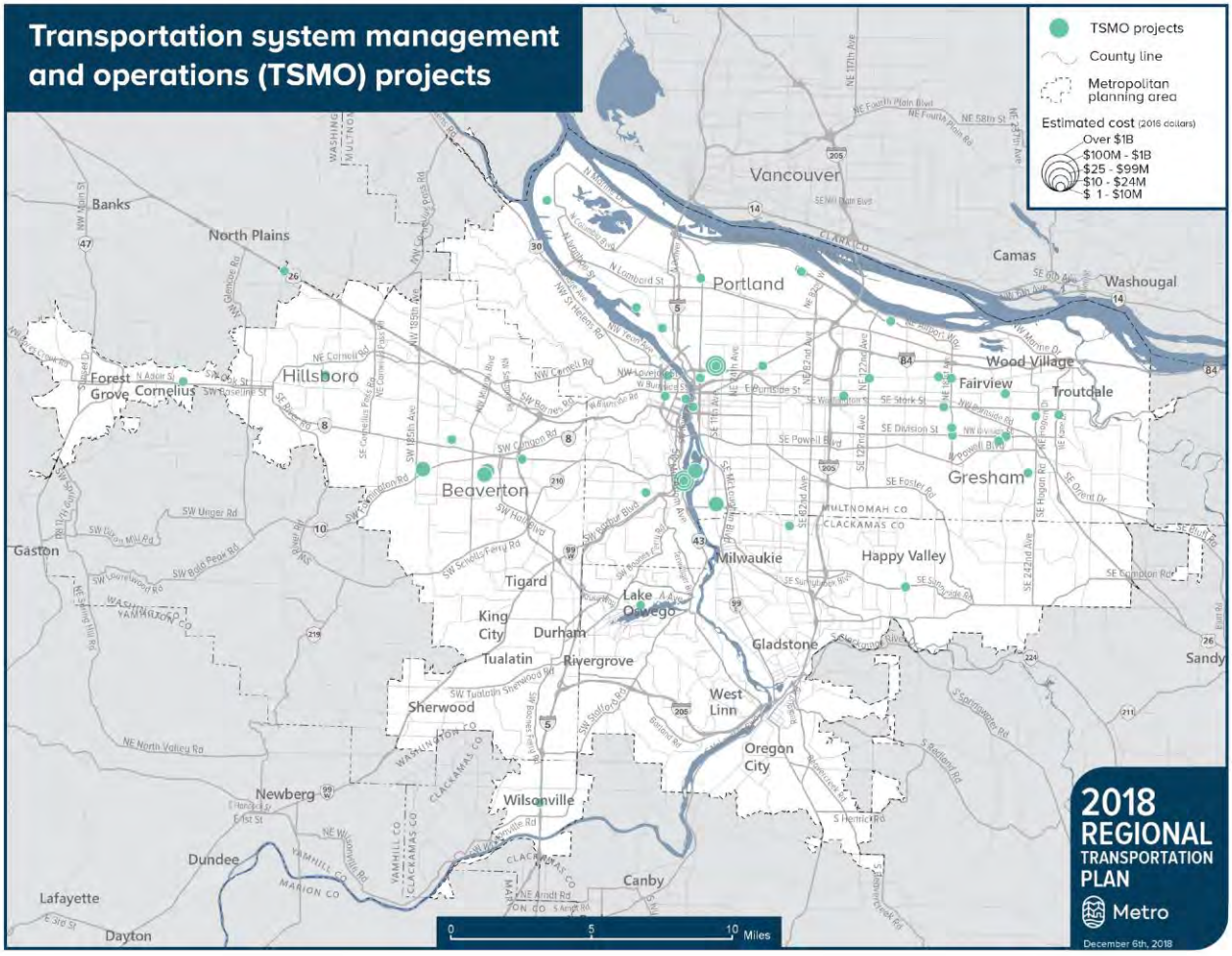
As shown in **Table 6.10**, transportation system management and operations (TSMO) represent 5 percent of the total number of capital projects in the Constrained RTP list of projects.

Table 6.10 Summary of Constrained RTP transportation system management and operations projects

Transportation system management and operations projects	C10 2018–2027	C 2040 2018–2040
TSMO Projects	20	40
Provide for real-time and forecasted traveler information	Information on current travel conditions and alerts are available to the public and third party developers	Current Conditions data is used by operators to forecast changing travel conditions
Multimodal integrated corridor management	Agencies integrate operations strategies in a few of the region's major travel corridors	Agencies integrate operations strategies in some of the region's major travel corridors
Advanced traffic signal operations	Traffic signals are interconnected in some industrial areas and major travel corridors	Traffic signals are interconnected in some industrial areas and major travel corridors
Transit signal priority	Some frequent bus routes	Most frequent bus routes
Freeway ramp meters	All urban interchanges	All urban interchanges
Freeway variable speed signs	Some high incident locations	Most freeways
Incident response vehicles	Incident response vehicles monitor some high incident locations	Incident response vehicles monitor all area freeways and major arterials adjacent to freeways
Estimated capital cost in 2016 dollars	**$71 million**	**$189 million**

Figure 6.27 shows the general location of Constrained RTP TSMO projects.

Figure 6.27 Greater Portland region: Map of Constrained RTP transportation system management projects



6.3.9 Transportation demand management projects

Public awareness, education and travel options support tools are cost-effective ways to improve the efficiency of the existing transportation system through increased use of travel options such as walking, biking, carsharing, carpooling and taking transit. Local, regional and state agencies work together with businesses and non-profit organizations to implement programs in coordination with other capital investments. Metro coordinates partners' efforts, sets strategic direction, evaluates outcomes and manages grant funding.

RTP Transportation demand management (TDM) projects are focused on:

- **Public awareness strategies** Events and other outreach strategies provide information about and encourage the public's use of travel options.

- **Commuter programs.** Employer-based commuter outreach efforts include: financial incentives, such as transit pass programs and offering cash instead of parking subsidies; facilities and services, such as carpooling programs, bicycle parking, emergency rides home and work-place competitions; and flexible scheduling such as working from home or compressed work weeks.
- **Individualized marketing.** Focused outreach encourages individuals, families or employees interested in making changes in their travel choices to participate in a program. A combination of information and incentives is tailored to each person's or family's specific travel needs. This outreach can be part of a comprehensive commuter program.
- **Travel options support tools** Reduce barriers to travel options and support continued use with tools, such as online rideshare matching, trip planning tools, wayfinding signage, bike racks and carsharing.

As shown in **Table 6.11**, Transportation demand management (TDM) projects comprise 2 percent of the total number of capital projects in the Constrained RTP list of projects.

Table 6.11 Summary of Constrained RTP transportation demand management projects

Transportation demand management projects	C10 2018–2027	C 2040 2018–2040
TDM projects	8	14
Local program implementation	All cities with >30k population lead travel options efforts, covering about 80% of regional population	All cities with >20k population lead travel options efforts, covering about 90% of regional population
Individualized marketing participation	No forecast data is available Current program reaches about 3% of households	No forecast data is available
Commuter program participation	No forecast data is available Oregon Employee Commute Options Rule requires work sites with more than 100 employees to have workplace programs	No forecast data is available
Public awareness marketing campaign	Existing ongoing and short-term campaigns increase awareness of *DriveLess. Connect*	Additional resources promote new travel tools, regional efforts and safety education
Provisions of travel options support tools	2015 program funding levels allow for completion of several new wayfinding signage and bike rack projects	Additional resources allow for public-private partnerships to create new online, print and on-street travel tools
Estimated capital cost in 2016 dollars	**$51 million**	**$127 million**

6.3.10 Other projects and programs to leverage capital investments

The 2040 Constrained investment strategy includes $105 million in investments to support Transit Oriented Development ($67 million), regional planning activities and corridor investment area refinement and planning activities ($38 million).

6.3.11 Transportation equity projects

The RTP reflects a regional commitment to plan and invest in the region's transportation system to reduce transportation-related disparities and barriers faced by communities of color and other historically marginalized communities, regardless of race, language proficiency, income, age or ability, while maintaining affordability and preventing displacement is necessary.

Out of the 822 projects in the Constrained RTP investment strategy, 588 capital projects are within an Equity Focus Area. The Constrained RTP investment strategy shows the combined investment of transit capital projects and active transportation projects in equity focus areas reaches over $3.9 billion in 2027 and $6.5 billion by 2040. These comprise around 44 percent of the RTP's planned investment by 2040.

Defining terms

Equity Focus Area
Census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, English language learners, and/or people with lower income. Most of these areas also include higher than regional average concentrations of other historically marginalized communities, including young people, older adults and people living with disabilities.

Refer to Chapter 7 and to **Appendix E** for information on how the investment strategies of the RTP impact historically marginalized communities in the greater Portland region.

6.3.12 Safety projects and safety benefit projects

Eliminating traffic related deaths and life-changing injuries and increasing transportation safety is a priority of the RTP. To address safety and reduce serious crashes, the RTP project list identifies projects that provide an overall safety benefit, as well as projects that have the primary purpose of reducing fatal and severe injury crashes, or minor/non-injury crashes at a documented high injury or high risk location.

Safety projects and safety benefit projects are targeted towards the Regional High Injury Corridors and Intersections and in race and income marginalized communities (equity focus areas).

Defining terms

Safety project
A project which has the primary purpose of reducing fatal and severe injury crashes or reducing minor/non-injury crashes by addressing a documented safety problem at a documented high injury or high risk location with one or more proven safety counter measures.

Safety benefit project
A project that includes design features that increase safety for one or more roadway user, but may not necessarily address an identified safety issue at an identified high injury or high risk location.

As shown in **Table 6.12**, of the 822 capital projects on the 2040 Constrained list:

- **Safety Projects**. 132 projects, 16 percent, of all projects on the 2040 Constrained list in the RTP are identified as safety projects. Those projects identify reducing fatal and severe injury crashes or reducing minor/non-injury crashes as the primary purpose of the project. Nearly 80 percent of these safety projects are located on a high injury corridor, and 73 percent are in an equity focus area (see map below: Projects with Primary Purpose of Reducing Crashes).
- **Safety Benefit Projects**. 551 projects, 67 percent, of all capital projects on the 2040 Constrained list have been identified to provide a safety benefit. Sixty percent of the safety benefit projects are on a high injury corridor, and 70 percent are located in an equity focus area (see map below: Projects with a Safety Benefit).
- **All capital projects on High Injury Corridors**. 458 of all capital projects on the 2040 Constrained list in the RTP, 56 percent, intersect with a regional high injury corridor. Of these projects, 126 are not identified as a Safety Benefit project because some are roadway extensions, some are transit projects, some are information technology system projects, etc. These projects provide other benefits that are critical to the transportation system.
- **Programs that impact safety**. In addition to capital projects, the regional Safe Routes to School, Transit Oriented Development and Transportation System Management and Operations programs provide safety benefits.

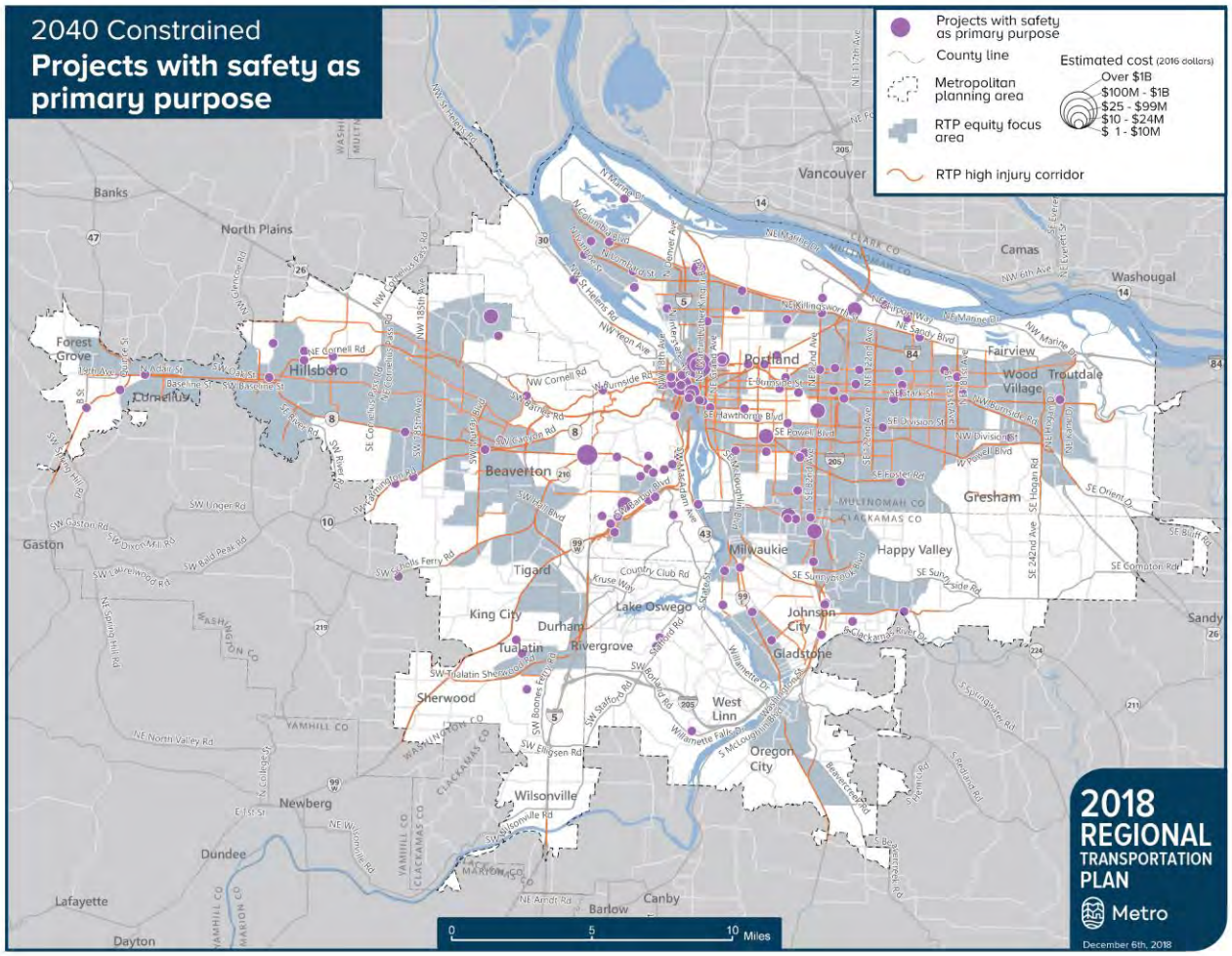
Table 6.12 Summary of Constrained RTP safety projects

Safety and safety benefit projects	C10 2018–2027	C 2040 2018–2040
Safety projects		
Number of **safety projects** with the primary purpose of reducing crashes	82	132
Number of **safety projects** on a High Injury Corridor*	71	104
Number of **safety projects** in Equity Focus Areas*	67	96
Estimated investment in **safety projects** in 2016 dollars *includes I-5 Rose Quarter Improvement project in first ten years for $390 million*	**$691 million**	**$ 1 billion**
Safety benefit projects		
Number of **safety benefit** projects	281	551
Number of **safety benefit projects** on a High Injury Corridor*	184	333
Number of **safety benefit projects** in Equity Focus Areas*	211	387
Estimated investment in **safety benefit projects** in 2016 dollar**s** *includes I-5 Rose Quarter project in first ten years, and I-5 Columbia River and OR 212/224 in 2028-2040 for a total of $3.6 billion*	**$2.3 billion**	**$7.6 billion**

*Does not include projects that are programmatic or are not geographically specific.

Figure 6.28 shows the location of projects that identified the primary project purpose as either "reduces fatal and severe injury crashes" or "reduces crashes," and overlaps with regional high injury corridors and RTP Equity Focus Areas.[1]

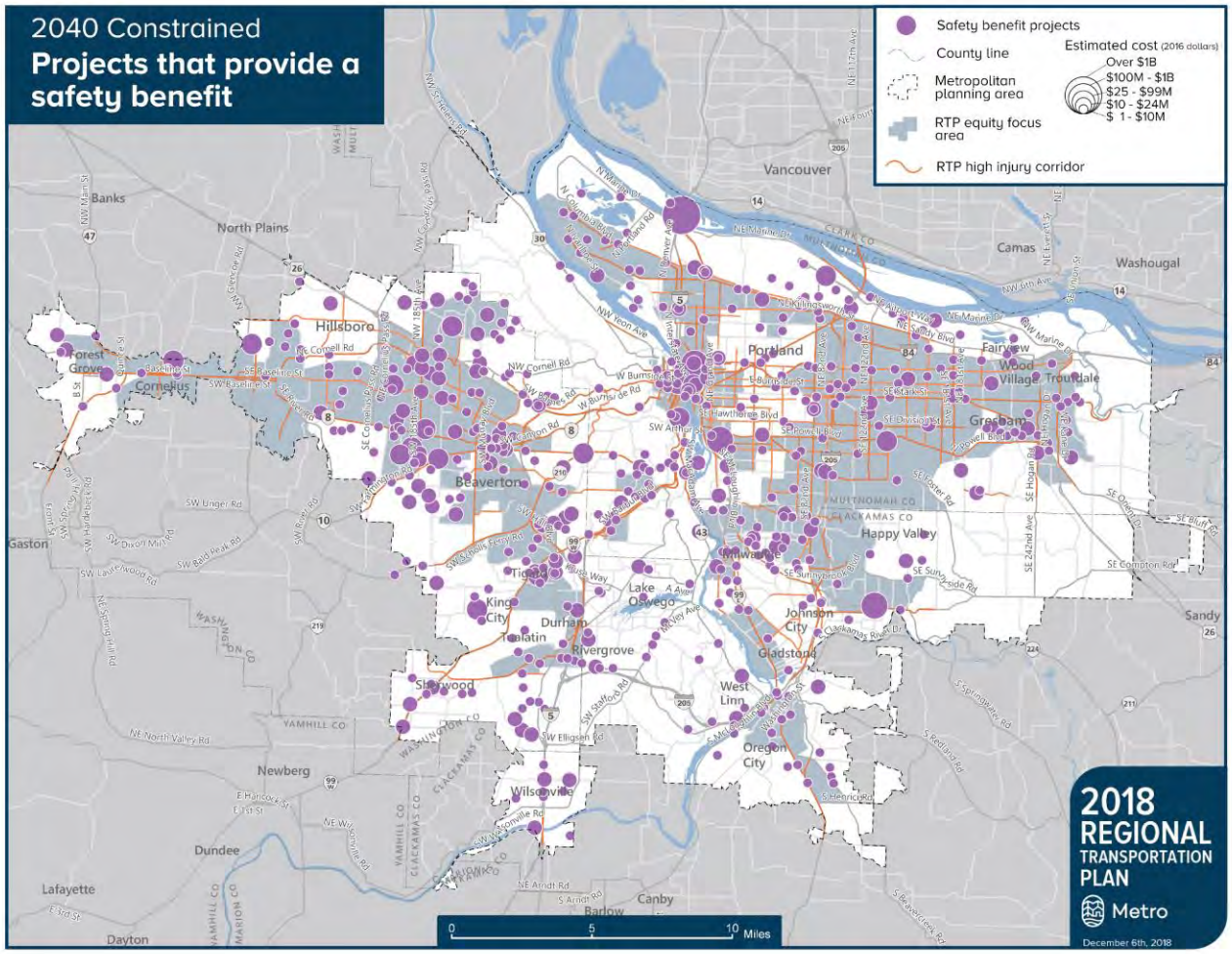
Figure 6.28 Greater Portland region: Map of Constrained RTP projects with the primary purpose of reducing crashes



[1] RTP Equity Focus Areas are census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color or English language learners, and/or people with low income.

Figure 6.29 shows the general location of Constrained RTP projects that provide a safety benefit, overlapped with regional high injury corridors and RTP equity focus areas.

Figure 6.29 Greater Portland region: Map of Constrained RTP safety benefit projects



6.3.13 Parking management

Parking management refers to various policies and programs that result in more efficient use of parking resources. Parking management is implemented through city and county development codes:

- 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, carshare vehicles, carpools, vanpools, bikes, public use (events or café "Street Seats") and freight truck loading/unloading areas.
- Off-street parking approaches include providing spaces in designated areas, unbundling parking, 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, and parking garages in downtowns and other mixed-use areas that allow surface lots to be developed for other uses.

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.

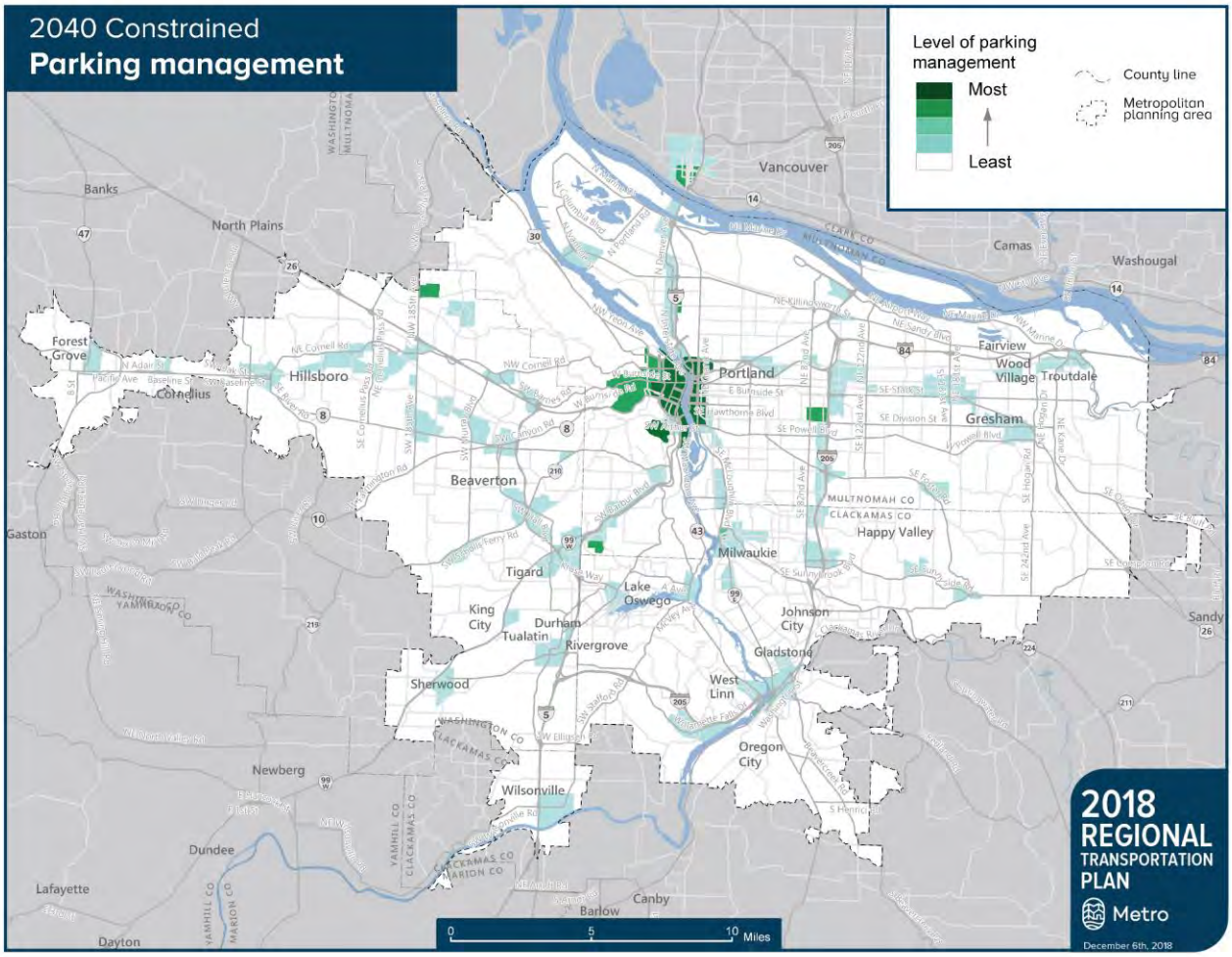
Table 6.13 describes parking management approaches in the Constrained RTP.

Table 6.13 Summary of Constrained RTP parking management

Parking management	C10 2018–2027	C 2040 2018–2040
Local parking management	Existing locally-adopted development codes remain the same as 2015 Free parking is available in most areas	Communities expand the flexibility of development codes and develop parking plans for all downtowns and centers served by high capacity transit Parking facilities are sized and managed so spaces are frequently occupied, travelers have information on parking and travel options, and some businesses share parking Free and timed parking is available in many areas
Share of trips to areas with actively managed parking	33% work trips 24% other auto trips	32% work trips 23% other auto trips

Figure 6.30 shows the general location where parking management approaches are applied in the Constrained RTP.

Figure 6.30 Greater Portland region: Map of Constrained RTP parking management



6.3.14 Transit operations and maintenance costs

Table 6.14 describes examples of transit operations and maintenance projects in the Constrained RTP.

Table 6.14 Summary of Constrained RTP transit operations and maintenance projects

Transit operations and maintenance	C10 2018–2027	C 2040 2018–2040
Examples of operating services	SMART Service to Clackamas Town Center and Oregon City	New bus service Columbia to Clackamas
Examples of maintenance projects	Preventative maintenance for fleet and vehicles, bus replacements, etc. to keep system in good repair	Preventative maintenance for fleet and vehicles, bus replacements, etc. to keep system in good repair
Estimated cost* in 2016 dollars	**$5.7 billion**	**$13.7 billion**

* Operating costs for TriMet service were calculated by annualizing the daily revenue hours proposed for each scenario and applying TriMet's average operating cost per revenue hour, with cost by mode weighted by the proportion of service provided on each mode. SMART and Portland Streetcar operating costs were calculated by applying each agency's FY17 annual operating costs.

6.3.15 Throughway, roads and bridges operations and maintenance costs

Table 6.15 describes examples of road-related operations, maintenance and preservation projects in the Constrained RTP.

Table 6.15 Summary of Constrained RTP throughway, roads and bridges operations and maintenance projects

Throughway, roads and bridges maintenance	C10 2018–2027	C 2040 2018–2040
Level of maintenance	Some maintenance backlogs grow	Adequately meet maintenance and preservation needs
Types of maintenance projects	Bridge and road pavement resurfacing, preventative maintenance, preservation and rehabilitation that do not add motor vehicle capacity	Bridge and road pavement resurfacing, preventative maintenance, preservation and rehabilitation that do not add motor vehicle capacity
Estimated cost in 2016 dollars	**$6 billion**	**$13.3 billion**

See **Appendices A and B** for the list of programmatic buckets in the Constrained RTP project list.

6.4 THE 2040 STRATEGIC PROJECT LIST

The strategic list of projects reflects additional policy-driven needs and project priorities that exceed the region's projected funding. The 2040 Strategic costs shown in **Table 6.16** include the Constrained RTP project costs plus estimated costs for additional projects that could be implemented with additional resources.

Table 6.16 Estimated costs for RTP investment strategies, including 2040 Strategic

RTP Capital Costs	C10 2018–2027	C 2040 2018–2040	S 2040 2018–2040
Transit capital	$3.2 billion	$5.1 billion	$6.2 billion
Throughways	$1.1 billion	$4.3 billion	$6.1 billion
Roads and bridges	$1.6 billion	$3.3 billion	$5.6 billion
Freight access	$156 million	$254 million	$467 million
Active transportation	$790 million	$1.8 billion	$3 billion
Technology – system management	$71 million	$189 million	$308 million
Information – travel options	$51 million	$127 million	$216 million
RTP Operations and Maintenance Costs	C10 2018–2027	C 2040 2018–2040	S 2040 2018–2040
Transit operations and maintenance	$5.7 billion	$13.7 billion	$16.7 billion
Roads and throughways operations and maintenance	$6 billion	$13.3 billion	$13 billion
Total estimated cost In 2016 dollars	**$19 billion**	**$42 billion**	**$52 billion**

Costs have been rounded and are in 2016 dollars.

See **Appendix C** for the list of projects included in the Strategic RTP project list.



2018 Regional Transportation Plan

Chapter 7

Measuring Outcomes

December 6, 2018

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7.1 INTRODUCTION

Cities and regions around the country are facing important choices about how and where they want to grow and invest in their communities. Faced with limited funding and significant infrastructure needs, the desire for getting the most out of our transportation investments has increased. Performance-based planning has emerged over the past decade as an effective way to understand the consequences and benefits of the choices facing regions. Performance measurement is a way to build accountability and transparency into the transportation planning and decision-making process.

Why performance evaluation matters

The greater Portland region's economic prosperity and quality of life depend on a transportation system that provides every person and business with access to safe, reliable, affordable and healthy travel options.

The Regional Transportation Plan (RTP) purposefully lays out a vision and supporting goals, objectives, performance measures (and targets) and policies that guide transportation planning and decision-making in the region to achieve desired outcomes. Evaluation of the planned regional transportation system projects and programs against a set of outcomes-focused performance measures and targets provides valuable information to the public and decision-makers, including:

- Measurement of how well investment priorities submitted to the Regional Transportation Plan by local agencies, the Oregon Department of Transportation, TriMet, SMART and special districts achieve RTP goals and objectives;
- Improved communication of regional transportation needs and priorities, which is especially important given limited available funding; and
- Increased transparency and accountability throughout the analysis and decision-making process.

When used effectively, performance measures can enable more comprehensive evaluation across multiple issue areas and help communicate tradeoffs and funding decisions to stakeholders. It allows stakeholders and decision-makers to understand whether the region's investment priorities are achieving agreed upon desired outcomes. Applied effectively, performance measurement can be a powerful tool for building public confidence that the available funds are well spent.

7.1.1 Chapter organization

This chapter reports on the expected system performance of the region's investment priorities and documents whether the region achieves regional performance targets in 2040.

7.1. Introduction: This section provides an overview of the chapter.

7.2 Performance-Based Planning and the RTP: This section describes the performance-based planning framework and provides a snapshot of performance outcomes from the evaluation of the RTP projects described in Chapter 6.

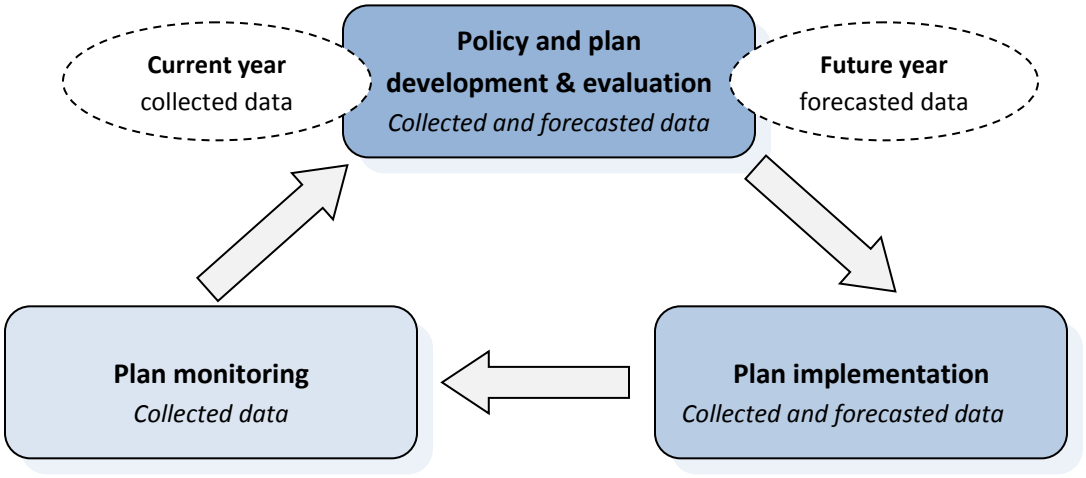
7.3 RTP System Evaluation Framework: This section describes the system evaluation measures used to evaluate performance of the Plan as a whole as well as background on the transportation equity analysis and different geographical areas on which the performance measures are reported.

7.4 How the System Performs: This section describes the expected outcomes and findings for each measure to meet state and federal requirements.

7.2 PERFORMANCE-BASED PLANNING AND THE RTP

Performance measures serve as the dynamic link between Regional Transportation Plan (RTP) goals and plan implementation. The RTP refers to the cyclical process of plan development, evaluation, plan implementation and plan monitoring as the Performance Measurement System, as shown in **Figure 7.1**.

Figure 7.1 Regional Transportation Plan Performance Measurement System



This chapter reports on the evaluation of plan performance. Through an evaluation of performance of the transportation system the region can better understand the extent to which investments in the transportation system will achieve desired outcomes and provide the best return on public investments.

This chapter also satisfies reporting requirements for performance measures and benchmarks mandated by the Oregon Transportation Planning Rule (TPR), the Oregon Metropolitan Greenhouse Gas Reduction Targets Rule and federal requirements to assess potential impacts of RTP projects on environmental resources, historical and cultural resources and tribal lands.

Plan monitoring in support of the region's federally-required Congestion Management Process and MAP-21/FAST Act reporting between the RTP update cycles is addressed in Chapter 8 and Appendix L. Some of the plan monitoring measures overlap with the performance targets and system evaluation measures, but rely on collected (observed) data rather than forecasted data.

System evaluation

The RTP is primarily evaluated using **forecasted data** from the travel model, however outcomes for some performance measures cannot currently be forecasted (affordability, safety and reliability) and these measures are not included in the system evaluation. Metro is working with federal, state and local partners to develop tools for future RTP updates that will support evaluating how the plan impacts affordability, safety and reliability in the region.

Table 7.1 lists the RTP performance measures used for plan evaluation, linking them to the RTP goals they support.

Table 7.1 How RTP System Evaluation Measures Inform Achieving RTP Goals

RTP System Evaluation Measures

Legend

● = measure highly correlated with achieving goal

◒ = measure somewhat correlated with achieving goal

○ = measure partially supports achieving goal

		RTP Goals										
		Vibrant Communities	Shared Prosperity	Transportation Choices	Reliability and Efficiency	Safety and Security	Healthy Environment	Healthy People	Climate Leadership	Equitable Transportation	Fiscal Stewardship	Transparency and Accountability
How much do households spend on housing and transportation in our region? [1]												
n/a	**Affordability***	●	●	◒	◒	○	○	●	○	●		
How safe is travel in our region?												
n/a	**Safety***	●	◒	●	●	●	◒	●	◒	●		
How much do people and goods travel in our region?												
1	**Multimodal Travel**	●	◒	●	●	◒	●	●	●	●		
2	**Mode Share**	●	◒	●	●	◒	●	●	●	●		
How easily, comfortably and directly can we access jobs and destinations in our region?												
3	**Access to Travel Options – system completeness ***	●	◒	●	●	●	●	●	●	●		
4	**Access to Jobs***	●	●	●	○	○	○	◒	◒	●		
5	**Access to Community Places***	●	◒	●	○	○	●	●	◒	●		
6	**Access to Bicycle and Pedestrian Parkways**	●	●	●	○	●	●	●	●	●		
7	**Access to Transit***	●	●	●	◒	○	●	◒	●	●		
8	**Access to Industry and Freight Intermodal Facilities**	○	●	○	○	○	○	○	○	○		
How efficient is travel in our region?												
9	**Multimodal Travel Times**	●	●	●	●	○	○	○	○	○		
10	**Congestion**	◒	●	○	●	●	◒	◒	◒	○		
11	**Transit Efficiency and Ridership**	●	○	●	●	○	◒	○	○	○		
How will transportation impact climate change, air quality, the environment, historic and cultural places and public health?												
12	**Carbon Emissions**	○	●	●	○	○	●	●	●	○		
13	**Clean Air**	○	●	●	○	○	●	●	◒	●		
14	**Potential Habitat Impact**	◒	○	○	○	○	●	●	◒	●		
15	**Potential Historical, Cultural and Tribal Lands Impact**	●	◒	○	○	○	○	◒	○	○		
16	**Public Health**	◒	◒	○	○	○	●	●	●	○		

There are no system evaluation measures for the "Fiscal Stewardship" and "Transparency and Accountability" goals.

* Performance measures with an asterix (*) reflects the transportation priorities identified by historically marginalized communities and serve as the basis for the federally-required Title VI Benefits and Burdens analysis.

[1] Evaluation measures and methods to be developed for next RTP.

7.2.4 Performance measure outcomes at-a-glance

This section provides a snapshot of the various performance measures used to assess the performance of the RTP. Some of the measures are included in the system evaluation in **Section 7.4** and others are not because Metro does not yet have methods or tools to forecast some desired performance outcomes. Observed data is cited when forecast data is not available**.**

As a frame of reference, **Table 7.2** shows the 2015 estimates and 2040 future year projections of household, population and employment used in the system analysis for the metropolitan planning area boundary. This information was developed for use in the Regional Travel Demand Model as part of preparing a regionally-coordinated distribution of the forecasted growth for the region for local and regional planning activities. The forecasted growth distribution was adoped by the Metro Council in October 2016.[2]

Table 7.2 Base year (2015) and future year (2040) regional household, population and employment

	Households	Population	Employment
2015	636,467	1,605,672	895,094
2040	896,451	2,178,848	1,240,653
Growth	+259,984	+573,176	+345,560
Percentage growth	41%	36%	39%

Source: Metro Research Center



Figure 7.2 summarizes projected changes in demographics, travel and related emissions between 2015 and 2040 within the metropolitan planning area boundary assuming the 2040 Constrained projects.

[2] Metro Ordinace No. 16-1371 (For the Purpose of Adopting the Distribution of the Population and Employment Growth to Year 2040 to Local Governments in the Region Consistent with the Forecast Adopted by Ordinance No. 15-1361 in Fulfillment of Metro's Population Coordination Responsibility under ORS 195.036), adopted by the Metro Council on October 13, 2016.

Figure 7.2

2018 RTP System Evaluation Results Summary

Totals are for travel within the metropolitan planning area for the greater Portland region and assume the 2040 Constrained projects.

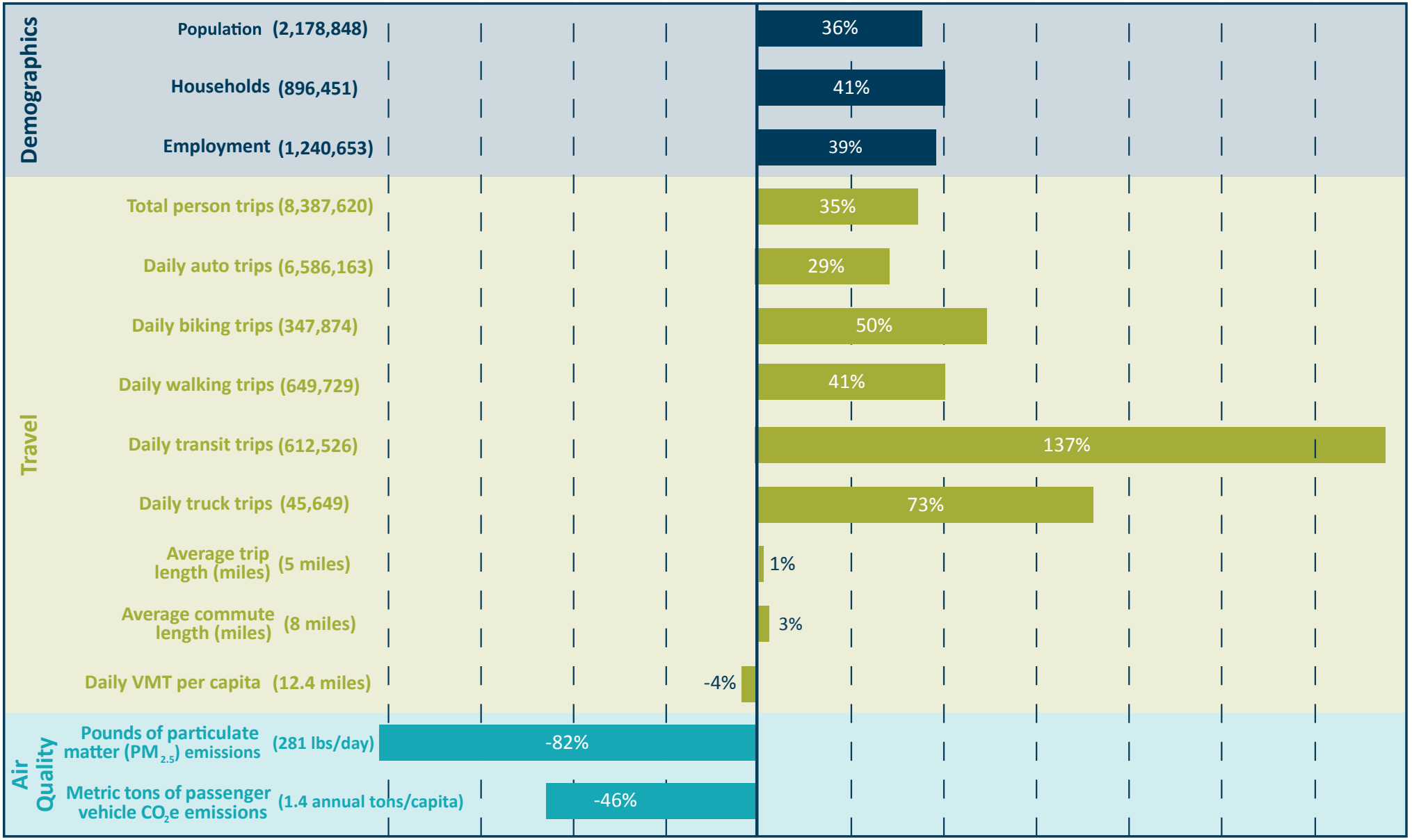


Table 7.3 provides a legend for performance outcomes summarized in Table 7.4.

Table 7.3 Expected Outcomes of the 2040 Constrained Projects – Legend

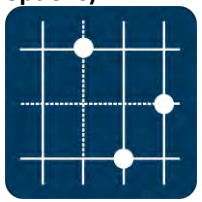
	**Plan is on target**
	**Plan moves in the right direction, but does not meet target**
	**Plan moves in the wrong direction for meeting the target**

Table 7.4 provides an "at-a-glance" overview of performance measures used in the RTP system evaluation and progress made towards targets or desired direction by 2040 if the 2040 Constrained projects are fully implemented. Not all performance measures have a performance target. If a performance measure does not have a target, the desired direction is indicated. Performance measures for affordability and safety are included in the system evaluation. Because Metro does not yet have methods or tools to forecast performance for affordability or safety; observed data is cited.

See Section 7.4 for detailed results and findings for each measure.

Table 7.4 Expected Outcomes of the 2040 Constrained Projects – At-A-Glance

Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
How much do households spend on housing and transportation in our region?				
Affordability 	By 2040, reduce the combined housing and transportation expenditure for lower-income households by 25 percent, compared to 2015 combined housing and transportation expenditure levels.	Plan does not forecast affordability or provide system evaluation results. Observed data shows that the region needs to make big strides to reduce disparities in affordability.	Observed data shows that the region needs to make big strides to reduce disparities in affordability for people of color.	Not applicable.
How safe is travel in our region?				
Safety 	By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 50 percent reduction by 2025 and a 16 percent reduction by 2020 (as compared to the 2015 five year rolling average).	Plan does not forecast safety performance and does not provide system evaluation results. Observed data from the last five years indicates that the region is not moving in the right direction to achieve target.	Annual average fatal and severe injury crashes for all modes increased or remained flat since the 2014 RTP, and are higher for people of color and people with low incomes.	Not applicable.
How much do people and goods travel in our region?				
Mode share 	By 2040, triple walking, biking and transit mode shares, compared to 2015 modeled mode shares.	Plan increases walking, biking and transit mode share from 16 percent to 20 percent of all trips, but does not meet target.	Not included in transportation equity analysis.	

Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
How easily, comfortably and directly can we access jobs and destinations in our region?				
System completeness (access to travel options) 	By 2040, complete 100 percent of the regional network of sidewalks, bikeways and trails.	Plan makes progress towards meeting the target, but does not reach target of completing 100 percent of the regional active transportation network. In 2040, 71 percent of sidewalks, 65 percent of on-street bikeways, and 47 percent of regional trails are complete on the regional active transportation network.	Plan makes greater progress towards meeting the target in equity focus areas compared to non-equity focus areas, but does not reach target of completing 100 percent of the regional active transportation network in equity focus areas.	 Region and equity focus areas
Access to jobs 	There is no target for this measure. The desired direction is to increase the number of low and middle-wage jobs accessible to the average household in equity focus areas compared to the average household in non-equity focus areas.[3]	Measure is for historically marginalized communities in equity focus areas, see next column.	The average household in an equity focus area sees an increase in the number of jobs, including low and middle wage jobs that can be reached by transit compared to the rest of the region and non-equity focus areas. For other forms of travel (driving, biking, and walking) the increase in the number of jobs the average household in equity focus area can reach is less than what the average household in the region and in non-equity focus areas can reach in a reasonable commute time.	 Region  Equity focus areas

[3] Metro will update performance measure with a target and develop evaluation methods to measure the disparities gap in access to low and middle-wage jobs for households in equity focus areas in the next RTP update.

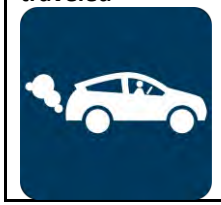
Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
Access to community places 	There is no target for this measure. The desired direction is to increase to the number of community places accessible to the average household in equity focus areas compared to the average household in non-equity areas. [4]	Measure is for historically marginalized communities in equity focus areas, see next column.	The average household in equity focus areas sees a greater increase in the number of community places reached in a short transit trip compared to the average household in the region and non-equity focus areas. The region and non-equity focus areas see a greater increase in the number of community places reached within a short trip of driving, biking or walking compared to households in equity focus areas.	 Region  Equity focus areas
Access to bicycle and pedestrian parkways 	There is no target for this measure. The desired direction is an increase in the number and share of households within a 1/4-mile of a bicycle or pedestrian parkway.	Plan increases access to bicycle parkways to 79 percent of all households in 2040, and results in a decrease in access to pedestrian parkways, decreasing from 86 percent in 2015 to 85 percent in 2040.	Not included in transportation equity analysis.	
Access to transit 	There is no target for this measure. The desired direction is an increase in the number and share of households, low-income households and employment near high capacity or frequent transit service by 2040.	Plan achieves desired direction. By 2040, 66 percent of households are within the desired distance to frequent all day transit; 79 percent of jobs are within the desired distance to frequent transit.	Plan increases access to transit in equity focus areas by 2027 and 2040.	

[4] This measure replaces the 2014 RTP essential destinations target. Metro will update the performance measure with a new target and develop evaluation methods to measure the disparities gap in access to community places for households in equity focus areas in the next RTP update.

Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
Access to industry and freight intermodal facilities 	There is no target for this measure. The desired direction is to reduce truck hours of delay on the freight network that provide access to intermodal facilities and industrial lands in 2040.	Plan performance is inconclusive due to limited analysis area in initial performance evaluation. More work is needed to develop this measure for use in the next RTP update.	Not included in transportation equity analysis.	Not applicable.
How efficient is travel in our region?				
Multimodal travel times 	There is no target for this measure. The desired direction is to maintain or reduce travel times for transit, freight, bicycle, and motor vehicle trips.	Plan generally improves or maintains transit, truck and bicycle travel times. Auto travel times increase in most corridors.	Not included in transportation equity analysis.	
Congestion 	By 2040, meet the Interim Regional Mobility Policy for throughways and arterials.[5]	Plan does not meet policy in all locations.	Not included in transportation equity analysis.	

[5] Refer to Chapter 3 of the 2018 RTP for Interim Regional Mobility Policy Target thresholds.

Freight delay 	By 2040, reduce vehicle hours of delay per truck trip by 10 percent, compared to the 2040 No Build.	Plan does not meet target. Truck delay during the 1-3 PM time period increases 382 percent in 2040 Constrained, and increases 166 percent during the 4-6 PM peak period.	Not included in transportation equity analysis.	
Cost of freight delay 	There is no target for this measure. The desired direction is to reduce growth in cost of delay (in constant dollars) on the regional freight network compared to the 2040 No Build.	Plan decreases cost of delay by 67 percent during the 1-3PM time period and by 29 percent during the 4-6PM peak period, compared to not implementing the plan by 2040.	Not included in transportation equity analysis.	
Transit efficiency and ridership 	There is no target for this measure. The desired direction is an increase in hours of transit service and ridership.	Plan more than doubles total boardings and increases hours of transit service by 60 percent by 2040.	Not included in transportation equity analysis.	

Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
How will transportation impact climate change, air quality, the environment, historic and cultural places and public health?				
Carbon emissions  	Meet or exceed Climate Smart monitoring targets to reduce per capita greenhouse gas emissions from passenger vehicles.[6] Reduce per capita greenhouse gas emissions from cars and small trucks by 20 percent by 2035 and 25 percent by 2040, compared to 2005 levels.[7]	Plan meets or exceeds most monitoring targets by 2040, making satisfactory progress implementing the Climate Smart Strategy. It makes progress towards, but does not meet, targets to complete the active transportation network. Plan includes 9,513 transit service revenue hours, which exceeds the Climate Smart Strategy level of 9,400 hours. By 2040 annual per capita emissions from passenger vehicles decrease by 46 percent compared to 2015 levels. [8]	Not included in transportation equity analysis.	
Vehicle miles traveled 	By 2040, reduce vehicle miles traveled per person by 10 percent, compared to 2015.	Plan reduces vehicle miles traveled per person but does not meet target. In 2040, vehicle miles traveled per person decline 4 percent below 2015 levels.	Not included in transportation equity analysis.	

[6] Refer to Appendix J for detailed information about the Climate Smart Strategy monitoring targets, analysis assumptions and expected performance.
[7] The target was set by LCDC based on analysis conducted using ODOT's GreenSTEP tool. Metro uses the EPA-approved MOVES model to conduct RTP regional emissions analyses. Significant methodological differences in how GreenSTEP and MOVES estimate on-road vehicle emissions do not allow direct comparison of forecasted on-road vehicle emissions results. See Appendix J for more information.
[8] Based on the analysis, Metro finds the region is making satisfactory progress implementing the Climate Smart Strategy and can reasonably be expected to meet the state-madated targets for reducing per capita greenhouse gas emissions from cars and small trucks by 2040. See Section 7.4.12 and Appendix J for more information.

Measure	Target or desired direction	Performance within the metropolitan planning area	Performance in equity focus areas	Plan direction
Potential habitat impact 	There is no target for this measure. The purpose of this measure is to identify projects that overlap with sensitive high value habitats so that as projects move toward implementation, appropriate avoid, minimize, or mitigation strategies can be applied.	Plan identifies at least 544 projects that overlap or cross regionally identified high value habitats. Mitigation strategies are addressed specifically during the project development phase as part of the environmental and land use review, consultation and permitting processes all construction projects must undergo.	Not included in transportation equity analysis.	
Potential historical and cultural resources impact 	There is no target for this measure. The desired direction is to identify projects that overlap with historical and cultural resources, and define potential mitigation strategies for historical and cultural resources.	Plan includes 62 projects located within 100 feet of historic properties listed in the National Register. Mitigation strategies are addressed specifically during the project development phase as part of the environmental and land use review, consultation and permitting processes all construction projects must undergo.	Not included in transportation equity analysis.	
Potential tribal lands impact 	There is no target for this measure. The desired direction is to identify projects that overlap with tribal lands, and define potential mitigation strategies to avoid tribal lands.	No tribal lands were identified within or adjacent to the metropolitan planning area.	Not included in transportation equity analysis.	
Public health 	There is no target for this measure. The desired direction is to increase lives saved, years lived and avoid health care costs.	Plan decreases premature death and disease and avoids more thanr $31 million in annual health care costs due to increased physical activity and reduced emissions.	Not included in transportation equity analysis.	

7.3 RTP SYSTEM EVALUATION FRAMEWORK

The system evaluation framework of the Regional Transportation Plan Performance Measurement System, shown in **Figure 7.3**, is used during periodic plan updates. Under federal law, updates occur at least every five years. During plan updates, the region reviews its goals and objectives for the transportation system and develops and refines an investment strategy comprised of infrastructure projects and programs submitted by cities, counties, the Oregon Department of Transportation, TriMet, SMART and special districts.

The Regional Transportation Plan (RTP) development and evaluation has two levels: performance targets and system performance evaluation. As previously described in Chapter 2, 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 (though not all goals have targets). In comparison, system evaluation measures evaluate changes between current conditions (in 2015) and the set of transportation investments the region has chosen to pursue (the funding investment strategies described below). There is some overlap between the targets and the measures but they serve different functions. The performance targets are listed in Chapter 2.

Figure 7.3 2018 RTP Evaluation Framework



For the 2018 RTP update, Metro conducted three rounds of system evaluations. Following the first round of analysis, Metro engaged the public, regional policymakers and agencies responsible for developing the project lists in review and discussion of the Round 1 system evaluation findings. Based on the findings and subsequent public and stakeholder input, regional policymakers then recommended that the Metro Council direct agencies to refine the draft list of projects to better meet near-term regional priorities for improving safety, advancing equity, implementing the Climate Smart Strategy and managing congestion. In Spring 2018, Metro issued a second "call for projects" and requested agencies to revise the draft project list to better achieve the near-term regional priorities. Performance of the revised projects and programs was subsequently evaluated and reported for public review and feedback. Additional project list refinements were recommended, and subsequently adopted, following the final public comment period in summer 2018. Metro evaluated performance of the final adopted projects and programs in a third system evaluation.

The system evaluation that follows in Section 7.4 reports the performance of the adopted projects and programs. The projects and programs are described in **Appendices A, B and C**.

7.3.1 Measuring transportation equity

As part of the 2018 RTP, Metro conducted a transportation equity evaluation of the financially constrained 2018 RTP investment strategy. The equity evaluation satisfies federal requirements for Environmental Justice Impact Analysis.

The purpose of the transportation equity evaluation was to look at how well the region's planned long-range transportation investments performed relative to transportation priorities identified by historically marginalized communities. These identified transportation priorities subsequently shaped transportation-related equity goals, objectives, and performance measures in the Plan.

The transportation equity evaluation takes a system-wide look at the region's long-term investment strategy to:

1) determine whether progress is being made towards transportation priorities expressed by historically marginalized communities;

2) determine whether the financially constrained long-range transportation investment strategy, in totality, is disproportionately impacting historically marginalized communities and if mitigation measures are necessary; and

3) continue to learn from the assessment to propose technical refinements for future transportation equity evaluations.

The 2018 RTP transportation equity evaluation worked to incorporate and reflect previous recommendations from the 2014 Civil Rights Assessment, other agency strategic direction, federal corrective actions, as well as the latest research and best practices – drawing from national experts, think tanks, engagement, and academic partnerships. These different sources shaped and informed further how to measure equity within the context of the transportation system.

Through engagement with historically marginalized communities, the outcomes historically marginalized communities identified as priorities for the transportation system include (not in order): [9]

- accessibility
- affordability
- safety
- environmental health

These topic areas were translated into system performance measures, which were guided by the input of a technical work group comprised of community-based organizations, social justice advocates, public health agencies and jurisdictional partners. A foundational element of the transportation equity evaluation of the 2018 RTP investment strategy was based on defining equity focus areas, which served as the main geography of comparison of performance relative to the region and the non-equity focus areas. The equity focus areas identify census tracts where there is a significant residential presence of three historically marginalized demographic groups: people of color, people in poverty/with lower income and English language learners.

Lastly, as recipient of federal transportation funds, Metro is responsible for successful integration of environmental justice (EJ) and civil rights (Title VI) 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. The programmatic evaluation of the 2018 RTP investments is used to demonstrate the planning of investments in the regional transportation system complies with federal non-discriminatory and disproportionate impact regulations.

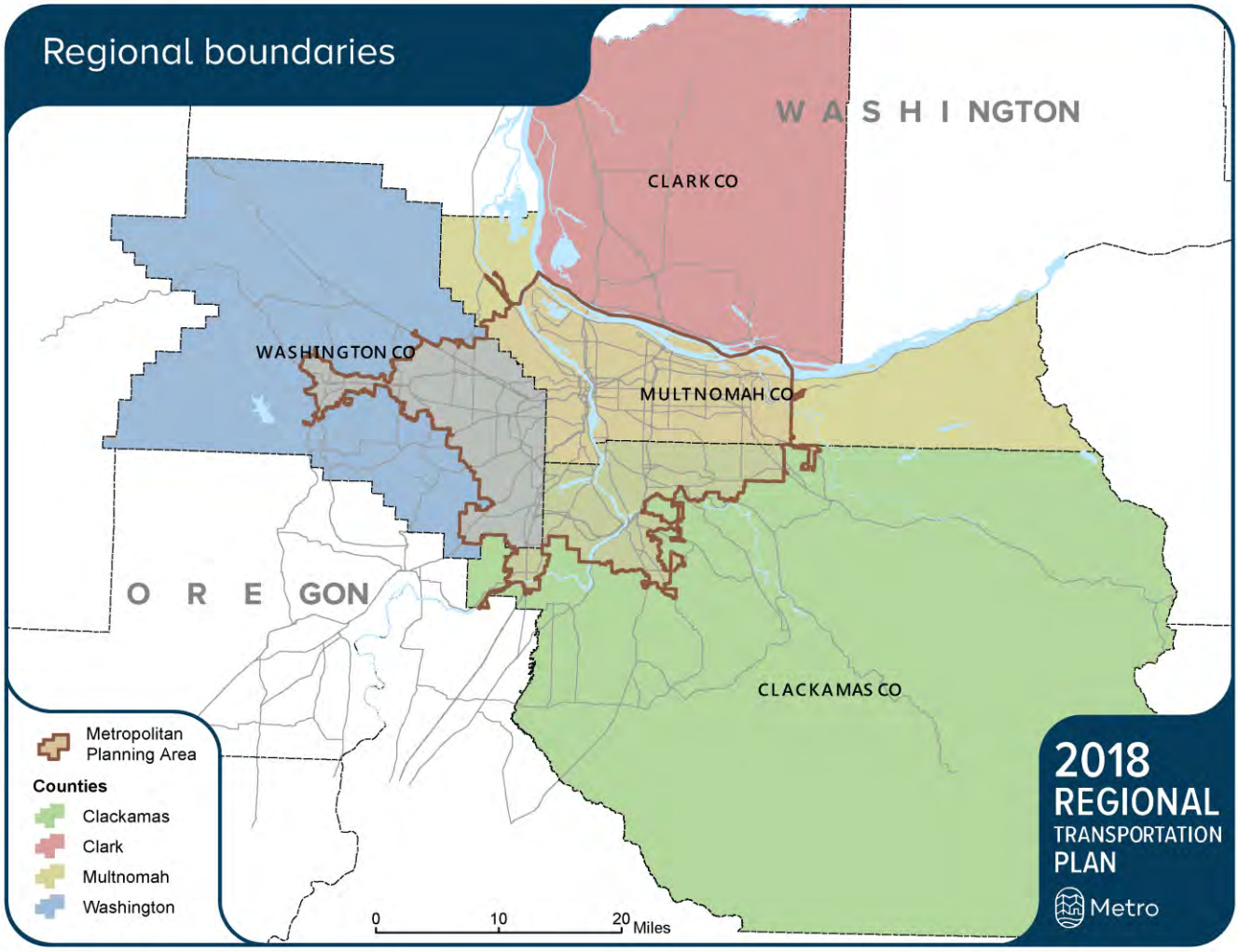
Further detail about the 2018 RTP transportation equity system evaluation can be found in **Appendix E:** 2018 RTP Transportation Equity Evaluation.

[9] Due to capacity constraints and additional resource needs, the affordability system evaluation measure was deferred and recommended for development prior to the 2023 RTP.

7.3.2 Evaluating system performance for different geographical areas

Metro evaluated the performance of the transportation system for the: 4-county region and metropolitan planning area. Within the metropolitan planning area (MPA), some measures were also evaluated in equity focus areas, sub-regions, regional centers and mobility corridors.

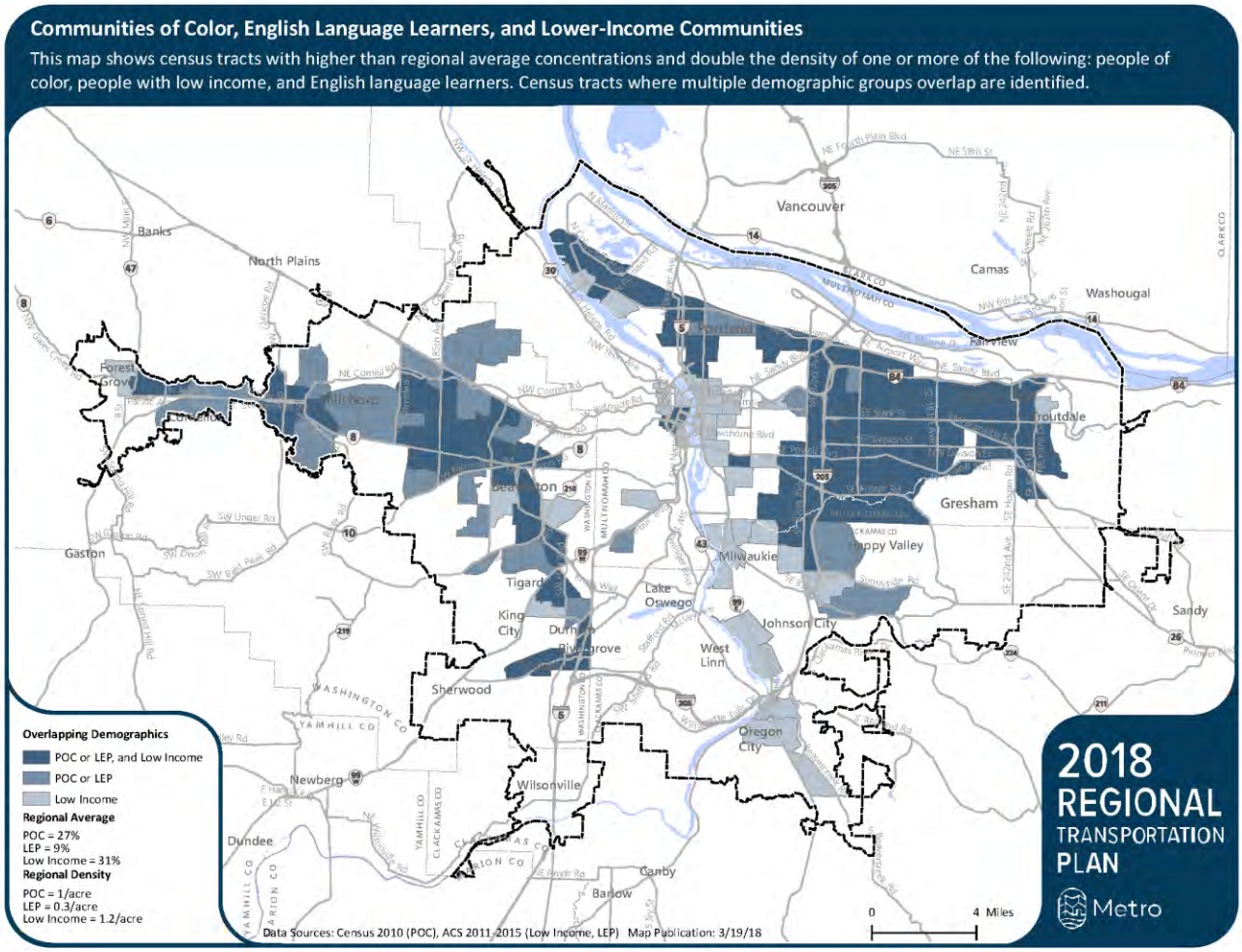
Figure 7.4 Regional analysis boundaries



4-County Region
This area includes all of Clackamas, Multnomah, Washington and Clark Counties.

Metropolitan Planning Area (MPA) Boundary The primary geographic area for the RTP system evaluation, this is the geographic area determined by agreement between the Metropolitan Planning Organization (MPO) – Metro – and the Governor, in which the metropolitan transportation planning process is carried out by the MPO. Refer to Chapter 1 for more information about the MPA boundary and MPO responsibilities.

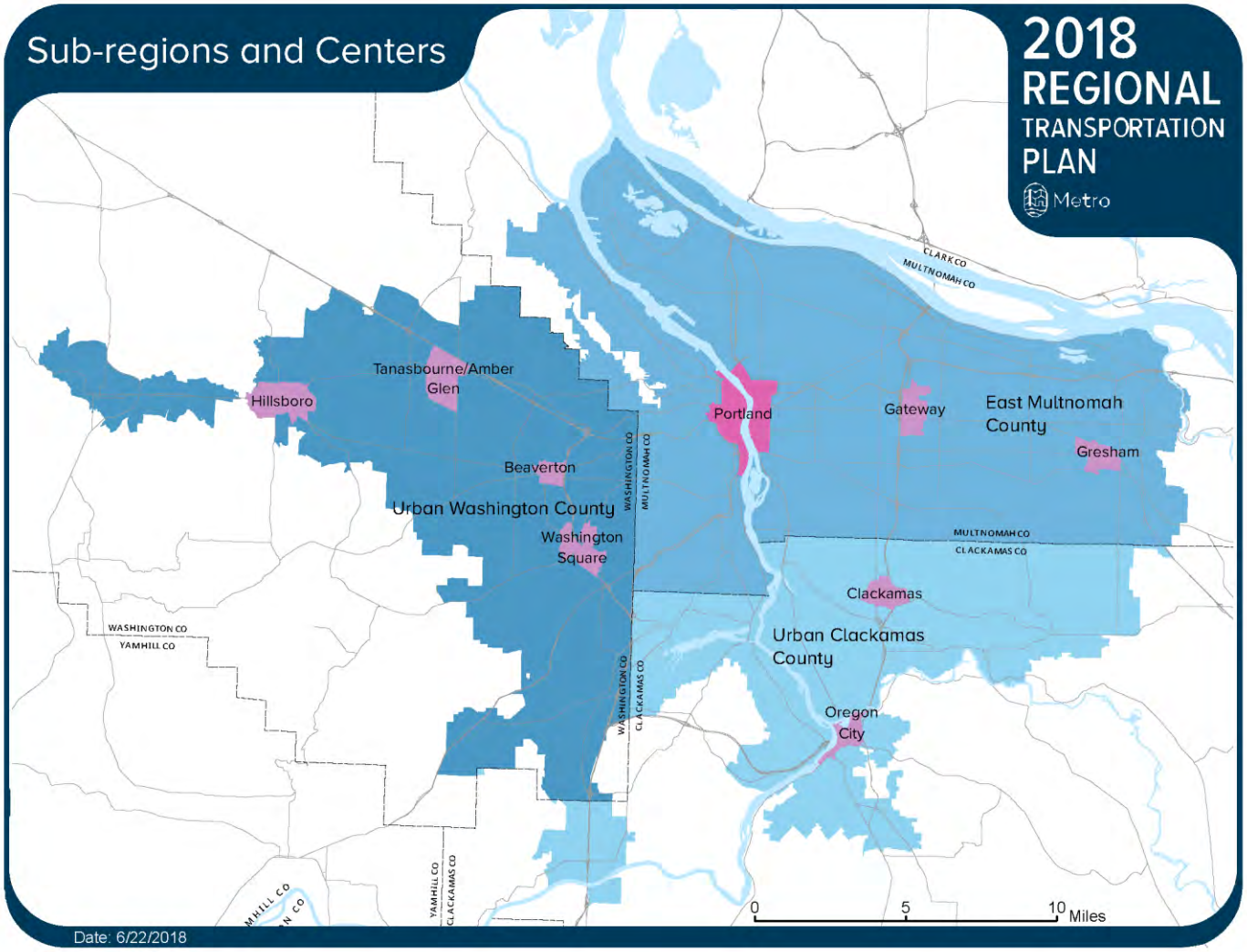
Figure 7.5 RTP Equity Focus Areas



Within the MPA some measures were analyzed for sub-geographies:

Equity Focus Areas Some evaluation measures include findings for equity focus areas. These areas are census tracts with higher than regional average concentrations and double the density of one or more of the following populations: people of color, English language learners, and/or people with lower income. Most of these areas also include higher than regional average concentrations of other historically marginalized communities, including young people, older adults and people living with disabilities.

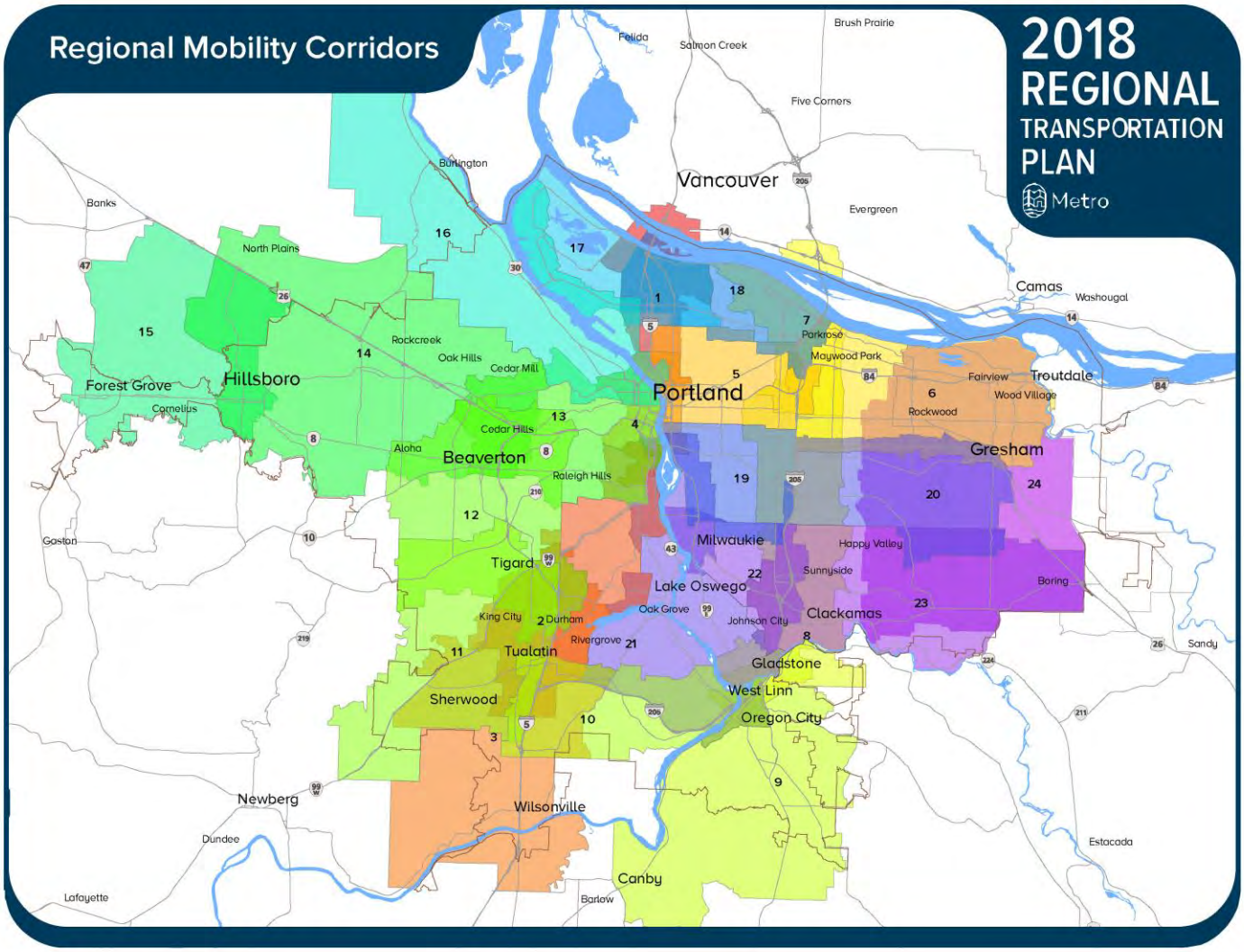
Figure 7.6 Sub-regions and centers



Within the MPA some measures were analyzed for sub-geographies:

Sub-Regions and Centers Some evaluation measures include findings for these sub-regions: Portland, Urban Clackamas County, East Multnomah County and Urban Washington County, and for the 2040 Regional Centers and Portland Central City.

Figure 7.7 Regional mobility corridors map



Within the MPA some measures were analyzed for sub-geographies:

Mobility Corridors Some evaluation measures include findings by Mobility Corridor. Mobility corridors represent subareas 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.

7.3.3 Evaluating system performance for different investment strategies

Metro evaluated the performance of the transportation system for six different investment strategies. Refer to **Chapters 5 and 6** for additional information on the investment strategies and the project lists. Refer to **Appendix M** for detailed information on the regional travel forecast modeling assumptions for each of the strategies.

- **2015 Base Year –** This includes the "existing conditions" strategies against which the other funding assumptions are compared, and uses 2015 population and employment numbers. All transportation projects completed by 2015 are included in the Base Year.
- **2027 No Build** – This strategy assumes only projects with committed funding are built by 2027 and uses 2027 projected population and employment numbers.
- **2027 Constrained** – This strategy assumes that all projects and programs identified in the first ten years of the Regional Transportation Plan are completed by 2027 and uses 2027 projected population and employment numbers.
- **2040 No Build** – This strategy assumes only projects with committed funding are built by 2040 and uses 2040 projected population and employment numbers.
- **2040 Constrained** – This strategy assumes that all projects and programs on the full Constrained list are completed by the year 2040 and uses projected 2040 population and employment numbers.
- **2040 Strategic** – This strategy assumes that all projects on the full Constrained list and all of the projects on the full Strategic list are completed by 2040 and uses projected 2040 population and employment numbers. Funding has not been identified for projects on the Strategic list, and therefore evaluation results are not shown for the Strategic investment strategies in this Chapter. Refer to Appendix I: Performance Evaluation Summary Tables for an overview of system evaluation measure outcomes for the Strategic investment strategies.

7.3.4 How to read the system evaluation measures

Each system evaluation measure provides the same set of information. The graphic below provides an overview of the type of information that is provided for each evaluation measure.

Title of Evaluation Measure

Data source: This identifies the source of the data reported. The performance measures rely on data generated by the regional travel demand forecast mode (Metro travel forecast model), MetroScope, the regional land use model and GIS analysis (Metro RLIS) to generate current and future year findings. Emissions data is generated using the MOVES model in accordance with all pertinent EPA guidance for preparing emissions estimates for air quality conformity purposes.

Description: This provides a brief description of what the system evaluation measure is and how the data was analyzed. Refer to Appendix I for a complete description of the methodologies.

Target or desired direction: Not every measure has a target. If a measure has a target, direction towards achieving the target is described. If the measure does not have a target, then the desired direction or outcome of the measure (such as increase or decrease) is described.

Findings: This provides a description of what the data evaluation is telling us.

Equity findings: If the evaluation measure evaluated the equity impact those findings are provided here.

7.4 HOW THE SYSTEM PERFORMS

This section describes the findings for each of the RTP system evaluation measures.

System Evaluation Measures

Affordability – Metro does not currently have the ability to forecast affordability. Evaluation measure(s) and tools will be developed and tested in the next update of the RTP if available. This measure will be monitored using observed data.

Safety – Metro does not currently have the ability to forecast crashes. Evaluation measure(s) and tools will be developed and tested in the next update of the RTP if available. This measure will be monitored using observed data.

Reliability – Metro does not currently have the ability to forecast system and freight reliability. Evaluation measure(s) and tools will be developed and tested in the next update of the RTP if available. This measure will be monitored using observed data.

1. **Multimodal travel**
2. **Mode share**
3. **Access to travel options – system completeness**
4. **Access to jobs**
5. **Access to community places**
6. **Access to bicycle and pedestrian parkways**
7. **Access to transit**
8. **Access to industry and freight intermodal facilities**
9. **Multimodal travel times**
10. **Congestion**
11. **Transit efficiency and ridership**
12. **Carbon emissions**
13. **Clean air**
14. **Potential habitat impact**
15. **Potential historical and cultural resources impact**
16. **Potential tribal lands impact**
17. **Public health**

7.4.1 Multimodal travel

Data source: Metro travel forecast model.

Description: System-wide number of miles traveled (total and share of overall travel) within the Metropolitan Planning Area Boundary (MPA) by different modes of travel.

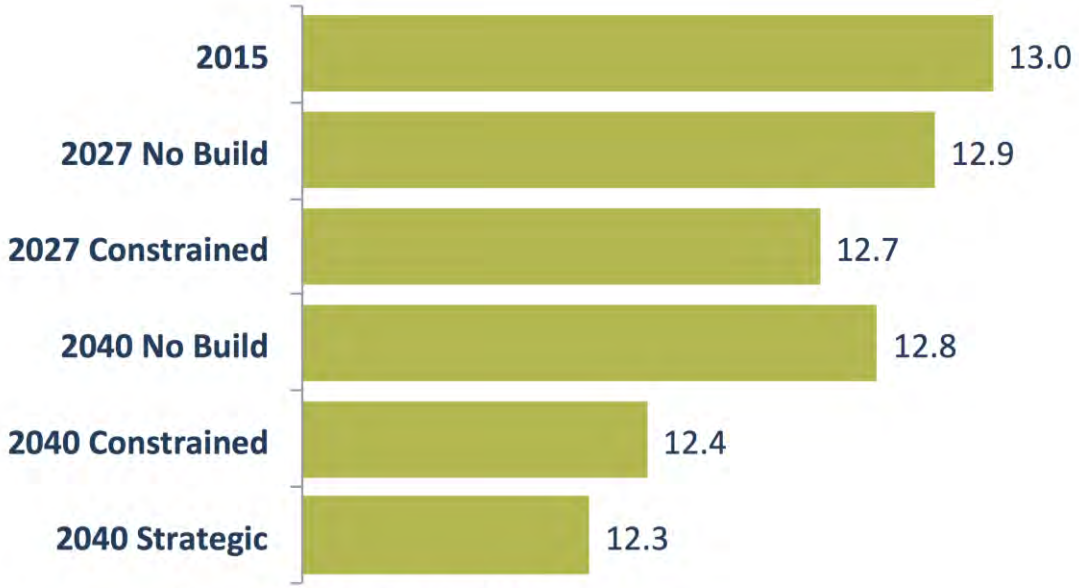
- Person miles traveled *(total and per capita)*
- Vehicle miles traveled (VMT) *(total, per capita, per employee)*
- Transit miles traveled *(total, per capita, per employee)*
- Bicycle miles traveled *(total, per capita, per employee)*
- Pedestrian miles traveled *(total, per capita, per employee)*
- Freight miles traveled *(total)*

Target or desired direction: By 2040, reduce vehicle miles traveled per person by 10 percent compared to 2015.

Findings: Overall travel (person miles traveled – all modes) per capita is increasing in future strategies while vehicle miles traveled per capita decreases 4 percent between 2015 and the 2040 Constrained strategies – making progress towards the target, but not reaching it. That means that other modes such as transit and bicycling are increasing. In the 2040 Constrained strategies transit miles traveled per person increases by 82 percent from 1.1 to 2.0, and bicycle miles travel per person increases by 20 percent, from 0.50 to 0.60 between 2015 and 2040. Miles traveled by any mode are higher per employee than per capita.

Equity findings: Not included in transportation equity analysis.

Figure 7.8 Vehicle miles traveled per person each day (within the MPA)



Source: Metro Travel Demand Model

Table 7.5 Daily person miles traveled per person

Person Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	30,403,023	36,272,364	36,639,935	41,359,645	42,069,444	42,236,504
Per Person	18.9	19.0	19.2	19.0	19.3	19.4

Table 7.6 Daily vehicle miles traveled per person

Vehicle Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	20,798,618	24,534,300	24,128,244	27,879,927	27,098,119	26,883,845
Per person	13.0	12.9	12.7	12.8	12.4	12.3
Per employee	23.2	22.9	22.5	22.5	21.8	21.7

Table 7.7 Daily transit miles traveled per person

Transit Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	1,814,208	2,537,005	3,212,334	3,033,836	4,421,606	4,860,131
Per person	1.1	1.3	1.7	1.4	2.0	2.2
Per employee	2.0	2.4	3.0	2.4	3.6	3.9

Table 7.8 Daily bicycle miles traveled per person

Bicycle Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	750,707	970,434	997,531	1,198,724	1,231,769	1,204,307
Per person	0.5	0.5	0.5	0.6	0.6	0.6
Per employee	0.8	0.9	0.9	1.0	1.0	1.0

Table 7.9 Daily pedestrian miles traveled per person

Pedestrian Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	262,288	311,833	317,059	362,741	371,315	368,959
Per person	0.2	0.2	0.2	0.2	0.2	0.2
Per employee	0.3	0.3	0.3	0.3	0.3	0.3

Table 7.10 Daily freight truck miles traveled

Freight Miles Traveled	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Total	361,770	501,027	500,799	651,897	651,127	650,913

7.4.2 Mode share

Data source: Metro travel forecast model

Description: Evaluates percent of non-drive alone trips (daily walking, bicycling, transit and shared ride trips) at multiple geographies (region-wide, sub region, mobility corridor, and 2040 design type). The data is categorized by 'trips to, from within.'

Target or desired direction: Increase non-drive alone mode share at all geographic levels. Triple walking, biking and transit region wide by 2040 compared to 2015 levels.

Findings: Findings for mode share are provided below for region-wide, sub-regions, centers and other 2040 design types and mobility corridors.

Equity findings: Not included in transportation equity analysis

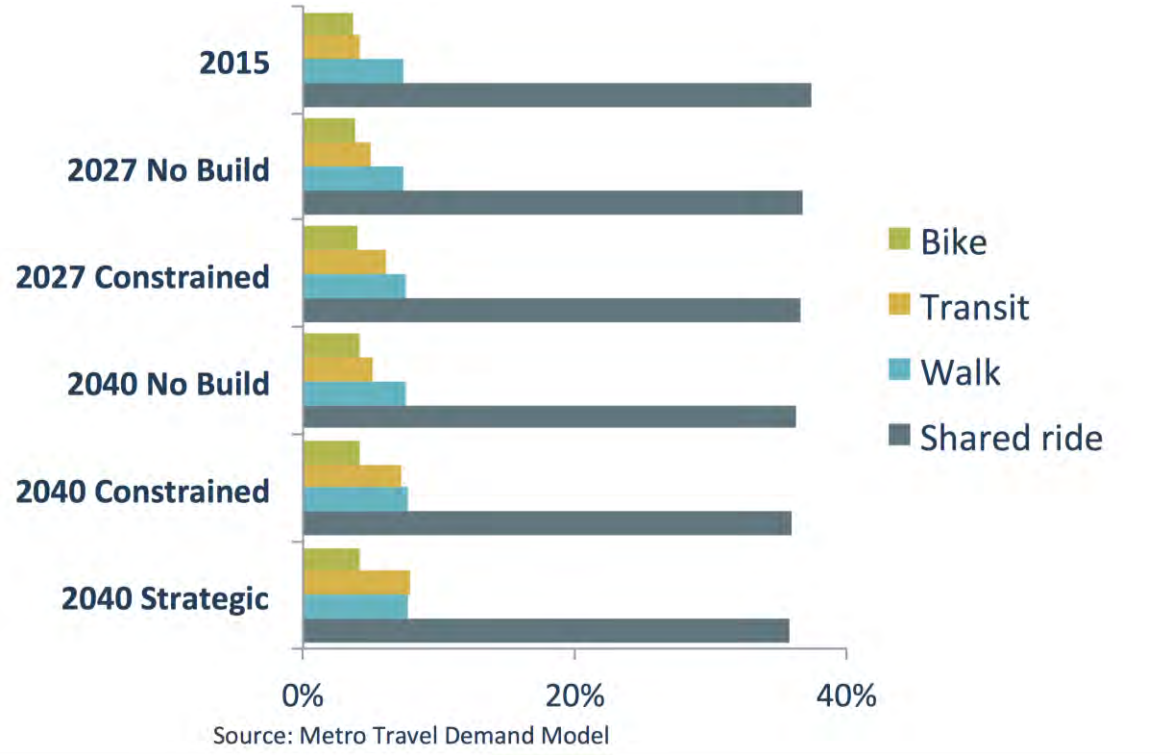
Region-wide (within MPA boundary)
Plan does not meet target of tripling walking, biking, shared ride and transit within the MPA between 2015 and 2040.

Table 7.11 Regional mode share (within the MPA)

Travel Mode	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Walk	7	7	8	8	8	8
Bike	4	4	4	4	4	4
Transit	4	5	6	5	7	8
Shared ride	37	37	37	36	36	36
Drive alone	45	45	43	45	43	43

Note: For all trips to, from and within the metropolitan planning area boundary, except school bus trips. Values have been rounded.

Figure 7.9 Non driving mode share within the MPA



Sub-region non-drive alone mode share

As the figure below shows, there are relatively large increases in walking, bike, shared ride and transit from 2015 to 2040 Constrained for travel within the City of Portland (from 26 percent to 32 percent) and urban Washington County (from 11 percent to 14 percent), with more moderate increases within other sub-regions. However, non-drive alone mode share does not triple for any sub-region.

Figure 7.10 Non-drive alone mode share by sub-region

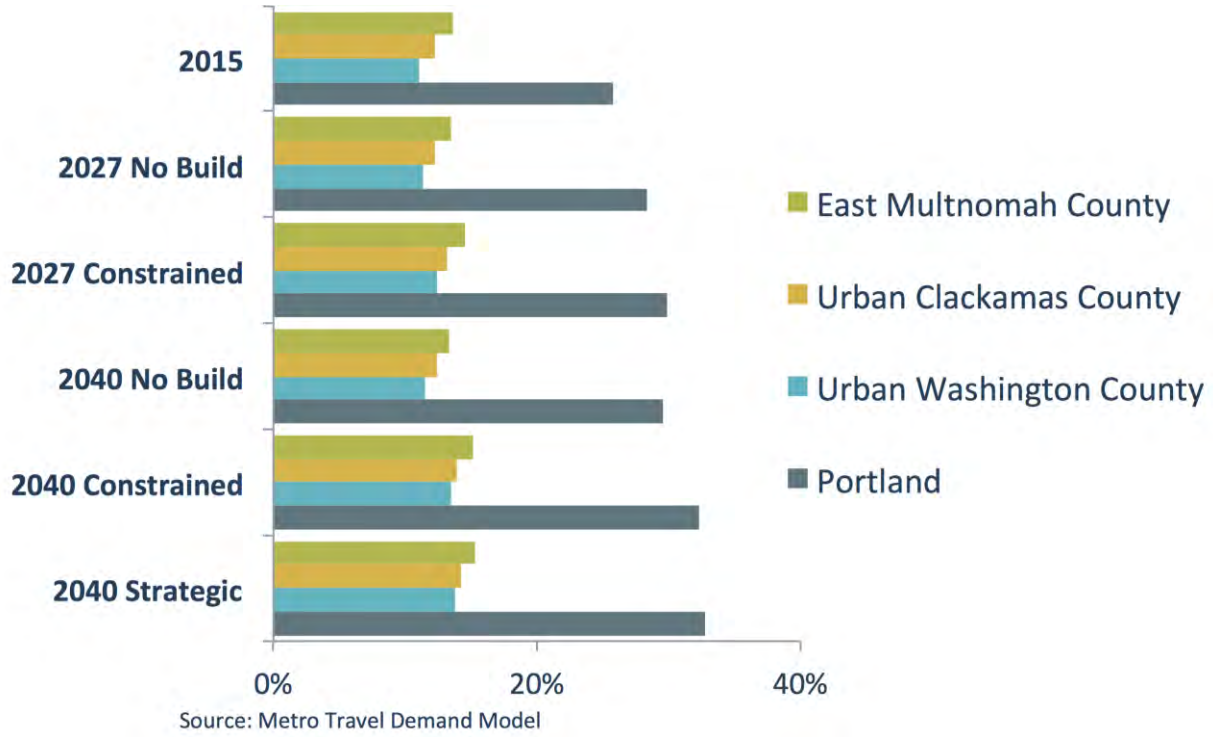


Table 7.12 Non-drive alone mode share by sub-region

Sub-region	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
City of Portland	61	62	63	63	65	65
East Multnomah County	57	56	57	56	57	57
Urban Clackmas County	54	54	55	53	55	55
Urban Washington County	52	52	53	52	54	54

Note: For all walking, biking, transit and shared ride trips to, from and within each sub-region. Does not include school bus trips. Values are rounded.

Centers and other 2040 land use design types

Shown in **Table 7.13**, centers across the region display relatively large increases in non-SOV mode share (transit, biking, walking and shared ride) between 2015 and 2040 demonstrating the RTP continues to comply with Section 0035(5) of the Oregon Transportation Planning Rule.

First adopted in the 2000 RTP and approved by the Land Conservation and Development Commission in 2001, the RTP targets shown in Tables 7.13 and 7.14 reflect the non-SOV mode share needed to comply with Section 0035(5). Section 0035(5) allows the RTP to include an "alternative standard" to measure progress in reducing reliance on the automobile in place of the requirement to achieve a specific reduction in per capita vehicle miles traveled. Cities and counties are responsible for identifying actions that will result in progress towards achieving these targets as they develop local transportation system plans, as required in Section 3.08.230 of the Regional Transportation Functional Plan. Progress toward achieving the targets is monitored through scheduled updates to the RTP.

Table 7.13 Non-drive alone mode share for 2040 centers

2040 Center	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic	RTP Target
Portland central city – downtown	74	77	77	80	83	84	60-70%
Portland central city – Lloyd district	60	69	69	71	71	77	
Portland central city – Central eastside	54	65	65	67	73	73	
Portland central city – River district	72	75	75	76	80	80	
Portland central city – South Waterfront	57	62	62	65	72	73	
Amberglen regional center	51	52	54	52	56	56	45-55%
Beaverton regional center	52	52	56	52	57	57	
Clackamas regional center	51	52	55	52	56	57	
Gateway regional center	53	53	56	53	57	58	
Gresham regional center	54	54	57	54	58	58	
Hillsboro regional center	54	54	56	53	57	57	
Oregon City regional center	52	50	52	50	52	53	

2040 Center	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic	RTP Target
Washington Square regional center	47	48	51	48	52	52	
Vancouver, WA – downtown	51	52	52	52	55	55	
Town centers Tier 1	53	54	54	54	57	58	55%
Town centers Tier 2	50	50	50	50	53	53	50%
Town centers Tier 3	49	49	49	49	51	51	45%
Town centers Tier 4	52	51	51	50	51	52	45%

Note: For all walking, biking, transit and shared ride trips to, from and within each designated 2040 area. Does not include school bus trips.

Table 7.14 Non-drive alone mode share for other 2040 Growth Concept Design Types

Other Design Types	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic	RTP Target
Station communities Tier 1	54	55	55	55	59	60	55%
Station communities Tier 2	42	44	44	45	49	50	45%
Station communities Tier 3	51	51	51	50	53	53	45%
Mainstreets and corridors	52	52	52	52	54	55	40-55%
Industrial areas	42	42	42	42	43	44	40%
Employment areas	45	46	46	46	47	48	45%
Neighborhoods	51	50	50	50	52	52	45%

Note: For all walking, biking, transit and shared ride trips to, from and within each designated 2040 area. Does not include school bus trips.

Mobility Corridors

Walking, biking and transit mode share increases in all mobility corridors across the region as shown in **Table 7.15**.

Table 7.15 Walking, Biking and Transit Mode Share Within Regional Mobility Corridors

Mobility Corridor	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Corridor 1 Portland Central City to Vancouver	26	29	30	30	32	32
Corridor 2 Portland to Tigard/ Tualatin	15	16	18	17	21	21
Corridor 3 Tualatin to Wilsonville	14	14	15	14	16	16
Corridor 4 Portland Central City Loop	53	58	60	60	64	64
Corridor 5 Portland Central City to Gateway	29	32	33	33	35	36
Corridor 6 Gateway to Troudale/Wood Village/ Fairview	14	15	16	15	17	17
Corridor 7 Gateway to Clark County	17	18	19	18	20	20
Corridor 8 Gateway to Oregon City	17	18	20	19	21	22
Corridor 9 Oregon City to Willamete Valley	17	17	17	17	18	18
Corridor 10 Oregon City to Tualatin	20	20	21	19	21	21
Corridor 11 Tigard and Tualatin to Sherwood / Newberg	14	14	15	14	17	17
Corridor 12 Beaverton to Tigard	13	14	15	14	16	17

Mobility Corridor	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Corridor 13 Portland Central City to Beaverton	46	48	50	49	52	52
Corridor 14 Beaverton to Hillsboro	13	13	14	13	15	16
Corridor 15 Hillsboro to Forest Grove	20	21	22	22	23	25
Corridor 16 Portland Central City to Columbia County	41	44	45	45	47	47
Corridor 17 Rivergate to I-5	23	24	24	24	25	26
Corridor 18 Columbia Corridor	17	18	19	19	20	20
Corridor 19 Portland City Center to Lents	24	26	26	26	28	28
Corridor 20 Lents to Gresham	16	16	17	16	17	18
Corridor 21 Portland Central City to Oregon City/West Linn	18	19	20	20	22	22
Corridor 22 Milwaukie to Clackamas	18	19	21	20	23	23
Corridor 23 Clackamas to Damascus	13	14	15	14	16	16
Corridor 24 Fairview / Wood Village / Troutdale / Happy Valley/ Damascus	13	13	14	12	14	14

Note: For all walking, biking and transit trips within each regional mobility corridor. Values have been rounded.

7.4.3 Access to travel options – system completeness

Data source: State and local agency Geographic Information System (GIS) data for sidewalk, bikeway, regional trail and street projects included in the RTP project database. Regional Land Inventory System (RLIS) GIS data of existing (constructed) sidewalks (as of 2012), bikeways (as of 2016) and trails (as of 2017). Regional Transportation Plan GIS data of the planned pedestrian, bicycle and transit networks (regional pedestrian and bicycle networks include regional trails). Data for arterial roadways was compiled from State of Oregon (Nov 2016), Metro Travel Model skims (2015), and RLIS (May 2017).

Description: Evaluates completeness of sidewalks, bikeways and regional trails for each of the RTP investment scenarios for the following:

- **Access to transit** – Miles of sidewalks, bikeways and regional trails completed within 1/2-mile from existing and planned light rail stops, 1/3-mile from streetcar stops, and 1/4-mile from bus stops; region wide and in equity focus areas.
- **Sidewalks** - Miles completed of the Regional Pedestrian Network (refer to map in Chapter 3); within 2040 centers, on existing arterial roadways and in equity focus areas.
- **Bikeways (on-street)** - Miles completed of the Regional Bicycle Network (refer to map in Chapter 3); within 2040 centers, on existing arterial roadways and in equity focus areas.
- **Trails (regional)** - Miles completed on the Regional Bicycle and Pedestrian Networks (refer to maps in Chapter 3) and in equity focus areas.

Target or desired direction: Hundred percent completion of the Regional Pedestrian and Bicycle Networks by 2040.

Findings: See below. Findings for equity focus areas are provided at the end.

Access to transit

All findings described are for the 2040 Constrained investment strategy in the RTP. While progress is made in filling gaps in sidewalks, bikeways and trails near transit, not all gaps are filled. By 2040, 74 percent of all sidewalks, 69 percent of all bikeways and 57 percent of regional trails are completed within 1/2-mile from light rail stops, 1/3-mile from street car stops, and 1/4-mile from bus stops, as shown in **Table 7.16 and Figure 7.11**.

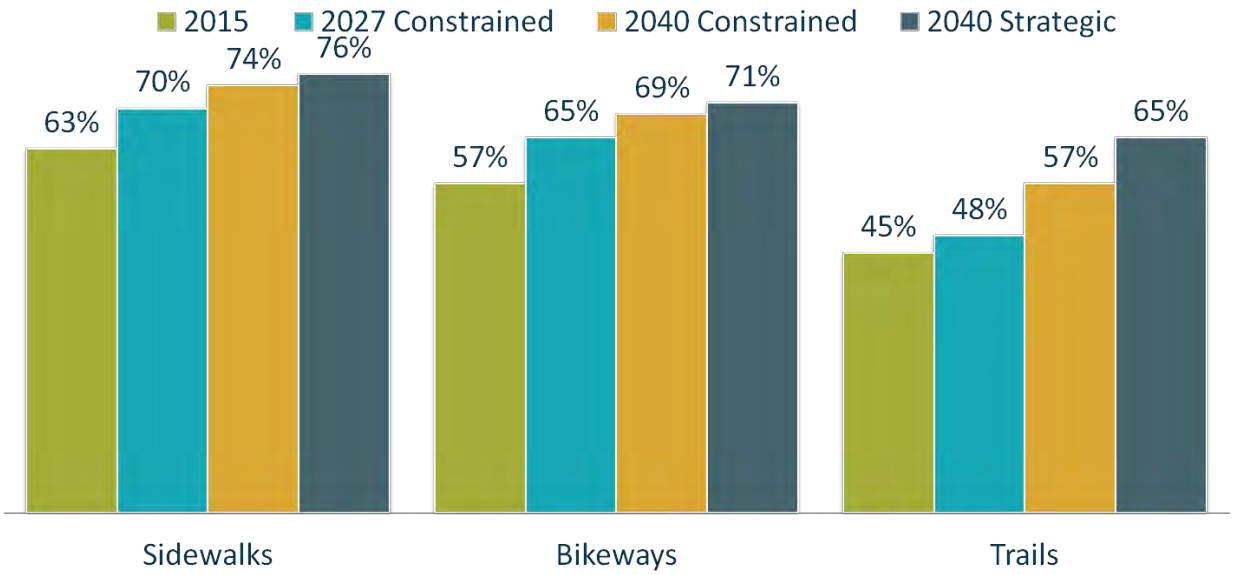
However, greater progress is made completing sidewalk, bikway and trail gaps near transit compared to region-wide completion. For example, while 74 percent of all sidewalks near transit are completed by 2040, 70 percent of sidewalks on arterial roadways are completed and only 69 percent of sidewalks are completed on the planned Regional Pedestrian Network. This indicates that policies and investments prioritizing access to transit are working.

Table 7.16 Percent of all sidewalks, bikeways and trails completed near transit and near transit within equity focus areas

	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Percent of sidewalks completed near transit	63%	63%	70%	63%	74%	76%
Percent of bikeways completed near transit	57%	57%	65%	57%	69%	71%
Percent trails completed near transit	45%	45%	48%	45%	57%	65%
Percent of sidewalks completed near transit within equity focus areas	73%	73%	80%	73%	83%	84%
Percent of bikeways completed near transit within equity focus areas	59%	59%	69%	59%	72%	74%
Percent of trails completed near transit within equity focus areas	44%	44%	49%	44%	56%	66%

Note: Near transit means within 1/2-mile from light rail stops, 1/3-mile from streetcar stops and 1/4-mile from bus stops. Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.11 Percent of all sidewalks, bikeways and trails completed near transit



Note: Near transit means within 1/2-mile from light rail stops, 1/3-mile from streetcar stops and 1/4-mile from bus stops.

Source: 2018 RTP Project Database and Regional Land Information System

Sidewalk completeness

All findings described are for the 2040 Constrained investment strategy in the RTP. While progress is made, the target of completing 100 percent of the regional pedestrian sidewalk network is not met. Sixty-nine percent of sidewalks on the planned regional pedestrian network were completed in 2040, as shown in **Table 7.17 and Figure 7.12.**

Additionally, the Plan makes progress towards completing sidewalks in 2040 centers and on arterial roadways, but not all gaps are filled.

By 2040, the plan will complete 51 percent sidewalks within 2040 centers.

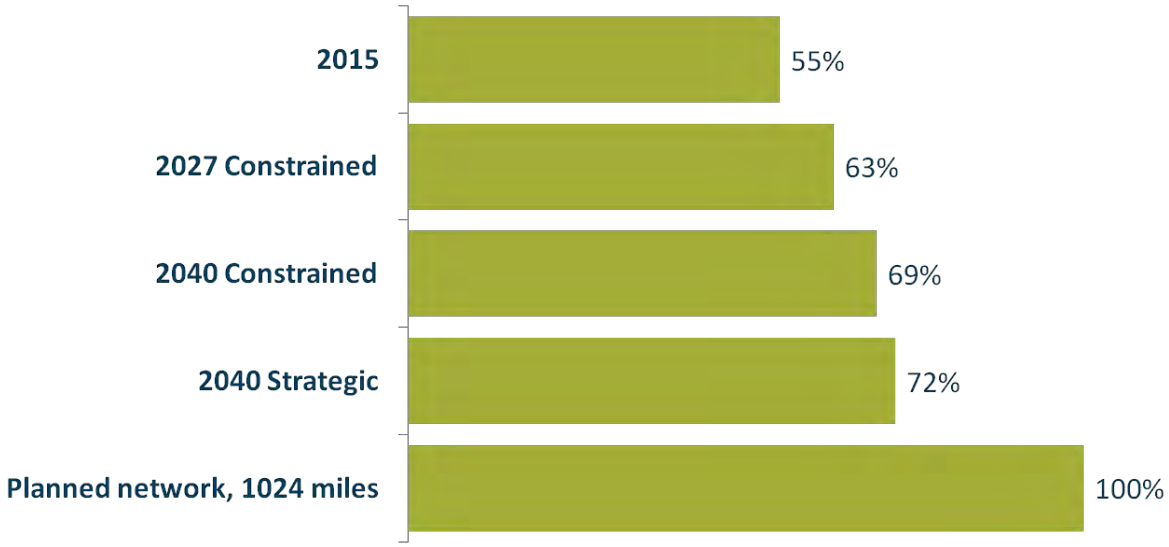
By 2040, the plan will complete 63 percent of sidewalks on the 773 miles of arterial roadways in the region.

Table 7.17 Number and percent of sidewalk miles completed on the planned pedestrian network, in centers and on arterials

Sidewalk completeness	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Planned network	566 55%	566 55%	645 63%	566 55%	703 69%	737 72%
Planned network within equity focus areas	355 69%	355 69%	397 77%	355 69%	418 81%	422 82%
Centers	773 47%	773 47%	806 49%	773 47%	830 51%	840 52%
Centers within equity focus areas	577 55%	577 55%	599 57%	577 55%	616 58%	622 59%
Arterials	393 51%	393 51%	449 58%	393 51%	489 63%	505 65%
Arterials within equity focus areas	249 66%	249 66%	282 75%	249 66%	299 80%	301 80%

Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.12 Percent of sidewalks completed on the planned regional pedestrian network



Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.13 Percent of sidewalks completed on existing arterial roadways



Source: 2018 RTP Project Database and Regional Land Information System

Bikeway (on-street) completeness

All findings described are for the 2040 Constrained investment strategy in the RTP. While some progress is made, the target of completing 100 percent of the regional pedestrian sidewalk network is not met. By 2040, the plan completes 63 percent of the planned regional bikeway network (731 out of 1,158 miles), as shown in **Table 7.18 and Figure 7.14.**

Additionally, the plan makes progress towards completing bikeways in 2040 centers and on arterial roadways, but not all gaps are filled.

By 2040, the plan will complete 31 percent of bikeways within 2040 centers.

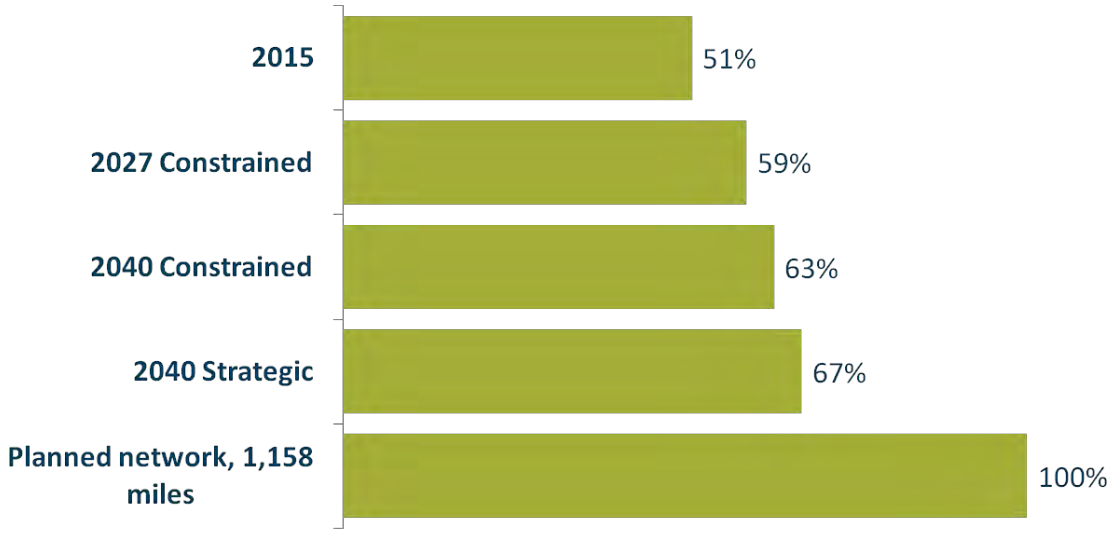
By 2040, the plan will complete 66 percent of bikeways on arterial roadways in the region.

Table 7.18 Number of miles and percent of on-street bikeways completed

On-street bikeway completeness	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Planned network	596 51%	596 51%	679 59%	596 51%	731 63%	771 67%
Planned network within equity focus areas	324 56%	324 56%	374 65%	324 56%	400 70%	411 71%
Centers	439 27%	439 27%	476 29%	439 27%	498 31%	509 31%
Centers within equity focus areas	321 30%	321 30%	352 33%	321 30%	364 34%	370 35%
Arterials	435 56%	435 56%	478 62%	435 56%	507 66%	529 69%
Arterials within equity focus areas	238 63%	238 63%	265 71%	238 63%	277 74%	281 75%

Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.14 Percent of bikeways completed on the planned regional bike network



Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.15 Percent of bikeways completed on existing arterial roadways



Source: 2018 RTP Project Database and Regional Land Information System

Regional Trails completeness

All findings described are for the 2040 Constrained investment strategy in the RTP. While some progress is made, the target of completing 100 percent of regional trails on the pedestrian and bicycle networks is not met. By 2040, the Plan will complete 51 percent of the planned regional trail network that is identified on the regional pedestrian and bicycle networks, 262 out of 509 miles. Note: The total number of miles of regional trails on the pedestrian and bicycle networks does not include all regional trails, nor does it include some off-street bikeways.

Table 7.19 Number of miles and percent of regional trails completed

Regional trail completeness	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Planned network	185 *36%*	185 *36%*	204 *40%*	185 *36%*	262 *51%*	296 *58%*
Planned network within equity focus areas	68 *39%*	68 *39%*	75 *43%*	68 *39%*	90 *51%*	109 *62%*

Source: 2018 RTP Project Database and Regional Land Information System

Equity findings: All findings described are for the 2040 Constrained investment strategy in the RTP. Equity focus areas see a higher level of active transportation (i.e. sidewalk, on-street bikeway, and trail) completion compared to the overall completion rate for the region and in non-equity focus areas. In general, level of completion for planned miles of sidewalks, on-street bikeways and trails exceed region and non-equity areas of one to three percent. When looking at

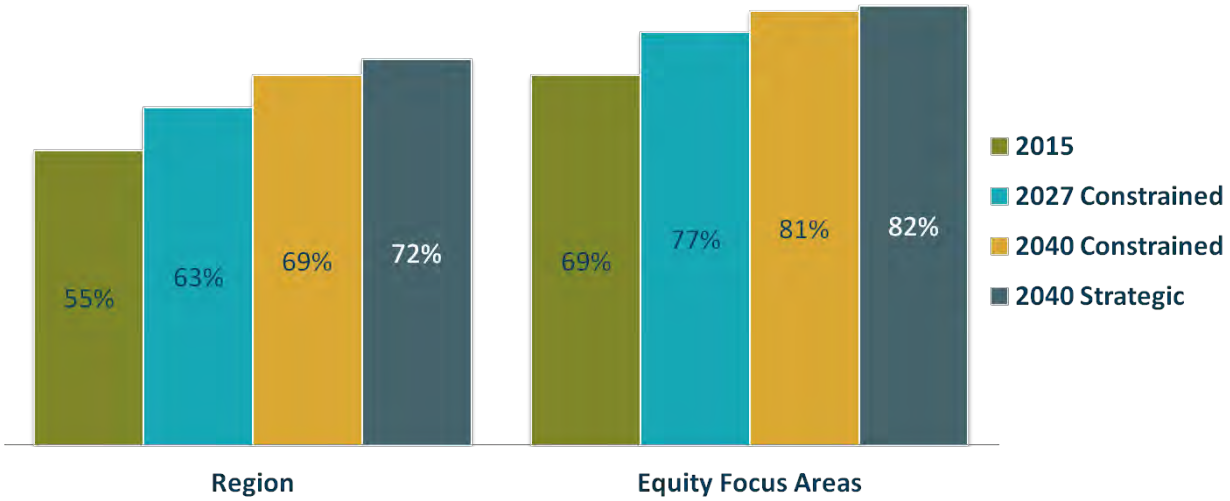
the rate of completion on arterials, a slightly lower rate of active transportation system completion in equity focus areas is planned compared to the overall regional active transportation network. In 2040, arterials see between 20 to 16 percent increase in miles of sidewalk and on-street bikeway completion, which is lower than the region overall at 24 to17 percent increase. Overall, however, the results illustrate that in the refinement phase, partners placed further focus to complete the active transportation network in equity focus areas while also balancing considerations like urban arterial facility and proximity to a transit stop.

Furthermore, what is also observed is that greater rates of completion are in equity focus areas within the first 10 years (2018-2027) of the 2018 RTP investment strategy. Also, a greater proportion of the active transportation investment relative to other types of transportation investment is in the first 10 years of the plan (28.8 percent of 2018-2027 investment; 14.9 percent of 2028-2040 financially constrained). When looking at completion rate of the on-street bicycle network in equity focus areas by 2040, the increase is 14 percent, and the first 9 percent of that growth in miles of completed on-street bicycle network is planned between 2018-2027. The remaining 5 percent growth in miles of on-street bicycle network is set for the outer years of the investment strategy. This is a change from what was observed in the first round of performance evaluation of the 2018 RTP where more active transportation investments were planned for the outer years of the Plan period. Jurisdictional partners responded to Metro Council direction to advance and further complete the active transportation network in the first 10 years of the 2018 RTP. The one area where this statistic diverges slightly is with regional trails, where 4 percent of completion is observed in the first 10 years and 8 percent in the outer part (2028-2040) of the Plan.

Nonetheless, the active transportation network does not see 100 percent completion in any category by 2040. Sidewalk completion on the planned network tops out region-wide at 83 percent in equity focus areas, 58 percent in 2040 centers and 80 percent on arterials. When looking further, sidewalk completion in proximity to transit stops (e.g. bus, streetcar, or light rail) sees 83 percent (with the 2040 financially constrained investment strategy) through 84 percent (with the 2040 strategic investment strategy) completion. The overall 2018 RTP investment level in active transportation ranges between $1.84 billion (in the 2040 financially constrained) to $2.98 billion (in the 2040 strategic). This range makes up between 10.7 percent to 12.4 percent of the overall 2018 RTP investment strategy.

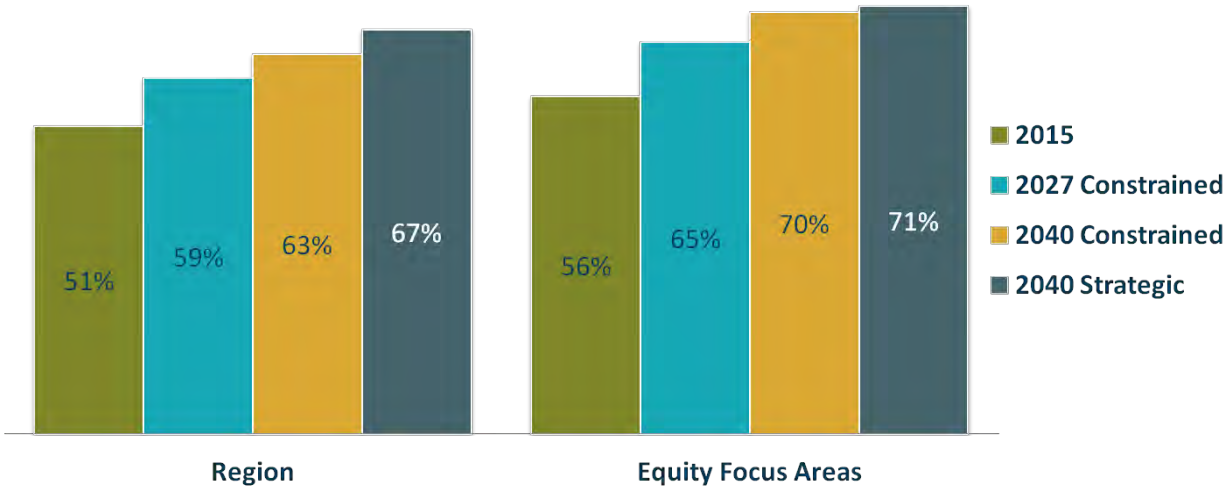
While falling short of the region's target to complete the active transportation network by 2040, the focus on advancing active transportation projects in the first ten years of the Plan and placing active transportation investments in equity focus areas at a greater levels than the non-equity focus areas indicate there is not an disproportionate or disparate impact.

Figure 7.16 Percent sidewalks completed on planned network in equity focus areas



Source: 2018 RTP Project Database and Regional Land Information System

Figure 7.17 Percent bikeways completed on planned network in equity focus areas



Source: 2018 RTP Project Database and Regional Land Information System

7.4.4 Access to jobs

Data source: Geospatial project information for proposed transportation projects provided by project sponsors and forecasted employment/jobs from MetroScope. Projections of jobs and geographic distribution of employment is based on underlying U.S. Bureau of Labor Statistics data (Quarterly Census of Employment and Wages) and assumptions regarding growth for the employment industries in MetroScope, and the Metro travel forecast model.

Description: Number and percent change of jobs (classified by wage groups – low, middle, and high) accessible by driving, transit, bicycling, and walking region-wide, in equity focus areas (people of color, English language learners and lower income) and in non-equity focus areas within the following commute times:

- 30 minutes by auto*
- 45 minutes by transit*
- 30 minutes by bike
- 20 minutes by walking

*Includes access and egress times.

Low-wage jobs were defined as jobs that pay an annual salary between $0 - $39,999. Middle-wage jobs were defined as jobs that pay an annual salary between $40,000 –$65,000. High-wage jobs were defined as jobs that pay an annual salary greater than $65,000. See Appendix I for more information on how the travel time and annual salary assumptions were developed.

Target or desired direction: No target. Desired direction is to increase the number of jobs accessible to the average household within a reasonable commute, with a focus on increasing middle and low-wage job access for the average household in equity focus areas compared to non-equity focus areas in the region by 2040.

Per recommendation by the transportation equity work group, Metro will update the performance measure with a target and develop evaluation methods to measure the disparities gap in access to low and middle-wage jobs for households in equity focus areas for the next update of the RTP.

Findings: In general, the 2018 RTP investment strategy increases the number of jobs the average household can reach within a commute time adjusted by travel mode. With the first ten years of investment outlined in the 2027 Constrained investment strategy, the average household will see a range of 18 more jobs by walking to 21,000 more jobs by transit accessible due to the investment strategy (See Table 7.17). The additional number of jobs accessible means the average household in the region is able to reach upwards of 49 percent of all the jobs in the region within a typical commute time, depending on the form of travel. Interesting to note is that the average household is able to reach approximately 10 percent of the region's 1 million projected jobs by either transit, during rush hour, or by bicycle within their respective commuting times (45 minutes for transit, 30 minutes for bicycling). By far, the investment in transit in the 2040 Constrained investment strategy show larger gains in the number of jobs accessible, where nearly

25 percent more jobs become accessible to the average household within a 45 minute transit trip. Comparatively, driving and biking saw closer to .8 percent (biking) to 1.6 percent (driving) increased job access in the typical 30-minute commute time. This illustrates that the multimodal investments in the 2027 Constrained investment strategy is making a positive impact in increasing the number of jobs accessible across different forms of travel, giving households more options for commuting to work.

While the 2027 Constrained investment strategy sees increases in the number of jobs accessible, the additional investment planned for 2028 through 2040 in the full 2040 Constrained investment strategy further increases the number of jobs the average household can reach within a typical commute time. For driving, transit and walking, the increase in the number of jobs at a minimum doubles with some cases the increase being 3 to 4 times greater than the gains seen within the first ten years. The one exception is bicycling, where a decrease in the number of jobs accessible within a 30 minute bicycle ride is projected. The decrease may be due to the greater number of route and facilities options available for bicycle commutes, creating further out of direction travel or longer than 30 minute bicycle commute trips. In general, the average household will see a range of 70 more jobs by walking to over 40,000 more jobs by transit as a result of the long-range investment strategy. Similar to the first 10 years, transit will see the greatest increase in the number of jobs, upwards of 42 percent, accessible within a 45-minute transit commute.

Table 7.20 Change in the Number of Jobs Accessible Within a Typical Commute Time

Change in Total Number of Jobs Accessible in 2027 (reflects difference between 2027 Constrained and 2027 No Build)						
	Auto Rush Hour	**Auto Non Rush Hour**	**Transit Rush Hour**	**Transit Non Rush Hour**	**Bike**	**Walk**
All Jobs	15,169	8,460	21,448	19,371	907	18
Low Wage Jobs	7,194	4,040	10,197	9,192	411	9
Middle Wage Jobs	4,168	2,318	5,883	5,322	258	5
High Wage Jobs	3,807	2,102	5,368	4,857	239	4
Change in Total Number of Jobs Accessible in 2040 (reflects difference between 2040 Constrained and 2040 No Build)						
	Auto Rush Hour	**Auto Non Rush Hour**	**Transit Rush Hour**	**Transit Non Rush Hour**	**Bike**	**Walk**
All Jobs	36,268	37,062	40,694	40,185	-509	70
Low Wage Jobs	17,118	17,512	18,671	18,452	-255	32
Middle Wage Jobs	10,017	10,223	10,929	10,829	-131	20
High Wage Jobs	9,165	9,362	10,065	9,960	-122	18

Table 7.21 Change in the Number of Jobs Accessible, by Wage Profile, Within a Typical Commute Time for Different Communities

	Change in Number of Jobs Accessible in 2027 (reflects difference between 2027 Constrained and 2027 No Build)					
	All Jobs					
	Auto Rush Hour	**Auto Non Rush Hour**	**Transit Rush Hour**	**Transit Non Rush Hour**	**Bike**	**Walk**
Region	15,169	8,460	21,448	19,371	907	18
Equity Focus Areas	13,210	7,534	24,155	21,549	365	11
Non-Equity Focus Areas	16,694	9,087	17,157	15,797	1,467	25
	Low Wage Jobs					
	Auto Rush Hour	**Auto Non Rush Hour**	**Transit Rush Hour**	**Transit Non Rush Hour**	**Bike**	**Walk**
Region	7,194	4,040	10,197	9,192	411	9
Equity Focus Areas	6,277	3,595	11,502	10,235	162	5
Non-Equity Focus Areas	7,906	4,343	8,138	7,486	667	13
	Middle Wage Jobs					
	Auto Rush Hour	**Auto Non Rush Hour**	**Transit Rush Hour**	**Transit Non Rush Hour**	**Bike**	**Walk**
Region	4,168	2,318	5,883	5,322	258	5
Equity Focus Areas	3,621	2,067	6,622	5,919	103	3
Non-Equity Focus Areas	4,596	2,488	4,711	4,341	417	6

Equity findings: For the average household within an equity focus area, the number of jobs accessible within a typical commute time by different forms of travel is expected to increase. The average household in an equity focus area will see upwards of 11 more jobs within a 20-minute walk to over 24,000 more jobs within a 45-minute transit trip due to the 2018 RTP investment strategy through 2027. With the addition of the 2018 RTP investment strategy beyond 2027 to 2040, the increase in the number of jobs accessible for the average household in equity focus areas goes up to 65 more jobs within a 20-minute walk to over 44,000 more jobs in a 45-minute transit trip. When looking more specifically at low-wage and middle-wage jobs, as a result of the 2018 RTP investment strategy, the average household in equity focus areas sees the number of middle and low wage jobs accessible in a 45-minute transit commute increase 42 percent by 2040.

The positive take away from the 2018 RTP investment strategy is that there is an increase in the number of jobs accessible to the average household in the equity focus areas within a typical 45-

minute transit commute trip. This pattern holds true regardless of the time of day (e.g. rush hour travel, when typically there is more transit service available, or non-rush hour travel, any other time of day). Additionally, with the 2018 RTP investment through 2027, there is an increase of 21,000 more jobs accessible in a 45-minute transit commute for the average household in an equity focus area. By 2040, the additional planned investment increases the number of jobs accessible within a 45-minute transit commute to over 44,000 for the average household in the equity focus areas. A similar pattern is observed when looking at both low and middle wage jobs. The number of low and middle wage jobs accessible within a 45-minute transit commute for the average household in equity focus areas increases by a little over 10,000 (low wage) and a little under 6,000 (middle wage) in 2027 to just over 21,000 (low wage) and over 12,300 (middle wage) jobs. This result shows the region is focusing transit investments in equity focus areas to support the travel needs of historically marginalized communities.

In some cases, the average household in the region and the average household in non-equity focus areas sees a greater increase in the number of jobs within a typical driving, bicycling or walking commute compared to the equity focus areas. For example, with the planned investments through 2027, the non-equity focus areas see an increase of 1,467 more jobs accessible by bicycle in a 30-minute commute, whereas equity focus areas see an increase of 365 more jobs in a 30-minute commute. This same pattern of non-equity areas seeing an increase in the number of jobs accessible is observed when looking at jobs by their wage profile (low, medium, high), primarily in driving, bicycling, and walking modes with investment through 2027 and with the investments through 2040 as identified in the 2018 RTP.

There are some potential reasons for why the average household in the region and in non-equity focus areas sees a greater increase in the number of jobs accessible within a typical driving, biking, or walking commute, regardless of wage profile. For driving, traffic congestion may impact why equity focus areas may see a lesser increase in the number of jobs accessible within a 30-minute driving commute. Another factor may be the changing land use mix in the region where the typical commute distance is getting longer, resulting in longer travel times.

For walking and bicycling, it is possible that as more transportation investments build out the active transportation network, specifically in equity focus areas, that more route options become available that are more attractive for riding and walking. The results of the Access to Travel Options performance measure indicate that the region did focus active transportation investments in equity focus areas. The increased number of available route options may encourage people commuting to work to bike a little bit further or slightly out of direction to access a better bicycling or walking facility. More time spent in active travel may be an indirect benefit. Whereas in the non-equity focus area, especially in the less developed areas of the region, a new bicycle facility which may have not existed and without other route options would vastly open up access for commuting. The results may illustrate the swings or a decrease in the number of jobs accessible within a 20-minute walk commute or 30-minute bicycle commute is not a detrimental result because it is impacting travel behavior and choice. More analysis would be needed to fully understand these results.

While equity focus areas experience less increase in the of number of jobs accessible by driving, bicycling, and walking compared to the region overall and non-equity focus areas, equity focus areas have a greater number of jobs accessible within a typical commute across all forms of travel. For example, in 2027 without the 2018 RTP investment strategy, the average household in equity focus area can reach a little over 107,000 jobs, about 10 percent of all the region's jobs by transit, in a 45-minute commute. For the non-equity focus areas, the average household can reach a little over 57,000 jobs while the average household in the region can reach a little over 86,000 jobs by transit in the same 45-minute window. This indicates the region has been focusing on placing transportation investments in equity focus areas and not only trying to gain efficiency.

The mixed results demonstrate that more investigation is necessary to understand how to improve and increase the number of jobs accessible by a reasonable commute for the average household in equity focus areas across all forms of travel. While the 2018 RTP investment strategy has determined a successful approach for transit including locating transit service, it is necessary to understand how to increase the number of jobs accessible by bicycling and walking in particular. Historically marginalized communities tend to use transit, bicycling, and walking for more of their travel trips. In addition to further investment, other strategies may be necessary, such as land use strategies, travel options education and demand management. More analysis is necessary to determine an appropriate set of strategies to make improvements and whether there is a potential disproportionate or disparate impact.

7.4.5 Access to community places

Data source: Geospatial project information for proposed transportation projects from project sponsors; U.S. Bureau of Labor Statistics – Quarterly Census of Employment and Wages (2013) and select North American Industry Classification System (NAICS) codes, and Metro travel forecast model.

Description: Measure access by bicycling, walking, transit, and driving region-wide, in equity focus areas (people of color, English language learners and lower income), and in non-equity focus areas within the following travel times:

- Automobile – 20 minutes*
- Transit – 30 minutes*
- Bicycle – 20 minutes
- Walk – 20 minutes

*Includes access and egress times.

Analysis is based on the locations of existing community places and does not factor in possible additional community places as a result of population and employment growth. MetroScope spatially distributes non-residential land uses and employment at a coarse granularity; finer detail on the locations of community places is necessary to predict future community places growth. As a result, the increase in the number of community places which can be reached within a short

driving, transit, walking, or bicycling trip may be greater than discussed in the findings. Community places, for purposes of this analysis, included hospitals and other medical services, civic places, such as post offices, churches, social services, libraries, schools and colleges, financial institutions, such as banks and credit unions, grocery stores, and essential retail services, such as hardware stores, pharmacies and laundry services. See Appendix I for more information on the NAICS codes and list of community places included this analysis.

Target or desired direction: No target. Desired direction is that by 2040, increase the number of community places accessible for the average household in equity focus areas compared to the average household in non-equity focus areas.

Per recommendation by the transportation equity work group, Metro will update performance measure and develop evaluation methods to measure the disparities gap in access to community places for households in equity focus areas for the next update of the RTP.

Findings: Region wide, the 2040 Constrained investment strategy increases the number of community places accessible within a short driving and transit trip. With the 2018 RTP investments through 2027, the average household in the region can get to 33 to 57 more community places in a short driving trip, or 78 to 100 more community places in a short transit trip depending on the time of day. With further investment planned for after 2027, the 2018 RTP investment strategy further increases the number of community places reached in a short driving or transit trip to upwards of 76 to 143 more community places accessible to the average household.

While the 2040 Constrained investment strategy is showing positive progress in the greater number of places accessible, little or no change in the number of community places accessible in a short walking or bicycling trip is observed as a result of the investment strategy. In general, the average household in the region can reach 66 community places in a short walk and 360 community places in a short bicycle ride. See **Appendix E** for full accessibility tables. Nonetheless, individual investments in active transportation may have a more significant impact in increasing the number of community places reached for an individual community than what the system-wide evaluation is showing.

Table 7.22 Change in the Number of Community Places Accessible Within a Typical Commute Time for Different Communities

Change in Number of Community Places Accessible in 2027 (reflects difference between 2027 Constrained and 2027 No Build)						
	All Community Places					
	Auto Rush Hour	Auto Non Rush Hour	Transit Rush Hour	Transit Non Rush Hour	Bike	Walk
Region	57	33	100	78	1	0
Equity Focus Areas	52	31	120	90	1	0
Non-Equity Focus Areas	59	35	72	60	1	1
Change in Number of Community Places Accessible in 2040 (reflects difference between 2040 Constrained and 2040 No Build)						
	All Community Places					
	Auto Rush Hour	Auto Non Rush Hour	Transit Rush Hour	Transit Non Rush Hour	Bike	Walk
Region	114	76	143	139	0	1
Equity Focus Areas	101	69	165	161	0	0
Non-Equity Focus Areas	123	79	109	105	1	1

Note: Typical commute time varies by form of travel.

Equity findings: When looking more closely at the analysis in the equity focus areas, the 2018 RTP 2027 Constrained and 2040 Constrained investment strategies result in more community places which can be reached in a short transit trip compared to the region and non-equity focus areas. This means the average household in the equity focus areas see a greater increase in the number of community places reached in a short transit trip compared to the average household in the region or in non-equity focus areas as a result of the investment strategy. The equity focus areas see an increase of 90 to 120 more community places reached in a 30-minute transit trip depending on the time of day in the 2027 Constrained investment strategy. The number of community places reached further increases to 165 with the 2018 RTP investments planned for the 2040 Constrained investment strategy. The region and non-equity areas see an increase range from 60 to 109 (non-equity focus areas) and 78 to 143 (region) with the 2018 RTP investment strategy.

While the significant increases in the number of community places reached in a short transit trip for the average household in a equity focus area is a positive sign, when it comes to other forms of travel (i.e. driving, walking, and bicycling), the region and non-equity focus areas see a greater increase in the number of community places reached within a short trip. For example, in a 20 minute drive, depending on the time of day, the average household in the region can reach 114 more community places in 2040 as a result of the 2018 RTP investments. This is 13 more

community places than the average household in an equity focus area. This means the average household in the region and in a non-equity focus area is seeing greater benefit in reaching community places in a short trip as a result of the 2018 RTP investment strategy compared to the average household in an equity focus area.

As described earlier in this section, minimal change was observed in the number of community places reached in a short bicycle or walking trip in the region. The same result is seen in non-equity focus areas and in equity focus areas. While the change is a difference of one more community place reached within a short bicycle or walking trip, the increase was generally observed more consistently in non-equity focus areas than equity focus areas. As described earlier in this section, the results may not fully show the increased numbers of community places reached as a result of the investment strategy since the analysis did not account for future community places opening as a result of population and employment growth creating new demand for grocery stores, doctors/dental offices, and other retail or services.

Additionally, as described more fully in the Access to Jobs analysis, the results for the number of community places reached within a short trip (15 minutes for bicycling, 20 minutes for walking) may not fully capture the benefits being gained by implementing the active transportation investments in the 2018 RTP. As new sidewalks and bikeways get built, new route options become available which may attract more out of direction travel in order to have a more pleasant walking or bicycling experience. This may result in trips taking longer than 15 or 20 minutes to get to different destinations, but more time spent in active travel with the associated health benefits.

The mixed results from the access to community places evaluation measure for the equity focus areas indicate further investigation is necessary to determine whether there is a potential disproportionate or disparate impact.

7.4.6 Access to bicycle and pedestrian parkways

Data source: Metro Regional Land Inventory System, Geographic Information Systems.

Description: Evaluates number and percent of households within 1/4-mile of a bicycle or pedestrian parkway (the highest level regional bicycle and pedestrian facilities – typically built as regional multi-use trails or along arterials). See Chapter 3 for more detail on these routes.

Target or desired direction: No target for this measure. The desired direction is an increase in the number and share of households within a 1/4-mile of a bicycle or pedestrian parkway.

Findings: In the 2015 base year, over 75 percent of households in the planning area are within ¼-mile of a regional bicycle parkway. This increases to over 77 percent in the 2027 Constrained system and slightly more in the 2040 Constrained and 2040 Strategic investment strategy.

Table 7.23 Number of households with access to regional bicycle parkways

Access to regional bicycle parkways	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Number of households	477,937	573,569	602,046	655,960	706,232	712,351
Percent of households	75%	74%	78%	73%	79%	79%

In the 2015 base year, 86 percent of households in the planning area are within 1/4-mile of a regional pedestrian parkway. This percent decreases slightly to 84 percent in the 2027 Constrained investment strategy, rising slightly to 85 percent in the 2040 Constrained and the 2040 Strategic investment strategy. One reason for the future decrease is that the RTP project list does not include many projects to complete pedestrian parkways in some of the newer growth areas on the edge of the region. As many of the pedestrian parkways are on frequent-service transit routes, this reflects the difficulty of providing access to high-quality transit in these areas.

Table 7.24 Number of households with access to regional pedestrian parkways

Access to regional pedestrian parkways	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Number of households	543,926	648,066	653,831	738,896	762,485	765,136
Percent of households	86%	83%	84%	82%	85%	85%

7.4.7 Access to transit

Data source: Metro travel forecast model.

Description: Number and share of households within 1/4-mile of bus, 1/3-mile from streetcar and 1/2-mile of high capacity transit or frequent service transit, region-wide, and in equity focus areas households (POC and LEP) and (POC, LEP and LI).

Number and share of jobs within 1/4-mile of bus, 1/3-mile from streetcar and 1/2-mile of high capacity transit or frequent service transit, region-wide and by subareas.

Target or desired direction: Per the Climate Smart Strategy, the 2035 monitoring targets for access to transit are:

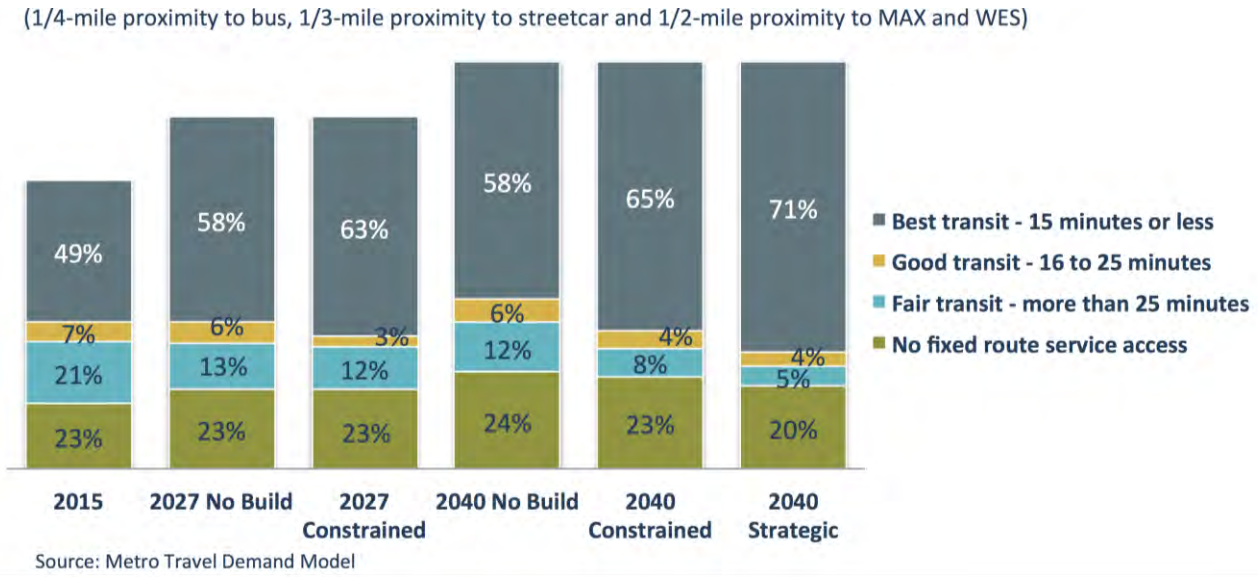
- 37 percent of households are within 1/4-mile of all day frequent service
- 49 percent of low-income households are within 1/4-mile of all day frequent service
- 52 percent of employment is within 1/4-mile of all day frequent service:

Findings: Determining the ease, comfort and directness of our transit system is no easy task, but the analysis shows that at the very least we are headed in the right direction. Under each of the investment strategies, the majority of the households and jobs in the region have access to 15-minute or better transit service. Between 70-85 percent of the jobs in the region would be accessible by frequent service transit in 2040. The majority of the households, 60 -70 percent, in the region would also have access to frequent service transit. There would be a higher percentage of jobs and households with access to frequent service transit during the peak rush hours and off-peak hours.

Equity findings: Low-income households region wide and in the equity focus areas would have greater percentage of households with access to frequent service compared to the region as a whole. Across the 2027 Constrained, 2040 Constrained and 2040 Strategic investment strategies, transit access is expected to increase for historically marginalized communities and communities of color and is expected to outperform the region as a whole, putting the region one step closer to establishing a more equitable transit system.

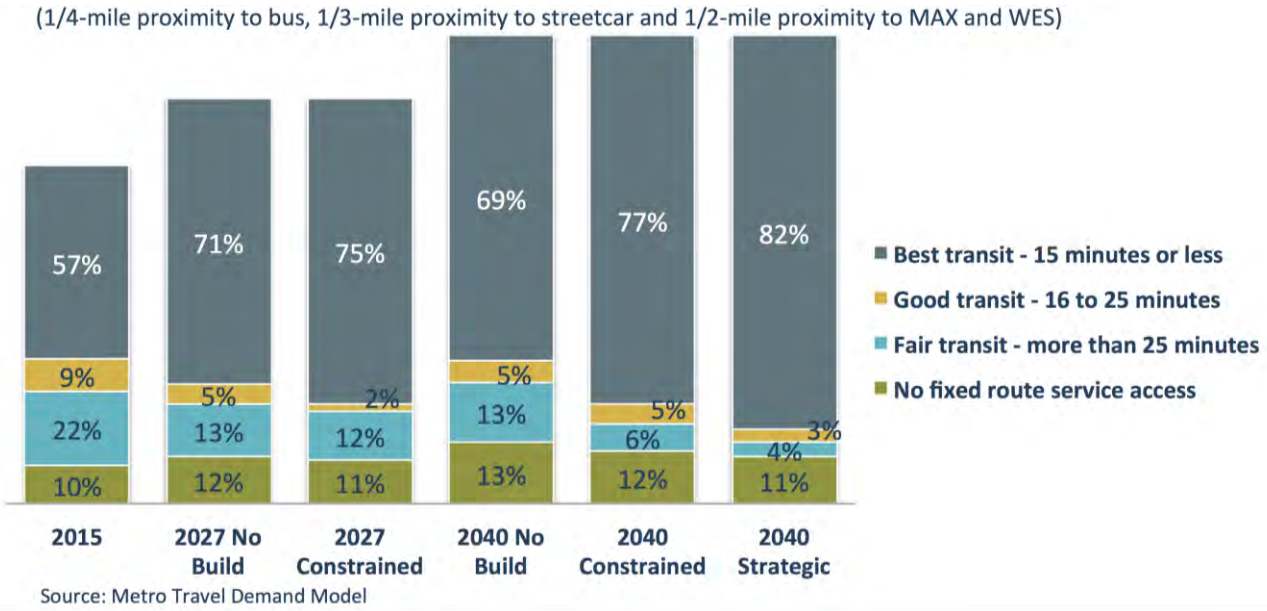
Proximity to stations: There is no motivation to use transit if it's geographically inaccessible, and even if it's geographically accessible there's no point in using it if it doesn't take you where you want to go. RTP transit planning considers these concepts of access concurrently. The good news is that the future looks bright for both qualifiers of access. As the graph below highlights, we can expect more than three-quarters of the region's households to have access (proximity) to transit by 2040, the majority being classified as "best transit" operating at 15-minute or better intervals. Additionally, 90 percent of the jobs in the region are accessible by transit. **Figures 7.18 and 7.19** shows the percentages of households and jobs with access to transit by frequency of planned transit service. **Figures 7.20 through 7.23** present the access and frequencies for jobs, households, low-income households and low-income households in communities of color for various time frames analyzed.

Figure 7.18 Share of households with access to transit during rush hour



More than three-quarters of the households in the region are expected to be near higher frequency transit. The number of households with 15-minutes or better transit service increases significantly between today and the future 2040 financially constrained investment strategies. The jobs in our region see even higher rates of transit access.

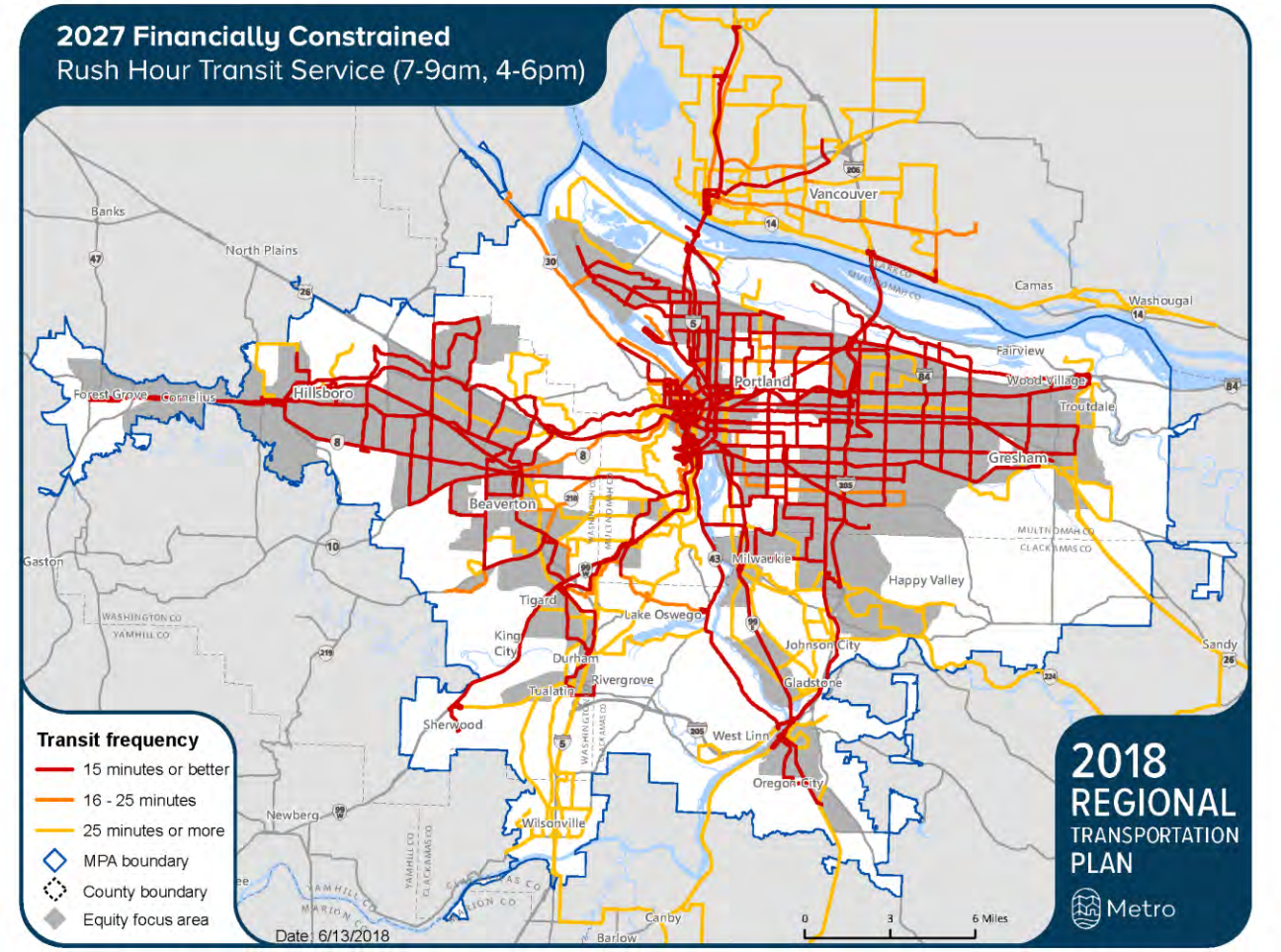
Figure 7.19 Share of jobs with access to transit during rush hour



Approximately 90 percent of the jobs in the region are located near transit. As shown in the figure above, the number of jobs accessible by 15-minute or better transit service increases significantly between today and the 2040 financially constrained investment strategies. The increase in transit service and frequencies means that more people are able to access job opportunities.

The figures that follow show transit service by RTP Investment Strategy.

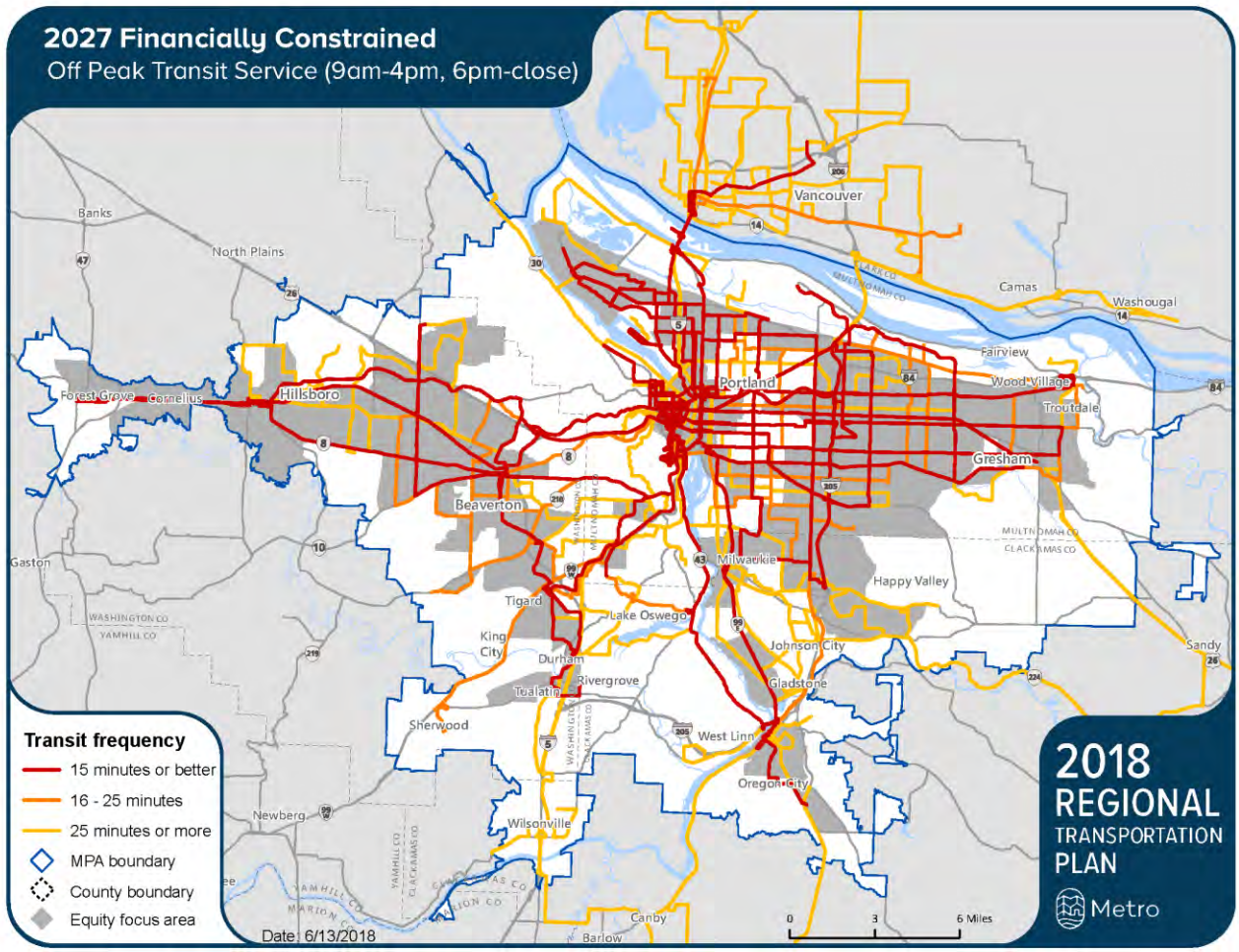
Figure 7.20 2027 Constrained rush hour transit service



Estimated share jobs and households near 15-minute or better rush hour service by 2027:

- 75 percent of jobs
- 63 percent of households
- 72 percent of low-income households
- 82 percent of low-income households in the equity focus areas

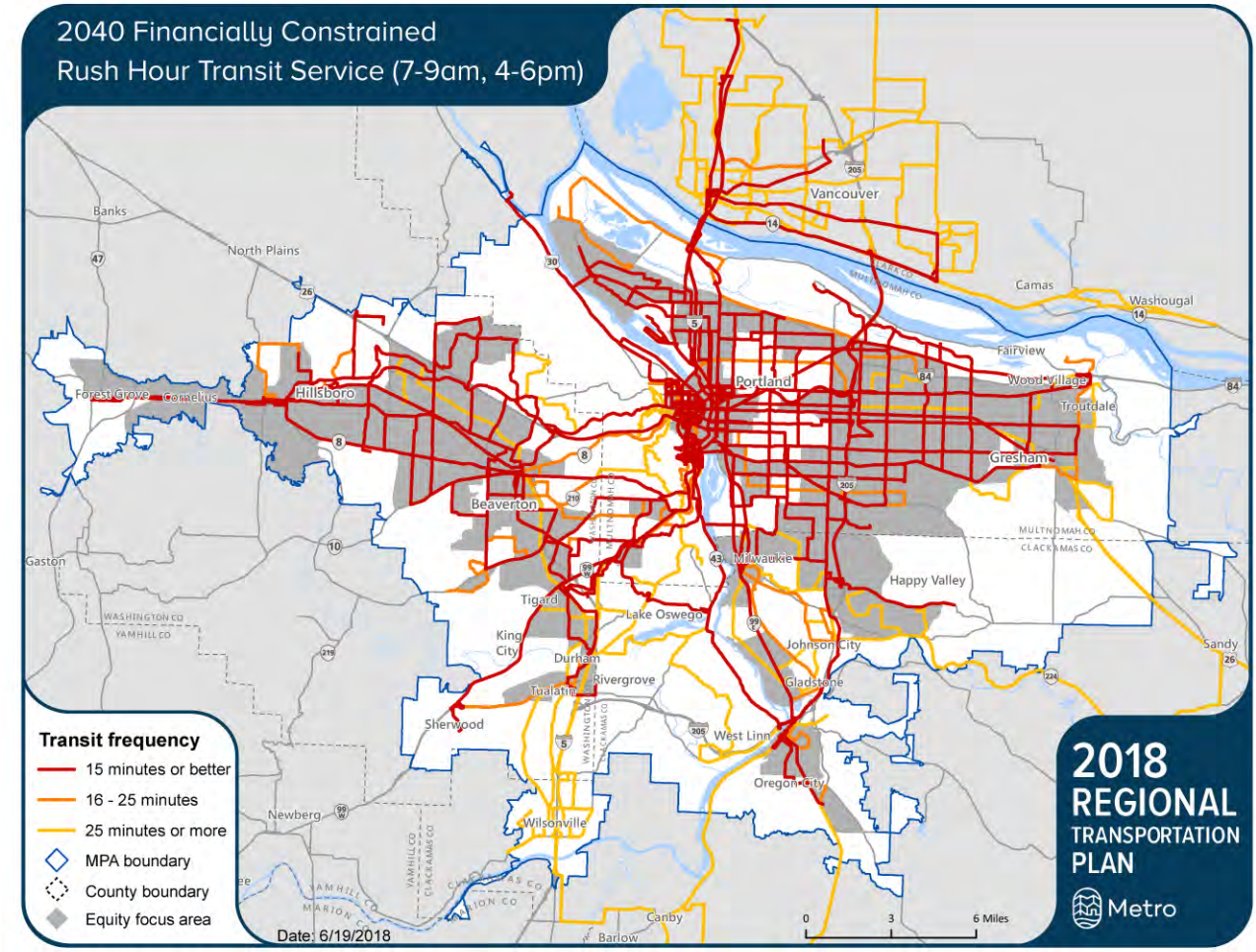
Figure 7.21 2027 Constrained off-peak transit service



Estimated share of jobs and households near 15-minute or better daytime and evening service by 2027:

- 67 percent of jobs
- 53 percent of households
- 63 percent of low-income households
- 72 percent of low-income households in the equity focus areas

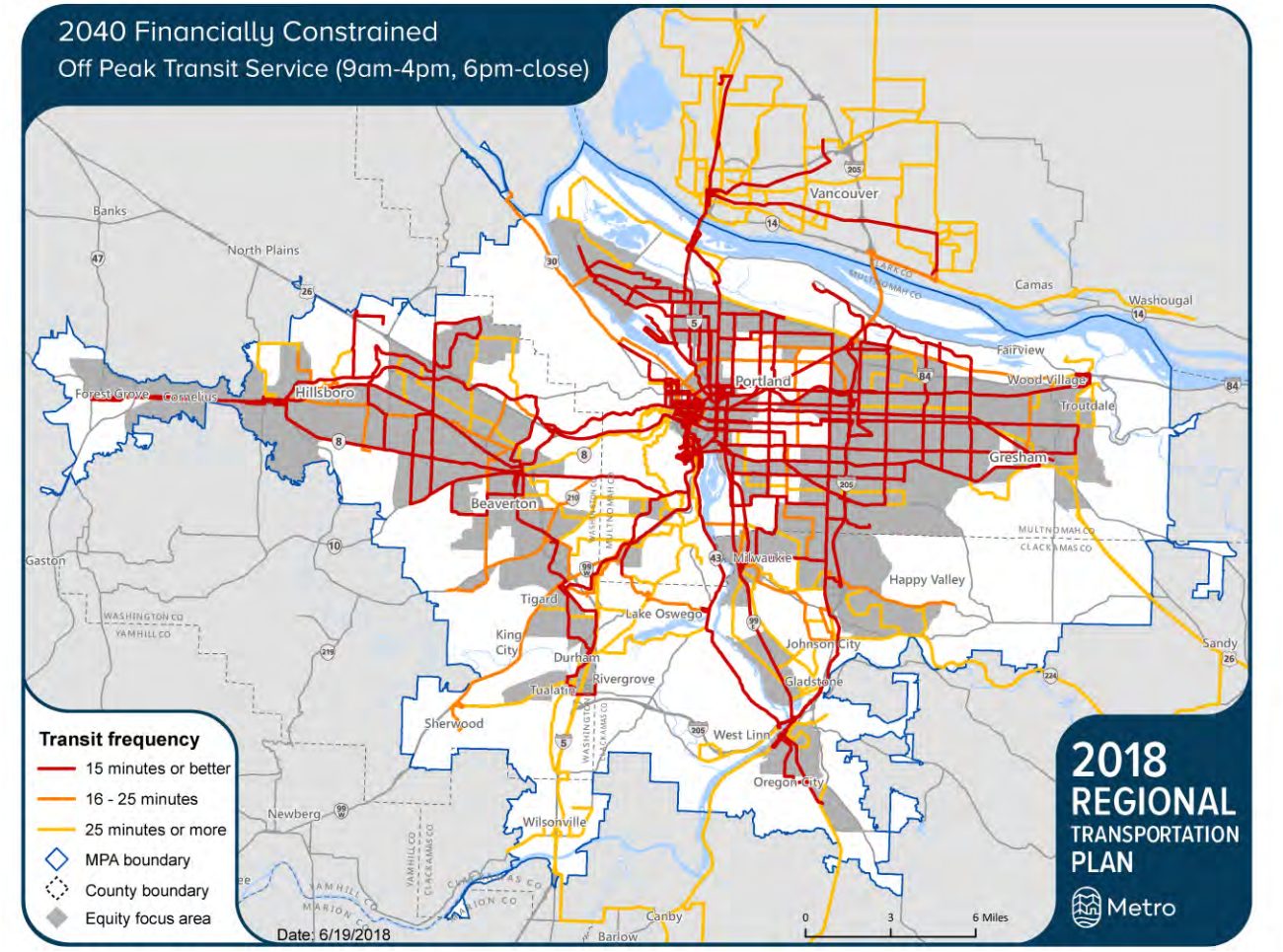
Figure 7.22 2040 Constrained rush hour transit service



Estimated of jobs and households near 15-minute or better rush hour service by 2040:

- 77 percent of jobs
- 65 percent of households
- 74 percent of low-income households
- 84 percent of low-income households in the equity focus areas

Figure 7.23 2040 Constrained off-peak transit service



Estimated share of jobs and households near 15-minute or better daytime and evening service by 2040:

- 69 percent of jobs
- 57 percent of households
- 68 percent of low-income households
- 78 percent of low-income households in the equity focus areas

7.4.8 Access to industry and freight intermodal facilities

Data source: Metro travel forecast model.

Description: Extent that industrial land and freight intermodal facilities are transportation constrained. This measure was developed and tested, but not fully implemented or evaluated as part of the 2018 RTP update. The intent is to measure the number of trucks that are coming from or going to freight intermodal facilities or industrial land within each of the Regional Mobility Corridors, and determine the hours of truck delay they are experiencing on the regional freight network. The times of day that were measured include the AM peak (7-9 AM), the mid-day for trucks (1-3 PM) and the PM peak (4-6 PM). The two areas chosen to test were the Tualatin and Sherwood Industrial Area off Tualatin-Sherwood Road (in mobility corridor 11); and the Marine Terminals 5 and 6 and the rail yards off Marine Drive (in mobility corridor 17).

Target or desired direction: There is no target for this measure. The desired direction is to reduce truck hours of delay on the freight network that provide access to intermodal facilities and industrial lands in 2040.

Findings: Incomplete and inconclusive due to testing being limited to two areas with freight intermodal facilities/rail yards or industrial land. Intermodal facilities and rail yards are not the only places that attract large numbers of freight trucks. According to the truck model, in 2015 the Tualatin and Sherwood Industrial Area generates 30 percent more truck trips (regardless of time period) than does the North Portland industrial area that includes Marine Terminals 5 and 6 and two rail yards. By 2040, that difference increases to about 33 percent more truck trips regardless of time period.

See Chapter 10 of the Regional Freight Strategy for more information on the methodology used to test this measure. This measure will be more fully developed as part of the next RTP update (due in 2023).

Equity findings: Not included in transportation equity analysis.

7.4.9 Multimodal travel times

Motor Vehicle Travel Times

Data source: Metro travel forecast model.

Description: Evaluates mid-day and PM peak travel time between 20 regional origin-destination pairs.

Target or desired direction: No target. Maintain motor vehicle travel times between key origin-destinations.

Findings: With the exception of the Central City to Vancouver corridor, motor vehicle travel time increases, generally by a few minutes, for all three 2040 investment strategies compared to the 2015 Base Year, for both travel periods and all origin-destinations. Evening peak travel times grow at a faster pace the mid-day travel times.

Overall, the 2040 Constrained and the 2040 Strategic investment strategies decrease motor vehicle travel time when compared to the 2040 No Build. Central City to Vancouver shows a 4-6 minute improvement in travel time in the 2040 Constrained.

Refer to Appendix I for tables showing travel times for each of the mobility corridors.

Equity findings: Not included in transportation equity analysis.

Transit Travel Times

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 or desired direction: No target. Reduce transit travel times between key origin-destinations.

Findings: In general, most corridors see a decrease or a maintaining of travel times from the 2015 Base Year to the 2040 Constrained; some corridors see decreases in transit time between 10 and 46 minutes. There are modest increases in transit travel times during the PM peak travel period from the 2015 Base Year to the 2040 Constrained in some corridors. For example:

- Gateway to Vancouver Mall - decrease in travel time of 15.4 minutes in the 12-1 travel period and decrease of 13.2 minutes in the 4-6 PM peak.
- Gateway to Oregon City - decrease in travel time of 12.4 minutes in the 12-1 travel period and decrease of 12.8 minutes in the 4-6 PM peak.
- Clackamas Town Center to Oregon City - decrease in travel time of 13.4 minutes in the 12-1 travel period and decrease of 9.5 minutes in the 4-6 PM peak.
- Tualatin to Oregon City - decrease in travel time of 35.3 minutes in the 12-1 travel period and decrease of 12.4 minutes in the 4-6 PM peak.
- Tigard to Sherwood decrease in travel time of 10.5 minutes in the 12-1 travel period and an increase of 6.2 minutes in the 4-6 PM peak.
- Tualatin to Sherwood - decrease in travel time of 46.4 minutes in the 12-1 travel period and decrease of 26.9 minutes in the 4-6 PM peak.

Refer to **Appendix I** for tables showing travel times for each of the mobility corridors.

Equity findings: Not included in transportation equity analysis.

Freight Travel Times

Data source: Metro Travel Forecast Model.

Description: Evaluates the one hour mid-day (12-1 PM), mid-day for trucks (2-3 PM) and PM peak (5-6 PM) truck travel times for 24 routes (one for each mobility corridor) that use the regional freight network, and start and/or end at a major industrial site (rail yard, intermodal facility, major industrial site, etc.).

Target or desired direction: No target. Maintain or decrease truck travel times for routes on the regional freight network within mobility corridors.

Findings: The following modeled results for major freeways are for the percent change in truck travel time for the 2040 Financially Constrained (FC) compared to the 2040 No Build (percents have been rounded):

- Central Eastside Industrial District in Portland to downtown Vancouver: 12-1 PM = 21 percent less; 2-3 PM = 18 percent less
- Central Eastside Industrial District in Portland to downtown Vancouver: 5-6 PM = 24 percent less
- I-5 @Morrison Bridge to Tualatin Industrial Area: 12-1 PM = 7 percent less; 2-3 PM = 2 percent less
- I-5 @Morrison Bridge to Tualatin Industrial Area: 5-6 PM = 2 percent less
- I-5 @Morrison Bridge to I-84/I-205: 12-1 PM = 1 percent less; 2-3 PM = 2 percent more
- I-5 @Morrison Bridge to I-84/I-205: 5-6 PM = 2 percent less
- I-84/I-205 to Fed Ex Troutdale: 12-1 PM and 2-3PM = stay the same
- I-84/I-205 to Fed Ex Troutdale: 5-6 PM = stay the same
- I-5 @Morrison Bridge to Hillsboro Industrial Area: 12-1 PM = 3 percent less; 2-3 PM = 2 percent more
- I-5 @Morrison Bridge to Hillsboro Industrial Area: 5-6 PM = stay the same

Due to the Columbia River Crossing/I-5 capacity project and the I-5 Rose Quarter project, truck travel times between the Central Industrial Eastside District (CEID) and downtown Vancouver, Washington improve by about 18 to 23 percent over the 2040 No Build. Due to smaller-scale throughway investments on I-5 south of downtown Portland, truck travel times between the Morrison Bridge and the Tualatin Industrial Area improve slightly during the PM peak period (1.5 percent less) and improve by 2.1 to 6.6 percent during the off peak periods. However, for I-84 east of I-5 and US 26 west of Hillsboro, the truck travel times during the peak period are about the same (.4 to 2.2 percent less) and have only small variations during off-peak travel times (3 percent less to about 2 percent more).

The following modeled results are for the Sunrise Corridor area between I-205 and US 26 in Boring, and show the percent reduction in truck travel time for the 2040 Financially Constrained (FC) compared to the 2040 No Build:

- Clackamas Industrial Area to Highway 212 at US 26: 12-1 PM = 10 percent less; 2-3 PM = 12 percent less
- Clackamas Industrial Area to Highway 212 at US 26: 5-6 PM = 15 percent less
- Due to completion of the Sunrise Highway project between 122nd and 172nd truck travel times between the Clackamas Industrial Area and US 26 in Boring improve by about 10 to 15 percent (depending on the time period) over the 2040 No Build.
- Capacity improvements on Highway 217 occur within the 2040 Strategic scenario and provide faster travel times on Highway 217 from US 26 to I-5. Compared to the 2040 No Build the truck travel times on Highway 217 southbound between US 26 and I-5 are about 13 percent faster in the PM peak period and about 10 to 11 percent faster during the off peak periods with the 2040 Strategic.

Refer to Appendix I for tables showing travel times for each of the mobility corridors.

Equity findings: Not included in transportation equity analysis.

Bicycle travel times

Data source: Metro Travel Forecast Model.

Description: Evaluate changes in bicycle travel times between key origins and destinations.

Target or desired direction: No target. Decrease or maintain bicycle travel times between key origins and destinations.

Findings: Bicycle travel times do not change significantly in most corridors – bicycle travel times remain reliable. One notable exception is that the travel time between Lake Oswego and the Park Avenue MAX Station reduces by over 68 percent (from approximately 39 minutes to 12 minutes) due to the RTP project that will construct a bicycle and pedestrian bridge over the Willamette River between Lake Owego and Oak Grove. See **Appendix I** for a table showing bicycle travel times within all origin/destination pairs.

Refer to **Appendix I** for tables showing travel times for each of the mobility corridors.

Equity findings: Not included in transportation equity analysis.

7.4.10 Congestion

Interim Regional Mobility Policy

Locations of throughways and arterials that do not meet regional mobility policy.

Data source: Metro Travel Forecast Model.

Description: Identifies number and percent of network miles and locations within the Metropolitan Planning Area (MPA) that exceed the interim regional mobility policy for congestion in the one hour mid-day (1-2 PM) and two-hour pm peak (4-6 PM) periods. 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 may occur as a result of the congested link. Congestion is measured by using the ratio of volume to capacity. Refer to Chapter 3 for interim regional mobility policy thresholds for congestion.

Target or desired direction: Meet the interim regional mobility policy thresholds for congestion.

Findings: All three 2040 investment strategies (2027 and 2040 Constrained and 2040 Strategic) see an increase the number of network miles that do not meet the Interim Regional Mobility Policy, compared to the 2015 Base year. In particular, certain state highway segments (listed in **Appendix I**) in the system will not meet the mobility standards in Table 7 of Oregon Highway Plan (OHP) under Policy 1F.1 of the OHP by 2040, even with the investments to the system proposed in the 2018 RTP. In this situation, OHP Policy 1F.5 establishes a different performance standard for the 2018 RTP.

> "For purposes of evaluating … transportation system plans, in situations where the volume to capacity ratio for a highway segment … is currently above the standards in Table 6 or Table 7 … and transportation improvements are not planned within the planning horizon to bring performance to the established target, the mobility target is to avoid further degradation."

The region has many more identified needs for improvement of highway performance than there is feasible funding available to address (RTP Chapter 5). As described in Chapter 5, the RTP includes a financially feasible implementation program and feasible policies, projects and supporting strategies. As a result, the RTP improves performance as much as feasible and implements a number of projects, strategies and actions aimed at avoiding further degradation.

The Plan fails to meet the current v/c thresholds, particularly for the region's throughway system, triggering the need for a refinement plan to consider alternative approaches for measuring and addressing mobility and transportation system adequacy under the Oregon Transportation Planning Rule and Oregon Highway Plan Policy 1F. Metro and ODOT have committed to updating the interim regional mobility policy to better align with the comprehensive set of goals and desired outcomes identified in the RTP. As allowed under OHP Policy 1F.3, the refinement plan's resulting alternative highway mobility targets are expected to reflect the balance between relevant objectives related to land use, economic development, social equity, and mobility and

safety for all modes of transportation. Described in Chapter 8 (Section 8.2.3.1), an updated policy will be considered for approval by JPACT and the Metro Council as an amendment to the RTP as part of the next RTP update (due in 2023). The updated policy for state-owned facilities will be considered for approval by the OTC as an amendment to Policy 1F of the Oregon Highway Plan.

Tables 7.25 and 7.26 show the number and percent of miles of throughways and arterials that do not meet the interim regional mobility policy. Mileage is counted twice if both directions of a throughway or arterial segment do not meet the mobility policy. "4-6 PM" means the miles of throughways or arterials that do not meet the mobility policy during the full two-hour peak period. Segments that do not meet the policy in only the 4-5 PM or 5-6 PM travel periods are not included in the miles of segments in the "4-6 PM (both hours)."

Figures 7.24 through 7.29 show throughway network locations exceeding the mobility policy in either direction in red (identified as "unacceptable congestion") for the one-hour mid-day (12-1 PM) and two-hour evening peak (4-6 PM) periods for the 2015 base year, 2027 Constrained and 2040 Constrained. Refer to **Appendix I** for a list of each state-owned facility that does not meet the interim regional mobility policy for the one-hour mid-day (12-1 PM) and two-hour evening peak (4-6 PM) periods.

Equity findings: Not included in transportation equity analysis.

Table 7.25 Throughway network miles that do not meet regional mobility policy

Travel period	2015 Base Year		2027 No Build		2027 Constrained		2040 No Build		2040 Constrained		2040 Strategic	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
12-1 PM	4.0	2%	9.7	4%	9.6	4%	25.9	9%	16.8	6%	15.2	5%
4-6 PM [1]	15.6	6%	38.4	14%	32.4	12%	59.6	22%	48.1	18%	44.8	16%
4-6 PM[2] both hours	10.9	5%	28.7	11%	23.8	9%	50.8	19%	39.6	14%	36.3	13%
4-5 PM one hour	2.0	<`1%	2.6	1%	2.6	1%	2.9	1%	3.5	2%	4.0	2%
5-6 PM one hour	2.7	<`1%	7.1	2%	6.0	2%	6.0	2%	5.0	2%	4.4	2%

Table notes:

[1] Includes all miles exceeding the Interim Regional Mobility Policy Threshold during anytime between 4-6 PM.

[2] Does not include miles exceeding the Interim Regional Mobility Policy Threshold for a single hour (e.g., 4-5 PM or 5-6 PM)

Percentages are rounded to the nearest percent.

Table 7.26 Arterial network miles that do not meet regional mobility policy

Travel period	2015 Base Year		2027 No Build		2027 Constrained		2040 No Build		2040 Constrained		2040 Strategic	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
12-1 PM	5.8	<`1%	11.2	<`1%	12.1	<`1%	28.9	<`1%	19.1	<`1%	17.2	<`1%
4-6 PM [1]	19.6	<`1%	45.3	1%	39.0	1%	69.6	2%	58.1	1%	51.8	1%
4-6 PM[2] both hours	14.4	<`1%	34.0	<`1%	29.1	<`1%	58.9	2%	46.0	1%	41.8	1%
4-5 PM one hour	2.4	<`1%	4.0	<`1%	4.0	<`1%	4.1	<`1%	5.1	<`1%	5.1	<`1%
5-6 PM one hour	2.8	<`1%	7.3	<`1%	5.9	<`1%	6.6	<`1%	7.1	<`1%	4.9	<`1%

Table notes:

[1] Includes all miles exceeding the Interim Regional Mobility Policy Threshold during anytime between 4-6 PM.

[2] Does not include miles exceeding the Interim Regional Mobility Policy Threshold for a single hour (e.g., 4-5 PM or 5-6 PM)

Percentages are rounded to the nearest percent.



Regional Mobility Policy Update

There has been increasing discussion of the role of motor vehicle volume-to-capacity (v/c) as a performance metric. The region and local communities across the region have adopted goals such as improving safety for all roadway users (e.g., pedestrians, bicyclists, freight and transit users) and encouraging infill development to implement the 2040 Growth Concept, which often conflict with meeting v/c thresholds.

The region has committed to updating the interim regional mobility policy to better align with the comprehensive set of goals and desired outcomes identified in the RTP. Chapter 8 (Section 8.2.3.1) describes a proposed work plan for considering measures aimed at system efficiency, including people-moving capacity, person throughput and system completeness. This work is anticipated to be completed prior to the next RTP update, due in 2023.

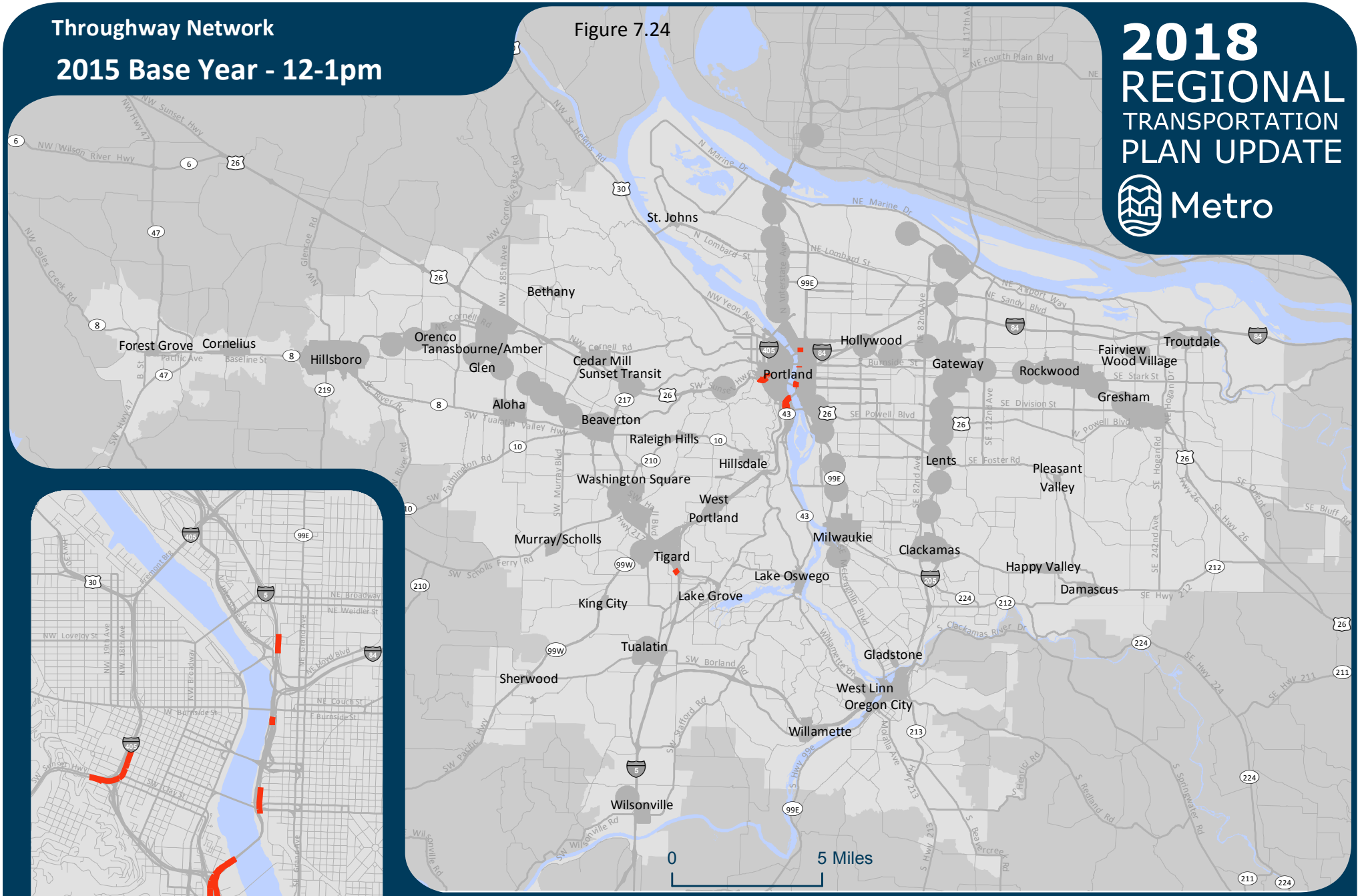
Throughway Network

2015 Base Year - 12-1pm

Figure 7.24

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 12-1 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

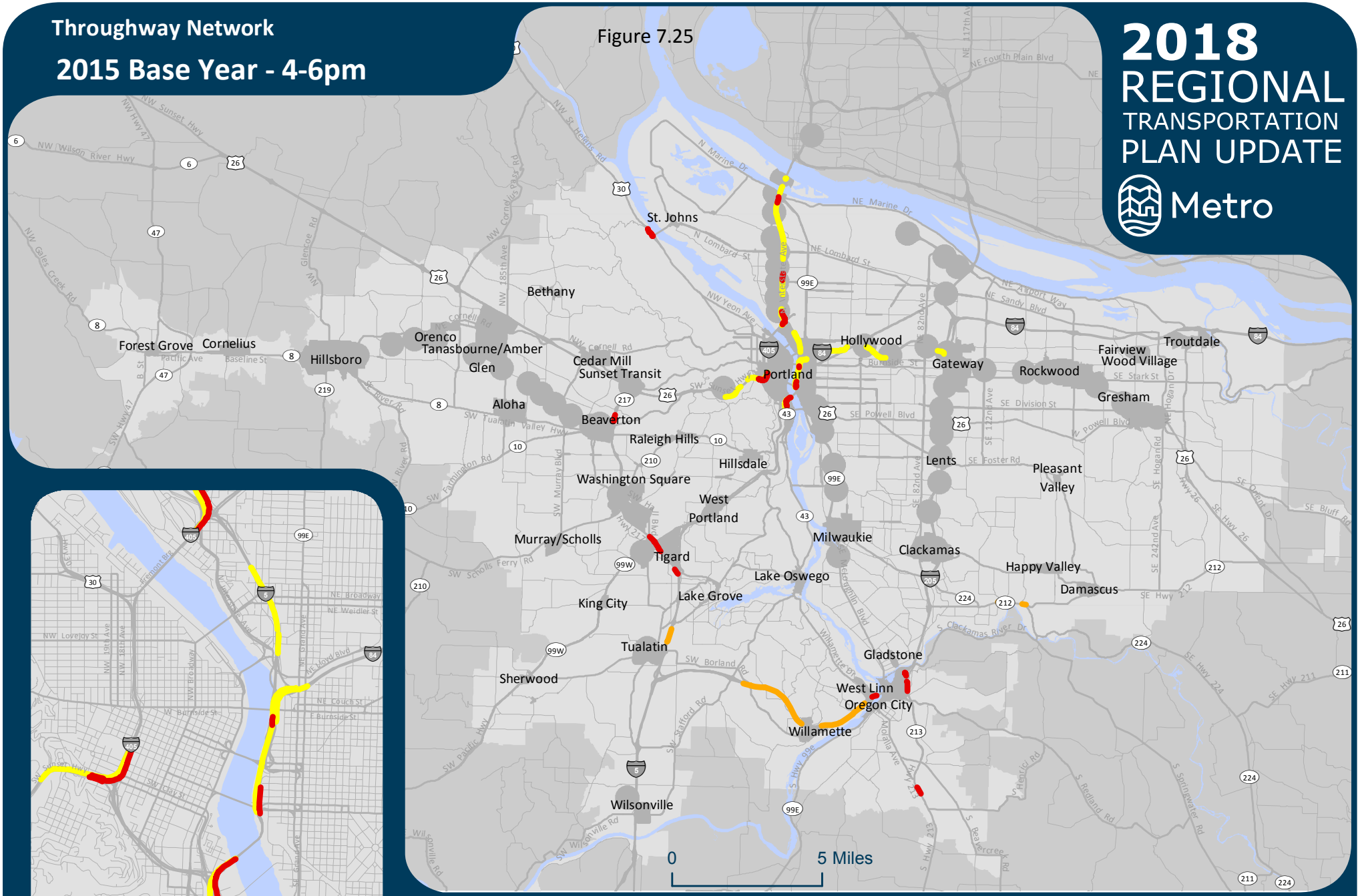
Throughway Network

2015 Base Year - 4-6pm

Figure 7.25

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 4-6 PM (peak travel hours) — 5-6 PM — 4-5 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

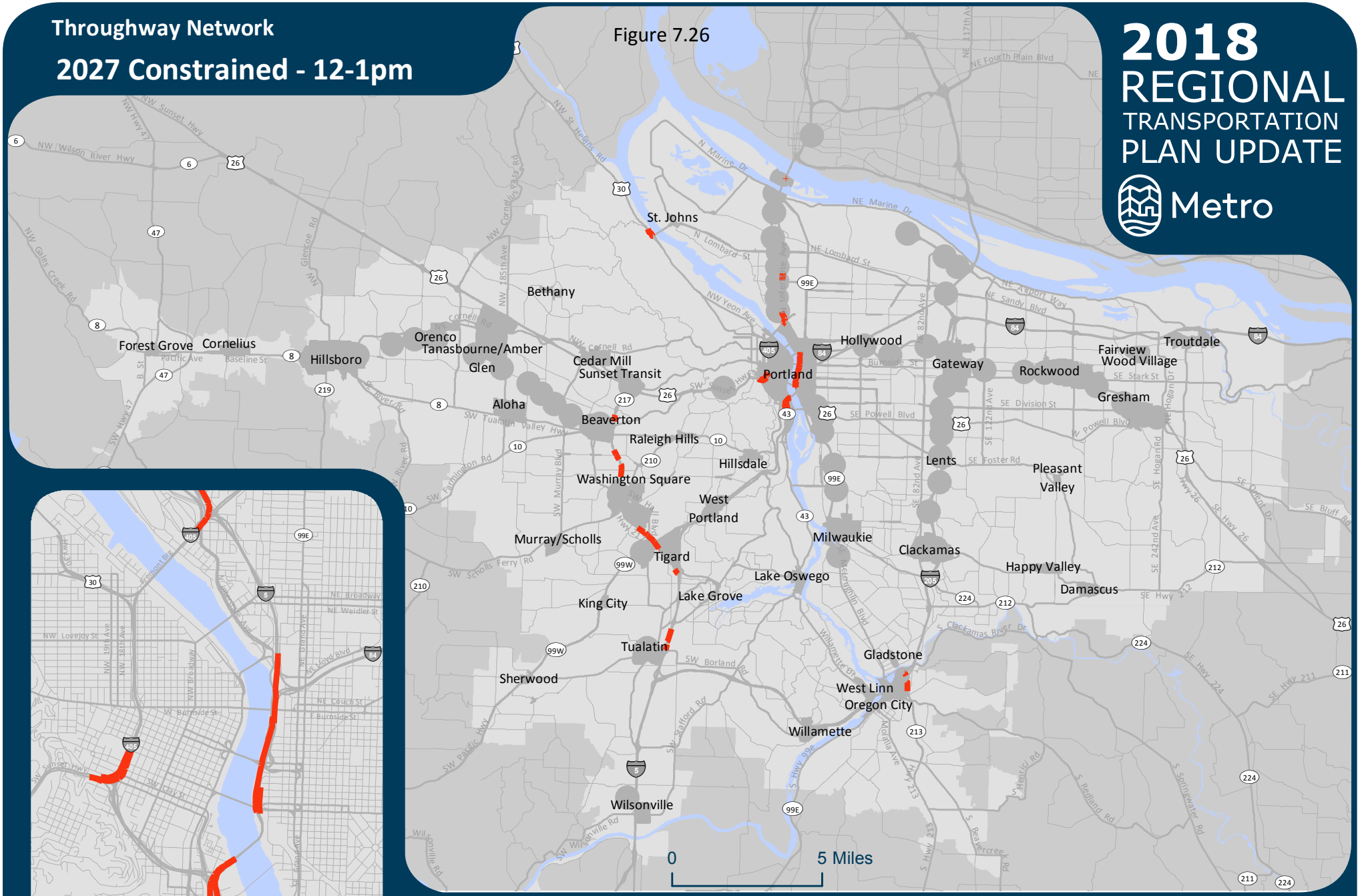
Throughway Network

2027 Constrained - 12-1pm

Figure 7.26

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 12-1 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

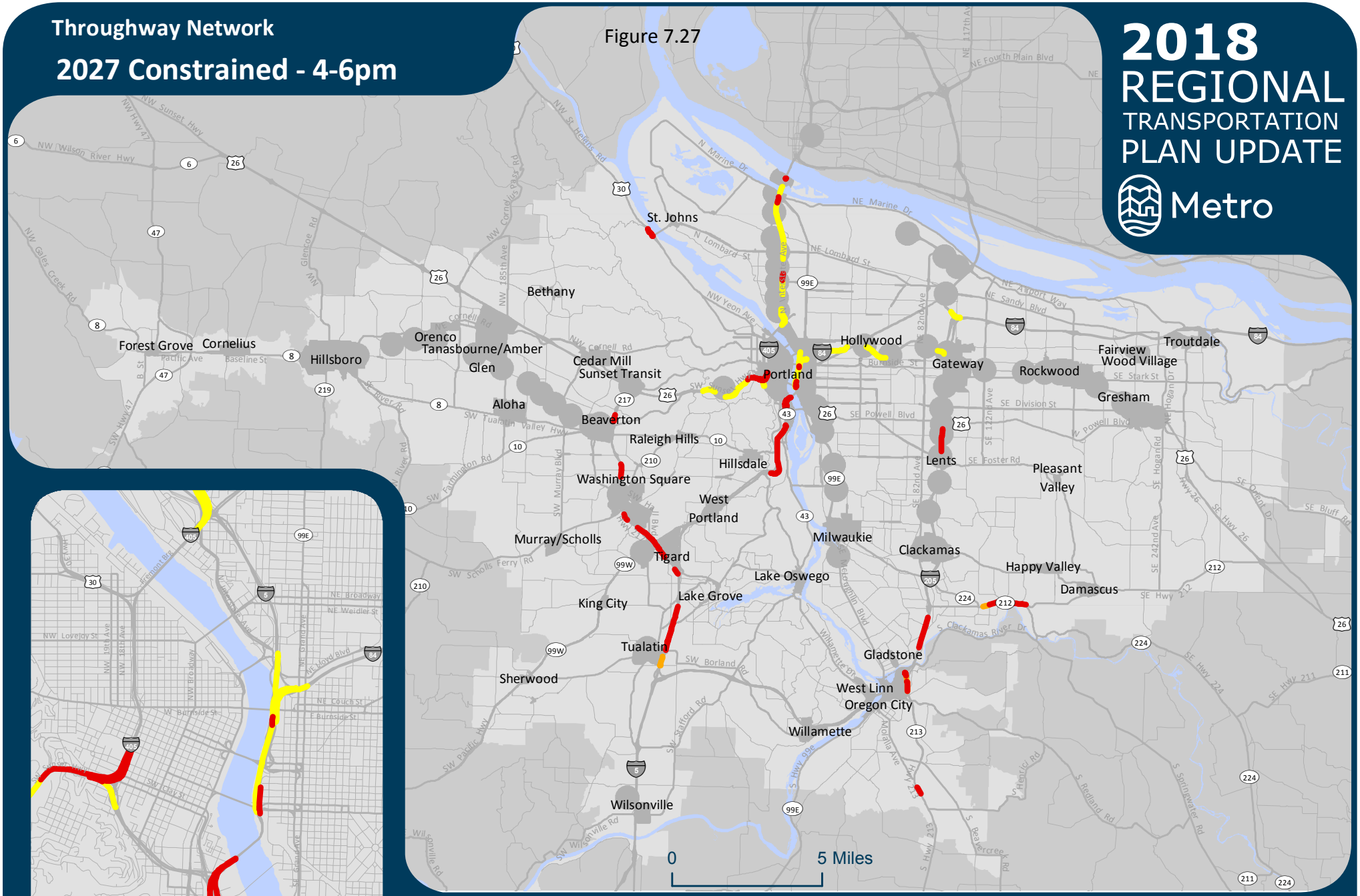
Throughway Network

2027 Constrained - 4-6pm

Figure 7.27

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 4-6 PM (peak travel hours) — 5-6 PM — 4-5 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

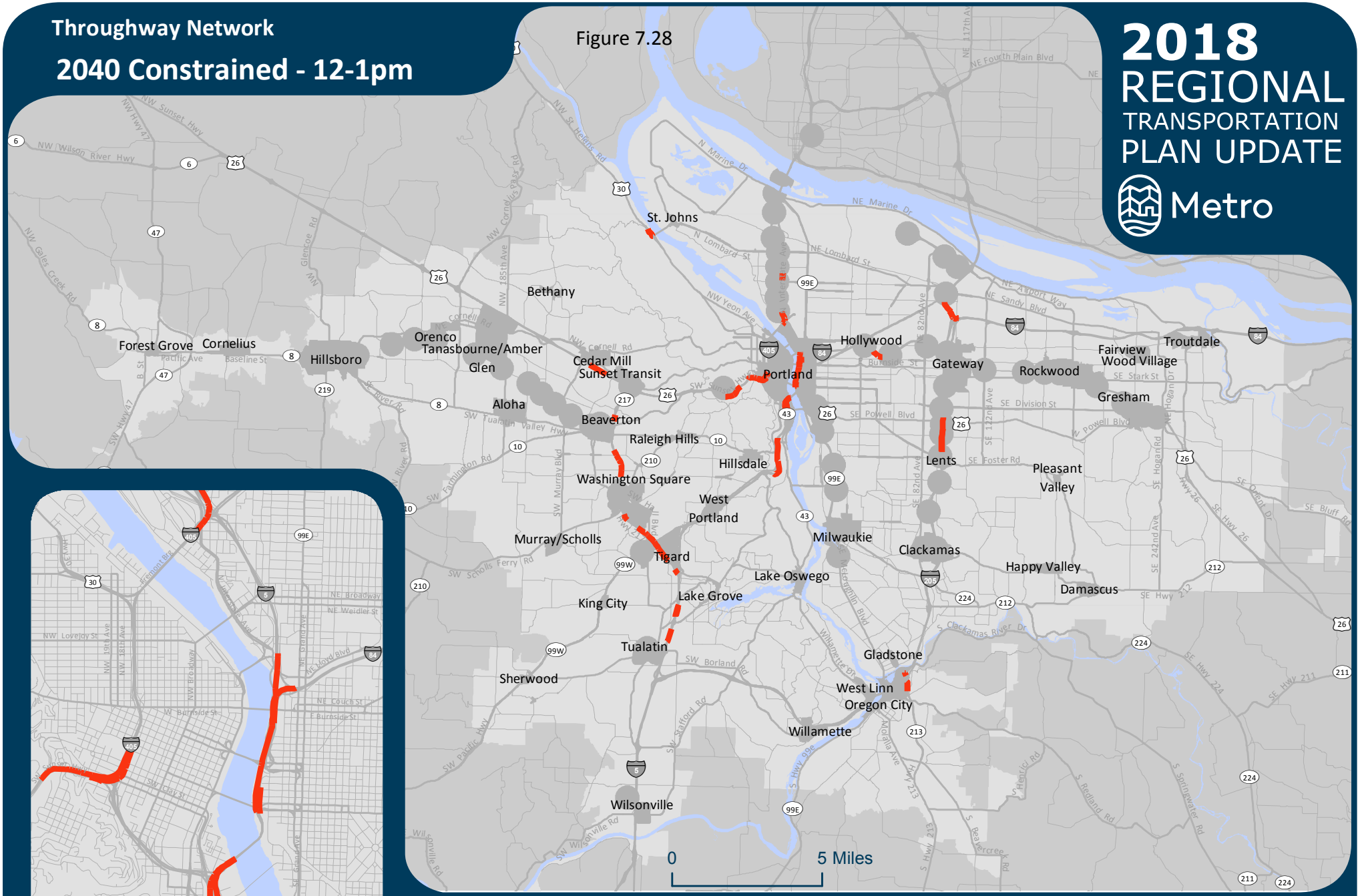
Throughway Network

2040 Constrained - 12-1pm

Figure 7.28

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 12-1 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

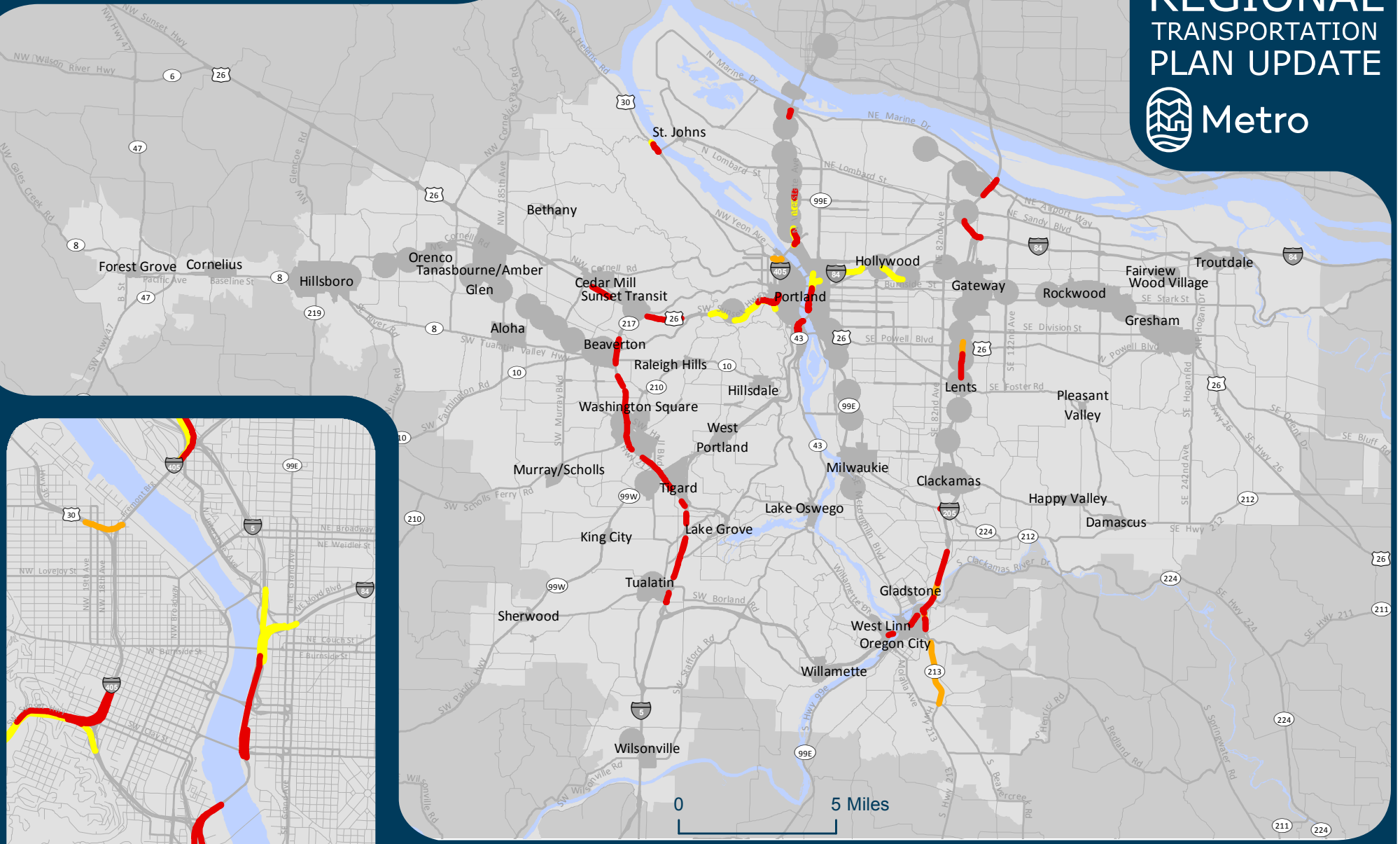
Throughway Network

2040 Constrained - 4-6pm

Figure 7.29

2018 REGIONAL TRANSPORTATION PLAN UPDATE

Metro



Unacceptable congestion: 4-6 PM (peak travel hours) — 5-6 PM — 4-5 PM

2040 Centers and station areas

Metro MPO Boundary

December 2018

This information is for planning purposes and reflects the regional mobility policy adopted in Chapter 2 of the 2018 Regional Transportation Plan.

Freight Truck Delay

Data source: Metro travel forecast model.

Description: Evaluates truck delay for freight movement using the regional freight roadway network in the two-hour AM peak (7-9 AM), the two-hour mid-day travel period (1-3 PM) and in the two-hour pm rush hour (4-6 PM). Figure 2.15 provides a map of the regional freight system which includes the roadway network. The hours of delay are reported in the table below for trucks. The truck delay is only accrued when the volume of all vehicles exceeds 90 percent of the roadways capacity.

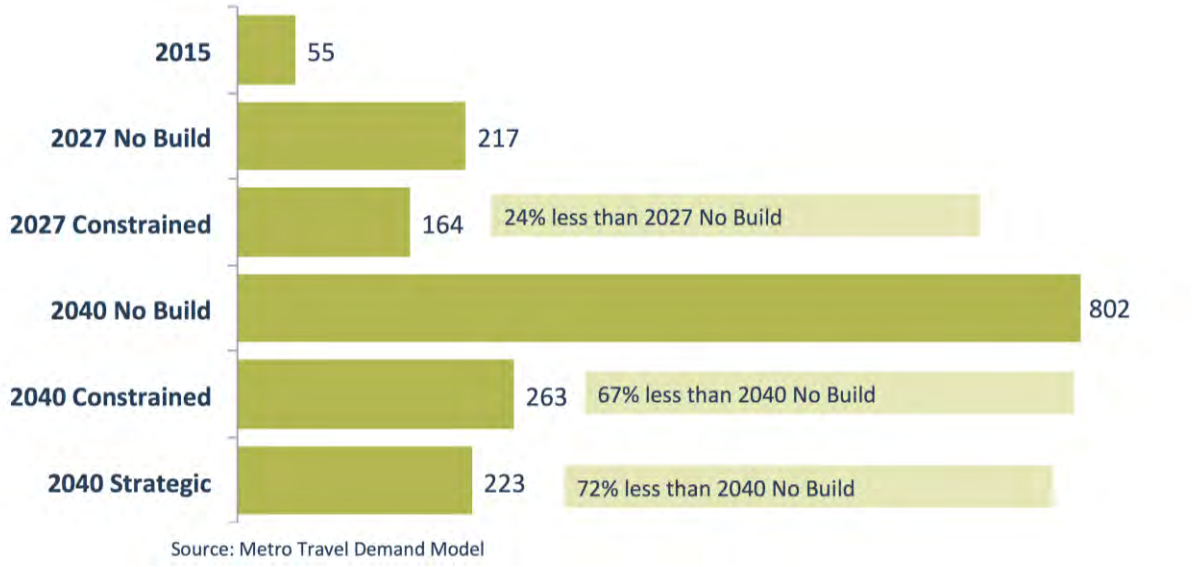
Target or desired direction: By 2040, reduce vehicle hours of delay per truck trip by 10 percent compared to 2015.

Findings: Between 2015 and 2040, truck delay on the regional freight network increases significantly for all investment strategies during all three time periods. 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 (example is 1-3 PM as shown in bar chart below). In the two-hour mid-day (1-3 PM) the 2040 Financially Constrained truck delay is 67 percent less than the 2040 No Build and the 2040 Strategic truck delay is 72 percent less than the 2040 No Build. In the two-hour pm peak (4-6 PM) the 2040 Financially Constrained and the 2040 Strategic truck delay is less than the than 2040 No Build by 29 percent and 32 percent, respectively.

Table 7.27 Truck vehicle hours of delay (VHD) on the Regional Freight Network

Travel period	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
7-9 AM peak hours of delay	219	456	393	724	500	481
1-3 PM Mid-day hours of delay	55	217	164	802	263	223
4-6 PM peak hours of delay	154	364	290	576	409	392

Figure 7.30 Truck hours of delay on the Regional Freight Network from 1-3 PM



Total Cost of Traffic Delay on Freight Network

Data source: Metro travel forecast model.

Description: Evaluates average cost of delay for freight movement in the two hour AM peak period (7-9 AM), the two-hour mid-day travel period (1-3 PM) and in the two-hour PM peak period (4-6 PM). Values of time are taken from ODOT report The Value of Travel-Time: Estimates of Hourly Value of Time for Vehicles in Oregon in 2015. 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 $28.20 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 $30.72 per hour. The travel forecast model allocates 35 percent of trucks to medium category and 65 percent to heavy category. The per hour value of time dollar amounts for trucks are the same for both 2015 and 2040.

Target or desired direction: No target. Desired direction is to reduce growth in cost of delay (in constant dollars) on the regional freight network in the two-hour mid-day and two-hour pm peak as compared to the 2040 No Build strategies.

Findings: In the 2040 No Build, the cost of delay on the regional freight network increases almost four fold during the two-hour PM peak compared to the 2015 Base Year. For the 2040 No Build, the cost of delay on the regional freight network increases almost 15 fold during the two-hour mid-day period. However, implementation of the 2040 Constrained or the 2040 Strategic results in a 65 to 70 percent decrease in the cost of delay for the mid-day peak period compared to the 2040 No Build strategy. For the two-hour PM peak travel period the 2040 Constrained or 2040

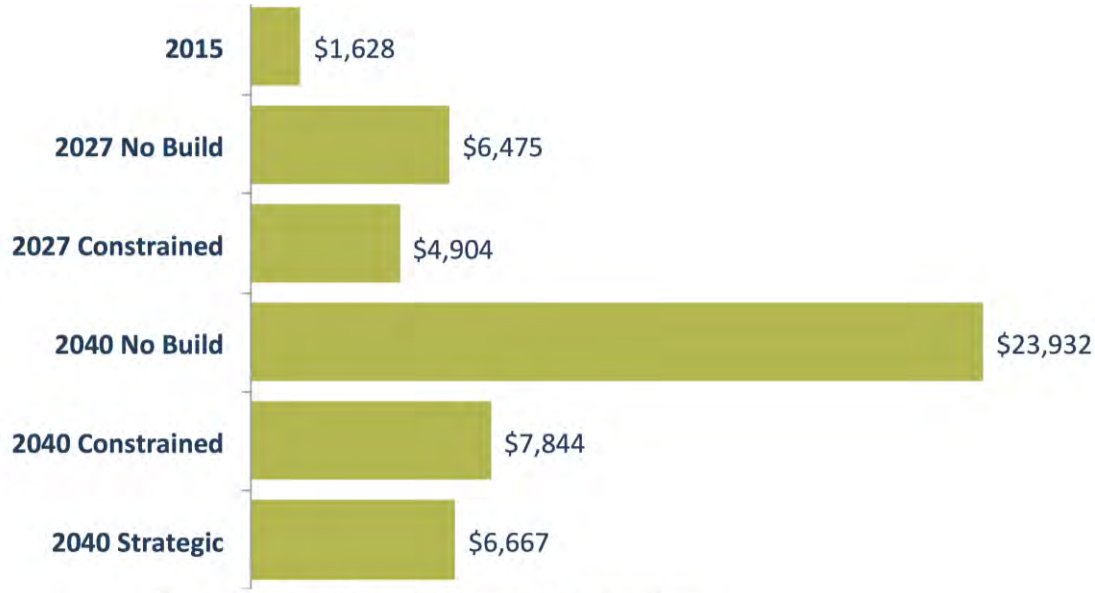
Strategic investments reduce cost of delay by 27 percent to 29 percent compared to the 2040 No Build.

Table 7.28 Cost of truck vehicle hours of delay on the Regional Freight Network within the MPA

Time period	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
7-9 AM cost of delay	$6,534	$13,604	$11,715	$21,598	$14,921	$14,363
1-3 PM cost of delay	$1,628	$6,475	$4,904	$23,932	$7,844	$6,667
4-6 PM cost of delay	$4,594	10,852	$8,646	$17,185	$12,203	$11,689

Note: Delay is accrued where v/c exceeds 0.9.

Figure 7.31 Cost of truck hours of delay on the Regional Freight Network, 1-3 PM



Source: Metro Travel Demand Model and ODOT value of time

7.4.11 Transit efficiency and ridership

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 for all transit service providers – TriMet, SMART, C-TRAN and Portland Streetcar, Inc.

Target or desired direction: No target. Increase AWD transit boarding rides and revenue hours of service

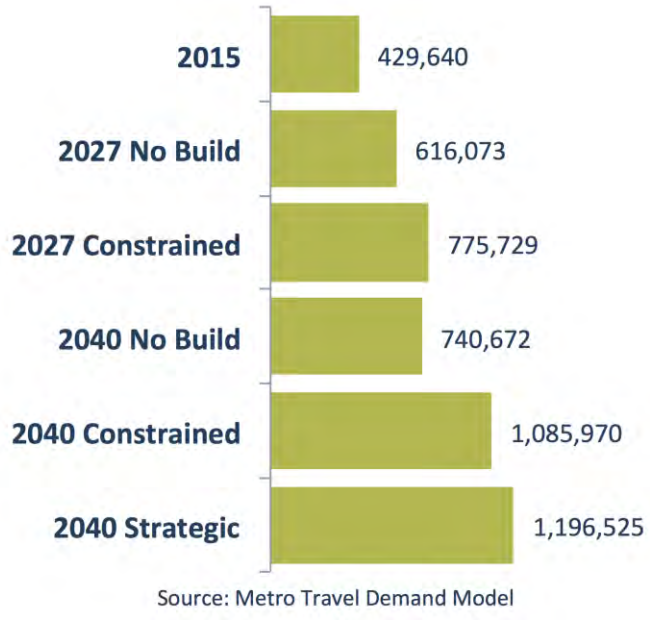
Findings: Total boardings and revenue hours of transit service both increase dramatically between 2010 and 2040. The 2027 and 2040 Financially Constrained Investments Strategies show and increase in AWD boardings and revenue hours of service over the 2027 and 2040 No Build reflecting the addition of new high capacity transit and expanded bus service.

Table 7.29 Transit productivity

Transit productivity	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Daily transit boardings	429,640	616,073	775,729	740,672	1,085,970	1,196,525
Daily revenue hours	6,577	7,607	8,868	7,780	10,263	12,462
Daily transit boardings per revenue hour	65	81	87	95	106	96

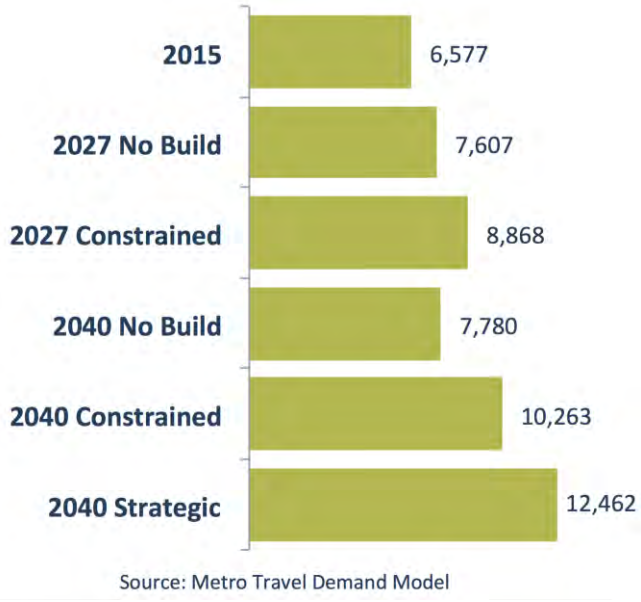
Note: For the entire four-county region, including transit agencies serving Clark, Clackamas, Multnomah and Washington counties.

Figure 7.32 Average daily transit boardings (all providers)



Note: This figure includes TriMet, SMART, C-TRAN and Portland Streetcar, Inc.

Figure 7.33 Average weekday transit revenue hours of service (all providers)

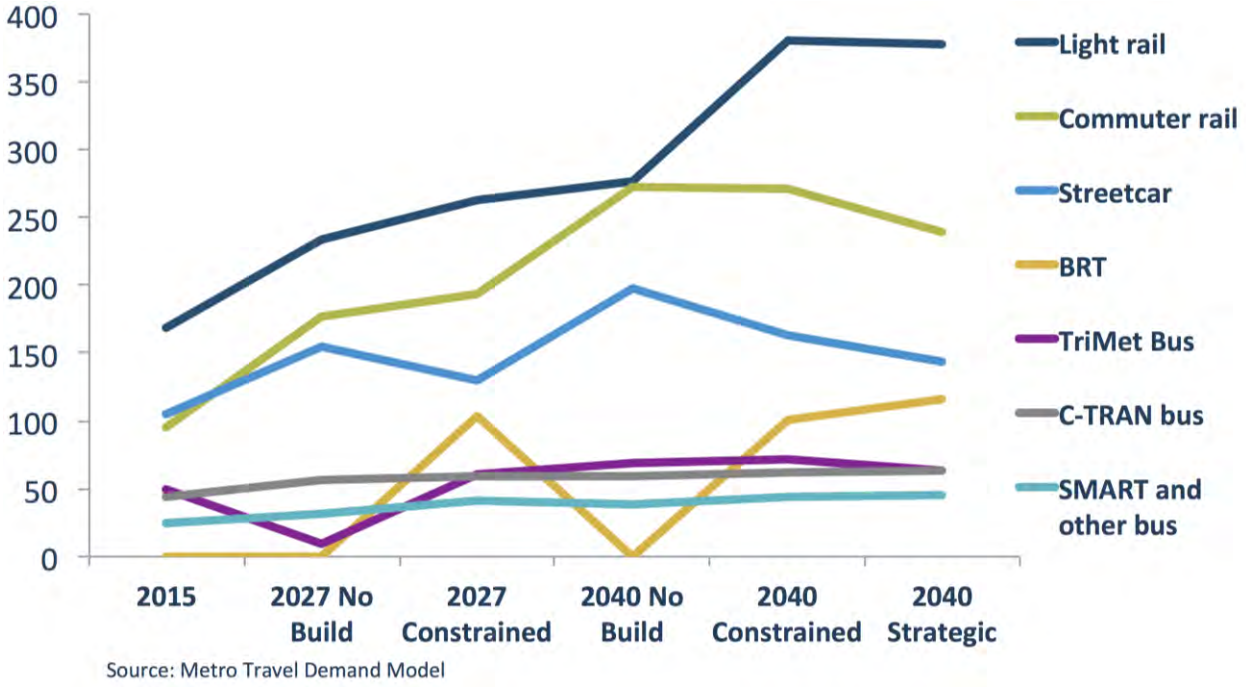


Note: This figure includes TriMet, SMART, C-TRAN and Portland Streetcar, Inc.

Figure 7.34 Average weekday transit boardings per revenue hour



Figure 7.35 Average weekday transit boardings per revenue hour by transit mode



Source: Metro Travel Demand Model

7.4.12 Carbon emissions

Data source: The on-road vehicle emissions estimates for the 2018 RTP were produced within a software framework that combines the regional transportation model with EPA's emissions projection MOVES model, version MOVES2014a. A newer version of MOVES (MOVES2014b) has since been released, but it should be noted that the improvements incorporated into this update pertain almost exclusively to estimates of non-road emissions and are, therefore, not relevant to this analysis.

Description: Evaluates projected mobile source emissions of carbon dioxide (CO2) a primary greenhouse gas pollutant to determine mobile source greenhouse gas emissions in the base year and for 2027 and 2040 to determine if mobile source greenhouse gas emissions are declining as a whole and on a per capita basis.

Metro's current implementation of MOVES was developed for air quality conformity purposes in accordance with all pertinent EPA guidance included in the document, "Using MOVES to Prepare Emission Inventories in State Implementation Plans and Transportation Conformity: Technical Guidance for MOVES2010, 2010a and 2010b" (April 2012).

Metro estimates future mobile source greenhouse gas emissions by using existing and proposed transportation project information and inputting the project information into the travel demand model to understand the travel behavior in the region with and without proposed investments at key times in the future (2027 and 2040). Key travel behavior outputs include trip generated, mode split (i.e. percentage of trips taken by different transportation modes), trip distances, and vehicles miles traveled. This information is then taken into the MOVES2014a emissions model to

estimate projected greenhouse gas emissions with and without the proposed transportation investments for the Portland airshed in 2027 and 2040. Then the total vehicle emissions are divided by projected population estimate to understand emissions per capita and ultimately the reduction level from the base year of 2015. Detailed information about the fleet and technology assumptions used in the 2018 RTP on-road vehicle emissions analysis and a comparative assessment of VisionEval and MOVES emissions estimation methodologies is provided in Appendix J.

Target or desired direction: The target adopted in the 2014 Climate Smart Strategy is to reduce per capita greenhouse gas emissions from cars and small trucks by 29 percent by 2035, and 25 percent by 2040, compared to 2005 levels. The Climate Smart Strategy performance measures and monitoring targets were adopted with an acknowledgement that they will be reviewed during development of the 2018 Regional Transportation Plan to address new information, such as federal transportation performance-based planning rulemaking. At the time of adoption, Metro also anticipated transitioning from using ODOT's GreenSTEP software tool (VisionEval) to the Environmental Protection Agency's MOVES model for forecasting on-road mobile source greenhouse gas emissions in the region. This transition was anticipated because Metro maintains and implements MOVES to conduct federally-required air quality and other on-road vehicle emissions analysis, and does not have the expertise nor the resources necessary to maintain and implement VisionEval on an on-going basis. Further, significant methodological differences in how VisionEval and MOVES estimate on-road vehicle emissions do not allow for direct comparison of forecasted on-road vehicle emissions results.

To assess progress towards the targets, the region's Climate Smart Strategy calls for the implementation of nine key land use and transportation policies to reduce greenhouse gas emissions. Monitoring targets are used to track progress. One of the most significant transportation strategies outlined in the Climate Smart Strategy is increasing transit service hours. The Climate Smart Strategy called for 9,400 transit service revenue hours (excluding C-TRAN) within the metropolitan planning area boundary by 2035 to meet the region's greenhouse gas reduction target. Refer to **Appendix J** for details on the monitoring targets and other performance outcomes.

Findings: The 2018 Regional Transportation makes satisfactory progress towards implementing the Climate Smart Strategy and, if fully funded and implemented, can reasonably be expected to meet the state-mandated targets for reducing per capita greenhouse gas emissions from cars and small trucks (light-duty vehicles) for 2035 and 2040.

- By 2040, the plan, together with advancements in fleet and technology, is expected to reduce total annual greenhouse gas emissions from all on-road vehicles by 19 percent (compared to 2015 levels) and annual per capita greenhouse gas emissions from all on-road vehicles by 40 percent (compared to 2015 levels).
- By 2040, the plan, together with advancements in fleet and technology, is expected to reduce total annual greenhouse gas emissions from passenger cars and passenger trucks by 27

percent (compared to 2015 levels) and reduce annual per capita greenhouse gas emissions from passenger cars and passenger trucks by 46 percent (compared to 2015 levels).

Due to differences in emissions analysis tools, the 2018 RTP greenhouse gas emissions estimates are not directly comparable to the state-mandated greenhouse gas emissions reduction targets that were set using VisionEval. However, the findings above and in Appendix J demonstrate the region is making satisfactory progress implementing the Climate Smart Strategy.

The findings also demonstrate that more investment, actions and resources will be needed to ensure the region achieves the mandated greenhouse gas emissions reductions defined in OAR 660-044-0060. In particular, additional funding and prioritization of Climate Smart Strategy investments and policies will be needed.

Equity findings: Not included in transportation equity analysis.

Table 7.30 Projected mobile source greenhouse gas emissions — all vehicles

	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Average daily GHG emissions from all vehicles (metric tons)	14,418	12,773	12,625	11,942	11,670	11,597
Percent reduction from 2015	N/A	-11%	-12%	-17%	-19%	-20%
Percent reduction per person from 2015	N/A	-25%	-26%	-39%	-40%	-41%

Note: Results are from MOVES 2014a and reflect summer emissions within the metropolitan planning area boundary.

Table 7.31 Projected mobile source greenhouse gas emissions – passenger vehicles only

	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Average daily GHG emissions from passenger vehicles (metric tons)	11,472	9,732	9,611	8,564	8,357	8,299
Percent reduction from 2015	N/A	-15%	-16%	-25%	27%	-28%
Percent reduction per person from 2015	N/A	-28%	-29%	-45%	-46%	-47%

Note: Results are from MOVES 2014a and reflect summer emissions within the metropolitan planning area boundary.

7.4.13 Clean air

Data source: The on-road vehicle emissions estimates for the 2018 RTP were produced within a software framework that combines the regional transportation model with EPA's emissions projection MOVES model, version MOVES2014a. A newer version of MOVES (MOVES2014b) has since been released, but it should be noted that the improvements incorporated into this update pertain almost exclusively to estimates of non-road emissions and are, therefore, not relevant to this analysis.

Description: Evaluates projected mobile source emissions of criteria pollutants: carbon monoxide (CO), nitrogen oxide (NO_X), volatile organic compounds (VOC), and particulate matter (PM_{10} and $PM_{2.5}$) and transportation-related air toxics identified with guidance from the Oregon Department of Environmental Quality.[10]

Metro estimates future mobile source emissions by using existing and proposed transportation project information and inputting the project information into the travel demand model to understand the travel behavior in the region with and without proposed investments at key times in the future (2027 and 2040). Key travel behavior outputs include trip generated, mode split (i.e. percentage of trips taken by different transportation modes), trip distances, and vehicles miles traveled. This information is then taken into the MOVES2014a emissions model which includes information about vehicle fleet mix, corporate average fuel economy (CAFÉ) standards, fuel composition, and emissions rates to determine what the projected emissions of individual air pollutants would be with and without the proposed transportation investments for the Portland airshed in 2027 and 2040.

Target or desired direction: Decrease the amount (e.g. grams, ounces, pounds, or tons) of mobile source air pollutants in the 2027 Constrained and 2040 Constrained compared to the 2015 Base Year.

Findings: The 2018 RTP investment strategy in 2027 and 2040 show a significant reduction of criteria pollutants emissions and transportation-related air toxics emissions from mobile source pollution compared to 2015 base year emissions. Certain pollutants including carbon monoxide, volatile organic compounds, benzene, and naphthalene gas see significant reductions in the pounds or grams of emissions reduced by 2027 and further in 2040.[11and 12] In looking more closely, the investment strategy also provides further reductions from the no-build conditions in 2027 and 2040, meaning despite projected population growth and economic activity, the region's

[10] Nitrogen oxide and volatile organic compounds are precursors to Ozone. Transportation-related air toxics are: Acrolein, Arsenic, Benzene, 1,3-Butadiene, Chromium 6, Diesel particulate matter plus diesel exhaust organic gases (Diesel PM), Formaldehyde, Naphthalene, Polycyclic organic matter

[11] Long-term emissions projections of carbon monoxide from mobile sources are expected to remain in decline as updated technology has reduced the amount of carbon monoxide from vehicles.

[12] Ambient levels of volatile organic compounds, a precursor pollutant to ozone pollution has been steadily rising. Therefore, while mobile source emissions of volatile organic compounds pollution is expected to decline, ozone pollution impacting public health remains a matter of concern for the region.

investment in a multimodal transportation system is making progress in reducing mobile source air pollution emissions.

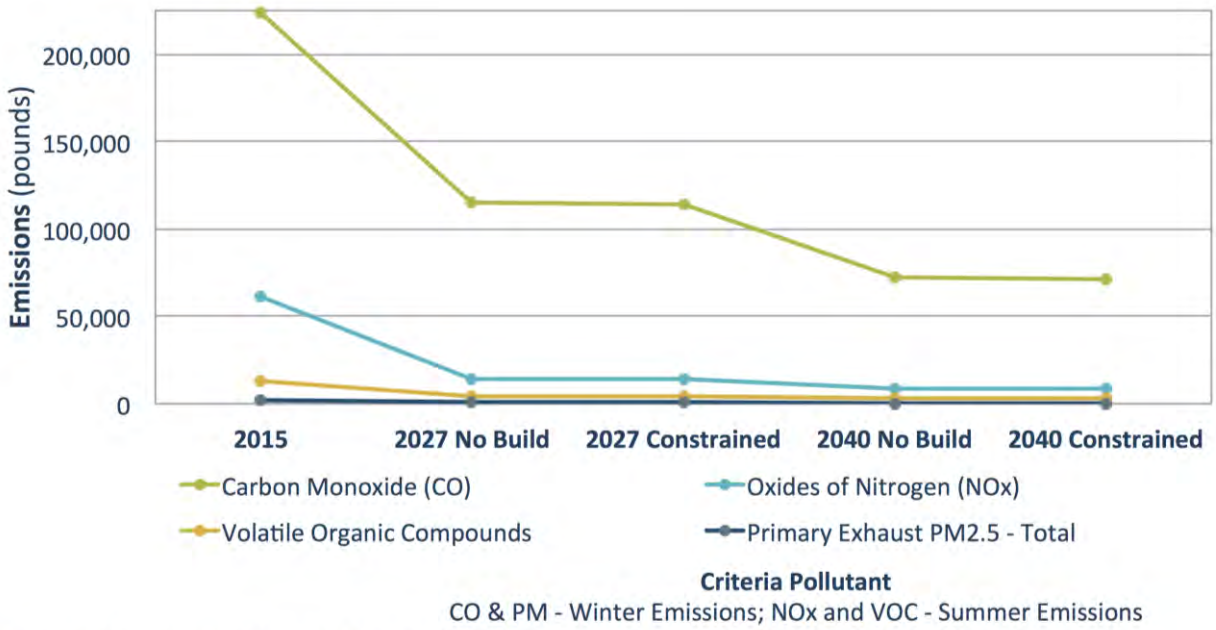
Equity findings: Not included in transportation equity analysis.

Table 7.32 Estimated mobile source emissions by air pollutant – criteria pollutants

Pollutant	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Carbon monoxide (CO) (Winter)	223,788	115,027	114,192	72,028	71,302	71,076
Nitrogen oxide (NOx) (Summer)	61,147	14,556	14,462	8,628	8,534	8,514
Volatile organic compounds (VOC) (Summer)	13,306	4,272	4,218	3,024	2,936	2,913
Particulate Matter 10 exhaust (PM_{10}) (Winter)	1,739	566	562	319	314	313
Particulate Matter 2.5 exhaust ($PM_{2.5}$) (Winter)	1,575	509	505	285	281	280

Note: Results are from MOVES 2014a and reflect pounds of summer or winter emissions within the metropolitan planning area boundary.

Figure 7.36 Estimated mobile source criteria pollutant emissions by RTP Investment Strategy



Source: Regional Travel Demand Model and MOVES Model

Table 7.33 Estimated mobile source emissions by air pollutant – air toxics

Pollutant	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Diesel Particulate Matter* (pounds)	622	145	144	53	52	52
Acrolein (pounds)	16	5	5	3	3	3
Benzene (pounds)	356	83	82	46	45	45
1,3-Butadiene (pounds)	41	5	5	2	2	2
Formaldehyde (pounds)	252	85	84	65	64	63
Arsenic (grams)	68	79	79	90	88	88
Chromium 6 (grams)	0.35	0.40	0.40	0.45	0.45	0.44
Naphthalene Gas (grams)	14,394	3,952	3,912	2,470	2,409	2,397

Note: Results are from MOVES2014a and reflect summer emissions within the metropolitan planning area boundary.

Figure 7.37 Estimated mobile source emissions of selected air toxics

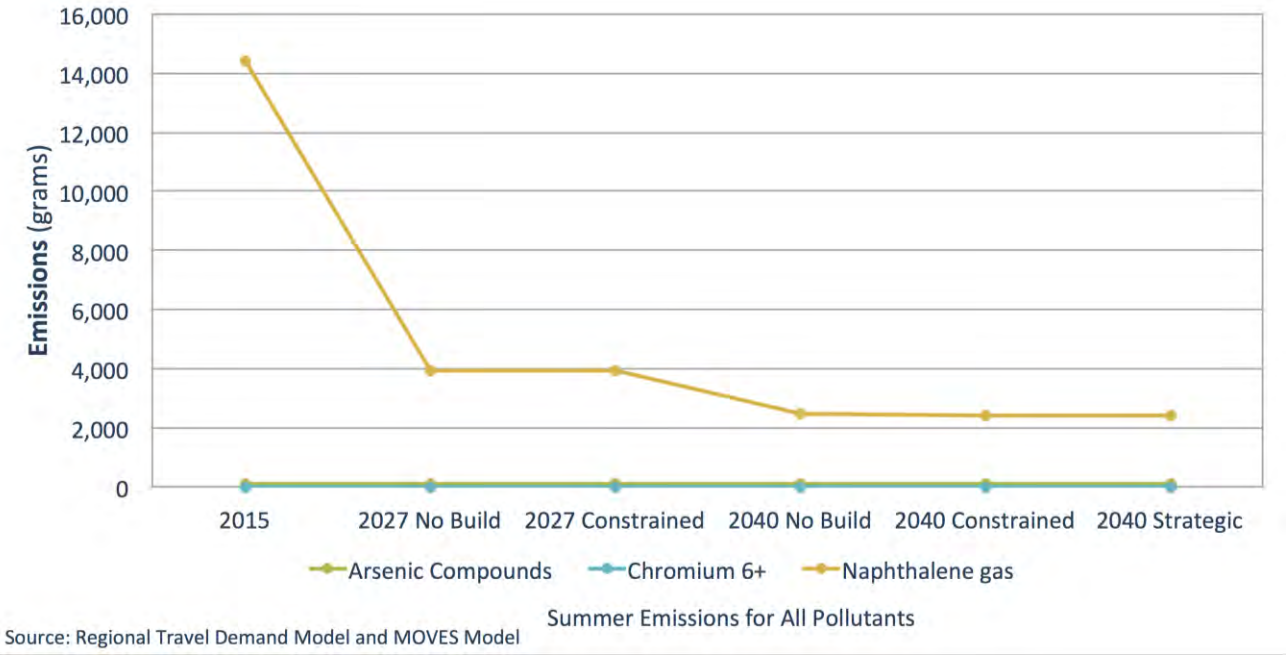
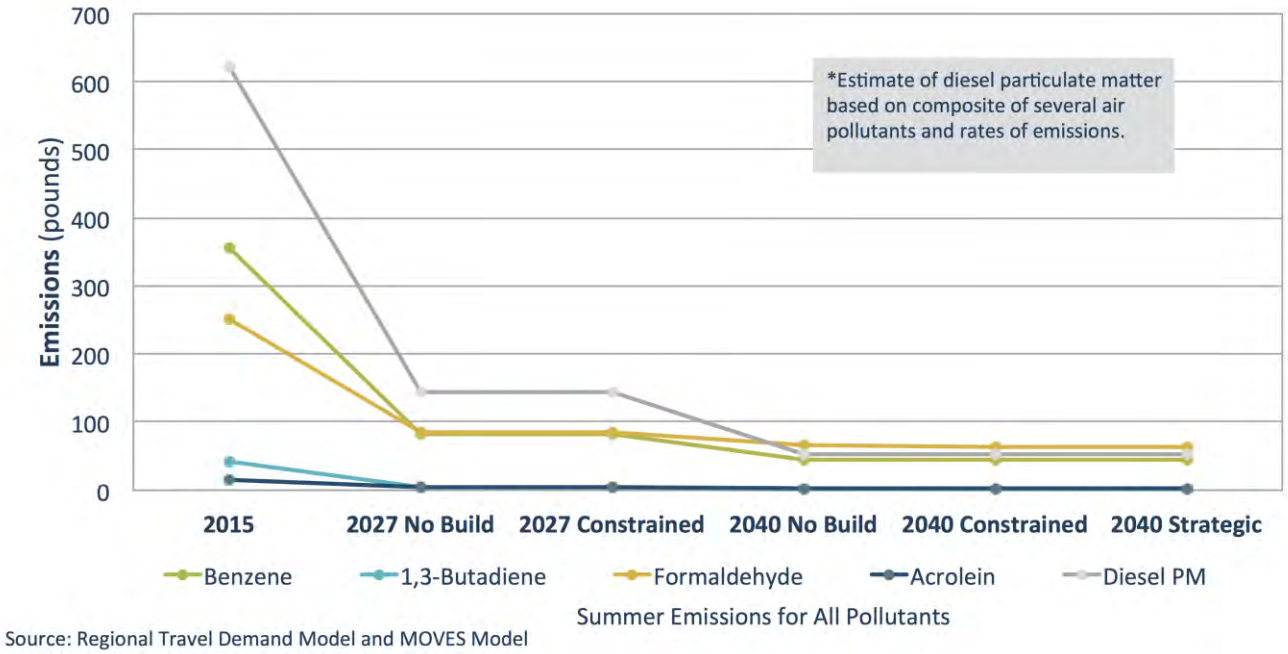


Figure 7.38 Estimated mobile source emissions of selected air toxics



Source: Regional Travel Demand Model and MOVES Model

7.4.14 Potential habitat impact

Data source: Several different data were used to evaluate potential impact to habitat in the region. Refer to **Appendix F** for additional information on the data sources and methodology used for this performance measure. Data used:

- **Metro Title 13 inventory.** Adopted by Metro in September 2005, this inventory combines Regionally Significant Riparian & Upland Wildlife habitat, Habitats of Concern, and impact areas into one integrated layer. This regional dataset has not been updated since 2005 but is included because it is the official dataset and for comparison to the Regional Conservation Strategy and Oregon Conservation Opportunity Areas (see next two bullets).

- **Regional Conservations Strategy (RCS) high value habitat areas**. Data was developed from 2010 to 2013 by the Intertwine Alliance – a broad coalition of public, civic, private, and nonprofit organizations. The data identifies the top twenty-five percent high value habitat areas within an eight-mile buffer of the urban growth boundary and the Bull Run Watershed. The analysis considered many features, including existing vegetation, wetlands, hydric soils, floodplains, habitat patch size and shape, distance from streams and wetlands, and the presence of roads. High Value areas ranked in the top quarter of all areas because of the type, location, and size of their habitat.[13]

[13] Information about development of the Regional Conservation Strategy and data can be found at: www.regionalconservationstrategy.org

- **Oregon Department of Fish and Wildlife Conservation Opportunity Areas.** Data is was adopted in 2016 by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy, the official State Wildlife Action Plan for Oregon. Conservation Opportunity Areas (COAs) are places where broad fish and wildlife conservation goals would best be met and are indentified through a rigorous process that combines multiple datasets.[14]

- **Fish bearing streams.** Oregon Fish Habitat Distribution data (2018) is from the Oregon Department of Fish and Wildlife and identifies. These data describe areas of suitable habitat believed to be used currently or historically by native or non-native fish populations. The term "currently" is defined as within the past five reproductive cycles. Historical habitat includes suitable habitat that fish no longer access and will not access in the foreseeable future without human intervention. This information is based on sampling, the best professional opinion of Oregon Dept. of Fish and Wildlife or other natural resources agency staff biologists or modeling. Due to natural variations in run size, water conditions, or other environmental factors, some habitats identified may not be used annually.[15]

- **Oregon Fish Passage Barriers.** Data is from the Oregon Department of Fish and Wildlife and was last updated in 2017. The data contains both passable and impassable barriers to native migratory fish. Data from multiple agencies have been compiled into this standardized dataset that is stewarded by ODFW. Separate datasets exist for current barriers and removed / replaced barriers.

- **Wetlands.** Data for the wetlands analysis is from the U.S. Fish and Wildlife National Wetlands Inventory. It is clipped to the Intertwine's Regional Conservation Strategy extent and published to RLIS in 2016; does not include local wetland inventories.

- **Floodplains and flood hazard areas.** Data is published by the Federal Emergency Management Agency (FEMA) and was published to RLIS in October 2018. The data identifies areas with a 1-percent-annual-chance flood event, the 0.2-percent-annual-chance flood event, and areas of minimal flood risk.

Description: Evaluates the potential impacts of transportation projects on identified regional and urban high value habitat areas defined in the Metro's Title 13 inventory, in the Regional Conservation Strategy, Oregon Conservation Opportunity Areas, to fish bearing streams and fish passage barriers, to wetlands, floodplains and flood hazard areas.[16] This analysis used the datasets listed above and refers to the Regional Conservation Strategy as the framework for efforts to conserve biodiversity within the greater Portland-Vancouver region.

[14] Information on the Conservation Opportunity Areas can be found at: http://oregonconservationstrategy.org/conservation-opportunity-areas/

[15] Data and information is available through the Oregon Department of Fish and Wildlife's Nartural Resources Information Management Program https://nrimp.dfw.state.or.us/nrimp/default.aspx

[16] A map of the regional and urban high value habitat areas can be found at: www.regionalconservationstrategy.org/document/8

Appendix F includes a list of the projects which intersect with the analysis areas of potential habitat impact. Projects in the RTP, represented as points and lines in the geographical information system (GIS) shapefiles, were given a 100-foot buffer and overlaid with the analysis areas listed above. Any project within the 100-foot buffer that wholly or partially intersected with one or more of the analysis areas is flagged in the project lists and included in the tables below. Projects that could not be represented as a point or a line (for example regional programsor system management projects) were not included in the analysis.

Habitat analysis areas are not exclusive. For example, regional data on wetlands is included in the Title 13 inventory, the Regional Conservation Strategy high value habitat areas, Oregon Conservation Opportunity Areas, and the wetlands inventory. Each of the analysis areas have overlapping, but unique, boundaries. Therefore, the number of projects identified in each analsyis area should not be added together.

Target or desired direction: There is no target for this measure. The purpose of this measure is to identify projects that overlap with sensitive high value habitats so that as projects move toward implementation, appropriate avoid, minimize, or mitigation strategies can be applied.

Findings: The number and percent of projects that intersect with one or more analysis area is shown in **Table 7.36** for each of the investment strategies. **Appendix F** includes maps showing the location of projects in each analysis area. A total of 459 projects in the 2040 Constrained list intersect with high value habitats identified in the Regional Conservation Strategy, while 544 intersect with Title 13 inventory high value habitat areas. Overall, these projects make up nearly 59 percent and 70 percent, respectively, of the total 2018 RTP investment strategy, excluding operations and programmatic projects.

While many RTP projects overlap with identified high value habitats, it is important to note that the potential alignments for many proposed projects are conceptual until more detailed project development work is conducted. Projects that intersect high value areas should consider alignment options that avoid the resource area as well as environmental mitigation strategies during future project development as described in the design policy section Chapter 3 of the Plan and in **Appendix F**. Identifying areas of potential conflict early in the transportation planning process allows for more meaningful consideration of mitigation strategies, including project alignment, design and construction features that avoid or minimize impacts on the resource area. Many of these strategies are addressed specifically during the project development phase as part of the environmental and land use review, consultation and permitting processes all construction projects must undergo.

Table 7.34 Potential habitat impact analysis - number and percent of projects

Resource area	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Title 13 inventory high value habitat areas	N/A	N/A	267 67%	N/A	544 70%	726 71%
Regional Conservation Strategy (RCS) high value habitat areas	N/A	N/A	219 55%	N/A	459 59%	634 62%
Oregon Conservation Opportunity Areas (COAs)	N/A	N/A	118 30%	N/A	228 29%	301 29%
Fish bearing streams	N/A	N/A	136 34%	N/A	286 37%	395 38%
Fish passage barriers	N/A	N/A	101 25%	N/A	195 25%	269 26%
Wetlands	N/A	N/A	191 48%	N/A	394 51%	542 53%
Floodplains and flood hazard areas	N/A	N/A	178 45%	N/A	341 44%	459 45%

Note: This table shows the number and percent of RTP projects that are within 100 feet of identified resource areas. Operations and programmatic projects were not included in this analysis.

Table 7.35 Number of 2040 Constrained projects potentially impacting environmental resources, by project type

Type of capital project	Title 13 high value habitat areas	RCS high value habitat areas	Oregon COAs	Fish bearing streams	Fish passage barriers	Wetlands	Floodplain and flood hazard areas
Roads and bridges	319	269	113	167	102	244	173
Throughways	35	32	18	29	30	32	29
Transit capital	36	32	27	29	21	29	36
Freight	27	18	20	8	8	16	30
Bike and pedestrian	289	266	110	149	100	211	172
Transportation System Management	20	17	13	13	8	10	19

Note: Operations and programmatic projects without a specific geographic location were not included in this analysis. Oregon COAs are Conservation Opportunity Areas designated by the Oregon Department of Fish and Wildlife.

7.4.15 Potential impacts to historic and cultural resources and tribal lands

Data source: Tribal lands data from the Bureau of Indian Affairs and listed historic properties data from the National Register of Historic Places.

Description: Evaluates the potential impacts of proposed RTP projects on listed historic and cultural resources and tribal lands identified in the metropolitan planning area.

Target direction: There is no target for this measure. The purpose of this measure is to identify projects that overlap with historic and cultural resources or tribal lands so that as projects move toward implementation, appropriate avoid, minimize, or mitigation strategies can be applied.

Findings: Metro reviewed tribal lands data available from the Bureau of Indian Affairs to identify potential federally recognized tribal lands in the planning area. No tribal lands were identified within or adjacent to the metropolitan planning area. In addition, Metro reviewed data from the National Register of Historic Places. More than 650 historic places and structures have been listed in the National Register in the planning area. The data is available upon request from the Metro Research Center. [17]

Using Geographic Information System (GIS) mapping software and data from National Register of Historic Places, the analysis identified 72 projects within the planning area that are located within 100 feet of historic properties listed in the National Register, of which 62 projects are in the 2040 Constrained list.

Table 7.36 Number of 2040 Constrained RTP projects potentially impacting historical and cultural resources or tribal lands, by project type

Type of capital project	Number of projects located within 100 feet of listed historic and cultural resources	Number of projects located on tribal lands
Roads and bridges	21	0
Throughways	1	
Transit capital	17	
Freight	1	
Bike and pedestrian	17	
Transportation system management	5	

Note: Operations and programmatic projects were not included in this analysis.

The historic and aesthetic value of the built environment is also recognized as key to the quality of life of the region's residents. Where transportation improvements are developed which may impact on such resources, appropriate mitigation and design elements should be addressed. Section 106 of the National Historic Preservation Act (NHPA) requires all federal agencies to take

[17] For more information on each site visit www.nationalregisterofhistoricplaces.com/or/state.html and click on Clackamas, Multnomah or Washington County.

into account the effects of their undertakings on historic properties. All properties listed in the National Register are protected by the Oregon State Historic Preservation Office (SHPO).

Oregon Revised Statute (ORS) 358.653 requires state agencies and all "political subdivisions" of the state—including counties, cities, universities, school districts and local taxing districts—to consult with the Oregon State Historic Preservation Office to avoid inadvertent impacts to historic properties for which they are responsible. Impacts are usually the result of construction projects, but may also include the transfer of properties out of public ownership.

Potential transportation project related impacts to historic and cultural resources may include physical changes to historic transportation infrastructure, effects of road widening on historic settings or structures, effects on historic roadside elements, effects of air pollution on resources due to increased traffic, and disturbance or infringement on cultural landscapes. The nature of these impacts is highly location and project specific, and the information about historic and cultural resources is constantly evolving. It is important for each project to be evaluated in the specific context and timeframe in which it is designed with up-to-date information.

Typically, mitigation activities include the preservation and documentation of these assets, along with context-sensitive design of new or renovated infrastructure to complement existing streetscape or architectural features as closely as possible. Identifying these areas of potential conflict early in the transportation planning process allows for more meaningful consideration of mitigation strategies, including project alignment, design and construction features that avoid or minimize impacts on the historic and cultural resources in the project area. Many of these strategies are addressed specifically during the project development phase as part of the environmental and land use review, consultation and permitting processes all construction projects must undergo.

7.4.16 Public health

Data source: Integrated Transport and Health Impacts Model (ITHIM), MOVES model and regional travel model, Oregon Health Authority vital statistics.

Overall description: Metro partnered with Multnomah County Public Health and the Oregon Health Authority (OHA) to estimate the health effects of regional transportation investments using ITHIM. ITHIM uses information about travel behavior to estimate changes in chronic disease and premature deaths associated with lack of physical activity and from air pollution – two documented leading causes of death and chronic disease in the greater Portland region. *Note: Metro and the OHA used ITHIM in a series of Health Impact Assessments (HIAs) during the Climate Smart Strategy planning process that concluded in 2014.*

For the 2018 RTP, Metro, Multnomah County Public Health and the OHA used ITHIM to estimate changes in death and disease resulting from a change in travel behavior attributed to the investments proposed in the 2018 RTP. Three key pieces of information are needed to run ITHIM: average minutes of walking and cycling per person per week, and change in fine particle (PM2.5) pollution.

Metro modeled travel behavior for the Base Year and each of the investment strategies; walking and cycling minutes include trips accessing transit stops. Using the MOVES model, Metro estimated change in the mass of fine particulate matter (PM2.5) released by mobile sources for each scenario. MOVES outputs are in units of mass (e.g. grams per year), but ITHIM uses a concentration to estimate health benefits. Although there is not a standard practice for converting a mass estimate to a concentration, the analysis used a recent PM2.5 inventory provided by the Oregon Department of Environmental Quality for Multnomah County suggesting that on-road emissions account for approximately 11 percent of fine particulate pollution. Using 2015 monitor data from three air monitors in the region, an average baseline concentration was calculated. The final step was applying the percentage changes from MOVES to the portion of PM2.5 attributable to on-road sources in the region, resulting in estimates for each investment strategy. These estimates do not account for changes in particle pollution from other sources, such as residential wood combustion or industrial point sources.

2015 Base Year death and burden of disease estimates for each disease were compiled from Oregon Health Authority vital statistics. Number of deaths between 2011-2015 were downloaded from the Oregon Public Health Assessment Tool (OPHAT) and averaged for the five year period. Disability Adjusted Life Years (DALY) are calculated by summing Years of Life Lost (YLL) and Years of Living with a Disability (YLD) for each disease. DALYs are a unit of disease burden that combine years of life lost with years of living with a disability. When summed across a population, changes in DALYs can be thought of as changes in the burden of disease within that population. YLL are calculated using the World Health Organization (WHO) DALY Template from number of deaths by age group, gender and life expectancy at the time of death. YLD are imputed for the Metropolitan Planning Area from WHO Global Burden of Disease 2010 estimate for the US.

For future years, population numbers changed but the age distribution was kept the same across all investment strategies. This enables more direct comparisons with 2027 Constrained investment strategy and isolates the effect of changes in travel behavior.

As in most scenario modeling exercises, these results should be interpreted primarily as a way to compare investment strategies, as opposed to a prediction of what will likely come to pass. The results reported here are not a comprehensive estimate of health effects. ITHIM omits several diseases and causal pathways that are related to transportation, but for which no model module has been created. Among the effects not modeled are diseases and deaths associated with traffic noise, non-particle air pollution, and traffic injuries. Both noise and air pollution are associated with cardiovascular disease and diabetes (Babisch, 2014; Dzhambov, 2015). The estimate of risks from air pollution are not adjusted for noise. Although ITHIM includes a model for injuries, the input data necessary to use it was not available. This shortcoming is notable because of the high burden of death and disability from traffic crashes. Unintentional injuries were the fourth leading cause of death in the 3-county area from 2012-2016. Including traffic crashes could therefore substantially alter estimates of health impacts from the RTP. Finally, estimates are based on present disease rates, not projected rates based on estimated trends.

Overall findings: The burden of premature death and disease decreases under all investment strategies, with the 2040 Strategic slightly outperforming the 2040 Constrained in comparison to

the 2040 No-Build Scenario. The 2040 Constrained investment strategy achieves substantially greater benefits than the 2040 No Build, a 26 percent larger reduction in the burden of disease. Benefits from reduced air pollution accrue mostly in the first 10 years of the planning period, resulting in minimal additional benefits between 2027 and 2040.

The bulk of the health benefits from the proposed RTP are attributable to the reductions in air pollution. This is a departure from past studies and is a result of relatively small changes in total physical activity estimated by the travel model. Air pollution reductions are primarily driven by improvements in vehicle efficiency anticipated under current regulations, which is why health benefits are seen even in the No Build investment strategies. Health benefits from air quality could increase if vehicle emissions became further curtailed through regulation, infrastructure investment, or by faster than anticipated adoption of technologies such as electric vehicles. Similarly, health benefits could be greater if additional pollution reductions occur outside of the transportation sector – changes not modeled for this measure.

Average per person weekly minutes of biking and walking

Description: The regional travel model estimates an average # of weekday miles traveled walking and biking per person. This is converted to an average weekly minutes per person spent walking or biking.

Target or desired direction: No target for this measure. The desired directions to increase weekly minutes of biking and walking, ideally to reach the recommended 150 minutes of moderate intensity physical activity.

Findings: As shown in **Table 7.36** the 2040 Constrained investment strategy increases weekly minutes of biking and walking per person to 59.4 minutes, compared to 48 minutes in the 2015 Base Year, a 24 percent increase. Though beneficial, the increase does not meet national guidelines, as published by the US Dept of Health & Human Services (2008), which recommend at least 150 minutes per week of moderate intensity physical activity.

Table 7.37 Average per person weekly minutes of biking and walking

	2015 Base Year	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Average weekly minutes walking per person	31.6	33.4	36.5	34.4	39.6	40.8
Average weekly minutes of biking per person	16.4	17.8	18.3	19.3	19.8	19.3
Total average weekly minutes of biking and walking per person	48	51.2	54.8	53.7	59.4	60.1

Estimated lives saved annually from increased physical activity and reduced air pollution

Description: For physical activity, ITHIM first converts time spent walking and biking into metabolic equivalent tasks (METs), a consistent unit of energy expenditure from exercise. For air pollution, the model uses average annual PM 2.5 concentrations to estimate disease related to air pollution. The outputs of ITHIM are expressed as change in deaths and change in disability adjusted life years (DALYs).

Target or desired direction: No target for this measure. The desired directions to increase the number of lives saved and increase the number of years lived.

Findings: The burden of premature death and disease decreases under all investment strategies, with the 2040 Strategic investment strategy outperforming the 2040 Constrained in comparison to the 2040 No-Build Scenario. As detailed in **Table 7.36**, the 2040 Constrained Scenario achieves substantially greater benefits than the 2040 No Build, a 26 percent larger reduction in the burden of disease. Benefits from reduced air pollution accrue mostly in the first 10 years of the planning period, resulting in minimal additional benefits between 2027 and 2040.

Table 7.38 Estimated lives and years saved from increased physical activity and reduced air pollution

	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Estimated lives saved annually	15	17	19	22	23
Estimated Disability Adjusted Life Years (DALY)	209	260	272	354	379

Healthcare costs saved

Description: ITHIM uses a cost-of-illness approach consistent with the method used for the Climate Smart Strategy HIAs (Iroz-Elardo et al. 2014) and the US EPA (US EPA, 2007). This method uses large-scale studies of the cost of treating specific illnesses in the US and estimates the regional share of that cost. In this case, we used the CDC Chronic Disease Cost Calculator to arrive at estimates for direct (medical treatment) and indirect (absenteeism) costs of illness for the greater Portland region in 2027 and 2040. The Chronic Disease Cost Calculator does not provide estimates for specific cancers, nor for dementia. Therefore this method does not estimate avoided costs associated with dementia or cancer (lung, breast, and colon) even though it estimates the change in the burden of these diseases. This means that the total cost estimate is an underestimate. Consistent with methods from previous studies, it applies the population attributable fraction (percent change in DALYs from baseline) to arrive at an estimated change in treatment cost.

Target or desired direction: Lower healthcare costs.

Findings: Over $30 million in health care costs are avoided in the 2040 Constrained and 2040 Strategic investment strategies.

Table 7.39 Health care costs avoided (in 2017$)

	2027 No Build	2027 Constrained	2040 No Build	2040 Constrained	2040 Strategic
Annual health care costs saved	$17 million	$20 million	$26 million	$31 million	$32 million

Note: Estimates are rounded to the nearest million.



2018 Regional Transportation Plan

Chapter 8

Moving Forward Together

December 6, 2018

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8.0 PURPOSE



Learn more about the 2018 Regional Transportation Plan at **oregonmetro.gov/rtp**

Metro is the metropolitan planning organization (MPO) designated by Congress and the State of Oregon, for the Oregon portion of the Portland-Vancouver urbanized area, serving 1.5 million people living in the region's 24 cities and three counties. As the MPO, Metro formally updates the Regional Transportation Plan every five years in cooperation and coordination with the Oregon Department of Transportation and the region's cities, counties and transit agencies.

The Regional Transportation Plan is a blueprint to guide investments for all forms of travel – motor vehicle, transit, bicycle and walking – and the movement of goods and freight throughout the greater Portland region. The plan identifies current and future transportation needs, investments needed to meet those needs, and what funds the region expects to have available over the next 25 years to make those investments a reality.

Updates to the plan and subsequent implementation must meet the requirements of the federal Fixing America's Surface Transportation (FAST) Act, Oregon's Transportation Planning Rule (which implements Statewide Planning Goal 12), Oregon's Metropolitan Greenhouse Gas Emissions Reduction Targets Rule and Metro's Regional Framework Plan. In combination, these requirements call for development of a multimodal transportation system plan that is integrated with and supports implementation of local and regional land use plans and adopted Climate Smart Strategy, and meets federal, state and regional planning requirements.

Chapter organization

This chapter summarizes future work to implement the RTP, consistent with federal, state and regional requirements. The chapter is organized as follows:

8.1. Introduction: This section summarizes the purpose and content of the chapter.

8.2. Planning and programs: This section summarizes local, regional and state planning and programs that advance implementation of the plan.

8.3. Projects: This section summarizes major project development activities in the region and the allocation of federal transportation funds to implement projects in the RTP.

8.4. Amending the plan: This section summarizes the process for making revisions to the plan between scheduled updates.

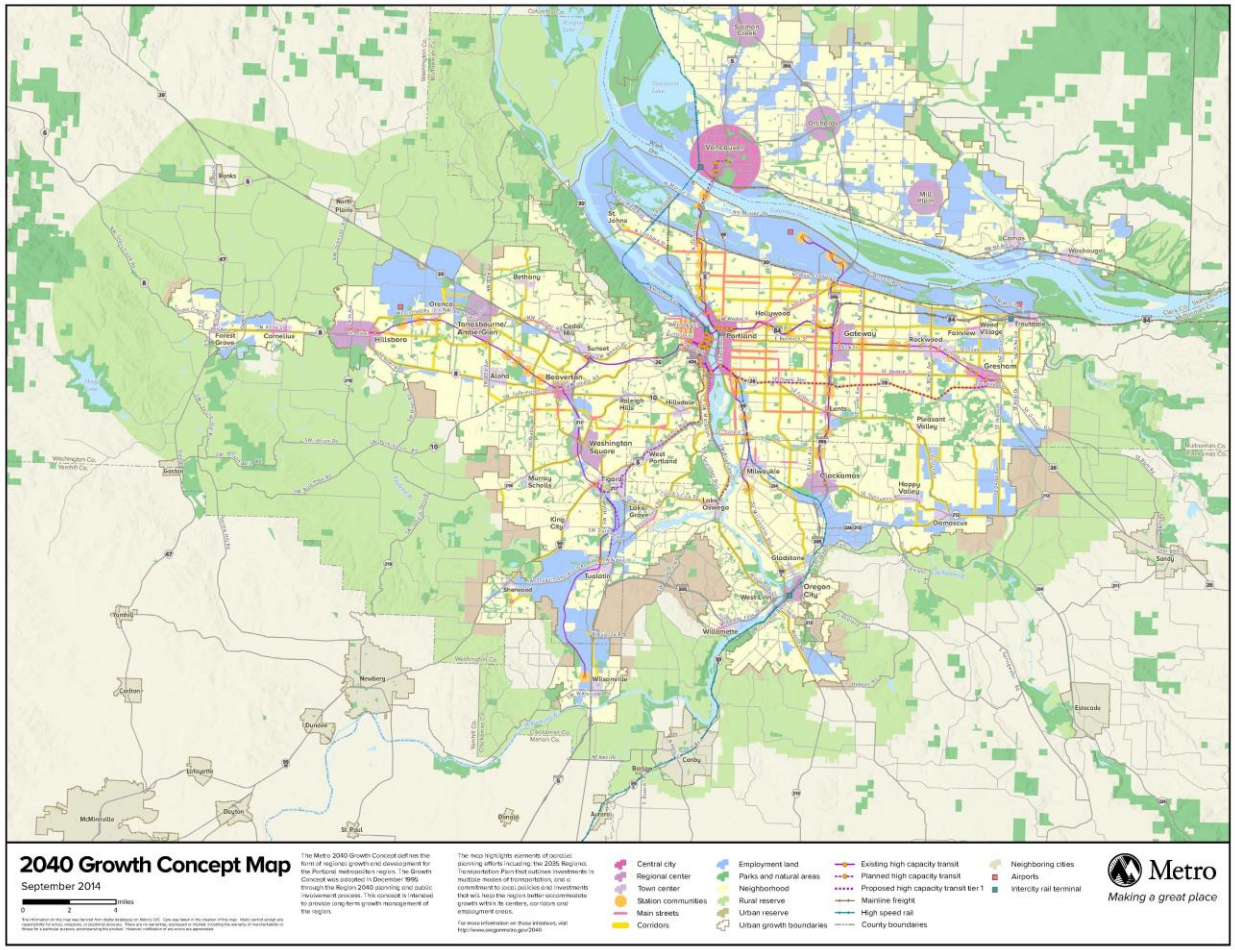
8.5. Data and tools: This section summarizes data and research activities to address existing and emerging planning and policy priorities and innovative practices in transportation planning and analysis and ensure that the region has the resources to fulfill its transportation performance measurement and reporting responsibilities.

8.1 INTRODUCTION

Connecting Our Shared Values and Vision for the Future: Setting a Course for Transportation

Metro worked with federal, state and local government partners as well as residents, community groups, and businesses to develop the 2018 Regional Transportation Plan. The result of that work is a set of regionally identified goals and policies that guide our transportation planning and investment decisions overall, strategies to help meet those goals and policies, a shared understanding about existing financial resources, and a recommended set of projects that make progress addressing the region's significant and growing transportation needs and challenges. The goals, policies, projects and strategies in this plan also address federal, state and regional planning requirements based on our shared values and the outcomes we are trying to achieve as a region, including implementation of the 2040 Growth Concept.

Figure 8.1 2040 Growth Concept (2014)



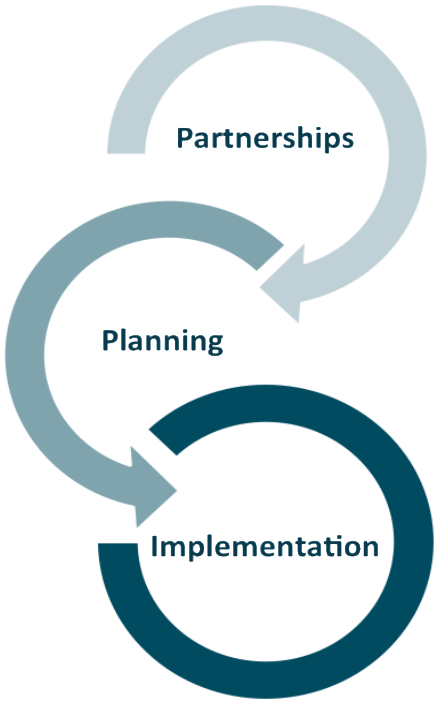
The 2018 Regional Transportation Plan is a key tool for implementing the 2040 Growth Concept – our shared land use and transportation strategy for managing growth

The plan sets an updated course for future transportation planning and investment decisions and continued implementation of the 2040 Growth Concept – the region's adopted land use and transportation strategy for managing growth and building healthy, equitable communities and a strong economy.

The plan takes into account the changing circumstances and challenges we face and addresses them directly, adopting new approaches for addressing safety, accessibility, mobility, environmental health and transportation equity that distinguish this plan from past RTPs, and that align with existing funding challenges and opportunities.

Central to this plan are innovative approaches to connect community land use aspirations and transportation investments and use of regional mobility corridor strategies to comprehensively address our growing transportation needs while protecting public and environmental health. Each mobility corridor strategy is uniquely tailored by optimizing operations on existing throughways, and arterial streets that also serve as transit and freight routes, completing gaps in biking and waking connections and strategically expanding the transit and roadway system.

This RTP continues to broaden how performance of the system is measured to define system needs. This plan builds on the broader system completion policy adopted in 2010, adopting new accessibility, transportation equity and safety measures to evaluate performance of the investments recommended in this plan. These new measures will also be used to monitor how the transportation system is performing in between scheduled RTP updates.



The plan will be implemented through a variety of policies, projects, strategies and actions at the local, regional, state and federal levels.

Through its policies, projects and strategies, the RTP aims to attract jobs and diverse housing to our region's downtown centers, main streets and employment areas. It seeks to increase the use of public transit, bicycling and walking, and reduce the amount of miles that our region's residents, employers and visitors need to drive in order to get around. 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 several performance targets set forth in Chapter 7.

To make more progress toward the goals and objectives of the plan, the region must take additional steps together and individually to address a wide range of planning, programmatic and project activities that will make it easier to implement adopted policies, projects and strategies. This chapter outlines those activities.

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 meeting the agreed upon goals, objectives and policies of this RTP.

Implementation of this plan will require a cooperative effort by all jurisdictions responsible for transportation planning in the region, and will involve:

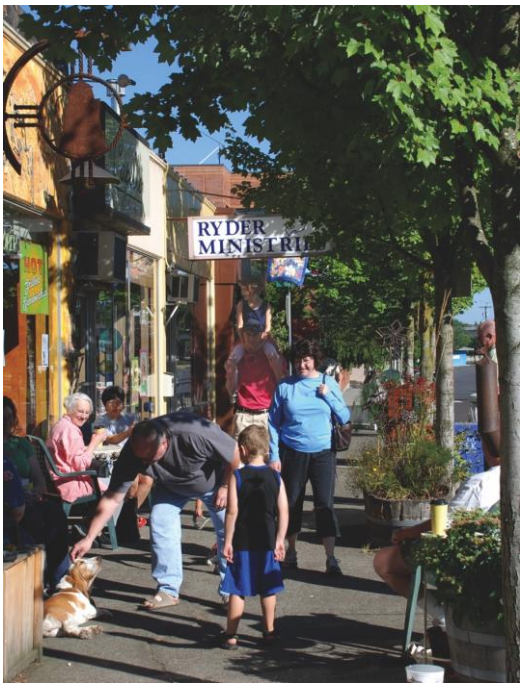
- Adoption of regional policies and strategies in local plans, including functional classifications for all modes and land use and transportation needs and agreed upon solutions identified in each mobility corridor strategy.
- A concerted regional effort to secure needed funding to build planned transportation investments needed to serve our growing and changing region.
- Focusing investments and system management strategies to support implementation of the 2040 Growth Concept and preserve the function of the region's mobility corridors in order to ensure that our land use and transportation policies are mutually supportive and make it easier for people to live and move around our region.
- 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 Transportation Plan, Oregon Highway Plan and four-year State Transportation Improvement Program (STIP), the Oregon Department of Land Conservation and Development's Transportation Planning Rule (TPR), the Oregon Metropolitan Greenhouse Gas Emissions Reduction Rule and TriMet's Transit Implementation Plan (TIP).

The Regional Transportation Plan is a living document and will continue to evolve and be updated on a regular basis to address existing and emerging issues. Metro will continue to engage and collaborate with regional partners and stakeholders on all topics and provide support to ensure successful implementation of this plan.

8.2 PLANNING AND PROGRAMS

This section summarizes local, regional and state planning and programs that advance implementation of the plan and 2040 Growth Concept.

8.2.1 Local Implementation



Local planning efforts which help implement the Regional Transportation Plan, include updates to the local transportation system plans, concept plans for designated urban reserves and topical, modal or subarea plans needed for consistency with the RTP or to address specific local or subarea transportation needs or emerging issues.

Local plans and projects are developed and updated to meet local transportation needs consistent with local land use plans and to implement the RTP and Regional Transportation Functional Plan (RTFP) as well as local needs and priorities. The RTFP directs how city and county plans will implement the RTP through their respective comprehensive plans, local transportation system plans (TSPs) and land use regulations. All of the actions included in the RTFP will help the region proactively address climate change, improve access and mobility and support other desired outcomes.

The TPR includes provisions for local TSPs to be updated within one year of adoption of the updated 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 and regional funding opportunities. The schedule will be updated following adoption of the Regional Transportation Plan.

In addition, the Portland metropolitan region has emerging communities- 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 define the needs of emerging communities and strategies needed to facilitate development in these areas, consistent with the 2040 Growth Concept.

8.2.1.1 Cooper Mountain Transportation Study

Washington County is conducting the Cooper Mountain Transportation Study to evaluate roadway network options to accommodate traffic through the Cooper Mountain area. Transportation in and around Cooper Mountain has long been a topic of discussion going back to the 1980s and 1990s with planning efforts around the Western Bypass and the Land Use, Transportation and Air Quality (LUTRAQ) studies. In more recent years, the Cooper Mountain transportation network has been an ongoing topic of discussion as part of the Washington County Transportation Futures Study, Concept Planning efforts of several cities, and anticipated development of other new urban growth areas (UGB additions since 2012 and Urban Reserves) on the western edge of the urban growth boundary. The Cooper Mountain area is experiencing increased traffic demand from regional growth and nearby developing areas.

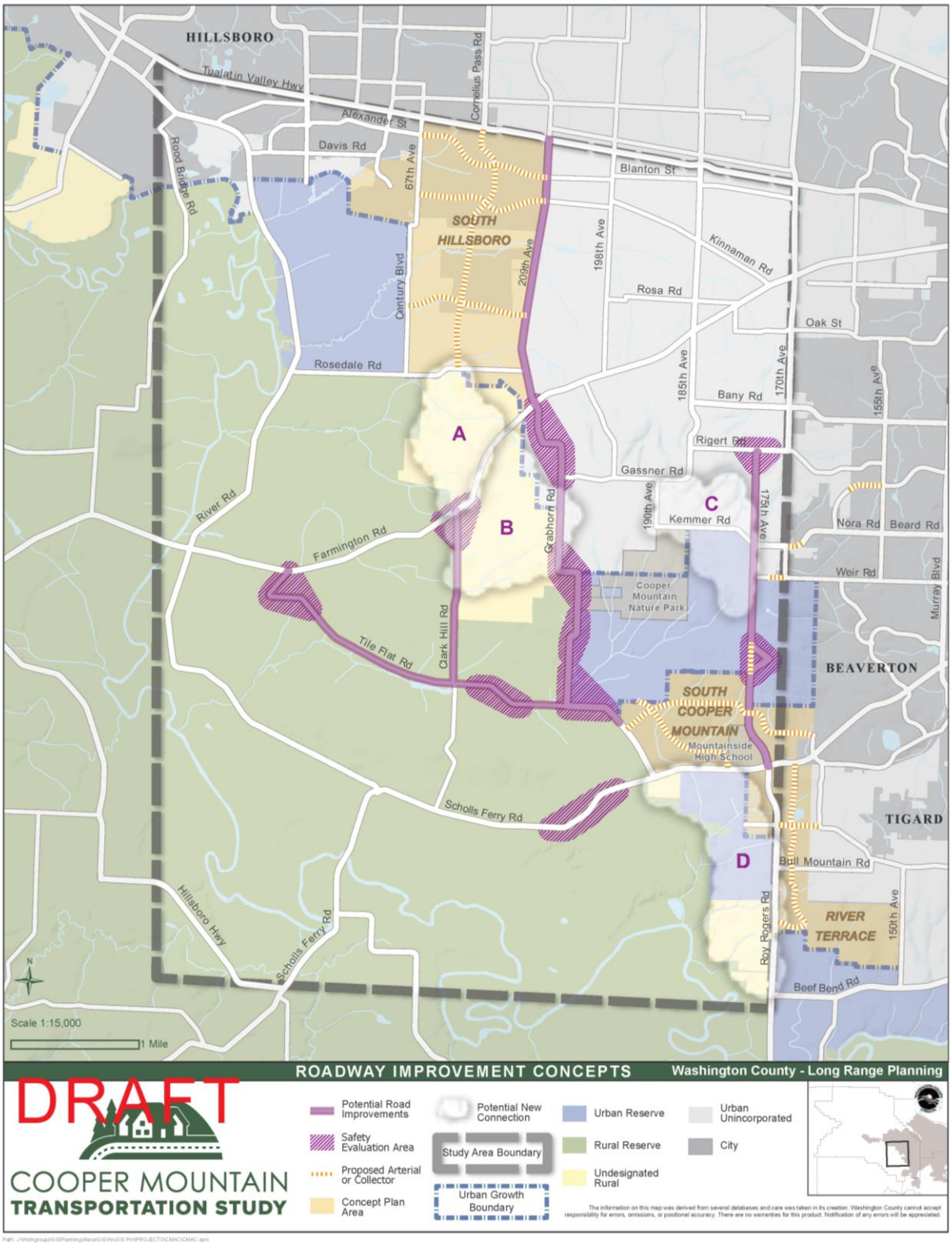
The Cooper Mountain study area is characterized by a mix of rural reserve, rural undesignated, urban reserve, and urban land. The developed areas are primarily residential and supportive uses. The existing rural roadway system was not intended to accommodate the current and projected levels of urban travelers using rural roads to go to and from urban destinations.

However, this trend is expected to continue with travelers moving between the communities of Sherwood, Tigard, Beaverton, Hillsboro and beyond on a regular basis. This study will take into account that the study area is part of a larger regional context and a multimodal transportation system is needed to connect several urban communities as well as provide accessibility to the rural community.

The Cooper Mountain Transportation Study began in fall 2017 and is expected to result in a number of Washington County Transportation System Plan and RTP amendments beginning in 2019 to add projects to the financially constrained project list and to update relevant RTP system maps.

Figure 8.2 illustrates the project study area. It includes areas of potential widening and/or safety improvements to existing roads, proposed roads that are already adopted into a local TSP or concept plan, concept plan areas, urban reserve areas, and clouded areas where additional new roadway connections could be made. The next steps in the study include refinement of the potential improvement concepts, alternatives and feasibility analysis, a final project list, and other action items for implementation.

Figure 8.2 Cooper Mountain Transportation Study Project Area



Source: Washington County Department of Land Use and Transportation

8.2.2 Metro's Regional Programs

Metro is responsible for several on-going regional programs that provide a combination of grants, technical assistance and planning to support local jurisdictions in implementing the 2040 Growth Concept and RTP. Modal experts provide expertise and support on freight, bicycle, pedestrian, motor vehicle, transit, Intelligent Transportation Systems (ITS) and operations planning, and topic experts provide support on climate change, equity, safety, emerging technology, shared mobility, connected and automated vehicles, street design, safe routes to school, resilience, transportation funding, brownfields, equitable housing and transit-oriented development. Metro's Regional Flexible Funds provide programmatic funding to help support that technical assistance, and capital funds to support implementation. The region's 2040 Grant Program supports planning processes to align land use and transportation goals, and the Equitable Housing grant program specifically focuses on supporting planning efforts to increase access to affordable housing across the region.

Regional programs identified in the Unified Planning Work Program, adopted annually by the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council, are described below.

8.2.2.1 Civil Rights and Environmental Justice program

Metro's transportation planning policies and programs ensure compliance with Title VI of the 1964 Civil Rights Act; the Executive Order on Environmental Justice; Section 504 of the 1973 Rehabilitation Act and Title II of the 1990 Americans with Disabilities Act; Goal 1 of Oregon's Statewide Planning Goals and Guidelines; and Metro's organizational values of Respect and Public Service. The program is advancing methods on identifying potentially affected populations, engaging those populations in the development of policy and program decisions, and analyzing the effects of policies and programs for historically marginalized communities.

Metro's work to ensure compliance includes implementing outreach strategies that help marginalized populations overcome barriers to participation; demographic data collection and mapping; assessing outcomes of plans and programs on historically marginalized communities; and trainings provided to staff on Title VI compliance requirements and environmental outreach best practices.

Program work on compliance is found across many areas of transportation planning: developing the Regional Transportation Plan (RTP), the Metropolitan Transportation Improvement Program (MTIP), corridor planning projects that follow NEPA regulations and in the Regional Travel Options program, which conducts federally-funded outreach that promotes non-automobile transportation options. In 2012, Metro created a new public engagement review process designed to ensure that Metro's public involvement is effective, reaches diverse audiences and harnesses emerging best practices. One of the three criteria for selection of members of the Public Engagement Review Committee, an advisory committee to the Metro Council, is ability to represent diverse communities in the region. Other components of the public engagement review process that will contribute to more inclusive engagement and accountability include an annual

public survey, meetings of public involvement staff from around the region to address best practices, an annual community summit to gather input on priorities and engagement techniques, and an annual report.

Metro addresses compliance agency-wide as well as within transportation planning functions and program-by-program. A key way that Metro complies across the agency is with implementation of its Diversity Action Plan, updated and adopted by the Metro Council in May 2017. The plan identifies goals, strategies and actions to increase diversity and cultural competence at Metro in four key areas: internal awareness and diversity sensitivity, employee recruitment and retention, committee membership and public involvement, and procurement. Metro's Strategic Plan to Advance Racial Equity, Diversity and Inclusion was adopted by the Metro Council in June 2016 and identifies goals and actions under five goals: Metro convenes and supports regional partners to advance racial equity; Metro meaningfully engages communities of color; Metro hires, trains and promotes a racially diverse workforce; Metro creates safe and welcoming services, programs and destinations; and Metro's resource allocation advances racial equity. Through the 2017-18 fiscal year, four departments are developing racial equity plans to reach the goals of the racial equity strategy: Planning and Development, Parks and Nature, Property and Environmental Services and the Oregon Zoo.

8.2.2.2 Regional Transportation Safety Program

Metro is formalizing regional transportation safety activities in a new Regional Safety Program to support achieving the Vision Zero target and achieving federal, state, regional and local safety performance targets. The work program will be based on the strategies and actions identified in the 2018 Regional Transportation Safety Strategy and the Regional Safe Routes to School Program. Tasks in the Regional Transportation Safety Program work plan will have annual reporting of federally mandated safety performance targets, annual reports to the Metro Council and JPACT. The work plan will also include coordination with local, regional, state, and federal plans to ensure consistency in approach to safety needs and issues across the region, updates to regional plans and the Regional Transportation Functional Plan to reflect current policy direction. Other work program activities include safety data collection, maintenance, analysis and interpretation, activities to coordinate with partners and increase awareness of the Safe System approach and Safe Routes to School, encouraging best practices in transportation safety and roadway design with funding and programmatic support identifying legislative priorities, and collaborating on efforts to highlight safety in materials, messaging and campaigns. The program will be closely coordinated with other regional transportation programs and region-wide planning activities.

8.2.2.3 Regional Active Transportation Program

The Regional Active Transportation Program manages updates to and implementation of pedestrian, bicycle and access to transit in the Regional Transportation Plan (RTP) and the Regional Active Transportation Plan. The program provides guidance to jurisdictions in planning for safe, efficient and comfortable active transportation access and mobility on the regional transportation system (including regional trails and multi-use paths). The program is closely

coordinated with other regional transportation programs and region-wide planning activities, and with Metro's Parks and Nature Department. Additionally, the program supports coordination with local, regional, state, and federal plans to ensure consistency in approach to active travel needs and issues across the region. The program ensures that prioritized regional bicycle and pedestrian projects are competitively considered within federal, state, and regional funding programs. Ongoing data collection, analysis, education, and stakeholder coordination are also key elements of Metro's active transportation program.

8.2.2.4 Regional Freight Program

The Regional Freight Program manages updates to and implementation of multimodal freight elements in the Regional Transportation Plan (RTP) and supporting Regional Freight Strategy. The program provides guidance to jurisdictions in planning for freight movement on the regional transportation system. The program supports coordination with local, regional, state, and federal plans to ensure consistency in approach to freight-related needs and issues across the region. Metro's coordination activities include ongoing participation in the Oregon Freight Advisory Committee (OFAC), and Portland Freight Committee (PFC). The program ensures that prioritized freight projects are competitively considered within federal, state, and regional funding programs. Ongoing freight data collection, analysis, education, and stakeholder coordination are also key elements of Metro's freight program. The program is closely coordinated with other regional transportation programs and region-wide planning activities.

8.2.2.5 Transportation System Management and Operations (TSMO) Program

With the intent of supporting TSMO investments and activities in the greater Portland metropolitan region, the TSMO program encompasses three activity areas that include regional policy development and implementation, MTIP grant management and system performance management:

- **Regional policy development and implementation.** The program maintains and periodically updates the Transportation System Management and Operations Strategy. The program provides leadership on the Regional Intelligent Transportation System (ITS) Architecture in order to comply with the FHWA rule that requires federally funded transportation projects to be in compliance with the National ITS Architecture. The program also guides implementation of the region's ITS communications network under the Communications Master Plan. It will continue to seek and support opportunities for research, education, and training on TSMO.
- **MTIP Grant Management.** The program manages the allocation of Regional Flexible Funding dedicated to TSMO. The TSMO program coordinates projects that were prioritized for a sub-allocation of federal funds for 2016-2018 and 2018-2021, consistent with the adopted Regional TSMO strategy. The program will continue to coordinate and manage the allocation of TSMO-designated regional flexible funds to partner agencies. It will provide support for applying systems engineering to regionally-funded ITS projects.
- **Congestion Management Process Support.** The program supports the federal mandates to maintain a CMP and promote TSMO, including intelligent transportation systems (ITS). The

program implements actions identified in the Arterial Performance Management Regional Concept of Traffic Operations (RCTO) to advance the region's performance measurement capabilities on arterial streets. CMP performance monitoring will continue (e.g., Regional Mobility Corridor Atlas) in order to support development of the RTP, local TSPs and MTIP programming. The program will continue to enhance PORTAL, a regional archived data user service managed by Portland State University. PORTAL will continue to expand the collection, archiving, and uses of multimodal performance data in a way that will enhance the region's ability to diagnose and address congestion and support multimodal operations consistent with the region's CMP.

The program is closely coordinated with other regional transportation programs and region-wide planning activities.

8.2.2.6 Regional Travel Options (RTO) and Safe Routes to School Programs

The Regional Travel Options Program implements RTP policies and the Regional Travel Options Strategy to reduce drive-alone auto trips and personal vehicle miles of travel and to increase use of travel options. The program improves mobility and reduces greenhouse gas emissions and air pollution by carrying out the travel demand management components of the RTP. The program maximizes investments in the transportation system and eases traffic congestion by managing travel demand, particularly during peak commute hours. Specific RTO strategies include promoting transit, shared trips, bicycling, walking, telecommuting and the Regional Safe Routes to School Program. The program is closely coordinated with other regional transportation programs and region-wide planning activities. The program is closely coordinated with other regional transportation programs and region-wide planning activities.

8.2.2.7 Air Quality and Climate Change Monitoring

The Air Quality and Climate Change Monitoring Program ensures the RTP and the MTIP address state and federal regulations and are carrying out the commitments and rules set forth as part of the Portland Area State Implementation Plan (SIP), the Climate Smart Strategy and the Metropolitan Greenhouse Gas Emissions Reduction Target Rule. The program also coordinates with other air quality and climate change initiatives in the region and monitors federal and state rulemaking that may impact forecasted emissions profiles. Metro is participating in a work group of the Department of Environmental Quality (DEQ) to develop a regional clean air construction strategy for clean diesel equipment and vehicles on select public improvement projects. The DEQ air quality program changes are implemented through the State Implementation Plan as part of ongoing implementation of the Transportation Control Measures. The regional and RTP will adhere to the changes once adopted.

8.2.2.8 Complete Streets Program

Metro's Complete Streets Program was established to provide transportation design guidelines, regional arterial and throughway design classifications and other tools to support local jurisdictions to design streets that implement context-sensitive design solutions that support the

2040 Growth Concept and achieving regional goals, including the Vision Zero target, increased transportation options for people of all ages and abilities, efficient and reliable travel for all modes, healthy people and environment, security, reduced green house gas emissions, sustainable economic prosperity, racial and income equity, vibrant communities, resiliency and fiscal stewardship. Program elements include providing technical assistance to cities and counties as transportation projects go through project development and design, and convening workshops, forums and tours to increase understanding and utilization of best practices in transportation design. The program is closely coordinated with other regional transportation programs and region-wide planning activities, and with Metro's Parks and Nature Department.

Metro staff will work with cities, counties, ODOT, TriMet, the Audubon Society of Portland, Metro Parks and Natural Areas department, members of the Regional Conservation Strategy working group, the Street Trust, Oregon Walks and other interested parties to review and update the design policy section of the RTP prior to completion of the next RTP update (due in 2023). The focus of this work will be to reflect updates to the regional design guidelines that will be finalized in 2019 and to better integrate green infrastructure and natural resource protection. This work will result in a set of recommended design policies for consideration by JPACT, MPAC and the Metro Council prior to inclusion in the RTP.

8.2.2.9 Regional Transit-Oriented Development Program

Since 2001, Metro's Transit-Oriented Development (TOD) program has had a unique and critical role in implementing the 2040 Growth Concept vision for vibrant, walkable centers and station areas linked by transit. The program invests in compact mixed-use projects near light rail stations, along frequent service bus corridors and in regional and town centers throughout the region increasing opportunities for people live, work and shop in neighborhoods with easy access to high-quality transit. The program provides financial incentives for TOD projects to increase transit ridership, stimulate private development of mixed-use buildings that would otherwise not proceed, and increase affordable housing opportunities near transit in high cost and gentrifying neighborhoods through land acquisition and project investments. With an increased focus on affordable housing, the program supports construction of housing near transit and services that is more affordable for older adults and lower- income households compared to what would otherwise be built on a property. Related program activities include opportunity site acquisition, investment in urban living infrastructure, and technical assistance to communities and developers.

8.2.2.10 Investment Areas Program

Metro's Investment Areas program helps communities build their downtowns, main streets and corridors and leverage public and private investments that implement the region's 2040 Growth Concept. Projects include supporting compact, transit oriented development in the region's mixed use areas, evaluating high capacity transit and other transportation improvements that cross city and county lines, and integrating freight and active transportation projects into multimodal corridors.

Major public infrastructure investments do not stop at city or county lines. Our transportation system connects the communities within greater Portland with the rest of the state and the rest of the world. When our region spends billions of dollars on expanding our road, transit and highway system to keep up with the continued population and employment growth, those public investments can both benefit and burden nearby communities. Over time, the region has become more strategic at linking together our transportation, housing, economic, racial equity and environmental goals, policies, and investments so that we can intentionally preserve and create great places that serve all people throughout the region, even as change and growth occurs.

The Investment Areas program completes system planning and develops multimodal projects in transportation corridor refinement plans identified in the Regional Transportation Plan. It also works on finance plans to align public investments in areas that support the region's growth economy. It includes ongoing involvement in local and regional transit and roadway project conception, funding, and design. Metro provides assistance to local jurisdictions for the development of specific projects as well as corridor-based programs identified in the RTP.

Metro's Investment Areas program has been connecting planning for major transportation projects with the community's broader goals and needs. While each area's conditions and needs are different, the approach of bringing together government, community, and business partners provides a framework to produce a shared plan of action to guide the investments and decisions of multiple agencies. Including a broader set of stakeholders in a collaborative decision making process allows for decisions that once seemed unclear or unfair to stakeholders to be more transparent. This approach improves our ability to involve and include those who are affected by these decisions and investments.

Investment areas can set the stage for a range of major capital investments beyond high capacity transit. Other Metro investment areas have focused on freight routes connecting major highways through small communities, redevelopment of brownfields in employment areas, and leveraging the opportunities of a regionally significant riverfront destination. The program is closely coordinated with other regional transportation programs and region-wide planning activities, including corridor refinement planning activities.

8.2.2.11 Emerging Technology Program

Metro's Emerging Technology program is new and will be guided by the Regional Emerging Technology Strategy. The Emerging Technology Strategy identifies steps that Metro and our partners can take to harness new developments in transportation technology—including automated, connected and electric vehicles; new mobility services like car share, bike share and ride-hailing services (for example, Uber and Lyft); and the increasing amount of data available to both travelers and planners—to create a more equitable and livable greater Portland region and meet the goals in the 2018 Regional Transportation Plan.

The Strategy forecasts how technology is likely to impact transportation over the coming decades, discusses how transportation agencies can respond in an era of increasingly rapid change and

identifies policies and actions that Metro and partners can take to stay on track to achieve our regional goals as technology continues to develop.

Metro has identified four **next steps** to take in the next two years that will advance the region's work on emerging technology and support local partners in implementing the policies in the Strategy:

- Fund **technology pilot projects** to test new approaches to connecting people to transit, promoting shared and active trips and providing more equitable transportation options.
- Convene partners to establish **new mobility policies** that are consistent across the region and aligned with this strategy to ensure new travel options operate safely, equitably and transparently.
- Develop **better data and tools** so that we can account for the impacts of emerging technology in transportation planning efforts.
- Advocate for **state and federal technology policy that supports our regional goals** and preserves local and regional authority to manage the transportation system.

8.2.3 Region-wide Planning

This section summarizes near-term planning at the regional-scale to advance implementation of the plan. Each planning effort is needed to address regional transportation policy or planning issues that could not be resolved during the plan update.

Table 8.1 Overview of Region-wide Planning Activities

	Lead Agency	Proposed timing
Regional Mobility Policy Update	Metro, ODOT	2019-21
Regional Congestion Pricing Technical Analysis	Metro, ODOT	2019-TBD
Transportation System Management and Operations Strategy Update	Metro	2019-20
Jurisdictional Transfer Assessment Program	Metro, ODOT	2019-20
Transit planning	TriMet, SMART	Annually
Enhanced Transit Concept Pilot Program	Metro, TriMet	2018-22
Central City Transit Capacity and Steel Bridge Analysis	Metro, TriMet	2019
Transportation Equity Analysis and Monitoring	Metro	2019-23
Funding Strategy for Regional Bridges	Counties	2019-21
Emergency Transportation Routes Project	Metro, RPDO	2019-20
Regional Freight Delay and Commodities Movement Study	Metro, ODOT	2022
Regional Freight Rail Study	Metro, Port	2023
Regional Transportation Functional Plan Update	Metro	TBD
Parking Management Policy Update	Metro	TBD
Green Corridor Implementation	Metro	TBD
Frog Ferry Passenger River Taxi Service Study	Friends of Frog Ferry	TBD

These efforts will be completed consistent with the RTP goals, policies and strategies. A lead agency, project partners and proposed timing for completion is identified for each planning effort along with a description of the issues to be addressed and expected outcomes from the work. This work will be completed by multiple partners as resources are available and pending future Metro Council and JPACT policy direction and will be coordinated through the development and approval of the annual Unified Planning Work Program (UPWP).

8.2.3.1 Regional Mobility Policy Update

Lead agency	Partners	Proposed timing
Metro and ODOT	ODOT, cities, counties, TriMet, SMART, FHWA, SW RTC	2019-21

As part of adopting the 2000 RTP, the first transportation plan to fully implement the Region 2040 Growth Concept, Metro developed a new approach to managing mobility. The new policy came from an extensive conversation with regional elected officials and policy makers over a two-year period, including an alternatives analysis to help officials better understand the tradeoffs with making mobility investments.

Originally adopted by JPACT and the Metro Council in 2000 and amended into the Oregon Highway Plan (OHP) by the Oregon Transportation Commission (OTC) in 2002, the interim regional mobility policy reflects a level of motor vehicle performance in the region that JPACT, the Metro Council and the OTC deemed acceptable at the time of its adoption. Policymakers recognized the policy as an incremental step toward a more comprehensive set of measures that consider system performance for all modes, as well as financial, social equity, environmental and community impacts. This RTP continues that evolution and has defined a broader set of performance measures that can provide a more comprehensive assessment of transportation system performance as reflected in the performance measures identified for each RTP goal and the regional performance targets, including the interim regional mobility policy, contained in Chapter 2 and Chapter 3.

The interim regional mobility policy reflects volume-to-capacity targets adopted in the RTP for facilities designated on the Regional Motor Vehicle Network as well as volume-to-capacity targets adopted in the Oregon Highway Plan for state-owned facilities in the urban growth boundary. In effect, the policy is used to evaluate current and future performance of the motor vehicle network, using the ratio of traffic volume (or forecasted demand) to planned capacity of a given roadway, referred to as the volume-to-capacity ratio (v/c ratio) or level-of-service (LOS).

Traditionally, motor vehicle LOS has been used in transportation system planning, project development and design as well as in operational analyses and traffic analysis conducted during the development review process. As a system plan, the RTP uses the interim regional policy to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. LOS is also used to determine consistency of the RTP with the OHP for state-owned facilities.

The interim mobility policy broke from the historic practice of "one size fits all" congestion standards for roads and freeways to a more tailored approach that coordinates our region's land use goals with the role of our major streets, focuses auto and freight mobility expectations on the freeway system and emphasizes the role of transportation choices in moving people throughout the region. The policy allows for more congestion during the peak period in locations that have good travel options available, such as high capacity transit, while aiming to protect the off-peak period for freight mobility. This new emphasis on a tailored mobility policy and multimodal solutions was also incorporated into the Oregon Transportation Plan (OTP) in 2006, the policy document that frames and organizes all of the state's modal plans for transportation.

The policy also recognizes that past practice of "building our way out" of peak-hour highway congestion is not only fiscally and technically unattainable, but also has unintended impacts that are inconsistent with the adopted 2040 Growth Concept vision, including encouraging development on rural lands outside the urban growth boundary and undermining the broader public and private investments being made in centers and transit corridors. The policy prioritizes investment in a multimodal transportation system in order to make sure that our transportation investments also help us meet our economic development, public health, climate change and fiscal responsibility goals.



Regional Mobility Policy Update

There has been increasing discussion of the role of motor vehicle LOS as a performance metric. The region and local communities across the region have adopted goals such as improving safety for all roadway users (e.g., pedestrians, bicyclists, freight and transit users) and encouraging infill development to implement the 2040 Growth Concept, which often conflict with meeting LOS thresholds.

The region has committed to updating the interim regional mobility policy to better align with the comprehensive set of goals and desired outcomes identified in the RTP. This section describes a proposed work plan for considering measures aimed at system efficiency, including people-moving capacity, person throughput and system completeness.

In the 2010 RTP, Metro expanded on the concept with the development of a series of regional mobility corridors that provide the geography for monitoring and reporting on mobility. Twenty-four mobility corridors, encompassing the entirety of the region's transportation system, were developed, with each corridor framed by Region 2040 land use outcomes, and bundling throughways, transit, arterial streets and bikeways in each mobility corridor as complementary parts of an integrated system. Metro publishes a periodic Regional Mobility Atlas to provide ongoing tracking performance of these corridors as a foundation for planning and project development work in the region.

In 2013, ODOT published the Corridor Bottleneck Operations Study (CBOS), another tool for understanding and responding to congestion bottlenecks on throughways within the regional mobility corridors. This tool has since been used to prioritize system management and operational investments on the region's throughways system with an eye toward fine-tuning a mature throughway system with strategic capacity improvements. The few major throughway projects envisioned in the RTP are focused on bottlenecks that are part of this shift toward maintaining, managing and operating a mature system.

Despite these efforts to keep pace with traffic growth in the region, congestion has continued to grow since the 2000 RTP mobility policy was adopted. During this time, the region has experienced significant population and employment growth, straining all parts of our transportation system. During the same period, state investments in the region's freeway system continued to decline from historic levels due to slowing state and federal transportation funding.

Congestion and its impacts on mobility and the region's economic prosperity and quality of life are a top public concern. The update identified current traffic congestion on many of the region's throughways and arterials, and predicts that many of these facilities are unlikely to meet the adopted interim mobility policy targets in the future, including I-5, I-205, I-84, OR 217 and US 26.

ODOT's 2016 Traffic Performance Report[1] shows what many of us have experienced: traffic congestion in the greater Portland region today can occur at any time of the day or week, and is no longer only a weekday peak hour problem. In 2013, about 11 percent of all travel in the greater Portland region occurred during congested periods. This increased to nearly 14 percent in 2015. This increase in congestion is a reflection of the both the region's continued growth, including our substantial economic rebound from the Great Recession that began in 2008.

More recently, the U.S. Department of Transportation issued new regulations (through MAP-21 and the FAST Act) for states and MPOs that will require greater monitoring of mobility on our throughway system and other facilities designated on the National Highway System and setting targets for system performance. While these new requirements differ somewhat from the current mobility policy for the region, the approach is similar.

ODOT and Metro propose to work in partnership on a refinement plan to update the regional mobility policy adopted in the RTP and the OHP Policy IF3 (Highway Mobility Policy) upon completion of the 2018 RTP. The process must comply with the provision of OHP Policy 1F3 and associated Operational Notice PB-02, and must include findings to demonstrate compliance. That means the project will set forth a Portland area-specific process(es) and documentation requirements and identify measures and targets for identifying needs and for demonstrating the adequacy of regional and local actions and projects in transportation system plans, and of mitigation measures for plan amendments during development review.

[1] The 2016 Traffic Performance Report establishes a baseline for long-term monitoring that will help Metro and ODOT better understand the performance of the region's freeway system and supports the region's Congestion Management Process.

Proposed measures and targets will generally be taken from existing measures and past research efforts, including the RTP, Climate Smart Strategy, ODOT Key Performance Measures, Federal performance measures and targets, Washington County TGM project on performance measures and standards, and the ODOT Region 1 Highway Performance Project and Traffic Performance Report. A targeted review of best practices from California, Washington, Florida, and other states and MPOs will be conducted. Measures to explore may include motor vehicle, freight and transit travel time and reliability, active transportation network completeness, street connectivity, transit coverage and frequency, mode share, accessibility, trip length, vehicle miles traveled, and mobility corridor person and goods movement capacity and throughput.

Metro and ODOT will engage TPAC, JPACT and other interested stakeholders in development of the scope of work (and desired outcomes) beginning in early 2019, after adoption of the 2018 RTP. The agreed upon scope of work and budget will also be reflected in the 2019-20 Unified Planning Work Program (UPWP). This work is expected to take two years and result in amendments to the RTP and regional functional plans and OHP Policy 1F3 for consideration by JPACT, the Metro Council and the Oregon Transportation Commission prior to the 2023 RTP update.

Expected outcomes of the update include:

- A mobility policy framework will be developed for the regional throughways, which generally correspond with expressways designated in the Oregon Highway Plan (OHP). This policy will be incorporated into the RTP, Regional Transportation Functional Plan (RTFP) and OHP Policy 1F3 for the purpose of evaluating the performance of throughways.

- A mobility policy framework will be developed for arterial streets. This policy will be incorporated into the RTP and RTFP for the purpose of evaluating the performance of county and city-owned arterials, and in OHP Policy 1F3 for the purpose of evaluating the performance of state-owned arterials.

Together, these new policy frameworks will guide transportation system planning as part of future RTP and local TSP updates and monitoring activities in support of the region's ongoing Congestion Management Process (CMP). The policy frameworks will also be applied to the evaluation of transportation impacts of plan amendments during development review, and will provide guidance for operational decisions.

The City of Oregon City has locally adopted the Highway 213 Corridor Alternative Mobility Targets plan, which includes alternative mobility targets at the intersection of Highway 213 and Beavercreek Road. The Highway 213 Corridor Alternative Mobility Targets were approved by the OTC as an amendment to the OHP in October 2018. It will be imperative that any planning work done regionally related to the regional mobility policy update, shall either create a condition where the Oregon City amendment to the Metro area mobility targets in the OHP is no longer necessary, or shall explicitly state that the Oregon City amendment to the OHP shall remain in effect even when an updated regional policy is adopted.

8.2.3.2 Regional Congestion Pricing Technical Analysis

Lead agency	Partners	Proposed timing
Metro and ODOT	Cities, counties, FHWA	2019-TBD

Growing congestion on the greater Portland area's throughways is increasing travel delays and unpredictability. This congestion affects quality of life as travelers sit in cars or on the bus, and impacts the economy through delayed movement of merchandise and lost productivity.

Ongoing efforts to address congestion in the region include investments in system and demand management strategies, improving transit service and reliability, increasing bicycle and pedestrian access and adding highway capacity in targeted ways. But it is clear that these strategies are not sufficient and will result in continued congestion in our region. We cannot address congestion through supply alone; we must also manage demand.

Through the end of 2018, ODOT is conducting a feasibility analysis to explore the options available and determine how congestion pricing, also know as value pricing, could help ease congestion in the greater Portland area.

Oregon's House Bill 2017, also known as Keep Oregon Moving, directs the OTC to develop a proposal for congestion pricing on I-5 and I-205 from the state line to the junction of the two freeways just south of Tualatin, to reduce congestion. The State Legislature directed the OTC to seek approval from the Federal Highway Administration no later than December 31, 2018. If FHWA approves the proposal, the OTC is required to implement congestion pricing.

The OTC formed a policy advisory committee in fall 2017 to provide a recommendation after considering technical findings, likely effects (traffic operations, diversion, equity, environmental and air quality, and others), mitigation opportunities and public input. This work is focused on identifying potential strategies to manage demand on I-205 and I-5. In its early stages, it has focused attention on the need to price comprehensively, rather than High Occupancy Toll lanes and to identify key mitigation strategies, such as increased transit service.

The project's limited scope has raised larger questions about how demand management pricing strategies could be implemented throughout the region; further study is needed in this area and should be undertaken to better understand different ways that pricing could work regionally and the different policy outcomes that various pricing programs, including cordon pricing, VMT-based pricing and network-based pricing might have. In addition, the study should evaluate issues and outcomes related to equity, safety and alternative investments, including the interaction between pricing and increased transit access. A comprehensive, regional study should be undertaken before the next update to the RTP in order to provide policy guidance as to how different types of pricing programs might impact traffic congestion, people and vehicle throughput, freight mobility, greenhouse gas emissions, air pollution, outcomes for under-served communities, mode share and overall traffic volumes and whether they improve the regional transportation system.

8.2.3.3 Transportation System Management and Operations Strategy Update

Lead agency	Partners	Proposed timing
Metro	Cities, counties, ODOT, TriMet, SMART, C-TRAN, RTC, FHWA	2019-20

The region's Transportation System Management and Operations (TSMO) program follows a 10-year plan that ends in 2020. Consequently, the Metro will update the TSMO Strategy before it expires, and to reflect the changing transportation technology-driven infrastructure and system needs.

The strategy will be considered for adoption by JPACT and the Metro Council when the update is complete. The TSMO Strategy will guide program investments using federal funding allocated by Metro through the Regional Flexible Fund Allocation process, state funding, additional federal grant funds and local funds, building on investments to increase transportation system efficiency and support innovative ways to use technology to actively manage demand, manage the system and to improve operations, such as building on the foundation of the region's Intelligent Transportation Systems (ITS) investments. The TSMO Strategy will include key components of the system monitoring, performance measurement and the federally-required Congestion Management Process (CMP) defined in the RTP. Most of the required CMP activities are related to performance measurement and monitoring.

While the current TSMO plan continues to serve the region, an update is needed to formalize new concepts among regional TSMO partners, including systems, operations and infrastructure for connected and automated vehicles following policy defined in the region's Emerging Technology Strategy. TSMO planning and systems support smarter operations through integrated corridor management, decision support systems, cloud-based applications and "Smart City" urban applications of the Internet-of-Things (IoT) in service of sensing real-time demand to improve operations.

The update will engage a broad range of stakeholders to understand issues and needs from operators and the traveling public. It will focus on empowering local and regional jurisdictions to analyze multimodal performance data to advance the region's ability to diagnose and manage congestion, support multimodal operations, reduce climate and other emissions and improve safety to achieve Vision Zero. The update will also include planning for next generation transit signal priority to improve transit travel time reliability and speeds system-wide. The update will result in an updated set of policies, projects and specific actions to guide TSMO investments and activities in the greater Portland region and further implement the Regional Transportation Plan.

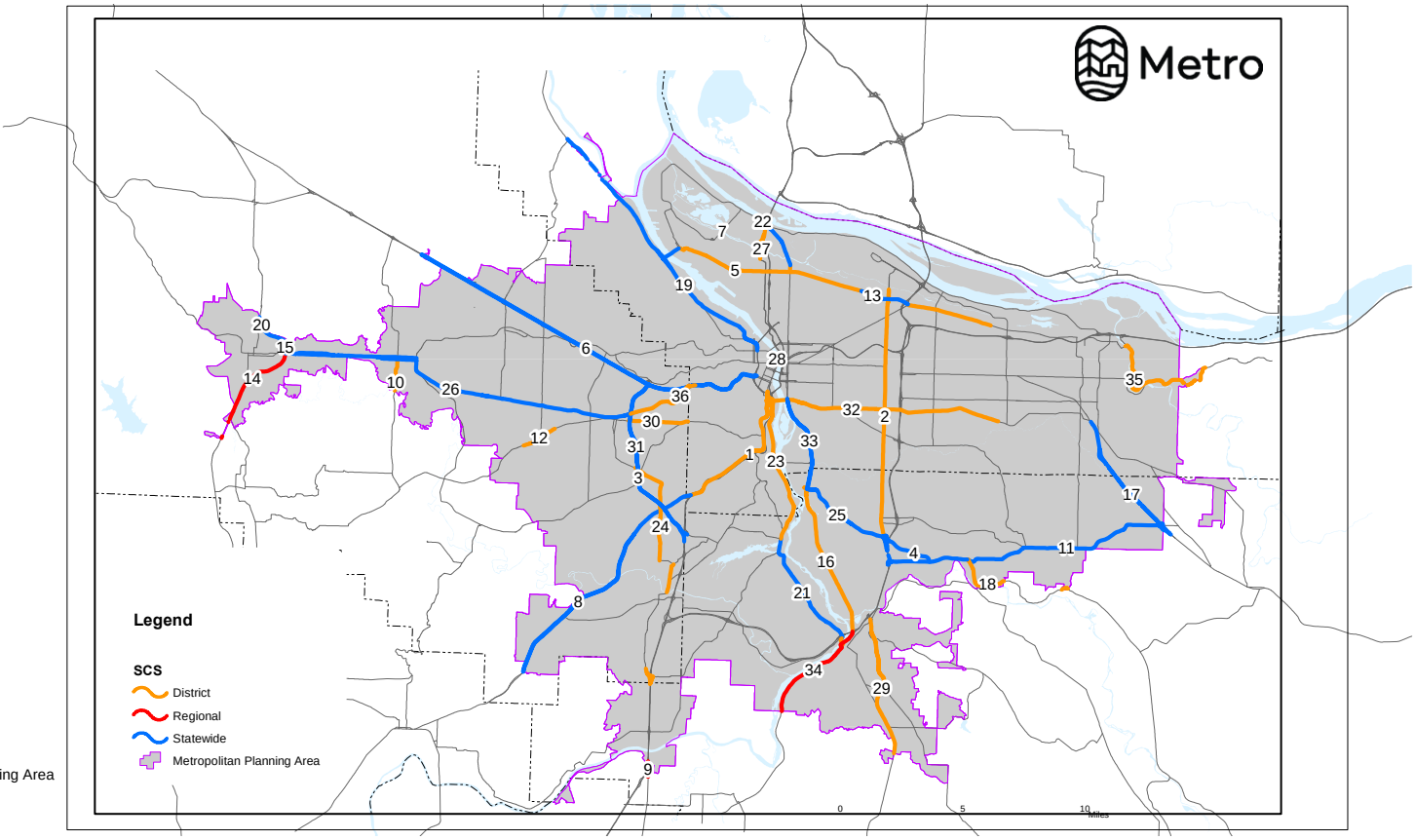
8.2.3.4 Jurisdictional Transfer Assessment Program

Lead agency	Partners	Proposed timing
Metro and ODOT	Cities, counties, TriMet, FHWA	2019-20

Purpose

The purpose of a jurisdictional highway transfer assessment program is to ensure that roadways in the Portland metropolitan region are owned by the agency best position to ensure the transportation infrastructure supports the land use and improves safety for all users. This means identifying which state-owned routes in the region should be evaluated and considered for a jurisdictional transfer; gaps and deficiencies on those routes; priorities among the routes; and barriers and opportunities to transfer the prioritized routes from state to local ownership.

Figure 8.3 Oregon Highway Plan State Highway Classifications



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Problem Statement

In Oregon, and specifically in the Portland metropolitan region, ownership patterns of streets, roads and highways reflect historical patterns but do not necessarily reflect current transportation uses, land use and development patterns. While many of the state-owned roads with an arterial classification carry freight, they also serve short distance local vehicle trips, transit, bicycle, and pedestrian travel. A road under ODOT jurisdiction that no longer fulfills its

original role in the context of the larger state highway system may be a very important route to the city or county where it is located in the context of the local and regional system. These roadways can be found throughout the region: from Hall Boulevard to the west, McLoughlin Boulevard to the south, Powell Boulevard to the east and Lombard Street to the north.

The history of each road also provides important context for decision-making. Sometimes called an "orphan highway," many roadways in the Portland metropolitan region were originally constructed as rural or farm-to-market roads. But as city limits expanded many of these roads became surrounded by increasingly dense urban environments that put pressure on them to function more as city streets. Due to increased commercial activity and access over time, these arterial highways now serve more of an accessibility than a mobility function, and often carry multiple modes of transportation each day. For example, 82nd Avenue is a major transit and pedestrian corridor. In 1983, Interstate 205 opened just 10 blocks east, creating a new north-south throughway. At this point, 82nd Avenue was no longer needed for long-distance travel.

In the RTP, these roadways are often identified as key travel corridors for freight, transit, vehicle, bicycle and pedestrian trips. There is a strong correlation between the 2018 RTP High Injury Network, where road users face higher than average probability of being killed or seriously injured, and arterial highways. It is a regionally recognized issue: how to balance mobility and reliability for all modes with accessibility, safety and livability. Maintaining these roads and implementing capital improvements is further complicated when local expectations and needs do not match state investment priorities.

According to the OHP Policy 2C (Interjurisdictional Transfers), it is the policy of the State of Oregon to consider jurisdictional transfers that rationalize and simplify management responsibilities, reflect the appropriate functional classification, and lead to increased efficiencies in the operation and maintenance of a particular roadway segment or corridor. ODOT's *A Handbook for Making Jurisdictional Transfers* reiterates that it is in ODOT's interest to concentrate state responsibility for the road system on highways with statewide or inter-regional significance and to increase the efficiency of operation and maintenance of the highway system.[2]

Most of these roadways have a backlog of pavement maintenance as well as gaps or deficiencies in basic urban pedestrian and bicycle facilities. Funding for near- or long-term investments has not been identified by the state or local jurisdictions. Furthermore, there is no agreement in the region on which roads are the highest priorities when it comes to what to transfer, when, and at what cost.

[2] Transferring Roads: A Handbook for Making Jurisdictional Transfers (2003) can be accessed online at: https://digital.osl.state.or.us/islandora/object/osl%3A9571/datastream/OBJ/view

Process

Metro will work with ODOT to lead a collaborative and inclusive process for decision-making to prioritize highways and address some of the next steps for transfer in the Portland region. Because Metro does not own any roadways, Metro will act as a facilitator and convener of partners to move the process forward.

While this process aims to assess and prioritize roadways for transfer in the Portland region, it is not intended to discourage any transfers or investments from occurring prior or during the assessment process. There are certain roadways and jurisdictions that may be ready for a transfer without going through this assessment process.

Jurisdictional Transfer Assessment Program Process

STEP 1: Identify roadways in the Portland region that might be candidates for jurisdictional transfer

STEP 2: Compile existing data

STEP 3: Evaluate costs and local readiness of corridors

STEP 4: Prioritize roadways for jurisdictional transfer in the Portland region

STEP 5: Identify risk issues and legal mechanisms for Tier 1 corridors

STEP 1: Identify roadways in the Portland region that might be candidates for jurisdictional transfer

The first step is a planning phase that necessitates Metro, ODOT and their partners to take a look at classifications in the context of today's transportation system, or what is planned in future investments.

Metro, ODOT and local jurisdictions (the project partners) will identify the state-owned roadways to be included in the study, including most arterials but excluding throughways. The map below displays the State Highway Classifications for all state-owned roads in the region. Action 2C.1 of the OHP suggests that potential candidates for jurisdictional transfer may include: urban arterials serving primarily local travel needs; urban streets that have remained state-owned after a parallel major improvement has been constructed; frontage roads; farm-to-market roads; other roads that function like county roads; and connector roadways between highways.

Road classifications will be used to determine the highways to review. The starting assumption is that:

- "Interstate Highways" will not be included.
- Roads owned by the state and classified as "Regional" or "District" will be included on the list of potential roadways for jurisdictional transfer.
- Roads owned by the state and classified as "Statewide" will be evaluated on a case-by-case basis according to existing and planned function, as defined in the OHP. In cases where a reclassification of the highway from Statewide to Regional or District is warranted, changes to the OHP may be sought before considering jurisdictional transfer.

The "Statewide" classification will likely require the most analysis and discussion. According to the OHP, the "Statewide" classification is defined as providing "inter-urban and inter-regional mobility and to provide connections… not served by Interstate Highways" and "the management objective is to provide a safe and efficient, high-speed, continuous-flow operation." These criteria will be used for determining which Statewide Highways remain in the classification and which should be reclassified as District or Regional.

In addition, the designations of state classifications have not been updated since the adoption of the OHP in 1999. The process for reconsideration will take into account National Highway System (NHS) and other freight-related designations that have been updated more recently. More research is needed if and how NHS designations affect a potential transfer. The RTP also provides a means to revisit the Statewide Highway classification, as the RTP already differentiates facilities with the OHP classification and the regional functional classification system. Those facilities that are designed as (or planned to include) limited-access, high-speed routes (per the OHP definition of Statewide Highways) are part of the RTP Principal Arterial network. Examples include the Sunset Highway, Highway 217 and Highway 99E/224/Sunrise.

Once roadways are identified, partners will also assess whether the current conditions of the highway are consistent with the RTP and local TSP design and modal classifications, local land use plans, past planning efforts, and submittals of projects to the RTP project list.

The potential roadways vary in length and often cross multiple jurisdictions. Since local jurisdictions are the likely recipients of the transferred highway, it is proposed to define segments, and beginning and end points based on jurisdictional boundaries.

If a jurisdictional transfer is not viable or appropriate, jurisdictions may pursue a potential Special Transportation Area designation in collaboration with ODOT.

STEP 2: Compile existing data

In the second step, data sources will be identified and cataloged at the corridor segment level to identify infrastructure gaps and deficiencies.

Below is a list of potential criteria and data sources that could inform this step in the process:

- **Safety score**
    - Evaluation of crash data and relation to the High Injury Network/High Crash Network identified in the RTP and/or ODOT's SPIS process.
    - Resources: ODOT crash data, Metro Regional Transportation Safety Strategy, Metro State of Transportation Safety Report, ODOT Region 1 SPIS Analysis
- **Asset score**
    - Evaluation of pavement conditions, may also take into account status of other assets on roadways, such as signals, bridges and culverts.
    - Resources: ODOT pavement rankings, TSMO/ITS evaluation

- **Pedestrian network completeness score**
    - Evaluation of gaps in the pedestrian network and ADA network. Analysis may include crossings.
    - Resources: ODOT Region 1 Active Transportation Needs Inventory and Metro Regional Active Transportation Network
- **Transit score**
    - Evaluate whether existing or planned frequent service route, Verify whether transit reliability is an issue. Determine whether it may be designated for Enhanced Transit.
    - Resources: Enhancement Plans from transit providers, and Metro Regional Transit Strategy

These scores will be used to assess deficiencies will be the starting point for the analysis in Step 4. In the next step, a consideration of equity could be used to further prioritize the roadways.

STEP 3: Evaluate costs and local readiness of corridors

Step 3 is a pivotal step to move toward improvements on identified roadways. The partners involved in a potential transfer must be ready for transfer and come to an agreement on how to assess the costs of transfer. Costs to bring the highway up to a state of good repair will be estimated for corridors, based on the analysis done in Step 2. The cost assessment will take into account maintenance needs, signals, bridges, culverts, stormwater management, pavement condition, pedestrian and transit needs and, if applicable, safety needs. Transfer recipients may want to develop cost estimate ranges for long term investments that would be implemented after a transfer is complete.

Second, partners will consider likely timeframes to complete repairs and transfers. It may not make sense for the state to upgrade a roadway if the recipient jurisdiction has near-term plans to make significant improvements that would result in rework.

STEP 4: Prioritize roadways for jurisdictional transfer in the Portland region

In Step 4, partners will prioritize the corridors for transfer, further narrowing the number of corridors to be considered for transfer.

Project partners will review the data compiled in Step 2 and the cost information in Step 3, and use that information to rank priority corridors in the region. For example, the safety score could be considered the most urgent factor. The pavement condition score is a strong indicator of how much repair needs to be done. Based on initial feedback from partners, the roads could be tiered based on safety and pavement ratings.

Based on the agreed-upon criteria, the roadway or roadway segments will be divided in three tiers:

- Tier 1: Highest priority roadways for transfer
- Tier 2: Medium priority roadways for transfer
- Tier 3: Lowest priority roadways for transfer

The roadways in Tier 1 will be further analyzed in Step 5. Equity is also a criterion that should be taken into account as applicable in the ranking process and could move a roadway up or down a tier. Equity focus areas are defined in the Regional Transportation Plan, reflecting areas of the region with the highest concentrations of people of color, people with low income and/or people with limited English proficiency.

STEP 5: Identify risk issues and legal mechanisms for Tier 1 corridors

The purpose of Step 5 is to identify and understand that liability and risk issues involved in a transfer, and learn from successful transfers. Project partners will consult with the Office of Metro Attorney, and solicit input from partner's attorneys, such as the DOJ, to document any liability and legal issues for consideration during a potential transfer.

Metro will summarize ODOT's requirements as set forth in the Handbook for making Jurisdictional Transfers, and document best practices from past transfers that have been successful. Examples include inner Sandy Blvd. MLK Blvd., and portions of Hall Blvd. and Farmington Road.

Expected outcomes

These steps will help prepare the region, local governments and the state to identify priorities and readiness. The process will not commit funding sources, but it will help project partners identify roadways that are good candidates for transfer, expected cost ranges to fund state of good repair improvements, cost ranges to fund additional improvements and potential funding sources and timelines for implementation.

Note: This process does not include decision-making on whether improvements on these roadways should be made before or after a jurisdictional transfer. Those decisions are context-sensitive and may be best determined based on the corridor and the partners involved.

8.2.3.5 Transit Planning

Lead agency	Partners	Timing
TriMet and SMART	Cities, counties, Ride Connection, other transit providers	Annually

The TriMet and SMART (South Metro Area Regional Transit) conduct annual transit service planning in coordination with Metro, cities, counties and other transit providers to implement the RTP, Regional Transit Strategy, Coordinated Transportation Plan for Seniors and People with Disabilities, TriMet Service Enhancement Plans and the SMART Master Plan. One of the key themes of this RTP is the need for more transit capital investment and service, in order to provide more of our region with safe, convenient, reliable, and affordable transit options and prioritize roadway capacity for freight mobility and trips that do not have functional alternatives.

In July 2017, the Oregon Legislature passed House Bill 2017, also known as the Keep Oregon Moving bill. This historic piece of legislation was the largest transportation bill passed by the Oregon Legislature in many years. Among the many transportation investments in the bill is a statewide investment in public transportation. This investment is funded by a 0.1% payroll tax on all employee salaries in the state. This will result in approximately $50+ million in funds for TriMet in FY20. The bill requires TriMet to develop a plan in conjunction with a citizen's advisory committee for improving public transit. The legislation specifically calls out the following projects as examples of what could be funded:

- Expansion of transit service frequency, hours, and coverage, especially to low income communities;
- Implementation of a fare mitigation program for low income communities;
- Purchase of zero carbon emitting vehicles via compressed natural gas or electricity;
- Improved connections between communities inside and outside transit district boundaries;
- School transportation for grades 9-12 equaling 1 percent of total funding; and
- Light rail construction was called out as ineligible for HB 2017 funding.

TriMet's HB 2017 Transit Advisory Committee has been meeting to develop a plan for the funding since October 2017. TriMet and the committee have been engaged in an outreach process that has included an online survey and five public workshops throughout the region to better understand how the community would like to see the transit system improved. TriMet contracted with the Immigrant Refugee Community Organization (IRCO) to design, promote and facilitate the public workshops. Workshops are being held throughout the region, with extra outreach conducted to communities of color, youth, seniors, immigrants, and people with disabilities. TriMet and the advisory committee must complete their work in the fall of 2018.

8.2.3.6 Enhanced Transit Concept (ETC) Pilot Program

Lead agency	Partners	Proposed timing
Metro and TriMet	ODOT, cities, counties, SMART	2018-22

This is a critical time in our region to consider how transit fits into our larger regional goals. As our region deals with significant population and employment growth, we must turn to more efficient modes of moving people around in order to ensure that our freeway system meets a basic level of mobility necessary for freight movement. The Climate Smart Strategy, adopted by JPACT and the Metro Council in 2014, provided clear direction to invest more in our transit system in order to meet regional goals and objectives related to sustainability and carbon emissions.

Recent, current and future growth rates require us to expand transit service to provide people with attractive transportation options while minimizing congestion. Significant and coordinated investment is needed to continue providing today's level of transit service as our region grows. Increasing transit service will require dedicated funding, policies, and coordination from all jurisdictions. Improving transit also helps the region meet its equity and access goals as it is a primary mode of transportation for the elderly, people with disabilities and youth, providing them with a way to get to work, school, and attain access to daily needs. Transit will become even more critical as our region's population ages. In order to make transit a more attractive mode in a quick timeframe with limited financial resources, the region is rolling out a new tool box of "enhanced transit concepts" which are implemented quickly and lead to faster, more reliable transit service.

To meet the greater Portland region's environmental, economic, livability and equity goals today and as we grow over the next several decades, new partnerships are needed to deliver transit service that provides increased capacity and reliability yet is relatively low-cost to construct, context-sensitive, and able to be deployed quickly throughout the region where needed. Producing "Enhanced Transit," through the co-investment of multiple partners could be a major improvement over existing service such as our region's existing and future Frequent Service bus lines, but less capital-intensive and more quickly implemented than larger scale high capacity transit projects the region has built to date. Investments serve our many rapidly growing mixed-use centers and corridors and employment areas that demand a higher level of transit service but may not be good candidates for light rail, or bus rapid transit with fully dedicated lanes at this time.

Goals of the ETC pilot program are:

- Increase transit ridership to a level that will be sufficient to meet regional and local mode split goals by improving transit reliability, speed, and capacity through hotspot bottleneck locations in congested corridors and throughout the region. This will be accomplished through moderate capital and operational investments from both local jurisdictions and transit agencies.
- Identify, design and build a set of Enhanced Transit projects, either to relieve hotspot bottlenecks or across whole congested corridors or in partnership with local jurisdictions and

facility owners where improvements are most needed and can be deployed quickly to produce immediate results.

- Develop a pipeline of Enhanced Transit projects so they are ready to advance forward to construction as jurisdictions identify funding.

On October 2017, JPACT authorized utilization of bond proceed revenue of $5 million to support the funding of the Enhanced Transit Concept Pilot Program. The program will support the development of ETC projects and build partnerships between transit agencies and jurisdictions to implement improvements quickly.

ETC can include regional scale, corridor scale, and/or spot-specific improvements that enhance the speed and reliability for buses or streetcar. A list of different types of ETC treatments by scale can be found in the Transit Policy section in Chapter 3.

Enhanced Transit Concept Workshops

The ETC Pilot Program is focusing on hotspot improvements that can be implemented quickly on frequent service lines that are experiencing the most reliability issues. As part of the pilot program, Metro and TriMet held a series of 14 workshops, between January and April 2018, to identify where and what kind of ETC treatments could be implemented. Each workshop looked at 3-5 roadway segments or hotspots across the region where existing and future frequent service bus lines have the highest ridership and are experiencing the most congestion and reliability issues. These hotspots were reviewed with local partners and potential ETC treatments were recommended to understand feasibility and project readiness based on context and local jurisdictional partner input.

Metro issued the Request for Interest (RFI) in May of 2018 and received a total of 38 ETC applications, demonstrating significant interest from regional partners. The applications built upon the series of workshops conducted with regional partners earlier in the year. Within the ETC applications, 49 individual projects were identified. While the pilot program has $5 million to spend, the total value of requested design services is estimated to be between $15 million and $20 million.

Projects received through the RFI process will be evaluated based on their readiness, transit need and potential benefit. ETC projects will include concept design, traffic analysis and transit benefit depending on the transit need and potential improvement. A portion of these projects will continue through project development, design and construction.

8.2.3.7 Central City Transit Capacity and Steel Bridge Analysis

Lead agency	Partners	Proposed timing
Metro and TriMet	ODOT, city of Portland, Portland Streetcar, Inc., FTA	2019

This study would explore ways to alleviate transit operational issues caused by the Steel Bridge. The bridge is a critical link between downtown Portland and the east side of the greater Portland region for the Blue, Green, Red, and Yellow MAX Lines, as well as for several bus routes. The 106 year old bridge constrains light rail throughput, requires frequent maintenance that impacts system-wide light rail reliability and presents structural risks. The Steel Bridge with its current two-track configuration cannot reliably accommodate anticipated growth in service.

Preliminary analysis by TriMet identified more than 20 concepts that were consolidated into representative alternatives and evaluated to understand the potential benefits and drawbacks. While TriMet will consider a full range of options at the start of any formal project, initial study suggests that two concepts appear most promising:

- a new transit bridge south of and parallel to the Steel Bridge
- a transit tunnel between Lloyd Center station and Goose Hollow station

A project of this magnitude could take a decade or more to plan, design and construct, including the steps necessary to comply with the National Environmental Policy Act (NEPA) and the Federal Transit Administration's Project Development process. This study would begin a regional conversation about solutions, opportunities and funding strategies. It would build upon the preliminary analysis completed by TriMet in order to define a single preferred project and identify the scope and resources needed to complete the future environmental review process as well as the risks that could impact planning.

Current issues

Capacity and travel time

Today, transit on-time performance around the Steel Bridge does not meet TriMet's 90 percent target. TriMet is in the process of making a $12 million investment in the Steel Bridge to improve travel times and address system reliability issues. Some projects have already been completed resulting in fewer delays for TriMet riders. However, with the tight headways required to accommodate additional trains, on-time performance could fall to 55 percent in 2040 and minor delays could impact the entire system.

Conflicting train and traffic movements

The ability to get trains across the Steel Bridge is about more than just capacity on the bridge itself. The traffic signal on the bridge's east side at North Interstate Avenue impacts light rail operations. Though light rail trains can preempt vehicular traffic at the signal, trains often must wait while the pedestrian cycle clears. At both the bridge's west and east approaches, signals are

located at the same place as track switches leading to delay from conflicting train movements as well as vehicles.

Operational and structural risks

Light rail operations on the Steel Bridge are complex and pose risks to TriMet. The bridge, built in 1912, would not likely survive a major earthquake. Even without a natural disaster, the bridge requires maintenance as it ages and bridge loads increase. The bridge is a unique link for all light rail lines and if the bridge is closed for any reason it would create system-wide operational challenges. Further, the bridge is owned by Union Pacific Railroad and any structural or seismic changes to the bridge would need to be approved by Union Pacific Railroad.

Long-Term Improvement Concepts

A new transit bridge option: A new transit bridge south of the Steel Bridge would include four light rail tracks. Station locations would remain as they are today. It would increase system ridership by 3,000 riders and decrease travel time by approximately two minutes. Planning of a new bridge would need to consider navigational clearance, structure type, and approach locations and bridge uses. The bridge would cost an estimated $300-650 million ($2017) without right-of-way or utility relocation.

A new tunnel option: A tunnel would extend from the vicinity of the Lloyd Center Station to the Goose Hollow Station, with approximately four underground stations in between. TriMet would retain some service on the existing surface alignment to continue to serve all stations. The tunnel would increase system ridership by 7,500 to 15,200 riders and decrease travel time by approximately 15 minutes between Lloyd Center and Goose Hollow, while improving system resiliency and redundancy. Planning of a tunnel would need to evaluate the locations of portals and determine the optimal number and locations of stations. Estimated cost is $900 million to 1.94 billion (in 2017 dollars) without right-of-way or utility relocation.

With either project, reconfiguration at the Rose Quarter and the west approaches to the Steel Bridge could create opportunities to support redevelopment in concert with other anticipated projects in the area.

8.2.3.8 Transportation Equity Analysis and Monitoring

Lead agency	Partners	Proposed timing
Metro	Cities, counties, ODOT, TriMet, SMART, community organizations	2019-23

The 2018 RTP transportation equity analysis identified the need for improved data to inform future planning and decision-making. The improved data will help develop a disparities baseline of communities of color and lower-income communities in terms of access, affordability, safety, and environmental health outcomes. Information about the disparities these communities experience will help to facilitate ongoing monitoring and evaluation of how transportation

projects are making progress towards implementing regional goals and objectives regarding transportation equity, accessibility, affordability, and safety.

The disparities baseline should include an in-depth existing conditions analysis which would be disaggregated by demographic characteristics, with a particular focus on different dimensions of accessibility, affordability (see H + T expenditure tool described in section 5 – Data and Research), safety, and environmental health outcomes, such as localized air pollution exposure.

8.2.3.9 Funding Strategy for Regional Bridges

Lead agency	Partners	Proposed timing
Counties	Cities, Metro, ODOT, TriMet	2019-21

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.

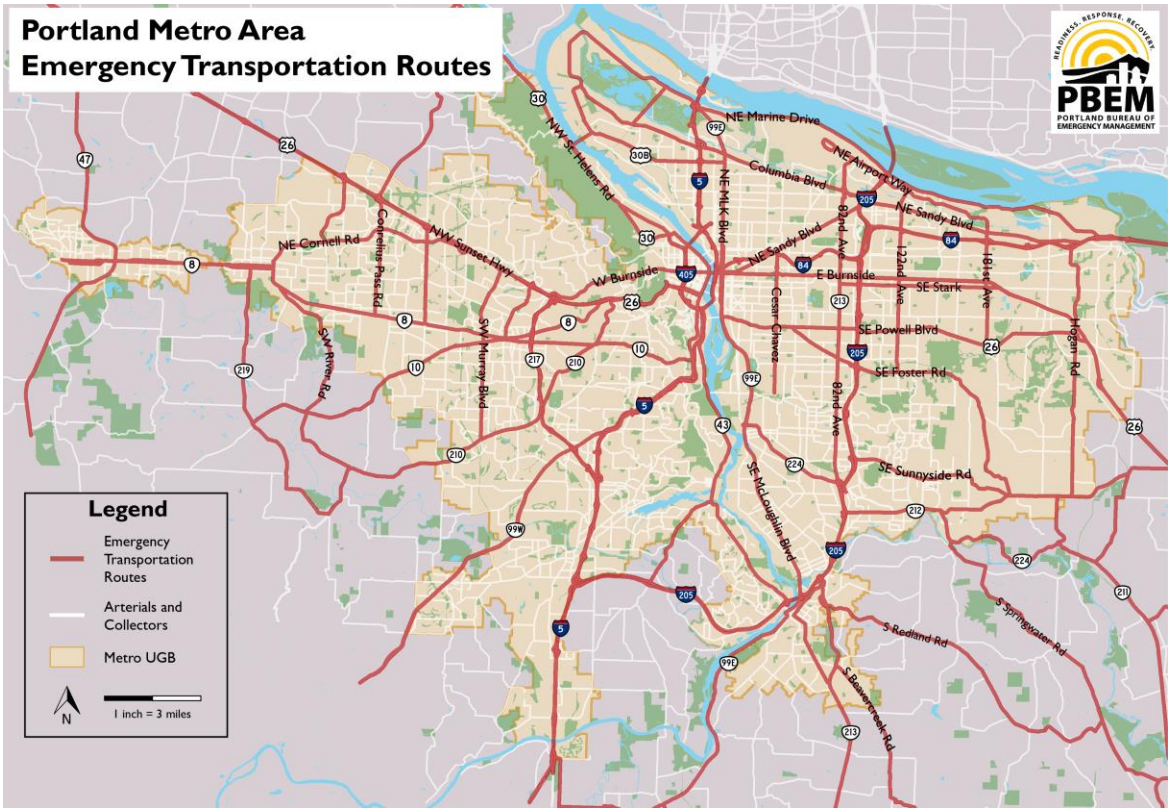
More collaboration and work is needed to identify a list of regional bridges and to develop a financial plan for ensuring ongoing operations and maintenance and other transportation needs of regional bridges, given the regional economic importance of keeping the Willamette River Bridges and other regional bridges fully functional in the long-term.

8.2.3.10 Emergency Transportation Routes Project

Lead agency	Partners	Proposed timing
Metro and Regional Disaster Preparedness Organization (RPDO)	Cities, counties, TriMet, SMART, ODOT, DOGAMI, WASHDOT, SW RTC, REMTEC	2019-20

Natural disasters can happen anytime, and the transportation system needs to be prepared to withstand them and to facilitate life-saving and life-sustaining activities, including the transport of first responders (e.g., police, fire and emergency medical services), fuel, essential supplies, and patients. The Emergency Transportation Routes (ETRs) project will aim to update the existing ETRs and MOU for the 5-county region in partnership with the Regional Disaster Preparedness Organization (RPDO). This project would apply a seismic resilience lens to update existing designated routes. The purpose of revisiting the existing ETR routes with a seismic lens is to evaluate whether the routes have a high likelihood of being damaged or cut-off during an earthquake and determine whether other routes may be better suited to prioritize as ETRs as a result.

Figure 8.4 Designated Regional Emergency Transportation Routes (2006)



First designated in 1996, regional ETRs are priority routes targeted during an emergency for debris-clearance and transportation corridors to facilitate life-saving and sustaining response activities. The current regional ETRs were established in a Memorandum of Understanding (MOU) between Oregon Department of Transportation (ODOT), Washington State Department of Transportation (WSDOT), Metro and local jurisdictions in the Portland-Vancouver metropolitan region in 2006. That MOU outlines responsibility for the Regional Disaster Preparedness Organization (RDPO) Emergency Management working group (REMTEC) to coordinate an update of the ETRs on a five-year cycle. However, no updates have been made since 2006.

Since 2006, our understanding of the seismic risks in our region has improved. Funded by the RDPO, the 2017 Oregon Department of Geology and Mineral Industries (DOGAMI) Enhanced Earthquake Impact Study assessed seismic vulnerability of buildings and infrastructure in the region, outlining anticipated impacts of a 9.0 Cascadia Subduction Zone (CSZ) earthquake in the Portland-Vancouver region. The DOGAMI analysis shows that most of the existing designated ETRs (meant to facilitate post-earthquake life-safety response activities) in the region will experience significant liquefaction, ground deformation and landslide risks.

ODOT has evaluated the seismic resilience of the state-designated Lifeline Routes in the Oregon portion of the Portland-Vancouver region. Currently, ODOT is working with each county to assess the resiliency of locally designated ETRs and potential detour routes for the most vulnerable state bridges by using arterial streets and throughways. This effort includes an evaluation of the cost-

benefit of the investment on local transportation system compared to the retrofit cost of state-owned bridges bypassed by the proposed detours. In addition, each county in Oregon is recommending changes to the ETRs within their respective jurisdiction based on this analysis. Any updates in Clark County will be coordinated with Washington State.

In 2018, Clackamas County updated their routes while evaluating bridge and overpass facilities on the State Lifeline Routes for ODOT. In 2019, Washington County, Columbia County and Multnomah County will complete a similar analysis of their ETRs in partnership with ODOT. Independent of ODOT's work with the counties, the City of Portland conducted an update of their ETRs in 2018, which will be brought into this planning effort.

Given the above work, the designation of current ETRs need to be re-evaluated at a regional-scale to reflect updates recommended by the City of Portland and each of the five counties. This project will update existing designated regional routes using the latest DOGAMI seismic data, ODOT Lifeline analysis and subsequent county-level bridges and ETR analysis. This will also ensure the updated ETRs are responsive to local and state knowledge and priorities. Planning and updates to infrastructure within the region since 2006 will also inform the ETR update; particularly the now seismically-resilient Sellwood and Tillikum Crossing bridges owned by Multnomah County and TriMet within the City of Portland, and recommendations identified in the 2018 Earthquake Ready Burnside project Feasibility Report.

The 2006 ETR MOU calls for an update every five years; however, more than ten years have passed since the last update. The MOU also established that REMTEC (also known as Regional Emergency Management Work Group) will take the lead to convene stakeholders for the update. REMTEC, a work group of the RPDO, helps develop the region's disaster preparedness capabilities through coordinated planning, training and investment in technology, but does not have dedicated transportation-focused planners within their group.

Expected outcomes of the project include:

- Identification of criteria by which to evaluate and refine the existing ETRs and any alternates that are considered in this work. ODOT considered seismic resiliency in establishment of their lifeline routes to which the ETRs must connect.
- Recommendations for a new MOU or other agreement documenting the updated emergency transportation routes (ETR) on a map of the region. The recommendations will define a reasonable time frame for periodic updates (perhaps extending the update from 5 years to 10 years, per recent practice, and potential responsibilities of the agencies involved (i.e. Departments of Transportation, Metro, TriMet, C-Tran, SMART, RDPO, REMTEC, DOGAMI).
- Recommendations on the updated ETRs for consideration by JPACT and the Metro Council in the next update to the Regional Transportation Plan and other relevant regional plans, policies and strategies.
- Recommendations for future planning work related to regional transportation recovery, resiliency and emergency management in the Portland-Vancouver region for consideration by the region's policymakers.

- Information to support the critical facilities assessment and Regional Recovery Framework Project being developed by the RPDO and the Regional Debris Management Plan developed by Metro.

Given the time that has elapsed and given the advances in our understanding of seismic risks and resilience in our transportation infrastructure, the time is right to update the ETRs. Updating the ETRs is strategic since Oregon House Bill 2017 dedicates $5.3 billion in seismic funding. The analysis from this project will support advocacy to direct transportation investments toward enhanced seismic resilience of our region's roads, bridges and transit and freight routes, increasing regional transportation resilience and security.

This work will be coordinated through the RPDO and appropriate RPDO work groups, emergency management staff from across the region, the Southwest Washington Regional Transportation Council and technical advisory committee, and the Metro Council and Metro's technical and policy advisory committees. The project will also provide opportunities for stakeholder input. In 2017, Metro partnered with the RPDO to submit a grant application to help fund this work, which, if awarded, would allow this work to begin in summer 2019 pending sufficient resources.

8.2.3.11 Regional Freight Delay and Commodities Movement Study

Lead agency	Partners	Proposed timing
Metro and ODOT	Cities, counties, Port of Portland, FHWA	2022

As a critical West Coast domestic hub and international gateway for commerce, the greater Portland area must maintain well-functioning river ports, rail connections and highways. ODOT completed the Freight Highway Bottlenecks Project in March of 2017, which identified locations on Oregon's highway network that are experiencing significant freight truck delay, unreliability, and increased transportation costs. The ODOT project showed that the greater Portland area has the bulk of the identified freight delay areas in Oregon. Based on ODOT's work, the Regional Transportation Plan and Regional Freight Strategy identify a small set of key highway bottlenecks on National Highway System facilities critical to state and regional truck mobility. The Regional Freight Strategy identified this study to address these truck bottlenecks and increase understanding of their economic importance to the region. The study would evaluate the level of commodity movement on the regional freight network within each of the mobility corridors identified in the Regional Mobility Corridor Atlas.

The study would use Metro's new freight model to evaluate the general types of commodities, the tonnage of the commodities and the value of the commodities that are using the regional freight network within each of region's mobility corridors. The study would also evaluate the need for improved access and mobility to and from regional industrial lands and intermodal facilities. The Regional Mobility Policy update described in Section 8.2.3.1 will establish a policy foundation for this work.

Potential outcomes of the study include:

- Developing a methodology for determining which freight facilities and mobility corridors are carrying the highest tonnage of goods and commodities, and the highest amount of value for those commodities.
- Based on the tonnage and value of the goods and commodities carried in each corridor, a measure could be developed for which corridors should be prioritized for transportation projects based on their importance for freight and economic value.
- Based on the congestion and unreliability found in each of the mobility corridors, transportation projects could be developed and prioritized for corridors that have the most importance for freight and economic value.

The study would likely utilize a new freight monitoring measure for reliability and the evaluation measures for cost of delay on the freight network, and freight access to industrial land and intermodal facilities (being developed as part of the current RTP update). The study would inform freight project priorities for the next RTP (due in 2023) and Regional Freight Strategy.

8.2.3.12 Regional Freight Rail Study

Lead agency	Partners	Proposed timing
Metro and Port of Portland	Cities, counties, ODOT	2023

Identified in the Regional Freight Strategy, this study would seek to identify and produce increases in rail capacity, safety, land use compatibility and operational efficiencies to support freight and goods movement in the region which is important to our long-term economic and environmental sustainability, and will help to maintain the region's competitive advantage in a global marketplace. The RTP and Regional Freight Strategy also note freight rail bottlenecks impacting critical access the region's ports and intermodal facilities, as well as the need for rail to efficiently carry its full share of existing and future commodities.

Potential outcomes of the study include:

- Identification of economically viable opportunities to develop short line intermodal hubs or logistics parks or other cargo-oriented development.
- A strategy to identify, develop and position top projects for confirmed and potential future federal and state funding, as appropriate, including:
    - An updated list of regional freight rail project priorities focused on improving capacity constraints and targeting industrial access to the rail networks.
    - A strategy to fund regional freight/passenger rail bottlenecks.
    - A strategy to fund needed grade separations.
    - A strategy to fund critical modernization projects on the short rail lines.

8.2.3.13 Regional Transportation Functional Plan Update

Lead agency	Partners	Proposed timing
Metro	Cities, counties, ODOT, DLCD, TriMet, SMART	TBD

Since the adoption of the 2040 Growth Concept in 1995, cities and counties across the region have updated their comprehensive plans, development regulations and transportation system plans to implement the 2040 Growth Concept in locally tailored ways. The RTP provides a long-range blueprint for implementing the transportation element of the 2040 Growth Concept and presents the overarching vision, policies and goals, system concepts for all modes of travel and strategies for funding and local implementation for the region. Projects submitted to the RTP are from adopted local, regional or state planning efforts that provided opportunities for public input. Cities and counties are responsible for creating transportation system plans that are periodically updated to stay consistent with the RTP and reflect local transportation priorities and needs. Each city and county develops its own process for engaging the public in the development of the plans.

Most communities throughout the region have an adopted transportation system plan that serves as the transportation element of a comprehensive plan consistent with the Regional Transportation Functional Plan (RTFP). The functional plan implements the goals, objectives and the policies of the RTP and its constituent strategies, including the Climate Smart Strategy and strategies for safety, freight, transit, transportation system management and operations, regional travel options and emerging technology.

Under state law, the RTFP directs cities and counties within the metropolitan planning area boundary as to how to implement the RTP through local transportation system plans and associated land use regulations and transportation project development. Local implementation of the RTP will result in a more comprehensive approach for implementing the 2040 Growth Concept, help communities achieve their aspirations for growth and support current and future efforts to achieve the goals and objectives of the RTP.

A targeted review and update is needed to:

- ensure the functional plan language and provisions are consistent with and adequately reflect new and updated goals, objectives and policies adopted in the 2018 RTP, with a focus on safety, equity, transit, and freight;
- make miscellaneous technical corrections and clarifications, such as outdated references to maps and figures in the 2010 RTP; and
- update the timeline for local TSPs updates.

8.2.3.14 Parking Management Policy Update

Lead agency	Partners	Proposed timing
Metro	Cities, counties, ODOT, TriMet, SMART	TBD

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.

This update is needed because current regional parking requirements were adopted more than 20 years ago. Despite minor updates, the requirements are out of date in terms of where they are applied and the amount of parking to be provided. Some of the factors affecting parking include: presence of high capacity transit, presence (or absence) of frequent bus service as well as infrastructure supporting bicycling and walking in an area and population and employment density of an area.

The region needs to be prepared to consider parking management programs as a tool to meet greenhouse gas emissions reduction, transportation demand management and stormwater management goals. New parking management approaches may be required as a tool to effectively reduce greenhouse gas emissions. The region needs to know more about the effect of different approaches on emissions to inform policy development.

New 'smart' technologies and other approaches to financing and managing parking may be available. The region may be missing new applications or technologies that can facilitate parking management and would benefit from a quick survey of best practices.

8.2.3.15 Green Corridor Implementation

Lead agency	Partners	Proposed timing
Metro	Cities, counties, ODOT	TBD

Green corridors were adopted as part of the 2040 Growth Concept in 1995. 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 greater Portland 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. Following adoption of the 2040 Growth Concept, Metro worked with the cities of North Plains, Canby and Sandy from 1998-2000 to develop intergovernmental agreements (IGAs) but did not formalize these agreements. This remains as an outstanding issue in fully implementing the Growth Concept.

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

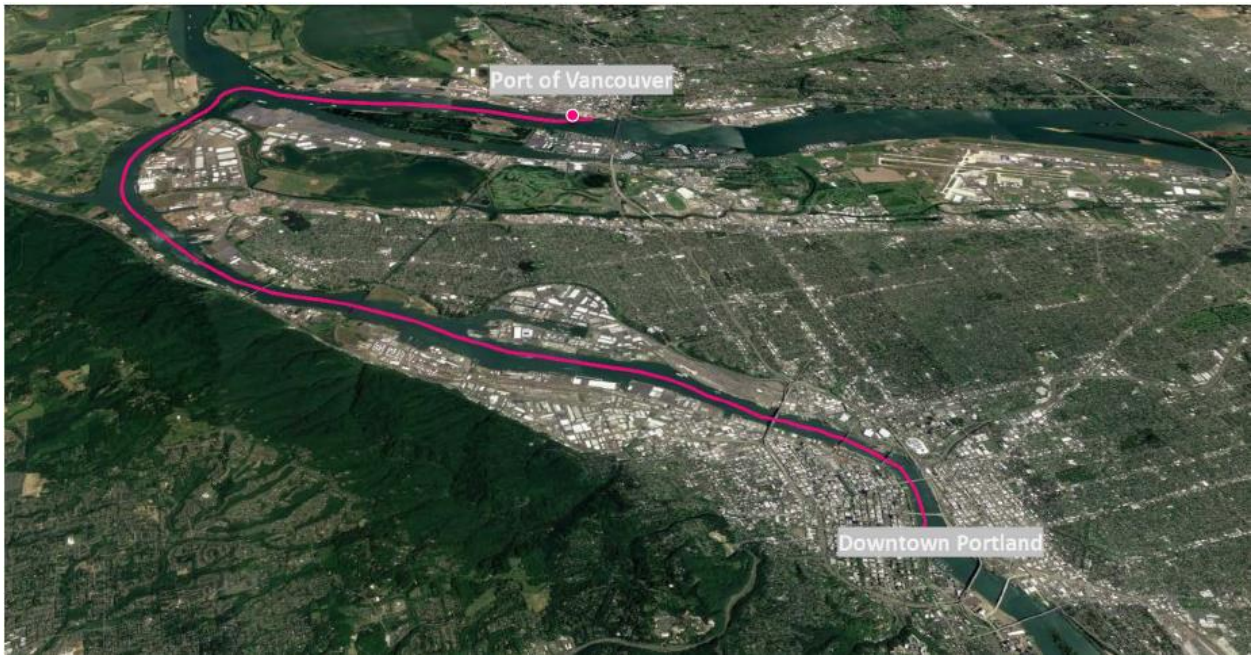
effort that identified areas for future urban use and other areas that should remain rural for the next 40 to 50 years. The urban and rural reserve decision provided a more certain framework for transportation improvements along the urban edge. Metro will work with interested local jurisdictions to complete IGAs for green corridors that reflect updated plans for urban and rural reserves.

In 2018, Metro's Chief Operating Officer recommended that Metro's Planning and Development staff return to the Metro Council in early 2019 with a proposed work program for updating the 2040 Growth Concept as part of the COO recommendation to the Metro Council on the 2018 Urban Growth Management Decision. Green corridor implementation will be forwarded for consideration as part of this future planning effort.

8.2.3.16 Frog Ferry Passenger River Taxi Service Study

Lead agency	Partners	Proposed timing
Friends of Frog Ferry	Cities, counties, Metro, Ports, TriMet, businesses	TBD

A non-profit group, Friends of Frog Ferry, is pursuing the study of a passenger river taxi service connecting Vancouver, WA with central Portland. Friends of Frog Ferry proposes a public / private partnership structure operating a 149 passenger ferry with room for bikes. Their proposal calls for two stops initially, with the potential for others. The ferry service could serve commuters as well as tourists, and provide a transportation option in case of a seismic event that impacts bridges. Increased regional congestion and improvements in boat technology suggest the current RTP cycle is an opportunity to again evaluate a ferry service. A study would analyze stops and travel times to model ridership and service patterns, as well as land development partnerships.



Source: Friends of Frog Ferry

8.2.4 Corridor Refinement Planning

This section identifies areas in the region – called mobility corridors - that are recommended for more detailed refinement planning to identify multimodal investment strategies adequate to serve regional transportation needs in the corridor.[3]

This RTP calls for an update to the region's mobility policy and related performance targets beginning in 2019, and is expected to affect corridor refinement planning identified in this section. Many of the areas identified for refinement planning in the RTP are identified because they do not meet the adopted regional mobility policy. Individual corridor refinement planning descriptions have been updated to reflect work remaining and are being carried forward in this RTP pending recommendations and findings from the Regional Mobility Policy Update.

JPACT and the Metro Council will provide further policy direction on the scope and schedule for the Mobility Policy Update in 2019. Metro and ODOT will engage TPAC, JPACT and other interested stakeholders in development of the scope of work (and desired outcomes) for the Mobility policy Update beginning in early 2019, after adoption of the 2018 RTP. The agreed upon scope of work and budget will also be reflected in the 2019-20 UPWP approved by JPACT and the Metro Council. Subsequent corridor refinement planning prioritization and development of scopes of work will be determined in coordination with project partners through TPAC and JPACT after adoption of the RTP and completion of the mobility policy update.

Corridor Refinement Planning and the Transportation Planning Rule

Corridor refinement planning is a response to the Oregon Transportation Planning Rule (TPR). Section 660-012-0020 of the TPR 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 jurisdictions to defer decisions regarding mode, function, and general location of improvements to address identified needs as long as it can be demonstrated that the refinement effort will be completed in the near future.

A corridor refinement plan must identify the capital and operational improvements that a mobility corridor needs consistent with the region's congestion management process. This is particularly critical for planning efforts that may result in significant expansion of roadways beyond the planned system. A CMP analysis is required for capacity-increasing projects that go beyond the planned RTP system before federal funds may be applied. For such projects, the CMP looks at road expansions beyond the planned system as a last resort and, as appropriate, requires that they be coupled with complementary operational and travel demand management strategies.

[3] Twenty-four subareas of the region – called mobility corridors - have been identified in the RTP. Each mobility corridor is defined by the designated 2040 Growth Concept land uses that are connected by an integrated system of throughways, arterial streets, transit and freight routes, and regional pedestrian and bike networks located within the subarea.

In the Portland region, in order to stay consistent with our regional transportation and land use goals, our corridor refinement process includes a multimodal look at transportation needs, as well as a review of existing and planned land use and projected growth. See Section 8.5.4 and Appendix L for more information about the region's CMP.

A corridor refinement plan includes the following steps:

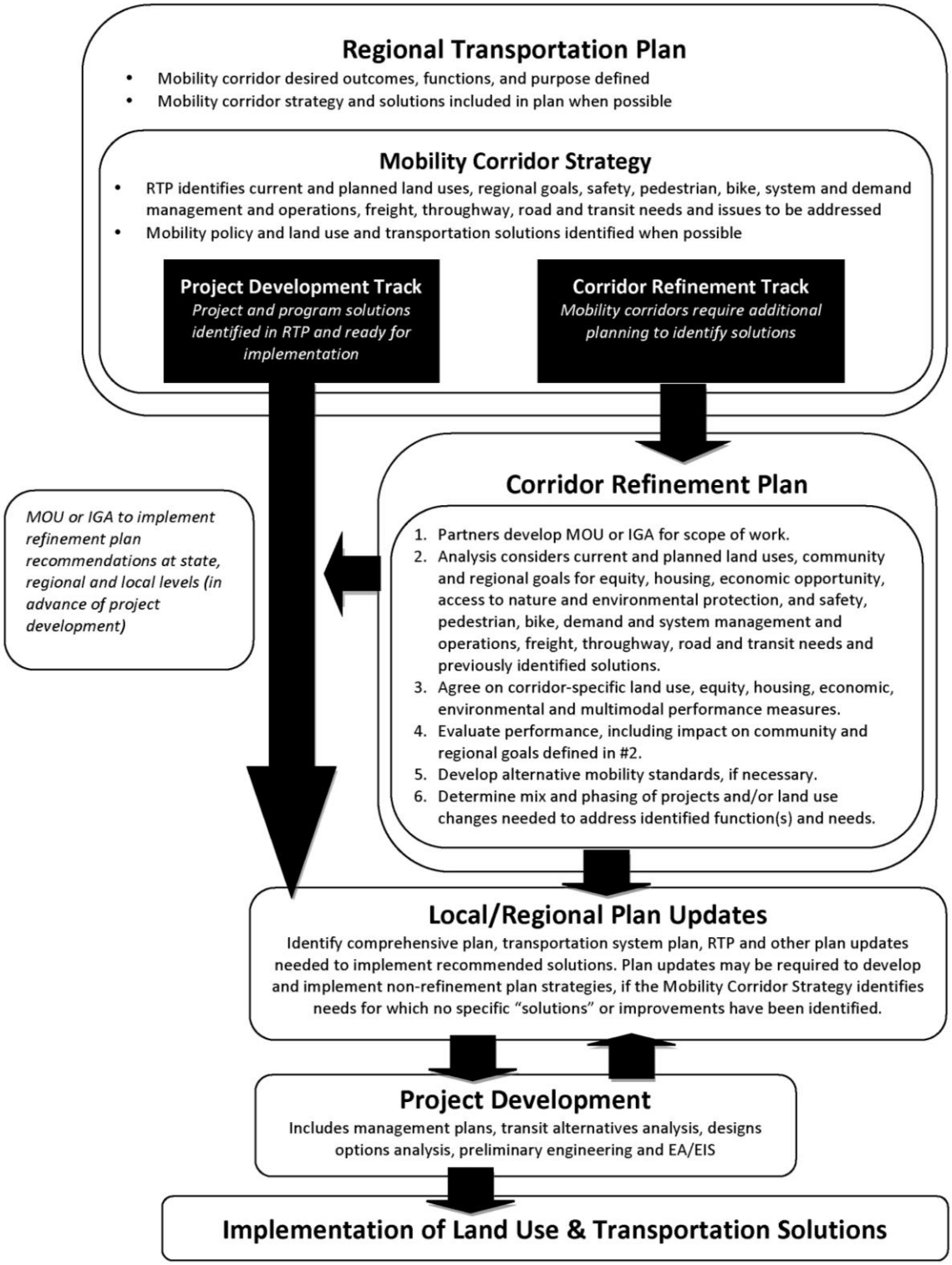
1. **Develop MOU or IGA** for refinement plan scope of work that includes identification of roles and responsibilities, methods of collaboration and consultation with Metro, if the refinement planning work is not led by Metro.
2. **Conduct analysis** that considers current and planned local land uses, regional and community goals for equity, housing, economic opportunity, environmental protection and stormwater management as well as safety, pedestrian, bike, system and demand management and operational strategies, freight, throughway, road and transit needs and previously identified solutions.
3. **Agree on corridor specific multimodal performance measures.**
4. **Evaluate multimodal performance** and potential impact on regional and community goals for equity, economic development and environmental protection and, if applicable, apply HCT system expansion assessment and readiness criteria.
5. **Develop alternative mobility or other performance standards**, if necessary.
6. **Determine mix and phasing of projects and/or land use changes** needed to address identified needs.
7. **Prepare local, regional and/or state plan amendments and MOU or IGA to implement** refinement plan recommendations at state, regional and local levels.

Consistent with the region's congestion management process, corridor refinement plans will provide decision-makers with more comprehensive information regarding safety, accessibility, environmental impact, mobility, reliability and congestion as they relate to the movement of persons and goods in the mobility corridor. They should also consider land use, economic opportunity, equity, travel demand and system management, street connectivity, walking and biking solutions in addition to increasing transit and road capacity. The corridor refinement plan will recommend a wide range of strategies and projects to be implemented 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. Planning and project development efforts should be conducted with an understanding of the corridor refinement planning anticipated in the RTP and not preclude any strategies or potential solutions identified for consideration in the corridor refinement plan. 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 mobility corridors with multiple jurisdictions.

Figure 8.5 shows the framework for how the mobility corridor strategy will be incorporated into the RTP or developed through a corridor refinement plan.

Figure 8.5 How A Mobility Corridor Strategy Is Developed and Implemented



Mobility Corridors Recommended for Future Corridor Refinement Plans

The main objective of the RTP mobility corridor framework is to organize information needed to help define the need, mode, function, performance standards, and general location of facilities within each mobility corridor consistent with the Transportation Planning Rule to ensure land use and transportation planning and decision-making are integrated. The needs assessment was developed based on the RTP policy framework and guided the identification of projects and programs during development of the RTP.

Under the mobility corridor framework, when determinations of need(s), mode(s), function(s), and general location(s) of solutions cannot be made, the mobility corridor needs a refinement plan. Corridor refinement plans are intended to be multimodal evaluations of possible land use and transportation solutions to address identified needs and develop a shared investment strategy, consistent with RTP goals, objectives and policies. This includes conducting an evaluation that considers the potential impact on regional and community goals for equity, housing, economic development, environmental protection and access to nature.

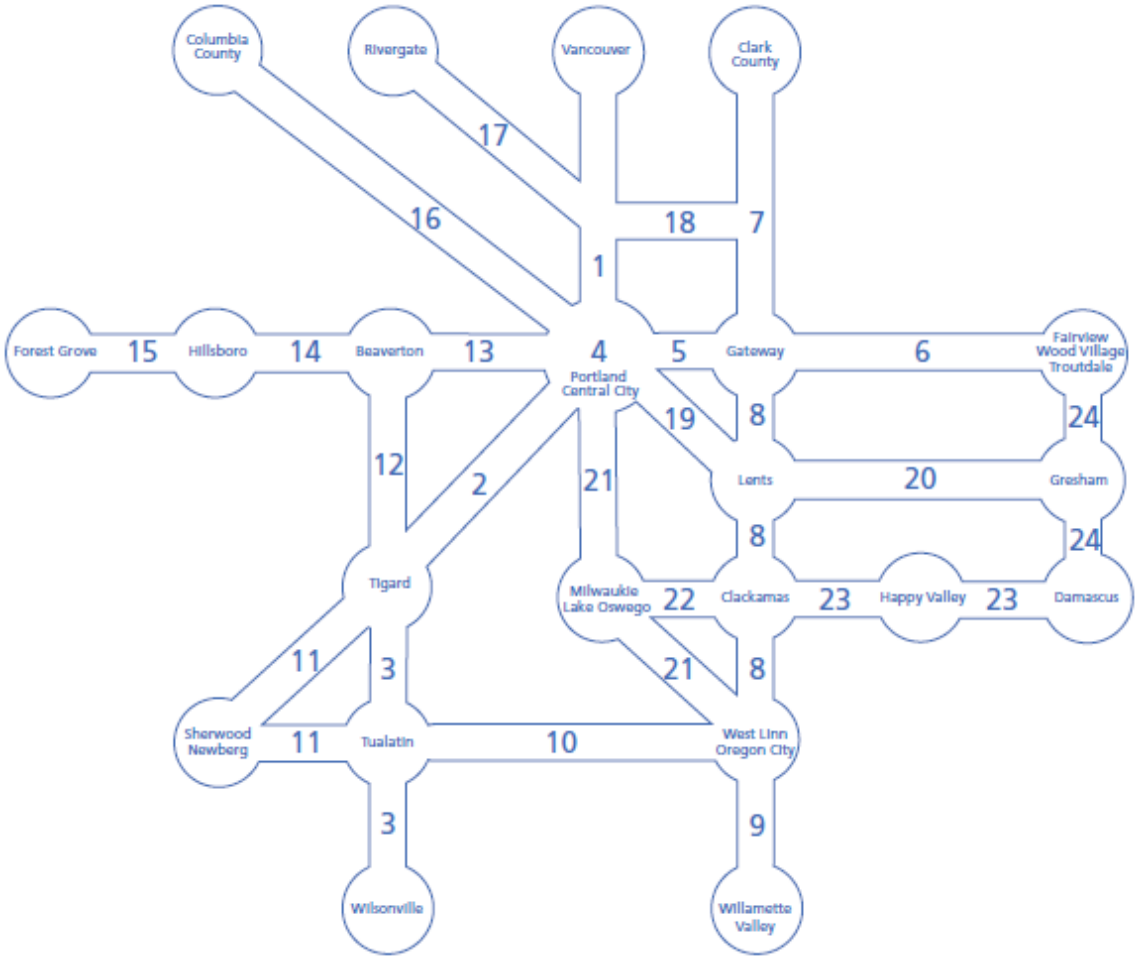
The RTP has identified a list of mobility corridors that do not meet the outcomes-based performance standards of the RTP and/or do not fully answer questions of mode, function and general location. These corridors need refinement planning and are listed in **Table 8.2**. The corridors are not listed in priority order. In addition, potential high capacity transit corridors identified in the Regional Transit Strategy are likely to require corridor refinement plans to develop shared land use and transportation investment strategies and determine transit mode, function, general location and any associated changes in road or freight rail functions and performance standards of existing transportation facilities. The Regional Mobility Policy update described in Section 8.2.3.1 will establish an updated policy foundation for this work.

Table 8.2 Mobility Corridors Recommended for Future Corridor Refinement Planning

Regional Mobility Corridor	General Geographic Scope of Mobility Corridor
Mobility Corridors #3	Tigard to Wilsonville which includes I-5 South[4]
Mobility Corridor #4	Portland Central City Loop, which includes I-5/I-405 Loop
Mobility Corridors #7, #8 and #10	Clark County to I-5 via Gateway, Oregon City and Tualatin, which includes I-205
Mobility Corridor #14 and #15	Beaverton to Forest Grove, which includes Tualatin Valley Highway
Mobility Corridors #13, #14 and #16	Hillsboro to Portland, which includes US 26 and US 30
Mobility Corridors #19 and #20	Portland Central City to Lents and Lents to Gresham, which includes US 26/Powell Boulevard
Mobility Corridor #24	Clackamas to Fairview/Wood Village/Troutdale, which includes OR 212 and Sunrise Corridor

[4] In coordination with project development activities for Mobility Corridor #10.

Figure 8.6 Illustrative Map of Mobility Corridors in the Portland Metropolitan Region



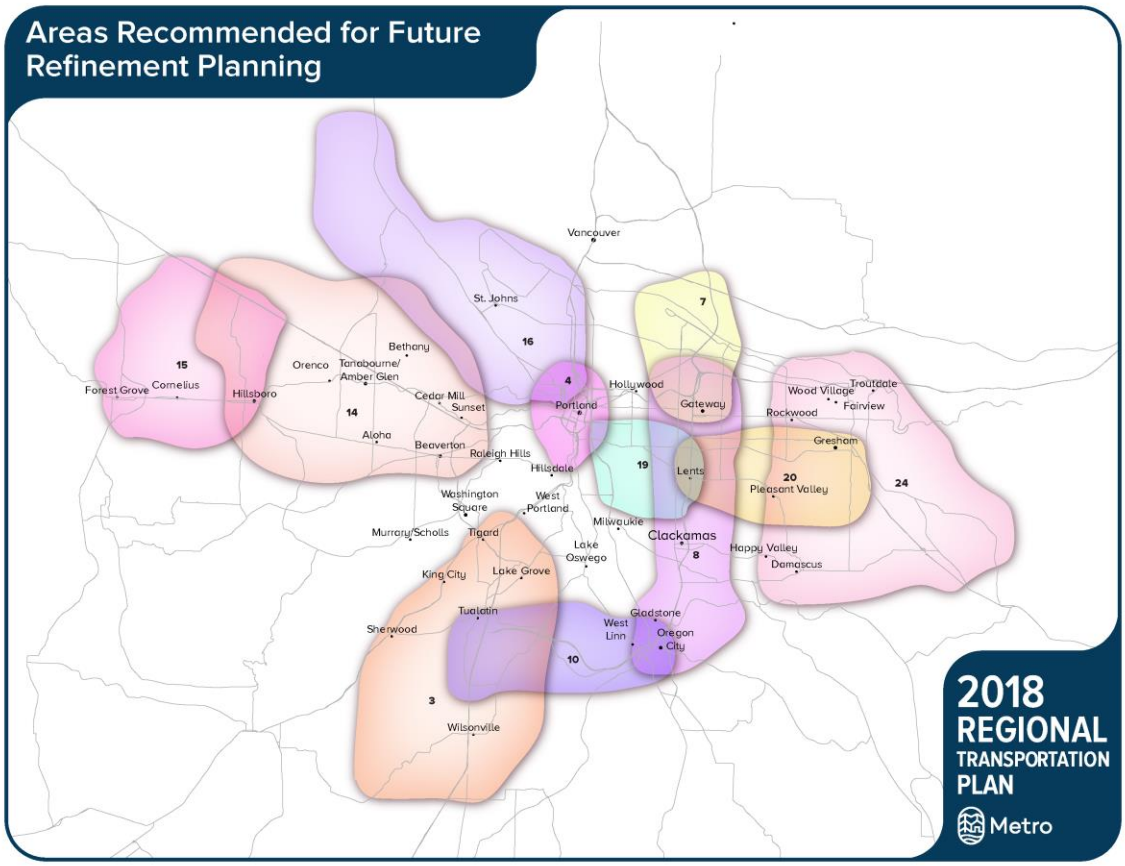
Corridor Refinement Plans that have been partially completed since 2014

- Portland Central City Loop (Mobility Corridor #4)
- Tualatin Valley Highway Corridor Plan (Beaverton to Forest Grove - Mobility Corridor #14 and #15)

Corridor refinement plans that have been completed since 2014

- Southwest Corridor Plan and Shared Investment Strategy (Portland central city/Southwest Portland, Tigard, Durham, King City, Tualatin, Sherwood, east Beaverton, small portion of west Lake Oswego – Mobility Corridor #2)
- East Metro Connections Plan (Gresham/Fairview/Wood Village/Troutdale to Damascus – Mobility Corridor #24)

Figure 8.7 Regional Mobility Corridors Recommended for Future Refinement Planning



8.2.4.1 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[5] 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.

In 2009, ODOT and the City collaborated to plan the reconstruction of the I-5: Wilsonville Road interchange, including infrastructure improvements and management strategies to better serve planned growth in the area. Since adoption of the interchange area management plan, ODOT completed the interchange reconstruction and implemented the bulk of the management plan's recommendations. More recent projects include the City's addition of a third lane to the Wilsonville Road southbound on-ramp and improvements at the Elligsen Road northbound on-ramp. In addition, ODOT is adding a single southbound auxiliary lane on I-5 from north of Lower Boones Ferry Road to I-205 and a second lane at the northbound exit ramp for Lower Boones Ferry Road to relieve congestion and reduce crashes. The auxiliary lane work includes on- and off-ramp lane modifications at Lower Boones Ferry Road and Nyberg Street, and extends the auxiliary lane from the OR 217 off-ramp to the Lower Boones Ferry Road off-ramp to I-205 on-ramp.

The Washington County Transportation Futures Study, completed in 2017, recommended completion of this corridor refinement plan to address growing transportation needs in the corridor. The Washington County Freight Study, also completed in 2017, identified the I-5 corridor as a key area of freight operational delay and unreliability and underscored the importance of developing and funding improvements in this area.

In 2017-2018, ODOT and the City of Wilsonville partnered on a Southbound I-5 Boone Bridge Congestion Study. They evaluated and developed solutions for a southbound bottleneck in the bridge area, in order to manage congestion and reliability for private vehicles, freight, and transit in the evening peak. This geographically focused study was timed to identify operational improvements in advance of upcoming seismic rehabilitation of the Boone Bridge, so that they could proceed as one project and allow the state to reduce total costs. The study led to the adoption of the I-5 Wilsonville Facility Plan, which documented a southbound auxiliary lane concept consistent with implementation recommendations for this corridor (see Project 11990 on the 2018 RTP Financially Constrained List). It did not preclude a larger I-5 south corridor

[5] *I-5/ Wilsonville Freeway Access Study, DKS Associates, November 2002*

refinement plan, and many of the broader multimodal needs in this corridor still need to be addressed.

A corridor refinement plan is proposed to address the following in coordination with project development activities for Mobility Corridor #10:

- Effects of widening I-205 on the I-5 South corridor;
- Effects of the I-5 to 99W Connector study recommendations on I-5 and the N. Wilsonville interchange and the resultant need for increased freeway access to preserve local system performance and in-line capacity for I-5 mobility;
- Effects of peak period and mid-day congestion in this area and mitigation options for 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;
- 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 on 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;
- 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;
- 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;
- Effects of the new and proposed auxiliary (ramp-to-ramp) lanes;
- Effects of future Southwest Corridor LRT;
- Identify and implement active transportation priorities that provide safe alternatives to vehicle travel; and
- Consideration of how land use interfaces with the transportation needs and impacts, local system enhancements and new connections, and improved transit network and service and potential outcomes.

In addition, the following design elements should be considered as part of the corridor refinement plan:

- Congestion pricing and HOV lanes for expanded capacity;
- Provide regional transit service, connecting Wilsonville and Tualatin to the central city;
- Increase WES service frequency and hours/days of operation;
- 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, City of Tualatin 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 Tualatin south of the I-5/I-205 split and in Wilsonville; and
- Complete gaps in the Fanno Creek and Ice Age Tonquin Regional Trails to provide a continuous off-street active transportation route through the length of the mobility corridor.

8.2.4.2 Portland Central City Loop (Mobility Corridor 4)

Context

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:

<u>Scope</u>

- Develop an overall Freeway Loop Corridor Refinement Plan that will guide public investment for improvements to the I-5/405 Freeway 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.

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.

The recommendations of the N/NE Quadrant Plan were incorporated in the recently adopted Central City 2035. In addition, as part of the plan, ODOT and the City worked to designate the Central City as a Multimodal Mixed-Use Area (MMA). MMAs are State designated high density, mixed use areas that are well served by multimodal transportation. MMA areas are exempt from mobility standards as part of land use amendments (safety and other State mandated policies remain in effect). As a condition of the MMA, the City and ODOT worked to identify safety improvements for the Loop (including the I-5 Broadway/Weidler Project), which were subsequently added to the City's list of TSP projects and submitted to Metro as part of the 2018 RTP.

Proposed Mobility Corridor Purpose Statement

The purpose of the study is to develop alternative design concepts for Portland Central City Loop. 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 safe and reliable highway operations and enhanced transit performance.
- Support a multi-modal strategy for automobiles, transit, trucks, bicycles, and pedestrians.
- Support the designation of the Central City as a Multimodal Mixed-Use Area (MMA).
- 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 multimodal connections across facilities.
- Avoid or minimize negative impacts on the natural and built environments.
- Evaluate facility improvement costs relative to the distribution of benefits and impacts.
- Develop strategies that can be implemented in phases, including consideration of value pricing.

8.2.4.3 Clark County to I-5 via Gateway, Oregon City and Tualatin (Mobility Corridors 7, 8 and 10)

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;
- Coordinate refinement planning activities with planning for the Stafford area;
- 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 and to allow for potential of bus-on-shoulder operations for bypassing of traffic queues on I-205 during periods of congestion;
- Expanded transit service in the corridor including provision of I-205 express bus service between Clackamas regional center and Bridgeport in Tualatin, and frequent bus service between Clackamas regional center and Clackamas Community College via downtown Oregon City;
- Extend high capacity transit service from Milwaukie to Oregon City along McLoughlin Boulevard;
- Complete gaps in the I-205 Multi-use path - including southernmost segment from Oregon City to Tualatin - to provide a continuous off-street active transportation route through the length of the mobility corridor; and

- 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;
    - Interchange improvements at locations including: Division/Powell, Airport Way, OR213, OR 212/224, Sunrise, Johnson Creek Boulevard and others;
    - 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;
    - Widen to 6 lanes from Stafford Interchange to Willamette River;
    - Widen Abernethy Bridge to 6 lanes plus auxiliary lanes;
    - Improvements needed on OR 213 (82nd Avenue) include bicycle/pedestrian and streetscape improvements.

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;
- Evaluate crash history of arterials and throughways in study area, with a focus on fatal and serious injury crashes, to inform potential transportation solutions and phasing;
- Eastbound HOV lane from I-5 to the Oregon City Bridge;
- Truck climbing lane south of Oregon City;
- Potential for inter-city transit service, vanpool services and other travel options, to/from rural areas and neighboring cities in Clackamas County, to expand travel options and slow traffic growth in the I-205 corridor;
- Potential for rapid bus transit 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;
- Explore opportunities to support economic and land use goals with the Columbia Connections Strategy;

- Provide recommendations to the Bi-State Coordination Committee prior to JPACT and Metro Council consideration of projects that have bi-state significance.

8.2.4.4 Beaverton to Forest Grove (Mobility Corridors 14 and 15)

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 Tualatin Valley 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, including:

- Complete detailed multi-agency study to determine future potential for high capacity transit solutions within the Tualatin Valley Highway corridor;
- The Moving Forward TV Highway Plan will be developed as a multi-agency study that determine nature and feasibility of HCT in the Tualatin Valley Highway corridor between SW 160th Ave and Cornelius Pass Road;
- 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; and
- 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 setback 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. The City of Hillsboro has determined that a BAT lane would not provide the anticipated benefit for transit service and therefore the city isn't acquiring ROW to develop the BAT lane as redevelopment opportunities occur on TV Hwy check with Gregg Snyder about this. The Moving Forward TV Highway Enhanced Transit and Access Plan will look at whether there are benefits of using a BAT lane in part of the corridor from 160th to Cornelius Pass Road.
- 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 been awarded two Statewide Transportation Improvement Program (STIP) projects (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, and enhancing crossings. ODOT will be enhancing two pedestrian crossings, infilling sidewalks, consolidating bus stops, providing transit queue jumps at one location and improving a bus stop For the second application (between 110th Avenue and SW 209th Avenue on TV Hwy), the project will enhance four pedestrian crossing locations, install buffered bike lanes between 153rd and 182nd Aves, consolidate bus stops, install illumination, ped actuation and signal interconnect at 141st/142nd and 174th, install physically separated walkways and bike lanes on bridge sections between 153rd and 160th Ave and the between 30th and 40th Aves.

- 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.

Long Term Refinement Planning Needs

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 Moving Forward TV Highway Enhanced Transit and Access Plan will determine the nature and feasibility of HCT in the corridor primarily between 160th and Cornelius Pass Rd.
- 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.

8.2.4.5 Powell-Division Corridor: Portland Central City to Lents Town Center and Lents Town Center to Gresham Regional Center (Mobility Corridors 19 and 20)

The Powell-Division Corridor is included in Mobility Corridors #19 and #20. The Mobility Corridor Strategy identified in 2014 RTP Appendix 3.1 notes that both corridors are anticipated to experience high levels of growth in employment and population by the year 2040.

A number of investments are needed in these corridors to address existing deficiencies and serve increased travel demand.

The Powell-Division Transit and Development Plan alternative analysis identified a project – now called the Division Transit Project - that addresses some of the needs identified for the Powell-Division Corridor by improving transit and safety on Division Street with a bus rapid transit project. The Division Transit Project is a part of the financially constrained RTP project list. The Division Transit Project does not fully address the transit, safety, and mobility needs that remain on Powell Boulevard.

Project development analysis and public input has resulted in a Locally Preferred Alternative for a Division Transit Project that includes bus rapid transit running from downtown Portland to downtown Gresham on Division Street through southeast Portland. Project partners recognized that Powell Boulevard improvements are still needed to address safety and mobility needs for all modes and supply essential transit connections in this corridor. Also, a number of steering committee members qualified their votes of support for the Locally Preferred Alternative as contingent upon a commitment to further study Powell Boulevard to address safety and mobility needs moving forward. Based on community feedback and analysis during the Powell-Division Transit and Development project, the City of Portland included language documenting this recommendation in their LPA adopting resolution, as follows:

> BE IT FURTHER RESOLVED, that Metro advance Powell Boulevard for regional consideration and prioritization within the High Capacity Transit planning process, and amend the Regional Transportation Plan to assert continued need for Powell Boulevard transit improvements.

This recommendation was codified by the City of Portland in its ordinances adopting the Locally Preferred Alternative and in the accompanying Powell-Division Transportation and Development Strategy (an attachment to the jurisdiction's LPA resolution).

The Powell-Division Corridor is included in Mobility Corridors #19 and #20. The Mobility Corridor Strategy identified in 2014 RTP Appendix 3.1 notes that both corridors are anticipated to see high levels of growth in employment and population by the year 2040.

Mobility Corridor #19 provides an important connection between the Portland Central City and the Lents Town Center and provides important freight access to rail facilities at Brooklyn Yard and access from Powell Boulevard and McLoughlin Boulevard to the Central Eastside Industrial District. This corridor also serves statewide and regional travel on Powell Boulevard (US 26), which serves as a statewide and regional freight route between I-5 and I-205.

The corridor does not meet regional performance thresholds (does not perform as it should) for its throughways (Powell Boulevard) and arterials (Division and Holgate streets) as defined in the RTP due to high volume to capacity ratios.

Strategies adopted in 2014 RTP Appendix 3.1 to improve the corridor include:

Near term:

- System and demand management along Powell Boulevard and parallel facilities for all modes of travel.
- Improved, safe pedestrian and bicycle crossings of Powell Boulevard.
- Modify existing signals, coordinate and optimize signal timing to improve traffic operations on Powell Boulevard.
- Prioritize and construct safety and streetscape improvements from SE 50th to SE 84th Avenue.

Medium term:

- Improve safety by all modes and enhance opportunities for use of bicycles, walking and transit on Powell Boulevard.
- Identify and implement potential changes to the cross section of Foster Road based on the Foster Streetscape Plan.

Mobility Corridor #20 provides an important connection between the Lents Town Center and the Gresham Regional Center. The corridor provides important freight access, connecting I-205 to Gresham and the Springwater Industrial Area. In addition, the corridor serves statewide travel, connecting to routes that lead to destinations outside the region such as the Mt Hood Recreational Area and Sandy Oregon.

Similar to Mobility Corridor #19, Mobility Corridor #20 is expected to experience high levels of employment and population growth by 2040 and does not meet regional performance thresholds for its throughways (Powell Boulevard) and arterials (Division and Foster streets) as defined in the Regional Transportation Plan due to high volume to capacity ratios.

Strategies adopted in 2014 RTP Appendix 3.1 to improve the corridor include:

- Near term: System and demand management along the Powell Boulevard and parallel facilities for all modes of travel.
- Medium term: Implement a three-lane cross-section on Powell Boulevard from I-205 to SE 174th Avenue with bicycle and pedestrian improvements.
- Long term: Implement additional capacity enhancements along Powell Boulevard from 162nd to 174th Avenue as needed. Additional enhancements may include intersecting north-south streets along Powell Boulevard.

Project development analysis and public input resulted in a Locally Preferred Alternative for a Division Transit Project that includes bus rapid transit running from downtown Portland to

downtown Gresham on Division Street through southeast Portland. The jurisdictions recognized that Powell Boulevard improvements are still needed to address safety and mobility needs for all modes and supply essential transit connections in this corridor. Also, a number of steering committee members qualified their votes of support for the Locally Preferred Alternative as contingent upon a commitment to further study Powell Boulevard to address safety and mobility needs moving forward. Based on this conclusion, the RTP was amended to include an additional, future corridor refinement plan for Powell Boulevard as part of the adoption.

In addition, during the Division Transit Project's LPA process, project partners (TriMet, Metro, City of Gresham, Multnomah County, and Mount Hood Community College) developed a Memorandum of Understanding (MOU), in which TriMet committed to improve service to Mount Hood Community College with more frequent service on the Line 20, which will connect the college to the new bus rapid transit line and neighborhoods, and new transit amenities added at the college. The MOU also included a commitment to engage with the college and other signatories to identify future transit improvements in the area, and to seek to identify potential improvements at the Gresham Transit Center in coordination with the City of Gresham. Likewise, a number of steering committee members shared their support for the LPA was contingent upon these actions.

8.2.4.6 Hillsboro to Portland (Mobility Corridors 13, 14 and 16)

Improvements are needed in this corridor to address existing deficiencies and future growth in freight, commuters, and commercial traffic between Hillsboro's Silicon Forest, Northern Washington County's agricultural freight, and the Portland Central City, the international freight distribution hub of I-5 and I-84, the Port of Portland marine terminals, rail facilities, and the Portland International Airport. This corridor is generally defined by US 26 (Sunset Highway), which extends from the Oregon Coast through the Vista Ridge Tunnel where it intersects with the I-405 loop accessing I-5, and I-84. The Sunset Highway Corridor Study is recommended to evaluate multi-modal improvement needs between I-405 and the US 26/Brookwood Parkway interchange.

Corridor Growth Demand

Corridor #13, which extends east to the Willamette River including the western portion of Portland's Central City and Corridor #14 extending west from Murray Boulevard to North Plains will account for 22 percent of the region's households, 20 percent of the region's population, and 31 percent of the region's employment by 2040.

Freight Mobility Challenges

Much of the existing and projected employment in Corridor #14 is traded-sector manufacturing employment, which places a high priority on its ability to import raw materials and export finished goods to the national and international market through Portland's air, water, rail, and trucking distribution infrastructure.

The 2013 *Westside Freight Access and Logistics Analysis* found that greater Portland's export economy relies on the computer and electronics industry, which accounts for over half the value

of the region's exports. This industry is primarily located in the region's Westside, sometimes called the "Silicon Forest," and depends on a tightly managed supply chain to efficiently bring products to markets that are mostly outside of the greater Portland area. Addressing freight mobility challenges experienced by the Westside computer and electronics industry will likely also benefit the footwear, apparel, medical/dental, biopharma and agriculture industries in Washington County.

Freight movement between the Westside industries and the PDX freight consolidation area and the Portland International Airport depends on two routes:

- US 26 eastbound to I-405 northbound to I-5 Northbound to Columbia Boulevard; and
- Cornelius Pass Road northbound to US 30 southbound to Columbia Boulevard via the St. Johns Bridge.

In interviews conducted for the *Westside Freight Access and Logistics Analysis* study, freight shippers of computer and electronics products reported afternoon congestion and reliability challenges within the US 26/I-405/I-5 corridor and that Cornelius Pass Road/US 30 becomes the de facto route in the afternoon. This was confirmed in travel time analysis conducted in conjunction with the study. In addition, ODOT Region 1's *Portland Region 2016 Traffic Performance Report* documented a further degradation of travel in the US 26 corridor since 2013 and identified that US 26 eastbound between Highway 217 and I-405 ranks in the top 10 of the region's bottlenecks in the region.

Safety and Reliability

With congestion becoming more pervasive on US 26 in the area of the Vista Ridge Tunnels and the I-405 interchange, traffic crashes have continued to increase. Cumulatively, there are 10 discreet locations on US 26 between I-405 and Highway 217 that rank in the state's top 10 percent of crash high-priority locations statewide.

Hazardous Materials and Natural Hazards

Sunset Highway at the Vista Ridge tunnels prohibits the hauling of hazardous materials. Petroleum products used to fuel vehicles in the Tualatin Valley and chemicals, including but not limited to industrial gases used in the manufacturing of silicon wafer products, commonly use Cornelius Pass Road with Highway 217 as the secondary route.

Both the Sunset Highway corridor and the secondary freight route of Cornelius Pass Road are susceptible to recurring incidents such as crashes, landslides, and trees blocking the roadways. In both cases, the regional transportation system lacks "redundancy" to accommodate any unforeseen impediments to travel. Similarly, both corridors (and their Willamette River bridges) are not likely to prove reliable and sustainable in the event of a Cascadia earthquake.

Commuter and Commercial Travel Demand

Corridor #13, which includes Sunset Highway and its array of complementary parallel arterial roadways (Cornelius Pass Road, Germantown Road, Cornell Road, Barnes/Burnside Road, and Beaverton-Hillsdale Highway), carry approximately 229,150 vehicles per day comprising roughly 390,000 person-trips per day. Of the total vehicle trips, Sunset Highway carries 160,000 vehicles per day, including 6,000 trucks, and Cornelius Pass Road serves approximately 11,000 vehicles per day.

At present, transit carries approximately 29,000 person-trips per day on the MAX Blue Line, the MAX Red Line, and multiple bus routes serving the parallel arterials in the corridor (23,600 on Blue/Red MAX). Together, transit is serving approximately more than 7 percent of the person-trips on the corridor connecting Portland's Central City to the northern Tualatin Valley, but about 17 percent of peak hour travel on the Sunset Highway corridor itself. The MAX Blue Line operates at near capacity presently during peak periods, prompting TriMet to plan the western extension of the MAX Red Line to Hillsboro's Airport/Fair Complex Station by approximately 2022.

Hillsboro has also been working with TriMet, Washington County, and the City of Portland to advance a potential new Sunset Highway Express Bus service which is envisioned to operate from Forest Grove through the north Hillsboro industrial area to Portland via US 26 with regional park-and-rides at Hillsboro Stadium and potentially near the US 26/ Cornell-Bethany interchange.

Potential Solutions

Potential transportation solutions in this corridor should evaluate the costs and benefits of the following range of investments intended to reduce congested hours of operations through the corridor, improve travel time reliability, reduce crash frequency, and improve transit utilization. The study would identify a set of potential improvements that would be subsequently advanced for further study and potential project development and funding. The following should be addressed as part of a future corridor refinement plan:

- Evaluate crash history of all commuter routes including arterials, collectors, and throughways in the study area, with a focus on fatal and serious injury crashes, to inform potential transportation solutions and phasing.
- Deploy Intelligent Transportation Systems infrastructure including variable speed signs, traveler information signs, corridor Bluetooth origin/destination tracking, and improved ramp meter algorithms.
- Evaluate potential ramp meter bypass(es) for freight and transit use along the Sunset Highway corridor.
- Operational improvements at the US 26 and I-405 bottleneck which may include modifications or full/part-time closures of I-405 ramps to NW Everett Street and from SW Montgomery Street and modifications to lane channelization on US 26 approaching the interchange.

- Evaluate system and demand management options to expand travel options over the west hills, including employer shuttle buses and carpools, on-demand ride sharing carpools, etc.
- Expanded transit service on the corridor including provision of a Sunset Highway express bus service between the Portland Central City via the SW Jefferson Street interchange and Hillsboro (or Forest Grove).
- Evaluate the potential for bus-on-shoulder operations for bypassing of traffic queues on US 26 during periods of congestion.
- Expand the Sunset Transit Center park-and-ride capacity.
- Extend high capacity transit service from Portland to north Hillsboro along Sunset Highway including additional park-and-ride locations west of Highway 217. This improvement could consider use of paid parking at park-and-ride locations as a potential public-private partnership funding opportunity.
- Increase the frequency of MAX Blue Line and MAX Red Line and extend the MAX Red Line west to the Hillsboro Airport/Fair Complex station.
- Develop a transit service route that connects US 26 from Powell Boulevard to Sunset Highway to better accommodate demand between SE Portland/Clackamas County and northern Washington County.
- Improved transit connections to MAX/HCT in the corridor, including Columbia County Rider connectivity and better local access to the Sunset Transit Center.
- Complete regional trail gaps - including Rock Creek Trail, Westside Trail and Saint Helens Road - to provide a continuous off-street active transportation route through the length of the mobility corridor.
- Evaluate potential benefits and burdens (adverse impacts) of congestion pricing on Portland area freeways, including I-5, I-405, US 26, and Highway 217.
- Evaluate widening of Barnes Road-Burnside Road to five lanes between NW 23rd Avenue and Highway 217.
- Evaluate widening improvements to Cornelius Pass Road between US 26 and US 30 to determine near-term and long-term needs (jurisdictional transfer from current Washington County/Multnomah County to ODOT is in process).
- Evaluate safety and congestion effects of proposed solutions on the St Johns Bridge and the communities of St Johns and Linnton.
- Evaluate a North Willamette Freight Bridge over the Willamette River north of the community of St. Johns extending from US 30 to the western terminus of Columbia Blvd and N. Lombard Street. This improvement could be a potential tolled facility and a public-private partnership opportunity.
- Evaluate freight-related improvements to address multi-modal conflicted corridors between the Willamette River and the PDX freight aggregation/air cargo areas along Columbia Boulevard and Marine Drive.

- Evaluate a potential improvement to Cornelius Pass Road, Germantown Road between Cornelius Pass Road and approximately Old Germantown Road, and a new multi-modal tunnel under Forest Park connecting to US 30 and the North Willamette Freight Bridge (the Northern Arterial or Northern Connector identified in the Washington County Futures Study). The evaluation should assess potential land use impacts in the area. This improvement could be a potential tolled facility and a Public-Private Partnership opportunity.
- Evaluate the effect of proposed solutions on wildlife habitat and connectivity and relative benefits of wildlife crossing infrastructure in proposed solutions to improve safety for people and wildlife and make habitats more connected.

8.2.4.7 Clackamas to Columbia (Mobility Corridor 24)

This effort will create a consistent, coordinated, multi-jurisdictional transportation plan that focuses on needed improvements for all modes along the 181st/182nd/190th/172nd corridor that connects I-84 in Multnomah County and Highway 212 in Clackamas County. The corridor crosses a wide variety of land uses, both existing and planned. The effort will use the results of the planning projects that have been initiated locally (e.g., Pleasant Valley TSP Refinement Project, Happy Valley Pleasant Valley/North Carver Comprehensive Plan, 172nd Avenue/190th Drive Corridor Management Plan and the Clackamas County TSP Update), and evaluate packages of multimodal improvements that will improve mobility and access along the corridor to jobs, housing and key commercial and industrial areas. This effort will identify a preferred package of transportation improvements and detail how they can be phased for implementation. This effort will also provide recommendations on urban street design as well as recommend amendments to local TSPs and the Regional Transportation Plan to implement the preferred multimodal package.

Potential Solutions

This effort will recommend a shared mobility corridor investment strategy, including long-term needs and improvements for auto, bicycle, freight, pedestrian, and transit mobility and connectivity. This effort will expand on already adopted planning efforts in the corridor to create a multi-jurisdictional implementation strategy that provides a clear path from existing conditions to desired transportation improvements that support community and regional goals for equity, housing, economic development, environmental protection and access to nature. The planning process will include extensive public involvement and identify a set of potential improvements that would be subsequently advanced for further study and potential project development and funding.

The study will include a needs assessment for auto, freight, transit, bicycle and pedestrian modes within the corridor to identify existing gaps and system deficiencies. The assessment and solutions will address completing regional trails gaps, including the Troutdale to Springwater Trail, the Sunrise Corridor Trail and the Butler Buttes Trail - to provide a continuous off-street active transportation route through the length of the mobility corridor. A full list of recommended projects from other related transportation planning efforts will be developed. Data for key performance metrics will be collected from the related transportation plans and analyzed. If necessary, additional projects will be identified and proposed if unmet needs are found. The

projects will then be evaluated, and recommended projects will be grouped into investment packages and grouped geographically. The preferred investment packages for all modes will then be fully documented in the final plan along with implementation strategies focusing on timelines and funding strategies.

More information is available at: https://greshamoregon.gov/Clackamas-to-Columbia-Corridor.

8.3 PROJECTS

8.3.1 Major Project Development

Transportation improvements where the need, mode, function and general location is identified in the RTP and local plans are expected to be further refined during detailed project development. For major projects, project development is generally completed jointly by affected or sponsoring agencies, in coordination and consultation with Metro. For purposes of the RTP, major projects are defined as large-scale, complex investments in the transportation system that typically cost $500 million or more regardless of the source of funding for the total project and is likely to receive state or federal financial assistance. Projects with total costs between $100 million and $500 million may also be considered major projects. Major projects typically have a high level of public, legislative or congressional interest, may be constructed in multiple phases and are anticipated to go through one of the planning processes identified below.

The purpose of project development is to consider project design details and select a specific project alignment, as necessary, after evaluating engineering, management and design alternatives, potential environmental impacts and consistency with applicable comprehensive plans, the Oregon Transportation Plan and the RTP. 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)). The project need, mode, function and general location do not need to be addressed again at the project level, since these decisions have been previously documented in the adopted corridor refinement plan or RTP project list.

In the case of projects requiring an Environmental Impact Statement, Environmental Assessment, or Documented Categorical Exclusion for a project of regional significance with multiple jurisdictions, decisions are documented through adoption of a Locally Preferred Alternative. Project development decisions for projects that qualify for a Categorical Exclusion under NEPA are documented by other means in accordance with the responsible agency's procedures.

Once the RTP or corridor refinement plans have established mode, function, general location, and identified solutions, project development may also result in recommended phasing of improvements.

A summary of completed and current major project development activities follows.

Table 8.3 Completed and Current Major Project Development

Project	Status
Interstate 5/Columbia River Crossing Project	LPA approved in July 2008. Record of decision signed by FHWA in December 2011. Project development work discontinued in 2013 in Washington and 2014 in Oregon. Joint Washington and Oregon Legislative Action Committee discussions begin in 2017.
Sunrise Project and Sunrise Jobs and Transportation Act Project	LPA approved in July 2009. Record of decision for Phase 1, Units 1, 2 and 3 signed by FHWA in February 2011. Phase 1 related projects were completed in June 2016. Environmental approval received for improvements on OR 224 at Rusk Road. Phase 2 and Phase 3 may require future NEPA reevaluation for improvements east of SE 122nd Ave, given changes in the built environment since 2010.
Division Transit Project	LPA approved in June 2017.
Southwest Corridor Project	LPA approved in Nov. 2018.
I-5 Rose Quarter Improvement Project	Environmental Assessment anticipated to be published in 2019. Design anticipated to begin in 2019.
MAX Red Line Improvements Project	LPA approval anticipated in January 2019. Documented Categorical Exclusion approval anticipated in 2019.
OR 217 Project	OR 217 Southbound: ▪ Categorical Exclusion anticipated by October 2019. OR 217 Northbound: ▪ Categorical Exclusion anticipated by April 2020.
I-205 South Corridor Widening and Seismic Improvements Project	Categorical Exclusion approved in December 2018.
Basalt Creek Parkway	IGA to plan for Basalt Creek signed by partners in 2011. Basalt Creek Transportation Refinement Study to define alignment completed in 2013 and adopted as an amendment to IGA. Categorical Exclusion anticipated in 2019.

8.3.1.1 Interstate 5 Corridor and Bridge Replacement Project (formally Interstate 5/Columbia River Crossing Project)

The proposed Interstate 5 (I-5) Corridor and Bridge Replacement Project (previously called the Columbia River Crossing (CRC) Project) is a major bi-state megaproject that would replace the I-5 bridges across the Columbia River and provide high capacity transit between Oregon and Washington. In July 2008,the Metro Council approved a Locally Preferred Alternative (LPA) for the prior CRC project. The prior CRC project completed the National Environmental Policy Act (NEPA) review process and received a federal Record of Decision (ROD) on a LPA in December 2011. The CRC project development work was discontinued in 2013 in Washington and in 2014 in Oregon. Transportation needs in the I-5 corridor remain.

The prior CRC NEPA effort was 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. Each of these sponsoring agencies would be responsible for approving all or part of a future I-5 corridor and bridge replacement project.

The LPA for the prior CRC project included replacement bridges to the current I-5 bridges 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. Elements were identified in the CRC FEIS to improve safety, travel reliability, freight mobility, and bridge structural stability and relieve congestion on Interstate 5 between Portland and Vancouver.

The project responded to six key problems identified in the project purpose and need: growing travel demand and congestion; impaired freight movement; limited public transportation operation, connectivity, and reliability; safety and vulnerability to incidents; substandard bicycle and pedestrian facilities; and seismic vulnerability.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) would be the lead federal agencies for the oversight and delivery of the federal permit compliance and funding. Both agencies must ensure that the NEPA process is properly conducted and completed before they provide funding or approval to construct a project.

Major milestones were achieved as part of the NEPA process for the prior CRC project including: National Marine Fisheries Service issuance of an Endangered Species Act Section 7 Biological Opinion (January 2011); publication of a Final Environmental Impact Statement (September 2011); FHWA/FTA issuance of a Record of Decision (December 2011); United States Coast Guard issuance of a Bridge Permit (Sept 2013); issuance of a Section 401 Water Quality Certification by the State of Washington Department of Ecology and Oregon Department of Environmental Quality (August 2013); and related consultation with regulatory and permitting agencies took place.

As directed by the Washington Legislature in SSB 5806, WSDOT prepared an inventory of all planning, environmental, permitting and engineering work that was previously performed related

to the construction of a new I-5 bridge over the Columbia River.[6] Completed in December 2017, the report aimed to provide information to the Washington Legislature, to the public and to a joint Washington and Oregon Legislative Action Committee in potential efforts to begin a new project development process.

For purposes of the 2018 RTP, modeling and cost assumptions are based on the Final Environmental Impact Statement (September 2011) and cost estimating from prior studies. As a mega-project, it has been assumed to have its own financing plan. Funding for improvements is expected to require a combination of federal funds, tolling and state funds from Washington and Oregon. Refinements of the project scope, design, phasing, costs and finance plan may occur during the RTP horizon. Refinements will occur through a technical review and public process that includes relevant agency stakeholders in Washington and Oregon.

More generally in the I-5 corridor, the 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 or pricing systems to help manage congestion.
- Maintain an acceptable level of access to the central city from Portland neighborhoods and Clark County.
- Address freight rail network needs and maintain off-peak freight mobility, especially to numerous marine, rail and truck terminals in the area.
- Ensure that there is safe, reliable, affordable, and efficient transit connections between the growing downtown of Vancouver and key job sites in the Portland metropolitan region, including downtown Portland and Washington County.
- 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.
- Develop actions to reduce through-traffic on MLK and Interstate to allow main street redevelopment.
- Explore opportunities to support economic and land use goals with the Columbia Connections Strategy.
- 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.

[6] The report can be found at:
wsdot.wa.gov/accountability/ssb5806/docs/WSDOT_I5_Bridge_Inventory_Report.pdf

8.3.1.2 Sunrise Project and Sunrise Jobs and Transportation Act Project

The Sunrise Corridor is an essential freight route from I-5 and I-205 to U.S. 26 and central and eastern Oregon. In addition, the Clackamas Industrial Area is home to one of the state's busiest and most critical freight distribution centers. The OR 212/224 corridor is not capable of handling the expected increase in traffic resulting from significant community development and industrial expansion in the corridor.

In July 2009, the project's Policy Review Committee (PRC) selected the Preferred Alternative for the Sunrise Project. The Preferred Alternative is Alternative 2 as studied in the Supplemental Draft Environmental Impact Statement with Design Options C-2 and D-3 and a portion of Design Option A-2 (Tolbert Overcrossing). A detailed description and map of the Sunrise Project Preferred Alternative is included in Appendix Q.

FHWA, ODOT and Clackamas County completed the Final Environmental Impact Statement (FEIS) for the Sunrise Project and on February 22, 2011, the FHWA signed a Record of Decision (ROD) that approves the 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.

The Sunrise Jobs and Transportation Act (JTA) Project constructed a new 2.5 mile road from I-205 to 122nd Avenue (as part of the larger Sunrise Project mainline). The Oregon Legislature approved $100 million in JTA funding for this project, which was built to address congestion and safety problems in the OR 212/224 corridor and improve local roadway connections to the Lawnfield Industrial District. Construction for the JTA phase of the Sunrise Project was completed in June 2016 and opened for use on July 1, 2016.

Future phases of the Sunrise Project include the design and construction of improvements between SE 122nd Avenue and SE 172nd Avenue, consistent with the FEIS and ROD. ODOT, in coordination with local agencies, has initiated preliminary analysis to examine options for the Sunrise Project's connection with OR 212/224 towards the east end of the corridor.

The most recent ODOT cost estimate for the completion of Phase II (extends from the east end of the project at SE 122nd to SE 172nd) is $250 million. This amount seems sufficiently high that it appears unlikely that all of Phase II can be completed in one project. At this point, the best strategy for moving the project forward could be to break Phase II of the Sunrise project into two or three sub-phases that each have independent utility and can be accomplished at a more reasonable cost. ODOT, in coordination with local agencies, has initiated preliminary analysis to examine options for the project's east end from the Rock Creek junction of OR 212 and OR 224 to the east end of the corridor.

8.3.1.3 Division Transit Project

The Division Transit Project is in the final stages of project development. Based on outreach and analysis, the Steering Committee recommended a LPA in November and the LPA was adopted by the local jurisdictions in December 2016. The Locally Preferred Alternative (LPA) for the transit project includes the transit mode (bus rapid transit), the route (from downtown Portland on the transit mall to Southeast Division Street to the Gresham Transit Center), and the general stop locations (approximately 1/3 mile apart). The project began the NEPA process by documenting potential impacts and benefits in accordance with federal requirements. With local adoption of the LPA, TriMet is leading the design, traffic analysis, and outreach with support from Metro and other project partners. In June 2017, the Metro Council adopted the LPA by Resolution No. 17-4776 at the same time the Metro Council amended the 2014 Regional Transportation Plan by Ordinance No. 17-1396 to include the LPA in the plan.

TriMet is working with partners to finalize the project's design, and Metro is leading the NEPA process by conducting a Documented Categorical Exclusion. The land use investment strategy pieces are being led by Portland and Gresham, moving forward on their locally adopted Local Action Plans. The Local Actions Plans outline their vision for implementing land use and economic development that complements the transit investment. Construction is anticipated to begin in 2019 with a targeted opening date of fall 2022.

Additional project information is available at: www.trimet.org/division/

8.3.1.4 Southwest Corridor Transit Project

The Southwest Corridor Plan is a comprehensive effort focused on supporting community-based development and placemaking that targets, coordinates and leverages public investments to make efficient use of public and private resources. The work has been guided by a Steering Committee comprised of representatives from the cities of Beaverton, Durham, King City, Portland, Sherwood, Tigard and Tualatin; Washington County; and TriMet, ODOT and Metro. Steering Committee members agreed to use a collaborative approach to develop the Southwest Corridor Plan and a Shared Implementation Strategy to align local, regional, and state policies and investments in the corridor. In August 2011, the Metro Council adopted Resolution No. 11-4278 that appointed the Southwest Corridor Steering Committee, and a charter defining how the partners will work together was adopted by the Steering Committee in December 2011.

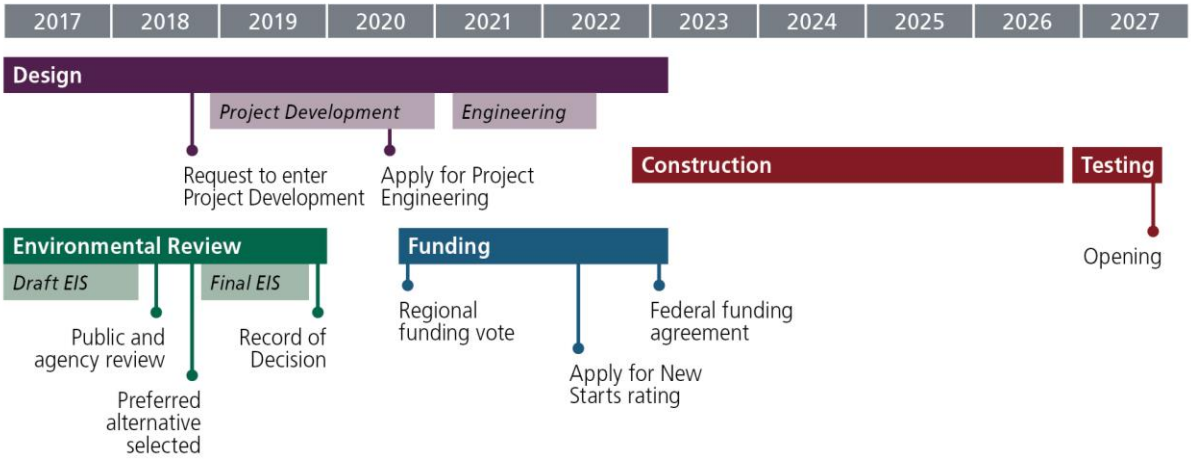
In October 2013, the Metro Council adopted Resolution No. 13-4468A, endorsing the Southwest Corridor Shared Investment Strategy and directing staff to coordinate and collaborate with project partners on refinement and analysis of high capacity transit (HCT) alternatives and local connections in the Southwest Corridor, along with associated roadway, active transportation and parks/natural resource projects that support the land use vision for the corridor. This resolution also directed staff to work with project partners to involve stakeholders at key points in the process and seek input from the public.

In June 2014, the Metro Council adopted Resolution No. 14-4540, which included direction to staff to study the Southwest Corridor Transit Design Options under NEPA in collaboration with the Southwest Corridor Plan project partners and with the involvement of stakeholders and public, pending Steering Committee direction on the results of the focused refinement analysis

The Southwest Corridor Light Rail Project has emerged as the preferred high capacity transit investment of the Southwest Corridor Shared Investment Strategy. The project is a proposed 12-mile MAX light rail line serving SW Portland, Tigard, Tualatin and the surrounding communities. The proposed project also includes bicycle, pedestrian and roadway projects to improve access to light rail stations. In compliance with NEPA, and at the direction of the Metro Council, an Environmental Impact Statement (EIS) will be prepared by Metro, TriMet and FTA to identify the significant positive and negative impacts the project could have on the built and natural environment and to determine options to avoid, minimize or mitigate those impacts. The Draft EIS, released in summer 2018, assessed the project alternatives remaining from over three years of analysis refinement and suggest ways to avoid, minimize or mitigate significant adverse impacts. The information disclosed in the Draft EIS, and public and agency comments on the Draft EIS, informed the Southwest Corridor Steering Committee in its recommendation of a LPA. In November 2018, the Metro Council adopted Resolution No. 18-4915 approving the Southwest Corridor LPA. The LPA is included in the RTP.

TriMet anticipates requesting entry in Project Development with FTA late in 2018. TriMet will be furthering the transit project design while Metro completes the final EIS. The final EIS will analyze and disclose the benefits and the adverse impacts of the preferred alternative, including the effects of mitigation measures identified in the Draft EIS and selected for inclusion in the project. Upon completion of the final EIS, TriMet will request a Record of Decision (ROD) from FTA, which authorizes the lead agencies to proceed with design, land acquisition, and construction based on the availability of funds. The general schedule for the Southwest Corridor Light Rail Project is shown below, with anticipated opening in fall 2027.

Figure 8.8 Southwest Corridor Project Schedule



More information is available at www.oregonmetro.gov/public-projects/southwest-corridor-plan.

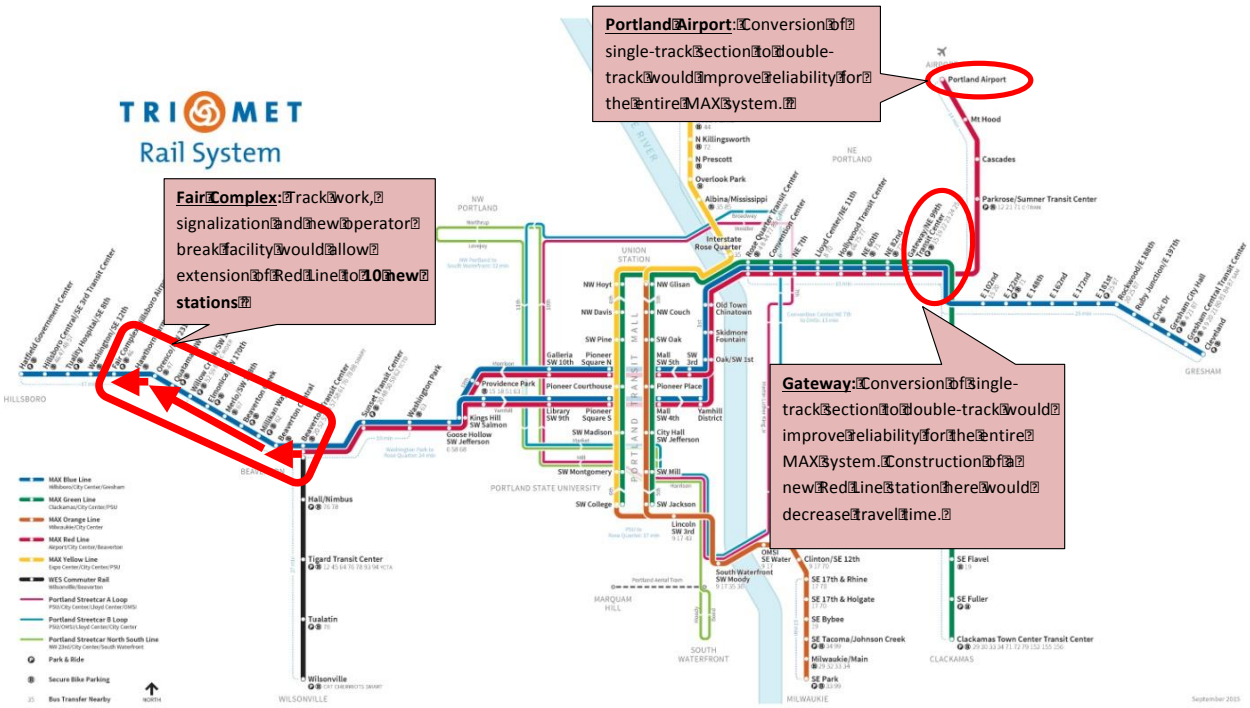
8.3.1.5 MAX Red Line Improvements Project

The MAX light rail system provides high capacity transit connecting the major centers of our region. The MAX Red Line has connected the City of Beaverton, downtown Portland, Gateway Regional Center, and Portland International Airport since 2001. Since its opening, there has been substantial growth in the corridor and more demand for reliable transit connecting these important centers. Currently, the Red Line has two single-track sections near Gateway/99th Ave and Portland International Airport, which result in inbound and outbound trains having to wait for each other. If a train is off schedule, these wait times can impact the entire MAX System as trains rely on the same tracks to serve different parts of the region. Adding a second set of tracks in these areas will reduce delays for riders on all five lines. In addition, MAX riders west of Beaverton Transit Center have been requesting Red Line service to better connect a growing part of the region.

The Red Line improvements west of the Beaverton Transit Center include improving track and switches and adding signals and a new operator break facility at the Fair complex/ Hillsboro Airport MAX Station allowing Red Line trains to serve ten more west side stations. These stations are currently served by the Blue Line, which is often overcrowded. Improvements will allow TriMet to increase train frequency to better meet rider demand. Improved transit will support anticipated redevelopment at the Port of Portland such as the expansion of the Portland International Airport and potential redevelopment at the Gateway Regional Center.

This project will complete a 2-year design process for the MAX Red Line double tracking and other improvements to increase light rail reliability on all five MAX lines and to improve carrying capacity to meet transit demand west of the Beaverton Transit Center. TriMet and Metro will work with the local jurisdictions and the Port of Portland to scope the project to improve access to major transit origins and destinations, improve reliability of the entire MAX system, and support future redevelopment at the Gateway Regional Center, the Port of Portland properties, and within Beaverton and Hillsboro. TriMet and Metro will also consult with the federal agencies during the scoping phase. TriMet is coordinating with local jurisdictions to avoid and minimize any potential impacts associated with improving the Red Line. NEPA is expected to be complete in 2019 with construction of improvements in the 2021-2022 timeframe. Opening is targeted for 2023. This work will improve mobility and transit performance throughout the region.

Figure 8.9 MAX Red Line Improvements Project Area Map



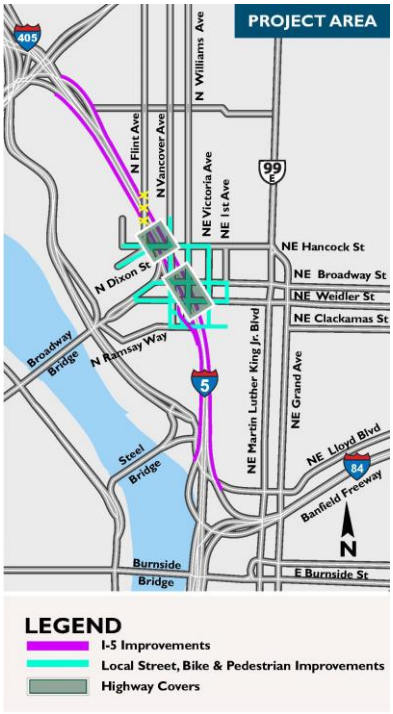
Source: TriMet

More information is available at: www.trimet.org/redlineimprovements.

8.3.1.6 I-5 Rose Quarter Improvement Project

ODOT and the City of Portland are ongoing partners on the I-5 Rose Quarter Improvement Project, which implements the recommendations of the I-5 Broadway-Weidler Facility Plan and the N/NE Quadrant Plan. The purpose of the I-5 Rose Quarter Improvement Project is to improve the safety and operations on I-5 between I-84 and I-405, the Broadway/Weidler interchanges, and adjacent surface streets in the vicinity of the interchange. In achieving the purpose, the Project also supports improved connectivity and multimodal access in the vicinity of the interchange.

Figure 8.10 I-5 Rose Quarter Improvement Project Area



Source: ODOT

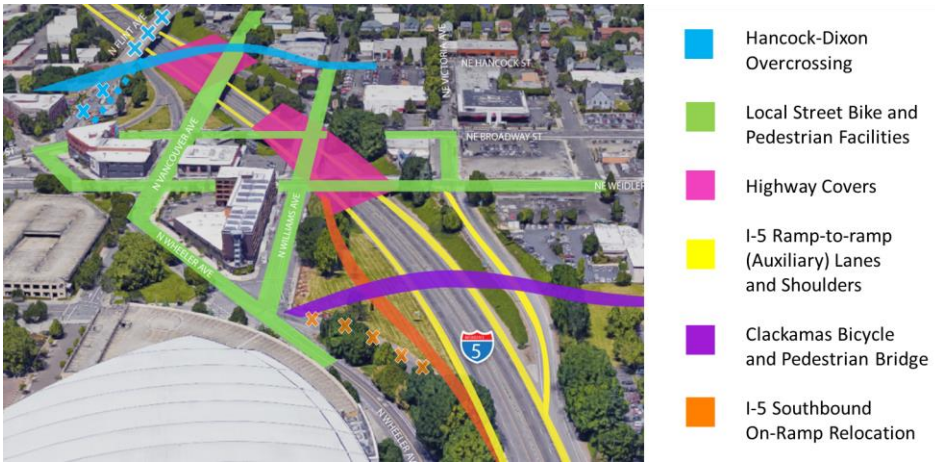
The I-5 Rose Quarter Improvement Project is intended to make travel more convenient, reliable, and safe for people driving on I-5, or biking, walking, or taking public transit in the Rose Quarter area. The Project will add:

- One new auxiliary lane in each direction on I-5 between I-84 and I-405 to improve traffic weaves and reduce frequent crashes;
- Full shoulders in each direction on I-5 between I-84 and I-405 to create space for disabled vehicles to move out of through traffic and allow emergency vehicles access;
- Relocating the I-5 southbound on-ramp from NE Wheeler to NE Weidler;
- Highway covers over I-5 at Broadway/Weidler and Vancouver/Hancock to provide space for wide sidewalks, separated bike lanes, roads, and new community spaces;
- Bicycle- and pedestrian-only bridge over I-5 from NE Clackamas Street to the Rose Quarter;
- New, direct road connection over I-5 between N Hancock Street and N Dixon Street;
- New, upgraded pedestrian and bicycle paths in the area of the Broadway/Weidler interchange; and
- Improved pedestrian and bicycle access to transit, including Portland Streetcar and TriMet bus and MAX lines.

Figure 8.10 shows the project location and **Figure 8.11** illustrates the project features.

More information is available at www.i5rosequarter.org.

Figure 8.11 I-5 Rose Quarter Improvement Project Features



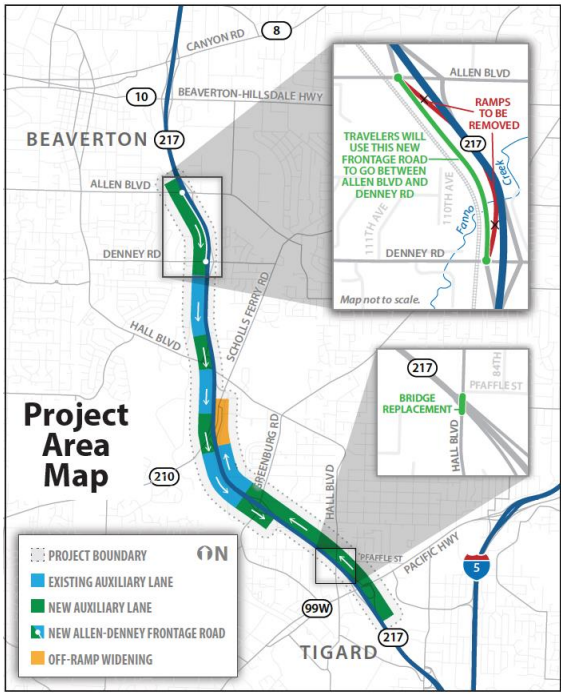
Source: ODOT

ODOT initiated the federal environmental review process for the I-5 Rose Quarter Improvement Project in December 2016, with expected publication of an Environmental Assessment by the end of 2018. Project design is scheduled to begin in 2019, with construction beginning as early as 2023.

The I-5 Rose Quarter Improvement Project is one of the projects of statewide significance included in House Bill 2017, with the majority of project funding provided by this bill. Per House Bill 2017, ODOT will present a Cost to Complete Report to the State Legislature prior to the programming of State funding.

8.3.1.7 OR 217 Project

OR 217 carries up to 120,000 vehicles a day and has 10 interchanges in just over seven miles of highway, with some of the shortest interchange spacing in the region. This causes significant bottlenecks, leading to high crash rates and unpredictable travel times. HB 2017 allocated a majority of funding needed to implement highway improvements on OR 217. ODOT is currently in the design phase and construction is slated to begin in 2020.



Source: ODOT

Figure 8.12 OR 217 Project area

The primary project elements include:

- Build auxiliary lanes on OR 217 southbound from Beaverton-Hillsdale Highway to Greenburg Road and on OR 217 northbound from OR 99W to Scholls Ferry Road.
- Build a collector-distributor road between Allen Boulevard and Denney Road interchanges along OR 217 southbound that includes a new parallel multi-use path as designated in the Chapter 3 RTP bicycle and pedestrian system maps. The project removes the weaving section on southbound OR 217 between the Allen Boulevard and Denney Road interchanges by replacing the southbound entrance ramp from Allen Boulevard and the southbound exit ramp to Denney Road with a collector-distributor road connecting the Allen Boulevard and Denney Road southbound ramp terminals. Consolidation of these interchanges into a "split diamond interchange" configuration is consistent with previous corridor plan recommendations.

Replace one of the Hall Boulevard bridges over OR 217. This is the southernmost bridge at SW Pfaffle Street (near OR 99W in Tigard). The bridge replacement is needed to accommodate the new auxiliary lanes.

Anticipated Benefits

- Provide significant operations and safety improvements on OR 217 southbound;
- Improve safety on a hazardous cargo route; and
- Reduce congestion/delay for all southbound travelers.

8.3.1.8 I-205 South Corridor Widening and Seismic Improvements Project

Preliminary design work is underway to widen I-205 between OR 213 and Stafford Road and improve the I-205/Abernethy Bridge to ensure it remains functional after a catastrophic earthquake. The design work was funded through HB 2017; however, construction funding for this project has not been identified.

The I-205 South project widens I-205 to add a third lane in each direction between Stafford Road and OR 213 and an auxiliary lane across the Abernethy Bridge in each direction. The I-205/Abernethy Bridge project provides for seismic upgrades of the Abernethy Bridge and includes seismic retrofit or replacement of eight additional bridges in the corridor. The project also adds Active Traffic Management System improvements, such as Traveler Information Signs, throughout the corridor and a new parallel multi-use path as designated in the Chapter 3 RTP bicycle and pedestrian system maps.

The Oregon Transportation Commission approved a Cost to Complete Report for the project that was shared with the Oregon Legislature in January 2018, as mandated by HB 2017. The Cost to Complete Report defines the project scope and recommends a project delivery method and phasing plan to complete the project by 2025. Read the report and find more project information at www.i205corridor.org.

Figure 8.13 I-205 South Widening and Seismic Improvements Project Area Map

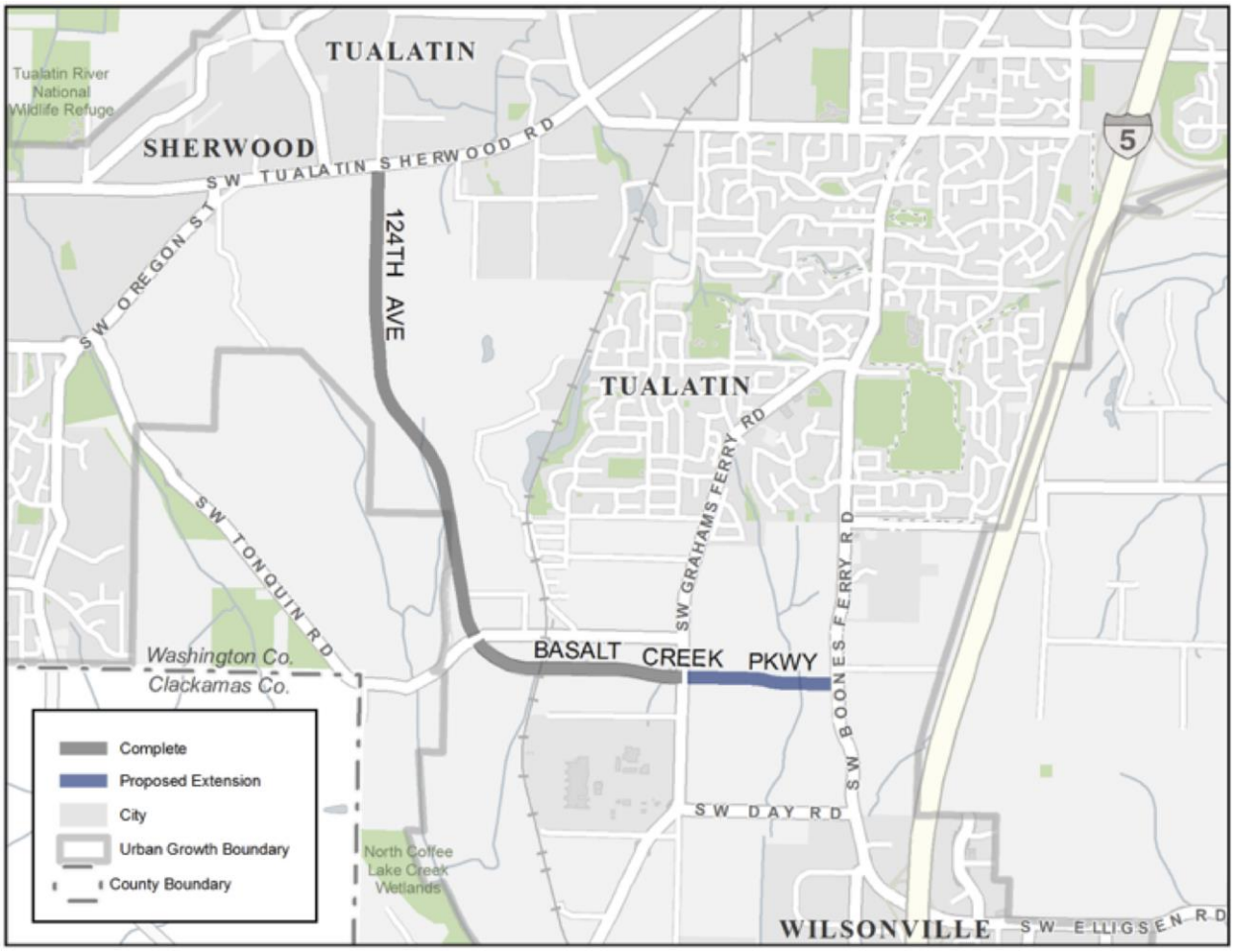


Source: ODOT

8.3.1.9 Basalt Creek Parkway

In 2002 and 2004, Metro added over 1900 acres of land to the UGB in south Washington County. Primarily intended for employment uses, the area is planned for development and growth of up to 14,000 jobs in the cities of Sherwood, Tualatin and Wilsonville when the area is annexed. The Basalt Creek Parkway, combined with the 124th Ave extension, will serve and catalyze development in this area. The new arterial is designated as a freight route in the Regional Transportation Plan. Figure 8.13 shows the new arterial.

Figure 8.14 Basalt Creek Parkway Project Area Map



Source: Washington County Department of Land use and Transportation

The Basalt Creek Parkway was recommended by the cities of Tualatin and Wilsonville, Metro and Washington County and Clackamas County as one of several arterials to support development of the South County area and replace what was once envisioned as a state route connection between 99W and I-5. Tualatin, Wilsonville, Metro and Washington County entered into an Intergovernmental Agreement for land use and transportation planning for the Basalt Creek subarea in 2011. In 2013 the partners endorsed the Basalt Creek Transportation Refinement Plan

and selected the general alignment for the Basalt Creek Parkway as part of a larger multi-modal transportation investment that includes the Tonquin Trail, bike lanes, collector roadways and upgrades to existing arterials.

The Basalt Creek Parkway is part of a multi-phase project with an existing investment of over $100 million. Washington County completed the first phase with the extension of 124th Avenue from Tualatin Sherwood Road to Tonquin Road. Other roads in the area, including the Tualatin Sherwood Road, Grahams Ferry Road, Tonquin Road and Boones Ferry Road have been improved or have committed funding as part of the plan.

The next phase of the Basalt Creek Parkway is the east-west span between 124th and Boones Ferry Road. The county and its partners have secured Regional Flexible Funds from Metro to complete the design for the Parkway, the environmental assessment and purchase right of way. The County and its partners intend to seek the remaining approximately $21 million for the roadway construction from federal, state or other sources.

8.3.2 Metropolitan Transportation Improvement Program

The Metropolitan Transportation Improvement Program (MTIP) documents how all federal transportation funding is spent in the greater Portland region for a four-year period as well as state- and locally-funded projects that may significantly affect the region's air quality. The MTIP serves multiple purposes – the document:

- lists all federally-funded transportation expenditures;
- identifies funding sources for transportation projects;
- provides project implementation details (e.g., in what year the preliminary engineering, right-of-way acquisition and construction phase is expected);
- demonstrates all federal requirements to expend federal funds have been met; and
- reports how adopted regional policies influenced the selection of these near-term investments as priorities to move forward.

This section describes the role of the MTIP as a key tool for implementing the RTP, and provides an outline of expectations of jurisdictional partners for demonstrating consistency with the RTP in order to be programmed in the MTIP for implementation. The MTIP document provides more specific description of how projects proposed to be included in the MTIP are expected to demonstrate consistency with the RTP.

8.3.2.1 MTIP responsibilities and oversight

Metro has the responsibility to prepare the MTIP, but it is done in collaboration and coordination with ODOT, and transit agencies, TriMet and SMART, as the region's four entities responsible for administering federal transportation funding. Additionally, cities, counties, the Port of Portland, other local agencies and the public participate in the development of the MTIP.

JPACT, the Metro Council and the Governor of the State of Oregon approve the MTIP. The MTIP is then incorporated, without change, into the State Transportation Improvement Program (STIP), which integrates regional and statewide improvement plans.

8.3.2.2 The role of the MTIP in regional planning

The RTP plays a significant guiding role for the MTIP as it sets the policy direction for what transportation investments are eligible for federal funding and the prioritization criteria for allocating federal funding. Through inter-regional coordination throughout the planning and programming process, the MTIP ensures that investments of federal funds are consistent with the RTP and makes progress in achieving performance targets established in the plan. The MTIP is updated every three years.

One of the primary purposes of the MTIP is to ensure scarce federal transportation funding and investments are making progress towards the regional vision set out for transportation system in the RTP. As a result, the greater Portland region's MTIP gives top priority to strategic transportation investments that leverage and reinforce the region's land use strategy envisioned in the 2040 Growth Concept and the supporting multimodal transportation investments in the RTP.

8.3.2.3 Demonstrating consistency prior to implementation

As the vehicle for implementing the RTP, the MTIP has two primary purposes:

1. ensure all federal requirements for expending federal transportation funds are being met; and
2. ensure the investments are making progress towards regional goals, objectives and implementing regional policies as part of performance-based programming.

Recognizing these two primary purposes of the MTIP, any investment requiring inclusion in the MTIP must demonstrate and justify how the investment implements the RTP and regional policy outcomes. This is necessary to meet federal eligibility and compliance purposes, provide the best transportation experience possible for the region's residents, businesses, employees and visitors and for good stewardship of scarce transportation resources.

The determination and demonstration of consistency with the RTP, done through the MTIP process, comprises quantitative and qualitative evidence that the investment advances implementation of the RTP investment strategy, financial constraint, project performance towards regional and federal performance targets, and public involvement and consultation. In general, there are two main avenues to demonstrate consistency with the RTP whether as an individual transportation investment or an entire package of transportation investments may be included in the MTIP. The two avenues include the following:

1. During the prioritization process to allocate federal transportation dollars to various transportation projects, including the identification of the criteria and the consideration of multimodal tradeoffs (prior to the submission to the MTIP); and

2. The process for amending the MTIP.

As each four-year MTIP is developed, determination of consistency is also conducted and demonstrated programmatically to show how the MTIP package is consistent with and advances the implementation of the Plan. Additionally, the programmatic evaluation serves as a monitoring tool for assessing progress in implementing the RTP.

The following sections describe the core areas that MTIP investments (at individual scale and during the funding allocation process) are required to demonstrate consistency with federal requirements and adopted regional transportation policy as expressed in the RTP goals, objectives and policies. Example questions are provided to illustrate what information is sought.

Regional significance

The adopted RTP represents the regional transportation system in the greater Portland region, which serve regional transportation needs and provides a specified level of seamless multimodal connectivity, accessibility, and management of people and goods traveling on the system. As a result, the limited amount of available federal funding must be allocated strategically to advance the operation or enhance the development of key facilities across the different modal systems (e.g., transit, bicycle and pedestrian active transportation, freight) to ensure an interconnectivity while supporting other desired regional outcomes (travel options, reduced greenhouse gas emission, etc.).

For the purposes of demonstrating consistency, the RTP has identified these key facilities, programs, and strategies in defining the regionally significant system. Additionally, other conditions and circumstances may qualify a transportation investment as regionally significant, as reflected in the RTP definition of regional significance and corresponding RTP network maps contained in Chapter 3.

Examples of questions asked for transportation investments to demonstrate Regional Significance:

- Is the transportation investment advancing a project on a facility designated in one or more of the RTP network maps?
- Does the transportation investment require permission or approval(s) from the U.S. DOT, regional transportation air quality conformity or project level NEPA review?

Regional goals and objectives

The adopted RTP demonstrates a significant need for investment in the transportation system to address many growing demands of the transportation system, including the growing backlog of maintenance, expansion of services, and increased connectivity and completeness of different modes. Recognizing the scarcity of funding while the need for investment is ever growing, each dollar invested in the regional transportation system must serve a regional purpose and advance the implementation of the region's transportation vision and supporting goals, objectives and policies.

To be included in the MTIP, investments must demonstrate how implementation will address one or more of the RTP's goals, objectives and policies, listed in Chapters 2 and 3. Moreover, the Metro Council identified these key regional policy priorities – transportation equity with a focus on race and income, safety, travel options, Climate Smart Strategy implementation, and managing congestion – to be the focus of this RTP. The RTP's goals serve as the broad direction and expectation of what each investment in the system should aim to achieve but additional focus and attention should be paid to the RTP policy priorities. These goals are consistent with the federal planning factors issued by U.S. DOT.

Examples of questions asked for investments to demonstrate consistency with Regional Goals and Objectives include:

- What regional goals and objectives are being addressed by this transportation investment?
- Is the project identified as part of the adopted RTP financially constrained project list?
- Is the project advancing one or more of the Climate Smart Strategy policies? If so, which policy(ies) and how?
- Is this project addressing and/or advancing a strategy or action within an adopted regional modal or topical strategy or plan, or shared strategy of the RTP? If so, which modal or topical strategy or plan? Which strategy (or strategies) and action(s)? How does it address or advance the modal or topical strategy or plan?

8.3.2.4 Demonstrating fiscal constraint

As a federal requirement, both the RTP and the MTIP are fiscally constrained. Project costs are not to exceed expected revenue sources. For the MTIP, transportation identified investments are only those projects for which resources are expected to be available, and funding identified for the first year must be committed by administering agencies to the project. The MTIP is not a comprehensive accounting of all transportation investments in the region; it only accounts for the funding of regionally significant projects and does not include projects on local streets and facilities. Projects that are 100 percent locally funded but of regional significance are included for informational and analysis purposes only.

Per federal regulations, transportation projects using federal funds are expected to demonstrate that revenues needed to deliver the project are available and the revenues were accounted for in long-range transportation plan revenue projections. Therefore, projects included in the MTIP must be included in the RTP financially constrained project list either as an identified individual project or through a programmatic category. Additionally, projects in the MTIP must be consistent in scope and financial scale as to what was reflected in the financially constrained RTP project list. The revenue assumptions used to develop the RTP financially constrained project are defined in Chapter 5. Projects included in the RTP financially constrained project list are identified in Appendix A (2018-2027 time period) and Appendix B (2028-2040 time period).

In the event that projects proposed for funding and inclusion within the MTIP were not included in the RTP financially constrained project list at time of adoption, the RTP must be amended to include the project or projects as a condition of being adopted in the MTIP.

To amend projects into the financially constrained project list continued fiscal constraint must be demonstrated by identifying additional revenues or removing other projects from the financially constrained project list. More information about the process and other requirements that must be met to amend the RTP will be provided in Section 8.4.

Examples of questions asked for transportation investments to demonstrate Fiscal Constraint:

- Is the transportation investment/project identified in the adopted RTP financially constrained project list?
- Is the project consistent in scope and cost as to what was accounted for in the RTP financially constrained project list and regional travel model?
- If this project is using federal dollars, how will the sponsoring agency adequately fund in perpetuity the operations and maintenance of the improvements being made?

8.3.2.5 Demonstrating support toward achievement of performance targets

Signed into law in 2012, the previous federal transportation reauthorization, known as Moving Ahead for Progress in the 21st Century (MAP-21), created the most significant federal transportation policy shift since the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). A fundamental element of the legislation was its focus on performance-based planning and programming.

For the first time, MAP-21 established a federal performance management framework to improve transparency and hold state transportation departments, transit agencies and metropolitan planning organizations (MPOs) accountable for the effectiveness of their transportation planning and investment decisions. The objective of the performance management framework was to ensure states and MPOs invest federal resources in projects that collectively will make progress toward the achievement of the national goals. The required performance-based approach includes targets for measures specified by U.S. DOT and requirements to track and report progress toward meeting these targets. Twelve performance measures have been identified through MAP-21 and subsequent U.S. DOT rulemaking. These federal performance measures and targets address:

- Safety
- Infrastructure condition
- Congestion reduction
- System reliability
- Freight movement and economic vitality
- Environmental sustainability

Preceding the adoption of the MAP-21 performance-based planning requirements, the Metro Council and JPACT adoption of the 2010 RTP established an outcomes-focused performance-based planning process that continues to today. The RTP performance-based process centers on measuring the performance of the adopted RTP investment strategy and monitoring progress towards 10 transportation system performance targets identified in Chapter 2. The RTP performance targets address:

- Affordability
- Safety
- Vehicle miles traveled
- Mode share
- System Completion
- Congestion
- Freight delay
- Climate change and greenhouse gas emissions reduction
- Clean air

The RTP performance measures and targets contained in Chapter 2 and Appendix L support and are consistent with the MAP-21 measures and align to the federal planning factors required for MPOs to address and make progress towards. To be included in the MTIP, transportation investments planned for the region to meet growing demands, needs or deficiencies, must also demonstrate contribution to progress toward federal and RTP performance targets.

Examples of ways in which transportation investments can demonstrate consistency with performance targets:

- How does the transportation investment/project contribute one or more of the federal and/or regional performance targets for the transportation system?
- What evaluation was performed to compare candidate projects for making progress toward federal and regional performance targets? What results can be provided to demonstrate the investment is making progress towards the federal and/or regional performance targets?
- How did the funding allocation process consider federal and regional performance targets in its criteria in the selection and allocation of funds?

8.3.2.6 Public involvement expectations and process for demonstrating consistency

As part of federal guidance on public involvement and on Civil Rights laws and the Executive Order on Environmental Justice, it is expected that all transportation investments identified in the MTIP have provided, and will continue to provide opportunity for community input and comment until the investment is implemented and/or open for service. This means prior to an investment being identified in the MTIP, it must have emerged through planning process that was adopted or approved by a governing body and be included in the RTP investment strategy. The planning

process, and that process's community engagement effort, indicates the investment addresses an identified transportation deficiency and need in the local community and the community has had opportunity to inform the plan. The adoption or approval of the plan must also provide an opportunity for public testimony.

Commonly recognized planning processes from which projects emerge include local transportation system plans (TSPs), but other planning processes include corridor studies, facility plans and sub-area plans. Additionally, through the development of the RTP project list, local jurisdictions are asked to self-certify transportation investments being proposed for the long-range transportation plan have undergone or are currently undergoing public involvement efforts through an approved planning process.

Examples of ways in which transportation investments can demonstrate consistency with Public Involvement include:

- From which planning process does the transportation investment emerge from? What opportunities for public feedback were available as part of the process?
- How was feedback from the public incorporated into the development of the investment?
- What demographic assessment was done to identify communities of color, people with limited English proficiency, people with low income and other historically marginalized communities as stakeholders?
- Were all interested/affected stakeholders meaningfully engaged in the funding allocation prioritization and decision-making process?
- Were all interested/affected stakeholders meaningfully engaged prior to the request for programming a project into the MTIP? [7]

8.3.2.7 Developing the MTIP

The MTIP development process is initiated by Metro with an update to the MTIP policies. The policies direct how JPACT and the Metro Council intend to coordinate the funding allocation processes administered by Metro through the Regional Flexible Funds Allocation (RFFA) process and for funds administered by ODOT and public transit agencies – TriMet and SMART. The policy document also describes how the funding allocation processes address federal regulations for the allocation of federal transportation funds.

Projects seeking funding through the RFFA process must be included in the financially constrained Regional Transportation Plan project list. JPACT and the Metro Council consider the MTIP for final approval. Upon adoption by the Metro Council, the MTIP is submitted to the Governor of Oregon for inclusion in the STIP.

[7] Interested and affected stakeholders means those members of the public affected or interested in transportation investment (or package of investment), as well as formal entities, such as natural resource agencies, emergency management agencies, tribal entities, etc. which may have interests or be affected by the implementation of the proposed transportation investment.

8.4 AMENDING THE REGIONAL TRANSPORTATION PLAN

Metro updates the RTP every five years, as required by federal law for all MPO areas designated with air quality attainment status. However, between RTP updates, amendments to the RTP may be necessary. Amendments can be triggered by substantially modified project need, mode, function or general location or new regionally significant projects identified through plans or studies adopted through a public process, including local transportation system plan updates. A plan amendment could also be necessary if substantial changes in financial resources occur not anticipated during the 2018 RTP update process.

To initiate a plan amendment, a local agency, ODOT, TriMet or SMART provides information to Metro outlining the specific amendment request along with a clear justification for the amendment or the source of the new funding. Metro staff review each amendment request and determine how the request should be processed.

This section summarizes the types of amendments and process for making amendments to the plan between scheduled updates.

8.4.1 RTP Policy, System Map and Compliance Criteria Amendments

When Metro amends policies or system maps in Chapter 3 of this plan, it will evaluate and develop findings regarding consistency with the Regional Framework Plan and Statewide Planning Goals (and implementing rules). Decisions on amendments made at this level are land-use decisions for need, mode, function and general location of a proposed project. Subsequent decisions on final project design will be needed prior to construction. In some cases a corridor refinement plan may be recommended pending the scale and scope of the proposed project.

As such, amendments at this level shall be reviewed through the post-acknowledgement process. However, a decision on an amendment to the RTP 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, function and general location of projects proposed in the RTP. The affected jurisdiction is responsible for preparing the specific local plan amendments and scheduling them for a public hearing before the governing body for action by that body by the time required.

8.4.2 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 address all of the region’s identified transportation needs for the next 20+ years.

Rather, the RTP identifies the projects, programs or future planning and refinement work required to adequately meet regional transportation system needs during the planning period. Regional

system needs are those on the regional arterial and throughway, freight, transit, bicycle, and pedestrian networks as defined and mapped in Chapter 3 of the RTP. Local transportation needs and solutions are addressed through city and county Transportation System Plans (TSPs) and studies, and involve additional analysis and improvements to provide an adequate local transportation system. This section anticipates future local and regional planning and defines a process for making amendments to the RTP to address regional transportation needs. Similarly, revisions to the RTP may result from multimodal corridor refinement plans, NEPA studies or other area plans or studies adopted through a public process.

The following processes may be used to amend the RTP between scheduled updates to include these changes:

1. **Major project amendments:** These are amendments that come from NEPA processes, corridor refinement planning as defined by the Transportation Planning Rule or other studies and involve additions or deletions of RTP Financially Constrained projects or a significant change in the mode, function or general location of the project. Such amendments require adoption by JPACT and the Metro Council by Ordinance, accompanied by findings:

   (a) demonstrating consistency with the RTP goals, objectives and policies and RTP modal function(s) of the facility as defined in Chapter 2 and 3;

   (b) describing the consideration of transportation strategies as described in Metro Code section 3.08.220.A;

   (c) demonstrating fiscal constraint; and

   (d) demonstrating the public process used to define and adopt the project is consistent with Metro's adopted Public Engagement Guide and RTP amendment procedures.

2. **Project amendments resulting from adopted local TSPs, area plans, concept plans or studies adopted through a public process**: New roadway, transit, bikeway, pedestrian, freight and demand and system management projects on the regional system shall be adopted by JPACT and the Metro Council by Ordinance, accompanied by findings:

   (a) demonstrating consistency with the RTP goals, objectives and policies and RTP modal function(s) of the facility as defined in Chapter 2 and 3;

   (b) describing the consideration of transportation strategies as described in Metro Code section 3.08.220.A;

   (c) demonstrating fiscal constraint; and

   (d) demonstrating the public process used to define and adopt the project is consistent with Metro's adopted Public Engagement Guide and RTP amendment procedures.

   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. **Other amendments** resulting from updates to the Regional Framework Plan or related functional plans.

The process and information required for requesting amendments to the Regional Transportation Plan between scheduled updates with be reviewed and refined following adoption of the 2018 RTP.

8.5 DATA AND TOOLS

8.5.1 Performance-based planning and programming

Over the past two decades, Metro and other transportation agencies have increasingly been applying "performance management" – a strategic approach that uses performance data to support decisions to help achieve desired performance outcomes. Performance management is credited with improving project and program delivery, informing investment decision-making, focusing staff on leadership priorities and providing greater transparency and accountability to the public.

Performance-based planning and programming (PBPP) applies this strategic approach within the planning and programming processes of MPOs, like Metro, and other transportation agencies to achieve desired performance outcomes for the multimodal transportation system. This includes a range of activities and products undertaken by a MPO together with other agencies, stakeholders, and the public as part of a 3C (cooperative, continuing, and comprehensive) process. It includes development of: long-range regional transportation plans, the Congestion Management Process, other plans and processes developed by ODOT and transit providers, such as Strategic Highway Safety Plans, Asset Management Plans, Transit Agency Asset Management Plans and Transit Agency Safety Plans, and programming documents, including State and Metropolitan Transportation Improvement Programs (STIPs and MTIPs).

PBPP attempts to ensure that transportation investment decisions are made – both in long-term planning and short-term programming of projects – based on their ability to meet established goals.

This section summarizes data and research activities to address existing and emerging planning and policy priorities and innovative practices in transportation planning and analysis. These activities help ensure that the region has the resources to fulfill its state and federal transportation performance measurement, monitoring and reporting responsibilities.

8.5.2 Data Collection and Coordination

This section summarizes data collection and coordination to support regional transportation planning and analysis, including regional travel model calibration and validation, and federal congestion management process analysis and performance based planning target setting and monitoring. The majority of our data is maintained in Metro's Regional Land Information System (RLIS). This database is comprised of over 150 different (primarily geospatial) data sets, and most of the data sets identified in the sections below are elements. Metro publishes RLIS on a quarterly basis, but many data sets are on different cycles and come from different sources. All data sets are available for review at http://rlisdiscovery.oregonmetro.gov, along with a date of last publication. The associated metadata should be consulted in advance to understand how the data were generated and to determine the appropriateness of its use.

8.5.2.1 Growth Data

Metro Research Center will continue to refine its recently developed Land Development Monitoring System (LDMS) as a component of RLIS. LDMS tracks the location and cost of residential and employment land utilization to inform regional growth and transport planning. Metro will work to enhance LDMS and RLIS with more equity-related data.

8.5.2.3 Travel Activity Data

Metro Research Center staff will lead coordination efforts for the next regional travel behavior survey (anticipated for 2022). Additional research will be necessary to ensure that the survey will capture traditionally relevant as well as emerging behavior (e.g., extent of Uber/Lyft utilization in place of other travel modes), and be conducted in a comprehensive and cost-effective manner.

New and emerging data collection methods (e.g., Sidewalk Labs Replica data, longitudinal or rolling surveys, mobile phone apps, personal GPS devices, etc.) will also be investigated to help ensure that the survey effort is well positioned to capture rapidly changing trends in personal travel behavior. Metro will partner with other Oregon modeling agencies (via the Oregon Modeling Steering Committee) as well as the Southwest Regional Transportation Council (SWRTC) to maximize the geographic span and cross agency utility of the data.

8.5.2.4 Transportation Safety Data

Metro staff will coordinate with federal, state, regional and local partners to acquire, collect and maintain the data currently used for transportation safety related analysis. This data includes, but is not limited to, crash data provided by ODOT and roadway network, traffic volume and vehicle mile traveled data. Additionally, new data required to provide more in-depth analysis will be pursued, including race and ethnicity of crash victims, posted speed data, and better bicycle and pedestrian count data.

8.5.2.5 Multi-Modal Network Data

Metro Research Center will continue to update multimodal data in RLIS. RLIS street centerlines and off-street trails networks are updated quarterly and comprise the basis of the multimodal network. Inventories of sidewalks and bike facilities are tied to these networks to allow for multimodal analysis. Sidewalks and bike facility inventories are updated as new data become available.

8.5.3 Analysis Tool Maintenance and Enhancement

This section summarizes planned maintenance and enhancement of the regional travel model, MetroScope and MOVES to address existing and emerging planning and policy priorities and innovative practices in regional transportation planning and analysis.

8.5.3.1 Growth Forecast

Metro Council has committed to making its next Urban Growth Boundary decision by the end of 2018. That decision will adopt a Regional Economic Forecast of total future jobs and employment. Upon adoption of those regional control totals Metro will work to create the next generation Distributed Forecast (the Traffic-Analysis-Zone-level growth forecasts used in transportation planning and forecasting). The distributed forecast (likely to be released in 2019) will be available to support future MTIP and RTP update cycles.

8.5.3.2 Growth Forecast Tools

Metro Research Center is working to scope and implement enhancements or replacements for the MetroScope land use allocation model in time for the anticipated 2024 Urban Growth Management cycle, and will consider a wide variety of traditional and next-generation tool options. This work will directly improve the means of producing future distributed forecasts.

8.5.3.3 Regional Transportation Model Tools

Metro staff will continue to maintain and enhance the current trip-based travel model. Future activities include: updating the simulation networks to reflect conditions for a 2020 base year, expanding the transit networks to cover the entire day, revisiting the bicycle assignment algorithm, revising the model that estimates external traffic and incorporating the new freight model. Metro staff will stay current with updated versions of the EPA's Motor Vehicle Emission Simulator (MOVES) for estimating criteria air pollutants, greenhouse gases and air toxics.

8.5.4 Analysis Tool Development

This section summarizes development of new analysis tools to address existing and emerging planning and policy priorities and innovative practices in regional transportation planning and analysis. It includes visualization tools, housing and transportation cost tool, project-level evaluation, piloting the multi-criteria evaluation (MCE) tool, and crash prediction modeling tools.

8.5.4.1 Regional Activity-Based Model

Key efforts during 2018-2019 will include the development of staff expertise, model validation and sensitivity testing, and the derivation/implementation of a tool acceptance program for the Activity-based Travel Demand Model. Given the rapidly changing personal travel landscape, it will be critical to ensure that the activity-based model framework is analytically positioned to overcome the methodological shortcomings of the current trip-based model and can be adapted to explicitly represent evolving travel behavior (e.g., travel via Uber/Lyft) or new near-horizon advances in technology (e.g., connected and automated vehicles). Research Center staff will coordinate closely with Metro planning to ensure that activity-based model framework is analytically aligned with anticipated policy questions.

8.5.4.2 Regional Freight Model

Development of the new freight model will be completed during the spring of 2018. Work will continue to integrate the model with the trip-based and activity-based passenger models. Modeling staff will continue to coordinate closely with Metro planning to ensure that new freight model is able to answer the analytical questions posed from the freight planning perspective (e.g., type and value of commodities by corridor and facility).

8.5.4.3 Multi-Criterion Evaluation Toolkit

Phase II of Multi-Criterion Evaluation (MCE) Toolkit development is anticipated to conclude by the end of 2018. Phase II scope will:

- add travel demand model and MCE toolkit workflow enhancements;
- test each benefit and test a bundle of benefits together in one scenario;
- improve methods for measures such as safety, physical activity and auto ownership benefits;
- incorporate stakeholder outreach support; and
- upgrade the visualizer to be fully-featured and web-accessible.

A key analytical feature of the MCE toolkit is its ability to identify potential benefits and/or impacts that have implications for equity considerations. Modeling staff will coordinate with Metro planning staff to ensure that the MCE continues to be fine-tuned and ready to address policy questions related to equity.

8.5.4.4 Housing and Transportation Expenditure Tool

In recent collaboration with the Planning Department, the Metro Research Center developed a prototype of a Housing and Transportation Expenditure tool. The prototype tool looks at out-of-pocket expenditure for housing and transportation and looks at the effects of future transportation investments and the housing and transportation expenditures that result. Both current and forecast states of the regional land markets and transport system will be represented. The prototype will undergo further development, testing and refinement in anticipation of application during the next MTIP process and RTP update.

8.5.4.5 Economic Value Atlas Decision-Support Mapping Tool

Development of the Economic Value Atlas (EVA) is establishing tools and analysis that align planning, infrastructure, and economic development to build agreement on investments to strengthen our economy. Phase III of the Economic Value Atlas decision-support mapping tool is anticipated to conclude by the end of 2018.

This work:

- Provides new mapping and discoveries about our regional economic landscape;
- Links investments to local and regional economic conditions and outcomes; and

- Informs policy and investment – providing a foundation for decision-makers to understand the impacts of investment choices to support growing industries and create access to family-wage jobs and opportunities for all.

The EVA will provide a solid data foundation for key regional activities such as:

- outlining a path to pursue policy, actions and investment that help secure these outcomes;
- defining potential areas for partners to collaborate and develop shared investment strategies;
- pinpointing areas of focus for regional investment to bridge local and regional economic development aspirations; and
- providing a data picture of the regional economy to align investments that achieve the coordinated vision of Greater Portland 2020, the 2040 Growth Concept and the Regional Transportation Plan.

This work will support regional transportation planning and investment decisions by:

- Highlighting key intersects between transportation + economic conditions that can guide project prioritization criteria incorporated into the next 3-year RFFA cycle.
- Building a granular understanding of relative economic strengths and challenges among communities in the region to inform local Transportation System Plans and area studies, regional investment areas and corridor refinement planning and planning studies, and advance more strategic transportation project prioritization and investment based on surrounding economic conditions.
- Supporting multiple applications by ongoing regional programs in Metro's Planning and Development Department.

8.5.4.6 Displacement Monitoring Tool

Historically marginalized communities engaged in the 2018 RTP update raised involuntary displacement as a key priority for the 2018 RTP transportation equity system evaluation during the scoping process. Specifically, historically marginalized communities desired to understand the potential displacement impacts to result in investment as well as what proactive mitigation strategies may be put into effect in advance to address the displacement risk. Through the 2018 RTP transportation equity system evaluation method development, it was determined the investment scenario analysis would not be able to look at displacement risk due to the limitations of the forecasting tool.

Nonetheless, in an effort to honor the input and recognize the concern about displacement risk from public investment in the transportation system, a recommendation from the 2018 RTP transportation equity system evaluation emerged to develop a streamlined displacement risk tool, which can help inform plans, project designs, and other components of transportation investment. Through the Southwest Equitable Development Strategy (SWEDS), a displacement risk assessment is underway and the method developed for this assessment will inform development of a displacement risk monitoring tool in the future.

8.5.4.7 Crash Prediction Modeling Tool

Better understanding and evaluation of how projects, programs and strategies impact transportation safety system wide is a key element to effectively planning for safety and achieving safe system programs such as Vision Zero. Metro staff will coordinate with federal partners and other MPOs to develop and pilot the use of crash prediction modeling tools to assess safety performance system wide.

8.5.4.8 2018 RTP Project Evaluation Pilot

At the direction of the Metro Council, Metro staff worked with the Transportation Policy Alternatives Committee (TPAC), the Metro Technical Advisory Committee (MTAC), and other interested partners to develop project-level evaluation criteria and apply the criteria to projects submitted for consideration in the 2018 RTP as a pilot.

This pilot responded to feedback from stakeholders and policymakers that expressed a desire to better understand how individual projects contribute to achieving regional goals and objectives. To that end, the RTP goals and objectives guided development of the pilot criteria, resulting in eleven evaluation factors and corresponding criteria. The pilot was intended to complement the system performance and transportation equity analysis of the whole 2018 RTP investment strategy.

In response to concerns raised by partner agencies, Metro set forth that the project level criteria are intended as informational only. They are meant to inform decision-makers in a consistent, mode-neutral way and not be used to determine inclusion in the plan or funding timeframe. For the pilot, Metro set a threshold of projects estimated at $10 million and above to comprise the pool of projects to evaluate.

Jurisdictional staff then applied the pilot criteria to 50 capital projects – essentially self-scoring projects using an MS excel workbook that automatically calculated scores as information was provided. The city of Portland, ODOT, TriMet, Port of Portland and each county applied the criteria to at least five of their respective project submittals. All other agencies applied the criteria to at least one of their respective project submittals.

2018 RTP Pilot Project Criteria

(The criteria are listed alphabetically)

- Air quality and climate change
- Congestion relief
- Environmental protection
- Equity and access to opportunity
- Freight and goods movement
- Jobs and economic development
- Placemaking and 2040 centers support
- Readiness and cost-effectiveness
- Transportation safety
- Travel options
- Bonus: Transportation resiliency

Scoring: A total of 105 points was available. Projects could receive up to ten points in each factor area, with an additional five points available for projects that addressed the transportation resiliency criteria.

Each factor area was equally weighted, but the measures associated with each factor area were weighted unequally in some cases.

In order to compare "apples to apples," Metro grouped similar project type submittals – bike projects were grouped with other bike projects, road projects were grouped with other road projects, etc. – for reporting purposes. A number of technical challenges emerged during the pilot, including:

- inconsistent application of criteria due to multiple scorers and complexity of some criteria;
- some data not readily available or in easy to use format;
- the number of factors considered in the criteria resulted in duplication of some criteria;
- the criteria did not account for negative adverse impact of projects;
- more GIS support needed from Metro;
- larger cost mega-projects most challenging to evaluate effectively; and
- insufficient time to apply and make necessary adjustments criteria within the planning process.

Recognizing the limited amount of time remaining in the RTP update schedule, the pilot was discontinued in 2017.

Metro remains committed to developing tools and methods to analyze transportation investments at the project-level to improve transparency and better demonstrate how investment priorities advance achievement of the desired outcomes reflected in the RTP goals and objectives. Staff identified several recommendations for further exploring methods for evaluating transportation investments at a project level, including:

- build more broad-based support for use of project evaluation to inform development and refinement of RTP project priorities;
- engage policymakers, technical staff and stakeholders in refining and further streamlining the criteria to address feedback received during 2018 RTP pilot;
- consider using updated criteria as a screening tool and starting point for future RTP updates, prior to initiating the RTP project solicitation;
- provide more Metro GIS support to complete an initial analysis instead of relying on self-scoring and build in feedback loop with jurisdictional partners on initial application of criteria and reporting of analysis;
- use the multi-criterion evaluation (MCE) tool to evaluate major projects (projects with a cost greater than $400 million) to provide better cost-benefit information to decision-makers; and
- ensure adequate time and resources are available to support future efforts.

8.5.5 Monitoring and Reporting Tools

This section summarizes information systems and data resource coordination efforts that Metro is doing or will do to ensure that the region has the resources to fulfill its transportation performance-based planning, programming and reporting responsibilities.

8.5.5.1 Monitoring Data and Information Systems

Metro Research Center staff will continue to investigate new and emerging data sources and data collection methods (e.g., Sidewalk Labs Replica, HERE, longitudinal or rolling surveys, mobile phone apps, personal GPS devices, etc.) to help ensure that Metro is well positioned to capture rapidly changing trends in personal travel behavior in a timely fashion. Research Center staff anticipate participating in a pilot project along with other regional partners, to acquire and test Sidewalk Labs Replica data during FY 2018-19. The pilot will help determine the viability and versatility of "big" data sources for research, model development and monitoring activities. Research Center staff will also continue to collect and process HERE data for federally-required performance monitoring purposes.

8.5.5.2 Congestion Management Process Data Collection and Monitoring

This section summarizes the region's approach to monitoring and reporting on the progress implementing the RTP through the regional Congestion Management Process (CMP).

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 (ITS) 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 and support the region's CMP.

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.

Table 8.4 lists where key elements of the region's CMP are addressed in the RTP and Appendices to show how the region's planning and investment activities implement the CMP.

Table 8.4. Key Elements of the Region's Congestion Management Process (CMP)

Regional Congestion Management Process	Associated RTP/MTIP Activities
Develop congestion management objectives and policies	RTP Goals and Objectives (Chapter 2), RTP Policies (Chapter 3)
Define geographic area and network of interest	RTP (Appendix L – Figures 3 and 4)
Establish multimodal performance measures	RTP Performance Measures and Targets (Chapter 2), RTP Federal Performance Measures and Targets (Appendix L)
Collect data and monitor system performance	RTP Existing Conditions (Chapter 4), ODOT Traffic Performance Report (2016),[8] Mobility Corridor Atlas (2015)
Analyze congestion problems and needs	RTP Existing Conditions (Chapter 4), ODOT 2016 Traffic Performance Report, RTC CMP Monitoring Report (2017), RTP Performance Evaluation (Chapter 7)
Identify and evaluate effectiveness of strategies	RTP (Chapter 6), RTP (Chapter 7), RTP (Appendix E - Transportation Equity Evaluation), RTP (Appendix F – Environmental Analysis and Potential Mitigation Strategies), RTP (Appendix J – Climate Smart Strategy Implementation and Monitoring), corridor refinement planning, area studies, local transportation system plans
Implement selected strategies and manage transportation system	MTIP, local jurisdictions, ODOT, TriMet, SMART, TransPort, Regional Transportation Functional Plan, RTP (Chapter 8)
Monitor strategy effectiveness[9]	Scheduled RTP updates, CMAQ Performance Plan (2018), RTP (Appendix J – Climate Smart Strategy Implementation and Monitoring), RTC CMP Monitoring Report

More information about the region's Congestion Management Process is provided in Appendix L.

After the 2018 RTP update, Metro, ODOT and other regional partners will work together to update the current regional mobility policy to better align with RTP outcomes, public expectations, and funding availability. This work will be informed by the ODOT value pricing study underway and help the region develop long-term strategies to address growing roadway congestion, given limited transportation funding and potential social equity, environmental and community impacts. The region's CMP will inform this work and likely be updated as a result.

[8] ODOT, "2016 Traffic Performance Report." (June 2017). Summarized in Chapter 4 of the RTP and available on-line at http://www.oregon.gov/ODOT/Regions/Documents/Region1/2016_TPR_FinalReport.pdf

[9] USDOT, "Guidebook on the Congestion Management Process in Metropolitan Transportation Planning." Page 1-1 (April 2011).

8.5.5.3 Greater Portland Pulse and Regional Barometer

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 and activities to implement the RTP and other regional policies and programs. More information on this project can be found at www.portlandpulse.org

Metro is expanding on these capabilities by developing a "regional barometer." This effort embraces changes in technology and user expectations by providing interactive mapping and data visualizations focused on Metro's Six Desired Outcomes for the region. It will utilize RLIS, the regional database that Metro curates and updates on an ongoing basis, upon which our planning policies are based.

8.5.5.4 Performance monitoring measures and targets

Performance monitoring measures identified in Chapter 4, Appendix J and Appendix L are used to track changes in system performance and implementation progress over time and between scheduled updates to the RTP. Reporting these changes provides valuable information on trends and conditions using actual empirical or observed data to the extent possible in advance of RTP updates to assess how the transportation system is performing and identify possible policy or strategy adjustments that may be needed.

Appendix J contains a complementary set of performance measures and performance monitoring targets specific to tracking implementation of the Climate Smart Strategy adopted by JPACT and the Metro Council in 2014 and report on progress. The Climate Smart Strategy performance measures and targets are used to monitor and assess whether key elements or actions that make up the strategy are being implemented, and whether the strategy is achieving expected outcomes. The Climate Smart Strategy performance monitoring targets are not policy targets, but instead reflect a combination of the planning assumptions used to evaluate the Climate Smart Strategy and outputs from the evaluation of the adopted strategy.

Appendix L documents the region's approach to addressing the federal transportation performance-based planning and congestion management requirements contained in the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. The multimodal performance measures and near-term performance monitoring targets in Appendix L are used to monitor transportation system performance using empirical or observed data between scheduled updates.



Work continues to establish a coordinated program for data collection and system performance monitoring between scheduled updates to the Regional Transportation Plan to inform planning and investment decisions.

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2018 Regional Transportation Plan

Glossary of Terms

December 6, 2018

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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 – Enables access to land uses while maintaining roadway safety and mobility through controlling access location, design, spacing and operation.

Action – Discrete steps to make progress toward a desired outcome(s).

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, people using wheelchairs or mobility devices and skateboarding. Transit is considered part of active transportation because most transit trips start with a walking or bicycle trip.

Active transportation network – Combined network of streets, trails and districts identified on the *Regional Pedestrian and Bicycle Network Functional Classification 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.

Adaptation – This term refers to adjustment in natural or human systems in anticipation of or response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects.

Air toxics – Also known as toxic air pollutants or hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects.

All Roads Transportation Safety (ARTS) – Formerly known as the Jurisdictionally Blind Safety Program, is an Oregon Department of Transportation Program that is designed to address safety needs on all public roads in Oregon. The program's goals are to:

- Increase awareness of safety on all roads;
- Promote best practices for infrastructure safety;

- Complement behavioral safety efforts;
- Focus limited resources to reduce fatal and serious injury crashes in the state of Oregon.

The program is data driven to achieve the greatest benefits in crash reduction and is blind to jurisdiction.

Amendment – A revision to a long-range statewide or metropolitan transportation plan, TIP, or STIP that involves a major change to a project included in a metropolitan transportation plan, TIP, or STIP, including the addition or deletion of a project or a major change in project cost, project/project phase initiation dates, or a major change in design concept or design scope (e.g., changing project termini or the number of through traffic lanes or changing the number of stations in the case of fixed guideway transit projects). Changes to projects that are included only for illustrative purposes do not require an amendment. An amendment is a revision that requires public review and comment and a redemonstration of fiscal constraint. If an amendment involves "non-exempt" projects in nonattainment and maintenance areas, a conformity determination is required.

Arterial – A classification 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 strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.

Attainment area – Any geographic area in which levels of a given criteria air pollutant (e.g., ozone, carbon monoxide, PM_{10}, $PM_{2.5}$, and nitrogen dioxide) meet the health-based National Ambient Air Quality Standards (NAAQS) for that pollutant. An area may be an attainment area for one pollutant and a nonattainment area for others. A "maintenance area" (see definition in this section) is not considered an attainment area for transportation planning purposes.

Autonomous vehicle (AV) – Also known as a driverless car, self-driving car, robotic car, AVs use sensors and advanced control systems to operate independently of any input from a human driver. Transportation experts have developed a five-level system to distinguish between different levels of automation;[i] in this plan we focus on Level 4 or 5 AVs, which can operate independently under most or all conditions.

Auxiliary lane – An auxiliary lane provides a direct connection from one interchange ramp to the next. The lane separates slower traffic movements from the mainline, helping smooth the flow of traffic and reduce the potential for crashes.

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.

Best practices – For purposes of this document, the term "best practices" is used as a general term of preferred practices accepted and supported by experience of the applicable professional discipline. It is not prescriptive to a particular set of standards or a particular discipline.

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) – A method to analyze the auto volumes, auto speeds and number of auto lanes on existing bikeways and within defined 'cycle zones' and assign 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 and suburban environments and to destinations outside the region. These bikeways connect 2040 activity centers, downtowns, institutions and greenspaces 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 cycletrack 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 wayfinding such as signs and pavement markings, connecting major destinations such as town centers, neighborhoods and regional destinations.

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 share – Systems like Biketown in Portland make fleets of bicycles available for short-term rental within a defined service area. Some bike share systems now offer electric bikes. **Conventional** bike share systems like Biketown in Portland are operated through exclusive agreements between a private company and a public agency, and in most cases users must pick up and leave bikes at designated stations, through Biketown and other modern systems also offer users the option of locking a bike anywhere within the service area. Fully **dockless** systems operated by companies such as Ofo, Lime bike and Spin allow users to pick up and leave bikes (or electric scooters, which many companies now offer) within a defined service area and require less coordination between the public and private sector.

Bike-transit facilities – Infrastructure that provide connections between the two modes, by creating a "bicycle park-and-ride," a large-scale bike parking facility at a transit station.

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.

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, including separated bike paths, striped bike lanes or wide outside lanes that accommodate bicycles and motor vehicles.

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.

Capacity expansion – Constructed or operational improvements to the regional motor vehicle network that increase the capacity of the system.

Car share – Services allow people to rent a nearby vehicle for short trips and pay only for the time that they use. Different car share service types include:

- Stationary car share (ZipCar, in some cases ReachNow), under which cars are kept at fixed stations and users pick up cars from and return them to the same station.
- Free-floating car share (Car2Go, ReachNow), which allows people to pick up and drop off cars anywhere within a defined service area.
- Peer-to-peer car share (Getaround, Turo), which enables people to rent cars from their neighbors on a short-term basis.

Central city (2040 Design Type) – Downtown Portland and adjacent areas (like Lloyd District) within the city of Portland.

Climate change – Any significant change in the measures of climate lasting for an extended period of time. Climate change includes major variations in temperature, precipitation or wind patterns, among other environmental conditions, that occur over several decades or longer. Changes in climate may manifest as a rise in sea level, as well as increase the frequency and magnitude of extreme weather events now and in the future.

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.

Community places – Key local destinations such as schools, libraries, grocery stores, pharmacies, hospitals and other medical facilities, general stores, and other places which provide key services and/ or daily needs.

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 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.

Complete streets project checklist – With the realization that street design affects so much more than traffic flow, leading Complete Streets programs have been successful in part because they endeavored to break down silos between city departments. In addition to regular meetings between departments, some cities have instituted a Project Checklist that is circulated for a sign-off from each interested department when street designs are in process. The best known example comes from the City of Seattle. Some Metropolitan Planning Organizations also use project checklists to ensure funding for street improvements adhere to Complete Street goals. Examples include the Bay Area's Metropolitan Transportation Commission, and the Mid-Ohio Regional Planning Commission.

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 management – The application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods. *See Appendix L for more information.*

Congestion management process – A systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state, regional and local needs. This systematic approach is required in transportation management areas (TMAs) to provide for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C., and title 49 U.S.C., through the use of travel demand reduction and operational management strategies. *See Appendix L for more information.*

Congestion Mitigation and Air Quality Improvement (CMAQ) Program – A federal source of funding for projects and activities that reduce congestion and improve air quality, both in regions not yet attaining federal air quality standards and those engaged in efforts to preserve their attainment status.

Connected vehicles (CVs) – Vehicles that communicate with each other, wireless devices or with infrastructure like traffic signals and incident management systems. It seems increasingly likely that vehicles in the near future will be automated and may include some connected elements, we typically use "automated vehicles" to refer to vehicles that include a mix of automated and connected elements, and only use "connected vehicles" to distinguish connected from automated vehicles.

Connected vehicle (CV) infrastructure – This refers to the communications, wireless devices and other infrastructure, such as traffic signals and roadside sensors, that offer the ability of vehcles to send and receive message to other vehicles, wireless devices and comunication devices to communicate information in order to help them navigate the transportation system safely and efficiently.

Connectivity – The degree to which the local and regional street, pedestrian, bicycle, transit and freight systems in a given area are interconnected.

Consideration – One or more parties takes into account the opinions, action, and relevant information from other parties in making a decision or determining a course of action.

Constrained budget – The budget of federal, state and local funds the greater Portland region can reasonably expect through 2040 under current funding trends presuming some increased funding compared to current levels.

Constrained list – Projects that can be built by 2040 within the constrained budget.

Consultation – One or more parties confer with other identified parties in accordance with an established process and, prior to taking action(s), considers the views of the other parties and periodically informs them about action(s) taken. This definition does not apply to the "consultation" performed by the States and the Metropolitan Planning Organizations (MPOs) in comparing the long-range statewide transportation plan and the metropolitan transportation plan, respectively, to State and tribal conservation plans or maps or inventories of natural or historic resources (see section 450.216(j) and sections 450.324(g)(1) and (g)(2)).

Context sensitive design – A model for transportation project development that requires proposed transportation projects to be planned not only for its physical aspects as a facility serving specific transportation objectives, but also for its effects on the aesthetic, social, economic and environmental values, needs, constraints and opportunities in a larger community setting.

Cooperation – The parties involved in carrying out the transportation planning and programming processes work together to achieve a common goal or objective.

Coordinated public transit-human services transportation plan – A locally developed, coordinated transportation plan that identifies the transportation needs of individuals with disabilities, older adults, and people with low incomes, provides strategies for meeting those local needs, and prioritizes transportation services for funding and implementation. Trimet leads developmentof this plan for the reigon.

Coordination – The cooperative development of plans, programs, and schedules among agencies and entities with legal standing and adjustment of such plans, programs, and schedules to achieve general consistency, as appropriate.

Corridor – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, freight, active transportation and transit route alignments.

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 row houses, 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.

Countermeasure – An activity, initiative or design element to prevent, neutralize, or correct a specific safety problem.

Crash – A violent collision, typically of one vehicle with another (vehicles include bicyclists, motorcyclists, freight trucks, school buses, transit buses, etc.), a pedestrian, or with a stationary objects such as a pole or guard rail.

Criteria pollutants – Carbon monoxide, lead, ground-level ozone, nitrogen oxides, particulate matter, and sulfur dioxides. Criteria pollutants are the only air pollutants with national air quality standards that define allowable concentrations of these substances in ambient air.

Cycletrack – 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.

Data-driven safety analysis – Uses data to promote the integration of safety performance into all roadway investment decisions. Broader implementing of quantitative safety analysis so that it becomes an integral part of safety management and project development decision making in order to lead to better targeted roadway investments that result in fewer fatal and serious injury crashes. Decisions are compelled by data, rather than by intuition or by personal experience.

Deficiency – A performance, design or operational constraint that limits, but does not prohibit the ability to travel by a given mode. Examples include locations where throughway capacity is less than six through lanes and arterial street capacity less than 4 lanes that do not meet the thresholds defined in Table 3.6 (Interim Regional Mobility Policy), 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, inadequate frequency, or schedule unreliability; and high crash locations).

Delay – The additional travel time required by all travelers, as measured by the time needed 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.

Design type – The conceptual areas depicted on the Metro 2040 Growth Concept Map and described in the Regional Framework Plan, including Central City, Regional Center, Town Center, Station Community, Corridor, Main Street, Inner Neighborhood, Outer Neighborhood, Regionally Significant Industrial Area, Industrial Area and Employment Area.

Electric vehicles (EVs) – Vehicles that use electric motors for propulsion instead of or in addition to gasoline motors.

Emergency – Any human-made or natural event or circumstance causing orthreatening loss of life, injury to person or property, and includes, but is not limited to, fire, explosion, flood, severe weather, drought earthquake, volcanicactivity, spills or releases of oil or hazardous material, contamination, utility or transportation disruptions, and disease.

Emergency medical services (EMS) – The treatment and transport of people in crisis health situations that may be life threatening. Emergency medical support is applied in a wide variety of situations, including traffic crashes.

Emergency transportation routes – Priority routes used during and after a major regional emergency or disaster to move people and response resources, including including the transport of first responders (e.g., police, fire and emergency medical services), fuel, essential supplies and patients.

Emerging technologies – A blanket term that we use throughout this plan to refer to new developments in transportation technology. We use it to refer both to technologies like automated vehicles or smart phones and services that operate using these technologies, like car and bike share.

Employer-based commute programs – Work-based travel demand management programs that can include transportation coordinators, employer-subsidized transit pass programs, ride-matching, carpool and vanpool programs, telecommuting, compressed or flexible work weeks and bicycle parking and showers for bicycle commuters.

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.

Employment lands – Areas of mixed employment that include various types of manufacturing, distribution and warehousing uses, and may include commercial and retail development.

Enhanced transit concept – Enhanced transit is a set of street design, signal, and other improvements that improve transit capacity, reliability and travel time along major Frequent Service bus lines. Enhanced Transit actions can include changes to the design and operation of streets and signals, typically owned and operated by the City. It can also include changes to transit vehicle fleet, station equipment and operation systems typically owned and operated by TriMet.

Enhanced transit projects come in a variety of shapes and sizes; for example, the improvements might address bottlenecks, or a portion of a transit line experiencing delay, or in some cases, improvements to a full transit line. Treatments can be applied systematically across a transit network to improve multiple lines or through a corridor approach to improve one or more transit lines. Enhanced Transit is intended to be flexible and context-sensitive during design and implementation. Enhanced Transit encompasses a range investments comprised of capital and operational treatments of moderate cost. It can be deployed relatively quickly in comparison to larger transit capital projects, such as building light rail.

Environmental justice – The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. (EPA definition)

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 mitigation activities – Strategies, policies, programs, and actions that, over time, will serve to avoid, minimize, rectify, reduce or eliminate impacts to environmental resources associated with the implementation of a long-range statewide transportation plan or metropolitan transportation plan.

Equitable Development – An approach to creating healthy, vibrant, communities of opportunity by creating smart, intentional strategies to ensure that everyone (residents of all incomes, races and ethnicities) can participate in, and benefit from, decisions that shape their neighborhoods and region.

Equity – Just and fair inclusion into a society in which all can participate, prosper, and reach their full potential. In transportation, a normative measure of fairness among transportation system users. *See also Racial Equity and Social Equity*.

Equity focus areas – Census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, English language learners, and/or people with lower income. Most of these areas also include higher than regional average concentrations of other historically marginalized communities, including young people, older adults and people living with disabilities.

Excessive delay – The extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of MAP-21 target-

setting, the speed threshold is 20 miles per hour (mph) or 60 percent of the posted speed limit, whichever is greater.

Extreme events – This term refers to risks posed by climate change and extreme weather events. The definition does not apply to other uses of the term nor include consideration of risks to the transportation system from other natural hazards, accidents, or other human induced disruptions.

Extreme weather events – Significant anomalies in temperature, precipitation and winds and can manifest as heavy precipitation and flooding, heatwaves, drought, wildfires and windstorms (including tornadoes). Consequences of extreme weather events can include safety concerns, damage, destruction and/or economic loss. Climate change can also cause or influence extreme weather events.

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.

Federal Highway Administration (FHWA) – The U.S. Department of Transportation agency responsible for administering the federal highway aid program to individual states, and helping to plan, develop and coordinate construction of federally-funded highway projects. FHWA also governs the safety of hazardous cargo on the nation's highwaysThe FHWA implements transportation legislation approved at the congressional level that appropriates all federal funds to states,MPOs and local governments.

Federal Transit Administration (FTA) – U.S. Department of Transportation agency that provides financial and planning assistance to help plan, build and operate rail, bus and paratransit systems. The agency also assists in the development of local and regional traffic reduction programs.

Financial plan – Documentation required to be included with a metropolitan transportation plan and TIP (and optional for the long-range statewide transportation plan and STIP) that demonstrates the consistency between reasonably available and projected sources of Federal, State, local, and private revenues and the costs of implementing proposed transportation system improvements.

Financially constrained or fiscal constraint – This means that the metropolitan transportation plan, TIP, and STIP includes sufficient financial information for demonstrating that projects in the metropolitan transportation plan, TIP, and STIP can be implemented using committed, available, or reasonably available revenue sources, with reasonable assurance that the federally supported transportation system is being adequately operated and maintained.

Fiscal constraint – A federal requirement that long-range transportation plans and four-year multistage investments programs (aka Transportation Improvement Program – TIP) include only projects that have a reasonable expectation of being funded, based upon anticipated revenues (for the long-range transportation plan) or secured revenues (for the four-year TIP). In other words,

long-range transportation plans or TIP cannot be a wish lists of projects; they must reflect realistic assumptions about revenues that will likely be available or secured.

Fixing America's Surface Transportation Act (**FAST Act)** – A funding and authorization bill to govern United States federal surface transportation spending, signed by President Obama on December 4, 2015. The FAST Act established funding levels and federal policy for our nation's highways and public transit systems for fiscal years 2016-2020. The $305 billion, five-year bill maintains the core highway and transit funding programs established by its predecessor MAP-21, and establishes the National Highway Freight Program, a formula program focused on goods movement.

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. Directional travel lanes usually separated by a physical barrier, and access and egress points are limited to on–and off–ramp locations or a very limited number of at–grade intersections.

Freight intermodal facility – An intercity facility where freight is transferred between two or more freight 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.

Freight intermodal facility – An intercity facility where freight is transferred between two or more freight modes (e.g., truck to rail, rail to ship, truck to air).

Freight modes – Freight modes are the means by which freight achieves mobility. These modes fall into five basic types: road (by truck), rail, pipeline, marine (by ship or barge) and air.

Freight rail – A freight train that is a group of freight cars hauled by one or more locomotives on a railway, transporting cargo all or some of the way between the shipper and the intended 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.

Full Funding Grant Agreement (FFGA) – An instrument that defines the scope of a project, the Federal financial contribution, and other terms and conditions for funding New Starts projects

Functional classification – The class or group of roads to which the road belongs. There are three main functional classes as defined by the United States Federal Highway Administration: arterial, collector, and local. Throughways and freeways fall under arterial in the federal classification system.

Gap – A missing link or barrier in the "typical" urban transportation system for any mode that functionally prohibits travel where a connection might be expected to occur in accordance with the system concepts and networks in Chapter 3 of the RTP. 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 or existing development.

Goal – A broad statement that describes a desired outcome or end statetoward which actions are focused to make progress toward a long-term vision.

Greenhouse gas emissions – The six gases identified in the Kyoto Protocol and by the Oregon Greenhouse Gas Mandatory Reporting Advisory Committee as contributing to global climate change: carbon dioxide (CO2), nitrous oxide (N2), methane (CH4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). Greenhouse gases absorb solar radiation and act like a heat-trapping blanket in the atmosphere, causing climate change. More information is available at epa.gov/climatechange.

Green infrastructure – A network of multi-functional green spaces and environmental features, both natural and engineered, that use or replicate natural systems to better manage stormwater, protect streams and enhance wildlife corridors—trees, soils, water and habitats. Examples include: permeable paving, vegetated swales, rain gardens, green streets, green roofs, green walls, urban forestry, street trees, parks, green corridors such as trails, and other low impact development practices.

Green streets – An innovative stormwater management approach that captures rain where it falls by using vegetation, soil and engineered systems to slow, filter and clean stormwater runoff from impervious surfaces.

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 enviro9nmentally 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.

Health impact assessment – A combination of procedures, methods, and tools by which a policy, program or project may be evaluated as to its potential effects on the health of a population, and the distribution of these effects within the population.

High capacity transit – High capacity transit is public transit that can have exclusive right of way, non-exclusive right of way, or a combination of both. Vehicles make fewer stops, travel at higher speeds, have more frequent service and carry more people than local service transit such as typical bus lines. It includes:

- Light rail uses high capacity trains (68 seats with room and design for several passengers to stand) and focuses on regional mobility with stops typically one-half to 1 mile apart, connecting concentrated housing or local bus hubs and employment areas. The service has its own right of way. Cars can be doubled, and service frequency increased, during peak hours.
- Commuter rail uses high capacity heavy rail trains (74 seats in a single car, 154 in doubled cars), typically sharing right of way with freight or other train service (though out of roadway). The service focuses on connecting major housing or local bus hubs and employment areas with few stops and higher speeds. The service may have limited or no non-peak service.
- Bus rapid transit uses coach-style or high capacity busses (40-60 seats with room and design for several passengers to stand). The service may be in the roadway with turnouts and signal priority for stops, have an exclusive right of way, or be some combination of the two. The service focuses on regional mobility, with higher speeds, fewer stops, higher frequency and more substantial stations than local bus, connecting concentrated housing or local bus hubs and employment areas. Service frequency can be increased during peak hours.
- Using the same technology as local streetcar, rapid streetcar focuses on regional mobility, offering fewer stops through less populated areas to connect housing areas to jobs or other destinations. Cars can be doubled, and service frequency increased, during peak hours. The service operates in mixed traffic, in exclusive right of way or a combination of the two.

High crash location – Highway or road segments identified by the frequency and severity of motor vehicle crashes. Identification of high crash locations is part of the safety problem identification process.

High injury corridors and intersections (RTP) – Roadways where the highest concentrations of fatal and severe injury crashes involving people in cars, biking and walking occur on the regional transportation system Corridors and intersections were analyzed to determine aggregate crash scores based on the frequency and severity of crashes, using the following methodology:

- Fatal and Injury A (serious) crashes for all modes are assigned to the network;
- "Injury B", "Injury C", and "PDO (property damage only)" crashes involving bikes and pedestrians are also assigned to the network;
- Fatal and Injury A crashes are given a weight of 10;
- Roadways are analyzed in mile segments; if a segment has only one Fatal or Injury A crash it must also have at least one B/C (minor injury) crash, for the same mode, to be included in the analysis.; and

- Roadway segments are assigned an N-score (or "crash score") by calculating the weighted sum by mode and normalizing it by the roadway length.

To reach 60 percent of Fatal and Severe Injury crashes, roadway segments had to have an N-score of 39 or higher; high injury Bicycle Corridors had to have an N-score of 6 or more, and high injury Pedestrian Corridors had to have an N-score of 15 or more. Intersections with the highest weighted crash scores were also identified; 5 percent of intersections had an N-score (or "crash score") higher than 80 and are also shown on the map, and 1 percent of intersections (the top 1 percent) had to have an N-score higher than 128.

High risk roadways – Characteristics if high risk roads are identified by looking at crash history on an aggregate basis to identify particular severe crash types (e.g. pedestrian) and then use the roadway characteristics associated with particular crash types (e.g. arterial roadways with four-or more lanes, posted speed over 35 mph, unlit streets) to understand which roadways may have a higher risk of the same type of severe crash.

High–occupancy vehicle (HOV) – A vehicle carrying more than two passengers with the exception of motorcycles.

High-occupancy vehicle lane – The technical term for a carpool lane. *See also high-occupancy vehicle.*

Highway – A design for a Throughway in which access points are a mix of separate and at–grade.

Historically marginalized communities – Communities of people that have been historically excluded from critical aspects of social participation including, voting, education, housing and more. Historical marginalization is often a result of systematic exclusion based on devaluation of any individual existing outside of the dominant culture. For purposes of the RTP, this includes people of color, people with limited English proficiency, people with lower-incomes, youth, older adults and people living with a disability.

Incident management – The detection and verification of incidents (crashes, stalled vehicles, etc. blocking traffic) and the implementation of appropriate actions to clear the highway.

Individualized marketing – Travel demand management programs focused on individual households. IM programs involve individualized outreach to households that identify household travel needs and ways to meet those needs with less vehicle travel.

Induced demand – The process whereby improvements in the transportation system intended to alleviate congestion and delay result in additional demand for the transportation segment, offsetting some of the improvement's potential benefits. For instance, when a congested roadway is expanded from 2 to 3 lanes, some drivers will recognize the increased capacity and take this roadway though they had not done so previously.

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.

Intelligent transportation systems (ITS) – Electronics, photonics, communications, or information processing used singly or in combination to improve the efficiency or safety of the transportation system. ITS can include both vehicle-to-vehicle communication (which allows cars to communicate with one another to avoid crashes and vehicle-to-infrastructure communication (which allows cars to communicate with the roadway) to identify congestion, crashes or unsafe driving conditions, manage traffic flow, or provide alternate routes to travelers.

Intermodal connector – A road that provides connections between major rail yards, marine terminals, airports, and other freight intermodal facilities; and the freeway and highway system (the National Highway System).

Intermodal facilities – A transportation element that allows passenger and/or freight connections between modes of transportation. Examples include airports, rail stations, marine terminals, and rail–yards that facilitate the transfer of containers or trailers. See also passenger intermodal facility and freight intermodal facility definitions.

Level-of-service (motor vehicle network) – A traditional measure of congestion, calculated by by dividing the number of motor vehicles passing through a section of roadway during a specific increment of time by the motor vehicle capacity of the section. For example, a LOS of 1.00 indicates the roadway facility is operating at its capacity.

Traditionally, motor vehicle LOS has been used in transportation system planning, project development and design as well as in operational analyses and traffic analysis conducted during the development review process. As a system plan, the RTP uses the interim regional policy to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. LOS is also used to determine consistency of the RTP with the Oregon Highway Plan for state-owned facilities. *See also volume-to-capacity ratio and regional mobility policy.*

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 jurisdiction – 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 or roads – 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.

Lower income focus area – Census tracts with higher than regional average concentrations and double the density of people with lower income. Lower income is defined as households with incomes below 200 percent of the federal poverty level, adjusted for household size (i.e., with incomes up to twice the level of poverty), as defined by the U.S. Census Bureau for 2016. The 2016 federal poverty level for a two person household was $16,020.

Main line rail – Class I rail lines (e.g., Union Pacific and Burlington Northern/Santa Fe).

Main roadway routes – Designated freights routes that are freeways and highways that connect major activity centers in the region to other areas in Oregon or other states throughout the U.S., Mexico and Canada.

Major transit stop – Existing and planned light rail stations and transit transfer stations, except for temporary facilities and other existing and planned transit stops which:

(A) Have or are planned for an above average frequency of scheduled, fixed-route service when compared to region wide service. In urban areas of 1,000,000 or more population major transit stops are generally located along routes that have or are planned for 20 minute service during the peak hour; and

(B) Are located in a transit oriented development or within 1/4 mile of an area planned and zoned for:

(i) Medium or high density residential development; or

(ii) Intensive commercial or institutional uses within 1/4 mile of subsection (i); or

(iii) Uses likely to generate a relatively high level of transit ridership.

Marine facilities – A facility where freight is transferred between water–based and land–based modes.

Meaningful involvement – This term means that the public should have opportunities to participate in decisions that could affect their environment and their health, their contributions should be taken into account by regulatory agencies, and decision-makers should seek and facilitate the engagement of those potentially affected by their decisions. (from EPA)

Measure – An expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets.

Metric – A quantifiable indicator of performance or condition.

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 Area Boundary (MPA) – The geographic area determined by agreement between the Metropolitan Planning Organization (MPO) and the Governor, in which the metropolitan transportation planning process is carried out by the MPO.

Metropolitan Planning Organization (MPO) – A federally-required policy body responsible for the transportation planning, project selection and scheduling the use of federal transportation funds in its region. Governed by policy board, MPOs are required in urbanized areas with populations more than 50,000 and are designated by the governor of the state. Oregon currently has eight MPOs covering the metropolitan areas of Portland, Salem-Keizer, Corvallis area, Eugene-Springfield, Rogue Valley (Medford-Ashland,) Bend area, Albany area, and Middle Rogue. JPACT and the Metro Council constitute the MPO for the Portland region. The MPO conducts federally mandated transportation planning work, including: a long-range Regional Transportation Plan (RTP), the Metropolitan Transportation Improvement Program (MTIP) for capital improvements identified for a four-year construction period, a Unified Planning Work Program (UPWP), a congestion management process (CMP), federal performance-based planning and target-setting and conformity to the state implementation plan for air quality for transportation related emissions.

Metropolitan Transportation Improvement Program (MTIP) – The MTIP includes all federally funded transportation projects in the Portland metropolitan planning area, including projects planned by TriMet, the Oregon Department of Transportation and local agencies receiving federal funds allocated by Metro. The MTIP is incorporated in the Statewide Transportation Improvement Program (STIP), which identifies the state's four-year transportation capital improvements. See also transportation improvement program.

Metropolitan transportation plan – The official multimodal transportation plan addressing no less than a 20-year planning horizon that the MPO develops, adopts, and updates through the metropolitan transportation planning process. The Regional Transportation Plan is metropolitan transportation plan for the Portland region.

Microtransit – Services such as Via, Chariot and Leap can differ from conventional transit service in several different ways:

- Dynamic routing: Some microtransit services operate on flexible routes to pick up and drop off riders nearer to their origins and destinations. Services may deviate from a fixed route to make pickups and dropoffs, crowdsource routes from data provided by riders or make stops anywhere within a defined service area.
- On-demand scheduling: Instead of operating on a fixed schedule, microtransit services may allow riders to request a ride when they need it.
- Smaller vehicles: Microtransit services often use vans or small buses instead of 40-passenger buses.
- Private operation: Many microtransit services are privately operated or operated through partnerships between public agencies and private companies.

We distinguish between microtransit that is coordinated with public transit, for example services that connect people to high-frequency transit or operate in areas that are hard to serve with conventional transit, and luxury microtransit that serve existing transit routes and offer more space or amenities than a public bus at a higher cost.

Mitigation – Planning actions taken to avoid an impact altogether, minimize the degree or magnitude of the impact, reduce the impact over time, rectify the impact, or compensate for the impact. Mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

Mixed use – Comprehensive plan or implementing regulations that permit a mixture of commercial and residential development.

Mixed-use development – Areas of a mix of at least two of the following land uses and includes multiple tenants or ownerships: residential, retail and office. This definition excludes large, single-use land uses such as colleges, hospitals, and business campuses.

Mobility – The ability to move people and goods to destinations efficiently and reliably.

Mobility corridor – Mobility corridors represent subareas 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.

Modal targets – Performance targets for increased walking, biking, transit, shared ride and other non-drive alone trips as a percentage of all trips made in a defined area. The targets apply to trips to, from and within each 2040 Design Type. The targets reflect desired mode shares for each area for the year 2040 needed to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupant vehicles and per capita vehicle miles traveled.

Regional 2040 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 Neighborhoods	40-45%

Note: The targets apply to trips to, from and within each 2040 design type

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 share – The proportion of total person trips using various modes of transportation.

Motorcycle – A motor vehicle with motive power having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground. The NHTSA defines "motorcycle" to include mopeds, two or three-wheeled motorcycles, off-road motorcycles, scooters, mini bikes and pocket bikes.

Moving Ahead for Progress in the 21st Century Act (MAP-21) (P.L. 112-141) – Reauthorization of Federal highway funding, signed into law by President Obama on July 6, 2012. Subsequent adoption of the FAST Act does not replace MAP-21 in all areas regulation of transportation safety planning and funding, so both must be referenced.

Multimodal – Transportation facilities or programs designed to serve many or all methods of travel, including all forms of motor vehicles, public transportation, bicycles and walking.

Multimodal 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 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.

National Performance Management Research Data Set (NPMRDS) – A data set derived from vehicle/passenger probe data (sourced from Global Positioning Station (GPS), navigation units, cell phones) that includes average travel times representative of all traffic on each mainline highway segment of the National Highway System (NHS), and additional travel times representative of freight trucks for those segments that are on the Interstate System. The data set includes records that contain average travel times for every 15 minutes of every day (24 hours) of the year recorded and calculated for every travel time segment where probe data are available. The NPMRDS does not include any imputed travel time data.

Network – Connected routes forming a cohesive system.

New mobility services – Transportation services like ride-hailing, microtransit and car and bike share, which operate using smart phones and other emerging technologies. Many of these services are privately operated by new mobility companies.

Non-motorized – Generally referring to bicycle, walking and other modes of transportation not involving a motor vehicle.

Non-SOV travel – Any travel mode other than driving alone in a motorized vehicle (i.e., single occupancy vehicle or SOV travel), including travel avoided by telecommuting.

Objective (in a plan) – A specific, measureable desired outcome and means for achieving a goal(s) to guide action within the plan period.

Off–peak hours – 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.

Older adults (vulnerable) – The Moving Ahead for Progress in the 21st Century (MAP-21) Act created a new Special Rule for older drivers and pedestrians under 23 USC 148(g)(2), which was continued under the Fixing America's Surface Transportation (FAST) Act. If the rate per capita of traffic fatalities and serious injuries for drivers and pedestrians over the age of 65 in a State increases over the most recent 2-year period, this Special Rule requires a State to include strategies to address the increases in those rates in their State Strategic Highway Safety Plan (SHSP). FHWA issued the Section 148: Older Drivers and Pedestrians Special Rule Final Guidance in May 2016.[1] TriMet's *Coordinated Transportation Plan for Seniors and Persons With Disabilities* (2016) identifies several principles and actions related to addressing safety and security concerns getting to and at transit stops and on transit.

Operational and management strategies – Actions and strategies aimed at improving the performance of existing and planned transportation facilities to relieve congestion and maximize the safety and mobility of people and goods.

Oregon Transportation Commission (OTC) – The Oregon Transportation Commission is a five–member governor–appointed government agency that manages the state highways and other transportation in the state of Oregon, in conjunction with the Oregon Department of Transportation.

Oregon Transportation Plan (OTP) – The official statewide intermodal transportation plan that is developed through the statewide transportation planning process by ODOT and approved by the Oregon Transportation Commission.

Parking management – Strategies that encourage more efficient use of existing parking facilities, improve the quality of service provided to parking facility users, and improve parking facility design. Examples include developing an inventory of parking supply and usage, reduced parking requirements, shared and unbundled parking, parking-cash-out, priced parking, bicycle parking and providing information on parking space availability. More information can be found at vtpi.org/park_man.pdf

Passenger car equivalent – Passenger Car Equivalent (PCE) is a metric used in Transportation Engineering, to assess traffic–flow rate on a highway. A PCE is essentially the impact that a mode of transport has on traffic variables compared to a single car.

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 – Inter–city passenger rail 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. It is a transit

[1] U.S. Department of Transportation, Federal Highway Administration Older Drivers and Pedestrians Special Rule. https://safety.fhwa.dot.gov/hsip/older/

system that operates, in whole or part, on a fixed guide–way. These systems should be integrated with other transit services within the metropolitan region with connections at passenger intermodal facilities.

Passenger train – A railroad train for only passengers, rather than goods. Amtrak is the company that controls the railroads that carry passengers in the U.S.

Passenger vehicles – Motor vehicles with at least four wheels, used for the transport of passengers, and comprising no more than eight seats in addition to the driver's seat. Light commercial vehicles are motor vehicles with at least four wheels, used for the carriage of goods.

Peak period or hours – 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 traveling on foot, in a wheelchair or in another health–related mobility device.

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 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 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, protected street crossings, crosswalks, plazas, signs, signals, pedestrian scale street lighting 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-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.

People of color focus area – Census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color and/or English language learners.

Per capita – Used to describe the rate of something per person.

Performance-based planning and programming – Refers to the application of performance management within the planning and programming processes of MPOs and transportation agencies to achieve desired performance outcomes for the multimodal transportation system. Attempts to ensure that transportation investment decisions are made – both in long-term planning and short-term programming of projects – based on their ability to meet established goals.

Performance management – A strategic approach that uses data and information to support decisions that help to achieve identified performance outcomes.

Performance measurement – A process of assessing progress toward achieving goals using data.

Performance measure – A metric used to assess and monitor progress toward meeting an objective using 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. As used in the RTP, performance measures are used to evaluate transportation system performance and potential impacts of the plan's investments within the planning period. They are also 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 – A trip made by a person from one location to another, whether as a driver, bicyclist, passenger or pedestrian.

Per vehicle miles traveled (VMT) – Used to describe rate of something per the number of motor vehicle miles traveled, such as the crash rate per motorized vehicle miles. Except where otherwise noted, crash rates are per 100-million motorized vehicle miles travelled in this document.

Physically separated bicycle lanes – These types of facilities provide a physical buffer between a person riding a bicycle and auto traffic and can be referred to as cycle tracks, trails, paths and buffered bicycle lanes. Buffers can be provided by parked cars, landscaped strips, raised pavement, bollards and planters.

Planning area boundary – A boundary used by Metro for planning purposes – also called the metropolitan planning area boundary. Included within the boundary are all areas within the Metro jurisdictional boundary, the 2010 Census urbanized area, designated urban reserves and the urban growth boundary.

Planning factors – A set of broad objectives defined in Federal legislation to be considered in both the metropolitan and statewide planning process. The factors are:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
- Increase the safety of the transportation system for motorized and non-motorized users.
- Increase the security of the transportation system for motorized and non-motorized users.
- Increase the accessibility and mobility of people and for freight.
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.
- Enhance the integration and connectivity of the transportation system, across and between modes, people and freight.
- Promote efficient system management and operation.
- Emphasize the preservation of the existing transportation system.
- Improve the resiliency and reliabilityof the transportation system and reduce or mitigate stormwaterimpacts of surface transportation.
- Enhance travel and tourism.

Policy – A policy is a statement of intent and describes a direction and a course of action adopted and pursued by a government to achieve desired outcome(s).

Posted Speed – The speeds indicated on signs along the roadway. When speeds differ from statutory speeds there must be a posted sign indicating the different speed.

Practicable – This term means available and capable of being done after taking into consideration cost, existing technology and logistics, in light of overall project purposes.

Preparedness – This term refers to actions taken to plan, organize, equip, train, and exercise to build, apply, and sustain the capabilities necessary to prevent, protect against, ameliorate the effects of, respond to, and recover from climate change related damages to life, health, property, livelihoods, ecosystems, and national security.

Principal arterial – Limited-access roads that serve longer-distance motor vehicle and freight trips and provide interstate, intrastate and cross-regional travel. See definition of Throughway.

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 to determine the precise location, alignment, and preliminary design of improvements based on site-specific engineering and environmental studies. 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).

Protected bike lanes – Separated bike lane, cycle track, a bike lane that is physically separated from auto traffic, typically they are created using planters, curbs, parked cars, or posts and are essential for creating a complete network of bike-friendly routes. For bicyclists, safety increases significantly when there is physical separation from motorists through infrastructure. Fully protected bikeways can reduce bicycle injury risk up to 90 percent.[2] Another report found that on-street bike lanes that use barriers to physically separate bicyclists from motor vehicles are 89 percent safer than streets with parked cars and without bicycling infrastructure. When physical separation is not possible, infrastructure such as striped bike lanes, bicycle boulevards, and bike boxes help reduce the risk of conflict with motor vehicles.[3]

Public health – The health of the population as a whole, especially as monitored, regulated, and promoted by the state.

Racial equity – When race can no longer be used to predict life outcomes and outcomes for all groups are improved. The removal of barriers with a specific focus on eliminating disparities faced by and improving equitable outcomes for communities of color – the foundation of Metro's

[2] "Route Infrastructure and the Risk of Injuries to Bicyclists: a Case-Crossover Study," Teschke, et al. American Journal of Public Health, Vol. 102, No. 12, December 2012.
[3] A Right to the Road, p.48, GHSA, 2017.

strategy with the intent of also effectively identifying solutions and removing barriers for other disadvantaged groups.

Rail branch lines – Non–Class I rail lines, including short line or branch lines.

Ramp meter or metering – A traffic signal used to regulate the flow of vehicles entering the freeway. Ramp meters smooth the merging process resulting in increased freeway speeds and reduced crashes. Ramp meters can be automatically adjusted based on traffic conditions.

Refinement plan – Amendment to a transportation system plan which determines at a systems level the function, mode or general location of a transportation facility, service or improvement, deferred during system planning because detailed information needed to make the determination could not be reasonably obtained at that time.

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 centers (2040 design type) – 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 (RCS) 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 places: employment sites with 300 or more employees (includes regional sports and attraction sites such as Oregon Zoo, Oregon Museum of Science and Industry, Providence Park, Moda Center); 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 Block Grant 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. Unlike funding that flows only to highways or only to transit by a rigid formula, this is money that can be invested in a range of transportation projects or programs as long as federal funding eligibility requirements are met.

Regional freight network – Applies the regional freight concept on the ground to identify the transportation networks and freight facilities that serve the region and state's freight mobility needs.

Regional intelligent transportation system (ITS) architecture – A regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects.

Regional mobility policy – The minimum motor vehicle performance desired for transportation facilities designated on the Regional Motor Vehicle Network in Chapter 3. Table 3.6 reflects volume-to-capacity targets adopted in the RTP for facilities designated on the Regional Motor Vehicle Network as well as volume-to-capacity targets adopted in the Oregon Highway Plan for state-owned facilities in the urban growth boundary. In effect, the policy is used to evaluate current and future performance of the motor vehicle network, using the ratio of traffic volume (or forecasted demand) to planned capacity of a given roadway, referred to as the volume-to-capacity ratio (v/c ratio) or level-of-service (LOS. As a system plan, the RTP uses the interim regional policy to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. LOS is also used to determine consistency of the RTP with the Oregon Highway Plan for state-owned facilities. JPACT and the Metro Council adopted the policy in 2000, agreeing 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 financial, social equity, environmental and community impacts. The RTP mobility policy can be found in Chapter 2 and Chapter 3 of the RTP.

Regional trails – Regional Trails are defined by Metro as 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 Trails and Greenways Map – A map developed and maintained by Metro. The map was first developed as part of the *Metropolitan Greenspaces Master Plan*. The map includes the existing and proposed trails and greenways in the regional system. Many of the regional trails are included in the Regional Transportation Plan.

Regional transit network – The regional transit system includes light rail, commuter rail, bus rapid transit, enhanced transit, frequent bus, regional bus, and streetcar modes as well as major transit stops.

Regional Transportation Functional Plan (RTFP) – 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) – A long-range metropolitan transportation plan that is developed and adopted for the greater Portland metropolitan planning area (MPA) covering a planning horizon of at least 20 years. Usually RTPs are updated every five years through the federally-mandated metropolitan transportation planning process. The plan identifies and analyzes transportation needs of the metropolitan region and creates a framework for implementing policies and project priorities. Required by state and federal law, it includes programs to better maintain, operate and expand transportation options to address existing and future transportation needs. The RTP also serves as the regional transportation system plan under the Oregon Transportation Planning Rule.

Regional transportation system – The regional transportation system is identified on the regional transportation system maps in the Regional Transportation Plan. 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.

Regional Travel Options (RTO) Program – Metro program guided by a five-year strategic plan aimed at reducing the demand for roadway travel, particularly single occupant vehicle travel. More specifically, Metro's RTO program includes:

- a coordinated education and outreach effort to efficiently use public dollars to reach key audiences
- an employer outreach program to save employers and employees money
- a regional Safe Routes to School effort that supports local education programs in schools to teach kids how to walk and bicycle to school safely
- a regional rideshare program that makes carpooling safer and easier and helps people with limited transit access have options to get around
- a grant program that funds partner efforts, such as The Street Trust's Bike Commute Challenge, TriMet's and TMA's work with employers, Ride Connection's RideWise travel training program for seniors and people with disabilities, and Portland Sunday Parkways, to name a few
- funding for bicycle racks, wayfinding signage and other tools that help people to walk and bicycle
- funding for pilot projects to test new ways to reach the public through technology or innovative engagement methods.

See also transportation demand management.

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.

Regionally significant project – A transportation project (other than projects that may be grouped in the TIP and/or STIP or exempt projects as defined in EPA's transportation conformity regulations (40 CFR part 93, subpart A)) that is on a facility that serves regional transportation needs (such as access to and from the area outside the region; major activity centers in the region; major planned developments such as new retail malls, sports complexes, or employment centers; or transportation terminals) and would normally be included in the modeling of the metropolitan area's transportation network. Chapter 3 of the RTP defines the regional transportation system.

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.

Resilience or resiliency – This term means the ability to anticipate, prepare for and adapt to changing conditions and withstand, respond to and recover rapidly from disruptions.

Revision – A change to a long-range statewide or metropolitan transportation plan, TIP, or STIP that occurs between scheduled periodic updates. A major revision is an "amendment" while a minor revision is an "administrative modification."

Ride-hailing services – Also known as transportation network companies, or TNCs like Uber and Lyft, which use apps to connect passengers with drivers who provide rides in their personal vehicles.

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 underserved 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 diet – Road diets are 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.

Road users – A motorist, passenger, public transportation operator or user, truck driver, bicyclist, motorcyclist, or pedestrian, including a person with disabilities. (23 USC section 148)

Roadway connectors – Roads that connect other freight facilities, industrial areas, and 2040 centers to a main roadway route.

Rural reserves (2040 Design Type) – Large areas outside the urban growth boundary that will remain undeveloped through 2060. These areas are reserved to provide long-term protection for agriculture, forestry or important natural landscape features that limit urban development or help define appropriate natural boundaries for development, including plant, fish and wildlife habitat, steep slopes and floodplains.

Safe Routes to School – A comprehensive engineering/education program focused on youth school travel that aims to create safe, convenient, and fun opportunities for children to walk and roll (bike, scooter, etc.) to and from schools. City or school district based programs incorporate evaluation, education, encouragement, engineering, enforcement, and equity with the goal of increasing walking and rolling to school. Safe Routes to School is a national program that works to

nationally, regionally and locally to create safe, healthy, and livable urban, suburban and rural communities. The program works with parents, school districts, local governments, government, police and community partners to make it easy and safe for kids to walk and bike to school. Results are achieved through investments in small capital projects, educations and outreach such as walking school buses.

Safe System Approach – A data-driven, strategic approach to roadway safety that aims to eliminate fatal and severe injury crashes. The approach is based on a foundational understanding of the underlying causes of traffic fatalities and severe injuries (using data) and is based on the principle that errors are inevitable but serious crashes should not be. Transportation safety policies that use a Safe System approach include Vision Zero, Towards Zero Deaths, Road to Zero and Sustainable Safety.

Safe System Approach Speed Setting – Speed limits are set according to the likely crash types, the resulting impact forces, and the human body's ability to withstand these forces. It allows for human errors (that is, accepting humans will make mistakes) and acknowledges that humans are physically vulnerable (that is, physical tolerance to impact is limited). Therefore, in this approach, speed limits are set to minimize death and severe injury as a consequence of a crash.

Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) – Signed into federal law in 2005, SAFETEA-LU authorized the federal surface transportation programs for highways, highway safety, and transit through 2009. SAFETEA-LU refined and reauthorized TEA-21. SAFETEA-LU was subsequently replaced by MAP-21 and the FAST Act.

Safety – Protection from death or bodily injury from a motor-vehicle crash through design, regulation, management, technology and operation of the transportation system.

Safety benefit projects – Projects with design features to increase safety for one or more roadway user. These projects may not necessarily address an identified safety issue at an identified high injury or high risk location, but they do include design treatments known to increase safety and reduce serious crashes. Examples include adding sidewalks, bikeways, medians, center turn lanes and intersection or crossing treatments.

Safety data – Includes, but is not limited to, crash, roadway, and traffic data on all public roads. For railway- highway grade crossings, safety data also includes the characteristics of highway and train traffic, licensing, and vehicle data.

Safety project – Has the primary purpose of reducing fatal and severe injury crashes or reducing crashes by addressing a documented safety problem at a documented high injury or high risk location with one or more proven safety countermeasures.

Scenario planning – An analytical approach and planning process that provides a comprehensive framework for evaluating how various combinations of strategies, policies, plans and/or programs may affect the future of a community, region or state. The approach involves identifying various packages or strategies or scenarios against a baseline projection.

Security (public and personal) – Protection from intentional criminal or antisocial acts while engaged in trip making through design, regulation, management, technology and operation of the transportation system.

Serious Crash – Refers to the total number of Fatal and Severe Injury (Injury A) crashes combined.

Severity – A measurement of the degree of seriousness concerning both vehicle impact (damage) and bodily injuries sustained by victims in a traffic crash.

Shared mobility – Describes services that allow people to share a vehicle, such as ride-hailing trips, car and bike share and microtransit, as well as traditional shared modes like transit, car- or vanpools and taxis. Some of these services are privately operated by shared mobility companies.

Shared trips – Trips taken by multiple passengers traveling in a single vehicle, including carpools, transit trips and some ride-hailing or car share trips.

Short trip – 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–occupanct vehicle (SOV) – A private motorized passenger vehicle carrrying one occupant (the driver only). Also referred to as a drive alone vehicle.

Smart cities – The way in which public agencies are using technology to collect better data, provide better service, do business more efficiently and make better decisions.

Social equity – The idea that all members of a societal organization or community should have access to the benefits associated with civil society – the pursuit of an equitable society requires the recognition that there are a number of attributes that give members of a society more or less privilege and that in order to provide equitable situations the impacts of these privileges (or lack thereof) must be addressed. For transportation, equity refers to fair treatment or equal access to transportation services and options. In the context of safety, transportation equity relates to improving the travel choices, the safety of travel and not unfairly impacting one group or mode of transportation. More specifically it means improved safety for all transportation options and lessening the risks or hazards associated with different choices of transportation.

Stakeholders – Individuals and organizations with an interest in or who are affected by a transportation plan, program or project, including federal, state, regional and local officials and jurisdictions, institutions, community groups, transit operators, freight companies, shippers, non–governmental organizations, advocacy groups, residents of the geographic area and people who have traditionally been underrepresented.

State Highways – In Oregon, is a network of roads that are owned and maintained by the Highway Division of the Oregon Department of Transportation (ODOT), including Oregon's portion of the Interstate Highway System.

State Transportation Improvement Program (STIP) – The four-year funding and scheduling document for major street, highway and transit projects in Oregon. The STIP is produced by ODOT, consistent with the Oregon Transportation Plan (the statewide transportation plan) and other statewide plans as well as metropolitan transportation plans and MTIPsThe STIP covers the entire state and is overseen by the Oregon Transportation Commission (OTC). It must include all the metropolitan region's TIPs without change as well as a list of specific projects proposed by ODOT in the non-metropolitan areas. Updated every three years, the STIP determines when and if transportation projects will be funded by the state with state or federal funds.

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 (2040 Design Type) – 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.

Strategic plan – Defines the desired direction and outcomes to guide decisions for allocating resources to pursue the strategy.

Strategic project list – Additional policy-driven transportation needs and priority projects that could be achieved with additional resources.

Strategy – Involves setting goals, determining actions to achieve the goals, and mobilizing resources to execute the actions. A strategy describes how the ends (goals) will be achieved by the means (resources).

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.

Surface Transportation Block Grant (STBG) – A federal source of funding for projects and activities that is the most flexible in its use. Projects and activities which states and localities can use STBG include: projects that preserve and improve the conditions and performance on any federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure and transit capital projects, including intercity bus terminals.

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.

Sustainable – A method of using a resource such that the resource is not depleted or permanently damaged.

System efficiency – Strategies that optimize the use of the existing transportation system, including traffic management, employer-based commute programs, individualized marketing and carsharing.

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 specific level of performance that is desired to be achieved within a specified time period.

Throughways – Controlled access (on-ramps and off-ramps) freeways and major highways.

Toward Zero Deaths – The United States' highway safety vision. The National Strategy on Highway Safety provides a platform of consistency for state agencies, private industry, national organizations and others to develop safety plans that prioritize traffic safety culture and promote the national Toward Zero Deaths vision. As a strategic policy it is similar to Vision Zero.

Traffic – Movement of motorized vehicles, non–motorized 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 incident management – Planned and coordinated processes followed by state and local agencies to detect, respond to, and remove traffic incidents quickly and safely in order to keep highways flowing efficiently.

Traffic management – Strategies that improve transportation system operations and efficiency, including ramp metering, active traffic management, traffic signal coordination and real-time traveler information regarding traffic conditions, incidents, delays, travel times, alternate routes, weather conditions, construction, or special events.

Traffic signal progression – A process by which a number of traffic signals are synchronized to create the efficient progression of vehicles.

Transit Asset Management Plan (TAMP) – A plan that includes an inventory of capital assets, a condition assessment of inventoried assets, a decision support tool, and a prioritization of investments.

Transit Asset Management System – A strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively, throughout the life cycles of those assets.

Transit oriented development (TOD)/Metro Transit Oriented Development Program – A mixed-use community or neighborhood designed to encourage transit use, bicycle and pedestrian activity, containing a rich mix of residential, retail, and workplaces in settings designed for bicycle and pedestrian convenience and transit accessibility. Metro began a regional Transit Oriented Development program in 1998 as part of a strategy to leverage the region's significant investment in high capacity transit. As part of Metro's TOD Program, the agency strategically invests to stimulate private development of higher-density, affordable and mixed-use projects near transit to help more people live, work and shop in neighborhoods served by high-quality transit. In addition, the program invests in "urban living infrastructure" like grocery stores and other amenities, provides technical assistance to communities and developers, and acquires and owns properties in transit-served areas and solicits proposals from qualified developers to create transit-oriented communities in these places. To date, the TOD program investments totaling $16 million have leveraged more than $697 million in private development activity across 45 completed TOD projects.

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% 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 demand – The quantity of transportation services desired by users of the transportation system.

Transportation demand management (TDM) – The application of a set of strategies and programs designed to reduce demand for roadway travel, particularly single occupant vehicle trips, through various means (e.g. education, outreach, marketing, incentives, technology). The strategies aim to affect when, where and how much people travel in order to make more efficient use of transportation infrastructure and services. Strategies include offering other modes of travel such as walking, bicycling, ride–sharing and vanpool programs, car sharing, alternative work hours, education such as individualized marketing, policies, regulations and other combinations of incentives and disincentives that are intended to reduce drive alone vehicle trips on the transportation network. Metro's TDM program is called the Regional Travel Options (RTO) program. *See also Regional Travel Options Program.*

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 – The removal of barriers to eliminate transportation-related disparities faced by and improve equitable outcomes for historically marginalized communities, especially communities of color.

Transportation improvement program (TIP) – A prioritized listing/program of multimodal transportation projects covering a period of 4 years that is developed and formally adopted by an MPO as part of the metropolitan transportation planning process. The TIP must be consistent with the metropolitan transportation plan, and is required for projects to be eligible for funding under title 23 U.S.C. and title 49 U.S.C. chapter 53. In the Portland metropolitan region, the TIP is referred to as the Metropolitan Transportation Improvement Program (MTIP). In practice, the MTIP is a short-term, four year program of transportation projects that will be funded with federal funds expected to flow to the region and locally and state-funded regionally significant projects.

Transportation management associations (TMA) – Non-profit coalitions of local businesses and/or public agencies, and 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 management area (TMA) – An urbanized area with a population over 200,000, as defined by the U.S. Census Bureau and designated by the Secretary of Transportation, or any additional area where TMA designation is requested by the Governor and the MPO and designated by the Secretary of Transportation. These areas must comply with special transportation planning requirements regarding congestion management process, project selection, processes for develoment of tan RTP and MTIP and certification identified in 23 CFR 450.300-340.

Transportation needs – Estimates of the movement of people and goods based on current population and employment and future growth consistent with acknowledged comprehensive plans. Needs are typically defined based on an assessment of existing transportation system gaps and deficiencies and projections of future travel demand, from a continuation of current trends as modified by policy objectives expressed in Statewide Planning Goal 12, the Transportation Planning Rule, federal planning factors and the RTP (Chapter 2 and Chapter 3).

Deficiencies are defined as the difference between the current transportation system and adopted standards based on performance measures and targets identified in Chapter 2. Deficiencies are capacity or design constraints that limit but do not prohibit the ability to travel by a given mode. Gaps are defined as missing links in the transportation system for any mode. Gaps either prohibit travel by a particular mode or make it functionally unsafe. Together, gaps and deficiencies are defined as needs.

- **Local transportation needs** means needs for movement of people and goods within communities and portions of counties and the need to provide access to local destinations.
- **Regional transportation needs** means needs for movement of people and goods between and through communities and accessibility to regional destinations within a metropolitan area, county or associated group of counties.
- **State transportation needs** means needs for movement of people and goods between and through regions of the state and between the state and other states.

See also gap and deficiency.

Transportation performance management (TPM) – Strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.

Transportation planning – A continuing, comprehensive, and cooperative (3-C) process to encourage and promote the development of a multimodal transportation system to ensure safe and efficient movement of people and goods while balancing environmental and community needs.

Transportation planning rule (TPR) – Oregon's statewide planning goals established state policies in 19 different areas. The TPR implements the Land Conservation and Development Commission's Planning Goal 12 (Transportation) which requires ODOT, MPOs, Counties and Cities, per OAR 660-012-0015 (2) and (3), to prepare a Transportation System Plan (TSP) to identify transportation facilities and services to meet state, regional and local needs, as well as the needs of the transportation disadvantaged and the needs for movement of goods and services to support planned industrial and commercial development, per OAR 660-012-0030(1).

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) – A set of strategies for increasing travel flow on existing facilities through improvements such as ramp metering, traffic signal synchronization, incident response and access management.

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. A TSP describes a transportation system and outlines projects, programs, and policies to meet transportation needs now and in the future based on community (and regional) aspirations. A TSP typically serves as the transportation component of the local comprehensive plan. The TSP supports the development patterns and land uses contained in adopted community and regional 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. The RTP is a regional TSP.

Local TSPs must be consistent with the applicable Regional Transportation Plan. Jurisdictions within a metropolitan area must adopt TSPs that reflect regional goals, objectives, and investment strategies specific to the area and demonstrate how local transportation system planning helps meet regional performance targets. A jurisdiction within a Metropolitan Planning Organization area must make findings that the proposed Regional Transportation Plan amendment or update is consistent with the local TSP and comprehensive plan or adopt amendments that make the Regional Transportation Plan and the TSP consistent with one another. (OAR 660-012-0016) TSP updates must occur within one year of the adoption of a new or updated Regional Transportation Plan. (OAR 660-012-0055).

Travel options/choices – 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 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.

TripCheck – An Oregon Department of Transportation website that displays real-time data regarding road conditions, weather conditions, camera images, delays due to congestion and construction, and other advisories. Additionally, TripCheck provides travelers with information about travel services such as food, lodging, attractions, public transportation options, scenic byways, weather forecasts, etc. This information is also available through the 511 travel information phone line.

Truck terminal – A facility that serves as a primary gateway for commodities entering or leaving the metropolitan area by road.

Underserved communities – Populations that have historically experienced a lack of consideration in the planning and decision making process. It describes historically marginalized communities in addition to those that are defined in the federal definition of Environmental Justice. These populations are seniors, persons with disabilities, youth, communities of color, low-income communities, and any other population of people whose needs may not have been full met in the planning process.

Unified Planning Work Program (UPWP) – This refers to annual statement of work identifying the planning priorities and activities to be carried out within a metropolitan planning area. At a

minimum, a UPWP includes a description of the planning work and resulting products, who will perform the work, time frames for completing the work, the cost of the work, and the source(s) of funds.

United States Department of Transportation (USDOT) – The federal cabinet-level agency with responsibility for highways, mass transit, aviation and ports; it is headed by the Secretary of Transportation. The DOT includes the Federal Highway Administration and the Federal Transit Administration, among others.

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 youth, seniors, and people with disabilities 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.

Update – For federal purposes, this means making current a long-range statewide transportation plan, metropolitan transportation plan, TIP, or STIP through a comprehensive review. Updates require public review and comment, a 20-year horizon for metropolitan transportation plans and long-range statewide transportation plans, a 4-year program period for TIPs and STIPs, demonstration of fiscal constraint (except for long-range statewide transportation plans), and a conformity determination (for metropolitan transportation plans and TIPs in nonattainment and maintenance areas). For state purposes, this means TSP amendments that change the planning horizon and 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 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.

Urbanized area (UZA) – A geographic area with a population of 50,000 or more, as designated by the Bureau of the Census.

Urban reserve – An area outside of the urban growth boundary designated for future growth by the Metro Council pursuant to OAR 660 Division 27.

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.

Vehicle – Any device in, upon or by which any person or property is or may be transported or drawn upon a public highway and includes vehicles that are propelled or powered by any means.

Vehicle miles traveled (VMT) – A common measure of roadway use by multiplying miles traveled per vehicle by the total number of vehicles for a specified time period. For purposes of this definition, "vehicles" include automobiles, light trucks and other passenger vehicles used for the movement of people. The definition does not include buses, heavy trucks and other vehicles that involve commercial movement of goods.

Vision – In this document, an aspirational statement of what the region (and plan) is trying to achieve over the long-term through policy and investment decisions.

Vision Zero – A system and approach to public policy developed by the Swedish government which stresses safe interaction between road, vehicle and users. Highlighted elements include a moral imperative to preserve life, and that the system conditions and vehicle be adapted to match the capabilities of the people that use them. Vision Zero employs the Safe System approach.

Visualization techniques – Methods used by States and MPOs in the development of transportation plans and programs with the public, elected and appointed officials, and other stakeholders in a clear and easily accessible format such as GIS- or web-based surveys, inventories, maps, pictures, and/or displays identifying features such as roadway rights of way, transit, intermodal, and non-motorized transportation facilities, historic and cultural resources, natural resources, and environmentally sensitive areas, to promote improved understanding of existing or proposed transportation plans and programs.

Volume–to–capacity (v/c) ratio – A traditional measure of congestion, calculated by by dividing the number of motor vehicles passing through a section of roadway during a specific increment of time by the motor vehicle capacity of the section. For example, a V/C ratio of 1.00 indicates the roadway facility is operating at its capacity.

Also referred to as level-of-service, this ratio has been used in transportation system planning, project development and design as well as in operational analyses and traffic analysis conducted during the development review process. As a system plan, the RTP uses the volume-to-capacity ratio targets to diagnose the extent of motor vehicle congestion on throughways and arterials during different times of the day and to determine adequacy in meeting the region's needs. The v/c ratio targets are also used to determine consistency of the RTP with the Oregon Highway Plan for state-owned facilities. *See also level-of-service and regional mobility policy.*

Vulnerable users – In this document, refers to groups of people that are more vulnerable to being killed or severely injured in traffic crashes. Vulnerable users are people that are more vulnerable to being killed or seriously injured in crashes. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, road construction workers, people with disabilities, people of color and people with low income.

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.

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.

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.

Wayfinding – Signs, maps, street markings, and other graphic or audible methods used to convey location and directions to travelers. Wayfinding helps people traveling to orient themselves and reach destinations easily.

LIST OF ACRONYMS

3R	Resurfacing, Restoration and Rehabilitation project
AARP	American Association of Retired Persons
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AQMA	Air Quality Maintenance Area
ARTS	All Roads Transportation Safety
ATM	Active Traffic Management
ATMS	Advanced Transportation Management System
AV	Autonomous Vehicle
BAT	Business Access and Transit Lane
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics (federal)
BRT	Bus Rapid Transit
BUILD	Better Utilizing Transportation Investment to Leverage Development
BY	Bypass
CAAA	Clean Air Act Amendments
CAV	Connected and Autonomous Vehicles
CBD	Central Business District
CCTV	Closed Circuit Television
CDBG	Community Development Block Grant
CE	Categorical Exclusion
CFR	Code of Federal Regulations
CIG	Capital Investment Grant
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Management Process
CO	Carbon Monoxide
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
CONS	Construction (Project Phase)
CORE	Committee on Racial Equity
CRF	Crash Reduction Factor
C-TRAN	Clark County Public Transportation Benefit Area Authority
CV	Connected Vehicle
DBE	Disadvantaged Business Enterprise
DEIS	Draft Environmental Impact Statement

DEQ	Oregon State Department of Environmental Quality
DLCD	Oregon Department of Land Conservation and Development
DOA	Design Option Alternatives (Project Phase)
DOT	Department of Transportation
E&D	Elderly and Individuals with Disabilities
EA	Environmental Assessment
EFA	Equity Focus Area
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
ETC	Enhanced Transit Corridor or Enhanced Transit Concept
ETR	Emergency Transportation Route
EV	Electric Vehicle
FARS	Fatal Analysis Reporting System
FAST Act	Fixing America's Surface Transportation Act (2015)
FDE	Final Design and Engineering (Project Phase)
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFO	Full Federal Oversight
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY/FFY	Federal Fiscal Year (October 1 thru September 30)
GHG	Greenhouse Gases
GIS	Geographic Information System
HB	House Bill
HC	Hydrocarbons
HCM	Highway Capacity Manual
HCT	High Capacity Transit
HIC	High Injury Corridor
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
HSP	Highway Safety Plan

HUD	Department of Housing and Urban Development
I/M	Inspection/Maintenance
ICM	Integrated Corridor Management
IGA	Intergovernmental Agreement
IM	Incident Management
IOF	Immediate Opportunity Fund (State Fund Type)
ISTEA	Intermodal Surface Transportation Efficiency Act (1991)
ITS	Intelligent Transportation System
JPACT	Joint Policy Advisory Committee on Transportation
JTA	Jobs and Transportation Act (State Program and fund type)
LCDC	Oregon Land Conservation and Development Commission
LEP	Limited English Proficiency
LOS	Level of Service
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
MAP-21	Moving Ahead for Progress in the 21st Century (2012)
MIS	Major Investment Study
MMA	Multimodal Mixed-Use Area
MMLOS	Multi Modal Level of Service
MMUCC	Model Minimum Uniform Crash Criteria Guideline
MOU	Memorandum of Understanding
MOVES	Motor Vehicle Emissions Simulator
MP	Mile Point
MPA	Metropolitan Planning Area
MPAC	Metro Policy Advisory Committee
MPO	Metropolitan Planning Organization
MSTIP	Major Streets Improvement Program
MTAC	Metro Technical Advisory Committee
MTIP	Metropolitan Transportation Improvement Program
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NB	Northbound
NEPA	National Environmental Protection Act
NHFP	National Highway Freight Program (Federal)
NHPP	National Highway Performance Program (Federal)

NHS	National Highway System
NHSTA	National Highway Safety Traffic Administration
NOx	Nitrogen Oxides
NPMRDS	National Performance Management Research Data Set
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OMSC	Oregon Modeling Steering Committee
ORS	Oregon Revised Statutes
OTC	Oregon Transportation Commission
OTP	Oregon Transportation Plan
P&R	Park and Ride
PBPP	Performance Based Planning and Programming
PD	Project Development (Project Phase)
PE	Preliminary Engineering
PERC	Public Engagement Review Committee
PHEV	Plug-in Hybrid Electric Vehicle
PL	Metropolitan Planning (fund)
PM10	Particulate Matter
PM2.5	Particulate Matter (fine)
PORTAL	Portland Transportation Archive Listing
PRD	Parks and Recreation District
RATP	Regional Active Transportation Plan
RCTO	Regional Concept for Transportation Operations
RDPO	Regional Disaster Preparedness Organization
RETR	Regional Emergency Transportation Route
RF	Rapid Flashing
RFI	Request for Interest
RFP	Regional Framework Plan
ROD	Record of Decision
ROW	Right of Way
RTAC	Regional Transportation Advisory Committee (SW Washington)
RTC	Southwest Washington Regional Transportation Council
RTFP	Regional Transportation Functional Plan
RTO	Regional Travel Options

RTP	Regional Transportation Plan
RTS	Regional Transit Strategy
RTSS	Regional Transportation Safety Strategy
RUGGO	Regional Urban Growth Goals and Objectives
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SB	Southbound
SHSP	Strategic Highway Safety Plan
SIP	Oregon State (Air Quality) Implementation Plan
SFY	State Fiscal Year (July 1 thru June 30)
SMART	South Metro Area Regional Transit
SOV	Single Occupant Vehicle
SPIS	Safety Priority Indexing System
SPR	State Planning and Research (Federal)
SRTS	Safe Routes to School
STBG	Surface Transportation Block Grant (Federal Fund)
STIP	State Transportation Improvement Program
STP	Surface Transportation Program (Federal Fund)
TA	Transportation Alternatives (Federal)
TAM	Transit Asset Management
TAMP	Transit Asset Management Plan
TAZ	Transportation Analysis Zone
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century (1998)
TIFIA	Transportation Infrastructure Finance and Innovation Act (finance program for projects of regional and national significance)
TIGER	Transportation Investment Generating Economic Recovery (discretionary grant program)
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TNC	Transportation Network Company
TOD	Transit Oriented Development
TPAC	Transportation Policy Alternatives Committee
TPR	Transportation Planning Rule
TRILOC	TriMet Local Funds

TriMet	Tri-county Metropolitan Transportation District
TSAP	Transportation Safety Action Plan
TSM	Transportation System Management
TSMO	Transportation System Management and Operations
TSP	Transit Signal Priority
TSP	Transportation System Plan
UGB	Urban Growth Boundary
UGMFP	Urban Growth Management Functional Plan
UPWP	Unified Planning Work Program
USDOT	United States Department of Transportation
V/C	Volume to Capacity
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WSDOT	Washington State Department of Transportation
YOE	Year of Expenditure (dollars)

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ACKNOWLEDGEMENTS

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Printed on recycled-content paper

December 6, 2018