Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting:	Metro Technical Advisory Committee
Date:	Wednesday, April 18, 2018
Time:	10:00 am – Noon
Place:	Metro Regional Center, Council Chamber

10:00 a.m.	1.	**Call to Order, Declaration of a Quorum and Introductions**	Tom Kloster, Chair
	2.	**Comments from the Chair and Committee Members**	Chair / All
	3.	**Community Communications on Agenda Items**	All
10:20 a.m. 30 min.	4.	**RTP 2018: Draft Emerging Technology Strategy** Purpose: Provide MTAC with an overview of the draft emerging technology strategy · Information / discussion	Tyler Frisbee, Metro
10:50 a.m. 45 min.	5.	**RTP 2018: Draft Transit Strategy Discussion Draft** Purpose: Provide feedback on the Regional Transit Strategy discussion draft in preparation for public review along with the 2018 Regional Transportation Plan and other strategies June 2018 · Information / Discussion	Jamie Snook, Metro
10:35 a.m. 30 min.	6.	**RTP 2018: Draft Freight Strategy Discussion Draft** Purpose: Provide MTAC the opportunity to review the draft report including regional freight policies, a revised regional freight network map and proposed actions to address each freight policy · Information / Discussion	Tim Collins, Metro
Noon		**ADJOURN**	

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August 2016

2018 MTAC Work Program

4/11/18

January 17, 2018 Comments from the Chair · Urbanism Next Conference, March 5 – 7 · Oregon Active Transportation Summit, March 15 – 16 Agenda Items · 2018 RTP: Update on Schedule, Technical Evaluation, Engagement Activities and Regional Leadership Forum #4 Information/Discussion (Ellis/Higgins, 30 min.) · Emerging Technologies Strategy : draft policy (Rose, 30 min.)	**February 21, 2018 – Cancelled** Comments from the Chair Agenda Items
March 21, 2018 – Cancelled Comments from the Chair Agenda Items	**April 18, 2018** Comments from the Chair Agenda Items · Draft Emerging Technology Strategy (Frisbee, 30 min.) · Draft Transit Strategy (Snook, 45 min.) · Draft Freight Strategy (Collins, 30 min.)
May 16, 2018 Comments from the Chair Agenda Items · 2018 Urban Growth Management Decision: Urban Reserve Goal 14 Analysis (Reid/O'Brien, 45 min.) · Draft RTP Policy Chapter Changes (focus on goals and objectives) (Ellis, 40 min.) · Draft RTP Implementation Chapter (Ellis, 40 min.)	**June 20, 2018** Comments from the Chair Agenda Items · Presentations from the Cities of Beaverton, Hillsboro, King City, Sherwood, Wilsonville – UGB Applications
July 18, 2018 Comments from the Chair Agenda Items	**August 15, 2018** Comments from the Chair Agenda Items · 2018 Urban Growth Management decision (recommendation to MPAC, if requested by MPAC) · Discuss RTP public comments and frame policy decisions for MPAC discussion
September 19, 2018 Comments from the Chair Agenda Items · Discuss RTP public comments and policy issues identified for MPAC discussion – **Recommendation to MPAC**	**October 17, 2018** Comments from the Chair Agenda Items
November 21, 2018 Comments from the Chair Agenda Items	**December 19, 2018** Comments from the Chair Agenda Items

Parking Lot

· Transportation resiliency

MTAC meets the 3rd Wednesday of the month.
TPAC and MTAC hold a joint work session on the 1st Wednesday of the month.
For agenda and schedule information call 503-797-1562 or e-mail paulette.copperstone@oregonmetro.gov.
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Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: April 18, 2018
To: Metro Technical Advisory Committee (MTAC) and interested parties
From: Eliot Rose, Senior Technology Strategist
Subject: Emerging Technology Strategy Discussion Draft

Purpose
The purpose of this memorandum and the associated materials and presentation is to provide MTAC with an overview of the discussion draft of the Emerging Technology Strategy (**Attachment 1**).

Action Requested
No formal action is requested. This is an opportunity for MTAC to ask questions and provide input on the discussion draft of the Emerging Technology Strategy, and to understand how the Strategy has developed since the last time that MTAC reviewed this material to help members provide feedback on the strategy moving forward.

Background
The Emerging Technology Strategy is a new component of the RTP. It 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 transportation network companies (e.g., Uber and Lyft)—to create a more equitable and livable region.

MTAC members have had three opportunities to provide input on the Emerging Technology Strategy policy language in 2018. TPAC and MTAC members offered feedback on the initial draft of the policy language at the January joint workshop. Then MTAC discussed the revised draft policy language later in January. Finally, at the April joint TPAC-MTAC workshop, members reviewed the Emerging Technology Strategy policies in the broader context of the regional transportation plan (RTP) policy chapter.

Based on the input that we received from members of MTAC, as well as from other Metro committees, Council, and conversations with partners we have made the following changes to the Strategy:

- Added language emphasizing that emerging technologies should be used to supporting transit in the Choices policy
- Removed the Prosperity policy, which partners felt was not tied clearly enough to the work of Metro and our partners
- Clarified the relationship between emerging technology policies and Metro's adopted regional goals

- Added specifics throughout the strategy about how we want to see emerging technologies implemented in our region, and who among Metro and our partners are responsible for implementation.
- Generally edited and clarified policy language.

In addition, the discussion draft contains information and background research on the impacts and projected development of emerging technologies that provides additional context for the policies.

Next Steps

Staff will finalize the Emerging Technology Strategy guided by the Metro Council, Metro's technical and policy advisory committees, and public comment. The Metro Council will consider adoption of the final strategy in December 2018 alongside the other elements of the RTP. Upcoming discussions and actions include:

- **April 18 and 20 – MTAC and TPAC**: Discussion draft of Emerging Technology Strategy – information/discussion
- **May 9 and 17 – MPAC and JPACT**: Discussion draft of Emerging Technology Strategy – information/discussion
- **June 5 – Council**: Consider approving discussion draft of Emerging Technology Strategy for release as part of the public review draft of the RTP
- **June 29 – August 13 – Public comment period**: Public review draft of Emerging Technology Strategy
- **September – MTAC and TPAC**: Adoption draft of Emerging Technology Strategy – recommendation to MPAC and JPACT
- **October – MPAC and JPACT**: Adoption draft of Emerging Technology Strategy – recommendation to Council
- **December – Metro Council**: Adoption draft of Emerging Technology Strategy – final action (by Metro Resolution)

Attachments

1. Emerging Technology Strategy discussion draft
2. Emerging Technology Strategy Technical Appendices discussion draft

DISCUSSION DRAFT

2018 Regional Transportation Plan

Emerging Technology Strategy

A strategy for guiding innovation to support the greater Portland region's goals

April 11, 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.

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TABLES AND FIGURES

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EMERGING TECHNOLOGY PRINCIPLES, POLICIES, AND NEXT STEPS AT A GLANCE

Principles

Vibrant Communities: Emerging technologies 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 find new opportunities, and emerging technologies create more efficient ways to meet the transportation needs of local businesses and workers.

Choices: Emerging technologies provide new travel options throughout the region while supporting transit, bicycling and walking.

Congestion: Emerging technologies reduce congestion by promoting shared trips, decreasing vehicle miles traveled, minimizing conflicts between modes, and managing demand.

Safety: Emerging technologies reduce the risk of crashes for everyone and protect users from data breaches and cyberattacks.

Environment: New mobility service use vehicles that run on clean or renewable energy.

Equity: New mobility services are 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 contribute their fair share of the cost of operating, maintaining, and building the transportation system, and new technologies make it possible to collect transportation revenues efficiently and equitably. Public agencies should source new ideas and technologies competitively to get the best return on public investments.

Accountability: Companies and public agencies collaborate and share data to help make the transportation system better for everyone.

Policies

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

Equity: Make emerging technologies accessible, available, and affordable to all, and use these technologies to create more equitable communities.

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

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

Next steps

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 regionally consistent **new mobility policies** so that new options operate safely, equitably and transparently.

Develop **better data and tools** so that we can account for the impacts of emerging technologies 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.

TECHNOLOGY TODAY IN THE PORTLAND REGION

Technology is already transforming our region's transportation system. Transportation network companies (TNCs; for example Uber and Lyft), which began serving the region in 2015, illustrate how quickly new technologies can change people's travel choices. Only two years later, 36 percent of the region's residents say that they have taken a TNC ride. While people mostly use these services for occasional trips, 14 percent use them more than once a month.[1] In the city of Portland, TNCs now carry more people than taxis do,[2] providing over ten million rides within the city in 2017.[3]

Other shared mobility services are also growing rapidly within our region. Car share services now operate over 1,000 vehicles in the Portland area. Some car shareshare 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.[4]

Meanwhile, smartphones have become the most popular way for people to get information on their travel choices, while the number of people who get information from websites, print materials, or other sources declined precipitously. People increasingly rely on the type of real-time, multimodal 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.

The way that our region's residents access, experience, and use the transportation system has changed dramatically in the past five years. Since Metro last asked people about their travel choices in 2014, the percentage who say they would use Uber, Lyft, or a taxi for their commute if they didn't have a car 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 fell—particularly for transit, which dropped from 47 to 29 percent. It's not clear why we are seeing such rapid and significant changes in people's travel behavior.[5] The rising cost of living in areas where it is easy to take transit, carpool, bike, walk, or use car share likely plays a large role, and competition from TNCs may be a factor as well. What is clear is that public agencies must respond to these changes in order to make progress on our regional goals and to meet the needs of our residents and businesses.

THE NEXT FIVE YEARS

Autonomous vehicles (AVs) will likely accelerate the already-growing use of new mobility services and smartphone apps when they arrive. Many companies are already testing AVs, [6] and the first generation of street-ready AVs will likely be available within the next five years. These AVs will cost more than regular vehicles, so most people probably won't be rushing out to buy them for personal use, and in the coming decade most of the vehicles on the road will continue to be human-driven. However, TNCs and freight operators will be among the first to deploy AVs, which will help them cut the cost of trips and serve new users.

As a result, TNCs and other new mobility services will become a more popular option for everyday travel and in smaller cities and suburban areas. Right now, these services are mainly used in larger cities and for occasional recreational trips or trips to the airport. TNC use is already growing rapidly in cities outside of Portland, and as the cost of TNC trips fall thanks to AVs communities like Hillsboro, Oregon City, and Gresham could see the same level of TNC activity that Portland currently does. It likely won't just be Uber and Lyft serving these communities; many companies are planning to launch new transportation services when AVs arrive.[7]

These developments will deepen the impacts that technology is already having in our region, which are not only related to how technology is developing, but also how our region is growing and changing. The Portland area is experiencing rapid population growth, rising housing costs, and mounting congestion. Emerging technologies have the potential to help us confront these challenges—or to exacerbate them.

Equity

Our region is undergoing a housing crisis. During the first half of this decade, average home prices in the region climbed by almost 90 percent[8] and average rental prices rose by 34 percent.[9] Communities where it is easy to walk, bike, and take transit saw the greatest price increases, so people of color and low-income households—who are the most likely to rely on these options because they are more affordable than driving—are being displaced to areas that lack good transit service and safe bicycling and walking facilities.

Emerging technologies can help us better serve those who need it the most…

New modes like TNCs, car share, bike share, and microtransit can give people who can't afford to use a car the same flexibility and access to destinations as owning a car provides. Public agencies can use these modes to provide better transportation options to marginalized communities that are further from light rail lines or regional centers, at a lower cost than running new buses or trains. They can also help connect people who work a night shift when transit doesn't run, or in a large industrial area where transit doesn't provide door-to-door service, with their jobs.

…if we remove the barriers to using these services.

Half of low-income households lack a smartphone, and many others cannot afford a data plan or the extra cost of new services. People in wheelchairs cannot rely on finding an accessible vehicle or a helping hand when relying on shared services. Many others lack the knowledge, English fluency, or access to a bank account necessary to use app-based services. And while TNCs or car

share are more affordable than owning a car, they are still expensive compared to transit. As a result, the people who use new mobility services are more likely to be white, wealthy, and young.[10] In order to make sure that everyone benefits from these services, we need to make digital access a universal right, and work with community groups and new transportation services to bring better mobility to everyone, starting with those who need it most. We also need to continue to provide high-quality transit throughout the region, so that people can use new mobility services for short, affordable trips to transit stations rather than paying for longer trips.

Congestion

As our region grows, our transportation system is becoming more crowded. Measuring congestion is challenging, but recent studies have found that our region sees the type of congestion normally found in much larger metropolitan areas.[11] These patterns are largely due to where and how our region is growing; as discussed above people are being priced out of the region's centers and moving to places that are further from jobs and other destinations and harder to serve with transit, leading to more driving.

Emerging technologies can help reduce congestion…

New mobility services making it easier for people to share vehicles and rides, and when people share trips it helps to take cars off the road. Emerging technologies like dynamic routing and automated vehicles can also be used to improve transit service. Increased communication between vehicles and infrastructure makes it possible to manage and price the congestion more efficiently and equitably. And once enough autonomous vehicles are on the road, it should be possible for cars to travel close together at high speeds, moving traffic more efficiently.

…if they support transit, shared trips, and active transportation.

The majority of studies have found that TNCs and car share draw riders away from transit, which remains the most efficient way to move people along crowded streets. TNC studies from multiple cities have found TNCs draw more people away from modes that produce less congestion, like transit, walking, bicycling, and carpooling, than they do from driving alone.[12] TNCs with one passenger likely even increase congestion compared to driving alone, because they travel extra miles to pick people up and because roaming vehicles tend to congregate in congested places while awaiting rides. Meanwhile, vehicles making pickups and drop-offs in inappropriate places can delay transit and create unsafe conditions for bicyclists and other drivers. We need to continue to make transit, walking, and bicycling, which are the modes that produce the least congestion, the most convenient ways to travel, and use emerging technologies to facilitate shared trips and connect people to transit while managing conflicts and competition among modes.

Advancing the public interest

Metro and our public agency partners have a long tradition of working in collaboration with residents, businesses and community groups to create livable communities. This tradition extends to our work on technology; Metro and our partners have led the way in using technology to provide better travel information and manage the transportation system. For example, TriMet

developed the data format that is now used by transit agencies across the country to make schedule information available online, ODOT is one of the first state departments of transportation to test technology-enabled per-mile road pricing, and Metro has supported travel information and management programs across the region through our grant programs.

Public agencies can take an active role in shaping how technology impacts our region… Private companies are now leading the way in deploying new transportation technologies. This gives us a new set of partners who share our interest in a well-maintained, well-functioning transportation system, as well as in testing innovative new ways to move people and goods. It also means that public agencies need to take an active role in ensuring that new developments in technology help meet the needs of all our residents, rather than only those who can access and afford them, and create great communities in our region.

…if we're clear about our goals and we develop the tools that we need to reach them. Most cities in our region haven't set policies or made plans regarding emerging technologies. The differing needs, resources, and cultures of public agencies and private companies can make it hard to find opportunities for collaboration. We need to establish a vision for how technology can meet our regional goals and develop tools to achieve that vision.

Early successes in creating a smarter region

The City of Portland, in collaboration with many other public agencies and private companies, was one of seven finalists selected for the $40 million USDOT Smart City Challenge, with a proposal to collect and share data that would bring better travel choices to residents and help the City make better planning decisions. Though Portland did not win the City and its partners continue to collaborate to implement aspects of the plan. TriMet, long an innovator in providing better transit data to the public, won a grant to integrate information on TNC service to its transit planning app. A group of regional partners won a grant to provide real-time information to travelers along the I-84 corridor. And Portland has drafted a policy on AVs and released a call for projects to test AVs and related technology.

Meanwhile, Hillsboro was a finalist for the Bloomberg Mayors' challenge with a proposal to integrate both existing and emerging modes of transportation at hubs throughout the city, and is currently working on developing a Smart City plan. Organizations such as the Technology Association of Oregon, Forth, University of Oregon's Sustainable Cities Institute, and Portland State University, provide local and national thought leadership on technology-related issues. And partners including the Westside Transportation Alliance, Oregon DOT, and Ride Connection have developed innovative new ways to provide travel information and collect data, often with support from Metro. These early successes lay the foundation for Metro and our partners to collaborate and lead the way in creating a smarter transportation system.

THE NEXT FOUR DECADES

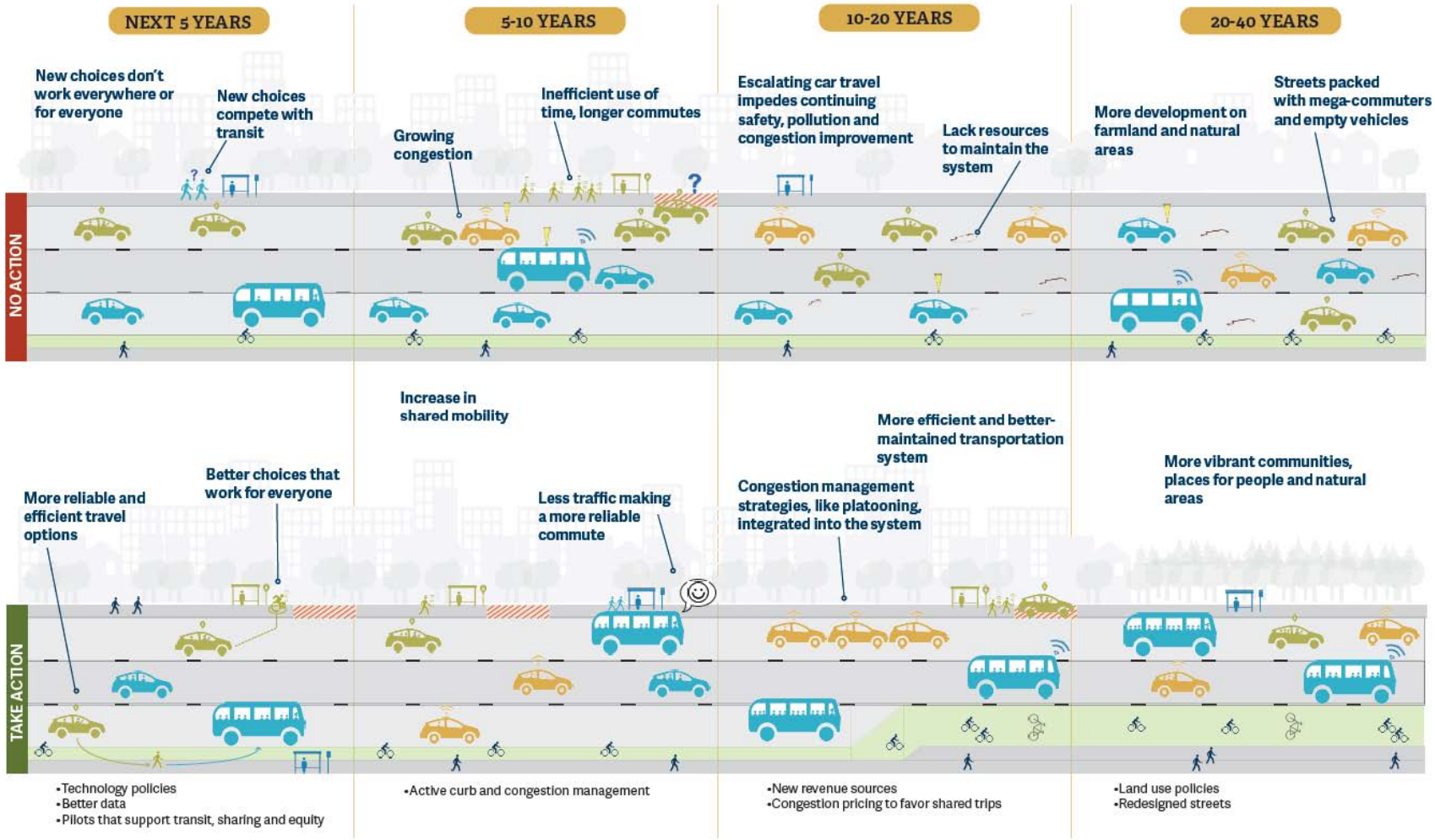
Over the longer term, we expect that technology will have broad and profound impacts on how people travel as vehicle technology continues to advance and more people use TNCs, car and bike share, and other new mobility services to get around. Emerging technologies stand to affect every one of our regional goals, both for better and worse, as summarized in Table 1. Our regional goals are summarized and consolidated below for ease of reading; the full text of the goals can be found in the 2018 Regional Transportation Plan.

Table 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.	Our region sprawls as driving becomes more convenient.
Prosperity	New mobility companies bring new jobs to the region, and people are able to spend more time working 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	New shared services arise, carpooling becomes easier, and transit becomes more efficient.	Driving alone becomes more convenient and new services compete with transit instead of increasing options overall.
Congestion	Congestion falls as AVs use roadway space more efficiently, carpooling becomes easier, and transit becomes more efficient.	Congestion increases as driving becomes more convenient, vehicles travel greater distances in order to move fewer people, there are more conflicts in high-demand areas and delivery vehicles clog local streets.
Safety	AVs 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 and new modes compete with transit, bicycling, and walking.
Equity	People who cannot or do not drive have more choices, and these choices become more affordable as technology advances.	New services focus on giving affluent riders better service at a higher cost, while others face barriers to accessing new technologies 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.
Accountability	Collecting transportation data becomes more efficient.	New mobility companies withhold data from public agencies and resist oversight.
Vibrant communities	We have more space for people instead of vehicles, particularly in regional centers.	Our region sprawls as driving becomes more convenient.

At this point, we cannot predict whether technology will support our goals or make it harder to achieve them. That outcome depends in large part on the actions that Metro and our partners take. What is clear is that we can begin to chart a course toward a positive future by taking action today to address the most pressing issues that technology presents. If we make sure that new mobility services work for everyone and support transit, shared trips, walking, and bicycling, we lay the foundation for reducing congestion, protecting the environment, and creating vibrant communities. By starting with the impacts that are already happening, we can also develop the tools that we will need to influence how technology develops over the long term. Figure 1 illustrates how taking action today can set us up for future success—as well as what might happen if we don't act.

Figure 1. What the region's future could look like if we take action on technology—and if we don't



How we can work with different emerging technologies

The assessment above looks at the impact of emerging technologies as a whole, which is helpful in identifying the general trends that we can expect to face, but masks the distinction between technologies. As we move forward with implementing the strategy, Metro and our partners will be faced with decisions about how to respond to the unique opportunities and challenges presented by different technologies as they reach maturity or as companies launch new services in our region. By looking at the impacts of different technologies, and our influence over them, we can identify more specific next steps for implementing our technology policies.

Table 2 summarizes the impacts of the different technologies covered in this strategy on each of our regional goals. Appendix 2 contains more detailed information on individual technologies.

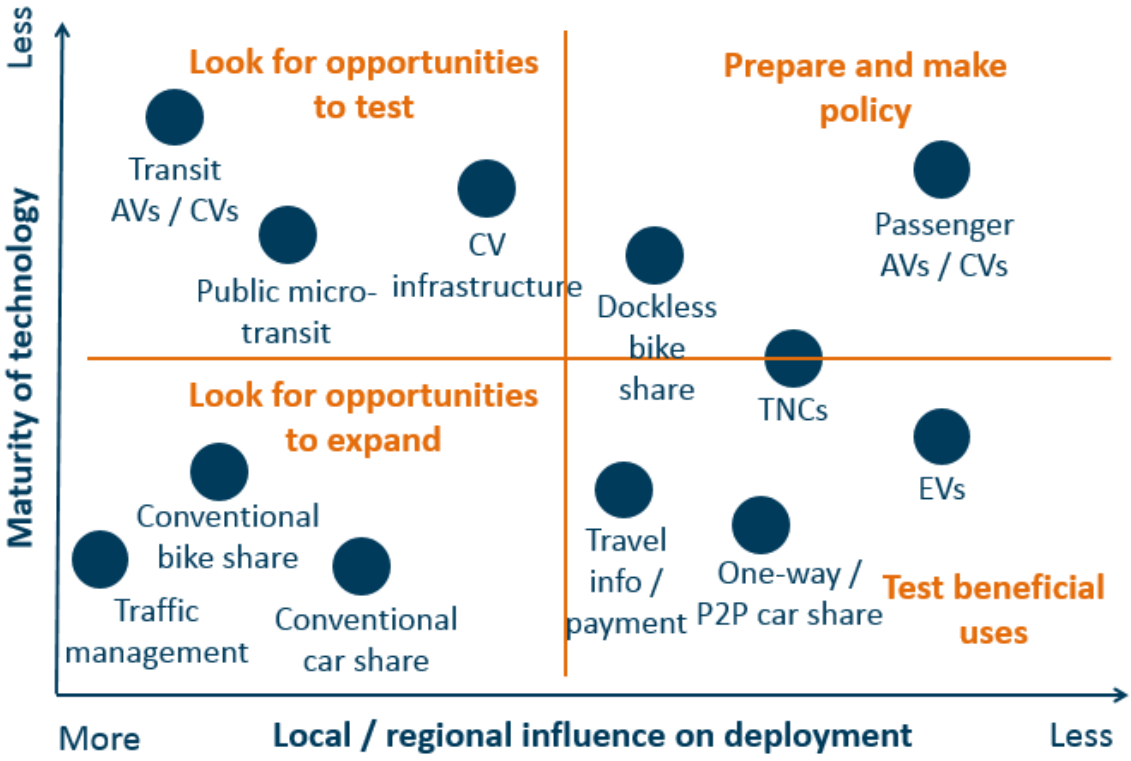
Table 2. How different emerging technologies are likely to impact our regional goals

Goal	AVs/CVs	CV infrastructure	EVs	Transportation network	Public microtransit	Private microtransit	Car share	Bike share	Travel information / payment
Vibrant communities	+/-						+		
Economic prosperity	-			-				+	
Transportation choices	+/-	+		+/-	+	-	+		+/-
Congestion	+/-			+/-	+	+	+		
Safety	+	+		-					
Environment	-		+				+	+	
Health			+					+	
Equity	+/-		+/-	+/-	+	-	+/-	+/-	+/-
Accountability	-	+		+/-	+	-	+	+/-	-
Fiscal stewardship		+	-		+	-			

+: Generally positive impact
+/-: Mixed impact
-: Generally negative impact
(blank): Neutral / not enough information to assess impacts

Some emerging technologies are already mature. Others have arrived but continue to grow and evolve, and many are still on the horizon. Public sector influence on emerging technologies also varies; in some cases the public sector deploys technologies directly or influences where and how technologies operate by issuing permits or allocating space and in other cases technologies operate with very little public oversight. These factors shape how public agencies can best respond to different emerging technologies, as shown in Figure 2.

Figure 2. How public agencies can respond to different technologies based on maturity of and public influence

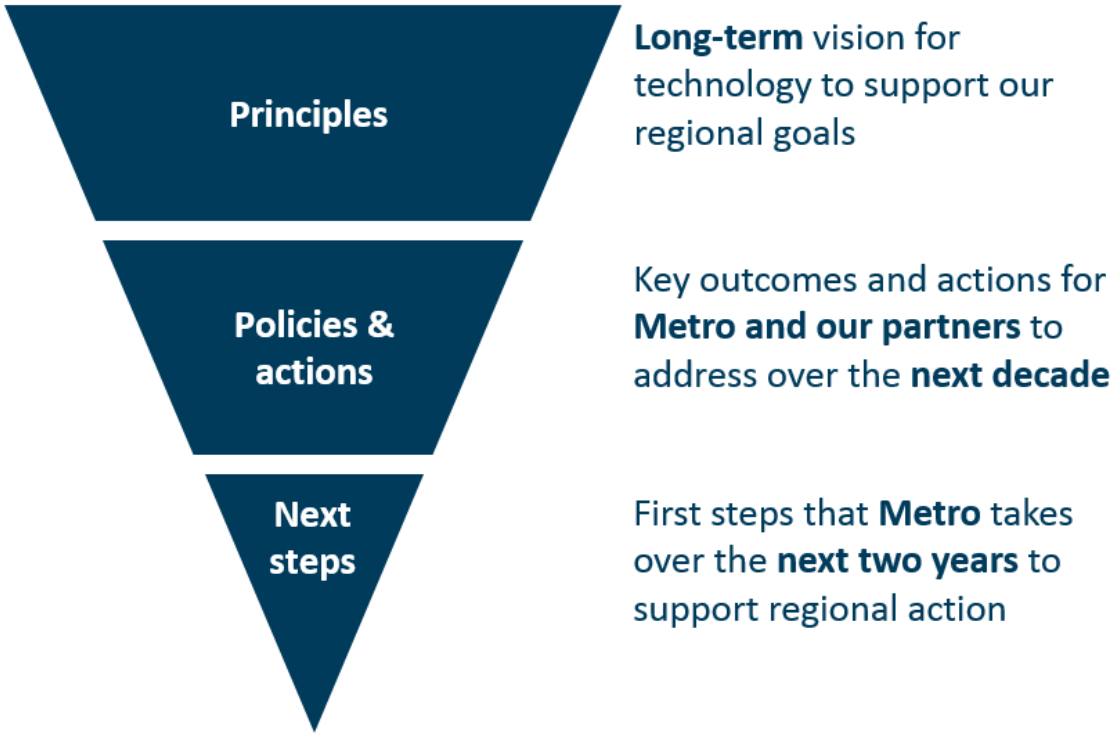


For mature technologies over which local and regional agencies have strong influence (conventional bike and car share, traffic management technologies), we have ample information on how they work, and can look for the right opportunities to expand these technologies to new communities. For those that are operating at scale without much public oversight (TNCs, EVs, third party travel information, and newer car share models) we need to test the ways that we think that these technologies can benefit the region and see how they work. For example, we can try using these technologies to connect people to transit or meet the mobility needs of historically marginalized people. Public agencies should look for initial opportunities to deploy technologies that are still on the horizon and can help us better operate and manage the transportation system. These include new technologies that can benefit transit, and to a lesser extent CV infrastructure, where there is still a fair amount of uncertainty over what information the vehicles of the future will need from the roadside. Lastly, for technologies that are still on the horizon and largely in the hands of the private sector (particularly AVs, but also dockless bike share and TNCs, which continue to grow rapidly and will continue to evolve as companies deploy AVs), public agencies need to prepare by developing forecasts and collecting information to inform policies and guide how these technologies are deployed.

EMERGING TECHNOLOGY VISION, POLICIES AND ACTIONS

The Emerging Technology Strategy begins with principles that outline a broad, long-term vision for how technology can support our regional goals and then focuses in on the critical steps we can take now to implement this vision. Policies and actions describe how Metro and our public agency partners can tackle the most pressing technology-related issues and opportunities that are likely to arise over the next decade in order to set ourselves on a positive long-term course. Next steps highlight what Metro will do in the coming two years to support our partners in moving forward with policies and actions.

Figure 3. Emerging technology policy framework



Principles

Principles articulate a long-term vision for how technology should support our regional goals. They apply both to public agencies and new mobility companies. They guide Metro and our partners in planning for and working with emerging technologies, as well as in identifying companies that share our goals when developing partnerships and pilot projects.

Vibrant communities: Emerging technologies 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 technologies create should more efficient ways to meet the transportation needs of local businesses and workers.

Choices: Emerging technologies should improve transit service, provide shared travel options throughout the region, and support transit, bicycling and walking.

Congestion: Emerging technologies should reduce congestion by promoting shared trips, decreasing vehicle miles traveled, minimizing conflicts between modes, and managing demand.

Safety: Emerging technologies 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, maintaining, and building the transportation system, and new technologies should make it possible to collect transportation revenues efficiently and equitably. Public agencies should source new ideas and technologies competitively to get the best return on public investments.

Accountability: Companies and public agencies collaborate and share data to help make the transportation system better for everyone.

Policies and actions

The following four policies cover the issues that Metro and our public agency partners have identified as the most pressing to address over the next decade in order to stay on track to meet our regional goals as technology and mobility continue to evolve.

Figure 4. Technology strategy focus areas

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

Equity: Make emerging technologies accessible, available, and affordable to all, and use these technologies to create more equitable communities.

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

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

These four policies are interrelated. In order to bring new and better transportation choices to the region we need to make sure that these options work for everyone. We need sound information and an innovative approach to identify, implement, and evaluate the projects that work best for our region. These policies are also critical to meeting our longer-term goals. We need to make transit and shared trips the easiest way to travel in a vehicle to make the most of emerging technologies' potential to reduce congestion and pollution, improve safety, and support our regional land use vision, and we need the right data and approach to protect the public interest as new technologies arrive. Table 3 below summarizes how the policies are related to the broader set of principles outlined above.

Table 3. Relationships between policy areas and principles

Policy area	Related principles
Equity	**Prosperity**: the transportation sector provides family-wage jobs for many people of color and lower-income households, and we need to help workers impacted by automation transition to new opportunities. **Choices**: HMCs are more likely to rely on transit and affordable, shared travel options, so these choices will be more widely used if HMCs have good access to them.
Choices	**Vibrant Communities**: transit, shared trips, and active transportation move people efficiently, freeing up space for people instead of cars. A thriving transit network is the backbone of our land use vision. **Prosperity**: Better choices mean less congestion and better access to jobs. **Congestion**: transit, shared trips, and active transportation all move people more efficiently than driving alone, reducing congestion. If AV trips aren't shared, the resulting increase in vehicle travel may outweigh the benefits of vehicles moving more efficiently. **Safety**: Minimizing conflicts between new mobility services and bicyclists and pedestrians protects vulnerable users from crashes. **Environment**: Shared vehicles and trips make electric or clean energy vehicles accessible for all. **Equity**: Improving transit service helps marginalized people, who are more likely to rely on transit, reach their destinations.
Information	**Choices**: Providing better travel information can help people who are used to driving alone find ways to take transit or share trips. **Congestion**: Public agencies need real-time transportation data to effectively manage and price congestion. **Safety**: As agencies collect increasing amounts of data, we need to protect people's confidential information. **Fiscal stewardship**: Data is an increasingly valuable resource, and we need to be as fastidious in managing our data as we are in managing our infrastructure. **Accountability**: We need data on new mobility services to assess how they are impacting our goals.
Innovation	**Prosperity**: Pursuing partnerships with new mobility companies can help attract additional resources. **Congestion**: We will need to anticipate the needs and characteristics of tomorrow's transportation system to effectively manage congestion. **Fiscal stewardship**: Pilot testing emerging technologies can be a more cost-effective way of learning about them than funding research or planning efforts.

Equity

Make emerging technologies accessible, available, and affordable to all, and use these technologies to create more equitable communities.

Metro and our partners are responsible for ensuring that the transportation system serves all people, particularly those in the greatest need. In particular, we know that communities of color often face the most significant barriers to accessing our transportation system; if we can reduce the barriers that these communities face, we improve access to the transportation system for all residents. New mobility services have the potential to bring more flexible transportation options to 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 night shift workers, people with disabilities, people who are displaced to areas that lack frequent transit service, and others. We will use new mobility services to fill these equity gaps while helping transportation workers who see their jobs threatened by automation 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 the economy changes.

Implementation actions

Partner with historically marginalized communities to identify barriers to accessing emerging technologies, understand the impact that new mobility services are having on displacement and transportation access, and develop solutions. (Metro, cities and counties, transit agencies)

Enable all people—regardless of race, age, language and culture, immigration status, banking status, and digital access—to access new mobility services. (Metro, cities and counties, transit agencies)

Develop standards for wheelchair accessibility and service equity for new mobility services. (Metro, cities and counties, transit agencies)

Create affordable payment options to help low-income people access new mobility services that meet their transportation needs. (Metro, cities and counties, transit agencies)

Use new mobility services to connect historically marginalized communities to transit stations and to employment centers, community services, and other destinations that are not well-served by transit. (Cities and counties, transit agencies)

Use technology to improve paratransit and human service transportation. (transit agencies)

Develop programs to help transportation workers whose jobs are affected by automation find new opportunities. (Transit agencies)

Choices

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

Emerging technologies have already given people in our region new ways to get around, whether by taking car or bike share, hailing a ride with a TNC, or simply making it easier for people to learn about and pay for transit. 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 technologies' potential to reduce congestion and pollution, improve safety, and support vibrant communities, we need to use these technologies 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 applications of emerging technologies 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. • Congestion and emissions fall. • 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. • Congestion and emissions rise. • New options are concentrated in urban areas.

Implementation actions

Price, manage, and design streets to reduce vehicle miles traveled and prioritize transit use and shared travel. (ODOT, Metro, cities and counties, transit agencies)

Design and manage the curbside to minimize conflicts between new mobility services and transit riders, bicyclists, and pedestrians. (ODOT, Metro, cities and counties, transit agencies)

Support and deploy emerging technologies that reduce vehicle miles traveled by connecting people to transit or providing shared trips, particularly in communities that currently lack choices. (Metro, cities and counties, transit agencies)

Explore and pilot test technologies such as automated vehicles and dynamic routing to improve transit service. (Metro, transit agencies)

Work with travel information services to avoid routing drivers along neighborhood streets, through school zones, and in other areas where bicyclists and pedestrians are vulnerable to safety risks from increased traffic. (ODOT, Metro, cities and counties)

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. We will make sure that high-quality data is available on all transportation options in the region and that information is presented in a way that allows travelers to seamlessly plan and book trips. We will also develop the data that Metro and our partners 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 work to develop 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 technologies are 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. • We waste resources on collecting and sharing data.

Implementation actions

Create or support services that allow people to compare and book travel options and multimodal trips seamlessly and competitively. (ODOT, Metro, cities and counties, transit agencies)

Modernize and share public agency data on transit service and bicycle/pedestrian infrastructure. (ODOT, Metro, cities and counties, transit agencies)

Conduct education and outreach to help travelers understand and use new mobility services that align with our principles. (ODOT, Metro, cities and counties)

Develop data policies that ensure access to and responsible usage of public agency data. (ODOT, Metro, cities and counties, transit agencies)

Collect data, conduct research, and conduct education and outreach on usage and impacts of emerging technologies. (Metro)

Increase capacity to send data to and collect data from the roadside. (ODOT, cities and counties)

Identify data that serves the public interest and share it in a way that protects confidentiality while supporting public decision-making. (Metro)

Develop congestion pricing systems that address the impacts of emerging technologies on travel and transportation revenues and use technology to price travel more effectively and equitably. (ODOT, Metro)

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 that last for 50 years and an unchanging set of transportation services. It can take decades to plan and build a project, and once 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 technologies 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 of new developments. 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.

Implementation actions

Use Metro funds and leverage local dollars to support emerging technology projects that align with our principles, with particular focus on projects that meet the needs of historically marginalized communities, encourage shared trips, with a particular focus on connecting people to high-frequency transit in areas that lack good bicycle, pedestrian, or local bus connections. (Metro, cities and counties)

Partner with new mobility companies, employers, researchers, and community groups when developing and implementing pilot projects. (Metro, cities and counties, transit agencies)

Develop and test new data, tools, systems and models to plan, manage, and price the transportation system. (ODOT, Metro, cities and counties, transit agencies)

Next steps

Below we discuss four steps that Metro will take in the next two years to advance our work on emerging technologies. For each, we describe key six-month and one-year milestones so that we can gauge our progress and change course if necessary. We will revisit and update this section of the strategy on an annual basis so that we can respond to new developments.

Fund technology pilot projects

Pilot projects are a cost-effective way to develop the information and partnerships that we need to make sure that emerging technologies benefit our region. One benefit of these technologies is that they lower the cost of trying new approaches to transportation. For example, instead of developing a new shuttle service that connects people to transit, we can now partner with shared mobility providers that are already operating in our communities to provide a similar service for a limited time, see how it works and decide whether it merits a long-term investment—all for less time and money than it would take us to plan and start up a new service.

Metro will develop a new pilot program, the Technology Grant Innovation Fund (TGIF), focused on testing how emerging technologies can meet the needs of historically marginalized communities, better connect people to transit, and facilitate shared trips, shared transportation choices or, and collect data to inform future decisions. Our goals are to support projects that provide Metro and our partners with information on how technologies can best support these outcomes and develop partnerships that enable longer-term success. Even projects that fall short of their intended outcomes can produce valuable partnerships and information about how emerging technologies can help us create more equitable and livable communities (see the example in the text box).

Community EV and e-Bike Project

One of the first technology pilot projects in the region with an equity focus was the Community Electric Vehicle and e-Bike Project, a collaboration between Hacienda CDC and Forth. Over the course of a year, the project made three electric vehicles, as well as a fleet of electric bikes, available to residents of the Cully neighborhood, which has a large Latinx population and lacks high-frequency transit. Both the EVs and e-bikes were widely used by residents. The project also illuminated some of the challenges with using shared mobility to meet the needs of marginalized communities. For example, usage of the EVs was limited by the peer-to-peer car share platform used to manage them, which only allowed day-long rentals during business hours; more flexible platforms are available in the region, but do not offer service in Cully. We may need new sharing platforms in order to help historically marginalized communities use shared mobility.

The pilot projects that we are interested in exploring include:

- Developing services or conducting outreach and education to remove barriers that historically marginalized communities (HMCs) face to accessing new mobility services.
- Partnering with community groups to develop and implement shared mobility services or projects that meet the transportation needs of HMCs.

- Using new mobility services to connect people to transit stations when walking, bicycling, or taking local transit service isn't an option.
- Providing shared rides for people who would otherwise drive alone.
- Using connected vehicle technology or dynamic routing to improve transit service.
- Testing new technologies or approaches for managing new mobility services, such as curbside management and occupancy-based pricing.
- Providing people with better transportation data and incentivizing shared and active transportation choices.

Metro will also support technology projects through two of our existing programs: the Regional Travel Options (RTO) program, which supports regional partners, including community based organizations, to do outreach and education projects and small-scale infrastructure improvements that increase walking, biking, ride sharing, telecommuting and public transit use; and the Transportation System Management and Operations (TSMO) program, which supports the region's transit service and road operators in deploying new management technologies. Table 4 shows how TGIF, RTO, and TSMO could support some of the pilot projects listed above.

Table 4: Opportunities to implement emerging technology projects through Metro programs

	Travel information, apps, and incentives	New mobility services	AV/CV/EV
TGIF	• Services to remove barriers to access for HMCs • Community partnerships that use new mobility to meet the needs of HMCs	• Services to remove barriers to access for HMCs • Community partnerships that use new mobility to meet the needs of HMCs • Shared mobility pilots that connect people to/from transit stations • Pilot testing technologies for occupancy-based pricing	• Shared EV, AV, or e-bike pilots in HMCs
RTO	• Improved public agency data on transportation options • Commute management and incentive apps • Services to remove barriers to access for HMCs	• Outreach, research and partnerships to help HMCs access services and develop projects • Services to remove barriers to access for HMCs	• Promotion of AV/CV/EV services the reduce single occupant vehicle trips
TSMO	• Systems to manage and share real-time transportation data • Incentives to reduce vehicle trips during peak periods	• Pilot testing technologies for occupancy-based pricing and curbside management	• CV, AV, or dynamically routed transit • Systems and standards for CV transit and passenger vehicles

Within the next six months, Metro will establish the program structure and evaluation criteria for a new innovation grant program, and issue a call for projects that use technology to help advance the four policies identified earlier in this chapter. We will also update the RTO and TSMO program guidelines to better support emerging technology projects.

Within the next year, we will select and fund the first round of TGIF projects, as well as the next round of RTO and TSMO projects.

Convene stakeholders to establish consistent new mobility policies across the region

TNCs, microtransit, and car and bike share are expanding rapidly and bringing exciting new transportation options to cities. That progress has come with some growing pains as new mobility companies grow from small startups into multimillion-dollar semi-public transportation services and public agencies struggle to keep up with new developments. Companies have faced fines and settlements for violating insurance requirements,[13] defrauding customers,[14] failing to accommodate people in wheelchairs,[15] and failing to investigate drivers who received complaints for driving under the influence.[16] Public agencies are also increasingly working with communications companies to collect and house a growing amount of data, and need to do so in a way that protects people's privacy and ensures ongoing access to public data for key stakeholders.

It can be challenging for a community to develop policies that address new technologies that aren't yet operating at scale. However, if we wait to take action until new services mature, we risk disrupting transportation options that people have come to rely on. We need to develop policies to ensure that new mobility services operate safely, equitably, and transparently, while protecting competitive information for the companies that operate these services and allowing them the flexibility to innovate. To the extent possible, these policies should be uniform throughout the region to give companies a consistent operating environment. There are plenty of examples from other communities for us to draw on; for instance, counties and cities of all sizes in Washington have adopted TNC ordinances, often in coordination with each other.[17]

Within the next six months, Metro will share information through the Emerging Technology Working Group on policy issues and approaches from other cities and identify next steps.

Within the next year, we will work with our partners to support the development of new mobility policies, potentially including regulatory, data-sharing, or incentive-based approaches. We will also identify how Metro can best support our partners, for example by developing model policy language, helping to coordinate or administer joint regulations, or collecting and sharing data.

Develop better data and tools to plan for emerging technologies

Based on the information we have today—including Metro's surveys, data from our partners, and a growing body of research—we know that emerging technologies are impacting our region and can identify the first steps we need to take toward our goals. As our work progresses, Metro and our partners will need more detailed information to better understand where and how emerging technologies are impacting our region. Pilot projects are one way for us to get that information, but we also need to explore other tools and data sources that can help us anticipate and plan for the impacts of emerging technologies, including:

- Collecting travel data on new mobility services so that we know how they help meet people's transportation needs throughout the region.
- Modeling the impacts of AVs and increased use of new mobility services so that we can prepare for more sweeping impacts to land use, congestion, and transportation revenues.
- Collecting more up-to-date data on travel behavior so that we can analyze the broader impacts of new services, technologies, and projects on people's transportation choices.
- Sharing real-time data on transportation performance among public agencies so that we can better manage the transportation system and give travelers up-to-date information that they increasingly rely on to plan trips.

Within the next six months, Metro will use our travel and land use models to forecast the impacts of AVs and shared mobility on our region, examining a variety of potential future scenarios. We will also explore new data sources and data-sharing partnerships with new mobility companies.

Within the next year, we will identify strategies to refine our data and models so that Metro and our partners have better information on how new mobility services are being used today and on how they will impact our region tomorrow. These strategies could include revising the surveys that inform our travel model to better capture how people use shared modes, updating these services more frequently so that our model is more responsive to the accelerating pace of technological change, or licensing private data sources that provide more detailed and comprehensive information on how we travel.

Advocate for state and federal technology policy that supports our regional goals

Many of the important policy decisions regarding emerging technologies, particularly automated vehicles, currently rest with the state and federal government. It makes sense to address many policy issues, such as safety testing, licensing and registration, and liability at the state and federal level for consistency's sake or because state and federal agencies already have the capacity to administer regulations. At the same time, cities and regional agencies, both in the Portland area and across the U.S., have a strong interest in getting emerging technology policy right, because new mobility services and their customers—as well as their impacts, both for better and worse—are concentrated in metropolitan areas. Cities and regions also plan and manage the streets on which the majority of AV travel will take place. Metro will advocate alongside and on behalf of our partners for state and federal policy that supports our regional goals and maintains local and regional authority to manage the transportation system.

Over the next two years, Metro will participate in the State of Oregon's Autonomous Vehicle Task Force and work with our partners to weigh in with a unified voice on other state and federal policymaking efforts related to emerging technologies.

GLOSSARY

Emerging technology is 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.

We discuss the following emerging technologies in this strategy:

Automated vehicles (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;[18] in this plan we focus on Level 4 or 5 AVs, which can operate independently under most or all conditions.

Connected vehicles (CVs) communicate with each other or with infrastructure like traffic signals and incident management systems. Since it seems increasingly likely that vehicles in the near future will include both automated and connected elements, we typically use "AVs" to refer to both AVs and CVs.

Connected vehicle (CV) infrastructure, such as traffic signals and roadside sensors, communicates information to CVs in order to help them navigate the transportation system safely and efficiently.

Electric vehicles (EVs) use electric motors for propulsion instead of or in addition to gasoline motors.

Transportation network companies (TNCs) like Uber and Lyft use apps and websites to connect passengers with drivers who provide rides in their personal vehicles.

Microtransit services such as Via, Chariot, and Leap use smart phones to allow riders to book trips and collect data to tailor routes, and typically serve these routes with vehicles that are smaller than conventional buses but larger than private vehicles.

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.

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.

Traveler information and payment refers to the numerous new ways in which technology enables people to learn about and pay for their travel options online. These services can help people compare different ways of getting around (moovel, 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, Uber/Lyft).

Common ways of grouping some of these technologies together include:

New mobility services refers to transportation services like TNCs, microtransit, car share and bike share, which are powered by smart phones and other emerging technologies. These services are usually privately operated by **new mobility companies**.

Shared mobility describes newer services that allow people to share a vehicle, such as TNCs, car and bike share, and microtransit, as well as traditional shared modes like transit, car- or vanpools, and taxis. These services are usually privately operated, by **shared mobility companies**.

Shared trips are trips taken by multiple passengers in a single vehicle, including carpools, transit trips, and some TNC or car share trips.

Smart cities refers to the ways in which public agencies are using technology to collect better data, provide better service, do business more efficiently, and make better decisions.

ENDNOTES

[1] Metro, 2017 Regional Travel Options Survey.

[2] http://www.oregonlive.com/commuting/index.ssf/2015/10/uber_lyft_now_dominate_portlan.html

[3] Conversations with Portland Bureau of Transportation staff and commissioners.

[4] https://bikeportland.org/2018/03/26/why-is-limebike-hiring-a-full-time-operations-manager-in-portland-272261

[5] Metro, 2017 Regional Travel Options Survey.

[6] https://www.greyb.com/autonomous-cars/

[7] Ibid.

[8] https://www.oregonmetro.gov/news/you-are-here-snapshot-portland-area-housing-costs

[9] https://www.oregonmetro.gov/news/you-are-here-snapshot-housing-affordability-greater-portland

[10] Metro, 2017 Regional Travel Options Survey; Shaheen, Susan; presentation at the Urbanism Next conference, March 5, 2018.

[11] http://www.koin.com/news/study-portland-traffic-among-most-congested-in-nation_20180208092200104/960359400; http://www.oregonlive.com/commuting/index.ssf/2018/02/portland-area_traffic_congesti.html.

[12] Shaheen, Susan; presentation at the Urbanism Next conference, March 5, 2018.

[13] https://www.washingtonpost.com/news/the-switch/wp/2015/06/18/lyft-agrees-to-pay-300000-settlement-for-violating-new-york-insurance-laws/?utm_term=.40102ec6b88f

[14] Ibid.

[15] https://sf.curbed.com/2017/11/7/16618232/chariot-justice-department-disabled-fine-san-francisco

[16] http://www.siliconbeat.com/2017/10/17/uber-pay-750000-fine-inadequate-dui-policies/

[17] http://mrsc.org/Home/Stay-Informed/MRSC-Insight/September-2016/Regulating-Rideshare-Companies-Like-Uber-and-Lyft.aspx

[18] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

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DISCUSSION DRAFT - TECHNICAL APPENDICES

2018 Regional Transportation Plan

Emerging Technology Strategy

A strategy for guiding innovation to support the greater Portland region's goals

April 11, 2018

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APPENDIX 1: FORECASTING THE FUTURE

Below we describe in more detail how technology is likely to develop in the coming decades, as well as how it will affect our goals if we don't act and the actions that public agencies need to take in order to prepare for successive waves of change.

The next five years: rise of the robot cars

How we expect technology to develop

In the next five years, the first AVs will likely hit our streets, and will be operated by TNCs, freight companies, and other private fleets. These first-generation AVs will be significantly more expensive than regular vehicles, but Uber and Lyft, as well as other companies that enter the TNC market, will be happy to pay for them because they reduce the cost of driver labor, which can make up 80 percent of the cost of a TNC trip. Initial AV deployments may be billed as "pilots," using vehicles that do not meet safety standards with a human operator ready to take over if something goes wrong. However, several of these "pilot" projects could be large enough in scale to serve entire cities.[1] AV pilots have already resulted in fatalities and other safety issues.[2]

Most of the first AVs will be EVs. Almost all passenger AVs available today are EVs, because it is easier to automate control of an EV than a regular vehicle.[3]

TNCs will also continue to expand and improve service throughout our region as they recruit new drivers and more people have the opportunity to try them. Other shared mobility services will also likely grow. BIKETOWN and car share companies plan to launch service in new communities in the coming years. New shared mobility models, such as dockless electric bike share, which is available in a small number of other U.S. cities, could also come to our region.

Transit agencies and freight companies will have new opportunities to innovate. Transit agencies across the country are already testing new approaches such as microtransit, AV shuttles, and subsidized TNC trips to connect people to transit. In our region, TriMet is developing resources to help people plan transit trips—including connections to and from transit stations. As these trends converge, people in the region are likely to enjoy new ways to seamlessly make and plan connections to transit. Freight companies and retailers will also continue to experiment with new ways to distribute goods, particularly the growing amount of purchases made online. Innovations such as TNC-style delivery services, drone deliveries and package lockers could change how goods travel along our local streets.

Apps will become the dominant way to access travel information. Whether you're a driver, cyclist, transit rider, or pedestrian, apps are already the most widely-used way to get information on how to get around, and their popularity will continue to grow. Public agencies' success in managing the transportation system will come to depend increasingly on how well people can access travel information via smartphone—particularly via third-

party apps like Google Maps, moovel and Transit App, which are drawing a growing share of users while usage of most public agency apps or websites plateaus or dwindles.

How it could impact our goals

Transportation choices: People in the region will have new ways to get around and plan trips. However, it is less clear whether emerging technologies will meaningfully improve our choices. New mobility services could bring better options to areas where driving is the only way to travel and complement transit, walking, and bicycling. Or they could compete with walking, bicycling, transit, and each other by focusing on serving those who already enjoy access to a variety of travel options.

Equity: As more people in the region turn to app-based transportation services and travel information, we risk leaving those who can't use or afford these services behind. Competition between new modes and transit could impact service that low-income people na dcommunities of color disproportionately rely on.

Accountability: The public will have limited insight into how new technologies are affecting our communities. In most areas of the region these companies do not provide data on how people are using their services nor face requirements to provide safe and equitable service. Federal legislation may prohibit state and local governments from requiring that AVs make vehicle data available.

How the region can prepare

- Develop policies to ensure that new mobility services—especially those that pilot test AVs—operate safely and equitably, and provide the information that we need to plan for our changing system.

Emerging technologies and transit

The rise of TNCs and microtransit has some people wondering whether transit will soon become a thing of the past—especially once AVs enable more affordable, flexible and convenient shared service. So why do we focus so much on transit in this strategy?

The first reason is because a future with transit looks so much brighter than a future without it. Even with shared AVs on the road, transit will remain the most efficient way to move people through congested areas. Transit is the mode that historically marginalized people most rely on for everyday trips, and the one that we can all rely on to keep our region moving in the event of a natural disaster. And the transit network is the backbone of our land use vision, anchoring vibrant communities across our region. New mobility services can reach people in places where transit isn't efficient, and they but it's difficult to imagine them providing all these other benefits.

The second reason is because transit provides great opportunities to innovate. TriMet is already a leader in making it easy for riders to plan and pay for trips online. We'll soon have the chance to pilot test new technologies like microtransit and AVs. Using them to connect people to transit gives us better learning opportunities because we know well how people currently use transit, which makes it easier to see how technologies change travel habits.

- Understand the barriers that people face to using emerging technologies, and work with affected communities to overcome these barriers.
- Pilot test new technologies to see whether they support our goals.
- Forecast how changes in technology will shape the future so that we can better plan for it.

5-10 years: AV fleets fan out

How we expect technology to develop

As AV technology matures, **TNCs and freight companies will begin to phase out human drivers.** This will enable TNCs to cut the cost of trips, potentially making TNCs a viable option for trips to work, the grocery store, and other daily destinations—not only in Portland, but also in communities like Hillsboro, Oregon City, and Gresham. And it likely won't just be Uber and Lyft serving these communities; many traditional automakers, AV technology firms, and car share companies are planning to launch TNC service when AVs arrive.[4] Autonomous transit vehicles should also become available, potentially lowering the cost of providing transit, particularly in areas that are challenging to serve with fixed routes.

We'll use the curbside differently. In addition to parking and bike lanes, the curbside will host increasing numbers of TNC drop-offs, and potentially also more EV charging, microtransit boardings, and new models of freight delivery.

How it could impact our goals

Congestion: In the nearer term, more TNC service likely means more congestion for the region. Researchers have found that TNCs increase vehicle miles traveled and focus on serving areas that are already congested. If AVs enable TNCs to more efficiently provide shared trips, it could help with congestion, and eventually, AVs should streamline traffic because they will be able to platoon and travel at higher speeds. However, the benefits of AVs on congestion will be muted as long as they are in mixed traffic with human drivers.

Prosperity: Close to 30,000 people, or 2.5 percent of workers in the region, drive vehicles for a living, and thousands more drive part-time for TNCs to supplement their incomes. These people could see their jobs threatened by automation. The transportation sector has long offered family-wage job opportunities to people who lack advanced educations, and TNCs have become a way for people who do not have full time employment to make ends meet, so these job losses will mainly impact lower-income households. Also, advances in freight delivery are likely to benefit national businesses and online retailers, making it harder for local businesses to compete. New mobility companies will bring some new jobs to the region, but mostly for skilled workers, and there are unlikely to be enough of these new opportunities to compensate for lost transportation jobs.

The impacts on **transportation choices**, **equity**, and **accountability** discussed in the previous section will also continue apace during this time frame, with some additional nuances. Autonomous transit could provide more flexible, efficient and affordable service, but if TNCs have a head start in deploying AVs it may be hard for transit to recapture riders. AVs could improve travel options for youth, older adults, and others who cannot drive. And the reduced cost of automated TNC trips could make TNCs a more viable option for low-income travelers. However, it seems likely that without significant effort to expand physical, financial, linguistic, and digital access many people will continue to be unable to access new mobility services.

Will the future be shared—and is that a good thing?

"Shared mobility" describes new services that allow people to share a vehicle, such as TNCs, car and bike share, and microtransit, as well as traditional shared modes like transit, car- or vanpools, and taxis. Over time, technology-enabled shared travel could become the norm, which could give people more options that cost less and reduce congestion, but we can't take that for granted.

The number of shared mobility start-ups that have gone under or operate at a loss should give pause to anyone placing all bets on a shared future. Even if shared mobility does prevail, it may not help us achieve our goals, because not all shared modes save people money and decrease traffic. If we want to see shared mobility benefit our region, we need to be specific about the type of sharing that we want to see, and take action to encourage it.

How the region can prepare

- Create programs to help affected transportation workers transition to new jobs
- Continue to develop pilot projects and partnerships with new mobility companies.
- Redesign and manage curb space to reduce conflicts and congestion, prioritize shared trips, and maintain safety, especially for bicyclists and pedestrians
- Price vehicle travel to manage congestion and encourage shared trips.

10-20 years: the AV tipping point

How technology could develop

Sometime in the next two decades we will likely reach the point when **the majority of new vehicles sold—and a significant portion of all vehicles on the road—are automated and electric**. If vehicles use common communications protocols, it will open up new possibilities for using connected vehicle infrastructure to manage the transportation system. Groups of AVs traveling side-by-side will be able to platoon, taking up less space on the roadway.

TNCs and freight could be entirely automated. **We could see TNC service peak** as companies fully deploy AVs and prices drop to the point that **significant numbers of people start to buy AVs for personal use**. Driving will become much more convenient, because people will be able to work, shop, or rest in their cars, and it may be possible to

Will AVs be shared or owned?

Experts describe two potential future scenarios for AVs, one in which they are operated in shared fleets and one in which they are individually owned. Shared AVs would likely mean fewer vehicle miles traveled, less congestion, a richer variety of travel options, and more space for people instead of vehicles. The fact that TNCs will start using AVs at scale years ahead of when they become affordable for most people increases the likelihood of the shared scenario, but it may be hard to provide shared service in more suburban or rural areas where homes and destinations are farther apart, as well as reverse 90 years of car ownership culture. The policies that we have in place could make a significant different in setting us on a path toward a shared future that better supports our regional goals.

dispatch an empty vehicle to run errands, pick up family members or someone who wants to rent the vehicle, or circle the streets instead of parking.

EVs will become as affordable as gasoline-powered vehicles as the cost of making the batteries that power EVs falls. We may need more publicly-available EV charging to accommodate this growth, but if the range that EVs can cover on a single charge increases most EV charging needs could be met at home, work, or wherever shared fleets are headquartered.

How it could impact our goals

Communities: In regional centers, which will see the highest use of shared mobility services, we could see much less demand for parking. This could make it possible to redesign streets that have on-street parking, creating more space for people, as well create new opportunities for development on now-vacant parking lots. It could also spur new development by saving developers money on building parking spaces.

Congestion: It is unclear whether congestion will increase or decline during this phase. On one hand, having more AVs on the road will likely mean that traffic moves more efficiently. On the other, by making it more convenient to drive and making it possible for vehicles to travel without passenger, AVs will likely increase vehicle miles traveled by anywhere from 3 to 68 percent,[5] further straining the region's roads, many of which are already at capacity.

Environment: Similar to congestion, transportation-related pollution and GHG emissions could go up or down during this phase. Vehicles will emit much less pollution per mile, but they will travel more. The significant increase in electricity demand due to electric vehicles—which could grow to 300 times what it is today globally[6]—may require the construction of new dams or the use of other, dirtier sources of energy.

Safety: Safety will likely improve once there are significant numbers of AVs on the road. Automation will eliminate human error in driving, which is responsible for the vast majority of crashes,[7] and even while AVs are in the minority we will see significant benefits. However, the growth in new uses of the curb zone may increase crashes in congested areas.

Transportation revenues: Revenues from two major sources of transportation funding—the gas tax and parking fees—will fall dramatically during this period. Drivers of electric vehicles will pay no gas tax, and even those who drive the next generation of more efficient gasoline-powered vehicles will pay less. Meanwhile, if AV drivers are shared or if drivers are allowed to send their private AVs on a cruise instead of parking them, local governments might not collect any parking fees.

Prosperity: Any decrease in congestion would be a boon for productivity, since many workers will be able to spend more time working and less time in traffic. Even if there is more congestion, AVs will turn the commute into working time for people with office jobs. However, those whose jobs require them to be at a specific location, such as construction workers, healthcare professionals, and teachers, may not be able to work in their AVs, and their productivity may even suffer if congestion increases.

How the region can prepare

- Price travel and develop new revenue sources to fund construction and maintenance of the transportation system
- Develop policies, design communities, and price travel to encourage shared travel and discourage vehicle ownership
- Reduce parking requirements and redesign streets in urban areas

20-40 years: the region, reshaped

How technology is likely to develop

Even according to the most conservative projections, the **majority of travel will be in AVs by 2050**, and **the majority of vehicles on the road will be AVs by 2060**. These changes could come much sooner, particularly if AVs are shared. Platooning and high-speed AV travel could become the norm on our streets, which could be transformed, with fewer, narrower lanes and no traffic signals. The need for parking spaces—already disappearing in urban areas—could also diminish in the suburbs.

How it could impact our goals

Communities: Since cars will need less space on the roadway, and may not need to park at all, we will have more space for people throughout the metro that can be converted to housing, parks, and trails, helping us create thriving centers and neighborhoods—assuming we can find new sources of transportation funding to help us retrofit our streets. However, many of the people who are now able to work while commuting could decide to live further out at the edges of the region, or even travel to Portland-area jobs from areas that are now rural. This could create more development pressure on farmland and natural areas and siphon growth away from now-vibrant communities.

Many of the impacts discussed in the above section will gain force during this period. **Safety** will likely improve for all, those who can work while commuting in their AVs will **prosper**, and **transportation revenues** will continue to dwindle. Advancing technology

will help to reduce **congestion** and benefit the **environment**, but it might not be enough to achieve our goals if AVs trigger sprawl on a scale we haven't seen before.

How the region can prepare

- Develop new land use policies to discourage sprawl and maintain vibrant communities in regional centers
- Reduce parking requirements and redesign streets throughout the region

APPENDIX 2: ASSESSING THE IMPACTS OF EMERGING TECHNOLOGIES

Automated and connected vehicles (AVs)

Automated vehicles use sensors and advanced control systems to operate independently of any input from a human driver, and connected vehicles communicate with each other or with infrastructure like traffic signals and incident management systems. Until recently, automated and connected vehicles were developing independently of each other, but it seems increasingly likely that vehicles in the near future will include both automated and connected elements, and here we use "AVs" to describe both technologies. Transportation experts have developed a five-level system to distinguish between different levels of automation;[8] in this plan we focus on Level 4 or 5 AVs, which can operate independently under most or all conditions.

Status: AVs are not available for purchase yet, but they are being pilot tested in a number of cities. The first consumer-ready models are expected to hit the streets within two years,[9] at a cost that is significantly higher than the cost of a conventional vehicle. Both the U.S. legislature and the State of Oregon are developing policies and regulations around the testing and deployment of AVs. The first generation of passenger AVs are likely to be operated in shared fleets, both by Uber and Lyft and by other operators that are poised to enter the market with the introduction of AVs,[10] because the money that these companies will save on driver labor will offset the additional cost of an AV. For similar reasons, freight companies will also likely be early deployers of AVs. The first AVs will mostly be electric vehicles; for engineering, economic, and environmental reasons nearly every model of AV currently runs on electricity.[11] Sales of AVs will likely outpace sales of non-automated vehicles in 15 to 20 years, and the number of miles traveled in AVs will likely outnumber miles traveled in conventional vehicles within 30 to 40 years.[12]

Public sector influence: Federal and state agencies intend to regulate the testing, safety, and deployment of AVs, but it remains to be seen whether local and regional agencies will have enough oversight to ensure that AVs meet their policy goals. Draft federal AV legislation could pre-empt local governments from managing how AVs operate on their streets,[13] and few of the Portland region's local governments have adopted policies regarding TNCs, which are likely to be the first to deploy AVs.

Promise and peril: AVs will likely have sweeping impacts on the region—both for the better and for the worse. It seems likely that they will create a safer transportation system, but also lead to much greater vehicle use and eliminate jobs. The impacts of AVs on land use, equity, and the environment could be either positive or negative, and we need to start planning today to set the region on a positive course.

Goal	Promise	Peril
Vibrant communities	If shared, AVs could free up vehicle lanes and space currently devoted to parking to create space for people.	If AVs make driving more convenient, people are likely to move further from regional centers. If AVs are allowed to operate at higher speeds on local streets, it could create mini-highways bisecting communities.

Goal	Promise	Peril
Prosperity	Local companies are poised to play a role in deploying AVs.[14] Innovative approaches to AV technology could attract new companies and investment.	Many other metro areas are competing with the Portland Region as technology innovators, and automation will likely eliminate jobs in the transportation sector.
Choices	AVs create opportunities to expand the reach of transit and make carpooling convenient.	It seems likely that by making driving more convenient, AVs will reduce transit ridership,[15] which could in turn lead agencies to eliminate service.
Congestion	AVs will be able to safely follow other vehicles more closely and choose lanes more efficiently, cutting congestion and increasing travel speeds.[16] AVs could enable transit service in areas that are currently not cost-effective to serve.	AVs are likely to increase VMT by making driving more convenient, traveling empty miles to run errands or pick people up, and enabling people who don't drive to travel by car,[17] which could offset their operational benefits.
Safety	AVs are likely to eliminate human error in driving, which is responsible for the vast majority of crashes.[18]	
Environment	The majority of AVs will likely be electric.	By increasing VMT, AVs could lead to growth in emissions even as cars become cleaner. AV-induced sprawl could increase development pressure on farmlands and natural areas
Equity	AVs will likely improve transportation access for those who are unable to or choose not to drive.	Shared-fleet AVs will involve many of the same barriers to equitable access as TNCs and other shared mobility services currently do, and by expanding the reach of these services they could exacerbate inequity. Meanwhile, individually-owned AVs will be more expensive than conventional vehicles.
Accountability	AVs will collect rich data that can be used to monitor, manage, and plan the system.	Federal legislation may prevent local and regional agencies from accessing AV data. AVs are likely to be managed by TNCs, which have avoided sharing data with public agencies.

Connected vehicle (CV) infrastructure

Connected vehicle infrastructure communicates information to CVs in order to help them navigate the transportation system safely and efficiently. It can include traffic signals, incident management systems, sensors, and monitoring systems, as well as the communications infrastructure needed to transmit increasing amounts of data to and from the roadside environment.

Status: Some public agencies and automakers are already using or testing CV infrastructure, but most work in this area is still in the conceptual phase. Going back ovFor over a decade, several cities have used transit signal priority, an early form of CV infrastructure where traffic signals sense approaching buses and modify signal timing in order to move them quickly through intersections. One of the early commercially-available applications in passenger vehicles is in certain Audi models, which sense when a traffic light is red and display the number of seconds remaining until it turns green.[19] FHWA has also been piloting CV infrastructure and devices in three different areas of the U.S. to improve safety and reduce congestion.[20] However, it is not clear whether or how the vehicles of the future will communicate with the roadside and with each other. The federal government recently withdrew a rulemaking process that would have required auto manufacturers to outfit all new models with similar communication equipment so that they could talk with each other and with roadside infrastructure.[21]

Public sector influence: Public agencies have authority over most infrastructure decisions, including installations of CV infrastructure, but until there are consistent standards for how vehicles communicate it will be hard to identify worthwhile large-scale CV projects. Between now and then, there are still more limited ways that public agencies can prepare for CVs, such as increasing data connectivity to and from the roadside in preparation for the CV era, developing policies on the use of CV infrastructure data to ensure that this data is used in a way that benefits the public, and piloting CV applications in transit vehicles, agency fleets, or in collaboration with private fleets.

Promise and peril: Public agencies will be able to manage the transportation system more efficiently, effectively, and safely if we can communicate with vehicles and they communicate with each other. However, it can be challenging to make sure that CV infrastructure investments are worthwhile given the uncertainly around how technology is developing. We also need to make sure that these investments benefit everyone, not just CV drivers.

Goal	Promise	Peril
Choices	There are early opportunities to use CV technology to make transit more efficient and reliable.	
Congestion	CV technology could allow public agencies to active manage the transportation system, rerouting traffic on the fly to avoid congestion and crashes.	

Goal	Promise	Peril
Safety	CVs, whether they have a human driver or are automated, are likely to be safer.[22]	
Accountability	CVs capture data that can be used to operate and monitor the performance of the transportation system more efficiently and thoroughly.	Cars might not provide us with the information that we need to know whether CV infrastructure is helping to meet our goals.

Electric vehicles (EVs)

Electric vehicles (EVs) use electric motors for propulsion instead of or in addition to gasoline motors.

Status: Automakers have been offering EVs for over a decade. In Oregon, as in the rest of the country, only a small share—roughly 100,000 of the 3.1 million passenger vehicles—are EVs.[23] However, EV sales are expected to increase dramatically in the coming years due to falling manufacturing costs, rising global demand, and state policies encouraging EV adoption.[24] According to more ambitious projections, EVs could cost the same as conventional vehicles by 2025 and outpace conventional vehicle sales by 2038.[25] If AVs rapidly take over the transportation system it could accelerate the growth in EV usage since almost all AVs available today are EVs.[26]

Public sector influence: State agencies, including in Oregon, have actively worked to increase the number of EVs on the road. Oregon has adopted emission standards that are stricter than the national standards and require manufacturers to offer more efficient vehicles, potentially including EVs, as well as a zero emissions vehicle mandate that effectively requires that a certain percentage of all vehicles sold be EVs.[27] The state also offers a $2,500 rebate on EV purchases, with an additional $2,500 for low- and moderate-income drivers who trade in an older car when making their purchase.[28] However, local and regional agencies have typically focused on providing public charging, amending codes to require new developments to provide chargers or electrical capacity in parking areas, and outreach. Given that these strategies don't address the primary reasons consumers don't buy EVs—their high cost or the lack of an electric model for many types of vehicles[29]—that most charging occurs at home and at work,[30] and that the pace of new development is relatively slow, it is hard to argue that these actions have a significant impact over EV adoption.

Promise and peril: Electric vehicles are better for the environment and for public health, but since EVs consume less gas we will need to find another way to finance the transportation system besides the gas tax.

Goal	Promise	Peril
Environment	EVs produce fewer emissions than gasoline-powered vehicles.	
Health	EVs emit fewer health-damaging criteria air pollutants	
Equity	Long-term savings on gasoline and maintenance mean that many EVs cost less to own overall than comparable gasoline powered cars—especially given federal and state rebates.	The higher up-front costs of an EV make it hard for low-income people to realize these long-term savings. The most affordable cars available are used, and used EVs are usually significantly more expensive than AVs.
Fiscal stewardship		EV owners buy less gas, and the gas tax is our main source of transportation revenue. It will be necessary to rethink how we fund transportation projects as vehicles get more efficient.

Transportation network companies (TNCs)

Transportation network companies (TNCs) use apps and websites to connect passengers with drivers who provide rides in their personal vehicles.

Status: TNCs are already changing the way that we travel in the Portland region. TNCs provided over ten million rides in the city of Portland in 2017,[31] carrying more people than taxis did,[32] and people in other areas of the region regularly use TNCs for weekend trips and trips to the airport. Two companies, Uber and Lyft, dominate the US TNC market and are the only TNCs serving our region today. However, several other companies are poised to begin operating TNC service in the near future.[33]

Public sector influence: TNCs have maintained that they are not transportation companies, but rather technology services, because they provide a platform that connects riders to drivers and do not operate vehicles. According to this line of thinking, TNCs are not subject to the same regulations as taxis and other transportation services, because they are not directly responsible for passengers' safety or mobility. However, several U.S. cities, counties, and states have challenged this argument and adopted TNC ordinances,[34] and courts in the European Union recently rejected it outright. Unlike neighboring states,[35] the State of Oregon does not currently have any laws in place regulating TNCs, and in our region only the City and Port of Portland currently have TNC regulations in place.[36]

Promise and peril: TNCs have significant long-term potential to expand transportation choices in suburban areas, increase carpooling, and reduce VMT and car ownership. However, the evidence to date finds that TNCs are increasing vehicle travel, competing with public transportation, and providing inequitable service.

Goal	Promise	Peril
Prosperity	TNCs provide flexible opportunities for drivers to earn extra money.	TNC jobs do not offer security or benefits. TNCs have moved to cut drivers' pay,[37] and drivers' jobs will likely be eliminated as AVs are deployed.
Choices	TNCs offer a new way to travel, and have plans to launch carpooling services in the region. Some transit agencies are subsidizing TNC rides to transit stops in order to boost ridership.[38]	TNCs generally focus on serving areas that already enjoy a variety of transportation choices, and attract riders away from transit.[39]
Congestion	Over time, TNCs could help to reduce VMT by facilitating carpooling and allowing people to own fewer cars. In the future, shared management of AVs by TNCs would help to reduce congestion.	TNCs likely increase VMT because they draw people away from transit, travel extra to pick riders up, and enable people to take trips they wouldn't otherwise take[40]—particularly in areas that are already congested.[41] In San Francisco, TNCs accounted for two thirds of congestion-related traffic violations downtown over a three-month period.[42]

Goal	Promise	Peril
Safety		In Portland and other cities, TNCs frequently violate safety requirements and traffic laws.[43] There have been instances of TNCs allowing drivers cited for DUIs to continue driving in spite of zero-tolerance policies.[44]
Equity	In Portland, TNCs face minimum requirements for service equity and disabled access. As AVs lower the cost of service, TNCs could improve transportation choices in HMCs.	TNCs appear to offer worse service to communities of color,[45] and lower-income people are less likely to use TNCs.[46] In spite of efforts to increase access, few TNC vehicles are wheelchair accessible.[47] People who are unbanked, undocumented, limited English proficiency, or lack access to the Internet also face barriers in accessing TNCs.
Accountability		In many cities, TNCs have actively worked to avoid regulators[48] or have failed to enforce regulations.[49]

Microtransit

Microtransit refers to privately-operated transit services that use smart phones to allow riders to book trips and collect data to tailor routes that meet riders' needs, and that typically serve these routes with vehicles that are smaller than conventional buses but larger than passenger vehicles.

Status: There are several microtransit services operating in major cities across the U.S., though none are currently serving our region. Some services, such as Chariot and Leap in San Francisco, essentially offer luxury alternatives to transit, operating along crowded bus lines charging higher fares for guaranteed seats, wi-fi, and other amenities.[50] Others focus on serving areas or high-demand routes that are currently not well-served by transit, such as Via's pilot service in West Sacramento[51] and Bridj's now-defunct service in Cambridge, which may or may not offer luxury service. It remains to be seen whether microtransit is a viable business model, and a number of services have already failed.[52] Riders are satisfied, but microtransit faces competition from both transit and from TNCs, and it is challenging to operate any transit service at a profit, especially when regulations are in place.[53]

Public sector influence: Many cities and states regulate microtransit, licensing services, conducting safety inspections, or requiring disabled access. Some agencies are also funding microtransit pilots in areas that are underserved by transit.[54]

Promise and peril: The benefits of microtransit depend on the service model. Services that offer luxury alternatives to conventional transit would do little to support our goals, but microtransit that provides first- and last-leg connections or serve areas that are hard to serve with conventional transit—which would likely require public collaboration—could be beneficial.

Goal	Promise	Peril
Choices	Because microtransit offers more flexible service, it could bring new choices to areas that are hard to serve with transit, including providing connections to transit stations that boost ridership.	Microtransit services that operate as luxury alternatives to public buses likely attract users away from transit.
Congestion	Microtransit facilitates shared trips among people who would likely otherwise drive.	
Equity	Some microtransit pilots offer phone-based bookings for people that do not have access to apps or the internet.	Most microtransit serves high-income neighborhoods and employment areas at a premium. People who are unbanked, disabled, undocumented, limited English proficiency, or lack access to the Internet also typically face barriers in accessing microtransit.
Fiscal stewardship	Microtransit could provide better service at lower cost in areas with underperforming transit.	Luxury microtransit attracts choice riders away from transit, diminishing revenues

Goal	Promise	Peril
Accountability	There are many models for how to regulate microtransit, and some companies actively share data and collaborate with public agencies.	Many of the jurisdictions where microtransit could provide benefits do not have any regulations in place.

Car share

Car share services allow people to rent a nearby vehicle for short trips and pay only for the time that they use.

Status: Car share has been around for nearly two decades. Today, several different companies are active in the Portland region, operating over 1,000 vehicles and offering different service models.[55] These include:

- Stationary car share (ZipCar, in some cases ReachNow), under which cars are kept at fixed stations, and users typically pick up cars from and return them to the same station. Compared to other models, stationary sharing is better-suited for suburban areas, longer trips, and errands (since a wider variety of vehicle types are available). Stationary car share is currently available throughout Portland's central neighborhoods and Beaverton, Hillsboro, Clackamas Town Center, and the PCC Sylvania campus.[56]
- Free-floating car share (Car2Go, ReachNow), which allows people to pick up and drop off cars anywhere within a defined service area. Free-floating car share allows for more flexible travel than stationary car share, and typically offers only compact cars. It is used mainly for short one-way trips in urban areas, and within the region free-floating carsharing is currently only available in Portland's central neighborhoods.[57]
- Peer-to-peer car share (Getaround, Turo), which enables people to rent cars from their neighbors on a short-term basis through services that provide insurance, enable payment, and manage booking and access. Peer-to-peer services are available in Portland, and used primarily for round trips and daily rentals.

Rapid change makes it hard to anticipate what car share will look like in ten years. Stationary car share, which a decade ago was the only type of car share available, is now facing strong competition from free-floating car share, and both of those models are threatened by the continued growth of TNCs.

Public sector influence: Public agencies have a fair amount of influence over most car share services. Stationary car share often requires space in the right of way or in public parking lots. Free-floating car share typically operates in areas where parking is at a premium, and relies on cities waiving parking fees or restrictions for shared vehicles.

Promise and peril: Research has found that car share users typically drive less and own fewer cars. However, since disadvantaged communities often lack access to car share, not everyone shares in these benefits.

Goal	Promise	Peril
Vibrant communities	Car share members own fewer cars, potentially reducing the space needed for parking in areas where car share is available.[58]	
Choices	Car share provides residents with a new transportation choice.	

Goal	Promise	Peril
Congestion	Stationary car share users, and to a lesser extent, free-floating car share users, drive fewer miles overall.[59]	
Environment	Car share vehicles are more fuel efficient than the average vehicle.[60]	
Equity	Car share can offer an affordable alternative to car ownership.	Car share services are focused on central neighborhoods that tend to be whiter and higher-income.[61] People who are unbanked, disabled, undocumented, limited English proficiency, or lack access to the Internet also face barriers in accessing car share.
Accountability	In many cases, car share services openly collaborate with public agencies in exchange for space or waived parking regulations.	

Bike share

Bike share systems make fleets of bicycles available for short-term rental within a defined service area.

Status: Over the past decade, cities around the world have created bike share systems. The City Portland launched its system, BIKETOWN, in 2016. BIKETOWN serves Portland's central neighborhoods[62] with a fleet of 1,000 bikes, and riders logged over 300,000 trips in its first year.[63] As with car share (see above), early bike share systems required users to pick up and leave bikes at designated stations, while modern systems are more likely to be free-floating or "dockless", which offers users more flexibility. Some systems are also offering or exploring adaptive bikes[64] for disabled riders or electric bikes[65] and scooters[66] that make longer trips easier. BIKETOWN is a hybrid system; bikes are usually kept at stations but users can pay an extra fee to leave a bike at another location in the service area.

Public sector influence: In most cases, a city enters into an exclusive agreement with a private operator to run its bike share system, and maintains oversight to make sure that the system is safe, equitable, and meet community members' needs—particularly in the case of station-based bike share systems, where public agencies play a large role in planning and designating space for stations. However, dockless bike share has the potential to undermine this sole provider model. Companies like Ofo, Limebike, and Spin operate dockless systems in Seattle, Washington D.C., and other U.S. cities, often independently of public oversight, which has led to complaints about illegal parking, safety, and other issues.[67] Seattle has created a pilot program to permit dockless systems in an attempt to address some of these concerns,[68] but cities will likely continue to face a choice between opening the market and making bike share more widely available versus maintaining control over the system.

Promise and peril: Research has found that car share users typically drive less and own fewer cars. However, since disadvantaged communities often lack access to car share, not everyone shares in these benefits.

Goal	Promise	Peril
Choices	Bike share provides people with a new travel option. Even though BIKETOWN does not serve many residential neighborhoods, it provides people who work in central Portland another option for midday trips that they might otherwise need to drive for, and potentially enabling them to commute by transit instead of driving.	
Congestion	Bike share shifts trips away from driving.[69]	

Goal	Promise	Peril
Environment	Bike share provides a low-emissions alternative to driving, particularly electric bikes, which allow people to take longer trips.	
Health	Bike share promotes active transportation.	
Equity	Programs like BIKETOWN For All, which offer discounted memberships, rider training, and easy enrollment for low-income people,[70] can overcome some of the barriers that disadvantaged people face in using bike share.	Bike share system generally focuses on serving central neighborhoods that tend to be whiter and higher-income.[71] People who are unbanked, disabled, undocumented, limited English proficiency, or lack access to the Internet also face barriers in accessing car share.
Accountability	Traditional bike share systems are operated in partnership with public agencies.	A growing number of dockless bike share companies are designed to operate independently of any public oversight.

Traveler information and payment

Technology is enabling a slew of new ways for people to learn about and pay for their travel options online.

Status: Traveler information and payment have been around for as long as maps and coins, but the rise of the Internet and smart phones have created a slew of new ways for people to plan and pay for their trips. A growing and at times bewildering number of applications are available to help people compare different ways of getting around (moovel, 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, Uber/Lyft). Some experts envision a future where all of these information streams are combined into a single app that enables people to seamlessly pick and pay for the best option for any trip, choosing from a variety of convenient shared and active options instead of relying on a personal vehicle. This concept, known as mobility as a service (MaaS), is being tested in Europe,[72] but it faces significant barriers to deployment in our region, including agencies that lack digital data on transit service and the bike/ped network and the two major TNCs' reticence to show comparative information on travel times and costs.

Public sector influence: Initially, the challenge for public agencies was in making their data available online, and many agencies created their own travel information websites and apps. With the growing number of third-party websites and apps, including many that are more widely used than agency-owned options, the challenge now lies in making sure that the information available is presented in a way that supports positive outcomes. For example, some driver information apps direct drivers through school zones to avoid congested routes, and some transit apps display information alongside TNC advertisements, potentially diverting riders away from transit. At the same time, the popularity of third-party apps means that it is seldom worthwhile for public agencies to develop their own platforms for the sake of controlling how information is presented. Public agencies have had limited success influencing how third-party apps present information, and some are considering placing conditions on third-party usage of public data.

Promise and peril: Making more information available on transportation choices supports our regional goals—if that information is presented in the right way and made available to all.

Goal	Promise	Peril
Choices	Better travel information makes people more aware of their choices, and competitive information and payment could help people break the habit of driving alone.	Third-party sites may direct people toward privately-operated services that pay for advertising and away from transit and active transportation.

Goal	Promise	Peril
Equity	A MaaS system would enable public agencies to offer flexible subsidies to low-income and transit-dependent travelers that they could use to pick the mode that works best for them.	Disadvantaged people frequently lack access to apps, data plans, and the Internet. Without additional investment in digital access, these groups will not benefit from enhanced travel information.
Accountability		Third-party apps sometimes use and present public data in ways that don't support our goals.

ENDNOTES

[1] The draft federal legislation governing AVs allows for each manufacturer to deploy 50,000 AVs that are exempt from safety standards in its first year of making AVs, rising to 100,000 AVs in the third year. https://www.congress.gov/bill/115th-congress/senate-bill/1885/text

[2] https://www.nytimes.com/2018/03/23/technology/uber-self-driving-cars-arizona.html

[3] https://www.usatoday.com/story/money/cars/2016/09/19/why-most-self-driving-cars-electric/90614734/

[4] Ibid.

[5] http://www.fehrandpeers.com/autonomous-vehicle-research/

[6] https://www.bloomberg.com/news/articles/2017-07-06/the-electric-car-revolution-is-accelerating

[7] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[8] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[9] https://www.wired.com/story/gm-cruise-self-driving-car-launch-2019/

[10] https://www.redchalk.com/industry/automotive/shifting-gear-future-scenarios-autonomous-vehicle-development/

[11] https://www.usatoday.com/story/money/cars/2016/09/19/why-most-self-driving-cars-electric/90614734/.

[12] http://library.rpa.org/pdf/RPA-New-Mobility-Autonomous-Vehicles-and-the-Region.pdf, p. 16-17; https://www.vtpi.org/avip.pdf, Table 7.

[13] https://nacto.org/2017/10/03/senate-fails-to-address-concerns-of-cities-in-av-bill/

[14] https://newsroom.intel.com/news/intel-mobileye-integration-plans-build-fleet-autonomous-test-cars/

[15] http://www.fehrandpeers.com/fpthink/nextgenerationvehicles/ (Looking for the white paper in which they discuss transit impacts; may need to pester F+P to repost/provide for citation.)

[16] http://www.fehrandpeers.com/av-simulation-research/

[17] http://www.fehrandpeers.com/wp-content/uploads/2017/03/CNU-Article-Autonomous-Rapid-Transit.pdf

[18] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[19] https://www.theverge.com/2016/12/12/13923254/audi-v2i-las-vegas-test-drive-traffic-signals

[20] https://www.its.dot.gov/pilots/index.htm

[21] https://apnews.com/9a605019eeba4ad2934741091105de42

[22] https://www.its.dot.gov/cv_basics/cv_basics_20qs.htm

[23] http://www.oregon.gov/ODOT/DMV/Pages/News/factsstats.aspx; http://blog.caranddriver.com/oregon-adds-rebate-for-electric-vehicles-and-tax-on-bicycles/

[24] https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf, p. 98

[25] https://www.bloomberg.com/news/articles/2017-07-06/the-electric-car-revolution-is-accelerating

[26] https://www.usatoday.com/story/money/cars/2016/09/19/why-most-self-driving-cars-electric/90614734/

[27] http://www.autonews.com/article/20160627/OEM11/306279987/zev-mandates-get-harder-to-ignore

[28] https://forthmobility.org/news/HB2017

[29] https://www.nrel.gov/docs/fy16osti/65279.pdf

[30] http://www.seattle.gov/Documents/Departments/OSE/FINAL%20REPORT_Removing%20Barriers%20to%20EV%20Adoption_TO%20POST.pdf

[31] Conversations with Portland Bureau of Transportation staff.

[32] http://www.oregonlive.com/commuting/index.ssf/2015/10/uber_lyft_now_dominate_portlan.html

[33] These include carsharing companies such as ReachNow (operated by BMW; https://www.geekwire.com/2016/bmw-launch-uber-lyft-competitor-seattle-launches-reachnow-car-sharing-brooklyn/), autonomous vehicle manufacturers like Waymo (https://www.cnbc.com/2017/10/03/alphabet-waymo-self-driving-car-service-fall.html), and automakers , including General Motors (https://www.theverge.com/2016/1/21/10802240/gm-maven-car-sharing-service-price-launch-date-michigan). The rapid growth of new TNC options that Austin, TX saw when Uber and Lyft stopped service (https://www.bizjournals.com/austin/news/2016/06/07/the-complete-field-guide-to-austins-ridesharing.html) also illustrates how quickly TNC services can multiply.

[34] For examples from Washington State, see http://mrsc.org/Home/Stay-Informed/MRSC-Insight/September-2016/Regulating-Rideshare-Companies-Like-Uber-and-Lyft.aspx.

[35] Washington has insurance requirements for TNCs (http://mrsc.org/Home/Stay-Informed/MRSC-Insight/September-2016/Regulating-Rideshare-Companies-Like-Uber-and-Lyft.aspx), and in California the Public Utilities Commission is responsible for licensing TNCs, and has adopted rules and regulations related to drivers, vehicles, drug policy, insurance, data reporting, fares, and wheelchair accessibility.

[36] See the Portland City Code beginning at §16.40.200 (https://www.portlandoregon.gov/citycode/?c=28593). The City of Portland's regulations cover permit applications and fees, vehicle and driver certification, company and vehicle operations, wheelchair accessibility, and insurance; riders pay a 50 cent per ride fee that supports enforcement and accessible service. The Port's regulations are similar except that there is an additional $2.00 fee.

[37] https://thedriverscollectivepdx.com/tnc-rate-info/

[38] For example, see https://www.psta.net/about-psta/press-releases/2016/psta-expands-transit-partnership-with-uber-lyft-across-pinellas-county/ (there are others we can cite too)

[39] http://usa.streetsblog.org/wp-content/uploads/sites/5/2017/10/2017_UCD-ITS-RR-17-07.pdf

[40] http://usa.streetsblog.org/wp-content/uploads/sites/5/2017/10/2017_UCD-ITS-RR-17-07.pdf, http://www.schallerconsult.com/rideservices/unsustainable.pdf

[41] http://www.sfcta.org/tncstoday

[42] http://www.sfexaminer.com/sfpd-uber-lyft-account-two-thirds-congestion-related-traffic-violations-downtown/

[43] Ibid and https://www.portlandoregon.gov/saltzman/article/637492; according to data from the City of Portland 35% of TNC audits revealed at least one violation, and the majority of violations were for safety-related issues, such as failing to carry adequate insurance or a hands-free device.

[44] http://www.cnbc.com/2017/04/13/uber-may-face-1-million-dollar-fine-over-california-drunken-driving-complaints.html.

[45] https://www.portlandoregon.gov/saltzman/article/637492 https://www.washingtonpost.com/news/wonk/wp/2016/03/10/uber-seems-to-offer-better-service-in-areas-with-more-white-people-that-raises-some-tough-questions/?utm_term=.2d881b8cfe5b

[46] http://www.trb.org/TCRP/Blurbs/174653.aspx.

[47] http://www.oregonlive.com/commuting/index.ssf/2015/10/uber_lyft_now_dominate_portlan.html / Greyball report

[48] https://www.nytimes.com/2017/03/03/technology/uber-greyball-program-evade-authorities.html

[49] http://www.cnbc.com/2017/04/13/uber-may-face-1-million-dollar-fine-over-california-drunken-driving-complaints.html

[50] https://www.citylab.com/transportation/2015/04/how-the-microtransit-movement-is-changing-urban-mobility/391565/

[51] http://www.sacbee.com/news/local/article183340381.html

[52] https://www.citylab.com/transportation/2017/11/dont-believe-the-microtransit-hype/545033/

[53] http://www.fehrandpeers.com/microtransit/

[54] http://www.arlington-tx.gov/residents/via/, http://www.sacbee.com/news/local/article183340381.html

[55] For a more detailed summary of car share business models, see https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/CIP-Automotive-Car-Sharing-in-Europe.pdf

[56] Service areas come from the ZipCar website (http://www.zipcar.com/portland) and conversations with ReachNow, and are current as of November 2017.

[57] Service areas come from the car2go (https://www.car2go.com/US/en/portland/where/) and ReachNow (https://reachnow.com/en/portland-or/drive/) websites, and are current as of November 2017.

[58] For an evaluation of the impacts of stationary car share, see http://trrjournalonline.trb.org/doi/pdf/10.3141/1992-09 and http://innovativemobility.org/wp-content/uploads/2015/07/Zipcar_Corporate_Final_v6.pdf. For an evaluation of free-floating car share, see http://innovativemobility.org/wp-content/uploads/2016/07/Impactsofcar2go_FiveCities_2016.pdf.

[59] Ibid.

[60] http://trrjournalonline.trb.org/doi/pdf/10.3141/1992-09.

[61] See service area maps for the different car share companies. Even peer-to-peer carsharing services, which do not provide any vehicles or physical infrastructure, sometimes redline disadvantaged communities; see http://www.opb.org/news/article/electric-car-sharing-low-income-housing/.

[62] https://www.biketownpdx.com/map

[63] Portland Bureau of Transportation. (2017, July 17). News Release: News Release: BIKETOWN celebrates first birthday with a week of prizes, Free Ride Day on Wednesday, July 19. Retrieved July 31, 2017, from https://content.govdelivery.com/accounts/ORPORTLAND/bulletins/1aaac54

[64] Both Portland and Detroit are exploring offering adaptive bike share bikes (http://betterbikeshare.org/2017/05/10/two-cities-explore-adaptive-bike-rentals-people-disabilities/).

[65] JUMP Mobility, operated by the same company that supplies BIKETOWN bikes, is now operating in San Francisco and Washington, DC (https://jumpmobility.com/).

[66] Scoot operates in San Francisco (https://scoot.co/).

[67] https://www.washingtonpost.com/news/dr-gridlock/wp/2017/10/05/abandoned-vandalized-and-illegally-parked-bike-share-bikes-now-a-d-c-problem/?utm_term=.90eaf6bf986a; https://nextcity.org/daily/entry/seattle-private-bike-share-experiment-stationless.

[68] https://www.seattle.gov/transportation/projects-and-programs/programs/bike-program/bike-share

[69] Ibid.

[70] https://www.biketownpdx.com/pricing/biketown-for-all.

[71] See service area maps for the different car share companies. Even peer-to-peer carsharing services, which do not provide any vehicles or physical infrastructure, sometimes redline disadvantaged communities; see http://www.opb.org/news/article/electric-car-sharing-low-income-housing/.

[72] http://maas.global/maas-as-a-concept/

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April 11, 2018

Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: Thursday, March 29, 2018
To: Metro Technical Advisory Committee (MTAC) and Interested Parties
From: Jamie Snook, Principal Planner
Subject: Draft Regional Transit Strategy – Discussion Draft

Purpose

The purpose of this memorandum is to provide an update to the Metro Advisory Committee (MTAC) on the development of the Discussion DRAFT Regional Transit Strategy (RTS). We are currently working on edits to the Regional Transit Network Map and will bring that to our meeting. The Regional Transit Strategy is a collaborative effort to create a single coordinated transit vision and implementation strategy. The objectives of the RTS are to:

- Implement the 2040 Growth Concept and Climate Smart Strategy
- Update RTP transit-related policies and performance measures
- Update the current Regional Transit Network Map and High Capacity Transit Map
- Update the Transit System Expansion Policy
- Recommend a coordinated strategy for future transit investments and identify potential partnerships, strategies and funding sources for implementation.

A public review draft of the Regional Transit Strategy will be released for public comment along with the DRAFT Regional Transportation Plan and other RTP Strategies in June 2018.

Action Requested

There is no formal action requested. Staff is seeking **feedback by April 27, 2018** regarding the following issues:

- Updated transit policies
- Proposed changes to the 2009 High Capacity Transit (HCT) System Map and additions to Regional Transit Network Map
- Updates on the Transit System Expansion Policy
- Draft Regional Transit Strategy report

Background

This is a critical time to consider how transit fits into our larger regional goals. The Climate Smart Strategy, adopted 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. Current growth rates will require us to expand transit service in order to provide people with transportation options and minimize congestion. Significant and coordinated investment is needed to continue to provide equivalent service as our region grows; increasing service and access will require dedicated funding, policies, and coordination from all jurisdictions. Transit also helps the region meet its equity and access goals as it is a primary mode of transportation for people with disabilities and youth, providing them with a way to get to work, school, and attaint access to daily needs. Investments in transit should increase access, provide more transportation options for residents and workers, and improve air quality, and reduce peak hour congestion.

The Regional Transit Strategy will inform as the transit component of the 2018 Regional Transportation Plan (RTP) update and will provide a coordinated vision and strategy for transit in the Portland metropolitan area.

Implement the 2040 Growth Concept and Climate Smart Strategy

Building off the Climate Smart Strategy, the regional transit vision is **to make transit more frequent, convenient, accessible and affordable for everyone**. The regional transit vision, policies and actions outlined in the Regional Transit Strategy build upon the strategies identified in the Climate Smart Strategy and support the implementation of our 2040 Growth Concept. The Regional Transit Strategy incorporates TriMet's Service Enhancement Plans, Wilsonville's Transit Master, Streetcar Strategic Plan and the 2009 adopted Regional High Capacity Transit Plan into a single vision of transit in the future.

Update RTP transit-related policies and performance measures

This vision has been incorporated into our transit related policies to create a seamless transit system that works for everyone. Existing policies were integrated with new policies that address: equity, maintenance and resiliency, enhanced transit concept, first and last mile, new technology and affordability.

The proposed new transit policies are:

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. *(New)*

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. *(New to address MAP-21 asset management and resiliency requirements)*

Policy 3. Make transit more frequent by expanding regional and local frequent service transit and improving local service transit. *(Minor revisions to consolidate policies)*

Policy 4. Make transit more convenient by expanding high capacity transit (through the System Expansion Policy framework) and the region's enhanced transit network *(New)*, and supporting expanded commuter rail and intercity transit service to neighboring communities. *(Minor revisions to consolidate policies)*

Policy 5. Make transit more accessible by improving pedestrian and bicycle access to 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. *(Minor revisions to add language on role of new mobility services)*

Policy 6. Use emerging technologies to provide better, more efficient transit service, focusing on meeting the needs of people for whom conventional transit is not an option. *(New to add language on role of emerging technologies)*

Policy 7. Ensure that transit is affordable, especially for people who depend on transit. *(New to add language on transit affordability)*

The transit related performance measures were modified to include performance measures from the Climate Smart Strategy.

Update the current Regional Transit Network Map and High Capacity Transit Map

The Regional Transit Network is the future transit vision and includes future regional and local bus, enhanced transit corridors, high capacity transit and intercity rail. The proposed Regional Transit Network map has been updated to include the 2009 HCT lines, new enhanced transit concept, streetcar and future transit service as identified by the TriMet's Service Enhancement Plans and Wilsonville's Transit Master Plan.

Proposed changes to the 2009 HCT Map include:

- Moving the I-5 HCT corridor from "High Capacity Transit Corridors under development" to "Next Phase Regional Priority Corridor"
- Moving the Portland to Lake Oswego Streetcar project from "High Capacity Transit Corridors under development" to "Next Phase Regional Priority Corridor"
- Portland to Gresham in the vicinity of Powell Corridor remains a "Next Phase Regional Priority Corridor"
- Add Portland to Gresham on SE Division St "High Capacity Transit Corridors under development"
- Moved Portland to Sherwood in the vicinity of Barbur/Highway 99 Corridor from "Near Term Regional Priority" to "High Capacity Transit Corridors under development"
- Modified the Clackamas Town Center to Damascus to connect to Happy Valley via the Columbia to Clackamas Corridor in the "Regional Vision Corridors"

Update the Transit System Expansion Policy

The System Expansion Policy was adopted as part of the 2009 Regional High Capacity Transit (HCT) System Plan and was designed to help jurisdictions move projects towards implementation. The transit system expansion policy would only apply to those investments seeking FTA Capital Investment Grant (CIG) program funding (e.g. New Starts, Small Starts or Core Capacity). Examples of investments that could be considered as part of this program are the Division Transit Project, a corridor based bus rapid transit (BRT), or the Southwest Corridor Transit Project. The purpose of the System Expansion Policy is to:

- Clearly articulate the decision-making process by which future HCT corridors will be advanced for regional investment
- Establish minimum requirements for HCT corridor working groups to inform local jurisdictions as they work to advance their priorities for future HCT
- Define quantitative and qualitative performance measures to guide local land use and transportation planning and investment decisions
- Outlines the process for updating the RTP, including Potential future RTP amendments, for future HCT investment decisions

The updated Transit System Expansion Policy (TSEP) is still under development. Key elements to the updating the TSEP include:

- **Reduce the number of criteria** by eliminating duplicative measures, those not commonly used in peer processes, and certain qualitative measures that can instead become an element of a project justification narrative section of Metro's process of submitting projects for the Regional Transportation Plan (RTP).
- **Focus the core evaluation measures** on those elements that describe the benefit of the project, consistent with regional values, as well as measures that enhance the competitiveness of projects in the FTA CIG program.
- **Evaluate project readiness separately** for the highest priority projects. Project readiness factors include funding potential (aligned with FTA criteria) and local aspirations (measure local commitment and established agency partnerships to ensure successful project delivery)

The Transit System Expansion Policy includes a multi-phased evaluation that includes core criteria as well as readiness criteria. The Core Criteria is comprised of measures that describe the benefit of the projects, consistent with regional values, as well as assess the competitiveness of projects for funding through the FTA CIG program. The Readiness Criteria is the second filter and is evaluated separately from the core criteria assessment for the highest priority projects. Project readiness factors include funding potential (a simulated scoring based on the FTA CIG program criteria) and local aspirations (measure of local commitment and established agency partnerships to ensure successful project delivery).

Working with our regional partners, we were able to reduce the number of criteria from 26 to 12. We are currently applying the draft criteria to the HCT projects identified in the 2018 Regional Transportation Plan (RTP). This will help validate the criteria for future use.

The core criteria assessment would apply to all projects that would likely seek federal funding from the FTA CIG program. This core assessment focuses on:

- Mobility and ridership
- Land use supportive and market potential
- Cost effectiveness
- Equity benefit
- Environmental benefit

The readiness assessment focuses on:

- Local commitment and partnerships
- Funding potential

This assessment can help highlight which investment or set of investments perform best and their alignment with the transit vision. Local jurisdictions or agencies that want to move a project forward towards implementation would then be evaluated through the readiness assessment. The proposed HCT projects from 2018 RTP are being assessed using these criteria and may be refined depending on the results.

Next Steps

We are continuing to work with regional partners through the Transit Work Group to help update and refine the Regional Transit Strategy and Transit System Expansion Policy. Below is a short list of next steps:

- Update the transit project list and future transit service through the 2018 RTP project refinement phase;
- Continue to work on updating the Transit System Expansion Policy; and
- Update the Regional Transit Strategy with feedback from regional partners.

DISCUSSION DRAFT

2018 Regional Transportation Plan

Regional Transit Strategy

A strategy for providing better transit service in the greater Portland region

April 2, 2018

oregonmetro.gov/transit

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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**
Regional Transit Strategy web site: **oregonmetro.gov/transit**

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.

TABLE OF CONTENTS

TABLES AND FIGURES

This is under development.

ATTACHMENTS

This is under development.

FORWARD

This section is under development.

EXECUTIVE SUMMARY

This section is under development. Executive summary will be about 2 pages. Executive Summary could handout for distribution.

CHAPTER 1: INTRODUCTION

The 2018 Regional Transit Strategy (RTS) sets regional transit policy and provides a framework for working towards implementing a regional transit system that supports our 2040 Growth Concept.

The Regional Transit Strategy provides a comprehensive assessment of our transit priorities for the greater Portland region, defined as the area within the Metropolitan Planning Area (MPA). The MPA is slightly larger than the region's Urban Growth Boundary. The Regional Transit Strategy is the transit modal component of the 2018 Regional Transportation Plan update.

[FIGURE 1 INSERT RTP MODAL AND TOPICAL PLANS WITHIN STATEWIDE PLANNING HIERACHY]

This Introduction provides context for the RTS, including Metro's role in transit planning; the policy framework that was used to define the overall regional transit strategy and vision, relation to other plans, the planning process and public engagement and the organization of this document.

Metro's Role

As the region's metropolitan planning organization (MPO), Metro has a variety of roles in transportation transit planning, including:

- setting regional transit vision, policies, targets, and performance measures;
- reporting on annual transit targets and performance measures;
- planning for high capacity transit projects, environmental planning, project development leading to a locally preferred alternative;
- convening jurisdictions and agencies to achieve better coordination;
- encouraging best practices in transit planning and design;
- supporting and introducing transportation legislation;
- supporting local and state efforts; and
- allocating federal transportation funding.

The 2018 RTS provides the regional transit vision for the Portland metro region: to make transit more frequent, convenient, accessible and affordable for everyone.

Policy Context

The planning context and policy framework for the Regional Transit Strategy is dependent upon a variety of regional and state plans that determine, and shape key policies, goals and principles should be considered.

State Policy and Planning Context

The following section describes the relevant statewide plans and policies.

The **Oregon Public Transportation Plan (OPTP)** is the transit modal plan for the OTP and is currently being updated. The OPTP provides a statewide vision for the public transportation system as well as policy foundation to assist transportation agencies in make decisions.

The OPTP vision is: "In 2045, public transportation is an integral, interconnected component of Oregon's transportation system that makes Oregon's divers cities, towns, and communities work. Because public transportation is convenient, affordable and efficient, it helps further the state's quality of life and economic vitality and contributes to the health and safety of all residents, while reducing greenhouse gas emissions." The OPTP includes goals and policies regarding:

- Mobility – public transportation user experience
- Accessibility and connectivity – getting from here to here
- Community livability and economic vitality
- Equity
- Health
- Safety and security
- Environmental sustainability
- Land use
- Strategic investment
- Communication, collaboration, and coordination

The **Transportation Planning Rule (TPR)**, Chapter 660, division 12 of the Oregon Administrative Rule, implements the statewide planning goals for transportation. The rule includes requirements for how local governments and Metropolitan Planning Organizations (MPOs) in metropolitan areas coordinate planning for land use and transportation systems to increase transportation choices.

The **Oregon Transportation Plan (OTP)** is the long-range transportation system plan for the state. It establishes a vision and policy foundation to guide transportation system development and investment. The OTP and its mode and topic plans guide decisions by the Oregon Department of Transportation and other transportation agencies statewide and is reflected in the policies and decisions explained in local and regional plans.

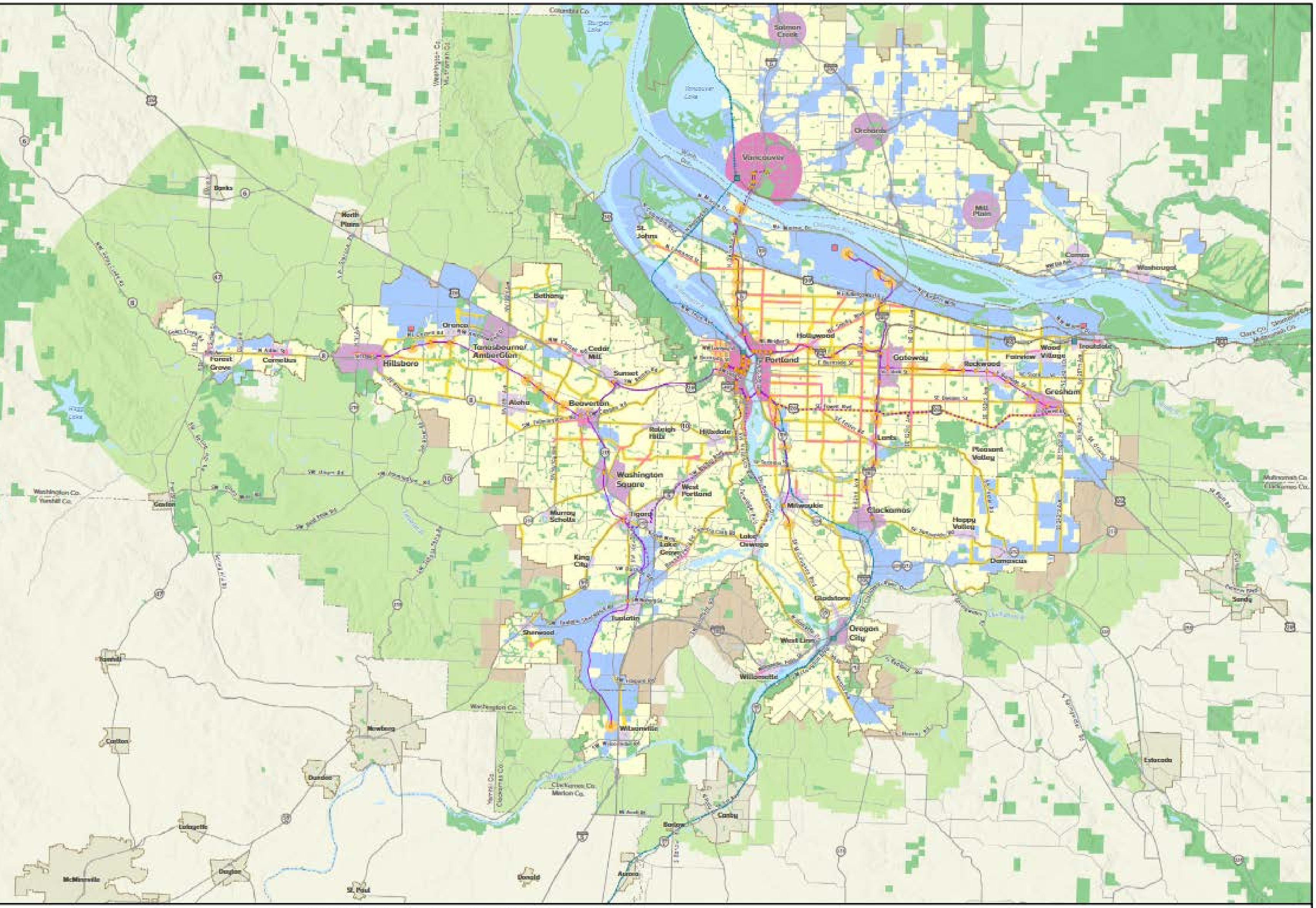
Regional Planning Context

The following section describes the relevant regional plans and policies.

Metro's **2040 Growth Concept**, see figure 2, is the region's long-range land use and transportation plan for managing growth to preserve the region's economic health and livability in an equitable, environmentally-sound and fiscally-responsible manner. The 2040 Growth Concept vision concentrates mixed-sue 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.

The **Regional Framework Plan**, adopted in 1997, identifies regional policies to implement the 2040 Growth Concept. The Plan has been amended overtime, most recently as part of the adoption of the Climate Smart Strategy in 2014. The policies in this plan aims to implement the 2040 Growth Concept and guides the RTS:

- Protect the economic health and livability of the region.
- Improve the safety of the transportation system.
- Provide a transportation system that is efficient and cost-effective, investing our limited resources wisely.
- Make the most of the investments the region has already made in our transportation system through system and demand management strategies, such as expanding the use of technology to actively manage the transportation system and providing traveler information and incentives to expand the use of travel options.
- Make **transit** convenient, frequent, accessible and affordable.
- Provide access to more and better choices for travel in this region and serve special access needs for all people, including youth, older adults and people with disabilities and people with low income.
- Provide adequate levels of mobility for people and goods within the region.
- Protect air and water quality, promote energy conservation, and reduce greenhouse gas emissions.
- Provide transportation facilities that support a balance of jobs and housing.
- Make biking and walking the most convenient, safe and enjoyable transportation choices for short trips.
- Limit dependence on drive alone travel, and increase biking, walking, carpooling, vanpooling and the use of **transit**.
- Make streets and highways safe, reliable and connected to provide for the movement of people and goods through an interconnected system of street, highway, air, marine and rail systems, including passenger and freight intermodal facilities and air and water terminals.



2040 Growth Concept Map

September 2014

0 2 4 miles

The Metro 2040 Growth Concept defines the form of regional growth and development for the Portland metropolitan region. The Growth Concept was adopted in December 1995 through the Region 2040 planning and public involvement process. This concept is intended to provide long-term growth management of the region.

The map highlights elements of parallel planning efforts including: the 2035 Regional Transportation Plan that outlines investments in multiple modes of transportation, and a commitment to local policies and investments that will help the region better accommodate growth within its centers, corridors and employment areas.

For more information on these initiatives, visit http://www.oregonmetro.gov/2040

Integrate land use, automobile, bicycle, pedestrian, freight and public transportation needs in regional and local street designs.

- Limit the impact of urban travel on rural land through use of green corridors.
- Manage parking to make efficient use of vehicle parking and land dedicated to vehicle parking.
- Demonstrate leadership on reducing greenhouse gas emissions.

The **Regional Transportation Plan** is a blueprint to guide investment and identify the region's priorities for all forms of travel – motor vehicle, transit, bicycle and walking – and the movement of goods and freight throughout the Portland metropolitan area. The plan identifies current and future transportation needs, investments needed to meet those needs and what funds the region expects to have available through 2040 to make those investments a reality. The plan is key step for these projects to qualify for potential regional, state and federal funding.

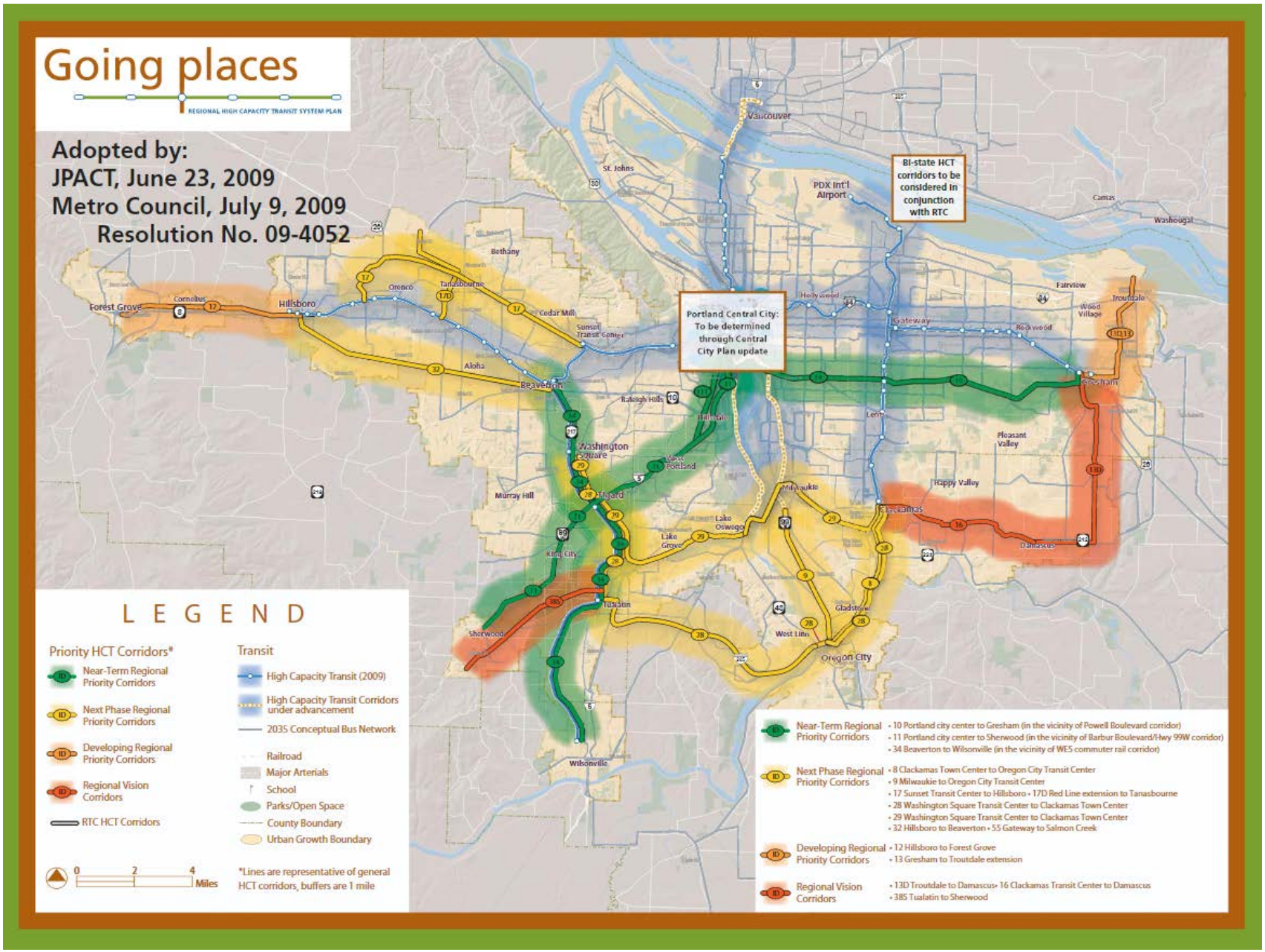
In 2009, Metro adopted a 30 year **The Regional High Capacity Transit (HCT) System Plan** to guide investments in light rail, commuter rail, bus rapid transit and rapid streetcar in the Portland metropolitan area. The HCT Plan identified16 corridors (see Figure 3) identified and ranked those corridors into four regional priority tiers, creating a framework for future system expansion prioritization. The four tiers are:

1. Near term regional priority corridors;
2. Next phase regional priority corridors;
3. Developing regional priority corridors; and
4. Regional vision corridors.

The near term regional priority corridors included three projects:

1. Portland city center to Gresham (in the vicinity of the Powell Boulevard corridor)
2. Portland city center to Sherwood (in the vicinity the Barbur Boulevard/Highway 99 corridor) and
3. Beaverton to Wilsonville (in the vicinity of the WES Corridor).

Two of these projects are moving forward. The Portland city center to Gresham is now called the Division Transit Project. The Division Transit Project is a 14-mile project that will increase transit capacity and improve travel time between Downtown Portland, Southeast and East Portland and Gresham. This project is currently in "project development" under the Federal Transit Administration (FTA) Capital Investment Grant program Small Starts funding pipeline.


Going places
REGIONAL HIGH CAPACITY TRANSIT SYSTEM PLAN
Adopted by:
JPACT, June 23, 2009
Metro Council, July 9, 2009
Resolution No. 09-4052
Bi-state HCT corridors to be considered in conjunction with RTC
Portland Central City: To be determined through Central City Plan update
Vancouver
St. Johns
PDX Int'l Airport
Camas
Washougal
Bethany
Forest Grove
Cornelius
Hillsboro
Orenco
Tanasbourne
Cedar Mill
Sunset Transit Center
Aloha
Beaverton
Hollywood
Gateway
Fairview
Wood Village
Troutdale
Rockwood
Gresham
Raleigh Hills
Hillsdale
Lents
Pleasant Valley
Happy Valley
Washington Square
West Portland
Multnomah
Murray Hill
Milwaukie
Clackamas
Lake Oswego
Lake Grove
King City
Damascus
Tualatin
Gladstone
West Linn
Oregon City
Sherwood
Wilsonville
LEGEND
Priority HCT Corridors*
Near-Term Regional Priority Corridors
Next Phase Regional Priority Corridors
Developing Regional Priority Corridors
Regional Vision Corridors
RTC HCT Corridors
Transit
High Capacity Transit (2009)
High Capacity Transit Corridors under advancement
2035 Conceptual Bus Network
Railroad
Major Arterials
School
Parks/Open Space
County Boundary
Urban Growth Boundary
0 2 4 Miles
*Lines are representative of general HCT corridors, buffers are 1 mile
Near-Term Regional Priority Corridors
• 10 Portland city center to Gresham (in the vicinity of Powell Boulevard corridor)
• 11 Portland city center to Sherwood (in the vicinity of Barbur Boulevard/Hwy 99W corridor)
• 34 Beaverton to Wilsonville (in the vicinity of WES commuter rail corridor)
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• 9 Milwaukie to Oregon City Transit Center
• 17 Sunset Transit Center to Hillsboro • 17D Red Line extension to Tanasbourne
• 28 Washington Square Transit Center to Clackamas Town Center
• 29 Washington Square Transit Center to Clackamas Town Center
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Developing Regional Priority Corridors
• 12 Hillsboro to Forest Grove
• 13 Gresham to Troutdale extension
Regional Vision Corridors
• 13D Troutdale to Damascus• 16 Clackamas Transit Center to Damascus
• 38S Tualatin to Sherwood

The Portland city center to Sherwood is now known as the Southwest Corridor Project. The Southwest Corridor Project proposal is a new 12-mile MAX line from Downtown Portland to Tigard and Bridgeport Village in Tualatin, along with numerous walking, biking and roadway project to help people access stations. Metro is working with TriMet, local partners and the FTA to develop the Southwest Corridor Environmental Impact Statement, in compliance with the National Environmental Policy Act, in anticipation of seeking federal funding through FTA's Capital Investment Grant program New Starts funding program.

Since these projects are moving forward, Metro, TriMet and regional partners will be updating the HCT plan as part of this effort.

Another aspect of the HCT Plan is the **System Expansion Policy** framework to advance high capacity transit project to regional priority. The framework:

- identifies which corridors should move into the federal project development process
- establishes a process for other corridors to advance toward development
- measures a corridor's readiness for investment using targets such as transit supportive land use policies, ridership development plans, community support and financial feasibility.

The system expansion policy is updated as part of the RTS and discussed further in Chapter 6: Implementation of this report.

The **Active Transportation Plan** (ATP) provides a vision, plan and policies for communities in our region to increase transportation options and support economic development, healthy active living, and equity. The primary recommends policy of the ATP is the completion of the active transportation network with a specific focus on providing access and connection to transit options. Holistic transportation planning considers more than one mode of transportation and the ATP clearly highlighted the importance of integrating active transportation and access to transit options.

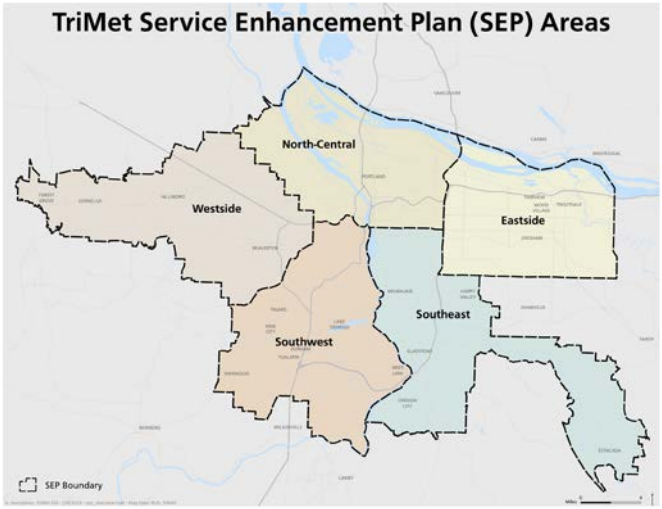
The **Climate Smart Strategy**, a 2009 mandate by the Oregon Legislature, sets policies, strategies and near-term actions to guide how the region moves forward to integrate reducing greenhouse gas emissions with ongoing efforts to create the future we want for our region. It will take a multi-modal effort to achieve our goal of reducing the region's per capita greenhouse gas emission from cars and light trucks at least 20 percent by 2035. Transit plays a key role in achieving these reductions.

As part of Metro's Code, the **Regional Transportation Functional Plan** contains policies and guidance to help local jurisdictions implement the policies in the Regional Transportation Plan its modal plans, including active transportation, freight and high capacity transit.

The **Urban Growth Management Functional Plan**, within the Functional Plan, provides guidance, under **Title 6: Centers, Corridors, Station Communities and Main Streets,** to

cities and counties and actions they must perform to be eligible for any regional investments. To be eligible for a regional investment, projects must be included in the RTP. In addition, cities or counties shall:

- Establish boundaries for the Center, Corridor, Station Community or Main Street;
- Perform an assessment of the Center, Corridor, Station Community or Main Street (including specific assessments to be included in this assessment); and
- Adopt a plan of actions and investments to enhance the Center, Corridor, Station Community or Main Street.



TriMet, the region's largest transit provider, has been working with riders, residents, neighborhood groups, governments, schools and businesses to create a shared vision for the future of transit through **TriMet's Service Enhancement Plans** (www.trimet.org/future).

Starting in 2012, TriMet began taking a fresh look at how transit service and access to transit could be improved to support current needs and future visions for community development and transportation system performance. By working with riders, businesses and neighbors to identify service needs and improvements throughout the region, we can expand service to be more responsive to the community's needs. In order to tailor the plans to meet differing communities' needs, the Service Enhancement Plans were developed for each of five geographic subareas, covering the entire region with TriMet's service district (in the order developed: West, Southwest, North-Central, Eastside and Southeast). As they were being developed, TriMet planners were careful to coordinate across these sub areas where the proposed network crosses those boundaries in order to form a coherent vision for the transit system.

These long-range plans (covering approximately a 20-year planning horizon) form the basis of the future service plans reflected in the Regional Transit Strategy and the 2018 Regional Transportation Plan update.

In 2017, Oregon legislature passed Oregon House Bill Keep Oregon Moving (HB2017) requiring TriMet to conduct a study on service for the region. This work is currently underway.

The 2016 update to **TriMet's Coordinated Transportation Plan for Elderly and Persons with Disabilities (CTP)** builds upon the foundation of the 2012 CTP as well as

the 2009 update, known as the Tri County Elderly and Disabled Transportation Plan (EDTP), both of which described the region's vision of a continuum of transportation services that takes into account people's abilities as they transition through various stages of age and disability.

The guiding principles of the CTP is to guide transportation investments toward a full range of options seniors and persons with disabilities, foster independent and productive lives, strengthen community connections, and strive for continual improvement of services through coordination, innovation and collaboration, and community involvement. This vision is accomplished through:

- Coordinate
- Innovate and collaborate
- Involve the Community
- Improve the service foundation
- Integrate land use and transportation decisions
- Improve customer convenience
- Improve safety
- Performance measures

Local Planning Context

The following section describes the relevant local plans and policies, from local transit provides. Additionally, cities and counties have policies, programs and project related to transit in their Transportation System Plans (TSPs) not listed in detail.

The Portland Streetcar is owned by the City of Portland and operated by the Bureau of Transportation (PBOT) in partnership with TriMet (the regional transit agency) and Portland Streetcar, Inc. (PSI), a non-profit that provides management support and private sector involvement in planning and operations. The **Portland Streetcar Strategic Plan 2015 – 2020** outlines the priories over the next five years. The vision for Portland Streetcar is to:

- Support and encourage growth in residential and commercial development in the central city, consistent with the City's Comprehensive Plan.
- Provide comfortable, convenient connections between housing, employment, educational institutions, services, and recreation.

More generally, the streetcar system was built to drive development toward the high-density neighborhoods identified in city and regional planning documents, and to provide a quality transit connection for those developments. This plan is meant to focus the partnership's work plan and resources on key areas of improvement for Portland Streetcar. Implementing the identified strategies will result in a more reliable and cost-

effective streetcar system that is recognized within the community as a critical component of Portland's present and future

The City of Wilsonville operates a transit service for the City of Wilsonville and connections outside the city called South Metro Area Regional Transit (SMART). The **Wilsonville Transit Master Plan** (TMP) (see http://ridesmart.com/327/Transit-Master-Plan-2017) provides a broad look ahead to the type of transit system and supportive transportation options required to meet Wilsonville's mobility needs. This is accomplished by providing proposals for improved transit service as well as strategies to reduce single-occupancy vehicles. With its combined transit and transportation options approaches, the TMP will guide future decision-making for SMART for the next five to seven years.

Cities and counties develop local transit plans and policies as well as development of their **Transportation System Plans (TSPs)**. The TSP identifies local needs and modal priorities, including transit. Cities and counties also develop localized plans, policies and incentives around transit.

Building upon our existing transit investments, policies, and plans, **the Regional Transit Strategy vision is to make transit more frequent, convenient, accessible and affordable for everyone**. The transit strategy will coordinate the operational, capital and transit supportive elements to make transit work more efficiently and effectively for everyone. The Regional Transit Vision is in response to the community needs and is as much about improving operations and ensuring a state of good repair as it is building new connections and supporting our 2040 Growth Concept and our Climate Smart Strategy.

Planning and Public Engagement Process

The Regional Transit Strategy was developed in coordination with and as part of the update of the Regional Transportation Plan between May 2016 and December 2018. The Regional Transit Strategy also provides and update to the Regional High Capacity Transit System Plan., adopted in 2009.

Throughout the planning process, transit and travel options were repeatedly identified as key elements to meeting and achieving our regional and local goals for the region.

Document Organization

The 2018 RTS is organized into six chapters, with a foreword, executive summary, and back matter such as a glossary and list of acronyms. Supporting documents are provided as standalone appendices. This section provides an overview of the different parts of the document.

Foreword

Introduces the genesis, purpose, limitations, and scope of the strategy.

Executive Summary

Provides a short summary and key elements of the strategy.

Chapter 1: Introduction

Provides and introduction to and context for understanding the strategy.

Chapter 2: Our Current Transit System

Describes our current transit system, both inside and connections to our MPA.

Chapter 3: Key Trends, Challenges and Opportunities

Describes the key trends, challenges and opportunities that shape our transit vision and policies.

Chapter 4: Regional Transit Vision and Policies

Describes the Regional Transit Vision and associated policies.

Chapter 5: Strategies and Actions

Describes the strategies and actions to help achieve our transit vision.

Chapter 6: Performance, Monitoring and Measuring Progress

Describes performance and monitoring measures for achieving our vision.

Chapter 7: Implementation

Outlines how to implement the Regional Transit Vision.

List of Partners

Agencies, organizations, non-profits, private entities, industry and the public who will play a role in implementing the 2018 RTS.

Acronyms

Defines acronyms used in the document.

Glossary

Defines terms used in the document.

Appendices

Appendices are stand-alone documents that provide additional technical information for the 2018 Regional Transit Strategy.

2009 High Capacity Transit (HCT) System Plan

CHAPTER 2: OUR CURRENT TRANSIT SYSTEM

We have options on how we get around today; we can drive, carpool, car share, bike, walk, or take transit. While this report focuses in on transit, a successful transportation system is a multi-modal transportation system.

The Oregon portion of our region is served internally by TriMet, Portland Streetcar Inc, the Portland Aerial Tram, Ride Connection and the City of Wilsonville SMART systems. The Southwest Washington portion of our is served by CTRAN, a full service transit provider for Clark County Washington, provides direction connections to Portland.

The Portland metropolitan region is also served by smaller providers that mainly operate outside our region or MPA but do make connections into our region. **Figure 4** shows the various existing transit options within and around our region.

Transit Service within the MPA

The following section describes the transit services that operate within our MPA.

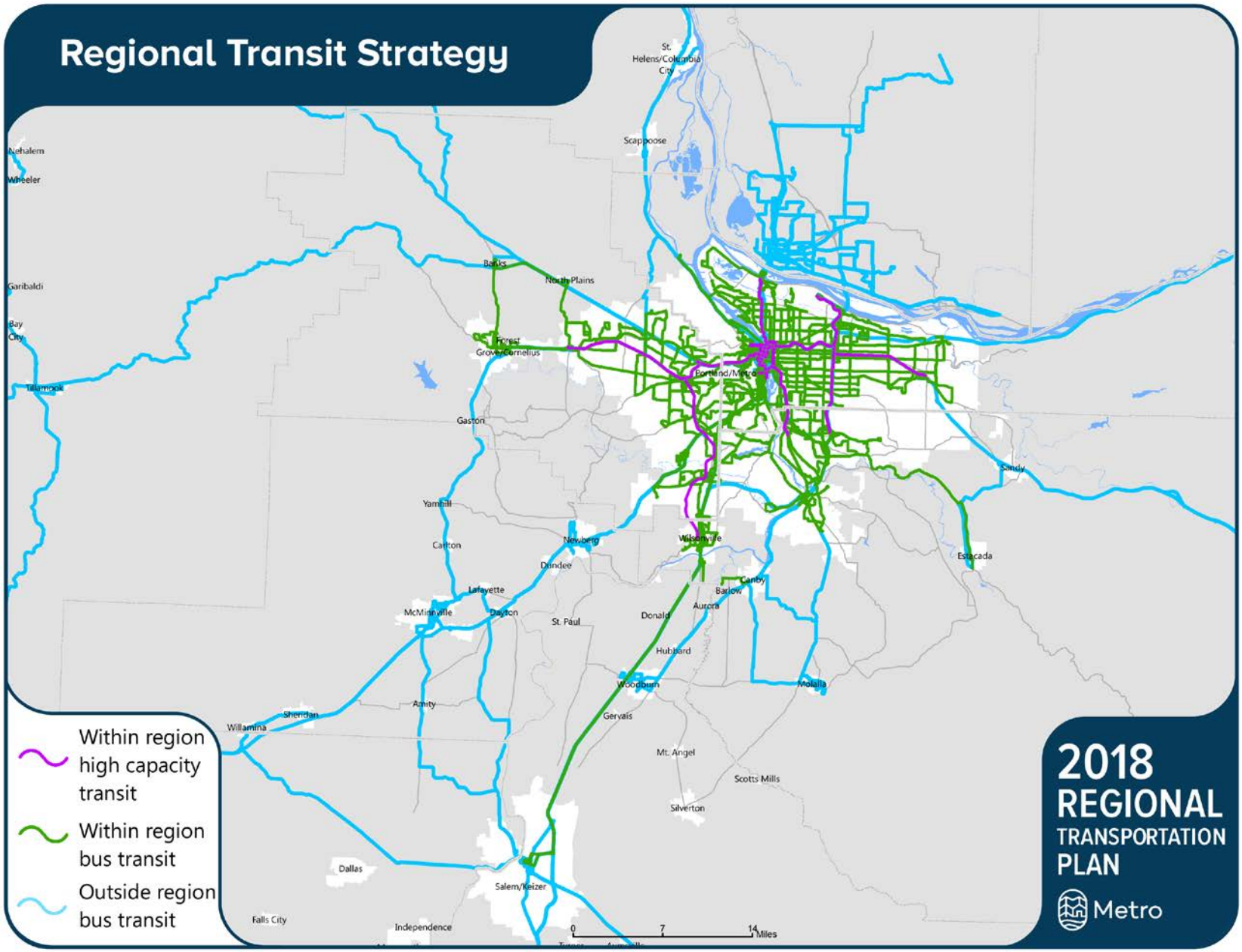
TriMet

TriMet is the largest of transit providers in our region. TriMet provides bus, light rail, commuter rail and paratransit services to the Portland metro region. The bus system serves most of the region with 77 bus lines, 12 frequent service bus lines, 6,644 bus stops and 659 buses.

TriMet's light rail MAX connects our regional and town centers of Hillsboro, Beaverton, Gresham, Clackamas Town Center, Milwaukie, Portland and the Portland Airport. TriMet and the region have invested in 5 MAX lines, 97 stations, 145 vehicles and 60 miles of track.

The Westside Express Service (WES) Commuter Rail serves the cities of Beaverton, Tigard, Tualatin and Wilsonville along an existing freight rail corridor. The WES Commuter Rail serves the region with three diesel multiple units (DMUs) and one trailer, two rail diesel cars (RDCs), five stations over 14.7 miles of track.

In addition to the bus and rail system, the LIFT Paratransit service provides door-to-door service for people with disabilities who are unable to ride regular bus or rail service. The LIFT Paratransit service is provided by 253 LIFT buses and 15 LIFT vans.


Regional Transit Strategy
St. Helens/Columbia City
Scappoose
Nehalem
Wheeler
Garibaldi
Bay City
Tillamook
Banks
North Plains
Forest Grove/Cornelius
Portland/Metro
Gaston
Yamhill
Carlton
Newberg
Dundee
Lafayette
McMinnville
Dayton
St. Paul
Donald
Aurora
Barlow
Canby
Wilsonville
Sandy
Estacada
Hubbard
Woodburn
Molalla
Gervais
Mt. Angel
Scotts Mills
Silverton
Amity
Sheridan
Willamina
Dallas
Salem/Keizer
Falls City
Independence
0
7
14
Miles
Within region high capacity transit
Within region bus transit
Outside region bus transit
2018
REGIONAL
TRANSPORTATION
PLAN
Metro

City of Portland Streetcar

The Portland Streetcar is owned by the City of Portland and operated by the Bureau of Transportation (PBOT) in partnership with TriMet (the regional transit agency) and Portland Streetcar, Inc. (PSI), a non-profit that provides management support and private sector involvement in planning and operations.

Portland Streetcar began service July 20, 2001 with a 2.4-mile alignment (4.8-miles round trip) from Portland State University to NW 23rd Avenue. Now, after 16 years, 5 extensions, and over 55 million riders, Portland Streetcar operates three lines around 16-miles of track in Portland's Central City.

South Metro Area Regional Transit (SMART)

The City of Wilsonville operates free in-town bus service in addition to inter-city connections to Salem, Canby, Tualatin, and South Portland. Known as South Metro Area Regional Transit, SMART also provides Dial-A-Ride service and an employee commuter program called SMART Options that encourages and shares resources for multi-modal commute trips. SMART operates over 35 vehicles ranging from 40-foot buses to minivans and a trolley bus.

Ride Connection

Ride Connection is a non-profit organization that works with community partners to provide and coordinate transportation options primarily for older adults and people with disabilities. Ride Connection provides a wide variety of services from training to use public transportation or transportation services to shuttle service to grocery stores and neighborhood centers to commuter service in rural areas not served by fixed route transit.

RideWise provides training for older adults and people with disabilities to travel independently and safely on public transit (bus and light rail). This service is at no cost for qualified individuals.

Door to Door services provides personalized transportation services for a variety of needs including medical, nutritive, shopping, supportive services, recreational and volunteer/work related needs.

RideAbout provides a free service for older adults and people with disabilities who need a little extra help getting around. RideAbout bus makes regular visits to grocery stores and local neighborhood centers.

Washington County Bus Service provides residents in rural Washington County a way to get around. Washington County Bus Service provides a connection from the Hillsboro Transit Center to Forest Grove via North Plains and Banks during the morning and evening commute periods.

Tualatin Shuttle provides a free deviated fixed route service connecting the Tualatin WES Commuter Rail Station to employment destinations in the Tualatin area during the morning and evening peak periods.

GroveLink provides a free deviated fixed route service in Forest Grove for access to employment, local destinations and regional transit services like TriMet and Washington County Bus Service from morning to evening commute periods (including mid-day service).

North Hillsboro Link provides a free deviated fixed route service linking the Orenco MAX Station to employment in the North Hillsboro area during the morning and evening commute periods.

Non Medical Transportation for OHP Members provides transportation for non-medical travel for Oregon Health Plan (OHP) members to community services, activities and other services specified in their service plan.

Dahlia: Dialysis Transportation provides a unique free transportation service to individuals who regularly receive dialysis treatments.

Portland Community College Shuttle

Portland Community College Shuttle is a free service to Portland Community College (PCC) students and staff. A current PCC ID must be shown to board the shuttle. Wheelchair lift is available on most buses.

Clackamas Community College Xpress Shuttle

The Clackamas Community College (CCC) Xpress Shuttle is a free shuttle service for students and the public. The shuttle connects from the MAX Green Line at the Clackamas Town Center to CCC in Oregon City and Harmony campuses. There are two shuttles: Shuttle 1 connects Clackamas Town Center and the CCC Oregon City Campus. Shuttle 2 also connects the Clackamas Town Center and the CCC Oregon City Campus with a stop at the Harmony Campus. The shuttles operate approximately 18 hours a day, Monday through Friday while school is in session.

Transit Service outside the MPA

The following section describes the transit services that operate outside our MPA but provide critical connections to our region.

C-TRAN

The C-TRAN offers the citizens of Clark County with safe, reliable and convenient public transpiration throughout the Clark County service area. They provide express commuter service to downtown Portland, Lloyd District, and Marquam Hill as well as limited bus service with connections to the Yellow Line light rail station; and three Connector service areas within the city limits of Camas, La Center, and Ridgefield.

In January 2017, C-TRAN launched the region's first bus rapid transit system, The Vine. The Vine uses larger buses, level boarding platforms and other features in order to reduce travel time improve reliability and control costs. The Vine cost less to operate than the service it replaced and saves riders time and marks C-TRAN as a regional leader in innovative transit infrastructure.

Salem-Keizer Transit Cherriots Regional

Cherriots Regional is the Salem-Keizer transit provider connecting people with places through safe, friendly, and reliable public transportation services. Enhancing the quality of life for the Salem-Keizer area through better air quality, less congestion, and increased services. Cherriots makes connections from Salem Transit Center to and from the Wilsonville Station at the WES between 5 a.m. and 8 p.m. each weekday. This route is a partnership between Wilsonville SMART and Cherriots, SMART providing eight trips and Cherriots providing five trips each day. Cherriots buses do not operate on weekends or holidays.

Cherry Lift is an origin-to-destination transportation service for people whose disability prevents them from using the Cherriots buses.

Columbia County Rider

The Columbia County Rider ("CC Rider") serves Columbia County residents and visitors with timely bus service between the communities of Clatskanie, Rainier, St. Helens, Scappoose, Vernonia, and many others, including trips to Portland and Kelso/Longview, WA.

CC Rider also offers a Dial-A-Ride service providing door to door transportation services for elderly, disabled and special life needs for the residents of Columbia County.

South Clackamas Transportation District

South Clackamas Transportation district (SCTD) operates three public transit service routes: Molalla to Clackamas Community College, Molalla to Canby, and Molalla City Bus. Upon request by a passenger (all passengers are eligible) using the Molalla City Bus Route, SCTD will deviate up to one-quarter mile from the established route.

Yamhill County Transit Area

The Yamhill County Transit Area (YCTA) provides bus service for everyone throughout Yamhill County with Link Routes to Hillsboro/MAX, Sherwood/TriMet, and Salem/SAM. YCTA also provides a Dial-a-Ride service for those unable to access the fixed routes due to mobility limitations or for those whose origins and destinations are not within close proximity to the fixed bus routes.

Canby Area Transit

Canby Area Transit (CAT) offers commuter bus service to Oregon City, Molalla, and Wilsonville. CAT also offers a general public Dial-A-Ride service within the Canby Urban Growth Boundary and a premium Dial-A-Ride service to eligible individuals who are unable to access the fixed route. Canby and Wilsonville SMART coordinate to provide better connections from Wilsonville to Canby and Oregon City.

Sandy Area Metro

Sandy Area Metro (SAM) offers Gresham and Estacada commuter routes as well as a demand-response service for door-to-door trips as needed. This service acts as a feeder service to the fixed route. A higher need of assistance requiring door-to-door service outside of the service area is also available.

Mt Hood Express

The Mt. Hood Express transit is a public bus service administered by Clackamas County and serves the communities along Highway 26, running from the city of Sandy east to Government Camp and Timberline. This service operates seven days a week as a limited stop commuter service. Seasonal service features include bike trailers and ski boxes for the convenience of riders to stow their equipment.

Columbia Gorge Express

The Columbia Gorge Express access to and from Portland to Multnomah Falls. Linking Gateway Transit Center with Multnomah Falls and Rooster Rock State Park, the Columbia Gorge Express bus provides an option, other than driving, for access the Gorge.

The Columbia Gorge Express will operate Friday through Sunday (and federal holidays), May through September. The bus departs Gateway Transit Center 10 times each day with round trip service to Rooster Rock State Park and Multnomah Falls.

CHAPTER 3: TRENDS, CHALLENGES AND OPPORTUNITIES

There are many trends, challenges and opportunities facing transit service in our region – from the increase in Transportation Network Companies (TNCs) to the abundance transit apps, an aging population, growing environmental concerns and many more. There is a lot to gain and a lot to lose. It's critical that our region remains proactive instead of reactive.

The following section describes the trends, challenges and opportunities that have influenced our regional transit policies and vision.

Implementing Climate Smart Strategy Goals

As greenhouse gases continue to increase, the Climate Smart Strategy is a response to a state mandate to develop and implement a strategy to reduce per capita greenhouse gas emission from cars and small trucks by 2035. Six desired outcomes for the region were endorsed by the Metro Policy Advisory Committee and approved by the Metro Council in 2010: vibrant communities, regional climate change leadership, transportation choices, economic prosperity, clean air and water, and equity. The Climate Smart Strategy achieves a 29 percent reduction in per capita greenhouse gas emissions, but it does more than just exceed the state mandated target. Analyses demonstrate it will also support job creation and economic development, save businesses and households money, help people live healthier lives, protect our region's clean air and water, and make the most of the investments we have already made in our transportation system.

The Regional Transit Strategy strives to support the goals laid out in the Climate Smart Strategy by improving transit's accessibility, service, reliability, and reach. Transportation sources account for 34 percent of greenhouse gas emissions in Oregon, the largest source of emissions in the state. Therefore, increasing use of transit and thereby keeping automobiles off the road is a key way to decrease emissions and help meet the goals set out by the strategy. TriMet and SMART are actively pursuing opportunities to change to low or no emission buses as part of their sustainability initiative and to support this effort

History of Racial Exclusion and Bias

The Draft 2018 RTP and the Regional Transit Strategy offer opportunities to reduce barriers and disparities faced by communities of color and other historically marginalized communities.

Like most of the nation, the Portland region's communities 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 Portland metropolitan region currently experience the worst economic and social outcomes of any demographic group, due to a long history – even as part of Oregon's statehood–of persistent, exclusionary and discriminatory policies which have barred communities of color – regardless of income, education, language proficiency, or age – from the opportunities that many white residents have had. As a result, the region struggles with racial disparities across nearly every measure of well-being and prosperity, including transportation.

But for a place to be sustainable and economically prosperous, the region must proactively address issues of racial disparities and embrace the current and future diversity. Focusing on disparities will help develop and maintain sustainable economic growth by fostering greater racial inclusion and smaller racial income gaps.

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.

The region's transportation system is one tool of many for reducing disparities experienced by communities of color. 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.

Economic Growth

Portland is a critical West Coast domestic hub and international gateway for commerce and tourism. The economic health of the region is dependent on industries that have been attracted to the region because of our well-trained labor pool, relatively low cost of living, and high quality of life. Many of the companies who have moved to Oregon want to locate near transit lines.

Unfortunately, economic growth slowly puts strain on the factors that make the area attractive in the first place. As more people move to the area, congestion and the cost of living increase. As more goods are produced and transported throughout the region, emissions increase and erode air and water quality. This is where transit comes in.

Transit plays an important role in making the region affordable, attracting a well-educated work force, keeping freight and goods moving, and supporting access to new jobs. Transit supports a healthy economy by providing essential connections between where people live and work. Transit can help reduce the number of cars on the road, which reduces traffic congestion and improves the movement of freight.

Aging Infrastructure

The region's transit system is relatively new compared to other metropolitan areas. However, it is becoming increasingly more important to invest in it in order to preserve safety and efficiency. While the focus has largely been on system expansion in previous years, critical elements will soon require maintenance as the system ages. TriMet has provided the region with public transit since 1969. Although significant technological advancements have required fairly constant updates, TriMet's fleet and facilities need to be kept in a state of good repair through continual investment.

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

New Technology

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

Smart phones have changed the way people get and fine information about transit. At a time when 90 percent of Americans own a cell phone, 58 percent own a smartphone, and 87 percent use the internet, technology can play a critical role in removing barriers to understand and using a variety of transit options. For example, smartphone apps can tell people when the next bus or MAX will arrive or how to plan a trip that uses multiple modes.

In order to be effective, user information provided by technology must be easy to use, accurate, and reliable. While technology that is up-to-date and user-friendly can be an enormous asset, technology that isn't up to the standards that people have come to expect can be a hindrance to getting people to choose transit when more convenient options exist.

Affordability

Traditionally, housing is considered affordable if it costs less than 30% of household income. However, those measures don't account for transportation costs, which are typically a household's second largest expense and inextricably tied to housing. According to the Housing and Transportation Index, the average Portland metropolitan area household spends 31% of their income on housing and an additional 21% on transportation. While only slightly higher than the ideal 50% for housing and transportation costs, this number hides the shocking truth of how much these costs vary. In reality, these costs range from a respectable 25% to a sky-high 105% when looking at individual blocks. In fact, there are two blocks in the metropolitan area where housing and transportation costs exceed 100% of income. While it's true that for these areas, it is housing that is the main culprit, transportation costs that are up to 27% of income are also contributing factors to the fact that Portland can be a prohibitively expensive city to live in.

Additionally, increasing affordability means more than lowering the cost of transit. It also means increasing access to it. This is a region where 15.3% of households take fewer than 10 transit trips per year. No matter how low the cost, people will not use transit if it isn't physically accessible, safe, and reliable. If there are no alternative transit options, then

people will be forced to bear the costs of owning and relying on automobiles, which add up to $12,213 for the average household in the metropolitan area.

The Regional Transit Strategy seeks to address these factors in order to make transit more accessible and convenient. In order to become the city we sought to create in the 2040 Growth Concept, affordable transit must become a priority.

Changing Travel Behavior

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

Between 1990 and 1995, daily vehicle miles traveled (VMT) per capita increased significantly nationally as well as in the Portland metropolitan region. During the past 18 years, implementation of the region's integrated transportation and land use planning strategy – the 2040 Growth Concept – has resulted in 15 percent fewer miles driven per capita and less time spent commuting than the national average.

It is likely that this trend will continue, as transportation preferences are changing for the newer generations of Americans. The millennial and future generations expect shared mobility options rather than the single-occupancy vehicles their parents dreamed of because they allow them the luxury of working while in transit, staying connected with peers, relaxing, or exercising through active transportation. However, with the cost of housing on the rise, the millennial and future generations are unable to afford housing in areas with robust public transit options.

This public support could generate a big opportunity at this moment in time to promote investments that will encourage future generations to use more transit than previous generations through all stages of life and to continue to prioritize transit as a safer, more eco-friendly, and healthier transportation option.

Public Health

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

There is a trend of rapidly rising rates of chronic disease associated with obesity, weight problems, and sedentary lifestyles – conditions that public health officials now describe as epidemic. There was a dramatic increase in obesity in the United States from 1989 through 2014. It has leveled off in recent years and even decreased in certain states, but more than one-third of U.S. adults (36.5%) are still obese today. Oregon obesity levels are

lower than national levels; in 2015, 27.9% of Oregon's population was obese. In the greater Portland region, the percentage of adult survey respondents who reported being overweight or obese increased between 2002 and 2010. In 2010, Clackamas County had the highest percentage of adult survey respondents reporting being obese (27.6%). Washington County had the highest percentage of adult survey respondents reporting being overweight (39.2%) and the highest percentage of adults who were either obese or overweight (63.1%). Multnomah County had the lower percentage of adults who were either obese or overweight (56.5%).

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

More work is needed though. The Interstate 5 (I-5) corridor and the Pacific Northwest have unacceptable levels of benzene and other air toxins. For example, levels of toxic emissions near downtown Portland – most notably benzene – have been measured at more than 8.5 times the federal standard. Diesel particulate matter is another air toxin concern, and diesel emission levels in parts of the region exceed healthy levels. Regulatory monitoring of these air toxins and carbon emissions is not currently required, yet they pose significant risks to public health.

Interest in the connection between urban planning and active living grew in the 1990s, an outcome of a growing interest in "smart growth," a movement to integrate land use, transportation, and public health planning. Studies since then report positive effects on human health in neighborhoods built to encourage walking and biking. **Not only does transit facilitate more active lifestyles, it also has a positive impact on chronic diseases such as asthma that are related to air quality and vehicle emissions**. Since transit can have such a positive impact on public health, the Regional Transit Strategy affirms the RTP's vision for an active and healthy region.

Aging Population

Age distributions are influenced by birth rates, death rates, and migration. As the baby boomer population - the second largest generation after millennials - reaches retirement age, the proportion of people over 65 has begun to rise in both absolute numbers and percentage of the total population. The median age in the Portland region was 36.7 according to 2012 American Community Survey data, up from 34.8 in 2000.

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

Public Funding

The need for public funding is directly related to the issues of growth and aging infrastructure. Today, the federal government is investing less in infrastructure than ever before. While budgets are shrinking, our transit systems require funding for maintenance and expansion. Traditional approaches to financing transit projects are not only failing to maintain our existing infrastructure, they are wholly inadequate to expand and build new systems to accommodate growth.

Federal and state transit funding sources are at their lowest levels since the 1960s. Diminished resources mean increased competition for funds and reduced ability to expand, improve, and maintain existing transit infrastructure. New funding strategies, enhanced public and private collaboration, and stronger public support for new revenue sources must be developed to pay for major system investments.

HB2017, also known as Keep Oregon Moving, is an exciting new step in the right direction for transit funding. HB2017 includes funding for transit that will allow our region to expand and improve transit service. This goes a long way in expanding and improving transit service and includes opportunities for natural gas or electric vehicles purchases and a low income fare program.

Oregon lawmakers passed House Bill 2017(Section 122) the first comprehensive transportation package to receive legislative approval since 2009. At $5.3 billion, the package makes significant investments in transit and many other transportation initiatives across the state. The measure creates a statewide employee payroll tax dedicated to transit improvements.

CHAPTER 4: REGIONAL TRANSIT VISION AND POLICIES

This is an important time to update the Regional Transit Vision. With continued regional growth, comes challenges such as 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 frequent, convenient, access and affordable for everyone**. What does frequent, convenient, accessible and affordable mean?

Regional Transit Vision

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 15 minutes or better every day of the week, 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 relatively easy to use. Perhaps most importantly, it needs to get people to their destination relatively quickly as compared to driving. 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 providing 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 enhance the experience of using transit and handicap-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 rural towns or outlying areas to access our transit system.

The second component of accessibility is to ensure that essential destinations and jobs be 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.

To make transit affordable by ensuring that transit is and remains affordable, especially for those dependent on it.

Affordability is the cornerstone of the other components of our vision. Frequency, convenience, and accessibility are meaningless if transit is not available to people because it is unaffordable. Additionally, affordability ensures that the transit system is equitable for low income populations, communities of color and those who rely on transit services instead of the private automobile to meet one's needs.

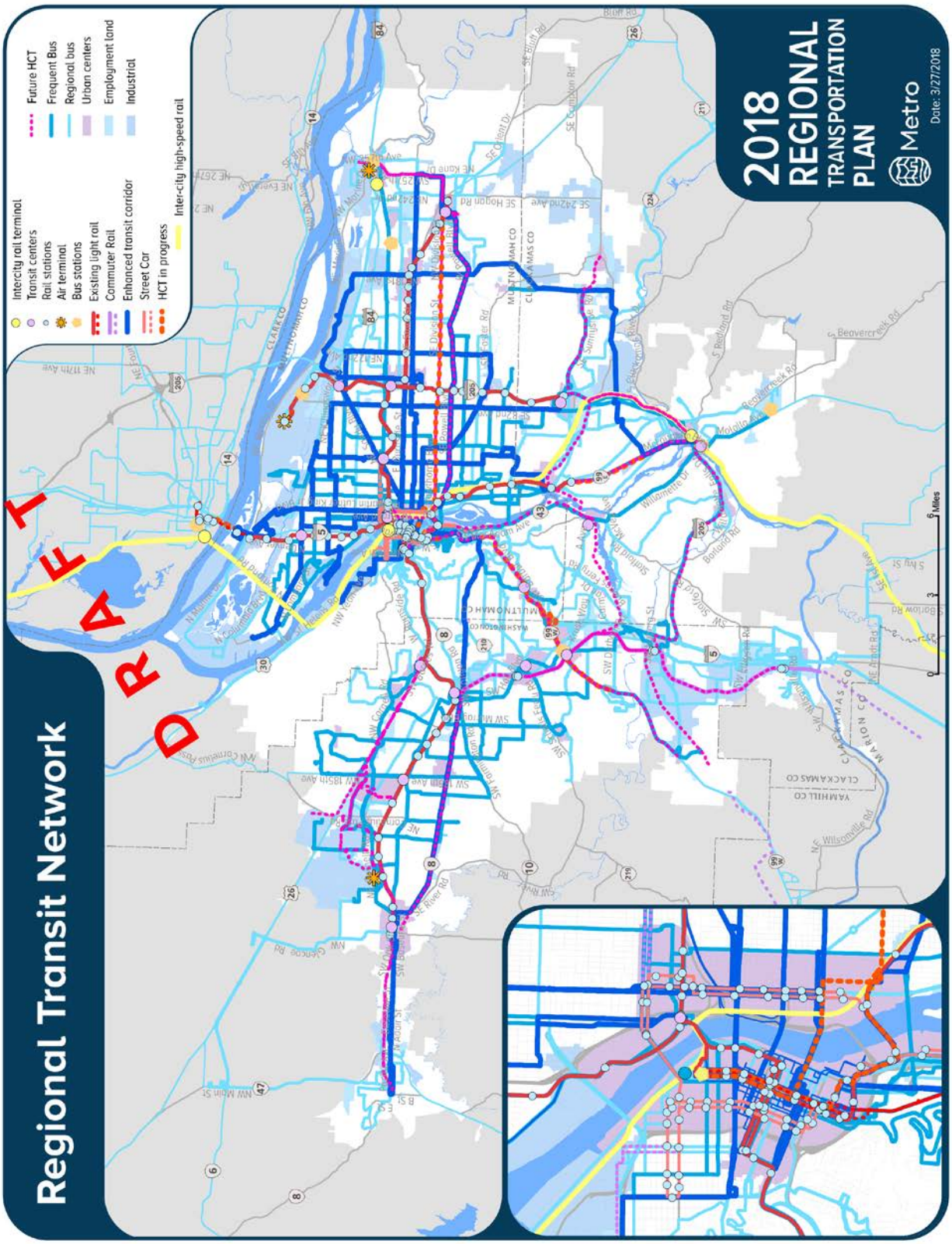
Regional Transit Network

The Regional Transit Network is the future transit vision. The Regional Transit Network includes future regional and local bus, enhanced transit corridors, high capacity transit and intercity rail.

Figure 5 presents the region's future transit network. The Regional Transit Network map has been updated to include the 2009 HCT lines, new enhanced transit concept, streetcar and future transit service as identified by the TriMet's Service Enhancement Plans and Wilsonville's Transit Master Plan.

There were changes made to the 2009 HCT Map which include:

- Moving the I-5 HCT corridor from "High Capacity Transit Corridors under development" to "Next Phase Regional Priority Corridor"
- Moving the Portland to Lake Oswego Streetcar project from "High Capacity Transit Corridors under development" to "Next Phase Regional Priority Corridor"
- Portland to Gresham in the vicinity of Powell Corridor remains a "Near Term Regional Priority"
- Added Portland to Gresham in the vicinity on SE Division St "High Capacity Transit Corridors under development"
- Moved Portland to Sherwood in the vicinity of Barbur/Highway 99 Corridor from "Near Term Regional Priority" to "High Capacity Transit Corridors under development"
- Modified the Clackamas Town Center to Damascus to connect to Happy Valley via the Columbia to Clackamas Corridor in the "Regional Vision Corridors"

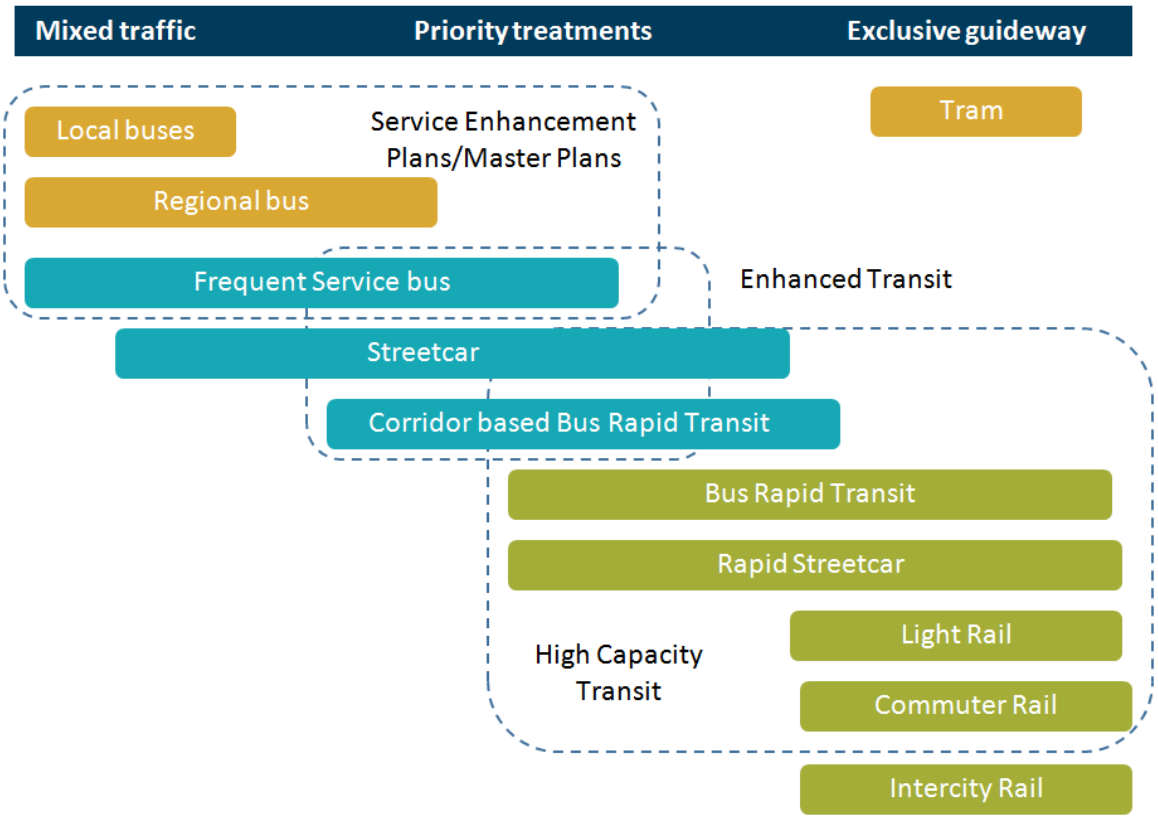

Regional Transit Network
DRAFT
2018 REGIONAL TRANSPORTATION PLAN
Metro
Date: 3/27/2018
Intercity rail terminal
Transit centers
Rail stations
Air terminal
Bus stations
Existing light rail
Commuter Rail
Enhanced transit corridor
Street Car
HCT in progress
Future HCT
Frequent Bus
Regional bus
Urban centers
Employment land
Industrial
Inter-city high-speed rail
0
3
6 Miles

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.

On top of our bus system, we have implemented streetcar and corridor based bus rapid transit (BRT). These services, along with frequent 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, new to our region, provides that transit priority treatment to help improve transit speed and reliability above the traditional transit service but not to the extent of high capacity transit or exclusive guideway.

Our 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. Figure 6 shows the broad transit spectrum that exists or is planned for regional transit system.

Figure 6. 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.

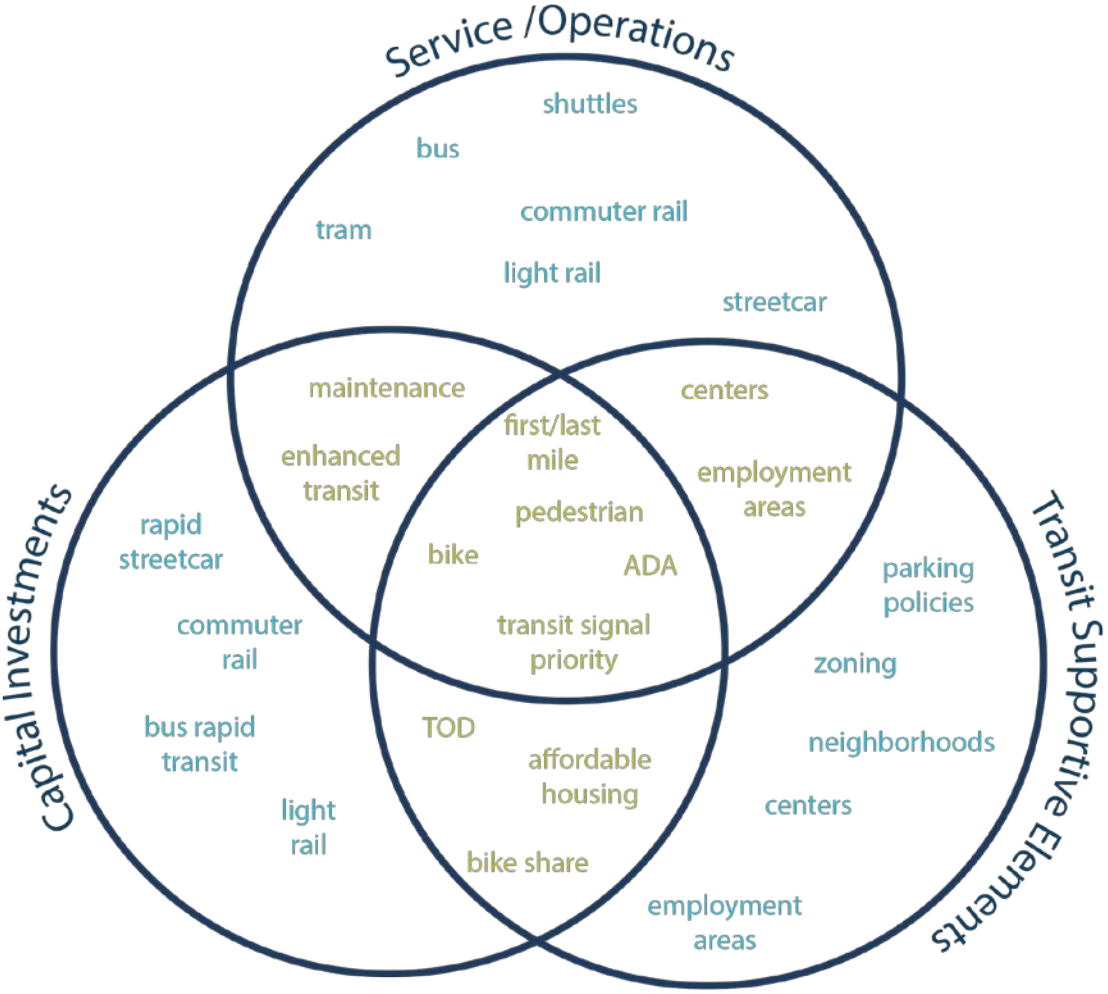
Implementation of the Regional Transit Vision

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:

1. **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.
2. **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.
3. **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 7 shows the relationships between these different types of investments.

Figure 7 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 as 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.

Recommended RTP Transit Policy language

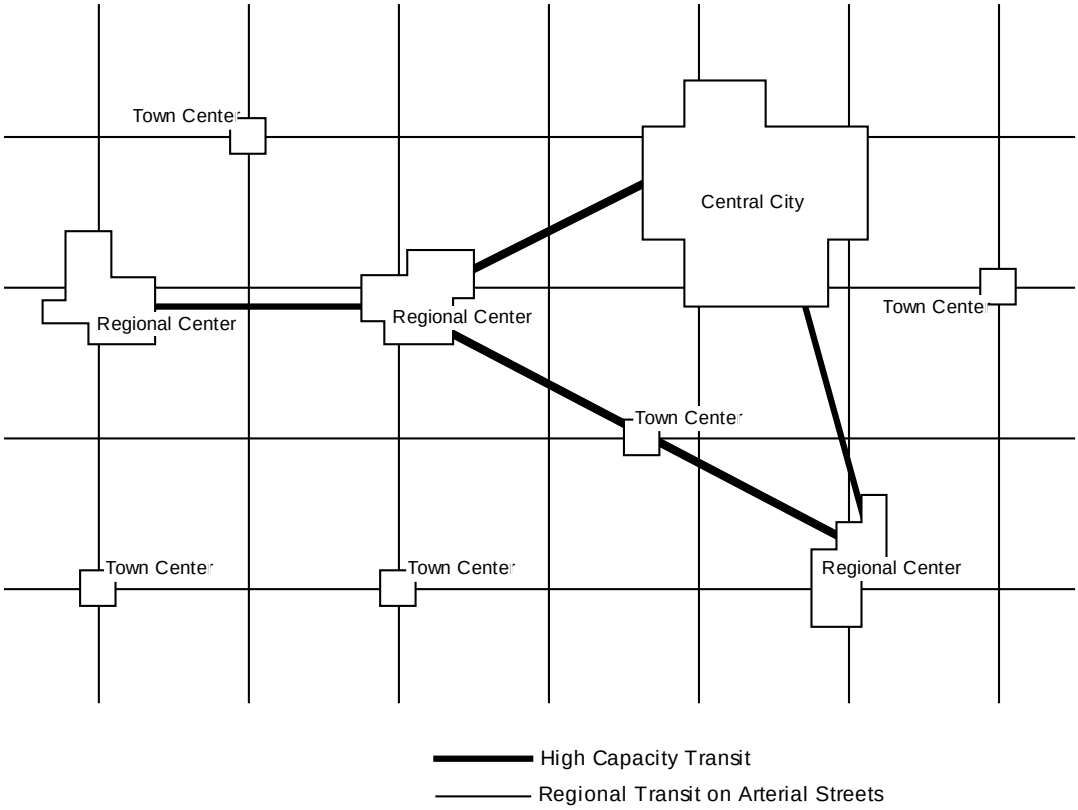
The regional street system has carried public transit for more than a century, beginning with the streetcars of the late 1800s and evolving into a combination of vans, buses, streetcars and light rail trains today. The Tri-County Metropolitan Transportation District of Oregon (TriMet) is the primary public transportation provider for the metropolitan region. The South Metro Area Regional Transit (SMART) in Wilsonville also provides regional transit service, connecting Wilsonville to downtown Portland. Just outside of the Metro region, Sandy Area Metro and Canby Area Transit provide transit service for Sandy and Canby. Bus service in other surrounding areas, all with connections to TriMet 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 required to implement 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 x** shows how the regional transit system concept would connect the 2040 centers.

Figure8. Regional Transit Network Concept



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

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 x**.

Table 1. 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 streets
Mix of uses	Mixed use (e.g., commercial, residential, and office uses)	Single use (e.g., all residential, all industrial)
Pedestrian and bicycle environment	Wide sidewalks 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 that generates transit riders.
- A mix of uses, and a balance of jobs and housing, that creates a place where activity occurs at least 18 hours a day.
- Well-designed streets and buildings that encourage pedestrian travel.
- Streets that can accommodate 40-foot buses.
- Safe, direct and convenient pedestrian and bicycle access, within communities and to transit stops.
- Street connectivity with good pedestrian and bike paths 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.

Regional transit priorities are informed by the following policies which aim to provide transit as an attractive and accessible travel option for all people in the Metro region,

optimize existing transit system operations and ensure transit-supportive land uses are implemented to leverage the region's current and future transit investments.

Seven policies form the foundation of this vision:

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 (NEW)

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. (NEW)

Policy 3: Make transit more frequent by expanding regional and local frequent service transit and improving local service transit

Policy 4: Make transit more convenient by expanding high capacity transit (through the System Expansion Policy framework) and the region's enhanced transit network, and supporting expanded commuter rail and intercity transit service to neighboring communities

Policy 5: Make transit more accessible by improving pedestrian and bicycle access to transit and explore new ways to improve connections to high-frequency transit when walking, bicycling or local bus service isn't an option (REVISED)

Policy 6: Use emerging technologies to provide better, more efficient service – beginning with the people for whom conventional transit doesn't work (NEW)

Policy 7: Ensure that transit is affordable, especially for people who depend on transit (NEW)

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 (NEW)

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.

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 whole 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 not only provide better service for underserved and transit-dependent residents, but also increase resources available to serve high-demand corridors.

Technology is another tool to actively manage the Portland metropolitan region's transit system 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.

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. (NEW)

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 Plan to help transit agencies maintain bus and rail systems as part of the Moving Ahead for Progress in the 21st Century (MAP-21) Act. 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 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. The FTA's Core Capacity grants help fund projects that increase the capacity, no less than 10%, on existing fixed guideway systems that are at capacity today or will be in five years.

Some recent maintenance projects and improvements that TriMet has currently 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 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.

Policy 3: Make transit more frequent by expanding regional and local frequent service transit and improving local service transit

Expand regional and local frequent service transit

Frequent service transit is defined as wait times of 15 minutes or better from the early morning to late in the evening, seven days a week. Its elements include additional service, reliability improvements, distinctive branding, improved passenger facilities at bus stops, enhanced pedestrian access and modern low-floor buses. Frequency is especially important for 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.

In 2040 corridors, main streets and centers, the RTP recommends supporting transit by providing transit-supportive development and well-connected street systems to allow convenient bicycle and pedestrian access.

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

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

Types of frequent transit services and facilities include:

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

Transit service improvements and expansion should be prioritized, with an emphasis on congested transit lines that serve historically marginalized communities. 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 local bus service increases the convenience of transit, particularly for areas without frequent service transit or where traditional transit service is not viable. Local transit service also expands community and regional transit service across the region that improves access to jobs and community places and can help facilitate that first/last mile connections where business and or homes are spread out and regional fixed-route bus service is not cost effective.

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:

- Tram
- Local Bus
- Para-Transit
- Deviated "On-Demand" routes
- Community and job connector shuttles
- Employer Shuttle Service
- Community Event Shuttles

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). Investments should be prioritized, as appropriate based on congestion along transit lines which service historically marginalized communities. Decisions about transit investments should be assessed with an equity lens.

Policy 4: Make transit more convenient by expanding high capacity transit (through the System Expansion Policy framework) and the region's enhanced transit network, and supporting expanded commuter rail and intercity transit service to neighboring communities

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 connection of the Portland Central City, regional centers, and passenger intermodal facilities. It operates on a fixed guideway or within an exclusive right-of-way, to the extent possible. High capacity transit strives for frequencies of 10 minutes or better during the day and 15 minutes on weekends. Passenger infrastructure at HCT stations and within station communities often include enhanced amenities, such as real-time schedule information, ticket machines, special lighting, benches, shelters, bicycle parking, civic art and commercial services.

To optimize and leverage transit supportive land uses, alignments and station locations be oriented towards existing and future high density, mixed-use development. To this end, urban form and connectivity, redevelopment potential, market readiness, public incentives and infrastructure financing should all be considered during the corridor refinement and alternatives analysis phases of project development. High capacity transit investments are informed and prioritized by the System Expansion Policy (see implementation chapter of this 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 (limited stop, all day bus service with significant portions of the line running in transit-only right-of-way).
- On-Street Bus Rapid Transit (limited stop, all day bus service, mostly operating in mixed traffic with focused transit priority treatments, such as queue jump lanes). Due to its flexibility, On-Street Bus Rapid Transit can have attributes that are more like High Capacity Transit or like Frequent Service Bus and may be considered as a mode in either, depending on circumstances.
- Commuter Rail (WES)
- Interurban Passenger Rail (e.g., Amtrak or regional rail systems in other regions)
- Intermodal Passenger Facilities (e.g., Union Station and Greyhound)
- Bicycle stations/parking
- Park-and-ride lots
- Transit Centers
- Transit Stations

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, low income, low English proficiency, seniors 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 can access from it, by limiting residential and business displacements and gentrification.

Any HCT planning effort should include the community directly into the decision-making process of selecting and designing the HCT facilities. 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 Transit System Expansion Policy, described in more detail in Chapter 7, provides the policy framework for advancing HCT transit projects. This policy guidance and framework

provides the process and criteria to inform regional decision making process to advance HCT projects identified in the 2009 HCT Plan.

Potential and promising HCT corridors will be evaluated through the Transit System Expansion Policy framework. The evaluation will inform the regional conversation regarding prioritizing HCT corridors for implementation. The Transit System Expansion Policy process and criteria are under development. More information is presented in Chapter 7: Implementation.

Expand region's enhanced transit network - *NEW*

In order to meet the Portland Metro 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. The Enhanced Transit Concept (ETC) employs new public partnerships to produce transit service and investments 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.

ETC can be implemented through the coordinated investment of multiple partners and has the potential to provide a 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 good candidates for light-rail, or bus rapid transit with fully dedicated lanes.

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, curb extensions, special lighting, enhanced sidewalks, protected crosswalks and bikeways, 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 x describes the different types of treatments that have the potential to improve reliability.

Table 2. 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	Bikes behind station
Bus stop consolidation	Left-side bike lanes
Rolling stock modification	Dedicated bike signal
Transit signal priority and signal improvements	Shared bus/bike zone
	Curb extension at stops/stations
	Far-side bus stop placement
	Street design traffic flow modifications

Enhanced transit project should be prioritized, as appropriate based on congestion along transit lines which service historically marginalized communities. Decisions about transit investments should be assessed with an equity lens.

Support expanded commuter rail and intercity transit service to neighboring communities

Intercity passenger rail and bus service to communities outside of the region provides an important connection to the regional transit network. A high level assessment of potential demand for commuter rail outside of the Portland urban growth boundary was conducted as part of the 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 planning 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 identified for potential high-speed rail investments to better connect communities across America. Shown in Figure 9, this corridor provides an important intercity rail connection between Eugene, Oregon and Vancouver, British Columbia. More work is needed to determine what partnerships, infrastructure investments and finance strategies are needed to support this level of service. More information about current efforts to support high speed rail are described in chapter 6.

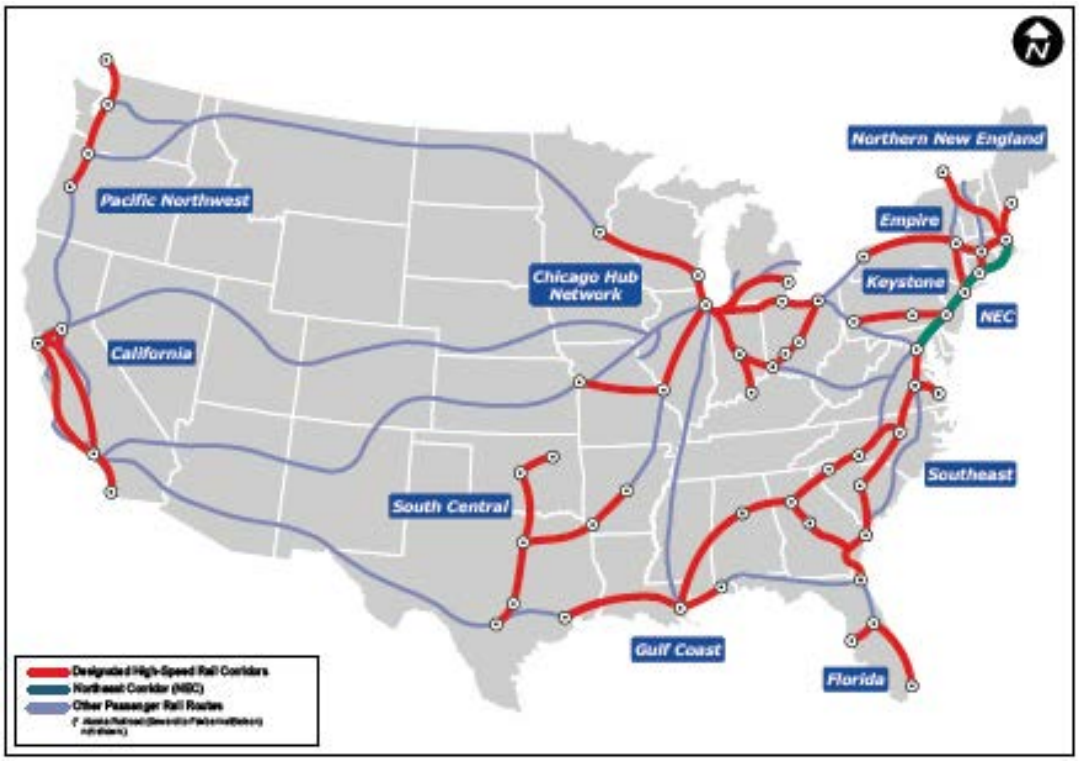


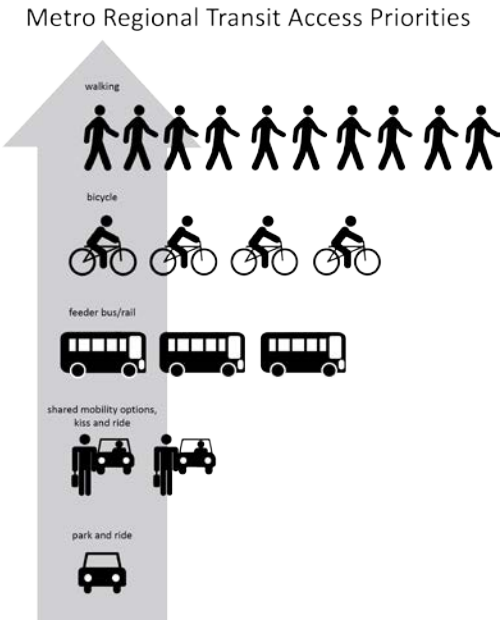
Figure 9. U.S. Intercity Passenger Rail Network

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

Policy 5: Make transit more accessible by improving pedestrian and bicycle access to transit and exploring new ways to improve connections to high-frequency transit when walking, bicycling or local bus service isn't an option *(REVISED)*

Improve pedestrian, bicycle access to transit

Figure 10
Regional Transit Access Priorities



Providing safe and direct walking and biking routes 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 10 depicts the Metro region's priorities for providing multi-modal access to the region's transit service. It prioritizes walking and biking to transit and deemphasizes driving to transit.

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.

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, transportation network companies (TNCs) Uber and Lyft provided an estimated 7 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.

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

- Shared electric bikes or scooters 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 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 work partner with microtransit or carsharing 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 TNCs 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 TNCs picking people up and dropping them off means that curb space is increasingly valuable, and the use of global positioning systems on TNC vehicles makes it possible to manage where these vehicles drop people off and pick them up. Agencies can manage the curbside to prioritize TNCs carrying more than one passenger and avoid conflicts with transit vehicles.

Policy 6. Use emerging technologies to provide better, more efficient service—beginning with the people for whom conventional transit is not an option.

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 doesn't 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 could 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, 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.

Policy 7. 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 Portland Metro 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, senior citizens, and people with limited English proficiency are those most affected by transportation costs because they're 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.

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 seniors (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).

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.

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 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.

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.

CHAPTER 5: STRATEGIES AND ACTIONS

Strategies

This section describes the current transit strategies that relate to how we are implement transit service, guiding our capital investments and supporting our transit system.

Climate Smart Strategy

In 2014 Metro released its Climate Smart Strategy, a state mandated strategy to implement changes that reduced per capita greenhouse gas emissions from cars and smalls trucks by 2035. Metro engaged communities, business, public health and elected leaders to shape a strategy that supports local plans for downtowns, main streets and employment areas; protect farms, forestland, and natural areas; creates healthy and equitable communities; increases travel options; and grow the economy while recuing greenhouse gas emissions.

Since its adoption in December of 2014 Metro and the region as a whole have already taken action to meet the goals of the strategy. Some of the places we have already began working include:

- Working with ODOT on updating the Oregon Public Transportation Plan
- Increasing state funding for transit service (House Bill 2017)
- Making funding for access to transit a priority through RTP
- Working with elected officials, community, and business leaders at local, regional and state levels to make transit more accessible
- Researching and developing best practices that support equitable growth and development near transit without displacement
- Developing a Regional Transit System Plan
- Supporting reduced fares and service improvement for low-income families, youth, older adults, and people with disabilities
- Partnering with transit providers and school districts to seek resources to support youth pass programs
- Expansion of transit payment options (Hop Fastpass)

As the list above highlights our region is making real strides towards using transit as a tool to reach our climate smart objectives. Our region's ability to successfully implement these strategies and actively improve the areas we are lacking demonstrates leadership and real dedication to the reduction of greenhouse gas emission in our region.

Focusing on racial equity

In June 2016, Metro adopted the Strategic Plan to Advance Racial Equity, Diversity, and Inclusion (Strategic Plan). The Strategic Plan's purpose is to provide clarity as to how Metro looks to achieves equity, one of the six desired outcomes for the region. The Strategic Plan to Advance Racial Equity,

Diversity, and Inclusion emerged as a need to provide greater direction to Metro's different lines of business and better integrating and approaching social equity in planning, operations, and services.

The key aspect of the Strategic Plan is its focus and emphasis on deliberately tackling inequities based on race and ethnicity. The Strategic Plan identifies 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 to how Metro considers and serves the needs of communities of color. The Strategic Plan also builds on the extensive equity work that Metro departments and venues have been conducting for a number of years. In developing the 2018 RTP, the region looks to opportunities to align the goals areas of the Strategic Plan with the policies, strategies, and actions of the region's long-range transportation blueprint.

In previously adopted Regional Transportation Plans, the focus on equity has looked at whether future transportation investments will serve a broad spectrum of historically marginalized communities. Moving forward, the Strategic Plan provides unified strategic direction to have an additional focus on race for the crucial equity work currently underway at Metro, including the development of the region's long-range transportation blueprint. The RTP equity analyzes all projects with an equity lens and an overlap of transit investments and communities of color.

Collaboration between transit providers in transit planning and service operations

Transit riders are not particularly concerned with who the transit provider is, they just want to get to the places they are traveling to. Therefore, in order to improve transit services for the entire region, we need to increase the degree of collaboration between transit service providers. As mentioned in Chapter 2, there are transit options within our regional and transit options that operate outside our region but provide for critical connections. Collaboration between transit providers and services are critical to improving the experiences of transit riders who transfer from one to the other and to plan for improvements that will benefit both agencies in the future.

When improving, expanding and capital investments in transit service, transit providers should be coordinating to ensure that seamless connections between transit providers is maintained and or improved. Transit providers should explore ways to improve the connections between transit providers (e.g. payment options, marketing or information sharing) that improves the transit riders experience.

Enhanced Transit Concept

A consistent theme of our public and partner outreach is that transit needs to be more reliable if want people to ride it. Light rail and commuter rail operate in exclusive guideway, so reliability is not necessarily a big issue. But as our region grows and congestion worsens, the reliability of our bus system which operates in mixed traffic is going to become more and more important.

Through a Transportation Growth Management (TGM) grant, through the Oregon Department of Transportation (ODOT), TriMet and the City of Portland developed an Enhanced Transit Corridors Plan and a toolbox of potential improvements that could apply to congested transit corridors that

could increase capacity and reliability with moderate capital and operational investments and could be deployed quickly. The City of Portland and TriMet developed this approach specifically for transit service within the City of Portland. As this was being developed, Metro, TriMet and local jurisdictions sought to adapt this approach to the rest of the region to develop enhanced transit corridors that can move forward towards implementation and construction.

Through the RTS, the region developed a policy framework (see Chapter 3: Vision and Policies) and criteria to identify enhanced transit candidate corridors, as well as identify opportunities for service improvements, capital investments and policy commitments to enhance transit service in the corridors that need it most. The Regional ETC Pilot Work Plan goals are to:

- Increase transit ridership to level 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 through moderate capital and operational investments from both local jurisdictions and transit agencies.
- Identify, design and build a set of Enhanced Transit projects, either as 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 for to construction as funding is identified.

Role of Technology

Metro's Emerging Technology Strategy, included as part of the 2018 update to the Regional Transportation Plan, lays out a plan to harness innovations like automated vehicles and shared mobility to create a more equitable and livable Portland region. These technologies have the potential to transform how we travel, but much uncertainty remains about when they will reach maturity and how they will affect communities. The Emerging Technology Strategy forecasts when and how technology will likely impact our region and identifies policies and actions for Metro and our partners to guide the region toward positive outcomes.

Emerging technologies have the potential to support transit, but also present new challenges. Shared mobility services like car share and bike share to provide new opportunities to connect people who aren't within walking or bicycling distance of transit to stops and stations, but there is growing evidence that some of these services draw riders away from transit and make it harder for buses to operate efficiently by producing conflicts and congestion. Advances in automated vehicles and dynamic routing could help make transit more efficient and bring service to areas that are hard to serve with fixed routes, but automated passenger vehicles could make driving much more convenient, dramatically reducing transit ridership. The Emerging Technology Strategy includes policies and actions to ensure that technology supports transit, and these policies and actions are incorporated into the Regional Transit Strategy.

Growing Transit communities

The Growing Transit Communities Plan is an effort by the City of Portland's Bureau of Transportation to identify and prioritize the most beneficial improvements that would make getting to the bus and using the bus a safer and more convenient option, with a particular plan focus along sections of bus lines 87, 77, and 20. The purpose of the Growing Transit Communities Plan is to identify a methodology for determine a package of transportation investments on a corridor level that would best create transit-oriented neighborhoods, places where transit (along with walking and bicycling for short trips) is truly the mode of choice for getting to and from work, school, shops, or other destinations.

Frequent transit service is one essential component of a transit-oriented community, but other components include safe access to transit, bus stop quality, sidewalk and bikeway network connections, crossings of busy streets, and the overall built environment. Deficiencies in these other factors often lead to lower ridership, and make frequent service less viable to implement. Conversely, as these transit-supportive elements are put into place at a corridor and neighborhood level, transit demand is likely to increase, making increasing transit frequency more cost-effective, creating a virtuous cycle of Growing Transit Communities.

While this was developed by the City of Portland, the methodology to develop the concept can be applied to the rest of the region. As population increases throughout the region, increasing transit service frequency and targeted investments in access to transit are ways to increase transit ridership, meet our regional transit mode share targets and support the region's overall desired outcomes. As communities are thinking about additional service or expanding to frequent service, local jurisdictions should work with the transit provider to identify local actions that could be taken to improve ridership and justify additional service in corridors.

First and last mile connections

Another key transit-supportive element is ensuring safe, convenient and attractive access to the transit system for those who connect by walking, rolling and riding a bike. Given diverse facility ownership, it is imperative for transit operators in the region work closely with local and state partners to focus on strategic investments in improving access to transit on the roadway, cycling, pedestrian and other rights of way they own and operate but that are served by transit.

Pedestrian Access to Transit: Working with cities and counties across the region, as well as ODOT, TriMet's Pedestrian Network Analysis Project developed a data-driven system to prioritize places around the region where sidewalk and crosswalk investments will provide a safer and more comfortable walking experience and better access to transit.

This effort guides current and future investments in access, both from TriMet and from our partners in the region, and includes recent competitive grant awards for access improvements on corridors such as SW Barbur Blvd., SE Powell Blvd. and Tualatin Valley Hwy/Oregon Hwy 8.

Bicycle Access to Transit: With support from the state's Transportation Growth Management grant program, TriMet recently developed its first-ever Bike Plan to help improve bike access to transit,

and help guide investments in biking infrastructure and amenities by TriMet and its local and state jurisdictional partners. This includes improving bicycle facilities in the vicinity of transit service, expanding bike parking options at stations and stops and accommodating bikes on buses, MAX and WES trains. After a period of public outreach and working with stakeholders, the final plan was adopted by the TriMet Board of Directors in July 2016.

Improvements in bike parking facilities throughout the system are made as needed, and as funding allows, each year. These improvements may include new or additional basic bike racks, covered bike parking, bike locker upgrades, or secure and enclosed Bike & Ride facilities.

Transit operators also regularly seek grant awards for key bike parking improvements at strategic access points in the system. One recent highlight of a grant award is the current Westside Bike & Rides: Access to Employment project, funded through a ConnectOregon V grant from the State of Oregon. TriMet is using this funding to make enhanced bike parking improvements at the Goose Hollow/SW Jefferson St and Beaverton Creek MAX stations. This will allow cyclists to park their bikes at secure locations before traveling through the Westside tunnel, which is one of the most congested parts of the MAX system for bike access.

First and last mile connection for seniors and people with disabilities

Decisions we make today on how best to invest in transportation options for seniors and persons with disabilities will affect the future quality of life for thousands of tri-county residents. By 2040, there is expected to be approximately 230,000 more people 65 years and older in the tri-county area, growing from a 13.2 percent share of the population today to a 20.0 percent share in 2040. According to the 2010 US Census, over 10 percent of the region's population reported that they had a disability. Seniors will represent the fastest growing segment of population in years to come, far outpacing the rate of population growth. As the Portland metro region is projected to become proportionally older, many seniors are likely to become disabled due to physical frailty caused by the effects of aging. Existing resources are inadequate to meet the growing demand for services for these populations.

Transportation is a key determinant of health. The World Health Organization has developed a "Checklist of Essential Features of Age-friendly Cities" (2007) as a tool for a city's assessment and map for charting progress. All of the data indicates that 80-90% of individuals want to stay in their home as long as possible. One of the key elements of a Livable Community is adequate transportation to access medical care and other essential services. The concept of Age-friendly Communities or Livable Communities is being actively promoted by AARP, The National Council on Aging and the National Association of Area Agencies on Aging. The Institute on Aging at PSU is a leading expert in Age-friendly Communities.

These changing demographics challenge the conventional solutions of more buses, light rail service, and paratransit vans. While such traditional modes of transportation will surely be needed, there is a limit to how much the region can afford. Improved coordination among existing services, innovative collaboration to deliver new types of services and a regional commitment to

placing public facilities and social services at locations served by public transit will also be needed.

Regional Transit Strategy Actions

The Regional Transit Strategy Vision is to make transit more frequent, convenient, accessible and affordable for everyone. The following table describes the actions we can take to move our transit system towards our vision.

- **FREQUENT:** Align frequency and type of transit service to meet existing and projected demand in support of adopted local and regional land use and transportation plans.
- **CONVENIENT:** Make transit more convenient and competitive with driving by improving transit speed and reliability through priority treatments (e.g., signal priority, bus lanes, queue jumps, etc.) and other strategies. Improve customer experience by ensuring seamless connections between various transit providers, including transfers, route and schedule information and payment options.
- **ACCESSIBLE:** Provide safe and direct biking and walking routes and crossings that connect to transit stops to ensure transit services are fully accessible to people of all ages and abilities. Expand community and regional transit service across the region to improve access to jobs and Community places.
- **AFFORDABLE:** Ensure transit remains affordable, especially for those dependent upon it the most.

Table 3. Regional Transit Strategy Actions

FREQUENT	CONVENIENT	ACCESSIBLE	AFFORDABLE
ACTIONS: • Implement TriMet's Future of Transit Service Enhancement Plans. • Implement the SMART Master Plan. • Implement the Portland Streetcar Strategic Plan and expansion. • Implement and coordinate with C-TRAN's Transit Development Plan. • Implement and coordinate with state, regional, neighboring cities and rural transit providers future service plans. • Implement the Regional Enhanced Transit Concept Pilot Program. • Invest in Enhanced Transit Concept improvements. • Invest in High Capacity Transit corridors. • Implement TriMet's Coordinated Transportation Plan for Seniors and Persons with Disabilities, in conjunction with Special Transportation Fund Advisory Committee (STFAC) and service providers. • Coordinate transit investments with local and regional land use and transportation visions as service improvements are prioritized • Test and deploy connected vehicle technologies that help transit operate more efficiently, such as transit signal priority. • Design transit streets to prioritize curb access for transit vehicles and minimize conflicts with other modes.	**ACTIONS:** • Implement TriMet's Future of Transit Service Enhancement Plans. • Implement the SMART Master Plan. • Implement the Portland Streetcar Strategic Plan and expansion. • Implement and coordinate with C-TRAN's Transit Development Plan. • Implement and coordinate with state, regional, neighboring cities and rural transit providers future service plans. • Invest in Enhanced Transit Concept improvements. • Invest in High Capacity Transit corridors. • Invest in repair and maintenance and critical transit bottleneck improvements to ensure the existing system functions effectively and efficiently. • Facilitate service connections between transit modes and transit providers at transit hubs. • Implement and coordinate the HOP Fastpass program across multiple service providers. • Implement the TriMet Regional Transit Signal Priority Study recommendations, especially in congested corridors to improve on-time performance and reliability. • Provide programs and adopt policies that help increase transit usage and reduce drive alone trips, such as travel options information and support tools (e.g., trip planning services, wayfinding signage, bike racks at transit stops), individualized marketing, commuter programs (e.g., transit pass programs), and actively managing travel in downtowns and other mixed-use areas.	**ACTIONS:** • Coordinate transit investments with improvements to pedestrian and bicycling infrastructure that provide access to transit as service improvements are prioritized, in line with Regional Active Transportation Plan and TriMet's Coordinated Transportation Plan for Seniors and Persons with Disabilities. • Provide new community and regional transit connections to improve access to jobs and community services and make it easier to complete some trips without multiple transfers. • Enhance transit access to jobs and other daily needs, especially for historically marginalized communities[1], youth, older adults and persons living with disabilities. • Provide biking, walking, shared ride and park-and-ride facilities that help people access the transit system. • Use new mobility services like microtransit, TNCs and car/bike sharing to improve connections to high-frequency transit when walking, bicycling, or local bus service isn't an option. • Coordinate and link transit-oriented development strategies with transit investments. • Coordinate transit investments with the regional Equitable Housing Initiative. • Coordinate and link transit investments with local and regional land use and transportation visions as service improvements are prioritized. • Explore and pilot test technologies such as automated vehicles and dynamic routing to provide better transit in communities that currently lack frequent service. • Explore and pilot test the potential of new mobility services to provide more convenient and	**ACTIONS:** • Expand existing reduced fare program to low-income families and individuals in line with Metro/TriMet Low Income Fare Task Force recommendations. • Expand transit payment options (e.g., electronic e-fare cards) to increase affordability and convenience. • Expand student pass program

[1] Historically marginalized communities areas with high concentrations (compared to regional average) of people of color, people with low-incomes, people with limited English proficiency, older adults and/or young people.

FREQUENT	CONVENIENT	ACCESSIBLE	AFFORDABLE
	• Improve the availability of transit route and schedule information and integrate information on first and last-mile transportation options. • Coordinate efforts between transportation providers to increase information sharing and ease of use (e.g., transfers and payment integration).	cost-effective paratransit and human service transportation.	

CHAPTER 6: MONITORING AND MEASURING PROGRESS

The section is draft, under development and will be updated as part of the RTP refinement phase.

The objective of the regional transit strategy is to highlight policies and methods that aim to increase transit use across our region. This chapter will explore the various performance measures, targets and monitoring measures that determine whether or not the region is progressing towards its transit goals.

Regional Performance Measures

Performances measures were refined and developed as part of the 2018 RTP update and development on the RTS. The following 6 questions to help frame the current status of transit in our region:

- How much do people and goods travel in our region?
- How much do households spend on housing and transportation in our region?
- How safe is travel in our region?
- How easily, comfortable and directly can we access jobs and destinations in our region?
- How efficient is travel in our region?
- How will transportation impact climate change, air quality and the environment?

Answering these questions help paint a clearer picture of whether or not the region is meeting its transit goals.

How much do people and goods travel in our region?

While it's no surprise that as the region's population increases the amount of daily vehicle trips will also. As a result, the total daily VMT in our region is expected to grow by 31.9%. Although increases in population typically bring increased total VMT our region is unique in expecting a decrease in the per capita VMT. This means that even as our population grows the average resident is expected to drive less and seek other transportation options – a key reason why continued investment in the efficiency and quality of our regional transit system is necessary.

Concurrent with reduced VMT the region is expected to see a substantial increase transit usage. The 2040 strategic model estimates the number of weekday transit trips to increase from 252,500 (2015) to 582,800 (2040) a staggering 131% increase. In addition to transit the region is expected to see increases in walking, and biking as well. The City of Portland Sub area is expected to see the largest non driving mode share increases with 33% of trips expected to be non-driving.

The movement of people and goods through the network are great indicators of economic activity and as a region strategic efforts must be made to maintain and expand the effectiveness of our transit systems to ensure they remain viable transportation options as the region's population continues to increase.

The data above indicates that, as a region, we're ahead of our peers when it comes to growth in transit usage but, there is always room to improve. Metro, with the help of partners around the region, need to continue exploring the barriers to transit use in our region. Meaningful engagement will lead us to strategies that break down barriers to transit use and improve the overall quality of life of everyone that calls the Portland metropolitan region home.

How safe is travel in our region?

Regionally we've placed high value on transit as an alternative method to automobile travel, as proponents of transit use; we must also consider the safety of our transit system. Transit safety analysis is more complex than automobile due to the fact that in most scenarios transit users are pedestrians first.

Taking a transit user's unique position into consideration offers two primary ways to approach safety:

- Physical Safety: This type of safety is concerned with the likelihood of an individual sustaining serious injury or death during the course of their trip.
- Emotional Safety (Security): This type of safety is more difficult to measure and is concerned with the opinions of potential transit riders. Emotional safety usually considers the non-transportation based "dangers" of transit usage, such as the fear of discrimination, concerns with the complexity of trip planning, or even the fear of being harmed by people you encounter along the way.

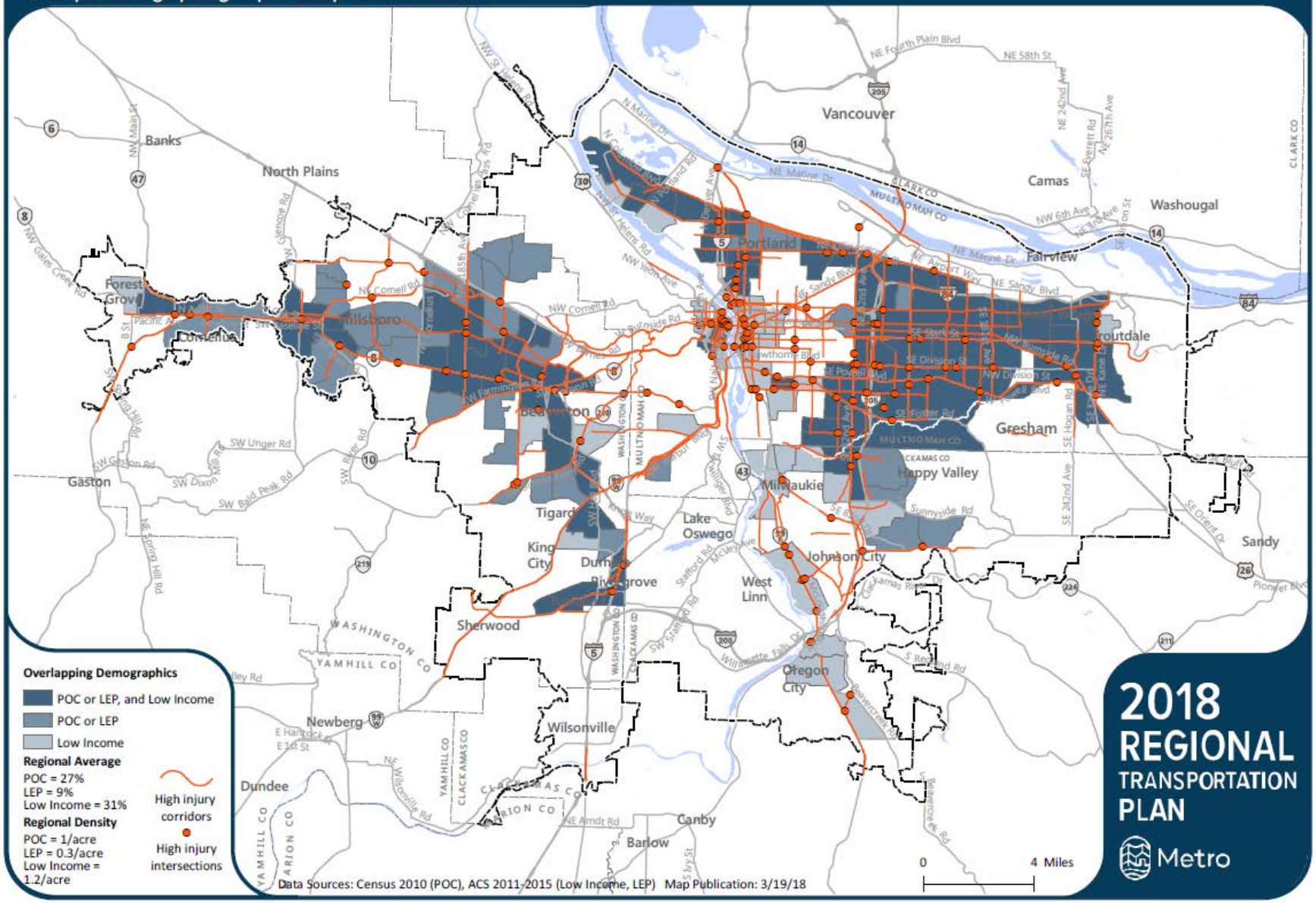
Physical safety concerns can typically be addressed by investments along the transit network that reduce the risk of serious death or injury for potential riders. From sidewalks, to stoplights – busses to bike lanes, projects that support safety support regional transit use. Across the constrained and strategic project lists the RTP identifies 382 projects aimed at increasing safety across the region.

Criteria: Build Complete Streets, Reduce fatal and severe injury crashes*, Reduce crashes*.

While the transit ride may be safer than its automobile counterpart, the entire trip may not be. Recalling that transit riders are pedestrians first it is critical we take into consideration their entire trip. High Injury Corridors (HIC) are places along a transportation network where there are disproportionate amounts of vehicular related deaths and injuries. The map below highlights the intersection of transit routes and high injury corridors.

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.



Many of the high crash corridors are along transit routes. This means, that in order to develop a safe and user friendly transit system, we must also invest in infrastructure that makes accessing transit safe, easy, and reliable.

How much do households spend on housing and transportation in our region?

For the average resident in our region housing and transportation consumes about 48% of their yearly income. The general rule of thumb is that no more than 28% of a person's income should go toward housing; currently our regional average is 27%. Potentially more so than housing, transportation expenditures can vary greatly, most sources suggest that a reasonable transportation cost lies somewhere between 15% – 20% of an individual's total income. Our region reports an average of 20% compared to the National average of 22%.

Transit use has the ability to significantly impact where our money is going. In 2016, the American Public Transportation Association (APTA) released its Transit Savings report which compared the average monthly expenditures for automobile ownership compared to transit use. On average, individuals in Portland were expected to spend $9,778 less per year by using transit. With similar savings reflected in 2018, $9,800 would represent approximately 15% of the regional average income. This means that the average driver in our region with viable access to transit could see their transportation expenditures fall to as low as 5% of their total income by switching modes of travel.

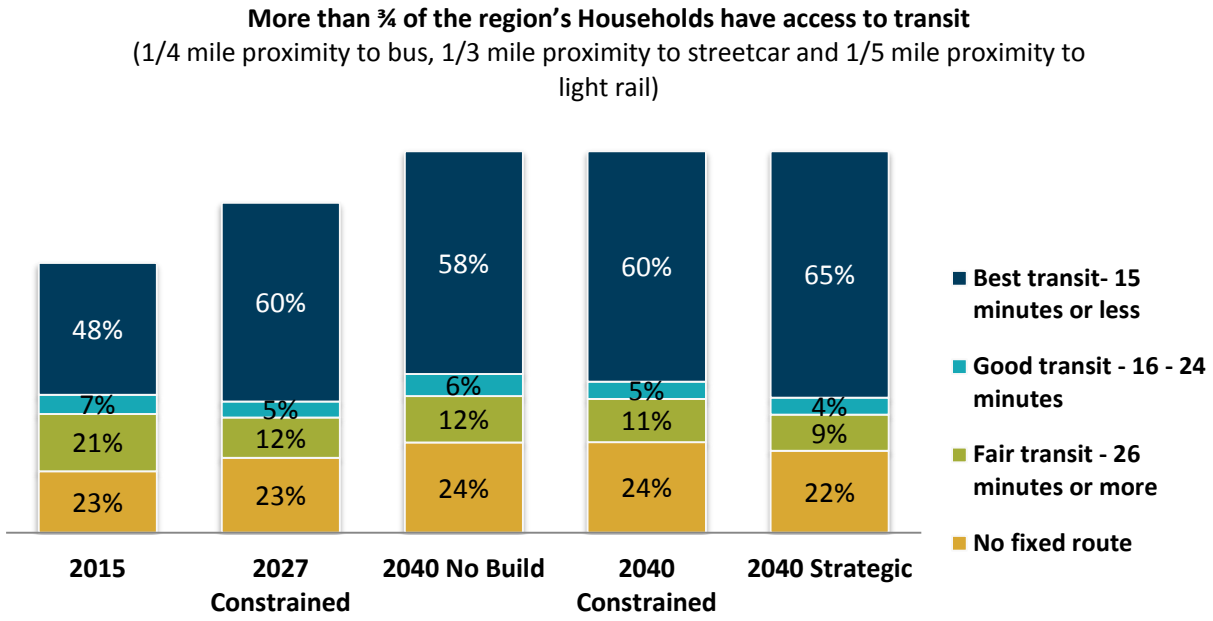
High housing costs are at the center of many conversations around the region. Investment and maintenance of a safe and accessible transit system has the ability to mitigate some of the financial impacts of increased housing costs in our region.

How easily, comfortably and directly can we access jobs and destinations in our region?

- When exploring transit access there are two primary things to consider:
- Time to Destination: This considers whether or not transit use gets people where they need to go in a reasonable amount of time.
- Proximity to Station: This considers the distance people live from transit stations.

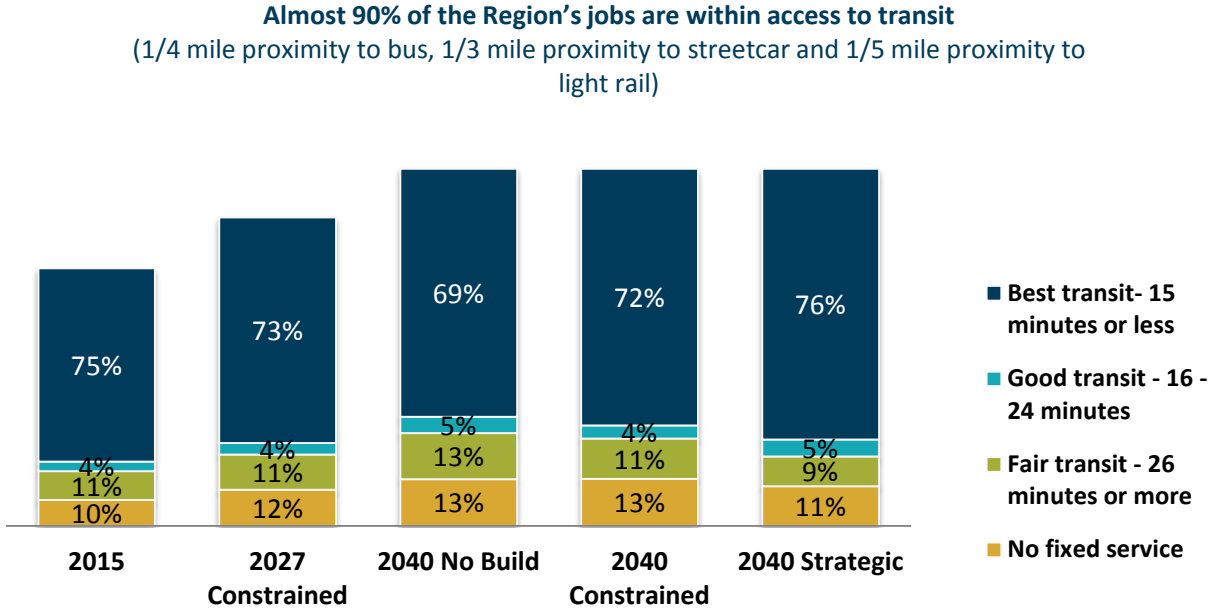
Proximity to stations: There is no motivation to use transit if it's geographically inaccessible, and even if it's geographically accessible there's no point in using it if it doesn't take you where you want to go. Good transit planning considers these concepts of access concurrently. The good news is that the future looks bright for both qualifiers of access. As the graph below highlights we can expect more than 3/4th 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.

Figure 12. Number of households with access to transit

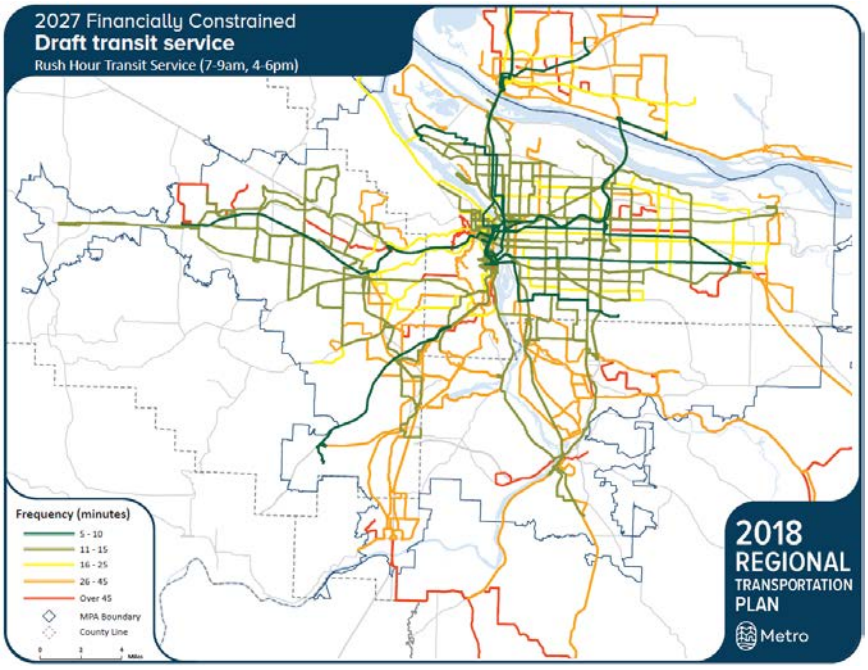


The jobs in our region see even higher rates of transit access (proximity).

Figure 13. Number of jobs with access to transit



The following figures show the jobs and households with access to transit by Investment Strategy.



10-year constrained

Results of projects scheduled in the first 10 years of the draft constrained list

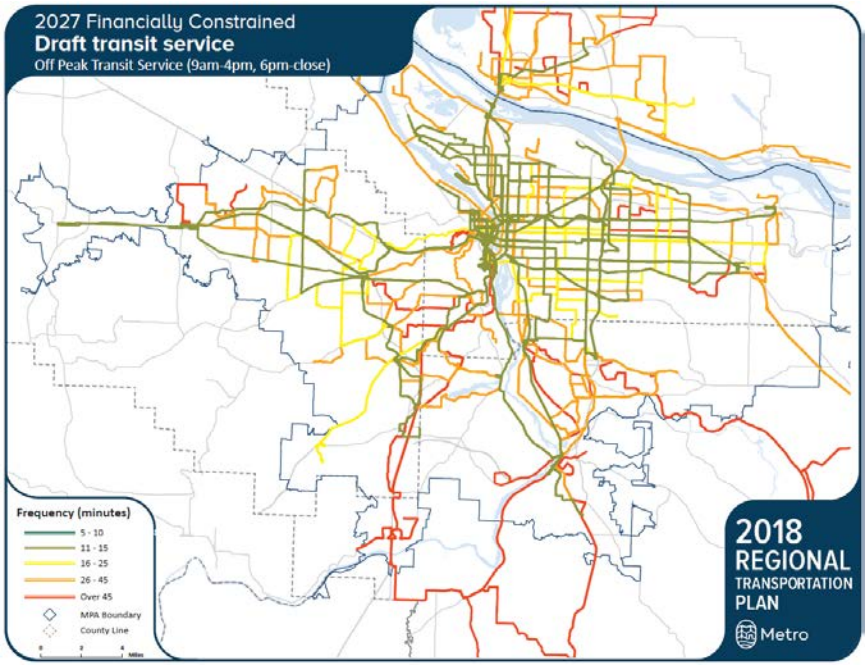
Estimated jobs and households near 15-minute or better rush hour service by 2027:

73% jobs

60% households

69% low-income households

78% low-income households in communities of color



10-year constrained

Results of projects scheduled in the first 10 years of the draft constrained list

Estimated jobs and households near 15-minute or better daytime and evening service by 2027:

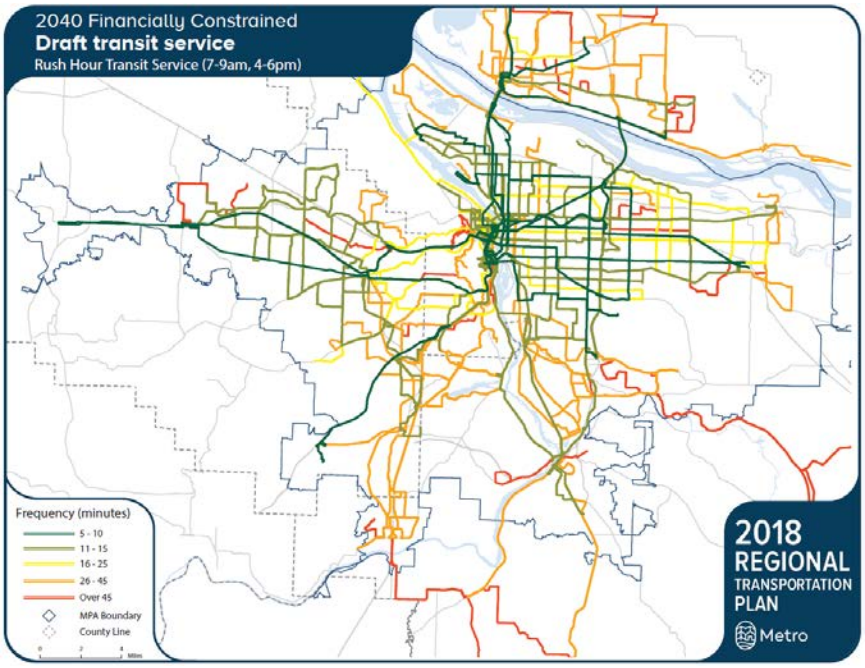
66% jobs

51% households

60% low-income households

69% low-income households in communities of color

Note: These maps are for research purposes and do not reflect current or future policy decisions of the Metro Council, MPAC or JPACT.



2040 constrained

Results of projects in the full draft constrained list

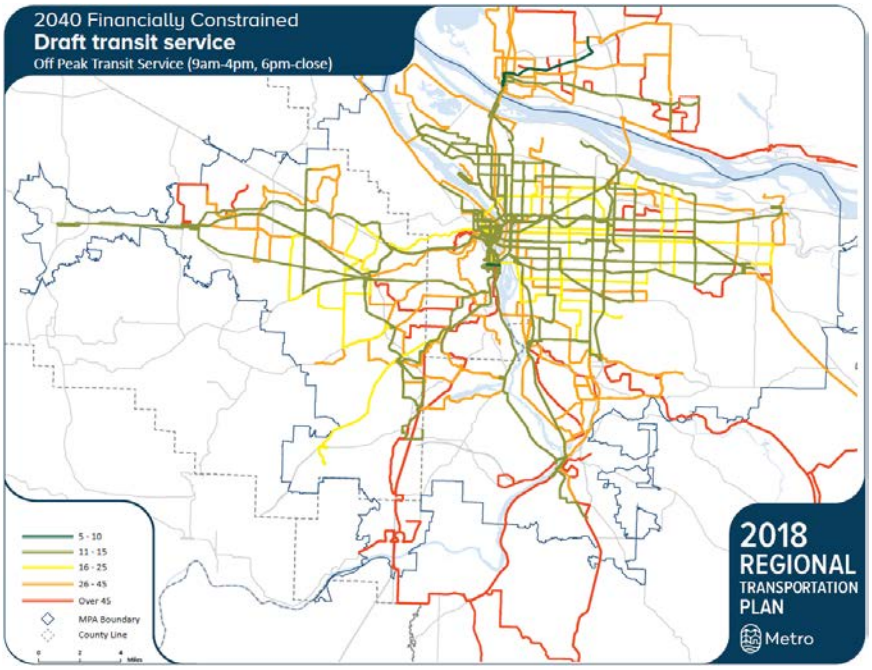
Estimated jobs and households near 15-minute or better rush hour service by 2040:

72% jobs

60% households

69% low-income households

78% low-income households in communities of color



2040 constrained

Results of projects in the full draft constrained list

Estimated jobs and households near 15-minute or better daytime and evening service by 2040:

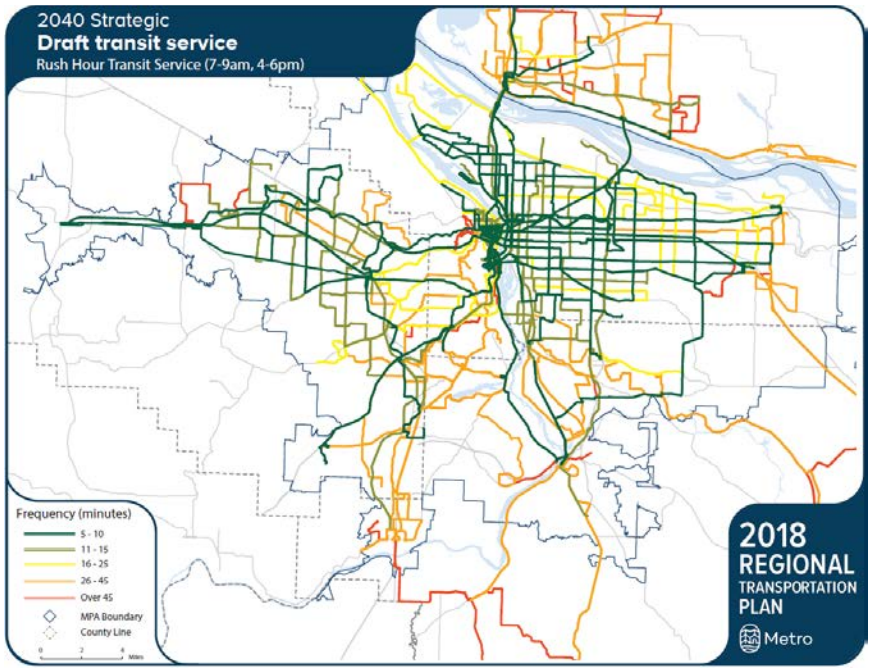
65% jobs

52% households

61% low-income households

70% low-income households in communities of color

Note: These maps are for research purposes and do not reflect current or future policy decisions of the Metro Council, MPAC or JPACT.



2040 strategic

Results of projects in the full draft constrained list and additional strategic priority investments

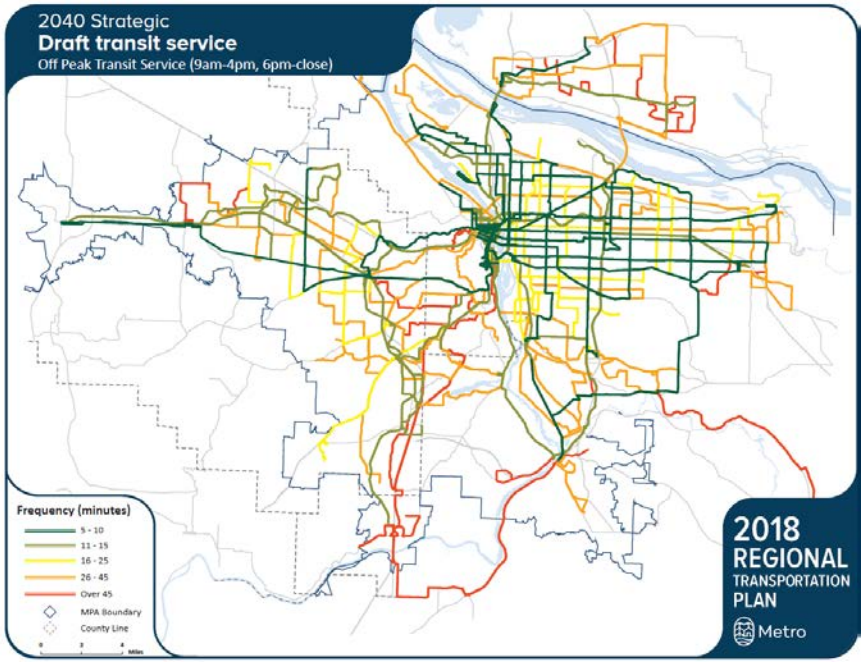
Estimated jobs and households near 15-minute or better rush hour service by 2040:

76% jobs

65% households

73% low-income households

82% low-income households in communities of color



2040 strategic

Results of projects in the full draft constrained list and additional strategic priority investments

Estimated jobs and households near 15-minute or better daytime and evening service by 2040:

69% jobs

56% households

65% low-income households

73% low-income households in communities of color

Note: These maps are for research purposes and do not reflect current or future policy decisions of the Metro Council, MPAC or JPACT.

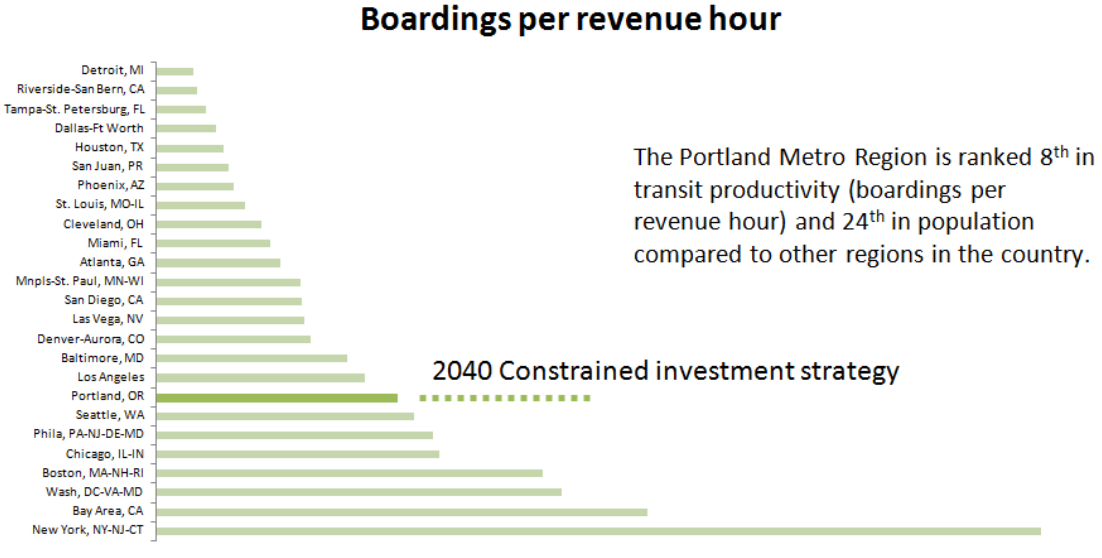
Home and work are important, but they aren't the only places we go. Access to community places like grocery stores and medical service locations are things that should also be served by the regional transit system. Across the 10-year, constrained, and strategic models transit access is expected to increase, further, access for historically marginalized communities and communities of color are expected to outperform the region as a whole, something that puts us one step closer to establishing a more equitable transit system.

Determining the ease, comfortably, and directness of our transit system is no easy task, but our models show that at the very least we are headed in the right direction. Due to social preferences there will always be a percentage of people who purposefully distance themselves from the transit network.

How efficient is travel in our region?

From an operational standpoint, a good indicator of efficiency in transit is boardings per revenue hour. This number reflects the average number of riders per day. Currently the Portland Metro Region is ranked 8th in boardings per revenue hour, but only 24th in size. With the current anticipated investments we are expected to reach a transit productivity level equivalent to what we see in Boston or Washington, DC today. While the future is promising, continued efforts must be made if we want to reach our larger goals, for example to triple the transit mode share from 2005. In addition to expanding transit infrastructure accessibility can also be addressed from an operational position. If we can make the end-user processes easier, we can attract more riders.

Boardings per revenue hour are a good determinant of efficiency from an organizational perspective, but for the many prospective transit users efficiency is simply the amount of time saved or lost by choosing transit over automobile travel.



Source: National Transit Database (NTD) 2015 Peer Review Summary

Data on Travel Times by Mode

This section is under development.

Historically, more people means more cars and more congestion however, a robust transit system can help mitigate the negative impacts of population growth. A regional dedication to maintain and expanding a world-class transit system can make a major difference on the lives of people living here.

How will transportation impact climate change, air quality and the environment?

Increasing transit use reduces the number of cars on the road and overall vehicle emissions in the region. Air quality is frequently the lowest in urban areas where traffic congestion is the worst which also means that individuals living in close proximity to major thoroughfares or highways sustain much higher health risks associated with poor air quality.

As mentioned in earlier sections, the Climate Smart Strategy identified key targets to achieving our regions goals of reducing carbon emissions. As we continue to pursue our environmental objectives it will be important to keep the Climate Smart performance measures in mind. Table x compares the Climate Smart monitoring targets to investments strategies.

Table 4. Draft Comparison of Climate Smart monitoring targets by Investment Strategy

Measure	2015 Baseline	2035 Monitoring target	2040 Constrained	2040 Strategic
Daily transit service revenue hours	6,525	**9,400**	8,671	10,332
Share of households within ¼ mile all day frequent service*	38%	**37%**	52%	56%
Share of low-income households with ¼ mile of all day frequent transit *	46%	**49%**	61%	65%
Share of employment within ¼ mile of all day frequent service*	68%	**52%**	65%	69%

*Climate Smart Strategy calculated the access to transit as a ¼ mile from any transit stop or station, the RTP analysis was more tailored and calculated the access for a ¼ mile from bus stop, 1/3 mile from streetcar station and ½ mile from light rail station

Investment in transit projects can also support higher density land development which reduces the distance and time people need to travel from place to place. Less distance means fewer emissions and cleaner air. Transit-oriented development also preserves land for other uses like parks, wildlife preserves, or agriculture.

If preserving the region's natural beauty for generations to come is a shared objective, reducing negative environmental impacts must be collaborative effort. Transit use is a tool proven to work. There is still a lot of work to do if we want to reach our goals but a region wide effort makes the task less daunting.

Targets

This section is under development.

Monitoring process and measures

This section is under development.

CHAPTER 7: IMPLEMENTATION

This chapter is under development and subject to change due to the refinement phase.

This chapter has three parts to it:

1. How is transit funded?
2. What are the local, regional and state transit priorities based on the RTP vision and project lists?
3. How do transit investments get implemented?

How is transit funded?

Transit service is funded through federal, state and local sources.

Federal funding

FTA Funding: This section is underdevelopment.

Since December 2015 and through fiscal year 2020, the Fixing America's Surface Transportation (FAST) Act has authorized several FTA programs to improve public transportation across the United States. Programs established by the Act vary in purpose and competiveness.

FTA Formula, or non-competitive, funds are designated to the region and allocated amongst TriMet, SMART, and C-Tran. These funds are marked as Section 5307 for transit capital, planning, and job commute programs, Section 5339 for bus and bus facilities programs, and 5310 to improve mobility for seniors and individuals with disabilities.

Competitive FTA funding sources include the Low or No Emission Vehicle Program, of which both SMART and TriMet have both been successful. Other competitive funding opportunities include the Transportation Investment Generating Economic Recovery (TIGER) Program for multi-modal and multi-jurisdictional transit projects that will enhance the economy and the Public Transportation Innovation grant for innovative products that assist the transit agency with better meeting customer needs. **FTA's Capital Investment Grant (CIG) Program** is FTA's discretionary funding source for funding major transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. It is a discretionary grant program unlike most others in government. Instead of an annual call for applications and selection of awardees by the FTA, the law requires that projects seeking CIG funding complete a series of steps over several years to be eligible for funding. For New Starts and Core Capacity projects, the law requires completion of two phases in advance of receipt of a construction grant agreement – Project Development and Engineering. For Small Starts projects, the law requires completion of one phase in advance of receipt of a construction grant agreement – Project Development. The law also requires projects to be rated by FTA at various points in the process according to statutory criteria evaluating project justification and local financial

commitment. A project can receive up to 50% of federal funding under the FTA Capital Investment Grant Program.

FTA's Capital Investment Grant Program is the primary funding source used by our region in developing our commuter rail, light rail, streetcar and bus rapid transit projects. We have been extremely successful in the past in receiving federal funding through this program. Because of our success, it is not unrealistic that this trend would continue. As previous mentioned, this is a discretionary and competitive grant program and includes projects to be rated at various points.

State funding

Oregon Department of Transportation provides several funding opportunities to support public transportation throughout the state. State funding comes by way of the Special Transportation Fund (STF), the *ConnectOregon* program, planning grants, the statewide transportation improvement fund (STIF) and more. The STF provides revenue in support of transportation need for seniors and people with disabilities. This program is funded through a combination of non-highway use gas tax, cigarette tax, and general funds. The *ConnectOregon* program is a grant initiative funded by lottery-based bonds to promote stronger, more diverse and efficient transportation options throughout Oregon.

Keep Oregon Moving, House Bill 2017 (HB2017),provides a huge boost for transit services and programs across Oregon. Oregon lawmakers passed House Bill 2017(Section 122) the first comprehensive transportation package to receive legislative approval since 2009. At $5.3 billion, the package makes significant investments in transit and many other transportation initiatives across the state. The measure creates a statewide employee payroll tax dedicated to transit improvements.

It is expected to generate $35-$40 million in additional annual revenue for TriMet. TriMet will use these funds to support two key priorities: a low income fare program and expanding bus service.

SMART is expecting receive an additional $1 million in annual revenue to increase transit coverage, increase transit service to weekends, convert their entire fleet to electric vehicles and to eliminate transit fares entirely.

In addition, 9% of the total House Bill revenues will be open to all transit agencies in Oregon in the form of competitive grants for a variety of projects; such as, to promote intercommunity services, enhance technology, and use as a match to obtain other grants.

Regional funding

Metropolitan Transportation Improvement Program (MTIP) - This section is underdevelopment.

Local Funding for transit

A predominant source of funding for both TriMet and SMART are local payroll taxes levied on businesses performing work in their respective transit districts assessed on gross payroll and/or self-employment earnings. SMART utilizes this source of revenue to run operations and leverage state and federal grants. This section is underdevelopment.

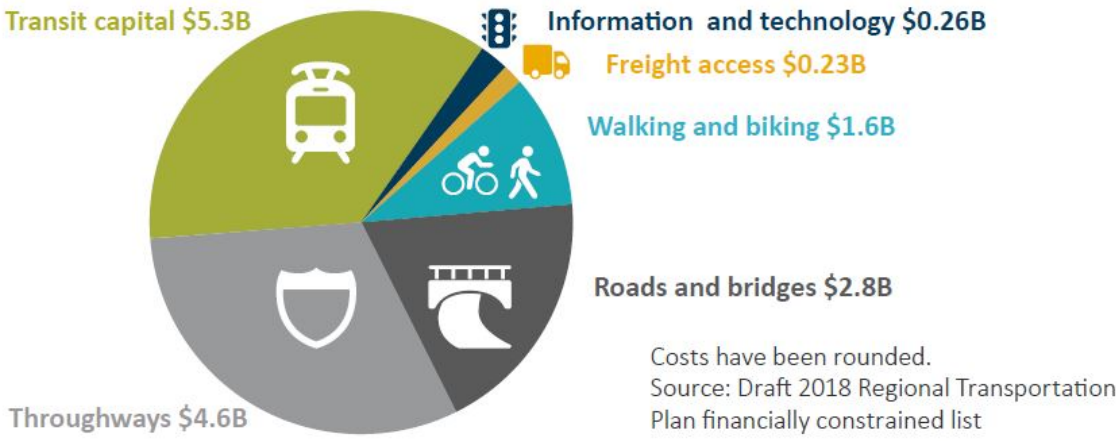
2018 Regional Transportation Plan priorities

The RTP comprises two main parts: the policy section (See Chapter 4 of this report) and the projects lists. The project lists are priority projects from local, regional or state planning efforts that have provided opportunities for public input. The project lists are separated into two categories:

1. The projects that fit within a constrained budget of federal, state and local funds greater Portland region can reasonably expect through 2040 under current funding trends; and
2. Additional strategy priority investments (not constrained to the budget based on current funding trends) that could be built with additional resources.

The RTP draft constrained list represents a $14.8 billion investment in the region's transportation system, with over half of that going to throughways, roads and bridges, not including road and transit operations and maintenance costs, based on round one call for projects.

Figure 20. Types of projects by cost (based on round one call for projects)

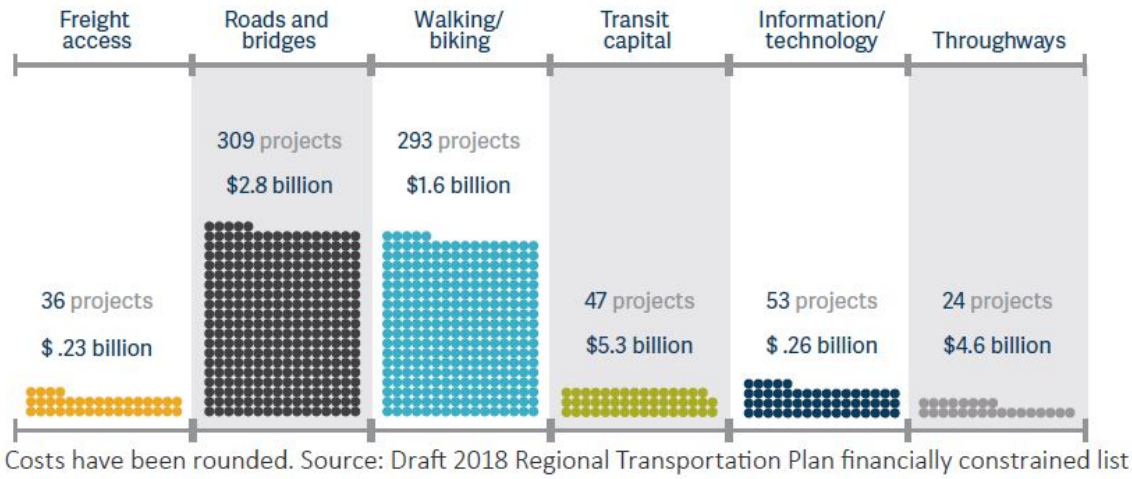


Roads, bridges, and walking and biking connections have the most projects in the draft 2018 Regional Transportation Plan constrained list, though the cost of projects vary greatly.

Types of projects by cost

Projects in the draft 2018 Regional Transportation Plan constraind list range from $1 million to nearly $3 billion, based on round one call for projects.

Figure 21. Types of projects by cost (based on round one call for projects)



Costs have been rounded. Source: Draft 2018 Regional Transportation Plan financially constrained list

Regional Transit Strategy priorities

Improving and expanding our transit service network is key to meeting our regional 2040 Growth Concept Land Use and our Climate Smart Strategy goals.

The following table describes the estimated costs for transit by investment strategy. The table also includes the Climate Smart Strategy for comparison purposes. As shown in **table x,** the RTP 2018 – 2040 financially constrained investment strategy exceeds the Climate Smart Strategy estimates.

Table 5. Transit service provided by Investment Strategy (as a result of round one call for projects)

	Climate Smart Strategy 2010-2035	Financially Constrained 2018-2027	Financially Constrained 2028-2040	Strategic 2018-2040
Daily revenue hours	9,400	8,600	8,700	10,300
Service expansion	44% increase from 2015	31% increase from 2015	33% increase from 2015	58% increase from 2015
Rush hour frequency	32 routes with 10-minute service 75 routes with 15-minute service	9 routes with 10-minute service 50 routes with 15-minute service	16 routes with 10-minute service 51 routes with 15-minute service	30 routes with 10-minute service 60 routes with 15-minute service
	Climate Smart Strategy 2010-2035	**Financially Constrained** 2018-2027	**Financially Constrained** 2028-2040	**Strategic** 2018-2040
Daytime and evening (off-peak) frequency	12 routes with 10-minute service 43 routes with 15-minute service	1 route with 10-minute service 31 routes with 15-minute service	2 routes with 10-minute service 32 routes with 15-minute service	20 routes with 10-minute service 39 routes with 15-minute service
New high capacity transit connections	MAX extension to Vancouver, Wash., WES operates all day with 15-minute service and bus rapid transit in five corridors: Southwest Corridor, Division Street, I-205 South, Tualatin Valley Highway to Forest Grove, and McLoughlin Boulevard to Oregon City	3 high capacity transit projects, including Division Transit, Southwest Corridor and the Red Line extension	2 additional (from 2027 Financially Constrained) high capacity transit projects: connecting Portland to Vancouver, Wash. improvements on the Steel Bridge	5 additional (from over the 2040 Financially Constrained) high capacity transit projects, including WES all day service, connections along Sunset Highway and to Oregon City and Forest Grove, improving bottlenecks downtown Portland
Other service enhancements	4 new streetcar connections, further implementation of locally-developed SMART and TriMet service enhancement plans	5 enhanced transit projects Streetcar extension to Montgomery Park	11 additional (from 2027 Financially Constrained) enhanced transit projects Streetcar extension to Hollywood	5 additional (from 2040 Financially Constrained) enhanced transit projects 3 streetcar projects: Amber Glen, extension on MLK Boulevard, to Johns Landing

Public and private shuttles	More major employers and some community-based organizations work with TriMet to operate shuttles	*To be determined as part of finalizing the Regional Transit Strategy*		
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	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
	Climate Smart Strategy 2010-2035	**Financially Constrained** 2018-2027	**Financially Constrained** 2028-2040	**Strategic** 2018-2040
Estimated capital cost* (2016$)	$4.7 billion	$3.4 billion	$5.3 billion	$6.8 billion
Estimated service operating costs** (2016$)	$8.5 billion	$4.7 billion	$10.9 billion	$13.1 billion

The following table expands on the high capacity transit and enhanced transit projects. In the first 10 years of the RTP, the region is following through on the commitments to build the Division Transit Project and the Southwest Corridor Transit Project. The Red Line extension to Hillsboro is another HCT investment proposed for the first 10 year period of the plan. The first 10 years also includes several ETC improvements and two streetcar extensions, all located within the City of Portland.

Table x. Transit capital improvements by Investment Strategy (as a result of round one call for projects)

RTP Financially Constrained 2018-2027	RTP Financially Constrained 2028-2040 *(2027 Constrained investments, plus)*	RTP Strategic 2028-2040 *(2018-2040 Constrained investments, plus)*
High Capacity Transit	**High Capacity Transit**	**High Capacity Transit**
• Southwest Corridor • Division Transit Project • Redline extension	• Portland to Vancouver MAX • Steel Bridge Transit Bottleneck	• HCT extension to Oregon City • Expansion of WES to all-day service • Sunset Highway HCT (Sunset transit center to Hillsboro Fairplex) • HCT extension to Forest Grove • Central City capacity planning
Enhanced transit corridors	**Enhanced transit corridors**	**Enhanced transit corridors**
• Central City Portals (downtown Portland bridges) • Martin Luther King Jr. Boulevard ETC • Sandy Boulevard ETC (NE Portland to Parkrose transit center) • 82nd Avenue ETC (in Portland) • Powell Boulevard ETC (SE Portland to I-205) • 122nd Avenue ETC (Lents to Parkrose transit center) • Streetcar to Montgomery Park in NW Portland • Streetcar upgrades on Grand Avenue in Portland	• NW Northrup ETC • Inner North Portland ETC • Caesar Chavez ETC (Sandy to Powell) • Lombard Street ETC (St. Johns to MLK Jr. Boulevard) • 82nd Avenue ETC (Swan Island to Clackamas town center) • Burnside Street ETC (Portland to Gresham) • Hawthorne Boulevard/Foster Road ETC (downtown Portland to Lents town center) • Tualatin Valley Highway ETC from Beaverton to Forest Grove • Beaverton-Hillsdale Highway ETC from Portland to Washington Square • Streetcar on NE Broadway to Hollywood town center in Portland	• Columbia to Clackamas Corridor ETC (Airport Way to Foster Road/172nd Avenue) • Powell Boulevard ETC (extent TBD) • Lombard/Caesar Chavez ETC (St. Johns to Milwaukie town center) • Belmont Street ETC (to Gateway transit center) • Streetcar in AmberGlen in Hillsboro • Streetcar to Johns Landing in SW Portland • Streetcar on Martin Luther King Jr. Boulevard in NE Portland

Implementation of transit investments and service

This section will describe how transit service improvements and expansions are implemented by transit provider. This section will also address how to advance ETC and HCT investments in the future.

Wilsonville's SMART Transit Service Improvements

In order to make positive and impactful changes to the transit system, SMART conducts an annual rider survey to determine current travel trends and demographics of customers. The collected information provides a base for SMART staff to review current services and make adjustments or re-prioritize service improvements on an annual basis.

Long-term service improvements are developed through the transit master planning process. The City of Wilsonville City Council adopted the 2017 Transit Master Plan (TMP) after an extensive, two-year, public involvement process. The TMP highlights future investments, service changes and agency goals for the next four to seven years.

Upon further public outreach, SMART will create an amendment to the TMP to include projects that qualify for House Bill 2017 funding. SMART aligns its service planning with the City fiscal year (July 1-June 30) in order to budget accordingly.

This section is under development. This section will summarize the process that SMART prioritizes transit service improvements and expansions annually.

TriMet's Service Enhancement Plans

This section is under development. This section will summarize the process that TriMet prioritizes transit service improvements and expansions annually.

Enhanced Transit Concept Pilot Program

This section is draft and under development.

Per direction by JPACT at their October 19, 2017 meeting to utilize bond proceed revenues of $5 million to support the funding of an "Enhanced Transit" pilot program. As our region grows and congestion increases, the need to connect people to their jobs, homes and daily activities is becoming more and more important. The goal of the Enhanced Transit concept is to develop strong partnerships between service and capital improvements that provides increased transit capacity and reliability, yet is relatively low-cost to construct, context sensitive and could deployed quickly.

Metro and TriMet worked with local jurisdictions to identify the potential universe for ETC consideration. First, the improvements must support an existing or planned frequent service line. The frequent service lines were assessed using time-point data segments from the bus operations to determine issues with transit reliability, dwell times and ridership per mile. The time point segments were ranked based on these three criteria and

shared with the local jurisdictions. The highest ranking time-point segments were evaluated further in a series of 14 workshops over the winter 2018.

At each of the workshops, the team and project partners assessed the reliability, travel speed data, ridership to diagnosis the transit related problems and locations to help determine the potential solutions. Then using Google Earth and Street View, the team looked at where improvements from the ETC Toolbox could be applied. The discussion and level of interest were captured and shared with the team following each workshop.

After the completion of the workshops, Metro will issue a Request for Interest (RFI) for local jurisdictions to submit projects to advance to concept design, project development and construction. The criteria for the RFI are categorized by eligibility and ranking:

Eligibility:

- Projects must be on an existing or future planned frequent service route;
- Projects must include ETC improvements that will improve transit speed and reliability; and
- Projects must have been assessed at one of the ETC workshops or some other local or regional planning process.

Ranking:

- Projects that can be completed within two years will rank higher; and
- Projects that have the greatest chance of being funded (e.g. there is a potential funding source available).

Transit System Expansion Policy

This section is DRAFT and under development.

The Transit System Expansion Policy (TSEP) provides a framework for the region to prioritize major capital investments in transit. This concept was originally developed in 2009 as part of the Regional High Capacity Transit System Plan. As part of the Regional Transit Strategy, the criteria in which projects were prioritized was narrowed to streamline the process.

This process applies to any projects that are seeking Federal funding through the FTA Capital Investment Grant Program. This information along with local support is meant to help guide the regional decision making process to advance HCT investments identified in the 2009 HCT Plan. The transit system expansion policy would only apply to those investments seeking FTA Capital Investment Grant (CIG) program funding (e.g. New Starts, Small Starts or Core Capacity). Examples of investments that could be considered as part of this program are the Division Transit Project, a corridor based bus rapid transit (BRT), or the Southwest Corridor Transit Project. The purpose of the System Expansion Policy is to:

- Clearly articulate the decision-making process by which future HCT corridors will be advanced for regional investment
- Establish minimum requirements for HCT corridor working groups to inform local jurisdictions as they work to advance their priorities for future HCT
- Define quantitative and qualitative performance measures to guide local land use and transportation planning and investment decisions
- Outlines the process for updating the RTP, including Potential future RTP amendments, for future HCT investment decisions

The proposed evaluation process aligns with recent regional priorities including the six desired outcomes for the Portland metropolitan region, the Climate Smart Strategy outcomes related to transit and the RTP System Performance Measures. It also aligns with the FTA Capital Investment Grant (CIG) program, which provides capital funding for high-capacity transit projects.

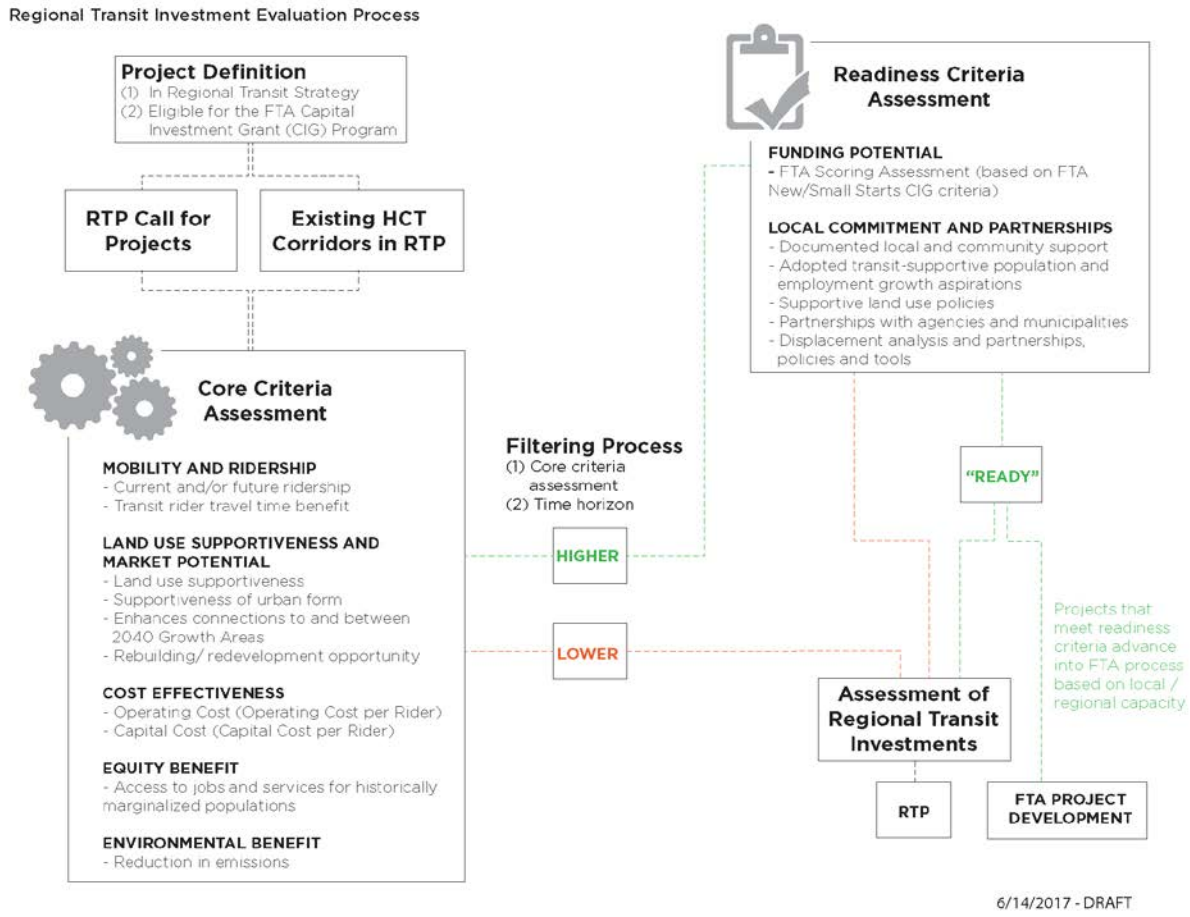
The TSEP evaluation framework aims to identify transit corridor capital projects that best meet regional outcomes and position projects for potential federal and other funding opportunities.

Key elements to the updating the TSEP include:

- **Reduce the number of criteria** by eliminating duplicative measures, those not commonly used in peer processes, and certain qualitative measures that can instead become an element of a project justification narrative section of Metro's process of submitting projects for the Regional Transportation Plan (RTP).
- **Focus the core evaluation measures** on those elements that describe the benefit of the project, consistent with regional values, as well as measures that enhance the competitiveness of projects in the FTA CIG program.
- **Evaluate project readiness** separately for the highest priority projects. Project readiness factors include funding potential (aligned with FTA criteria) and local aspirations (measure local commitment and established agency partnerships to ensure successful project delivery)

Figure 22 below identifies the process, including how projects are defined (e.g., which projects are run through this process), the criteria, and the outcomes of the process.

DRAFT Figure 22 TSEP Corridor Evaluation Process



Source: Nelson\Nygaard Consulting Associates, Inc.

The TSEP would be applied projects that meet the federal CIG program eligibility requirements for Fixed Guideway (including light rail and commuter rail), Fixed Guideway BRT, Corridor-Based BRT, and Core Capacity projects.

The TSEP includes a multi-phased evaluation that includes core criteria as well as readiness criteria. The Core Criteria is comprised of measures that describe the benefit of the projects, consistent with regional values, as well as assess the competitiveness of projects for funding through the FTA CIG program. The Readiness Criteria is the second filter and is evaluated separately from the core criteria assessment for the highest priority projects. Project readiness factors include funding potential (a simulated scoring based on the FTA CIG program criteria) and local aspirations (measure of local commitment and established agency partnerships to ensure successful project delivery).

Key Evaluation Assumptions

- **Assumed Mode.** Not all projects submitted for evaluation will have had sufficient planning completed to define the exact mode of the transit corridor project. An assumed mode is, however, required for including the project in the regional travel model and for several of the proposed criteria that are based on model outputs.

Therefore, project sponsors will be asked to compare their project to the minimum criteria for each of the general FTA project types and to select the most likely type.

- **Travel Time**. A travel time assumption will be based on the project type, level of corridor delay, and amount of the project operating in exclusive right of way. For the regional travel model to evaluate ridership and the travel time benefit of the project, the sponsor will need to define the approximate portion of the project that will operate in an exclusive right of way.
- **Feasibility.** For those projects that advance to the Readiness Criteria evaluation, a feasibility element will include a high-level assessment to identify areas where achieving the proposed amount of dedicated right of way may be challenging and to evaluate if there has been some level of agreement with the owner of the roadway about the stated right of way assumptions.

The Regional Transit Investments evaluation is a quantitative method for identifying which projects are most ready for the region to advance for potential funding by the FTA CIG Program. The outputs of this evaluation will be a visual snapshot illustrating the strengths and weaknesses of each project and will allow project sponsors to understand opportunities to enhance how a given project will score in future evaluations.

Recommended Regional Transit Investments Evaluation Criteria

Table 1 describes the proposed evaluation criteria and identifies the rationale and other notes related to the proposed analytical methods.

DRAFT Table x Transit System Expansion Policy Criteria

Criteria	Rationale/Notes
Mobility and Ridership	
Current and/or future ridership	▪ Ridership is a core measure of transit project benefit. ▪ Consistent with FTA, average existing and future ridership
Transit rider travel time benefit	▪ Travel time benefit to the user demonstrates the effectiveness of the project and is an important part of attracting ridership. ▪ Average travel time benefit per rider
Land Use Supportiveness and Market Potential	
Land use supportiveness	▪ Align with FTA Land Use evaluation measure. ▪ Existing corridor and station area development and character [pop. and empl. as well as urban design characteristics that exist today] ▪ Proportion of existing "legally binding affordability restricted" housing within ½ mile of station areas to the proportion of "legally binding affordability restricted" housing in counties through which the project travels [local or national data]
Supportiveness of urban form	▪ Street and block density impacts transit access. ▪ Measure the comprehensiveness of pedestrian and bicycle networks. Comprehensiveness of existing and planned pedestrian and cycling networks (source: RLIS data and submitted RTP projects). FTA evaluates

	existing station area pedestrian facilities, including access for person with disabilities [direct routes, continuous sidewalks, crossings]
Enhances connections to and between 2040 Growth Areas	▪ Transit is a key component of supporting the 2040 Growth Concept. (Central City, Regional Centers, Town Centers, Freight and Passenger Intermodal facilities, Employment areas, Industrial areas) ▪ Consider adapting measure to evaluate network connections using HCT + frequent network. This approach could illustrate how the corridor investment benefits the major O-D pairs between the growth centers connected.
Rebuilding/ redevelopment opportunity	▪ Catalyzing redevelopment is a benefit of investment in high quality transit. ▪ Consider aligning with existing Metro GIS data sources (e.g., TOD Strategic Plan).
Cost Effectiveness	
Operating Cost (Operating Cost per Rider)	▪ Aligns with FTA Cost-Effectiveness criterion. ▪ If mode and/or operating plan has not been determined, use typical operating cost per hour for a range of potential modes (LRT, BRT, Arterial BRT, Commuter Rail, and Streetcar) and an assumed service plan
Capital Cost (Capital Cost per Rider)	▪ Aligns with FTA Cost-Effectiveness criterion. ▪ If mode has not been determined, use typical capital cost per mile for a range of potential modes (LRT, BRT, Arterial BRT, Commuter Rail, and Streetcar) ▪ Federal measure is only based on federal share; so could have an assumed federal share for the purposes of evaluation.
Equity Benefit	
Access to jobs and services for historically marginalized populations	▪ The equity benefit of transit investments is an important value in the Portland and peer regions and CIG evaluation. ▪ Alignment with RTP system performance measure: The access to jobs and community places system performance measures
Reduction in emissions	▪ Aligning transit service with demand and land use is cost-effective way to reduce emissions. ▪ Model is not sensitive enough to produce this output on a corridor basis.
Funding Commitment/Partnerships/Local Support (Readiness Phase)	
Local Commitment and Partnerships	▪ Local commitment and partnerships between jurisdictions and agencies are essential for the implementation of large regional transit projects. ▪ Qualitative scoring of local interest and ability to deliver project. ▪ Feasibility assessment to evaluate if there has been some level of agreement with the owner(s) of the roadway about the stated right of way assumptions
Funding Potential	▪ For projects that would seek federal funding, assess project strength based on the CIG program criteria. ▪ As identified in the Federal CIG program, includes criteria similar to many of the proposed criteria.

Source: Nelson\Nygaard Consulting Associates, Inc

Projects to be evaluated

Projects to be evaluated through this process include the HCT projects plus streetcar projects that were submitted to Metro as part of the 2018 RTP call for projects in August of 2017. These projects became the project list for initial evaluation using the proposed criteria and evaluation framework.

The 2009 HCT Plan provided a comprehensive analysis of the projects in the HCT system plan and vision. This is not meant to supersede that process, but rather help local jurisdictions interested in moving projects from tier to the next.

Since we don't have the time and resources to model each project separately, these projects were divided into three bundles. Projects were grouped together based on geographies and minimizing overlapping projects or in close proximity, in order to try and capture as much of the project specific benefit as possible. The bundles below show the three bundles of HCT and Streetcar projects from the 2018 RTP project list.

Bundle 1:

- BRT to Oregon City
- Red Line extension
- Streetcar extension to Montgomery Park
- LRT Portland to Vancouver
- TV Highway BRT

Bundle 2:

- Streetcar from Montgomery Park to Hollywood Transit Center
- Steel Bridge Improvements
- Blue Line extension to Forest Grove

Bundle 3:

- Commuter Rail all day service
- Streetcar extension to John's Landing
- Streetcar extension on MLK
- Amberglen Streetcar

This analysis helps inform the conversations regarding advancing a project forward towards implementation. This process is not meant to represent a detailed corridor analysis, but rather a high level assessment of the project based on benefits and readiness. Individual corridor modeling and analysis typically happens when a corridor is defined and there is a planning process for that specific corridor. During the project planning phase, the regional travel demand model, as well as other planning tools, can be utilized at a corridor level to identify specific benefits and tradeoffs.

Investments beyond 2040

The projects in the RTP do not complete the transit system. It is projected that the region will fund the full TriMet Service Enhancement Plan and Wilsonville's Transit Master Plan future service scenarios. The project list does not complete the adopted HCT Plan and does not include high speed rail.

A list of projects included in our transit vision but not included in the RTP is under development.

Conclusion

While our region continues to be leader in the world of transit planning, there are always opportunities to grow, improve, and innovate. If our objective is to continuously improve the quality of life for the wonderful people that call this region home – thoughtful consideration must be placed on our transit system. Exceptional transit planning and investment are critical to a safer, healthier, and happier future.

Successful regional planning requires dedicated effort from a wide range of actors. The region, as a whole needs to come together to help turn our dreams into reality. From community members to elected officials and cyclist to freight truck drivers, a holistic approach must be taken if we hope to see real change.

This strategy offers a great starting point and highlights where the region is doing well and more importantly, several opportunities we have to improve. As a region we have continuously proved our dedication to positive change, a united regional effort toward the continued growth of our transit system and services is an opportunity to continue our legacy of leadership and ingenuity.

The road will certainly prove challenging, but the challenge is well worth the result – a better region for today, tomorrow, and one-hundred years down the dedicated bus lane.

If you picnic at Blue Lake or take your kids to the Oregon Zoo, enjoy symphonies at the Schnitz or auto shows at the convention center, put out your trash or drive your car – we've already crossed paths.

So, hello. We're Metro – nice to meet you.

In a metropolitan area as big as Portland, we can do a lot of things better together. Join us to help the region prepare for a happy, healthy future.

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2018 Regional Transportation Plan

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April 2, 2018

Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: Thursday, April 12, 2018
To: Metro Technical Advisory Committee (MTAC) and interested parties
From: Tim Collins, Senior Transportation Planner
Subject: Regional Freight Strategy Update

PURPOSE

The purpose of this memorandum is to provide MTAC an opportunity to discuss the draft 2018 Regional Freight Strategy, including regional freight policies, a revised Regional Freight Network map, and proposed actions that address each of the freight policies. The 2018 Regional Freight Strategy will replace the current Regional Freight Plan (June 2010).

ACTION REQUESTED

There is no formal action requested. Staff will provide an update on the Regional Freight Strategy.

Staff would like to know if MTAC has any feedback or concerns related to the revised freight policies, regional freight network map, or freight actions that should be addressed as part of finalizing the Regional Freight Strategy for public review.

BACKGROUND

The Portland metropolitan region is the trade and transportation gateway and economic engine for the state of Oregon.

The RTP defines a vision and supporting policies to guide investments in the region's multimodal freight network. The 2018 Regional Freight Strategy updates and replaces 2010 Regional Freight Plan. The Regional Freight Strategy will define how the region can enhance freight and goods movement. With the help of the Metro Council, MTAC, TPAC, JPACT, and the Regional Freight Work Group, staff has produced a discussion draft of the Regional Freight Strategy.

At the May 2017 work session, Metro Council directed staff to add a new freight safety policy. MTAC will be reviewing the seven updated Regional Freight Network policies and map that will be included in Chapter 2 of the 2018 RTP. The freight strategy will serve as the freight component of the 2018 Regional Transportation Plan (RTP).

REGIONAL FREIGHT POLICY FRAMEWORK

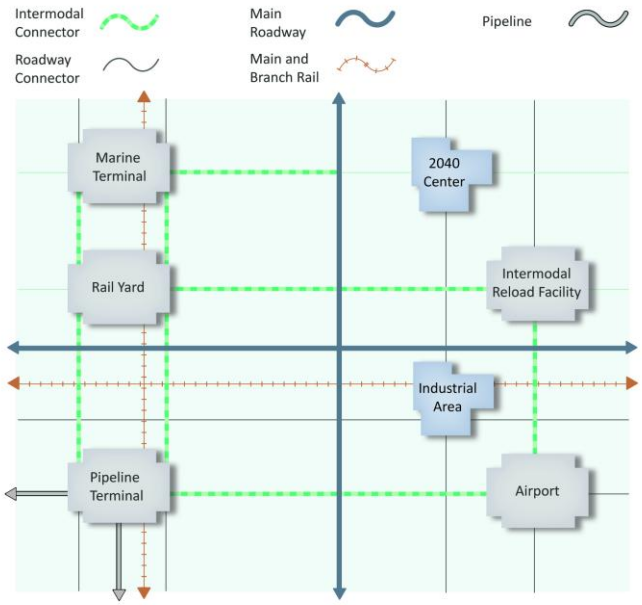
RTP Regional Freight Network Vision and Policies

The Regional Transportation Plan defines a vision and supporting policies to guide investment in each part of the regional transportation system, including the multimodal regional freight network.

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 1** shows the components of the regional freight system and their relationships. Figure 1 has been updated to show a new designation for Intermodal Connectors.

Figure 1 Regional Freight Concept



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

The **Regional Freight Network Map** 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. The Regional Freight Network map has been updated for the discussion draft of the Regional Freight Strategy and is significantly different than the one found in the 2014 Regional Transportation Plan and the 2010 Regional Freight Plan.

A major update to the Regional Freight Network map is the addition of a new freight roadway designation for Regional Intermodal Connectors. The Regional Intermodal Connectors represent National Highway System (NHS) intermodal connectors and other Tier 1 intermodal connectors that were designated by ODOT as part of the Oregon Freight Intermodal Connector System (OFICS) Study completed in 2017.

Regional Intermodal Connectors

National Highway System (NHS) intermodal connectors are roads that provide the "last-mile" connections between major rail, port, airport, and intermodal freight facilities and the rest of the National Highway System. Regional Intermodal Connectors are of critical importance for carrying commodities that are being exported from and imported into the state and across the county. More detail is provided in Chapter 3 of the Regional Freight Strategy Discussion Draft.

Key updates to the Regional Freight Network Map:

- Added a new designation to identify Regional Intermodal Connectors
- Map has a larger format with insets that focus on freight facilities and improve readability

Regional Freight Network Policies

As part of the 2018 Regional Freight Strategy, the intent of the 2010 goal statements have been maintained by combining them with the 2010 freight policies, and for consistency and simplicity, renaming them the Regional Freight Policies. In addition, the Metro Council directed staff to add a new policy (Policy 7) that addresses the issue of freight safety regarding the interaction of different freight modes (trucks, railroad trains, etc.) with passenger cars, bicyclist and pedestrians.

The proposed new and updated freight policies are:

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.
2. Manage first-rate multi-modal freight networks to reduce delay, increase reliability, improve safety and provide shipping choices.
3. Educate the public and decision-makers on the importance of freight and goods movement issues.
4. Pursue a sustainable multi-modal freight transportation system that supports the health of the economy, communities and the environment through clean, green and smart technologies and practices.
5. Integrate freight mobility and access needs into land use and transportation plans and street design to protect industrial lands and critical freight corridors with access to commercial delivery activities.
6. Invest in our multi-modal freight transportation system, including road, air, marine and rail facilities, to ensure that the region and its businesses stay economically competitive.
7. Eliminate fatalities and serious injuries caused by freight vehicle crashes with passenger vehicles, bicycles, and pedestrians, by improving roadway and freight operational safety.

These freight network policies were used to develop the freight actions that are outlined in Chapter 8 of the Regional Freight Strategy Discussion Draft.

NEXT STEPS

- Regional Freight Strategy Discussion Draft for MPAC input on April 25
- Regional Freight Strategy Discussion Draft for JPACT input on May 17
- Update the Regional Freight Strategy Discussion Draft to finalize for release of the Regional Freight Strategy for public review in June of 2018

/Attachments

1. Regional Freight Strategy Discussion Draft (March 22, 2018)
2. Regional Freight Concept (Figure 1 in this memo and Figure 5 in the discussion draft)
3. Regional Freight Network map (Figure 6 in the discussion draft)

DISCUSSION DRAFT

2018 Regional Transportation Plan

Regional Freight Strategy

A strategy for efficient goods movement in, to and from the greater Portland region

April 2, 2018

oregonmetro.gov/freight

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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**
Regional Freight Strategy web site: **oregonmetro.gov/freight**

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.

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Sustainability
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We inspire, engage, teach and invite people to preserve and enhance the quality of life and the environment for current and future generations.

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CHAPTER 1

INTRODUCTION

FREIGHT'S ROLE IN THE REGION'S ECONOMY

The 2018 Regional Freight Strategy sets regional freight policy. This Introduction provides context for the Regional Freight Strategy, including the role of regional government in freight planning, and existing federal, state, and regional policies related to goods movement.

1.1 Metro's role

As the region's metropolitan planning organization (MPO), Metro has a variety of roles and requirements in freight planning, including:

- Developing the Regional Transportation Plan (RTP) and the Metropolitan Transportation Improvement Plan (MTIP), including projects consistent with regional plans and policies.
- Allocating federal transportation funding through a project selection process informed by regional policies.
- Reviewing local comprehensive and transportation plans for consistency with the RTP.
- Reporting on freight targets and freight system performance measures.
- Convening jurisdictions and agencies to achieve better coordination.
- Collecting, maintaining and disseminating data;
- Encouraging best practices in freight strategies and roadway design with funding and programmatic support.
- Supporting local and state efforts to implement and update plans, policies and projects.

The 2018 Regional Freight Strategy provides the freight plan for the Portland metro region, defined as the area within the Metropolitan Planning Area (MPA). The MPA is slightly larger than the region's Urban Growth Boundary.

1.2 History of the Regional Freight Plan

The 2010 Regional Freight Plan defined goals, strategies and actions designed to guide the stewardship of our critical multimodal regional freight infrastructure and industrial land supply, to support a sustainable, balanced and prosperous tomorrow.

The 2010 Regional Freight Plan was an element of the RTP update and was guided by the Metro Council-appointed 33-member private-public sector Regional Freight and Goods Movement (RFGM) Task Force and a technical advisory committee. The plan is built on a

foundation of technical work, including research on the region's freight transportation systems and facilities, needs and issues. A more detailed history of the RFGM Task Force (including a membership roster), and the Regional Freight Advisory Committee, that served as the technical advisory committee, is included in Appendix B of this Regional Freight Strategy.

The 2010 Regional Freight Plan provided implementation strategies for addressing environmental and community impacts, system management, economic development and financing that were reviewed and recommended.

In 2016 and 2017, the Regional Freight Work Group was one of eight technical work groups identified to provide input and technical expertise to support the 2018 Regional Transportation Plan (RTP) update. In this role, the work groups were convened to advise Metro staff on implementing policy direction from the Metro Council, the Metro Policy Advisory Committee (MPAC) and the Joint Policy Advisory Committee on Transportation (JPACT). The Regional Freight Work Group met nine times from January 2016 through early 2018.

The primary charge of the Regional Freight Work Group has been to:

- Review status of 2010 Regional Freight Plan recommendations and help update freight data.
- Review documents on key trends and challenges with updated existing conditions data.
- Review a shared freight investment strategy.
- Review draft freight policy refinements and actions to support implementation.

The regional freight work group consists of topical experts, Portland Freight Committee members, TPAC and MTAC members or their designees, and staff from the City of Portland, larger cities in the region, Clackamas County, Multnomah County, Washington County, Port of Portland, Port of Vancouver, Regional Transportation Council (RTC), Federal Highway Administration (FHWA), and Oregon Department of Transportation (ODOT).

Table 1: The following is a list of the members of the Regional Freight Work Group:

Name	Affiliation
Nathaniel Brown	Portland Business Alliance
William Burgel	Burgel Rail Group
Gary Cardwell	NW Container Services, Inc.
Tim Collins	Metro, Regional Freight Work Group Lead
Lynda David	Regional Transportation Council, Washington State
Kate Dreyfus	City of Gresham
Nicholas Fortey	Federal Highway Administration
Jerry Grossnickle	Bernert Barge Lines

Jim Hagar	Port of Vancouver
Brendon Haggerty	Multnomah County – Public Health
Phil Healy	Port of Portland
Robert Hillier	City of Portland – Bureau of Transportation
Jana Jarvis	Oregon Trucking Association
Todd Juhasz	City of Beaverton
Steve Kountz	City of Portland – Bureau of Planning & Sustainability
Kathleen Lee	Greater Portland, Inc.
Jon Makler	Oregon Department of Transportation
Kate McQuillan	Multnomah County – Planning
Zoe Monahan	City of Tualatin
Joel Much	Sunlight Supply, Inc.
Don Odermott	City of Hillsboro
Carly E. Riter	Intel
Patrick Sweeney	City of Vancouver
Erin Wardell	Washington County
Pia Welch	FedEx Express
Steve Williams	Clackamas County

Table 2: Alternates for the Regional Freight Work Group:

Name	**Affiliation**
Steve Kelley	Washington County
Gregg Snyder	City of Hillsboro
Joanna Valencia	Multnomah County

1.3 Relationship to other plans

To be revised and completed later.

Implementation strategies for addressing environmental and community impacts, system management, economic development and financing have been reviewed and recommended as part of the RTP. The freight strategy will contribute to recommendations for better incorporating truck movement into Metro's Designing Livable Streets and Trails Guide.

Regional Transportation Plan

Metro periodically reviews and updates the Regional Transportation Plan (RTP) to keep it current with transportation challenges facing the region, and to incorporate new information, technologies and strategies. The updated plan provides a blueprint for building a sustainable transportation future that allows the region to compete in the global economy and preserve the unique qualities and natural beauty that define our region. An overarching aim of the RTP is to move the region closer to the vision of the region's long-range strategy for managing growth, the 2040 Growth Concept. Fundamentally, the RTP defines a

framework for making choices about the future of the region – choices about where to allocate limited transportation resources and choices about the future residents wish to see for our region and, by extension, the state of Oregon. The Regional Freight Strategy for the Portland metro region is an element of the RTP. While the strategy targets needs and issues specific to the freight transportation system, key policies and actions are incorporated into the comprehensive RTP.

1.4 Process and public engagement

To be completed later.

1.5 Document organization

To be completed later.

CHAPTER 2
TRENDS FOR REGIONAL FREIGHT AND GOODS MOVEMENT AND THE GREATER PORTLAND ECONOMY

2.1 Trade, transportation and economic health

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

Portland and Vancouver were founded and grew on the basis of vibrant and profitable statewide, regional and international trade. Access to the Pacific Ocean via the Columbia River from the inland empire to the east created the region's original economic engine. The Willamette River delivered the wealth of the various river valleys south and west of the Portland metro region in much the same way. It was through this trade that the Portland metro region established itself as a trade hub and prospered.

The Cost of Congestion to the Economy of the Portland Region (2005) reported that the region has a higher than average dependency on traded sector industries, particularly computer and electronic products, wholesale distribution services, metals, forestry, wood and paper products, and publishing. These business sectors 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. The 2007

What is the "traded sector"?

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

commodity flow survey projected an overall doubling of freight tonnage moved in the region by 2035. The region's forecasted population and job growth – an additional 670,400 residents and 420,200 jobs by 2040[1] – along with the associated boost in the consumption of goods and services are significant drivers of projected increases in local freight volume. Much of the projected doubling of freight tonnage passing through the Portland metropolitan region doesn't terminate here but instead moves well beyond the region's boundaries to the rest of the country.

Today the Portland-Vancouver area boasts an underlying foundation for a strong and diverse regional economy that will continue to support an enviable quality of life. The local economy is still very dependent upon an efficient, reliable and safe freight transportation system that recognizes the region's role as an international gateway and key domestic freight hub.

2.2 Freight trends

The global economy is in the midst of a profound change. Twenty-first century innovations in trade policy, communications and transportation have altered the sourcing, production and marketing of products on a global scale. Some of the most important trends are identified below:

- Due to open trade policies, more freight than ever before is moving across international boundaries.
- The rise of worldwide communications networks allow for the inexpensive and instantaneous transfer of information around the globe. These networks have allowed businesses to expand operations and markets and have given rise to new business models like e-commerce, leading to a higher volume of smaller, demand-responsive shipments.
- Access to good transportation services has allowed businesses to develop increasingly complex supply chains that are longer and far more specialized, yet increasingly fragile.

As a result of these global trends, U.S. international and domestic trade volumes are expected to grow at an accelerated rate. Trade volumes in Portland are expected to nearly double by 2040, to 600 million tons annually.[2] This is expected to have a profound effect on shippers and the infrastructure they depend upon.

West Coast ports have been struggling to keep pace with the increasing volumes of marine and air cargo coming from Pacific Rim trading partners like Japan, China, South Korea and Taiwan. The Portland Harbor will likely have a longer-term trend of growth in freight

[1] Metro Data Resource Center for 2040 Regional Transportation Plan. Population and employment forecasts include Multnomah, Clackamas, Washington counties in Oregon, and Clark County in southwest Washington. The percentage increases from 2015 are 30.2% (population) and 39.2% (employment).

[2] Port of Portland Commodity Flow Forecast, March 2015 (Cambridge Systematics).

volumes. In addition, the ports of Portland and Vancouver are not as constrained by dockside capacity as a number of other West Coast ports, so additional growth here can be handled at the ports.

According to the US census, total US trade with the Pacific Rim amounted to $1,170.7 billion in 2016. About $362 billion of that trade is exports. Most of the Portland-Metro region's international trade is with Pacific Rim counties and was estimated to be $10.5 billion in 2016. Much of the Pacific Rim freight processed by West Coast ports is destined for the rest of the country. However, the financial burden of maintaining and expanding the publicly owned transportation system serving this national need falls to local West Coast trade gateway jurisdictions.

Canada and Mexico are also important trading partners with the USA. According to the Western Washington University Research Institute, the value of US exports to Canada in 2015 was $280.1 billion, and the value of US exports to Mexico was $236.4 billion. The value of US imports from Canada in 2015 was $295.2 billion, and the value of US imports from Mexico was $294.7 billion. These numbers represent a rapid expansion of both imports and exports from our neighboring trading partners since 2002.

The goods movement industry has responded to this capacity crunch by employing larger trucks, rail cars, ships and planes. This trend places new demands on the goods movement infrastructure and reinforces the need to reconsider our approach to providing goods movement infrastructure. Government and industry must also work together to address increasingly stringent safety and security requirements being placed on the goods movement system.

Against this backdrop of sustained expansion in global trade the region must prepare to compete globally. The viability of the regional and state economy, and the ability to attract and sustain business investment in both, depend on it. Industry needs tangible and continuous improvements in the operating efficiency, capacity, modal redundancy and reliability of the regional goods movement system to remain competitive globally. Government must do its best to work with private sector stakeholders to accomplish this in a sustainable, environmentally sensitive and cost effective manner.

The regional goods movement system is failing certain large shippers: several traded sector firms in the region must truck their loads to San Francisco or Seattle/Tacoma to achieve satisfactory international aviation or marine connections. Other resource based industries in, or served by, the Portland metropolitan region's goods movement system are very sensitive to transportation costs and can easily lose global market share with shipping cost increases measured in pennies per pound. Still other area manufacturers have had to repeatedly adjust production schedules to compensate for congestion on the region's runways, roads and rail lines, leading to increased production costs and reduced productivity.

As shippers' supply chain logistics evolve, the definition of "state of the art" warehousing and distribution centers continues to change dramatically. Larger truck-biased cross dock facilities are becoming the new standard.

The local component of the goods movement system is also critically important to the economy and daily life. The local movement of goods and services is focused primarily on trucks. The ability to maneuver on local streets and to park to unload freight is vital for those trying to deliver goods and services to local communities.

The region's goods movement infrastructure and unique geographic location are competitive advantages that have created transportation sector jobs for more than a century. These jobs, in turn, serve the industrial and local freight needs of the Portland metro region, the state, the Pacific Northwest, the West Coast and the nation.

2.3 Efficient goods movement for the future

In the post-recovery world economy, strong growth in international, national and regional trade has once again driven the need for a flexible, adaptable, high performance multimodal freight transportation system. Efforts must consider these new stresses on marine, air, road, rail and pipeline networks and facilities. By 2040, the region's goods movement system will need to absorb a near doubling of freight volumes, measured in tonnage by all freight modes, with approximately 75 percent of that dependent on trucks to link producers and consumers, or to reach intermodal nodes for import and export.

Many local manufacturing firms that trade internationally, and who could locate globally, have chosen to make the greater Portland-Vancouver area their home because of its connections as an international transportation hub. These firms require a smoothly functioning goods movement system to operate efficiently and maintain profitability. In the absence of such a system, they will consider relocating to an area that meets these requirements.

And as the global economy recovers and grows, the Portland metro region will be called upon to address vastly expanded regional, national and international shipping needs reliably, safely, efficiently and sustainably. We have a responsibility to the region, the state and the nation to maintain an efficient and flexible goods movement system of sufficient capacity to meet future needs.

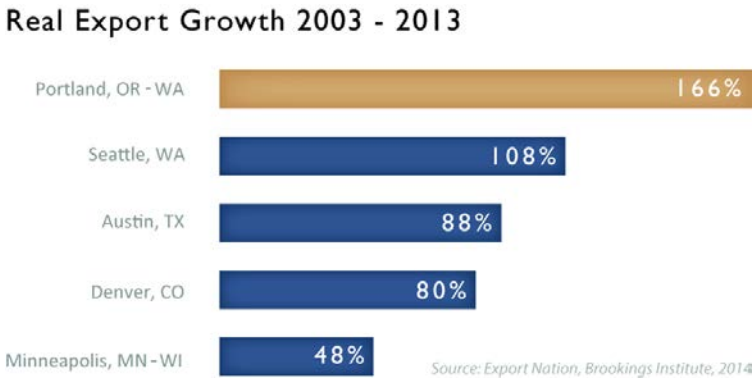
2.4 Portland is a global gateway

The ports of Portland and Vancouver processed 20.2 million metric tons of cargo in 2016. 12.7 million tons of cargo in Portland alone. Another 8 to 10 million tons of inland barge cargo also moves through these facilities. In addition to being the leading grain and mineral bulk harbor on the West Coast, the ports processed nearly 379,000 automobiles in 2016. . The dollar value of foreign trade moving through the Portland Harbor was about $14 billion, with about $10 billion of that moving through Portland, Most of this cargo is transported

beyond the Portland metro region, generally by truck and rail. There is also a huge support industry located in Portland associated with moving this freight.

As the figure below shows, the Portland region had a growth in export volume of 166% between 2003 and 2013. This growth made the Portland region the fifth-fastest growing export market among the 100 largest metropolitan areas and the region was 13th largest by export volume in 2013.

Figure 1: Real Export Growth 2003-2013



- The Port of Portland also operates the largest international airport in Oregon. Portland International Airport acts as the air freight hub for much of Oregon and Southwest Washington. Approximately $1.9 billion of international air freight cargo was shipped through Portland International in 2016.
- Oregon's total exports rose by 9.3% in 2016, and Oregon was the only state among its Pacific neighbors to post a net gain in dollar value. (Portland Business Journal April 2017)
- The 2015 Commodity Flow Forecast uses the 2007commodity flow survey, and projects an overall doubling of freight tonnage moved in the region by 2040. Imports and exports are projected to grow much faster than domestic freight tonnage moved in the region. Between 2007 and 2040, the tonnage of imports is projected to increase an average of 3.2% per year; and exports are projected to increase an average of 3.0% per year. Currently one in 10 jobs in Oregon is transportation related. Though the Port of Portland is sufficiently diversified to bear a temporary downturn better than some, there are many employers, large and small, who make up the Port of Portland's customer base that can be hit hard.

Mounting congestion and capacity issues on several freight modes could impede the region's ability to compete globally. Regional congestion and capacity issues already impact several national goods movement corridors traversing the region, including freight rail and trucking corridors.

Made in Oregon: the ninth most trade-dependent state

The Portland metro region is home to several traded sector industries that help drive the regional economy by serving as an economic pump, bringing in money from outside the region. Traded sector businesses in our region include Nike, Adidas, Columbia Sportswear, Intel, Lattice Semiconductor, FLIR, Genentech, Precision Cast Parts, Boeing, Oregon Steel Mills and Boise Cascade.

If the region is to maintain its status as an international freight gateway, steps must be taken to ensure that a flexible, adaptable, efficient and reliable goods movement system is in place. Cooperation with agencies and stakeholders across the state border with Washington is critical to make sure that freight throughways and access to primary hubs are seamless and that needed improvements are coordinated.

Deliveries of daily necessities increase with population and jobs

Modern urban life would be impossible without local goods movement. Nearly all the foodstuffs, clothing, housing materials, medical supplies, etc. that residents rely on daily come from outside the region.

Local suppliers and retailers require good connections to regional, national and international goods movement systems. They also need reasonably sized lane widths, curve and curb radii and loading zones.

2.5 Regional competitiveness requires regional cooperation across jurisdictions

The Portland-Vancouver area is a globally competitive international gateway and domestic hub for commerce. While Portland's status as Oregon's economic crossroads permits the region to have a vibrant, diverse and flourishing economy, it also carries certain responsibilities. The multimodal freight transportation system 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.

This Regional Freight Strategy identifies mode-specific issues, policies, strategies and investments designed to meet those responsibilities and support a truly multimodal, sustainable freight network within the Portland metro region. A systems approach to planning and managing our multimodal freight transportation infrastructure must recognize and coordinate both regional and local transportation and land use decisions to maintain seamless freight and goods flow and access that benefit us all.

The recommended actions will necessarily require collaboration between public and private sectors, the coordination of freight modes that are often competitors, and the reconciliation of institutional, jurisdictional and political perspectives. Yet stakeholders have shown a strong interest in and commitment to improving freight mobility and access and reducing freight's impacts on the communities it serves.

2.6 Congestion's costs

Traded sector industries require well-integrated and highly efficient international and domestic transportation connections to stay competitive in the global economy. These firms have historically located in the region to take advantage of the pipeline, rail, marine, aviation and highway connections it offers.

Increased roadway congestion and decreased system reliability have adversely impacted the productivity of traded sector firms throughout the region. This has led to decreases in equipment productivity, increased labor costs and inefficient use of fuel, leading to increased pollution for combined air cargo, trucking, pipeline, marine and rail carriers. Each of these modes relies on the regional road system for some portion of their operations, and all are impacted by congestion.

Manufacturers, shippers and distributors in the region operate in a time sensitive production environment, with each operating under a unique set of parameters. Missing critical connections due to transportation system failure costs these firms significant sums of money and can also result in a loss of customers over time. This can drive companies to consider relocating outside the region or prevent companies from starting up operations in the region.

2.7 Jobs and infrastructure

The logistics and (freight) transportation sectors provide tens of thousands of jobs to the region by facilitating the transport or trans-shipment of goods entering the region via various freight modes and routes to intermediate or end users. These firms also perform the vital task of distributing the myriad of goods that Oregonians consider essential to the maintenance of our households, businesses and communities.

One critical element of sustaining the region's high quality of life is ensuring that residents have access to family wage employment. As the region grows, the health of residents and communities will depend on decision-makers who appreciate the interdependence of economic, transportation and land use goals.

2.8 Freight oriented expansion supports middle income jobs

In 2015, with the assistance of the City of Portland, Port of Portland, Associated Oregon Industries, Oregon Business Association, and Oregon Business Council; the Portland Business Alliance published "Middle-income jobs in the Portland-metro economy". The report explores the current conditions of middle-income jobs and workers in the Portland metro area. The study uses both aspirational cities and peer cities as comparators to help offer perspective on exactly how Portland-Metro is performing as a region in relation to other parts of the country. Fundamentally, the objective of the report is to present comprehensive data on the trends of Middle-income jobs and to highlight the impacts these trends have on the Portland-metro area and its residents.

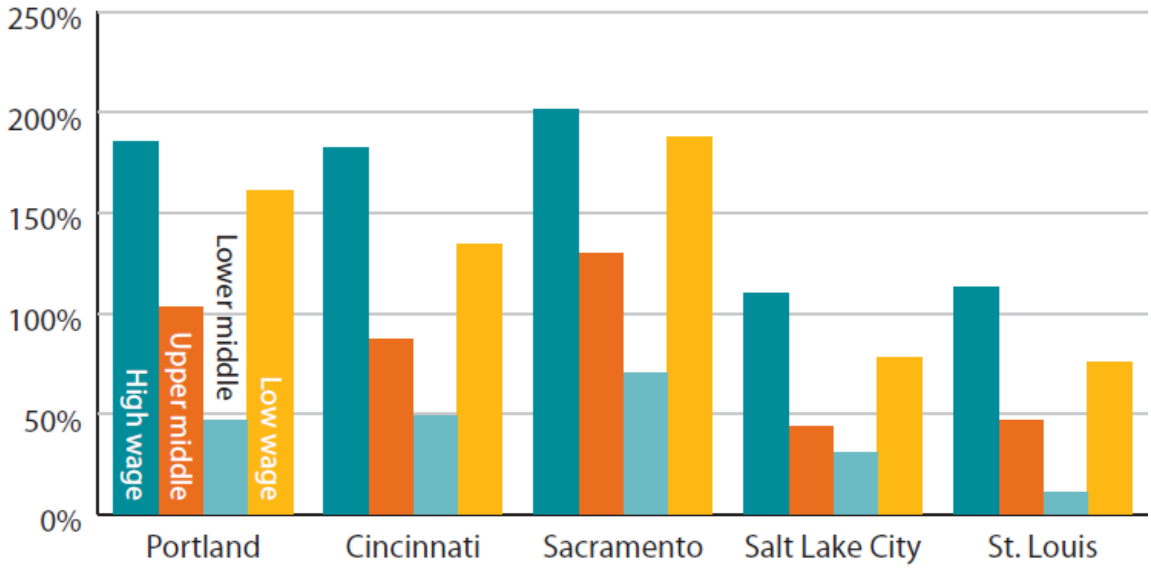
The term middle-income is used frequently throughout the study. Within the bounds of this study middle-income is defined as an annual income between $29,420 and $50,360 based on median wages in 2013. The middle is also divided into two categories lower-middle and upper-middle. The lower-middle ranges from $29,420 to $35,170 while the upper-middle is defined as jobs that pay between $40,730 and $50,360. By providing these two categories we are able to more accurately track the trends of job polarization.

In the Portland-metro area the jobs that comprise these income ranges mainly include manufacturing, production, sales and administrative support roles. Many middle-income jobs are also impacted by local markets and populations – these often include teachers, and trade workers - both of which are impacted by business cycles.

While the list above is not comprehensive it gives a good outline of the markets that typically offer middle-income jobs. Understanding these markets and the educational requirements of jobs in this income range are the first steps toward understanding why we have experienced a proportional decline in the amount of middle-income jobs in the last 30 years.

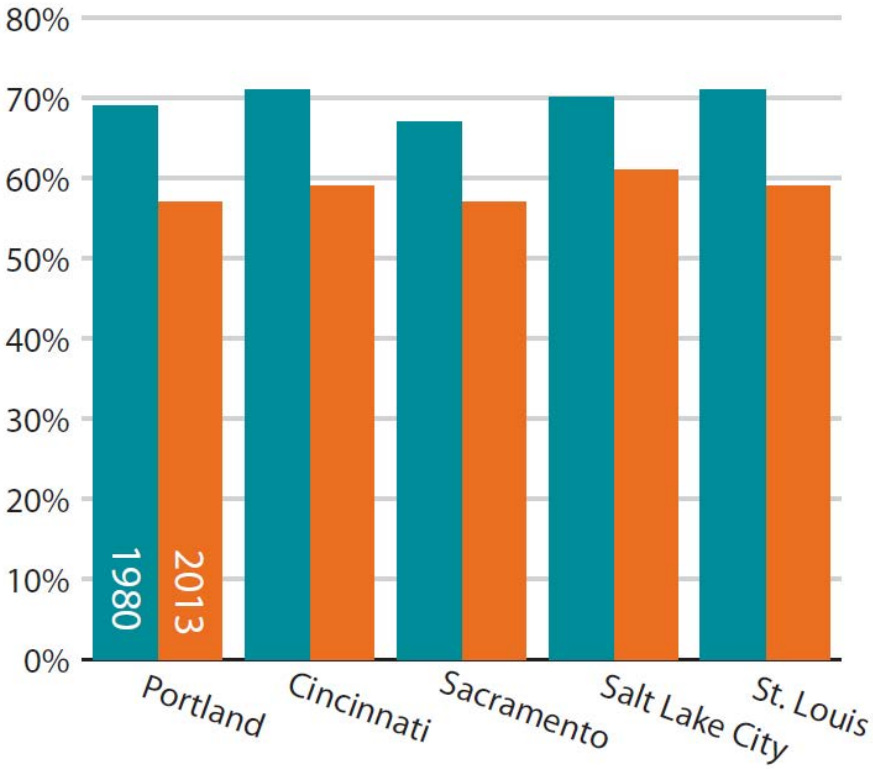
Between the years 1980 and 2013 the number of high-wage jobs increased by 185% and low wage jobs by 161% - in contrast, during this same period Upper-middle wage jobs only grew by 103% and Lower-middle jobs only saw an increase of 47%. This growth distribution was not limited to the Portland-metro area, in fact, both the aspirational city group and peer city group saw similar distributions of growth – the figures below more clearly express this.

Figure 2: Change in employment by wage group, peers



Source: U.S. Census Bureau; ECONorthwest calculations.

Figure 3: Middle-wage job share, peer cities, 1980 and 2013

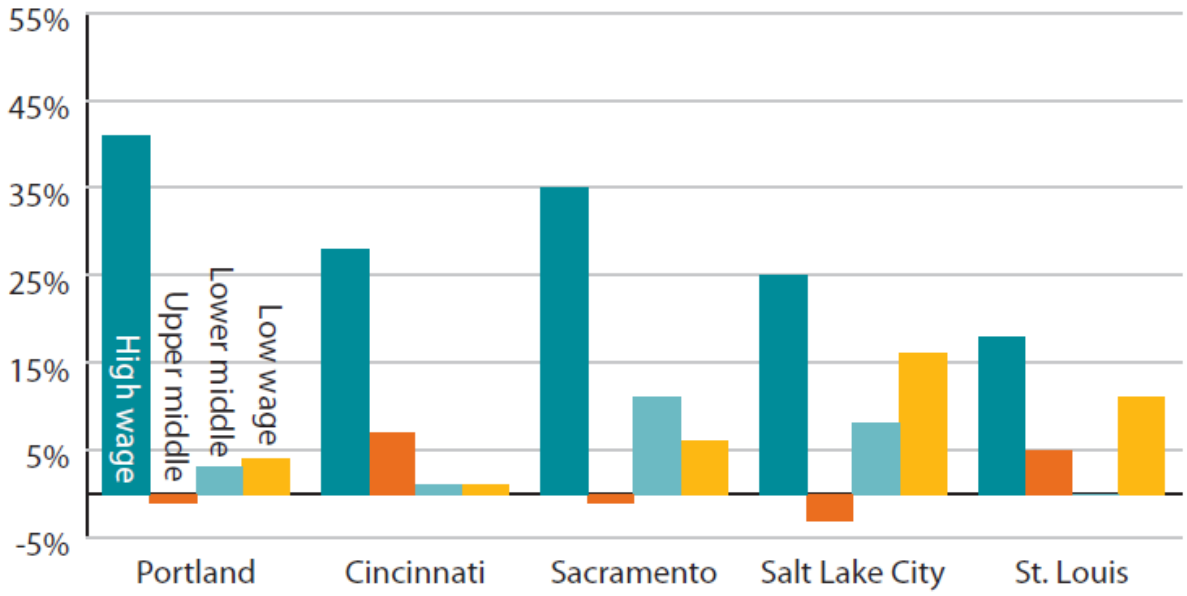


Source: U.S. Census Bureau; ECONorthwest calculations.

The report also focuses on the decrease of overall employment share that middle-income jobs hold. In 1980, middle-wage jobs represented 69% of Portland-metro's overall employment. By 2013 that number had decreased by 12 percentage-points to a share of just 57% (an 18% decrease).

In addition to share of middle-wage jobs declining, increases to real median wages within middle-wage jobs have stagnated. Both peer and aspirational data sets show a substantial increase in median income of high-wage jobs, minor increases in low-wage jobs – and in all but one case (see Cincinnati) the least substantial change impacting middle-wage jobs. When compared to the aspirational cities, Portland-Metro performed the worse in growth of median wages in every category except high-wage.

Figure 4: Growth in real median wages by wage group, peers, 1980-2013



Source: U.S. Census Bureau; U.S. Bureau of Labor Statistics; ECONorthwest calculations

Findings

As technology has progressed, naturally job markets have as well. The result of all this data offers a pretty clear outline of what is happening in the Portland-Metro area and, what will likely continue to happen if strategies to change the trend are not engaged.

It is important to come up with strategies that help make this region accessible and affordable for anyone who wants to live here. The report offers multiple strategies for combating the effects of the declining share of middle-wage jobs. These strategies are summarized as:

- **Education** – Technology will continue to advance and many jobs today won't be jobs tomorrow. However, regions that invest in education and training will be more resilient to the changes associated with more technology-based jobs. Greater

emphasis should be placed on closing the education achievement gap so that all workers, including underserved groups, have equal access to better-paying jobs.

- **Protection of existing job corridors** – Many middle-income jobs have been tied to geographical locations; for our region these primarily include the industrial sectors along the Columbia and Willamette rivers. Policies that protect, and support the further development of jobs in these industrial areas have the potential to play a significant role in the maintenance of a stable, and secure middle-income demographic.
- **Trade** – For our region, trade expansion means job growth. Trade-related jobs are wonderful sources for middle-wage growth, and jobs in this sector also support local-service industries that are also significant drivers of middle-wage jobs including manufacturing, education and health care.
- **Facilitation of growth corridors** – Many middle-income jobs are located in the growing technology centers in western Washington County, and around medical centers. It is important for government and the private sector to understand the factors that support growth, and develop policies that support these growing job centers.
- **Infrastructure** – As mentioned earlier, a large portion of middle-income jobs are along rivers and key highways. Infrastructure maintenance and improved access is critical to retaining and growing middle-income jobs in these areas. Policy makers should focus on ensuring that the region's port facilities are thriving, and that intermodal connector and highway congestion points are being addressed.
- **Workforce housing** – If leaders truly support the preservation of middle-income jobs an effort must be made to make living in the region an obtainable goal.

2.9 Invest now to boost the triple bottom line: People, planet, profit

The Portland-Vancouver area is a globally competitive international gateway and domestic hub for commerce. The multimodal freight transportation system 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. And with so many new residents expected in the Portland metro region by 2040, family wage job creation is going to be of paramount importance. Policies and programs designed to take advantage of the opportunities hidden in the downturn should begin to be refined and implemented, to ensure that the Portland metro region is flexibly and securely positioned for the future of freight and goods movement.

However, in addition to regional policy and program development and implementation, concrete freight-related projects must be built to ensure that the goals of the Regional Freight Strategy are met. Maintaining the Portland region's historic preeminence as a goods movement and industrial hub must remain a regional priority; our economic future depends on it. Regional infrastructure investment discussions should consider impacts to the local, regional and national economy, in addition to looking for cost-effective solutions.

Identified benefits—including those accruing to freight—must be conserved over time through regional policy and system management and monitoring. Investment in smart, strategic and green freight system improvements now can help the region secure not only its economic future by increasing its share of family wage jobs but also support development of a green economy that is the Portland-Metro area's trademark.

CHAPTER 3 REGIONAL FREIGHT VISION

3.1 Regional Freight Vision Framework

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 system 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.

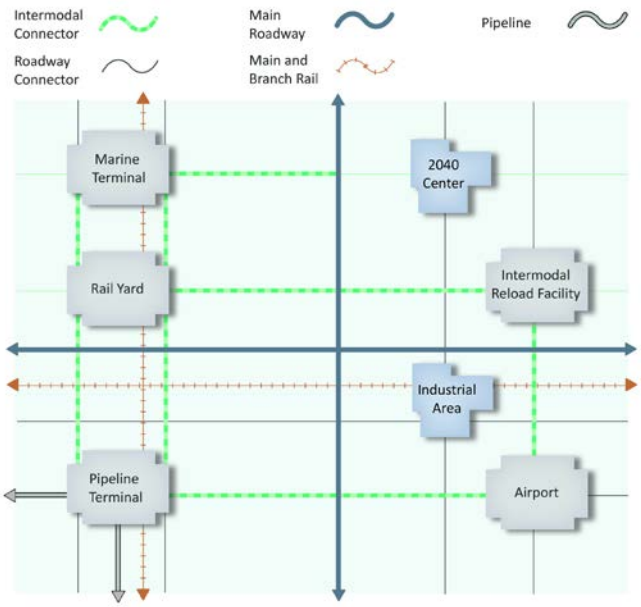
The Regional Freight Strategy addresses the needs for freight through-traffic as well as regional freight movements, and access to employment, industrial areas, and commercial districts.

3.2 Regional Freight Concept

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 5 shows the components of the regional freight system and their relationships.

Figure 5. Regional freight concept



Rivers, mainline rail, pipeline, air 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 connect industrial areas, marine terminals and pipeline terminals to rail yards. Pipelines transport petroleum products to and from terminal facilities.

Note: Figure 5: Regional freight concept will also be in Chapter 2 of the updated RTP.

The Regional Freight Network map, shown as Figure 6 at the end of this chapter, 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.

3.3 Regional Freight Network Classifications and Map

The Regional Freight Network map has been updated for the latest Regional Freight Strategy and is significantly different than the one found in the 2014 Regional Transportation Plan and the 2010 Regional Freight Plan. To show the continuity of the freight system in both Oregon and Washington state, the map now shows the freight routes in Clark County, north of the Columbia River. The previous Regional Freight Network map was difficult to read and many of the main roadway routes and road connectors were being covered up by the main rail lines and branch rail lines. The updated Regional Freight Network map now has the main roadway routes and road connectors as the top GIS layers and has offset the rail lines where possible to make them more visible. The Regional Freight Strategy now features the Regional Freight Network map as an 11x17 inch map to enhance readability. To highlight the importance of the rail network, and have better visibility for the rail lines that are still partially hidden on the main map, the updated Regional Freight Network map has added six inset maps (brown dotted line boxes) that focus on the key intermodal facilities (marine terminals, rail yards and pipeline facilities) and rail lines. These inset maps are located on the back side of the main map (see the next page).

The other major update to the Regional Freight Network map is the addition of a new freight roadway designation for Regional Intermodal Connectors. The Regional Intermodal Connectors represent National Highway System (NHS) intermodal connectors and other Tier 1 intermodal connectors that were designated by ODOT as part of the Oregon Freight Intermodal Connector System (OFICS) Study completed in 2017. The description and importance of NHS intermodal connectors and other Tier 1 intermodal connectors is described in the next section of this strategy.

3.4 Regional Freight Network and Intermodal Connectors

National Highway System (NHS) intermodal connectors are roads that provide the "last-mile" connections between major rail, port, airport, and intermodal freight facilities and the rest of the National Highway System. NHS Intermodal Connectors are defined by the FHWA's Freight Management and Operations as "roads that provide access between major intermodal facilities and the other four subsystems making up the National Highway System"[3] (footnote: FHWA Freight Management and Operations NHS Connectors). The four subsystems are Interstates; Other Principal Arterials; the Strategic Highway Network; and Major Strategic Highway Connectors. NHS intermodal connectors account for less than one

[3] *FHWA Freight Management and Operations NHS Connectors*

percent of total nationwide NHS mileage, but these roads are critical for the timely and reliable movement of freight[4].

Oregon Freight Intermodal Connector System (OFICS) Study

The Oregon Freight Intermodal Connector System (OFICS) Study was completed by ODOT in April of 2017, and defined and identified freight intermodal terminals and intermodal connectors within the Portland region (and the rest of Oregon). Freight intermodal terminals are defined as facilities which provide for the transfer of freight from one freight mode to another. Examples include the NHS intermodal terminals such as Port of Portland's Terminal 5 and Union Pacific's Brooklyn Yard. Smaller intermodal terminals and businesses that use more than one freight mode onsite, along with the smaller intermodal terminals are defined as "Intermodal Terminals/Businesses" (ITB), and were identified by the study.

The OFICS Study identified the locations of new intermodal connectors using the following criteria:

- They must be a public road
- They must serve as a primary access between an ITB and a state highway or an existing NHS intermodal connector
- Be a maximum length of 5 miles unless a longer length is justified

A review of the existing NHS Intermodal Connectors was completed as part of the study. The review determined if the connectors still met the FHWA's criteria for NHS Intermodal Connectors. All of the NHS Intermodal Connectors in the Portland region meet the NHS primary criteria of an average of 100 trucks in each direction per day.

Since a wide range of freight activity occurs on intermodal connectors, the study developed three tiers that sort the already recognized and new intermodal connectors by levels of importance. One of the main criteria for determining which tier an intermodal connector should be in is the average number of trucks per day on the intermodal connector. Sometimes this data was difficult to obtain so the study developed other criteria. The Tier 1 Primary Intermodal Connectors must meet the NHS Intermodal Connector criteria, which generally include:

- 50,000 TEUs/year or 100 trucks/day in each direction [5]
- Secondary Criteria: Connecting routes targeted by the state or MPO to address existing deficiency caused by increased traffic

The study defined Tier 2 Secondary Intermodal Connectors and Tier 3 Minor Intermodal Connectors. However, Metro determined that these intermodal connectors that don't meet

[4] *USDOT Federal Highway Administration, Freight Intermodal Connectors Study, April 2017*

[5] *TEU is a Twenty-foot Equivalent Unit that is equal to a 20 foot shipping container*

NHS criteria, and have less than 100 trucks/day each direction or serve smaller ITBs, are not of regional significance and are not included on the Regional Freight Network map. The Regional Freight Network map includes the Tier 1 Primary Intermodal Connectors and designates them as Regional Intermodal Connectors.

The Tier 1 intermodal connectors are the highest level of connectors and are considered as the primary classification in Oregon. The majority of the state's and the Portland region's ITBs are served by the Tier 1 intermodal connectors. In the Portland region the Tier 1 intermodal connectors consist of 16 existing NHS intermodal connectors and 3 recommended additional intermodal connectors. The three additions meet the NHS Intermodal Connector Criteria, and ODOT recommended to FHWA that these three additional intermodal connectors be designated as NHS intermodal connectors. These three additions are:

- North Rivergate Blvd. – between Terminal 5 and multiple ITBs, and N. Lombard St.
- North Leadbetter Road – a loop road south of Marine Dr. between the Terminal 6 access road and Portland French Bakery.
- NE Alderwood Road – between NE Cornfoot Road and Columbia Blvd.

Regional Intermodal Connectors

It is important to understand the truck usage and performance of the region's tier 1 and NHS intermodal connectors since they have a direct impact on goods movement efficiency and the health of the region's economy. 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 Metro 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 and both I-5 and I-205. Another example is NW Front Avenue/NW 26th Drive that provides a vital connection between the energy pipeline terminals (near NW 61st), and marine Terminal 2 and US 30, which had between 568 and 866 average daily trucks.

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 county.

3.5 Regional Freight Network Policies

In 2008, the Regional Freight and Goods Movement (RFGM) Task Force developed six goal statements to elaborate a policy framework that would protect and improve the cost-effective functioning of the critical regional freight network. They also developed five

policies to serve as the foundation of the freight network concept that somewhat mirrored the goal statements, but did not exactly match .

As part of the 2018 update to the Regional Freight Strategy, the intent of the RFGM Task goal statements has been maintained by combining them with the RFGM Task Force policies, and for consistency and simplicity, renaming them the Regional Freight Policies. In addition, the Metro Council directed staff to add a new policy (Policy 7) that addresses the issue of freight safety regarding the interaction of different freight modes (trucks, railroad trains, etc.) with passenger cars, bicyclist and pedestrians. These freight network policies were used to develop the freight actions that are outlined in Chapter 8. The following are the seven freight policies that guide the Regional Freight Strategy:

- **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 first-rate multi-modal freight networks to reduce delay, increase reliability, improve safety and provide shipping choices.
- **Policy 3:** Educate 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:** Integrate freight mobility and access needs into land use and transportation plans and street design to protect industrial lands and critical freight corridors with access to commercial delivery activities.
- **Policy 6:** Invest in our multi-modal 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.

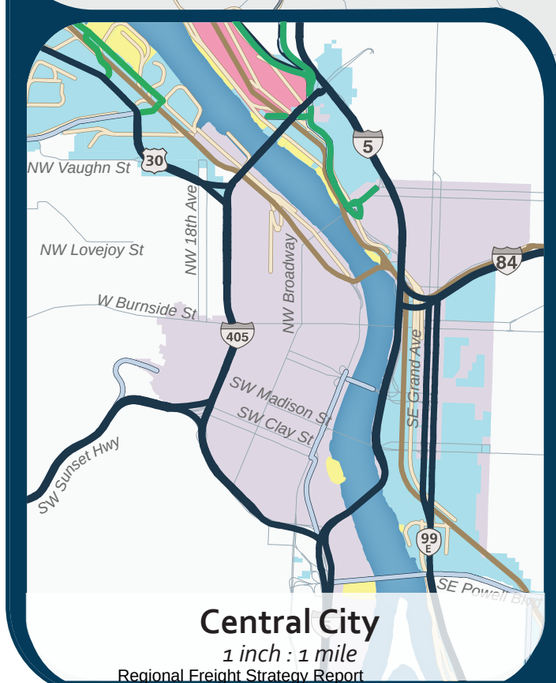
Regional Freight Network [DRAFT]

December 19, 2017

- Main rail lines
- Branch rail lines
- Main roadway routes
- Roadway connectors
- Clark County routes
- Regional intermodal connectors
- Marine facilities
- Rail Yards
- Employment
- Industry
- Urban centers
- Metropolitan planning area
- County boundaries
- Airports
- Extent indicator *see inset maps on back*

(dotted lines indicate planned projects, and do not identify specific alignments)

1 inch : 3 miles



Central City

1 inch : 1 mile

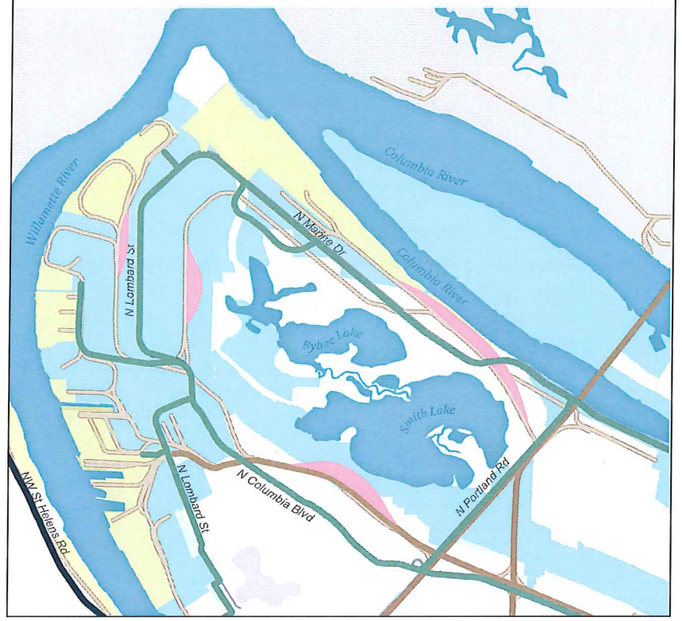
Regional Freight Strategy Report

DRAFT April 2, 2018

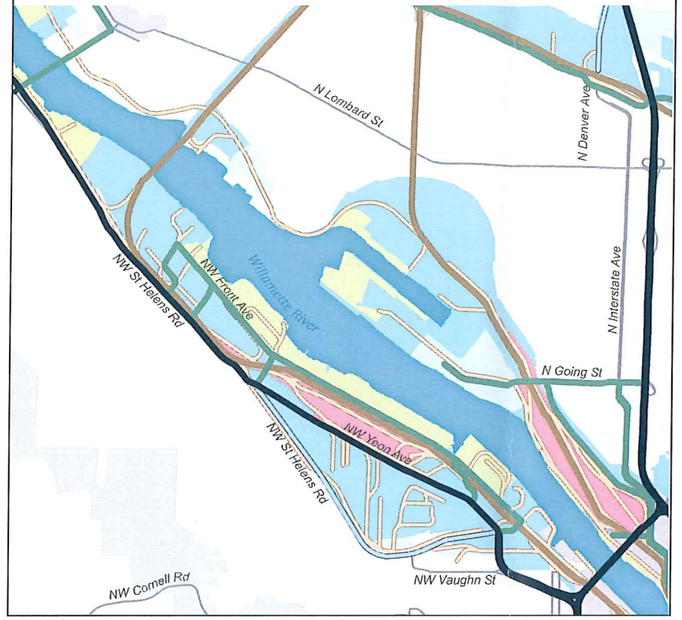
Metro

[DRAFT]

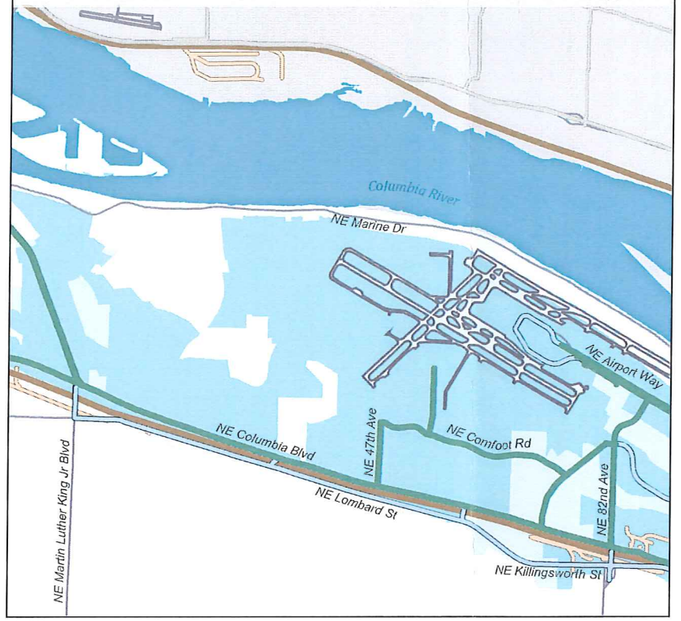
1. North Portland Marine Terminals



2. NW Industrial and Swan Island Areas



3. Portland International Airport + Airfreight



Legend

(dotted lines indicate planned projects, and do not identify specific alignments)

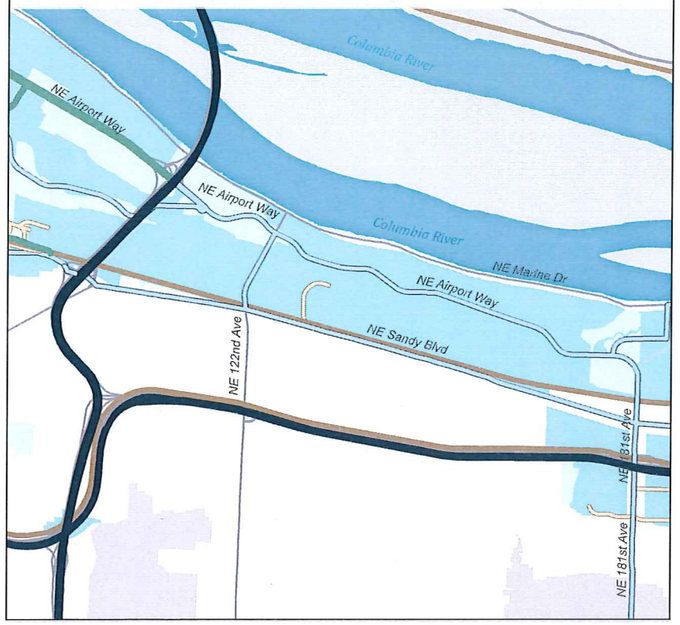
- Main rail lines
- Branch rail lines
- Main roadway routes
- Roadway connectors
- Regional intermodal connectors
- Marine facilities
- Rail Yards
- Employment
- Industry
- Urban Centers
- Urban Growth Boundary
- County Boundaries
- Airports

All insets adhere to the following scale:

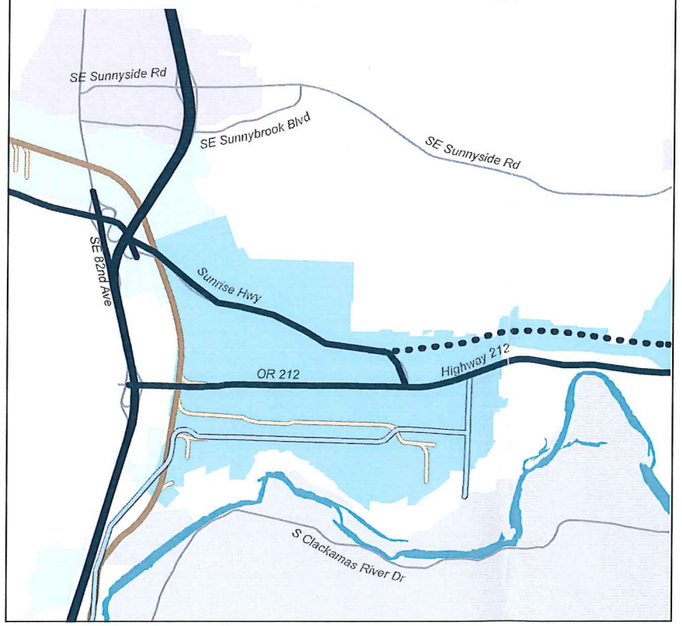
1 inch : 1 mile

October 18, 2017

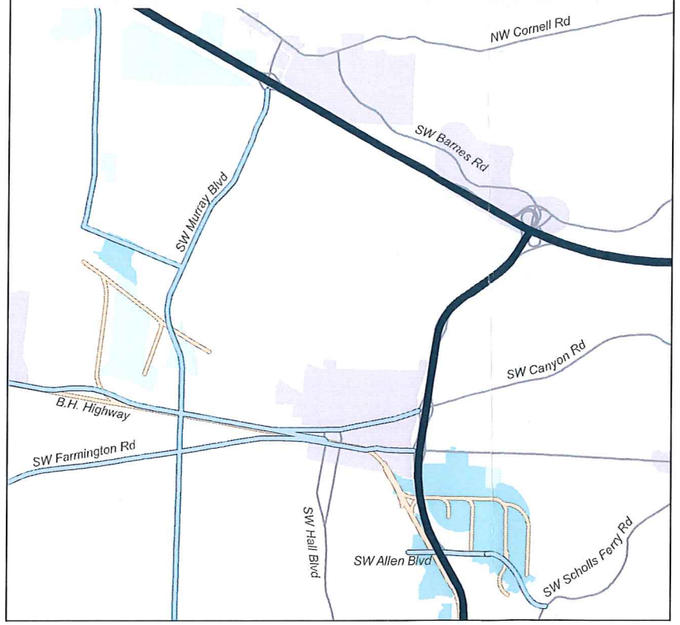
4. Kenton Rail Line / Columbia Corridor



5.Clackamas Industrial Area



6. Beaverton Industrial + Branch Rail Lines



CHAPTER 4 REGIONAL FREIGHT NEEDS AND ISSUES

4.1 Overview of Issues

In 2017, the Regional Freight Work Group (RFWG) reaffirmed that these six problem areas are the ones that need to be targeted:

- congestion and hotspots – chronic road and rail network bottlenecks that impede regional freight/goods movement
- reliability – unpredictable travel time due to crashes, construction, special events and weather
- capacity constraints due to physical and operational issues as well as lack of capacity in critical corridors
- network barriers – safety concerns and out of direction travel resulting from weight-limited bridges, low bridge clearances, steep grades, at-grade rail crossings and poorly designed turns or intersections
- land use – system capacity and land for industrial uses that is being lost to other activities
- impacts – managing adverse impacts including diesel emissions, greenhouse gas emissions, water quality, noise and land use conflicts

In line with sound regional planning practice, a systems approach must be taken in order to produce important outcomes such as reduced delay, better travel time reliability, safer travel across all modes and trip types, and broader shipping choices and better customer service to help area businesses remain competitive. Such an approach must also consider the economic context in which projects are built, and link transportation investment decisions to the local, regional and national economy.

4.2 Specific needs identification

The Regional Freight Work Group had open discussions that allowed them the opportunity for identifying challenges affecting freight and goods movement on the designated Regional Freight Network. A summary by mode of the RFWG's current constraints, challenges, and opportunities for freight and goods movement follows.

Constraints, challenges and opportunities on roadways and highways

- Increased congestion and congestion spreading over more hours per day on I-5 north of the Freemont Bridge (I-405).
- Capacity constraints exist at the Columbia River Bridge on I-5.
- Traffic constraints on roadway connections and intermodal connectors to I-5 are causing goods movement delays.
- I-5 at the Rose Quarter has been identified as a major traffic constraint.

- Highway 217 south of Beaverton-Hillsdale Highway has been identified as a major traffic constraint.
- Intra-county freight movements; such as high value commodities from Washington County that need to get to the air freight facility near PDX in Multnomah County, are experiencing long delays for extended periods of the day.
- Increased congestion and congestion spreading over more hours per day on US 26 (west of downtown Portland) create traffic constraints that cause trucks to avoid the freeway and travel out of direction on NW Cornelius Pass Road (north of US 26) and Highway 30 as an alternative route to avoid delays and unreliable travel times.
- For truck trips, NW Cornelius Pass Road has curvature and other design issues that need to be addressed.
- Increased demand for trucking on the region's freeway systems presents a major challenge to moving freight during congested hours.

Constraints, challenges and opportunities on and around rail lines

- Rail speed is slow, with some industrial trains that are a mile long (100+ cars), and at-grade railroad crossings cause major traffic impacts on the roadway system.
- Grade separating rail crossings at many more locations in the region presents a challenge. An example that was mentioned is the need for grade separation of the Union Pacific line as it crosses SE 8th Ave., SE Milwaukie Ave., and SE 12th Ave. (south of SE Division St.). The current at-grade crossings cause major delays to cars and trucks on the street network around these crossings in an active industrial area. This delay is amplified when freight trains and scheduled Light Rail Transit occur within a short time of one another.
- Freight rail demand on shared rail tracks at North Portland and Peninsula Junction is causing long delays to other freight trains and passenger trains (Amtrak). In 2017 the Oregon Transportation Commission approved an $8.2 million Connect Oregon VI project for rail improvements at North Portland Junction. However, improvements at Peninsula Junction were not included in this project.
- The Union Pacific Kenton Line that runs adjacent to Sandy Boulevard needs some double-tracking to address rail capacity constraints.
- There is an opportunity to address the issue of double-tracking with the Kenton Rail Line Study.
- Short term need for speed improvements to the Union Pacific Railroad line just north of the Steel Bridge river crossing. The current train speeds are 6 mph in the curves and would require a realignment of the tracks to improve speed.
- Capacity constraints on major rail lines in the region may require consideration of more double-tracking to: 1) improve freight train reliability; and 2) provide staging locations for freight trains off-line of the Seattle/Portland/Eugene passenger train corridor.

Constraints, challenges and opportunities around air freight

- Providing increased access to the Portland Airport (PDX) and consolidation facilities is limited by the existing routes. Air freight demand will grow as the area's population grows.
- The US Post Office has moved to NE Cornfoot Road near PDX. Increased truck demand, construction project impacts and overall traffic in the airport area will ause delays.
- The Westside Logistics Study showed computer and electronics shipments face constraints getting to the air fright facility on Air Trans Way, with congestion and reliability issues on US 26 (Sunset Highway) causing delays and other freight routing to get to east Portland.

Constraints, challenges and opportunities around energy pipelines

- Pipelines that supply fuels and other energy sources to the region are clustered along the Willamette River in the NW Portland Industrial area face the costs and challenges of retrofits for seismic resiliency.
- There are also financial challenges with providing seismic retrofits for resiliency on the regional freight system.

Constraints, challenges and opportunities for Marine/River (ships and barges)

- Providing more marine terminal space could be challenging.
- Deepen the Willamette River Channel for shipping has high costs and environmental challenges.
- There is a need to restore full container service at Terminal 6 (see "Loss of Container Service at Terminal 6" in Chapter 5, p.60). The impacts and short term challenges for commodity movement and freight modal changes have been addressed by ODOT and the Port of Portland. However, the long term opportunities are still being explored.
- The barges on the Columbia River cause the lift span on the I-5 Bridge to open when the river rises over six feet. There have been some years with nine months of high water.
- The location of the narrow opening of the railroad bridge (adjacent to the I-5 Bridge) makes for a difficult s-curve maneuver of barge traffic on the Columbia River that comes under these two bridges without lifting the I-5 Bridge. Barge safety is a major concern at this location. Barge traffic must avoid causing I-5 bridge lifts during peak traffic periods. During high water bridge lifts on I-5 cause major traffic delays even during off-peak hours.

- There is a need to restore operations of the Willamette Falls Locks to expand freight traffic on the Willamette River and reduce demand for trucks on the highways coming into the region. The historic Willamette Falls Locks in West Linn "were built in the early 1870s to move river traffic around the 40-foot horseshoe-shaped basalt ridge between Oregon City and West Linn" (US Army Corps of Engineers website).

Since December 2011, the Willamette Falls Locks have been in a "non-operational status".

Table 3 provides a categorized list of the key issues.

Table 3: Priority Issues for Freight and Goods Movement

Issue category	Key issues
Mobility and accessibility	• Road congestion on regional truck routes • Travel time reliability on regional truck routes • Accessibility between intermodal terminals, industrial areas, centers and the interstate highway system • Class 1/short line rail – throughput and velocity, capacity constraints in rail yards, sidings • Improved rail access and service for regional shippers • Barriers: weight/vertical clearance issues on bridges; gaps in connectivity (new roads/bridges) • Safe barge navigation in I-5/BNSF bridges area • At-grade rail crossings – grade separation • River channel deepening
System management	• Preservation and efficient use of existing capacity • Intelligent Transportation System tools (signal timing, cameras) • Access management • Increase in truck crash rate • Faster response to roadway incidents (crashes) • Truck parking: hours of service limitations • Efficient loading/unloading operations in commercial centers • Advances in traveler information (road conditions, directional signage) • Workforce access to industrial and employment areas • Maintenance dredging and Willamette Falls Locks repair • Rail system management (directional running, grade crossing info) • Modal redundancy
Land use	• General population growth and impacts to transportation system • Competition between industrial and other uses for interchange capacity • Adequate supply of industrial land served by transportation system (i.e., marine accessible) • Incompatible land uses along rail lines and major truck corridors • Accommodation of truck delivery in pedestrian-friendly areas and corridors (street design trade-offs)

Issue category	Key issues
Environment	• Air quality impacts from diesel engine emissions • Residential noise impacts from truck, rail and air cargo operations • Water quality
Investment strategies	• Link transportation investment decisions to regional, state and national economy. • Use of public-private partnerships to fund improvements. • The role of the public sector in funding private operations. • Use a building block approach to fix corridors (i.e., ITS first, then graduate to other solutions). • Incorporate lifecycle cost (maintenance) into project.
Coordination	• Create better coordination between freight system stakeholders in the region. • Educate decision makers and public about importance of region's freight transportation system. • Consider rail service needs for regional shippers. • Consider freight/goods movement needs in project development.
Research and data	• Freight system performance over time • Ongoing truck counts • Economic impact assessments of investments

In 2017, the Regional Freight Work Group reaffirmed that this list of key issues has the appropriate categories and issues that the Regional Freight Strategy should continue to address.

4.3 Key issues that have been addressed

A sizable number of significant freight studies have been completed since the completion of the Regional Freight Plan (2035) in June of 2010 that identified and addressed important freight issues in the region. These analysis reports and studies address freight needs, along with freight delay and access issues that the 2010 Regional Freight Plan had not yet explored. The following sections provide summaries of nine of these key freight studies, categorized by the freight issue that was addressed:

Freight bottlenecks and congestion

Portland Region – 2016 Traffic Performance Report (ODOT Region 1)
The 2016 Traffic Performance Report was produced by Region 1 at ODOT, and provides information on the health of the region's freeway system. It establishes a baseline for long-term monitoring that will enable Oregon Department of Transportation (ODOT) to better understand the urban freeway traffic mobility conditions of the system.

Traffic congestion is directly affecting freight in the region. The increasing congestion is moving into the mid-day hours. In the past, freight relied on the congestion-free mid-day

hours to move goods and services in the region. As the mid-day becomes more unreliable, freight is having more problems meeting delivery schedules, and the cost of shipping is increasing.

Overall, the number of crashes for the region's six freeway corridors has continued to increase in parallel with growing congestion. However, analysis of individual corridors shows the crash trend has declined or stabilized after construction of targeted operations and safety projects.

Corridor-level performance

The traffic data indicate the region's travel speeds and travel reliability are systematically getting worse. The following tables show indicators for corridors with the slowest average weekday speed (mph) and corridors with the least reliable travel. Buffer time is a measure of reliability. It is the extra time or cushion a traveler should add to their trip to ensure on-time arrival (95% of the time). Increasing buffer time equates to reliability getting worse.

Figure 7: Corridor-Level Performance

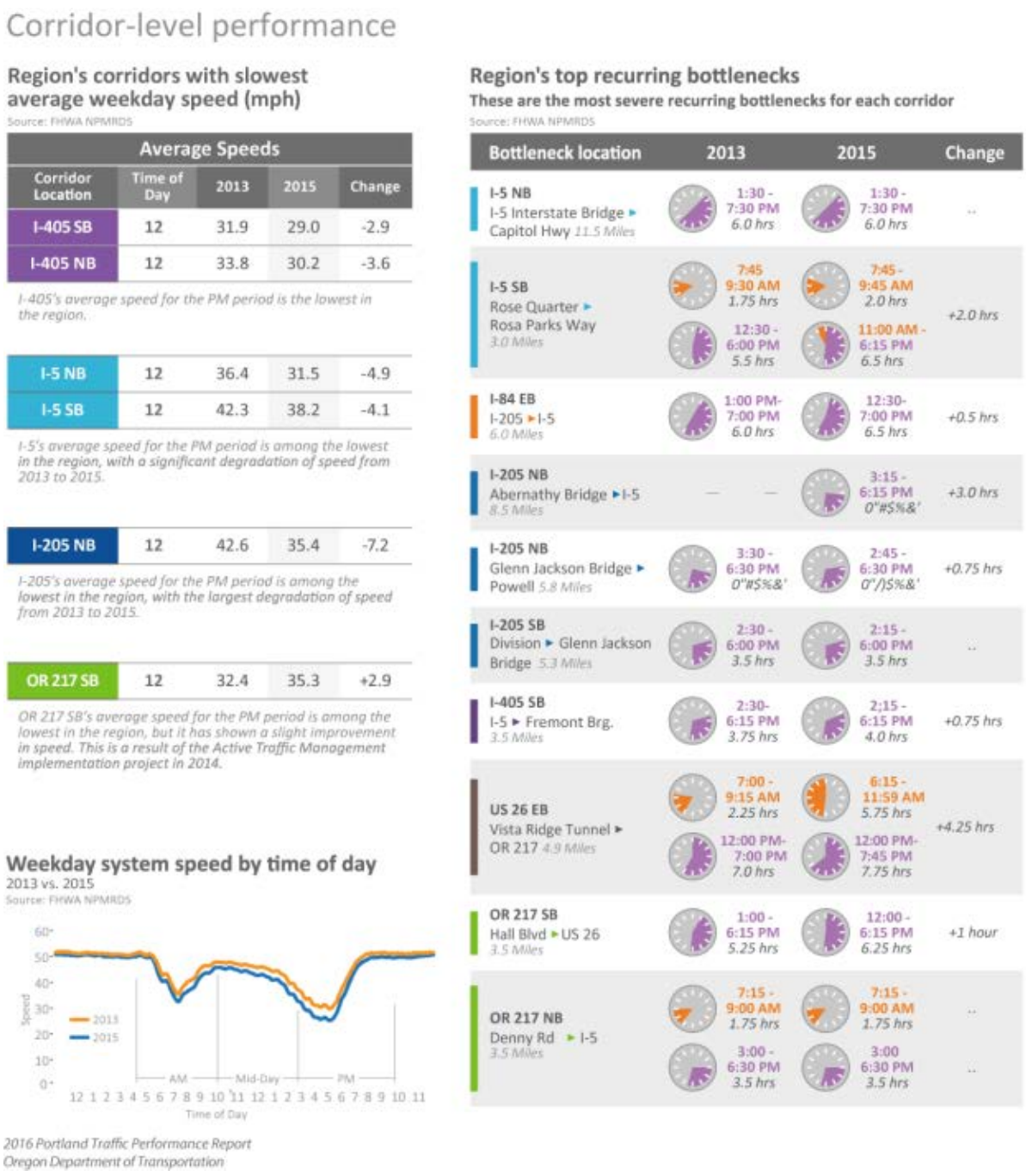


Figure 8: Travel Time Reliability Summary

Region's reliability

Travel time reliability summary

Source: FHWA NPMRDS

Corridors with least reliable travel*

Corridor location	Time of day	Travel time buffer (minutes) 2013	2015	Change	% Change
I-5 NB	PM	35.5	38.4	+2.9	8.2%
I-5 SB	PM	34.0	46.1	+12.1	35.6%
I-205 NB	PM	31.2	43.4	+12.2	39.1%
I-405 NB	PM	3.7	6.7	+3.0	81.1%
I-405 SB	PM	4.4	6.2	+1.8	40.9%
US 26 EB	PM	16.2	17.8	+1.6	9.8%
OR 217 SB	PM	7.6	8.1	+0.5	6.6%

Corridors with most significant increases in PM buffer time*

Corridor location	Time of day	Travel time buffer (minutes) 2013	2015	Change	% Change
I-5 SB	PM	34.0	46.1	+12.1	35.6%
I-205 NB	PM	31.2	43.4	+12.2	39.1%
I-405 NB	PM	3.7	6.7	+3.0	81.1%
I-405 SB	PM	4.4	6.2	+1.8	40.9%
US 26 WB	PM	2.0	5.4	+3.4	89:;

Corridors with largest increases in mid-day buffer time*

Corridor location	Time of day	Travel time buffer (minutes) 2013	2015	Change	% Change
I-5 SB	Mid-Day	10.0	14.5	+4.5	45.0%
I-205 NB	Mid-Day	4.0	8.1	+4.1	102.5%
I-205 SB	Mid-Day	4.2	9.6	+5.4	128.6%
US 26 EB	Mid-Day	3.7	7.0	+3.3	89.2%
OR 217 SB	Mid-Day	2.1	5.0	+2.9	138.1%

**Selection based on buffer time weighted for length of corridor*

Corridor with improved buffer time* and reliability

Corridor location	Time of day	Travel time buffer (minutes) 2013	2015	Change	% Change
I-84 EB	PM	12.0	6.8	-5.2	-43.3%

Reliability on I-84 EB has shown a decrease in both average and buffer travel time during the PM peak. This is due to the auxiliary lane extension project constructed in 2014 at the I-84 EB exit ramp to I-205 NB.

Corridor that experienced sustainable reliability

Corridor location	Time of day	Travel time buffer (minutes) 2013	2015	Change	% Change
OR 217 SB	PM	7.6	8.1	+0.5	+6.6%

OR 217 SB PM travel time has decreased and the buffer time change is among the lowest in the region.

This is the result of the Active Traffic Management (ATM) project that was deployed in 2014. The purpose of the ATM is to manage the recurring congestion to improve the safety and reliability of the corridor.

2016 Portland Traffic Performance Report
Oregon Department of Transportation

Interstate freight routes

I-5 carries the highest freight volumes, ranging from 13,600 to 17,800 trucks per day. It is the major north-south corridor for long-haul freight movement. In the northern corridor it serves Port of Portland marine facilities and Portland International Airport. In the southern corridor, it serves the Tualatin-Wilsonville industrial area.

I-205 carries the second highest freight volume, ranging from 7,900 to 13,100 trucks per day. It also functions as a north-south corridor for long-haul freight movement. In the north corridor it serves the Portland International Airport and the Columbia Corridor industrial area. In the southern corridor, it serves the Oregon City and Clackamas industrial areas.

I-405 has freight volumes ranging from 5,900 to 10,000 trucks per day. It functions as an inter-urban freight route for the west side and the US 30 industrial areas.

I-84 has freight volumes ranging from 6,500 to 7,800 trucks per day. It is the only interstate for east-west freight movement in the state. It serves the Troutdale industrial area, Port of Cascade Locks, and Port of Hood River.

Freeway Freight Routes

US 26 and OR 217 are the two freeways that provide fright access to the industrial areas in Washington County.

US 26 has freight volumes ranging from 1,500 to 6,000 trucks per day. It provides east-west freight connections from I-405 and I-5 to the North Hillsboro industrial area. Freight from high-tech industries in the Hillsboro area are low volume but high value commodities.

US 26 is restricted from hauling hazardous materials through the Vista Ridge Tunnel near I-405, Trucks carrying hazardous materials are required to use OR 217 or Cornelius Pass Road to US 30.

OR 217 provides a north-south freeway freight route connecting Washington County freight to US 26 and I-5. It has freight volume of about 4,300 trucks per day.

Figure 9: Average Daily Freight Truck Volume / Percent

Freeway Congestion and Reliability Impacts on Freight

Data for the region's six freeways show increasing congestion, decreasing travel speeds, greater delays and unreliable trip times. In 2013, 11.3 percent of freeway travel in the Portland metro region took place in congested conditions. This increased to 13.7 percent in 2015.

"Congestion and travel delay due to deficiencies in the transportation system are impacting businesses throughout the state, threatening their national and international competitiveness." (Note: Economic Impacts of Congestion on the Portland Metro and Oregon Economy – Portland Business Alliance 2014)

Many business owners report that they have changed to staggered shifts, added evening and overnight operations, and are increasing operations during off-peak hours (Economic Impacts of Congestion on the Portland Metro and Oregon Economy). This results in increased labor expenses, as operators need to hire additional drivers to cover new shifts.

As congestion creeps into the mid-day, truckers find it challenging to deliver goods and services on time. The loss of reliability during the day makes it difficult for interstate travel and delivery of goods resulting in increases in trucking costs. Reliability has degraded on all six of the region's freeways between 2013 and 2015.

Figure 10: Corridor Length

I-5 Corridor –I-5 truck volume accounts for 10 to 17 percent of total traffic, and has the highest truck volumes in the Portland region. For both directions of I-5 in the AM peak, mid-day, and PM peak, both the average travel time and the buffer time increased. I-5 northbound and southbound during the PM peak experiences some of the most unreliable

travel times in the region. I-5 southbound during the PM and I-5 northbound during the mid-day has one of the largest buffer travel time increases in the region.

I-84 Corridor – I-84 truck volume accounts for 5 to 20 percent of total traffic. It carries the fourth highest truck volumes in the Portland region, providing long haul access for interstate east-west connections. Reliability on I-84 westbound has degraded between 2013 and 2015 for the AM peak, mid-day, and PM peak. Reliability on I-84 eastbound has shown a decrease in both average and buffer travel time during the PM peak. Buffer time reliability for I-84 eastbound in the AM peak and mid-day has remained the same.

I-205 Corridor - I-205 truck volume accounts for 6 to 9 percent of total traffic. It carries the second highest truck volumes in the Portland region, providing an alternative north-south interstate route to I-5 on the east side. For both directions of I-205 in the AM peak, mid-day, and PM peak, both the average travel time and the buffer time increased. I-205 northbound during the PM peak experiences some of the most unreliable travel times and largest buffer travel time increases in the region. I-205 northbound and southbound during the mid-day have some of the largest buffer travel time increases in the region.

I-405 Corridor – I-405 is an urban interstate connector, linking I-5, US 26 (Sunset Highway) US 26 (Ross Island Bridge) and US 30. I-405 truck volume accounts for 6 to 8 percent of total traffic. I-405 has the third highest truck volume in the Portland region. For both directions of I-405 in the AM peak, mid-day, and PM peak, both the average travel time and the buffer time increased. I-405 northbound and southbound during the PM peak is among the corridors with unreliable travel time and is also among the corridors with the largest buffer time increase in the region.

US 26 Corridor – US 26 is a primary east-west connector to I-5 from the west side. Hazardous material cargo is restricted on US 26 at the Vista Ridge Tunnel. US 26 truck volume accounts for approximately 4 percent of total traffic. US 26 provides east-west freight connections to I-405 and I-5 freight routes. For both directions of US 26 in the AM peak, mid-day, and PM peak, both the average travel time and the buffer time increased. US 26 eastbound during the PM peak is among the top corridors with unreliable travel time. Westbound PM travel experiences some of the most significant increases in mid-day buffer time.

OR 217 Corridor – Because of hazardous material restriction on US 26 at the Vista Ridge Tunnel, OR 217 is the west-side detour connection for trucks carrying this material between US 26 and I-5. OR 217 truck volume accounts for approximately 4 percent of total traffic. OR 217 southbound during the PM peak is among the worst for reliability not only for the corridor but also the region. However, from 2013 to 2015, it had the lowest rate of change, whereas other freeway corridors in the region have degraded at a significantly higher rate. This is attributable to Automated Traffic Management (ATM) measures deployed in the corridor. Mid-day reliability on OR 217 southbound has degraded substantially, with buffer times longer than the AM buffer time.

Overall, freight truck reliability on the Portland region's major freeway and highway system has deteriorated rapidly since the last Regional Freight Plan in 2010.

Freight Highway Bottlenecks Project and delay areas (ODOT - March 2017)
Bottleneck identification is of national concern, as expressed in the 2012 Moving Ahead for Progress in the 21st Century Act (MAP-21) and carried into the Fixing America's Surface Transportation (FAST) Act. MAP-21 specifically highlights the importance of identifying and addressing bottlenecks on the multimodal freight system. Studies of existing freight highway conditions in Oregon identified that congestion from bottlenecks is a major issue, impairing Oregon's economy with variations in travel time reliability and rising travel costs. The 2011 *Oregon Freight Plan* (OFP) incorporated a strategic implementation initiative 2.3, which directed the state to "identify and rank freight bottlenecks…in particular those located on the strategic system. The Freight Highway Bottlenecks Project (FHBP) was initiated to identify locations on Oregon's highway network that were experiencing significant freight truck delay, unreliability and increased transportation costs.

There are many elements associated with freight truck delay and unreliability, including roadway congestion, high collision areas, and geometric conditions such as steep grades, severe curves or roadways that are not up to functional standards. The FHBP looked at a variety of key measureable indicators to identify locations on the state freight highway network, specifically those routes identified at ORS 366.215 restriction review routes. Indicators were things such as:

- **Delay** – the hours of delay that trucks accumulate at each corridor per day, during the season of the year that produces the largest delays for that segment.
- **Unreliability** – unreliability of shipment travel times that cannot be anticipated.
- **Geometric Issues** – % grade, degree curvature, narrow lanes or shoulders.
- **Volume** - Volume-to-capacity ratio and peak congested travel.
- **Incident-Related** – Frequency of various collision types.
- **Cost –** Transportation delay costs, inventory delay costs, and unreliability costs.

Feedback and responses/contributions from freight stakeholders were essential for the successful identification and tiering of freight highway bottlenecks. A technical advisory committee (TAC), made up of local and regional freight practitioners, an OFAC representative, ODOT Motor Carrier Division representative, Oregon Trucking Associations and other stakeholders was convened to review data, assess indicators and review bottlenecks list.

Some considerations the stakeholder groups identified at various points in the project that were incorporated into the final list included:

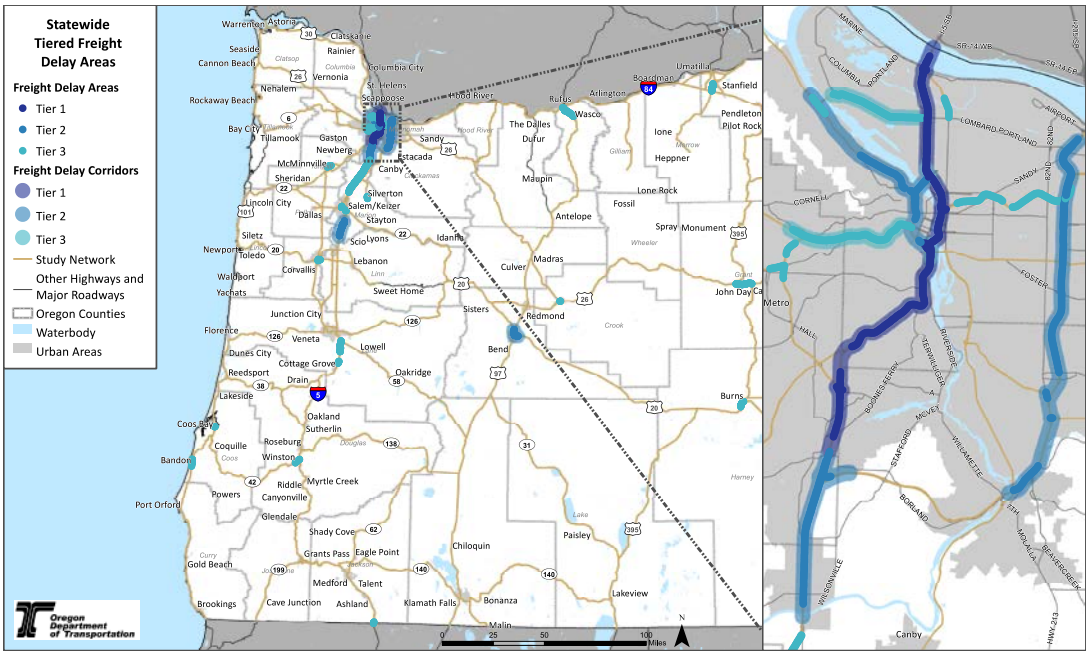
- **Key Indicators** – All stakeholder groups indicated that they did not believe all the indicators were equal in terms of importance. The stakeholders collectively agreed that travel delay and unreliability were the two major indicators that should be

focused on to trigger a bottleneck designation. The other indicators were used to help understand the cause of the delay area and tier the bottleneck areas.

- **Urban vs. Rural** – The analysis found that the freight network in urban areas often operated at a different scale than in the rural areas of the state. Therefore, different thresholds were considered in urban and rural conditions.
- **Corridors** – There were clear strings of delay areas, particularly in the Portland-Metro area that, should be considered as corridors, rather than individual delay areas. This reflects the cumulative impact that longer segments have on freight movements. It also acknowledges the need to consider the entire corridor when developing solutions.
- **Tiering** – The costs associated with travel delay and unreliability were determined to be the key indicator to determine the bottleneck corridor and delay area severity.

The final tiered freight highway delay areas map is shown below. As shown, both freight delay **areas** and freight delay **corridors** are presented. The Portland-metro area has the bulk of the identified delay areas and corridors, even though the thresholds for rural areas are significantly lower than those in urban areas. Delay areas within corridors represent nearly all of the first two tiers, reflecting the high cost of cumulative delay and reliability on the freight industry. The only tier one corridor is I-5 in the Portland metropolitan area because the impacts to freight in this corridor far exceed those in other locations throughout the state. The freight highway bottleneck list and map were endorsed by OFAC during their regular meeting on January 18, 2017.

Figure 11: Freight Highway Delay Areas



Corridor Bottleneck Operations Study (ODOT)

The Corridor Bottleneck Operations Study (CBOS) is a 2013 study conducted by ODOT to identify low-cost and effective solutions to the recurring bottlenecks within the Portland Metro area. The resulting document was a Project Atlas that identified bottleneck locations along the five metro area corridors (I-5, I-205, I-84, I-405 and US 26) as well as a collection of low-cost, operational solutions to the various bottlenecks.

The development of the Project Atlas consisted of three primary steps:

1. **Corridor-level reconnaissance**

This included preliminary surveying and research to provide a solid foundation for specific investigation in order to validate recurring bottleneck activity and primary causes.

2. **Bottleneck Analysis, evaluation, screening, and selection of solutions**

This step was aimed at design and operation – during this step the bottlenecks were analyzed and potential solutions were developed, evaluated, and screened by a design panel consisting of professionals from an array of discipline areas. The projects proposed were primarily constrained by cost ($1 million to $20 million range) and the inability to add capacity. As a result, the benefits resulting from projects are likely to be moderate or incremental and be geared towards improving safety by limiting the amount of weaves and merges that occur at interchanges.

3. **Refinement of Solutions**

The third and final step focused on more in depth evaluation of operation and design solutions. The evaluation included traffic modeling as well as an assessment of project feasibility.

Study Area

The study area in the CBOS consists of five corridors in the Portland metropolitan area (see Figure 12.) Note that the study area within these corridors includes the ramp merge and diverge locations in addition to the roadway mainline. Figure 12 (below) highlights the boundaries of the study area.

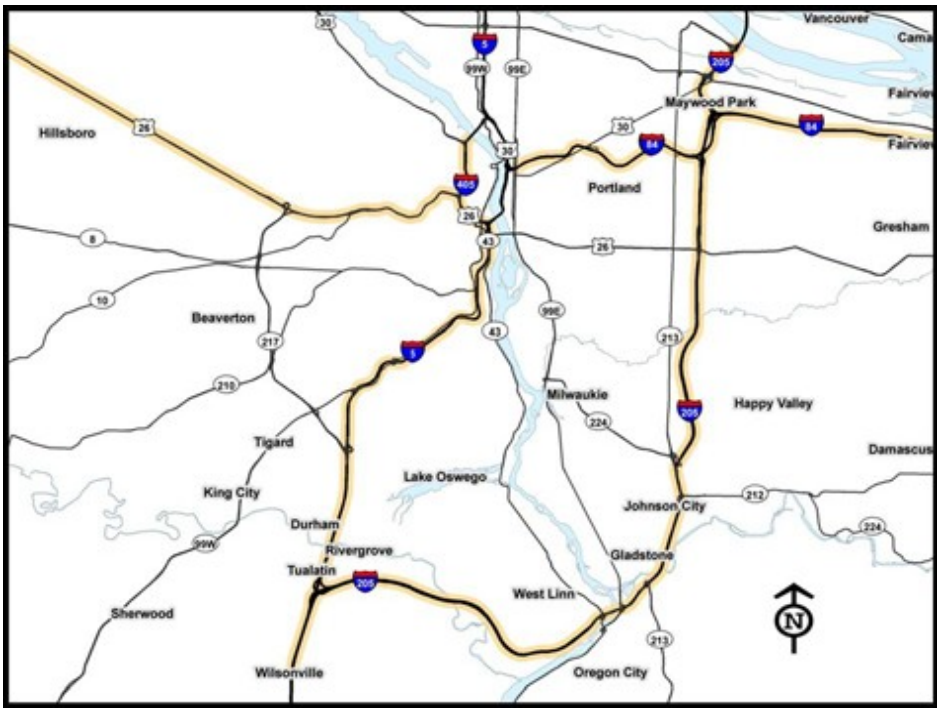


Figure 12: The Study Area in the CBOS

I-5: North Boundary – Marquam Bridge| South Boundary – Boones Bridge
I-205: North Boundary – Airport Way | South Boundary – I-5 interchange in Tualatin
I-84: West Boundary – I-5 | East Boundary – 257th Avenue
I-405: North Boundary – I-5 | South Boundary – I-5
US 26: West Boundary – OR 47 | East Boundary – I-405

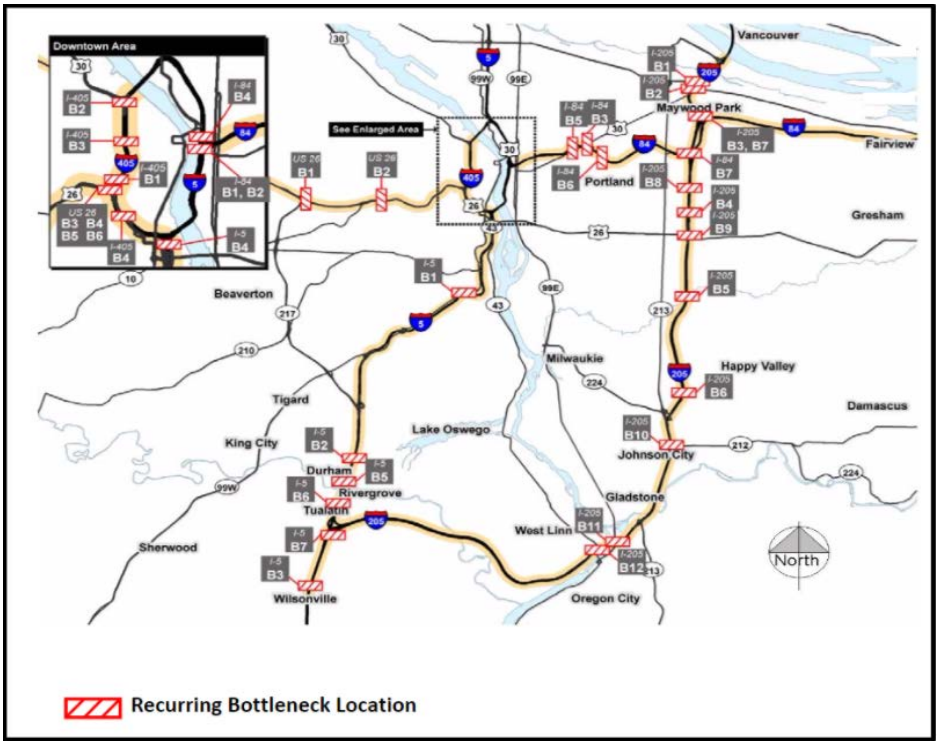


Figure 13: Bottleneck Locations

Findings
The conclusion of the study offered helpful information regarding the location, duration, and typical cause of each bottleneck. The study identified thirty-six (36) recurring bottleneck locations distributed throughout the five corridors. Figure 13 highlights these bottleneck locations.

Economic Impacts of Congestion in Oregon (2014)
The final report for the study was prepared by the Economic Development Research Group in February of 2014 for the Portland Business Alliance, Oregon Business Council and the Port of Portland. The following is a summary from the report of transportation's role in the State's economy, the transportation system's impact on business, and the impact of congestion and travel delay on the Oregon economy.

Oregon's transportation system is the backbone of the state's economy. A well-maintained, resilient, and efficient network of highways, rail and waterborne transportation is essential to support the businesses that provide the jobs and revenues needed to underpin the resource-based, traditional manufacturing and advanced biotech and computer/electronics technologies that characterize the state's economy. The key findings are:

- Oregon's competitiveness is largely dependent on efficient transportation. Over 346,400 jobs are transportation related, or transportation- dependent, meaning that system deficiencies threaten the state's economic vitality.
- Businesses are reporting that traffic congestion and travel delay is costing money, forcing changes in business operations and location decisions.
- Oregon's geographic location makes it a key component of US West Coast logistics, serving as a major hub for domestic and international freight. The state provides key international air and maritime gateways, as well as an important junction of critical transcontinental highways.
- "Traded industries" – those industries that provide goods and services outside of Oregon and bring money back into the state economy – are particularly reliant on an efficient transportation network. Exports from these industries are shipped through most major ports on the US West Coast. These industries are also critical to statewide economic growth and job creation.
- Congestion and travel delay due to deficiencies in the transportation system are already impacting businesses throughout the state, hurting their competitiveness. Direct interviews with businesses were conducted as part of this study, and the results underscore the fact that transportation is critical to business competitiveness and sustained business growth in Oregon. Due to increasing congestion, businesses report that they are drastically altering operations in order to keep a competitive edge.
- Changes in business operations are nearing the limits of what a business can do to overcome transportation congestion before it becomes a severe issue. Many respondents reported that they have implemented staggered shifts, evening and

overnight operations, and are increasingly operating during "off-off-peak" hours. However, the businesses do so at the boundaries of regulatory limits on hours, concern about driver safety, and limits as to when they can feasibly deliver to customers.

- Failure to adequately invest in the transportation system will result in significant losses to Oregon's economy, job base and quality of life. Congestion is becoming an increasing problem statewide, and that investments in infrastructure can strongly mitigate these conditions.
- These travel time savings from new investments translate to significant economic impacts. With transportation investments in the "Improved Future Investment Scenario," these savings would generate an additional 8,300 jobs by 2040; $928 million in output; $530 million in GDP or value added; and $380 million in wages and compensation to employees.

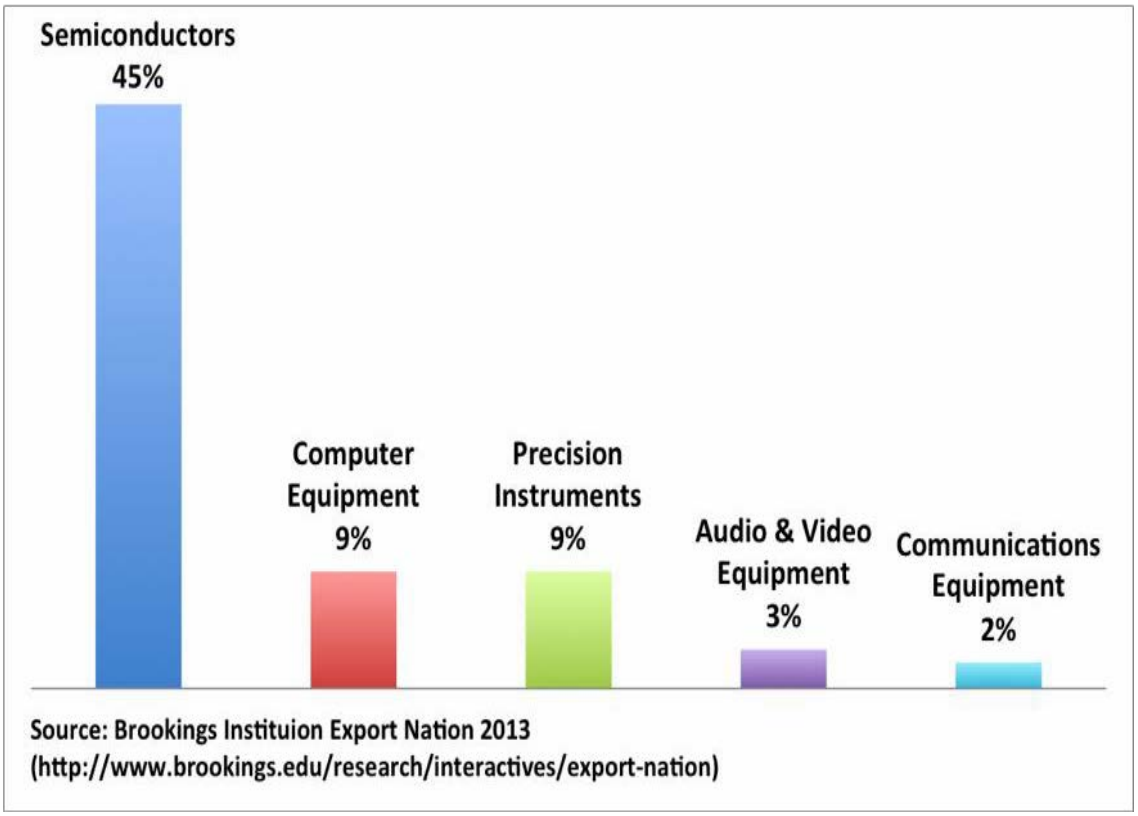
Freight access and logistics

Portland Region Westside Freight Access and Logistics Analysis Report (DKS - October 2013)

Portland's Dependence on High-Tech Exports

Portland's economy has long relied on export industries, serving broad domestic and international markets and bringing outside dollars into the region. Increasingly, Portland's export economy relies on semiconductors and the computer and electronics (C&E) industry, which accounts for over half the total value of the region's exports (Figure14). 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 Portland Metropolitan area. This study provided recommendations on how to improve goods movement from the Westside C&E industry to Portland International Airport (PDX) freight consolidation locations.

Figure 14: Industries Representing Two Percent or More of the Portland Region's Exported Goods



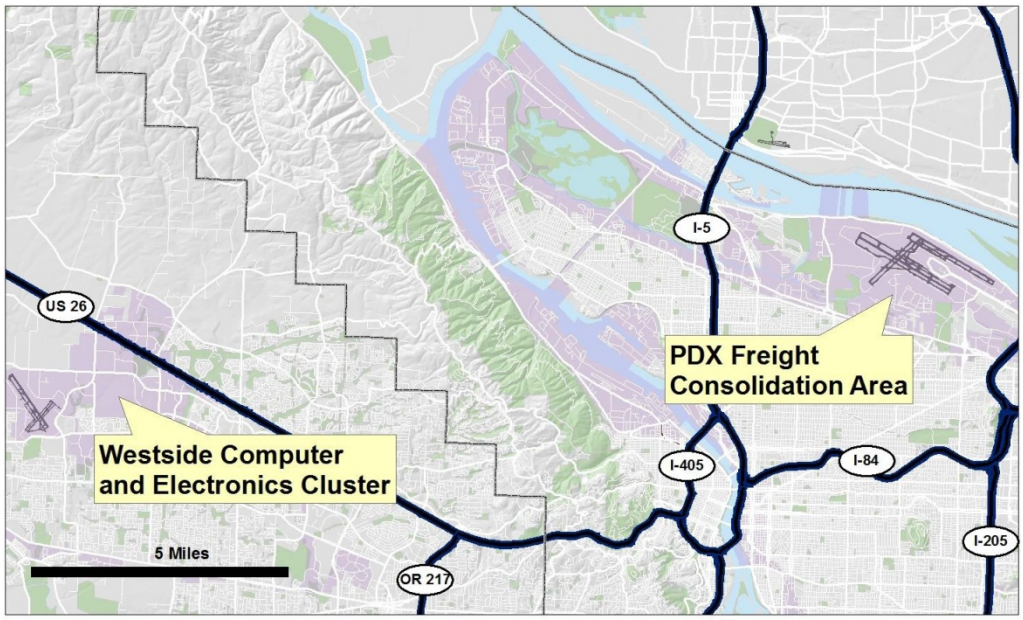
While this study focused on a single sector of the region's export economy, it is important to recognize that policies and investments that support the computer and electronics industry may support other key export industries such as footwear, apparel, and agricultural products.

Continued growth in these other industries will tend to have ancillary benefits to the computer and electronics industry, such as improving the frequency of Portland International air cargo service or increasing the range of freight movement options.

Study Focus

This study focused on the outbound movement of goods from Westside computer and electronics manufacturers to the freight consolidation area at Portland International Airport (PDX), as shown in Figure 15. While not all C&E goods fly out of PDX, the freight consolidation area, generally located north of Columbia Boulevard and south of the terminal, is home to several firms that support international and domestic service by handling and combining C&E goods before trucking them north or south of the Portland region for consolidation at other airports. For the purposes of the study, Westside C&E firms are assumed to be clustered south of US 26 in the vicinity of Brookwood Parkway.

Figure 15: Portland Region Westside Freight Access and Logistics Analysis Study Area



Freight movement between the Westside C&E cluster and the PDX freight consolidation area depends on two routes: (1) US 26 to I-405 north to I-5 north, and (2) Cornelius Pass Road to US 30 then eastbound across the St. Johns Bridge to Columbia Boulevard. These key routes are the focus of this study. The study does not consider other corridors, such as OR 217 and I-5 south that are important to regional freight movement but are not regular routes for transporting freight from the Westside to PDX.

The study looked at projects that can have a significant impact on speed, efficiency, and reliability and that can be pursued in the near term.

Study Findings

Several important findings emerged from this study's industry interviews and technical analysis:

- Portland International Airport (PDX) is a crucial location along the supply chain, but most C&E freight moves out of PDX on a truck.
- Firms involved in freight movement and logistics currently use PDX as a freight consolidation hub, but they generally find it is most efficient to truck, rather than fly, goods to airports that have better links to overseas destinations.
- Supporting a strong Westside C&E cluster can help leverage freight movement options for other industries. While the Silicon Forest is dominant in the region's export economy, other regional export industries such as footwear, apparel, and agriculture can benefit from the short-term strategies identified in this report. All export industries in the region benefit from air cargo services out of PDX, and these services can be maintained and/or increased by increased export activity.

- Reliability of the roadway system is key to C&E goods movement. Interviews indicated that after 2:00 p.m. "all bets are off" regarding the reliability of the US 26/I-405/I-5 corridor and that Cornelius Pass Road/US 30 becomes the de facto route in the afternoon. Analysis of travel time data confirms that Cornelius Pass Road/US 30 is significantly more reliable in the midday and p.m. hours.
- The Westside C&E industry is heavily dependent on a rural road with known deficiencies. Cornelius Pass Road from the Washington County line to US 30 was designed and built for rural use, but is increasingly used for urban-to-urban trips. Because it is a winding and steep road through a narrow pass, it is susceptible to incident-induced congestion (such as truck rollovers) and a lack of viable alternative routes.

Recommendations

Three strategies emerged from this study that show clear benefit to Westside C&E freight movement and can potentially be implemented in a short timeframe. These strategies are shown in Table 4.

Table 4: Recommended Priority Projects

Project Name	Description	Benefits
Enhanced Traveler Information	Provides predictive traveler information at key points on routes approaching US 26, alerting drivers to congestion on US 26, through the central city loop, or on Cornelius Pass Road northbound.	Provides more reliable travel time by alerting drivers of incidents, reducing non-recurring delay.
US 26 Truck Ramp Meter Bypass	Modify select US 26 on-ramps to allow freight to bypass ramp meter queues.	Potential to reduce queue-related delay by 10 to 20 minutes.
Enhanced Freeway Incident Response	Increase incident response and clearing capacity on key US 26/I-405/I-5 freight route to reduce non-recurring congestion impacts.	Reduces delays due to incidents.

Washington County Freight Study (July 2017)

Background

Washington County is the economic engine of the Portland-metro region and the state. The computer and electronics industry, which accounts for nearly half of state exports in terms of value, is centered on the western part of the Portland-metro region, primarily in Washington County. The county contains over 15 percent of the state's jobs (second highest in the state) and has the highest average wages. Given the trade-dependent nature of many businesses in Washington County, it is important to understand how freight congestion impacts these companies' ability to operate, compete, and grow.

Study Purpose and Scope

The Transportation Futures Study analyzed the future transportation needs of Washington County based on anticipated population and employment growth. It found that delays for trucks would be more than twice that for other vehicles. While that study outlined broad transportation needs for all users in the county, study partners determined that additional freight-specific data and analysis were needed to further identify and prioritize needs for trucks.

Previous studies have explored the dependence of traded sector jobs on the transportation system in the region. The purpose of this study was to identify and prioritize infrastructure problems within Washington County that impact freight. The results will inform the development of regional, state and federal funding requests and need for road improvements. They will also provide input regarding freight flows and market considerations (including cost sensitivity and urgency) to the future demand forecast for the Hillsboro Airport Masterplan.

Under the guidance of the Steering Committee composed of project partners, the study:

- Reviewed existing plans, studies and data
- Conducted interviews with companies that ship or carry goods into or out of Washington County
- Analyzed recent truck operations using real-time speed and volume data.
- Evaluated and prioritized truck needs within Washington County

Key Findings

- As the economic engine of Oregon and a major exporting region, Washington County is highly dependent on freight infrastructure.
- In addition to computers and related components, plastic, wood, paper, tools, nursery, seed, fruit and tree nut products all represent significant exports produced in Washington County.
- The Portland metropolitan area has the bulk of identified delay areas and corridors in the state according to the recently completed Freight Highway Bottleneck Project (FHBP).
- Due to its relative speed and flexibility, trucks are by far the most common mode. On their own, or in combination with other modes, trucks are a part of most freight trips.
- Businesses' heavy reliance on trucks makes highway and arterial congestion a major concern for many firms in Washington County and the region. Congestion adds time to deliveries, resulting in significant costs to businesses. Most interviewed firms indicated that highway congestion was a serious impediment and complained of significant impacts from consistent, pervasive roadway congestion. A severe

national truck driver shortage, exacerbated by federal requirements and traffic delays, is impacting the ability of businesses to move goods.

- New real-time truck operations data on arterials was analyzed with truck counts in an analysis that allowed more detailed understanding of local delay and reliability issues critical to freight movement than previously.
- The limited number of routes into the county, the degree of delay and unreliability on them, and the importance of county freight to the economy make access to Washington County a statewide issue. These concerns were expressed by stakeholders and supported by the study evaluation and the statewide FHBP.
- The I-5 corridor was most often cited by stakeholders and represents the highest need in both this analysis and the statewide bottleneck study.
- The US 26 corridor near the Sylvan Tunnel followed I-5 in terms of stakeholder concerns and freight operational performance in this analysis, and was also identified as a delay corridor in the statewide study.
- Many Washington County highways and arterials suffer from congestion throughout much of the day. Other key areas of freight operational delay and unreliability include portions of OR 217, OR 8, Tualatin-Sherwood Road, Cornelius Pass Road and Murray Boulevard.
- Farm to market roads near the edge of the urban area are not built for the volumes or loads they are subject to.

Stakeholder Suggestions to Improve Freight Movement

Stakeholders had a number of suggestions to improve freight movement, including the following general approaches:

- Adding HOV or truck-only lanes
- Providing incentives to encourage off-peak delivery
- Adding lanes or interchanges at bottleneck areas along specific corridors
- Expanding transit service, routes, and facilities along congested corridors
- Higher speed limits

Each of these tools offers its own set of opportunities and limitations. They might work in some locations or for some industries and not others. However, they should all be explored as part of a comprehensive approach to freight delay and reliability issues in the Portland metropolitan area.

Conclusions

This freight needs analysis was intended to provide information to decision-makers in establishing transportation funding priorities. Freight delay and reliability within and to Washington County are a major regional issue. Due to the importance of county traded

sector businesses to the economy, the freight needs identified here rise to the level of statewide significance.

As summarized, this study identified and prioritized Washington County Freight needs. This study finds that freight access to, and movement within, Washington County represents a significant cost to businesses and drag on the economy. These findings demonstrate the location of significant freight needs in and around Washington County and underscore the importance of developing and funding road improvements to meet them.

Over-dimensional trucks

Highway Over-Dimensional Load Pinch Point Study (ODOT)

Purpose
The Highway Over-Dimension Load Pinch Point Study (HOLLP) was conducted by the ODOT Freight Planning Unit, Transportation Development Division with the goal of identifying, analyzing and ranking interstate and state highway pinch points that restrict the movement of over-dimension loads. The study was completed in May of 2016. The primary purpose of the study was to develop a list of key pinch points that can then be presented to the ODOT Region and Area Commission on Transportation for project recommendations that would remove these pinch points.

Definitions
An over-dimension load is a load classification that is triggered when a load has any of the following dimensions.

1. Width greater than 8 feet 6 inches
2. Vehicle height or vehicle combination greater than 14 feet
3. Front overhang greater than 4 feet beyond front bumper
4. Load is greater than 40 feet and extends 5 feet beyond the end of the semi-trailer; or load less than or equal to 40 feet exceeds 1/3 of the wheelbase of the combination, whichever is less.
5. Vehicle combination length that exceeds those authorized on the reverse of MCTD Group Map 1.
6. Any single axle weight that exceeds 20,000 pounds, tandem axle weigh that exceeds 34,000 pounds, or gross combination weight that exceeds 80,000 pounds.

Most commonly over-dimension loads include cranes, excavators, steel plates, manufactured homes, forklifts, boats, transformers, windmill turbines, and other oversized industrial equipment.

The study highlights two primary route types that are relevant to over-dimension loads.

1. High Routes - these routes are designated as the routes required for the transport of over-dimensional loads requiring vertical clearance.

2. Reduction Review Routes (RRR) – are the highways associated with ORS 366.215 and OAR 731-012-0010. The statute states that Oregon Transportation Commission may not permanently reduce vehicle-carrying capacity of a RRR unless safety or access considerations require a reduction.

Bottlenecks or delay areas are commonly referred to as places or points where congestion frequently occurs. In relation to the study, over-dimension pinch points are those areas that become problematic due to width, length, and vertical clearance or weight constraints. For over-dimension loads these pinch points usually take the form of overpasses, narrow roadways, sharp curves, or weight-restricted bridges.

The HOLPP uses the same dimension categories to classify pinch points within the study. The three classifications offer useful information surrounding the nature of pinch points for over-dimension loads within the Oregon transportation network.

Heavy Load (HL) Pinch Point

- These are bridges along the highway which cannot support the weight of over-dimension loads. Note that the most current list of weight-restricted bridges provided by the ODOT Bridge Program shows that none of the weight-restricted bridges are graded to handle a weight greater than 60,000 pounds and as mentioned earlier, over-dimension weight loads are gross weights greater than 80,000 pounds which means that HL pinch points are all weight-restricted bridges

Vertical Clearance (VC) Pinch Point

- These are classified as areas lacking the required vertical clearance for over-dimension transport. They are based on the vertical clearance design standards **in the Oregon Highway Design Manual: 17'-4" on High Routes, 17'-0" on NHS** Non-High Routes and 16'-0" on Non-NHS and Non-High Routes. As a safety buffer, the MCTD adds an additional 4" to the actual height of any bridge unit when routing trucks and will not route any truck that doesn't meet the clearance with the buffer zone included.

Wide and Long (WL) Pinch Point

- These are points along the highway where it is difficult or impossible to move some over-dimension loads due to horizontal constraints. The study offers no dimensions for WL pinch points however, ODOT Maintenance District staff has identified WL pinch points based on their experience and history of routing over-dimension loads on the highways within their districts. Commonly these points take the form of guard rails, narrow bridges, curbs, non-removable signs, intersections, and any other horizontal constraint.

Findings

The study resulted in a High Priority Pinch Point classification system that highlights the criteria for distinguishing locations as high or low priority for action.

ODOT's High Priority Criteria:

- **WL Pinch Points -** In order to be classified as High Priority all WL pinch points within RRR segments must be separated by at least 15 miles (either direction). This helps direct focus on situations where removing a pinch point would open up a RRR to wider and longer loads. Additionally, all High Priority WL pinch points must be less than one mile in length.
- **VC Pinch Points** – In order to be classified as High Priority all VC pinch points must be at least 6" less than the design standard for that type of highway. Similar to WL pinch points all High Priority VC pinch points must separated from other VC pinch points on a RRR segment by at least 15 miles in order to focus on situations that would have greater impact if a single pinch point is removed.
- **HL Pinch Points** – At this point all HL pinch points are classified as High Priority because there are so few weight-restricted bridges on the RRR.
- **Combination Pinch Points** – These are pinch points that fall into multiple categories such as a WL/VC pinch point. In order to qualify as High Priority a combination pinch point is only required to meet the High Priority criteria for one of the pinch points.

Special circumstance can warrant a High Priority classification of a pinch point and must be documented. Any pinch point not meeting the criteria listed above are currently rated as Low Priority.

At this time eighty-eight (88) pinch points have been identified within the boundaries of the Portland region's metropolitan planning area. Nineteen (19) of these pinch points have been classified as High Priority. Eight (8) of the High Priority pinch points are due to WL constraints, and additional 8 (eight) are due to VC constraints, one (1) is due to HL constraints and the remaining two (2) are combination pinch points. The sixty-nine (69) other pinch points are currently rated as Low-Priority with the vast majority (60 points) classified as VC areas.

Figure 16: Insert a map of Highway Over-Dimension Load Pinch Point location if available

While the study does not specifically address how each pinch point should be technically modified it does offer helpful insight on best practices for categorizing and prioritizing the problem areas, and a clear picture of where potential projects should take place.

Regional Over-Dimensional Truck Route Study

The Portland Freight Master Plan and the Regional Freight Plan both identified the need to plan for the efficient movement of over-dimensional freight vehicles within and through the metro region. The City of Portland, ODOT, Metro, Clackamas, Multnomah and Washington Counties agreed to work together to prepare a Regional Over-Dimensional Truck Route Study for the three county metro region.

The purpose of this study was to provide local jurisdictions with a comprehensive assessment of over-dimensional truck movements to more effectively plan for their safe and efficient routing within and through the metro region. This project identified and mapped the most commonly used and preferred routes for the safe movement of over- dimensional vehicles and documented the minimum clearance requirements to accommodate over-sized loads. Physical and operational constraints and missing gaps in the over-dimensional freight network were defined and recommended capital transportation improvements and planning-level costs for removing identified constraints were developed.

An inventory and assessment of current transportation policies and over-dimensional permitting practices was conducted to identify potential policy changes and permitting efficiency improvements. The goal was to develop a seamless over-dimensional route system that transcends jurisdictional boundaries and to provide policy guidance for accommodating over-dimensional vehicles in state, regional and local transportation system plans and local street design guidelines.

The study was initiated in October 2015 and concluded in March 2017. The Project Management Team (PMT) consists of representatives from the partner agencies to provide project oversight and guidance. The project consultant conducted the technical planning and engineering analysis, cost considerations and final report preparation. The Stakeholder Advisory Committee (SAC) composed of representatives from the over- dimensional hauling industry, and provided strategic input on all work products from the user's perspective.

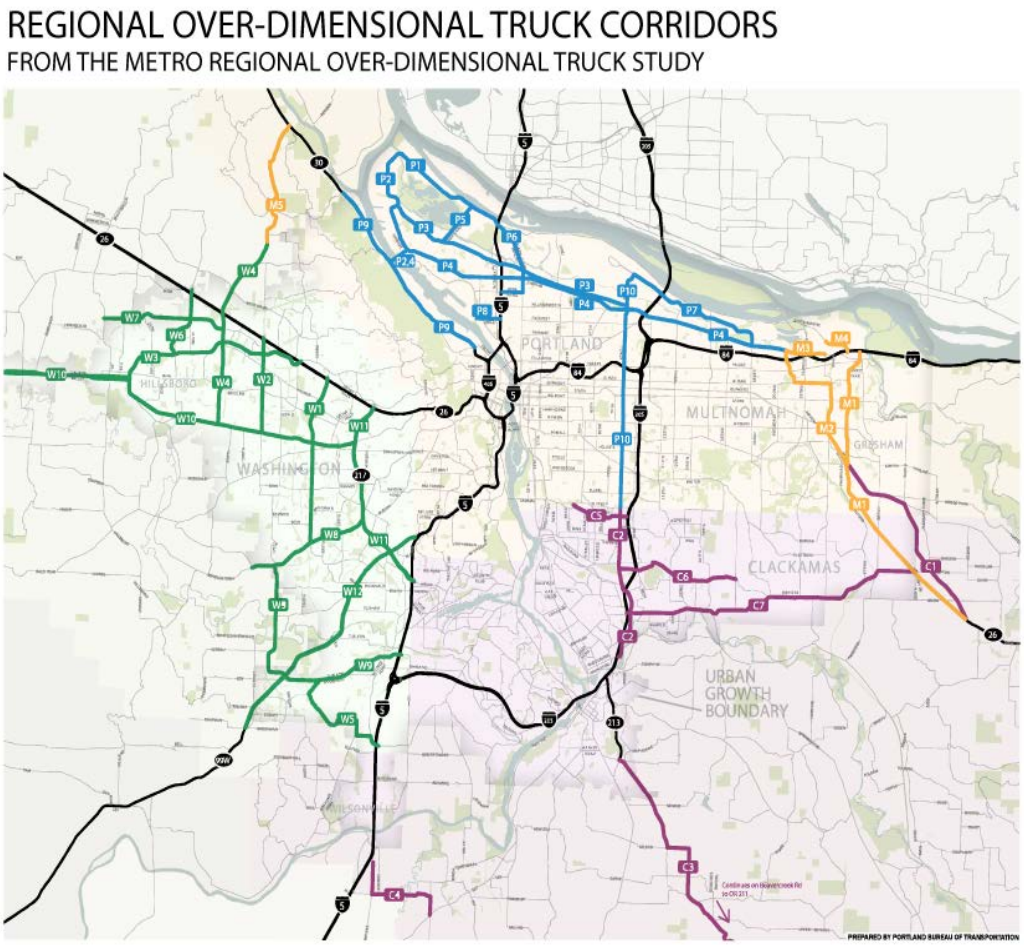
Findings

The definition of over-dimensional trucks is defined by ODOT statewide. ODOT Motor Carrier Division requires permits for truck size and loads meeting the following dimensions:

- Width exceeding 8 feet, 6 inches
- Height exceeding 14 feet
- Length exceeding 40 feet
- Gross Vehicle Weight exceeding 80,000 lbs.

Thirty-four Regional Over-Dimensional Truck Corridors were identified for this study (see Figure 17)**.**

Figure 17: Regional Over-Dimensional Truck Corridors



20,611 Single Trip Permit (STP) records issued by ODOT between 2012 and 2015 were evaluated to identify overall width, height, length, weight and commodity type moved.

- **Commodities Moved:** Excavators, Cranes and Log Loaders account for 30% of all commodities.
- **High Loads:** 90% of all high loads were 15 feet or less. The highest load was a transformer at 18-feet, 2-inches moved between Happy Valley and Oregon City.
- **Wide Loads:** 35% of all wide loads were between 11-12 feet. Excavators accounted for 24% of wide loads between 11-12 feet. The widest load was a 25-foot steel skirts moved from Newberg to Portland.
- **Long Loads:** 60% of the loads were between 70-90 feet in length with excavators accounting for 15% of these movements. The longest load was a 225-foot heat exchanger moved from the Oregon/Washington border at I-205 to Hillsboro.
- **Heavy Loads:** 75% of all heavy loads were between 120,000-160,000 lbs., with excavators accounting for 20% of these movements. The heaviest load was a 662,212 lbs. transformer moved between Oregon City and Clackamas.

Recommended capital improvements for the City of Portland, and the three counties, along with a more detailed summary of the study, are available in the "Key Freight Trends and Logistics Issues Report" (to be completed in 2018).

Industrial land supply

Regional Industrial Site Readiness – 2017 Inventory Summary

The Portland metropolitan region competes on a global scale to attract traded-sector jobs. A key factor in determining a business's likelihood of settlement is adequate land to do so. Having a site inventory of varying sizes and locations within Portland's Urban Growth Boundary plays a key role in facilitating potential economic opportunities that support a thriving region, new jobs, and increased wages.

The Regional Industrial Site Readiness Project is a report that examines the supply of large (25+ acre) industrial sites available to accommodate existing and future employers. The inventory considers industrial sites within the Portland metropolitan area Urban Growth Boundary (UGB) and select urban reserves. The objectives of the 2017 report include the following:

- Track the changes in inventory since the 2014 update
- Analyze the readiness for each site inventoried
- Inform policy makers about policy changes and investments that have influenced the development-readiness;
- Summarize investments, tax base, and jobs created from development of inventory sites; and

- Identify policy and investment actions that can ensure a consistent inventory of these vital sites into the future.

The report also introduces a tier system that assists in better prioritization of various development sites. Tier 1 sites are considered recruitment-ready for businesses expanding or locating in the region. Tier 2 sites will take longer to become development ready, but could be feasible for expansions of existing businesses and for speculative development for investors. Tier 3 sites meet the size and location requirements of the study but require complex fixed to become development-ready.

Tier 1: Development-ready within 180 days. It is anticipated that a site can receive all necessary permits; sites can be served with infrastructure and zoned and annexed into the city within this timeframe. No or minimal infrastructure or brown-field remediation is necessary and that due diligence and entitlements could be provided and/or obtained within this time period.

Tier 2: Likely to require 7-30 months to become development-ready.

Tier 3: Likely to require over 30 months to become development-ready

2014 – 2017 Inventory Changes

Since the last update to the report in 2014 the inventory of sites has decreased from 54 to 47. This change was primarily driven by a strong economic cycle, which we continue to see today. Additionally, 6 new sites were added to the inventory since 2014 (1 Tier 1, and 5 Tier 3) and 13 sites were removed mostly as a result of site readiness investment and development.

The charts below compare the changes in inventory by tiers and acreage for 2011, 2014, and 2017.

Table 5: Changes in inventory by tiers and acreage for 2011, 2014 and 2017

	2011 Inventory	2014 Inventory	2017 Inventory
Tier 1	9	14	10
Tier 2	16	17	11
Tier 3	31	23	26
Total	56 sites	54 sites	47 sites

	2011 Inventory	2014 Inventory	2017 Inventory
25-49 acres	40	39	33
50-99 acres	9	10	10
100+ acres	7	5	4
Total	56 sites	54 sites	47 sites

Findings

- Between 2014 and 2017, there has been significant development of large industrial sites in the region. There are relatively few unencumbered Tier 1 industrial sites remaining in the inventory and no 50+ or 100+ acre Tier 1 sites.
- There has been slower movement between tiers than in the previous inventory update (4 sites between 2014 and 2017, versus 7 sites between 2011 and 2014).

This is in part due to the market absorption of sites, but underscores the continued need to make these site readiness investments.

- Significant challenges remain to move sites to market. This is particularly true for sites that require aggregation and High-Need Tier 3 sites.
- Site readiness investments and development since 2011 have resulted in significant investment and job creation.

Recommendations

The Portland metropolitan region continues to see a demand for larger industrial sites ranging from 50 to 100+ acres. The 2017 inventory shows that there is a deficiency of Tier 1 sites of this size, and the challenges of moving Tier 2 and Tier 3 to market readiness. An inability to meet this need will lead to lost opportunities for the region.

The report recommends policymakers consider policy action and investments to address industrial site readiness challenges and development hurdles. The report divides recommendations into Regional, Local, and State actions.

Local and Regional Site Readiness Actions

1. Engage the Oregon Economic Development Department, Oregon Economic Development Association, local jurisdictions, private property owners, and developers in efforts to make investments in industrial sites needed to move these sites to market.
2. Actively work to find ways to aggregate 13 industrial sites with multiple property owners to realize the market potential of these sites. This is critical to realizing the potential of Coffee Creek, Meek Subarea and other industrial sites in the region.
3. Support local jurisdictions in evaluating the sites that require state and local legislative actions (e.g., annexation, zoning, and concept planning) and identify the timeline for and feasibility of completing this work. Metro has invested Community Planning and Development funds in the past to support such efforts.
4. Evaluate Tier 3 High-Need sites to determine if there is a path for development. If not, consider removing them from the inventory or creating a Tier 4.
5. Proactively work on solutions to the Lower Willamette cleanup to remove the cloud over the properties in the Portland Harbor.
6. Apply brown-field tools approved by the legislature to brown-field redevelopment of industrial lands (Brownfield Tax Abatement Program and Land Banking Authority).
7. Actively work on regional and local infrastructure financing solutions that impact 60% of the industrial sites in the inventory. Metro's Economic Atlas may help identify strategic infrastructure investments benefitting the region's industrial and employment lands. Local infrastructure needs could potentially be packaged with State infrastructure financing to fund local/regional projects through the West Coast Infrastructure Exchange.

8. Support regular updates of the inventory and track investments from sites that have been developed. Consider expanding the inventory to sites of 15 acres or more to reflect shifting market demand.

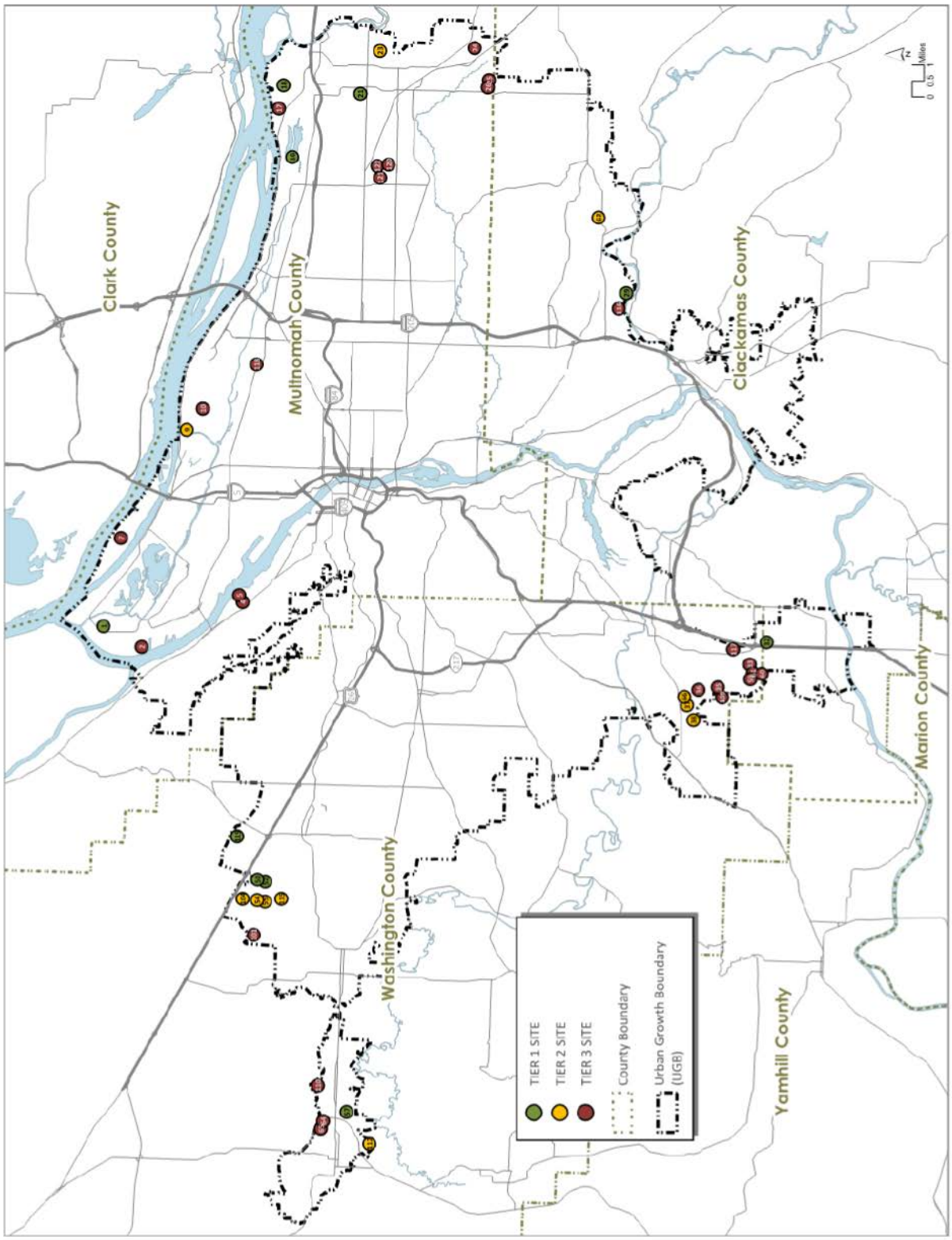
State Legislative Actions

9. Advocate for new tools and funding to support brown-field cleanup and redevelopment. This includes but is not limited to re-capitalization of the Oregon Economic Development Department's Brownfield Revolving Loan Fund and passage of Brownfield Tax Credit.
10. Support state loan funding for the Industrial Site Readiness Program and Special Public Works Fund. The Industrial Site Readiness Program was enacted in 2013 without authorization for loan funding. The Special Public Work Program is oversubscribed and underfunded.
11. Continue to support the Regional Solutions Teams that provide coordinated state attention to facilitate solutions for sites with complex issues involving multiple agencies. The Metro Regional Solutions Team played a key role in addressing site readiness issues in Troutdale, Gresham, Clackamas, and Hillsboro in the 2014-17 inventory cycle.

Local Development Actions

12. Evaluate the potential for new or expanded enterprise zones or other local or state incentives to help secure targeted development.
13. Encourage local communities to explore an expedited permitting process to address market expectations of issuing construction permits. Several communities with development wins in the 2014-2017 inventory cycle have expedited permitting programs in place (e.g., Hillsboro, Gresham).

Figure 18: Regional Industrial Site Readiness - Map of Tier 1, 2 and 3 Sites in 2017



CHAPTER 5

FREIGHT GENERATION IN THE REGION

5.1 Manufacturing, warehousing and distribution

The Portland metro region is home to a number of traded sector firms engaged in a broad array of activities. These firms bring wealth from outside the local economy into the region, helping communities to prosper. All of these enterprises have unique goods movement needs, some local, others national or international.

Unlike many areas of the country which have witnessed a substantial decline in manufacturing/industrial employment, the region has experienced some fluxuations, but overall growth in the trade-related sector of the economy during the last 15 years. This has created a need to efficiently deliver the materials needed for production (domestically and internationally) and to cost effectively ship finished products. Manufacturers in the region assemble products from components delivered from around the globe and ship components for assembly internationally. The mobility needed to support commerce in the region is as diverse as the commerce itself.

Manufacturers and shippers from throughout Oregon and Southwest Washington depend on the Portland metro region's warehousing, distribution, logistics, customs and multimodal goods movement infrastructure to move raw materials, semi-finished and finished products. In the summer of 2017, there were more than 92,000 jobs in Transportation, Warehousing, and Wholesale Trade, within the 7 county, Portland-Vancouver-Hillsboro Metropolitan Statistical Area (MSA). In the trade-related sector (includes manufacturing, wholesale, retail, transportation and warehousing) the total in 2017 rises to about 337,000 jobs within the same MSA[6].

These activities are spread throughout the region, with concentrations in Rivergate, the Columbia Corridor, Sunset Corridor, Swan Island, Clackamas-Milwaukee, Springwater-Damascus, inner Eastside, North Wilsonville-Tualatin-Sherwood, Beaverton-Tigard, Beavercreek and Northwest Portland industrial areas.

[6] Current Employment Statistics (CES) Nonfarm data

5.2 Intermodal facilities

In 2016 the ports of Portland and Vancouver hosted nearly 1,000 ocean-going ships. The Port of Portland alone hosted 678 ships that year. These vessels transported 12.7million metric tons of cargo to and from public and private facilities located in the Portland-Vancouver Harbor. Another 6.1 million tons of inland barge cargo also moved through these facilities. In total, $14 billion in foreign trade moved through Portland Harbor in 2016. Much of this cargo is transported beyond the Portland metropolitan area, through key truck and rail corridors.

In addition, the Port of Portland operates the largest international airport in Oregon. It is the hub for the vast majority of air freight activity in the Portland metro region, western Oregon and Southwest Washington. Approximately 231,298 tons of domestic and international air freight shipped through Portland International during 2016.

5.3 Regional Goods Movement

Highway and roads

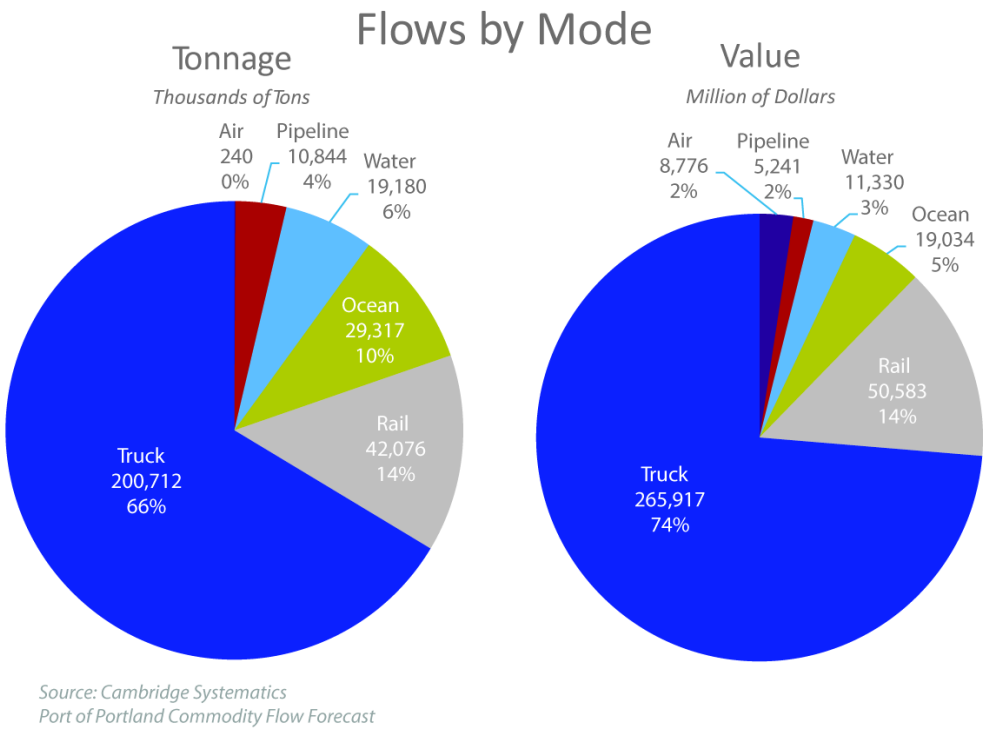
Trucks will remain the predominant mode of freight transport for the foreseeable future, due to their flexibility, speed, adaptability and availability. And though more than 90 percent of total regional truck trips begin and/or end within our region, as much as 52 percent of the total truck traffic entering the region via the interstate system is through traffic[7]. This reflects the importance of

[7] Figures obtained from 4,159 roadside intercept surveys reported as *Task 10, Portland Freight Data Collection Phase II, Final Summary Report* (March 2007) prepared for the Portland Freight Data Collection Team.

our stewardship role for maintaining the through-put efficiency of the interstate freeway system for national freight movement, but also provides a basis for requesting national assistance.

Measured by value, 74% of the commodities traveling in the Portland-region moved by truck. About 14% of the commodities moved by rail.[8]

Figure 19: Commodity Flows by Mode



Maintaining access to, and adequate capacity on, designated freight corridors, and the National Highway System (NHS) within the region will remain critical to efficient goods movement. Performance of NHS roads within the region varies, but there are locations with regularly recurring chokepoints. It is not unusual for these chokepoint locations to experience frequent failures, particularly during peak weekday travel times, greatly reducing overall system efficiency and reliability.

[8] Port of Portland Commodity Flow Forecast, March 2015, using 2007 FAF3 data

Rail

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

Class 1 rail lines[9] operating in the Portland metropolitan area (BNSF Railway and Union Pacific Railroad) have been capacity-constrained due to several long-standing and well documented historical factors. These constraints will worsen as freight volumes at the region's ports and intermodal facilities increase. Capacity chokepoints for the Class 1 railroads in the Portland metropolitan area have primarily centered on the Portland Triangle, located in the industrial/port areas of North Portland and Southwest Vancouver.

Issues in the Portland Triangle area include inadequate siding lengths (Class 1 railroads are now fielding up to 8,000 foot long unit trains), rail bridges with inadequate capacity and lowered sufficiency ratings, at-grade rail crossings, sidings and mainline track sections that are over capacity. Other Class 1 capacity constraints within the region include switch control at the Steel Bridge and inadequate rail and intermodal yard capacity for current and future needs. Outside the region, railcar clearances and increasing weights will need to be addressed, as the Class 1 railroads look to longer trains and heavier carloads to increase their operating efficiency and revenues.

Short line rail operators have taken over many of the local and regional rail functions formerly performed by the Class 1 railroads. Rail car weights are a critical issue for short line railroads. The Class 1 railroads are now considering rail car weights above 286,000 pounds, which will exceed the carrying capacity of many short line tracks in the region. Assisting regional short line railroads with track upgrades could reduce the risk of derailments, a potential public safety issue and certainly a productivity issue for the railroads. It also keeps trucks off the road. The short lines are also having to make-up more trains in their yards, which have limited capacity, before delivering them to the Class 1 rail yards. Assisting short line railroads requires government to show a clear public benefit, since these facilities are privately owned and operated.

[9] Railroads are classified according to their revenue; following decades of decline and mergers, there are now seven Class 1 railroads—constituting largest companies--currently operating in the United States. Class II railroads are also known as regional railroads; Class III includes the short line railroads.

Government and the railroads have historically cooperated to implement rail crossing safety improvements. The Class 1 and short line railroads have multiple at-grade crossings of their lines in the region, limiting train speeds and increasing the risk of conflicts between trains, vehicles, pedestrians and bicycles. Improving, eliminating, or grade separating at-grade crossings improves safety as the number and size of trains increase. Crossing improvements increase rail and road system productivity by helping longer trains clear crossings more quickly. Crossing improvements are the first step in applying for quiet zone status with the Federal Railroad Administration.

Air Cargo

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

Combined air cargo providers generally operate on a hub-and-spoke system, where freight is picked up at airports throughout the country in the early evening, flown back to a central destination to be sorted and then reloaded and flown to its final destination in the early hours of the morning for next day delivery. In order for this system to work, schedules must be maintained. This generally places air freight carriers' trucks on the road during evening peak hour traffic.

While traffic flows on the roadways immediately adjacent to Portland International have improved within the last decade, trucks carrying air freight to the airport during the evening peak hour face increasing congestion on several area highways leading to the airport. I-205, I-84, I-5, I-405 and US 26 all serve locations generating air freight cargo but have failing evening peak hour level of service.

Several traded sector manufacturers within the region are heavy users of air freight. Frequent roadway congestion forces many of these users to move shipping deadlines up, causing firms to lose valuable production time and increasing their production costs. Many shippers in the region were disappointed when direct air freight connections to Asia were lost in 2013 when Asiana Airlines stopped providing cargo service from Portland to Seoul, Korea. Some shippers need to truck their shipments to Sea-Tac or San Francisco International Airports to make their desired connections.

New air cargo service was restored in November 2016, when Cathay Pacific Airlines began to provide twice-weekly service to Portland as part of a route that begins and ends in Hong Kong. Air cargo service is more expensive and generally reserved for high-value, time sensitive and perishable goods. [10] In 2015, air freight carriers moved 228,428 tons of cargo

[10] The Oregonian/OregonLive, July 14, 2016

through Portland International Airport. East Asia markets accounted for just over half of Oregon' air exports (Port of Portland)

In May 2009, Portland International Airport began to implement a project to extend its north runway, as well as a complete overhaul of its south runway. The south runway rehabilitation was completed in 2011. The north runway extension added 1,825 feet to the runway and was completed in 2013 (Port of Portland website – April 8, 2013) With these improvements runway and taxiway capacity at the airport should be adequate to meet the needs of air freight carriers through the next decade, based on recent statements by the Port of Portland.

Marine

Modern commercial navigation of the Columbia River began in 1877, when Congress approved dredging a navigation channel between the Portland-Vancouver area and the mouth of the river in Astoria. Currently, almost 1,000 ocean-going vessels call on the Portland-Vancouver Harbor each year. Navigation channel depth on the Columbia River continues to be the limiting factor on the size, and therefore the number, of ships that call on the Portland-Vancouver Harbor. Channel deepening has been pursued for several decades, balanced by the need to protect various fish stocks migrating on the river.

The ports of Portland and Vancouver, as well as the other ports located along the lower Columbia River, lead the nation in the shipment of grain. They also ship large quantities of other bulk agricultural commodities from Oregon, Idaho and Washington to the rest of the world. The region's ports will still manage to grow by moving a wide range of marine cargoes, such as energy and transportation project related materials, manufactured goods, automobiles, agricultural and mining related products and fuel. The deepening of the Columbia River navigation channel to 43 feet will enable more cargo to flow into the ports of Portland and Vancouver. While still only able to accommodate small to medium-sized container vessels, the new channel depth is not a limit for other cargoes such as autos and bulks. Since completion of the channel deepening in 2010, freight facilities along the channel have completed over $1 billion in investments in new and expanded facilities.

The ports generate significant volumes of truck and rail traffic in the West Vancouver and Rivergate areas. Congestion during peak commute hours adversely impacts these truck movements. Intermittent congestion also impacts the Class 1 and short line railroads serving the area.

Loss of container service at Terminal 6

Marine container service is critical to Oregon and regional shippers. Terminal 6 has served a geographic and community market in Oregon, Idaho and SW Washington. In 2014, Terminal 6 captured 53 percent of the Oregon exports and imports market, with the remaining cargo moving through Puget Sound ports by rail or truck.

The Port of Portland's Terminal 6 lost container service in 2015. Since that time, there has been a great deal of volatility among container carriers, and a change in the operating structure at the terminal. To respond to the changing dynamics, the Port hired a national

consultant team and engaged an industry leader committee to determine the Port's future role in container shipping. This assessment should be complete by early 2018.

Terminal 6 has always been a multi-use facility that can handle oversized project cargo and containers with an on-dock intermodal yard. The terminal is also home to the Port's successful auto business, which includes Ford exports and Hyundai and Honda imports. Large project cargo, such as steel slabs, has previously moved through the terminal. Port of Portland is looking at short term ways to help support the industry get goods to market.

On March 31, 2017, the Port of Portland and ICTSI Oregon terminated their lease agreement at Terminal 6. The Port of Portland is working on a new plan to develop and manage carrier service for Oregon and Pacific Northwest shippers.

Even absent container activity (as is the case today) there is still cargo activity (and related rail and truck traffic) at the terminal. During the life of the RTP we would expect the volume of that activity and the related truck and rail movements to increase.

Pipelines and pipeline terminals

The Olympic Pipe Line Company, operated by BP Pipelines – North America, is a 400-mile interstate pipeline system. The pipeline runs from Blaine Washington to northwest Portland. The system transports gasoline, diesel, and jet fuel. The Olympic Pipe Line transports about 65 percent of the petroleum products that Oregon uses. The pipeline provides approximately 1.9 billion gallons per year to Oregon.

Regional distribution occurs from the tank farm through a Chevron owned pipeline to Portland International Airport and through the Kinder-Morgan pipelines to users and distributors throughout the region. Maintaining good quality access to the tank farm facility is critical, particularly in light of a recent at-grade rail crossing closure on an access road to the tank farm.

The Williams Northwest Pipeline transports natural gas products to northwestern Oregon and Southwest Washington. Northwest Natural Gas operates a private natural gas network that connects to the Williams Northwest Pipeline and radiates through and beyond the Portland metro region. This pipeline network delivers gas directly to end users within and beyond the Portland metropolitan area.

River/ Barges

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

The Columbia Snake River system is a vital transportation link for the states of Idaho, Oregon and Washington. The economies of these three states rely heavily on the trade and commerce that flows up and down one of the most important commercial waterways in the Northwest. River transport of bulk commodities, like wheat, is the most efficient way to move product to and from the ports. In 2014, Oregon exported $209 million worth of wheat, making it the second most valuable commodity export in the state. Approximately 85% of Oregon wheat is exported, largely to Pacific Rim countries.

In addition to wheat, petroleum products, mineral bulks and many more commodities are exported through this trade gateway. More than 4 million tons of petroleum products are received at terminals in Portland each year and approximately half of that volume is barged upriver to inland ports. Oregon is also the top mineral bulk exporter on the west coast and shipped over 5.7 million tons of mineral bulks out of the Port of Portland in 2014.

On the Columbia Snake River system the deep draft channel is 43 feet deep and runs from Astoria to the marine port facilities in Portland (105 miles). In 2015, over 44 million tons of international trade was carried in the deep draft channel. It also carried at least 24 billion dollars in cargo value.

The inland navigation channel runs from Portland/Vancouver to Lewiston, Idaho (360 miles) and is 14 feet deep. In 2014, barges carried over 9 million tons of commercial cargo

on the inland navigation channel. This part of the river represents an important gateway for Northwest wheat and forest products.[11]

Barge operators on the Columbia/Snake River system use equipment specifically constructed to operate in the locks on those rivers, adding significantly to their capital costs. It should be noted, however, that most import and export shippers prefer to use truck and rail for any higher value products moving through the ports.

The primary limiting factors to barge movement in the region are the BNSF rail and I-5 bridges crossing the Columbia River and the maintenance of navigable locks on the Columbia and Snake rivers.

5.4 Goods Movement and Land Use

While the success of the region's economy is directly tied to its ability to efficiently move freight, it is true that freight movement and operations can potentially produce adverse impacts on local communities in the form of:

- increased emissions, noise and vibration, lighting and safety concerns
- impacts to land uses, community access and bicycle and pedestrian movements
- competition for highway and parking capacity
- impediments to visual quality and redevelopment efforts

These concerns are likely to increase over time as freight volumes increase. Many of the typical complaints voiced regarding truck and rail operations could be minimized or avoided with thoughtful and appropriate land use planning, which, like a good fence, makes better neighbors. It's important to note that these types of impacts are not the exclusive domain of freight operations – highways, transit and other transportation systems and services, even hospitals and schools – can engender comparable concerns over impacts to nearby residents.

On the other side, freight carriers and shippers can themselves be impacted when communities seek to restrict access by trucks on certain streets, limit night-time operations, reduce the number of truck loading zones, increase water recreation activities and public access within working waterfront areas, or when communities seek to use a freight railroad's track for passenger rail service. As shippers' supply chain logistics continue to evolve, the definition of "state of the art" warehousing and distribution centers changes as well. Larger, increasingly truck-biased facilities are becoming the new standard.

Certain key regional intermodal rail to truck transfer facilities are quickly reaching their capacity and are constrained by the physical dimensions of their facilities. A regional discussion regarding retaining or restoring rail access into industrial areas should occur

[11] Pacific Northwest Waterways Association - Columbia Snake River System Facts 2016

among the warehousing, manufacturing and distribution sectors, local governments and the short line rail operators.

There has been a demand, at times, for conversion of industrial property to mixed-use residential. This is often incompatible with surrounding industrial operations and freight movement. Appropriate models of residential and commercial development should be planned for truck and rail corridors and areas adjacent to industrial sanctuaries to preserve the effectiveness of truck and rail corridors for industrial and freight use. From the viewpoint of freight carriers and shippers, allowing new, incompatible land uses into industrial areas impedes business operations and access, resulting in higher operating costs, reduced safety and efficiency.

There is often fierce competition for land, a finite resource. Siting, protecting and redeveloping industrial areas for industrial uses is in keeping with the goal of creating and preserving industrial sanctuaries in the 2040 Growth Concept, but managing and balancing competing land uses will continue to be difficult as the region grows. Maintaining reliable multi-modal transport options to our industrial areas is critical, particularly truck and rail connections. Providing rail service is becoming particularly difficult as rail operating practices continue to change rapidly.

CHAPTER 6

TECHNOLOGY FOR SUSTAINABLE FREIGHT TRANSPORT

6.1 Innovation and technology in freight transportation

Vehicle-to Infrastructure (V2I) is the next generation of Intelligent Transportation Systems (ITS). V2I technologies capture vehicle-generated traffic data, wirelessly providing information such as advisories from the infrastructure to the vehicles that inform the driver of safety, mobility, or environmental-related conditions. The State of Oregon and local agencies are likely to install V2I infrastructure alongside or integrated with existing ITS equipment. The majority of V2I deployments may qualify for similar federal aid programs as ITS deployments, if the deploying agency meets certain eligibility requirements. Deploying V2I technologies in freight trucks and the region's roadway infrastructure will be of key importance for improving freight mobility, reliability and safety.[12]

The following definitions of V2I communications deployment help the region better understand how useful different application of connected vehicle (CV) technology will be in improving commodity movement within the next five years (short term):

- **V2I Safety (V2I):** Safety applications that help truck drivers anticipate and respond to potentially unsafe conditions to help avoid incidents and delays.
    - **Curve Speed Warning (CSW)**: Alerts drivers who are approaching curves at speeds higher than the posted advisory speed.
    - **Spot Weather Impact Warning (SWIW):** Warns drivers of local hazardous weather conditions by relaying management center and other weather data to roadside equipment, which then re-broadcasts to nearby vehicles.
    - **Reduced Speed/Work Zone Warning (RSWZ):** Utilizes roadside equipment to broadcast alerts to drivers warning them to reduce speed, change lanes, or come to a stop within work zones.
- **Agency Data:** Applications that focus on communicating agency data to connected vehicles (CVs) or using CVs to collect data that agencies can use to plan and manage the transportation system.
    - **Freight Networks:** Transmits freight network routes and information (speed limit, capacity, etc.) to truck drivers.
    - **Work Zone Traveler Information:** Monitors and aggregates work zone traffic data for transmission back to truck drivers.
    - **Probe-enabled Traffic (Freight) Monitoring:** Utilizes communication technology to transmit real-time traffic data between vehicles and to agencies via roadside equipment.

[12] USDOT – Intelligent Transportation Systems- Vehicle to Infrastructure (V2I) Deployment Guidance

- **Road Weather:** Applications that help truck drivers anticipate and respond to severe weather conditions and events.
    - **Motorist Advisories and Warnings (MAW):** Uses road-weather data from connected vehicles to provide information to travelers on deteriorating road and weather conditions on specific roadway segments.
    - **Weather Response Traffic Information (WRTINFO):** Uses connected vehicle data and communications systems to enhance the operation of variable speed limit systems and improve work zone safety during severe weather events.
- **Mobility:** Applications that enhance mobility, increase efficiency, and reduce delay of freight vehicle travel.
    - **Freight Signal Priority (FSP):** Provides signal priority to freight vehicles along designated freight corridors.
    - **Dynamic Freight Routing:** Determines the most efficient route, in terms of avoiding congestion or minimizing travel time or emissions, for freight vehicles, and transmits this information to truck drivers.
- **Smart Roadside:** A set of applications to be deployed at strategic points along commercial vehicle routes to improve safety, mobility, and efficiency of truck movement and operations on the roadway.
    - **Wireless Inspection**: Utilizes roadside sensors to transmit identification, hours of service, and sensor data directly from trucks to carriers and government agencies.
    - **Smart Truck Parking:** Provides information such as hours of service constraints, location and supply of parking, travel conditions, and loading/unloading scheduling to allow commercial drivers to make advanced route planning decisions.[13]

In the long term (more than five years), the region, state and local agencies will need to acknowledge, monitor, study and plan for the impacts of driverless vehicles, changes in the demand for distribution centers, and the decline in retail stores due to on-line ordering of goods and services.

6.2 Going green

There are at least two variables that every commercial carrier must come to grips with: fuel cost and fuel use. The former frequently dictates the lengths to which a carrier will go to conserve fuel, while the later directly impacts the production of greenhouse gases and particulate matter 2.5 emissions[14]. The goods movement industry is responding to the

[13] FHWA ITS Joint Program Office website

[14] *Particulate matter smaller than 2.5 microns have been shown to affect human health.*

prospect of sustained higher fuel costs and tightening emissions standards. Tools being used to improve power-train operating efficiency and reduce stationary idling of truck diesel engines include:

- clean diesel technologies, more efficient power-trains and improved aerodynamics
- low sulfur and bio---diesel fuels
- on board auxiliary power units
- parking area power and HVAC hook---ups for trucks
- ongoing and innovative operational changes that reduce the carbon footprint of freight

Every operator of commercial vehicles, be they aircraft, marine, rail or truck, has grown increasingly sophisticated at load, route, operator and vehicle optimization in an effort to minimize equipment downtime and maximize profit. Recent increases in the cost of fuel have only intensified efforts to increase operational efficiencies.

Oregon's Clean Diesel Initiative and other efforts to promote clean diesel have translated into benefits for Oregon's freight oriented businesses. Older diesel engines are less efficient and pollute more than newer engines. They use more fuel and require more maintenance. However, upfront costs of replacement are a financial burden for businesses.

The Clean Diesel Initiative provides funds to local businesses in the form of matched dollars, grants and low interest loans to initiate retrofits or diesel engine replacements. This initiative has had the benefits of cleaner air and supporting a stronger economy.

A federal lawsuit settlement requires Volkswagen (VW) to pay $2.9 billion to a trust fund to be distributed to states, the District of Columbia and Puerto Rico. The initial allocation to the state of Oregon, based on registration share of Volkswagen diesels by state, is approximately $72.9 million. The funds are to be used over a ten year period to support a defined list of projects intended to offset the excess air pollution created by Volkswagen's cars.

Oregon's SB 1008 provided authority and initial direction to the Department of Environmental Quality (DEQ) to replace or retrofit at least 450 school buses. Other VW fund eligible mitigation actions depend on further actions in future legislative sessions. When these priorities are identified and authorized, the Mitigation Plan will be amended.

Four hundred and fifty is the estimated number of older diesel buses that would still be in the fleet by 2025 without the funds, which is the state's target year to eliminate polluting diesel school buses. Over the next four years, DEQ will offer funding to school districts to scrap/replace or retrofit exhaust controls until the target of 450 buses is reached.[15]

[15] DEQ Fact Sheet on Oregon's Initial Use for the Mitigation Fund

The public sector needs to complement these efforts by optimizing its own facilities and strategies to gain maximum through-put capacity and efficiency where it matters most. This effort needs to include multi-jurisdictional coordination and ongoing participation from the private sector goods movement community. The challenge of increasing the capacity of the goods movement system while remaining environmentally sustainable will require close coordination and cooperation between the private and public sectors.

6.3 Transportation system management

Several tools are available for transportation system management on the corridor level. These tools include variable message signs, traveler information systems, incident management and response, traffic signal progression, ramp metering and demand (traffic volume) responsive signal timing. Truck signal priority might also be considered in certain situations.

The public sector would benefit by managing its roadway infrastructure with the understanding that roadway capacity is valuable and costly to expand. For example, managing roadway performance through congestion pricing can include electronically charging road users a fee for using a road that might vary depending on changing real-time demand for roadway capacity throughout the day, with higher prices charged at periods of peak travel demand. Market-based road user fees, if properly implemented, can free up scarce road capacity for both passenger and freight needs, and provide revenue for alternative transportation and/or improvements to existing facilities.

Weigh-in-motion scales have been in use for many years, allowing trucks to bypass conventional truck scales, saving time, fuel and wear. Weigh-in-motion systems could be improved through the use of a single, common transponder system for commercial vehicles operating throughout several western states.

Some industrial areas within the Portland metro region have freed up roadway capacity by forming transportation management associations. These associations can facilitate and promote enhanced pedestrian, transit, carpooling and bicycle alternatives to the daily commute. These associations also work with employees to tailor transit services to their work shifts and with employers to facilitate staggered shifts, compressed work weeks and work-from-home programs. These efforts can reduce single occupant vehicle travel within industrial areas during critical peak travel times.

CHAPTER 7

FUNDING FREIGHT TRANSPORTATION NEEDS AND PRIORITIES

7.1 The transportation funding challenge

HB 2017 provides new state transportation resources

HB 2017-10, known as Keep Oregon Moving, was passed by the Oregon Legislature in 2017 and is the largest transportation investment in Oregon's history. It will generate $5.3 billion in total revenue over ten years that will fund various types of transportation projects around the state. About half of the funds will be distributed to local governments to fund local road and street maintenance and improvements, while the rest will be provided to the State Highway Fund to fund different types of projects around the state. For freight this includes:

- Bridges and highways – The majority of the State Highway Funds will go towards repairs and upgrades to bridges and highways to make them safer and more resilient to a major earthquake.
- Connect Oregon program – Connect Oregon will receive funding for multimodal projects, including rail, marine, aviation, and bicycle/pedestrian projects. Two specific projects are included in Keep Oregon Moving to help move freight from trucks to trains, which will decrease freight congestion on highways. However, neither project is located in the Portland region.
- ODOT's State Transportation Improvement Program (STIP)

Portland Region Projects

A portion of ODOT's funding is dedicated to specific projects around the state, with several in the Portland metro region. These projects will primarily address congestion and travel reliability of both passenger and freight vehicles. A description of the projects and their cost estimates are listed below:

- I-5 Rose Quarter ($30 million per year) – I-5 through the Rose Quarter has been identified as one of the most congested bottlenecks in the country. $30 million per year will be taken off the top of the State Highway Fund to add an auxiliary lane in each direction between I-84 and I-405, as well as build new bicycle and pedestrian connections across I-5 and I-84. The project aims to address growing congestion, increase travel reliability for passenger and freight vehicles, and enhance neighborhood connectivity.
- Oregon 217 ($98 million) – ODOT will build new auxiliary lanes south from Beaverton-Hillsdale Highway to Oregon 99W, and north from OR 99W to Scholls Ferry Road. The goal of this project is to address congestion and increase travel reliability.
- I-205 corridor bottleneck project ($15.5 million) – An auxiliary lane will be added on the northbound stretch of I-205 from Powell Boulevard to the I-84 west

interchange. It is estimated that this project will reduce the frequency of crashes by nearly 30%, in addition to providing more reliable travel times.

- I-205 active traffic management project ($15.2 million) – This project will use technology to provide travelers with real-time information on travel times, congestion, crashes, and other hazards. A similar system was implemented on OR 217, which resulted in a 21% decrease in crashes in the first year of use.

Jurisdictional Transfers

Keep Oregon Moving also includes several jurisdictional transfers of highways, with two in the Portland region. These transfers seek to place highways under the jurisdiction which can best control and manage the facilities. The transfers for the Portland region are:

- Cornelius Pass Road between US 30 and US 26 will be transferred from Washington and Multnomah counties to ODOT.
- Powell Boulevard between I-205 and the Portland city limits will be transferred from ODOT to the City of Portland. Keep Oregon Moving also allocated $110 million to upgrade this section of Powell Blvd.

2015 Federal Transportation Bill (FAST Act)

The current federal transportation act (2015) specifically addressed freight movement and provided federal money to the states along with federal grant opportunities to fund freight and goods movement projects.

The FAST Act, signed into law in December 2015, authorizes more than $305 billion in transportation investments over fiscal years 2016 through 2020. It builds upon Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012. There are three primary goals of the FAST Act: Improve mobility on highways; create jobs and support economic growth; and accelerate project delivery and promote innovation. Highlights from the bill and its impacts to Oregon include:

Highway Funding – Oregon will see a five percent increase in transportation funds as a result of the Act – rising from $482 million per year to $507 million in FY 2016, and then rising two percent each subsequent year.

Freight Funding – Two new programs were created for planning and funding of freight mobility projects:

- **National Highway Freight Program –** Provides a new annual funding stream to states to address freight projects on the national highway system. In the first year of the program, ODOT received $14.5 million, increasing to $19 million by FY 2020.
- **Nationally Significant Freight and Highway Projects Program –** Funds a new competitive grant program to fund large freight and highway projects, and is referred to as the Fostering Advancement in Shipping and Transportation for the Long-term Achievement of National Efficiencies or FASTLANE program. This

program was authorized at $4.5 billion for years 2016 through 2020, with $800 million for FY 2016 to be awarded on a competitive basis. MPOs, local governments, ports, and tribal governments are all eligible to apply for these funds. Large projects must cost a minimum of $100 million, and the federal grant funds can make up a maximum of 60 percent of the total cost. However, ten percent of the program budget is set aside for smaller projects, as well as multimodal projects. Large projects are eligible for a minimum award of $25 million, and small projects, which are below the minimum large project threshold, are eligible for a minimum award of $5 million.

Surface Transportation Program – The Surface Transportation program is changed to the Surface Transportation Block Grant Program (STBGP) under the FAST Act. Accordingly, there are two updates:

Increased local funding for large regions – Regions with populations over 200,000 will see an increase in the availability of funds from the STBGP from 50 percent at present to 55 percent over the course of the five-year bill.

Transportation Alternatives – Transportation Alternatives funds bike, pedestrian, and demand management projects. Previously a standalone program, Transportation Alternatives is now placed in the STBGP.

Public transit – Oregon saw a five percent increase in federal transit funding, receiving $98 million in FY 2016. The Buses and Bus Facilities Competitive Grant program was reinstated under the FAST Act.

Surface transportation system funding alternatives – A new competitive grant program, was funded at $15 million in FY 2016, and was created for states and multi-state groups to explore alternative funding mechanisms for the Highway Trust Fund (HTF). Currently funded primarily through the gas tax, the HTF is seeing reduced revenue as the fuel efficiency of vehicles has increased. The grants require states and multi-state groups to demonstrate a user fee based funding structure that maintains the long-term financial health of the HTF. Oregon was awarded nearly $5 million for two grants in FY 2017 to improve the state's innovative per-mile road usage charge program and launch a pilot of the program in partnership with the State of California.

Funding sources

The following funding sources are currently available to the region.

Federal funding sources or programs (FHWA programs, unless otherwise noted):

- **Surface Transportation Block Grant (STBG) Program** (decisions on which projects are allocated funds are made at the regional level)
- **National Corridor Infrastructure Improvement Program** (decisions on which projects are allocated funds are made at the regional level)

- **Congestion Management and Air Quality Improvement Program**
- **Transportation Infrastructure Finance and Innovation Act (TIFIA)**: Allowed the creation of state infrastructure banks through a federal credit. This is federal credit assistance for highway, transit, passenger rail, some freight rail, intermodal facilities, and some modernization to port terminals.
- **Freight Intermodal Distribution Pilot Grant Program:** This program is for intermodal projects that relieve congestion, improve safety and facilitate intermodal trade.
- **Railway-Highway Crossing Program:** Elimination of Hazards and Installation of Protective Devices at Rail-Highway Crossing
- **Maritime Administration (MARAD)**: Marine Highway Grants potentially support projects at marine terminals on the Columbia and Willamette Rivers. Projects need eligibility for funding by being included on a designated project list. MARAD also funds shipyard improvements with Small Shipyard Grants.
- **Army Corps of Engineers (ACOE):** Columbia River channel maintenance is administered by ACOE. The Port of Portland maintains the channel navigation and gets reimbursement from ACOE.
- **Federal Aviation Administration (FAA):** Airport Improvement Program Grants provide funding for runway construction and rehabilitation, taxiway construction and rehabilitation, airfield improvements (lighting, signage, etc.) and other airport capital improvements.

State funding sources

The following list of funding sources is generally administered through ODOT:

- **Oregon Gas Tax/Vehicle Registration Fees**.
- **Oregon Weight Mile Tax:** Charged to trucks weighing over 26,000 pounds, the tax is the primary source of tax revenue raised by trucks in the state. Weight Mile Tax receipts are primarily directed at roadway maintenance and system preservation efforts throughout Oregon, with a smaller amount allocated to administering the program.
- **Oregon Energy Income Tax Credit:** The Oregon Department of Energy offers a tax credit for businesses that invest in reducing energy consumption. Under this program transportation projects that reduce the number of single-occupancy vehicle trips are eligible for the credit. The credit covers up to 35 percent of eligible project costs.
- **Connect Oregon**: Funded through lottery proceeds, this effort has focused on projects that enhance intermodal connections and improve freight mobility for several modes, including aviation, marine and freight rail.

- **Immediate Opportunity Fund:** The purpose of the Immediate Opportunity Fund (IOF) is to support primary economic development in Oregon through the construction and improvement of streets and roads. One of IOF's project types is specific to funding"preparation of regionally significant industrial areas" (type D).[16]

The Connect Oregon program has shown that government and the private sector can collaborate successfully. These programs have delivered tangible benefits to freight movement within the Portland metro region and the state. The program has proven particularly useful in funding much needed projects for off-highway modes. Dedicating the loan revenues from the Connect Oregon program into a revolving fund could help the program be more self sustaining.

Local funding

Local jurisdictions within the region have local funding sources such as gas tax, parking fees and system development charges. These funds are not specific to freight projects, but help build and maintain the overall system, including the regional freight network.

Funding history

Prior to the increase from federal and state tax bills, revenue for transportation was in decline for many years.

Nationally, funding for transportation projects has become scarce. The need to replace aging transportation infrastructure and expand facilities in areas of the country experiencing growth has exploded. The private sector portion of the goods movement community has been making great strides in adopting sustainable technologies and wringing efficiencies out of their respective portions of the goods movement system. The public sector must also effectively weigh policies, programs and investments to achieve the maximum benefit for the goods movement system, particularly during a time of uncertain funding for transportation.

Accounting for inflation, public sector funding for transportation infrastructure, particularly targeting freight movement, had diminished across the United States over time. Even with recent federal recovery efforts and state legislation, competition for available funds will increase, and most road funds are likely to be funneled into critical safety projects. For most of the first decade of this century, the cost of construction materials had risen significantly on the global market, greatly increasing the cost to construct infrastructure improvements. Simply put, costs to construct improvements having been trending upward rapidly, while available revenues to pay for them had been declining. Deferred maintenance and delayed projects have cost individuals and businesses in terms of lost time and opportunities, increased vehicle wear and tear and threatened or lost jobs. The prior lack of investment in the US transportation infrastructure has weakened our ability to compete globally against China, India and the European Union, all of which are investing heavily in transportation.

[16] ODOT Immediate Opportunity Fund Policy Guidelines – March 19, 2015.

The successful implementation of any programs or projects in these times requires coordination at all levels of government with the business community to address the immediate and long term freight transportation funding needs.

CHAPTER 8

FREIGHT ACTIONS

8.1 Linking Freight Policy and Issues to Investments and Action

This chapter includes a "tool kit" of freight actions that respond to a broad range of needs and issues clustered around the seven policies in Chapter 3. Chapter 8 constitutes the regional freight action plan.

Many of the actions described are foundational activities that hold the regional freight action plan together – planning, coordinating, research and policy making, and take place on both an ongoing and cyclic basis. The current list of efforts will need to find staff, time and funding resources, whether that includes Metro, members of the freight, goods movement and economic development community, or other agencies or organizations. The 2010 Regional Freight Plan had a longer list of freight action items that has been winnowed down into a smaller selection of important, achievable near---term actions, and a few long term actions that will require additional scoping and determining the availability of staff time. The near-term action items should be achievable within the next 5 years and the long-term actions would take longer than 5 years.

Achievable near-term action and long-term action items are included and recommended for implementation to support the approved regional freight and goods movement policies. Each of the freight action items is associated with one of the seven regional freight and goods movement policies (Policies 1 to 7).

The 2018 RTP Freight Projects and Programs are included in an appendix to this freight strategy and are also included by reference as part of Action 6.1

8.2 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

This policy, as well as its related actions, speaks to Metro's mission as the metropolitan planning organization for the Portland metro area. Actions described below will give us better freight and goods movement data and will guide planning efforts to ensure that freight considerations are in mind, and to implement a multimodal plan that facilitates freight movements required for a vibrant regional and state economy.

Near-term Actions:

- **1.1:** Better define, preserve and enhance freight function in mobility corridors - In general, the freight mobility function is addressed as part of the regional mobility corridors. Define, preserve and enhance the freight function of the freight network within individual mobility corridors by evaluating deficiencies. Address freight operational needs on the regional freight network with project improvements in

freight corridors that should ensure continued freight access and mobility as a primary outcome.

- **1.2: Maintain private sector cooperation with Metro's planning and technical coordination, and with goods movement policy.**
    - Areas where the private sector and government agencies could provide value to Metro include:
        - Implementation of the Regional Freight Strategy
            - Review, assist, comment, contribute and/or lead various elements of the action plan
            - Contribute to future freight strategy refinements and updates
    - Regional planning efforts
        - System planning, modeling and analysis
    - Freight access/industrial land aspects of land use planning
        - Input into selecting and carrying out regional corridor refinement plans
        - Metropolitan Transportation Improvement Program (MTIP) funding and project selection processes
        - Provide input into ConnectOregon criteria and selection
        - Development of analytical tools, data bases, performance measures and policies
        - Prioritization of investments and projects with a freight and economic development perspective
        - Metro's freight program staff will participate on effective local, state and national freight---relevant organizations, such as the Portland Freight Committee, the Columbia Corridor Association, ODOT's statewide freight planning group, and the Oregon Freight Advisory Committee
        - Assisting localities with transportation system plan (TSP) freight components
    - Freight and goods movement, jobs and economic development
        - Develop policy and business support for transportation funding initiatives, including possible fees or pricing strategies
        - Define economic development context and goals for freight and goods movement policies and investments

        - Support for broad regional prosperity and environmental justice with an economic development strategy
    - Sustainability
        - Greening freight and industry while promoting sustainable jobs and economic growth
        - Greenhouse gas and other environmental impact reduction strategy development
    - Public education and stakeholder engagement
        - Feature freight issues in periodic Regional Snapshots and the Snapshot speakers series (as defined in Action 3.2)

- **1.3: Continue baseline freight and goods movement data collection and reporting activities**

    - Keeping current in an environment that is volatile, in an era which is increasingly unpredictable, is as challenging as it is essential. This recommended action ensures needed support for ongoing data collection and necessary expansions to existing efforts, such as PORTAL, ensuring updates to the commodity flow forecast, continuing to seek more detailed freight and goods movement flow data at the regional level, etc. Freight and business stakeholder interviews should be held periodically to provide early detection of problems and opportunities affecting the flow of goods and our regional economy. Collecting data sufficient to support other tasks, enabling the region to assess a wide variety of outcomes, including jobs creation, value/tons moved, economic impacts, cost of delays, emissions, energy use, neighborhood impacts and others associated with freight movement. In addition, new goals and programs for greenhouse gas reduction, and a regional congestion pricing pilot program, will change regional data needs.

- **1.4: Coordinate research, modeling and planning with Oregon Department of Transportation (ODOT)**

    - Coordination with ODOT is sufficiently important to be called out specifically. All efforts in recommendation 1.4 should include ODOT as a partner. Metro staff will work with ODOT's freight planners and the Washington Department of Transportation to consult and coordinate with respect to the statewide freight plan as well as periodic updates to the National Highway System/National Network freight designations.

Long-term Actions:

- **1.5: Develop and conduct freight and goods movement research program**

    - In general, freight is a less well understood component of the regional transportation system; many regions are struggling to improve and integrate such tools as basic freight data, performance measures and analytic and modeling tools. The Regional Freight Strategy distinguishes between the specialized needs for moving industrial/agricultural commodities through and beyond the region and the day-to-day needs of urban goods movement within the region's mobility corridors and 2040 centers. Yet this distinction requires the use of analytical tools which can shed light on those two categories of goods movement within our region. It also requires close coordination between Metro and ODOT.

In order to develop and/or refine freight---relevant analytical tools that can help Metro and its partners better predict, manage and invest for freight and goods movement; these elements of a research program should be considered:

- Continuing to develop the regional freight model
- Developing explicit linkages between improvements to freight components of Metro's regional model and the Oregon statewide model, focusing on enhancing the regional distribution component
- More fully incorporating freight trip time reliability performance measures into Metro's transportation and land use planning and project prioritization criteria.
- Finding and evaluating solutions for reliability and economic impacts for the next RTP update
- Exploring multiple data sources on the impacts that on-demand delivery (via Amazon, FedEx and other home deliveries) is having on transportation demand, and identifying ways to keep goods moving efficiently
- Seeking funding for desired elements of a research program through existing and new programs, as appropriate

8.3 Policy 2. Manage first-rate multi-modal freight networks to reduce delay, increase reliability, improve safety and provide shipping choices

This category comprises 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.

Near-term Actions:

- **2.1: Assess need to develop and fund better incident management and traveler information**

    - Real---time travel information (focused on truckers) to avoid incidents and find detours is increasingly important, particularly to improving reliability performance. Incident clearing resources and regionally coordinated efforts to manage incidents must be sufficiently funded. This action item would direct attention on deficiencies to be addressed.

- **2.2: Continue support for use and expansion of ITS system management tools**

    - Begin to address need for 24/7 congestion mapping for the multimodal freight system, among other needs. Support PORTAL's program of real---time traffic delay; provide GPS active (in cab) truck route management, electronic routing and signage.

- **2.3: Support workforce access to the region's industrial jobs through Metro RTO/TDM programs**

    - The regional freight work group recognizes the need for Metro's transportation demand management programs and supports non---auto mobility choices for workers to get to their jobs. If options are limited in certain industrial areas, deficiencies will be highlighted for the region to address. Efforts to improve alternative transportation options for workers will include partnering with TriMet and other service providers to ensure adequate transit service frequency and good access to high employment areas.

Long-term Actions:

- **2.4: Identify key mobility corridors for testing and development of Connected Vehicle (CV) infrastructure and other ITS strategies**

    - Key mobility corridors for testing would be identified by the freight functions of roadways within the corridors and the truck usage of those roadways. Coordination with the state, counties and cities would be required to develop which types of CV infrastructure would be used, and for the selection of a few key mobility corridors and roadways for testing and implementation. The testing will include an analysis of the types of changes to the infrastructure and the types of trucks impacted. Metro will monitor developments in, and the impacts of implementing

connected vehicle technology to inform future freight planning efforts and to maintain our competitiveness in goods movement .

8.4 Policy 3. Educate 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 help the public and elected officials make wiser land use and transportation decisions, a program of public education is required.

Near-term Actions:

- **3.1: Establish stakeholder outreach program**

  - Make use of an ongoing relationship with the freight community to provide topical and informative briefings to Metro's various audiences. The Portland Freight Committee and the Oregon Freight Advisory Committee (in which Metro participates) are the current groups to provide outreach to. Metro will provide additional outreach to the broader freight community, along with outreach to MPAC, JPACT and interested elected officials.

- **3.2: Provide support for topical fact sheets, and other published media that expands awareness of freight issues**

  - The Regional Snapshots are a series of quarterly web publications that provide readers with an approachable, engaging "State of the Region" update on a major topic of interest, such as jobs, housing, transportation, or the economy. The Snapshot tells the story of greater Portland through interactive charts, graphs, personal stories, interviews, videos, and profiles of places across the region.

    The Snapshot Speaker Series is a complement to the online Snapshot that dives deeper into the issues discussed in each edition. They feature topical experts from across the nation who can share best practices and lessons learned with our local policymakers and other stakeholders, and can be any of a wide range of formats including walking tours, panel discussions, and workshops.

    The Regional Snapshot program will be used to provide a spotlight on freight issues with periodic web topics and speakers. A key topic to articulate better is the link between freight and goods movement investments and environmental justice (reducing hot spot congestion and pollutants) and economic equity (good, family wage jobs in one of the few sectors that do not always require higher education). Freight

planning and presentations should be provided regularly so the public can stay informed on freight needs and issues.

- **3.3: Coordinate with Economic Value Atlas work which includes the economic development community**

    - Metro will continue to reach out to the economic development community, including the Portland Business Alliance, the Columbia Corridor Association, West Side Economic Alliance and others. Metro staff will work with these partners, and the Economic Value Atlas program, to support an economic development strategy for the region that is coordinated with infrastructure investment that supports freight, transit, equity and other economic issues.

8.5 Policy 4. Pursue a sustainable, multi-modal freight transportation system that support the health of the economy, communities and the environment through clean, green and smart technologies and practices

This category of issues and solutions 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 greenhouse gas curtailments.

Near-term Actions:

- **4.1: Provide useful "green freight" links from Metro's freight program webpage**

    - This would be a web resource that could provide information on best practices in sustainable freight, and direct our regional stakeholders to useful local, state and national programs and resources. This web resource would help identify what emission and greenhouse gas reductions can be expected from regional freight and goods movement activities. This action would be covered under Metro's Regional Snapshot program web page.

- **4.2: Pursue greenhouse gas and other pollutant reduction policies and strategies for freight**

    - Explore how local government and private industry can collaboratively reduce the emissions produced by trucks and still have shippers and freight carriers meet their customer's needs. Research into this action should identify strategies, projects or programs that best meet transportation, safety and air quality goals that are synonymous with efficient goods movements. Metro will work with DEQ and other

regional partners to explore and define potential environmental benefits in the following areas:

- Procedures for measuring greenhouse gas impacts of freight and evaluating the net greenhouse gas impact of freight projects
- Programs, policies and projects for cost-effective net reduction of greenhouse gas and other pollutants, such as industrial symbiosis (businesses sharing resources and possibly using neighbors' waste products in their processes), incentives for zero/low emission delivery vehicles and alternative fueling stations, public/private urban consolidation centers, off-hours delivery programs; and
- Leveraging and possibly expanding diesel retrofit programs, and promoting idle reduction regulations, etc.

  Note: Metro staff will be asking the Oregon Department of Environmental Quality (DEQ) to take this action as part of their work program.

8.6 Policy 5. Integrate freight mobility and access needs into land use and transportation plans and street design to protect industrial lands and critical freight corridors with access to commercial delivery activities

Jobs are an important element of quality of life for the region. With that fact in mind, this category 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.

Near-term Actions:

- **5.1: Continue to implement land use strategies to protect existing supply of industrial land**

  - Staff will identify lessons learned from previous efforts in the region and look at the most effective ways to protect high-value industrial land and prioritize and protect the value of freight investments to serve such areas. Protecting existing industrial land is part of the Urban Growth Management Functional Plan. This action will also focus on the economic impacts of failing to preserve and serve industrial lands. This will be tied in with Action 3.3, above.

- **5.2: Provide a freight perspective to the revision of Metro's 'Creating Livable Streets' design guidelines**

    - Moving and delivering goods is a key function of the region's highways and streets. Integrating freight and goods movement into our livable communities as they develop, will require special roadway design considerations.
    - As Metro updates its latest edition of "Creating livable streets: Street design guidelines for 2040", Metro will address the recommendations in the "Truck and Street Design Recommendations Technical Report" (May 2007). The update will coordinate with regional stakeholders to ensure that design guidelines on regional intermodal connectors and other key freight roadways keep in mind freight considerations.
    - Metro will ensure appropriate freight and goods movement representation on the technical work group that will provide input on the revision of the guidelines.

Design Elements and Consideration for Freight

To be completed later.

Long-term Actions:

- **5.3: Examine need for additional industrial land and the availability and readiness of industrial lands**

    - The region must ensure a continued adequate supply of appropriate industrial land. In addition to internal coordination between Metro's planning and land use staff, and coordination with local jurisdictions and industry sectors, an understanding of how cities and counties have been successful in maintaining and improving the availability and readiness of industrial lands will be pursued. Metro currently tracks the availability and readiness of industrial tracks in the region that are 25 acres or larger, through the Regional Industrial Inventory Project.

8.7 Policy 6. Invest in our multi-modal freight system, including road, air, marine and rail facilities, to ensure that the region and its businesses stay economically competitive

This category of solutions focuses on planning and building capital projects and developing the funding sources, partnerships and coordination to implement them. It includes the list of regional freight project priorities attached as Appendix B to this report, identifying a wide range of projects from preservation and maintenance to major facility construction.

Near-term Actions:

- **6.1: Work toward implementation of the RTP freight priority projects**

    - Advocacy for the prioritized list of regional freight projects within the approved RTP project list will be needed. This will include supporting funding needs and initiatives to build desired projects. In general, consistent with the message presented throughout this action plan, major investments for freight---oriented preservation, management and "build" projects should focus on:

        - Carefully evaluating what, where and when the freight problems occur (noting, e.g., that they do not always coincide with the commute peaks)
        - Addressing core throughway system bottlenecks with substantial freight impacts, to improve truck mobility in and through the region. Examples include the Columbia River Crossing, the I-5 Rose Quarter, I-205 South and Highway 217.
        - Improving and protecting the throughway interchanges that provide access to major industrial areas, particularly: I-5/Marine Drive and I-5/Columbia Blvd serving the Columbia Corridor and Rivergate industrial areas, I-205/OR 212 serving the Clackamas and Milwaukie industrial areas, and I-205/Airport Way serving Portland International Airport and east Columbia Corridor industrial areas
        - Improving arterial connections to current and emerging industrial areas
        - Ensuring safe transport of hazardous loads with a regional routing strategy
        - Looking beyond the roadway network to address critical marine and freight rail transportation needs such as maintenance of the Columbia River channel and upgrading main line and rail yard infrastructure

- **6.2: Strengthen the tie between project prioritization and the framework for freight performance**

    - Metro recognizes that, while autos and trucks must share the same network, auto trips can more easily be diverted off the highway system via a number of satisfactory existing or planned alternatives, including high capacity transit, a supporting bus network, and regional and corridor bicycle and pedestrian systems in various stages of

completeness. Thus, the dependence of trucks and truck-related commerce on the regional freight network should be recognized as a factor in roadway project prioritization. This action item relies in part on improving the understanding and rigor of freight-related performance measures within Metro's modeling protocols: are we measuring what is relevant to know about freight? In addition, this action depends on technical staff and the freight/jobs/economic development community's ability to articulate fact-based net benefits of strategic goods movement and business-friendly investments and to compete effectively for regional dollars and attention within the decision-making structure of their respective local jurisdictions.

- **6.3: When appropriate, focus regional funds on large capital projects**

  - Based on solid performance measures and other indicators of need and effectiveness, fully vetted through regional planning processes, it makes sense in some cases for the region to focus its funding on one large project. Examples are the throughway system bottleneck projects listed in Action 6.1.

- **6.4: Make strategic incremental improvements when large capital projects are unfunded**

  - When funds are not available for major system improvements, make incremental improvements to those facilities through less costly strategies using tools such as intelligent transportation systems, transportation system management and transportation demand management. Also, phase larger improvements, or ensure that projects move along through completing preliminary engineering, right-of-way acquisition or other steps toward construction.

- **6.5: Ensure that unfunded freight projects are on an aspirational or strategic RTP project list**

  - The region should be prepared to ensure that unfunded projects could at least be considered if unusual, one-time, or new funding sources become available.

- **6.6: Develop regional freight rail strategy**

  - Many hopes are pinned on the potential for regional freight rail to accommodate a greater share of the future demand for goods movement capacity. However, there is a lack of depth in understanding from an operational or investment perspective how that potential could be realized. For example, the I-5 Trade and

Capacity studies indicated that there was adequate capacity for the existing level of passenger train frequency along the north/south corridor. However, that capacity would be at the expense of freight train operations for both UP and BNSF region-wide, creating hot spot congestion, minimizing the possibility of growing freight rail commerce and degrading freight rail service throughout the Pacific Northwest; resulting in more trucks on the region's highways. The Portland metro region is committed to a variety of passenger rail modes and must reckon with the interactions with the freight rail system.

In addition, regional demand and support for pedestrian and bicycle trails, frequently puts pressure on existing freight rail capacity and operations. Issues of freight rail capacity, liability, safety, cost and efficiency must be balanced with other regional goals, based on common factual understanding of the underlying issues.

This action calls for a consultant-assisted technical regional rail study that would provide a foundation for developing the policy framework described earlier, and could incorporate that work as part of the study. Development of the strategy could include evaluation of public ownership and control of current or potential future passenger rail routes within the region or state, as part of a regional freight management strategy.

In addition to Metro's local jurisdictional partners, Class 1 railroads, the regional short line operator, TriMet, ODOT Region 1, ODOT Rail Division, the Ports and major shippers/customers would be critical stakeholders.

Long-term Actions:

- **6.7: Develop policy and evaluation tools to guide public investment in private freight infrastructure, focused on rail projects**

  - When staff capacity allows, more clearly define private and public sector roles, including incorporation of the identified state role in freight infrastructure planning and investment that is emerging from the statewide freight planning effort. This planning and analytical effort would answer the question "what are we trying to do with our freight investments?" And it would yield practical and usable performance measures and investment guidelines for public development of freight assets or services, when they are wholly or partially private. It would also help to correctly phase developments, based on public benefits, and identify equitable funding strategies. Rail/roadway grade separation

projects and a short-line investment strategy could be key focus areas for such policy development.

- Public investment could be appropriate, for example, when it:
  - Leverages private investment
  - Allows progression of a needed project that would otherwise not occur for a relatively modest investment
  - Involves a facility's yard or terminal but has regional impacts
  - Pays for intermodal links
  - Creates new passenger capacity by solving freight bottlenecks
  - Preserves or creates jobs, generates wealth and taxes
  - Allows for more competition, modes or choices to shippers, businesses or consumers
  - Increases overall benefits more than it improves any single mode or facility

Note: private investment in public infrastructure—apart from development fees—should also be part of this policy discussion.

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

Near-term Actions:

- **7.1: Promote and advocate with the cities and counties for the implementation of truck side guards on large freight trucks providing public services (i.e. sanitation and recycling), consistent with USDOT specifications.**

  - Side guards are safety equipment used on large trucks to reduce fatalities and major injuries with side impact crashes. Large cities across the United States are identifying side guards as a proactive way to provide a safer atmosphere for cycling and walking next to large trucks within increasingly dense urban areas.
  - City of Portland Bureau of Planning and Sustainability has committed to coordinate a pilot project to install side guards on 18 sanitation

(garbage) and recycling trucks operating in Portland. As of November 2017, the city had overseen the installation of side guards on three trucks.

- Metro will work with the City of Portland Bureau of Planning and Sustainability to promote the completion of the pilot project, and consider expanding the project to more sanitation and recycling trucks. Metro will advocate for the city to consider a program that eventually begins the installation of side guards on all large trucks that the city has control through licensing and franchises for city services. Metro may also consider a pilot project like the one at the City of Portland for the large trucks that handle the Solid Waste Disposal and Transportation services from Metro's two transfer stations to one or two landfills outside the region.
- Metro will reach out Clackamas, Multnomah and Washington counties, and other larger cities in the region to see if there is interest in starting pilot projects to install side guards on large sanitation and recycling trucks operating within their jurisdiction.

- **7.2: Develop design guidance for identifying and prioritizing improvements to regional intermodal connectors that should have bike and pedestrian facilities that are separated from the roadway, and other design treatments to enhance the safety of non-motorized modes.**

  - As Metro updates its latest edition of "Creating livable streets: Street design guidelines for 2040", Metro will coordinate with regional stakeholders to identify design guidelines on regional intermodal connectors and other key freight roadways that enhance the safety of non-motorized modes (see Action 5.2).
  - Due to the volume and size of trucks on the regional intermodal connectors, the design guidance will likely be separation of the bike and pedestrian facilities from the roadway and parallel roads or alternative routes that are separate from the intermodal connector to enhance safety.
  - Once the design guidelines on regional intermodal connectors and other key freight roadways have been established, Metro will develop criteria for identifying which of these freight roadways has the greatest need for improvements that enhance safety for non-motorized modes. Potential criteria could include a history of locations with serious crashes, the number of daily trucks, the percentage of truck traffic, number of daily bike trips, number of daily pedestrian crossings at key intersections, and proximity to schools and other facilities that generate bike trips and pedestrian activity. Once the

freight roadways and intersections with the greatest needs are identified, Metro would coordinate with the counties and cities to develop multimodal freight safety projects that would be included in the Regional Transportation Plan. Projects that enhance the safety of bicyclist and pedestrians could include off-street multi-use paths, or truck aprons and other intersection safety improvements.

CHAPTER 9

IMPLEMENTATION

9.1 Implementing Adopted Freight Plans

In addition to regional policy and program development and implementation, concrete freight related projects must be built when they are needed, to ensure that the goals of the Regional Freight Strategy are met.

9.2 RTP Freight Projects and Programs

Appendix A is a list of all 2040 RTP Freight Projects that were nominated by ODOT, the Port of Portland, the counties of Clackamas, Multnomah and Washington, and the cities within the region; as part of round 1 of the RTP call for projects. Freight projects are defined as all those RTP projects with an investment category of 'Freight' or 'Throughways', and some of the 'Roads and Bridges' category. 'Throughway' projects are considered to be freight projects since they are on the interstates and state highways within the region, and are also the main roadway routes on the Regional Freight Network map. Under the 'Roads and Bridges' category, freight projects are on facilities that are on the Regional Freight Network map, or are projects that provide freight access to intermodal facilities and/or industrial areas. The Regional Freight Work Group reviewed the investments under 'Roads and Bridges' to ensure the projects met the criteria for being a freight project.

(This section will be completed after the completion of round 2 of the RTP call for projects)

9.3 Freight data collection and analysis

Portland State University's Intelligent Transportation Systems Laboratory has begun a project to produce truck travel time estimates using the transponder information from ODOT's Green Light weight---in---motion system. The system can supplement Trip-check's traveler information system as well as help calculate key freight measurements by linking the other data collected by the weigh stations to the travel time estimates. The ITS lab at PSU houses and maintains the Portland Oregon Regional Transportation Archive Listing. PORTAL collects data from all of the in---bed loop detection sensors in the Portland area as well as free floating dynamic sensors that can be placed in TriMet buses or other vehicles. The archive also collects weather and incident reports, all of which can be accessed in a variety of methods to help monitor and evaluate traffic improvements and patterns.

Commodity Flow Forecast (Port of Portland)

Metro has deployed commodity-flow based truck models for almost 20 years. These models have utilized federal data on national and international commodities movement based on the Freight Analysis Framework (FAF) that informed Metro and the Ports of Portland and Vancouver. The FAF is produced through a partnership between Bureau of Transportation Statistics (BTS) and Federal Highway Administration (FHWA), and integrates data from a

variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all freight modes of transportation. The current model is based on FAF3, which utilized data gathered from the 2007 Commodity Flow Survey (CFS), together with data from several other sources.

The Port of Portland Commodity Flow Forecast was developed and completed by Cambridge Systematics in 2014 and 2015. The overall purpose of the Commodity Flow Forecast was to develop a commodity flow database that used the FAF3 data and produce a future forecast that is sensitive to the unique commodity movements within and coming out of the Portland-Vancouver Region. The region consists of six counties: Clackamas, Columbia, Washington, Multnomah and Yamhill in Oregon, and Clark county in Washington. Several other sources for regional commodities movement unique to the Portland-Vancouver Region were also uses for the forecast.

The Port of Portland Commodity Flow Forecast produced a set of 2007 base year data. The inputs to the base year volumes of commodities were adjusted for auto imports and waste and scrap material, based on available local data. Flows of commodities by direction (inbound, outbound, and within the region) were identified for both tonnage and value. Flows of commodities by trade type (domestic, imports and exports) were also identified for tonnage and value. The top domestic, import and export commodities were also identified for tonnage and value. The top domestic products by value are electronics at 11%, mixed freight (restaurant supplies, grocery food and supplies, and office supplies) at 9%,, machinery at 9%, gasoline and other fuels at 8%, and motorized vehicles at 8%. The top imported products by value are motorized vehicles at 32%, gasoline and other fuels at 13%, and machinery at 10%. The top exported products by value are cereal grains at 14%, other agricultural products at 9%, machinery at 9%, motorized vehicles at 9%, electronics at 8%, and transportation equipment at 8%.

The Commodity Flow Forecast also produced a set of 2040 future year data. Adjustments were made to future volumes for cereal grains, auto imports non-metalic mineral products and precision instruments based on more localized forecasts that are more accurate. Flows of future commodities by direction and by trade type, with growth rates, were calculated for 2040 by both tonnage and value.

Economic Value Atlas

In 2017, Metro initiated efforts in support of economic development activities by working together with key partners and stakeholders to develop an Economic Value Atlas (EVA). The EVA will provide tools and analysis to better align planning and public investments to strengthen the regional economy. It will provide a picture of the regional economy that will be used to align and help inform future investment decisions by defining outcomes that will support the economy across the region. Economic data in the EVA can also help identify future investment areas, where regional attention can support local partners to establish needed infrastructure, strategies, or policy changes to create beneficial economic outcomes.

This project will provide a solid data foundation for key regional activities such as:

- Defining potential areas for partners to collaborate and develop shared investment strategies in support of economic and workforce development.
- Providing a data driven 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.
- Pin-pointing areas of focus for regional investment, to bridge local and regional economic development aspirations.
- Outlining a path to pursue policies, actions and investments that help secure these outcomes.

A set of desired regional principles specific to economic outcomes for people, businesses, and places are being identified by the Economic Value Atlas Task Force. The Task Force includes economic and workforce development organizations, industry sector representatives, social equity focused organizations, and organizations representing interests across multiple types of infrastructure ; creating a broad base of partners interested in building an inclusive regional economy. A technical work-group has been formed to establish quantifiable criteria and a method to visually exhibit economic conditions among communities across the region, to understand how infrastructure investment, land use strategies, and business or workforce development activities may be targeted to advance desired economic outcomes locally and regionally.

New Regional Freight Model

The new Metro Freight Model is designed to replace the current trip-based truck model previously developed. The model simulates movement of individual shipments throughout the supply chain, including both direct shipments and shipments traveling through transshipment facilities. Shipments are allocated to trucks of various classes, and the movements of all freight vehicles are simulated over the course of a typical weekday. The freight model development project included an array of participants including Metro, the Oregon Department of Transportation (ODOT), the Port of Portland, and local agencies throughout the region.

The freight model development project was completed in February of 2018. Since completion of the project did not occur until early 2018, the new Metro Freight Model has not been used for any of the regional freight system evaluation measures or any other analysis within the 2018 Regional Freight Strategy.

The primary objectives of the project are to:

- Develop tools to enable a more comprehensive analysis of infrastructure needs and policy choices pertaining to the movement of goods;

- Develop more detailed network assignments by truck type to support regional environmental analysis, as well as local traffic operations and engineering analysis;
- Develop freight forecasts that are responsive to changes in economic forecasts, changing growth rates among industrial sectors, and changing rates of economic exchange and commodity flows between sectors; and
- Replace the trip-based truck model with a more realistic tour-based model.

Current Model

The current truck model is based on commodity flows, a method deployed by Metro for almost 20 years. The trips in the current method are modeled as simple 1-way trips and do not include service vehicles or parcel delivery. These models use data based on the Freight Analysis Framework (FAF) and are prepared under contract for Metro, Port of Portland, and Port of Vancouver. The most recent update was in 2014 using FAF3 (2007) data. In the current model commodities are either produced in the region, or enter the region via external highway cordon, marine port, rail yard, or air freight facility at Portland International Airport. For each long haul mode, a certain proportion is assumed to utilize trucks for a portion of the journey. Each group of commodities is associated with a group of employment types. Truck-borne commodities are distributed to Transportation Analysis Zones (TAZ) on the basis of TAZ employment. TAZ commodities are apportioned to heavy and medium trucks.

New Model

The new Freight Model was geared at filling in the gaps seen in the current model. It represents a new generation of "hybrid" models that micro-simulate both commodity supply chains and local truck tours. Similar applications have been successful in Chicago, Baltimore, Phoenix, and the State of Florida. With the addition of new truck behavior data the model is able to simulate truck movements. Truck data was obtained by GPS traces of truck movements by vehicle class, dispatch data maintained by businesses, and detailed business establishment surveys with truck itineraries. In addition to all the above improvements the new Freight Model has the ability to take a more holistic approach to modeling. It has the ability to focus on major regional export sectors and produce data to evaluate the economic costs of bottlenecks.

The new model is no longer restricted to route diversion only, it includes Long-Haul freight mode choice and additional responses including:

- Time and frequencies of deliveries
- Number and length of tours
- Number of stops that can be made per tour
- Number of trucks needed to serve all customers

The new model also expands the truck classes to include light, medium, and heavy. It has the ability to track commodities by Standard Classification of Transported Goods (SCTG) groups and the ability to track value by type of good, such as time-sensitive shipments. The new model also incorporates non-freight trucks, an option unavailable in the current model. It includes both service trucks and mail/parcel delivery trucks which are believed to account for over half of local truck VMT.

Regional Benefits

The new model will allow for improved ability to evaluate cost of congestion and benefits of freight improvements. It will offer clearer understanding of land use policies such as the role of warehousing and distribution in the process, and better understanding of truck related environmental impacts which could lead to an increase in our freight system efficiency.

A complete summary of the new freight model is included as Appendix C of this Regional Freight Strategy.

9.4 Future Freight Studies

In October of 2017, the Regional Freight Work Group (RFWG) discussed the need for future freight studies that should be called out in the 2018 Regional Freight Strategy. The RFWG discussed the need for the following four possible future freight studies:

- Regional Freight Rail Study
- Kenton Rail Line Study
- Willamette River Channel Deepening Study
- Regional Freight Delay and Commodities Movement Study

The RFWG recommended that the Regional Freight Rail Study, which was identifies in the 2014 RTP as needed, should be included as a future freight study.

The RFWG did not make a recommendation on the Kenton Rail Line Study. This study was generally defined as a way to determine which at-grade railroad crossings of the UP Kenton main rail line, that runs from the UP Seattle main line at Columbia Boulevard and N. Hurst Avenue east to the Sandy River (just southeast of the Troutdale Airport), should be grade separated. The need for this study will be determined and defined later. Consideration will be made for the Kenton Rail Line Study to become part of the Regional Freight Rail Study.

The RFWG did not make a recommendation on the Willamette River Channel Deepening Study. The Port of Portland later determined that the deepening of the channel was not suitable for study within the next 10 years and should not be included in the 2018 Regional Freight Strategy.

The RFWG recommended that the Regional Freight Delay and Commodities Movement Study should be included as a future freight study. The descriptions of the two studies that the RFWG recommended are included in the remaining part of this chapter.

Regional Freight Rail Study

The study should seek to identify and produce increases in rail capacity, safety, land use compatibility and operational efficiencies; 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.

Regional Freight/Passenger Rail Study - Expected Outcomes

Some of the potential outcomes of the proposed study are:

- 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, re-prioritized list of regional freight rail projects focused on improving capacity constraints and targeting industrial access to the rail networks
    - A funding strategy for regional freight/passenger rail bottlenecks
    - A strategy to fund needed grade separations
    - A strategy to fund critical modernization projects on the short rail lines

Fact-based guidance for stakeholders to use in negotiating claims over passenger/freight conflicts, balancing passenger and freight goals, and a viable set of solutions and initiatives to meet those goals:

- Regional guidance for public/private investment partnerships to guide investment of regional and national pots of money in identifying and developing freight rail corridors of local, regional and national significance; and
- Specific guidance for local jurisdictions as they develop their transportation system plans (TSPs) in order to avoid or minimize conflicts, and preserve or enhance the functionality of rail facilities and connected industrial land uses

On January 22nd 2015, Metro staff called a meeting with staff from City of Portland, Clackamas County, Multnomah County, Washington County, Port of Portland, ODOT Region 1, ODOT Rail, and a local rail expert, to discuss the potential need and purpose for a Regional Freight/Passenger Rail Study.

The Port of Portland Rail Plan had concentrated on Class 1 railroad lines and was focused on the Port of Portland interests, especially the Port terminals. The Port's plan was not

focus much on the short lines and other non-Class 1 railroad lines that run in Clackamas County (west of the Willamette River) and Washington County. The Port's plan identified grade separations as a key strategy to address capacity and safety, including projects along the Kenton Line (Class 1 railroad line) in Portland and Multnomah County.

It was suggested that the study should examine the issue of long trains (up to 7,000 feet long) that take a long time to separate and store the cars when accessing Portland inter-modal terminals due to a lack of storage capacity.

Clackamas County staff suggested that the study address freight rail and passenger rail within Clackamas County and Washington County. Clackamas County staff thought the study should look at improved short line service and providing sufficient freight rail service on the Brooklyn rail line.

Washington County staff stated that the county has shown interest in potential expansion of service and improving speeds with double-tracking some areas on the Portland Western railroad line. Washington County staff identified three areas for the study to consider: 1) Better understanding of existing and future private rail operations in Washington County; 2) Future added service on the WES commuter rail line; 3) Pedestrian crossing improvements to enhance safety at railroad crossings.

City of Portland staff suggested that the study look at a regional strategy for how and when to partner with private railroads to address funding of rail projects.

ODOT Rail staff suggested that any study of rail capacity needs should consider operational improvements, and not just infrastructure expansion.

The group agreed that the study should move forward after the completion of the Regional Over-Dimensional Truck Route Study, and that the input received at this meeting should be considered by Metro in the scoping and budgeting for this study.

Kenton Rail Line Study

The need for this study will be determined and defined later.

Regional Freight Delay and Commodities Movement Study

The purpose of the study would be to evaluate the level of commodity movement on the regional freight network within each of the mobility corridors identified in the Regional Transportation Plan's Mobility Corridor Atlas. The study would use Metro's new freight model to summarize the general types of commodities, the tonnage of the commodities and the value of the commodities that are using these freight facilities within each of the mobility corridors. The study would also evaluate the need for improved access and mobility to and from regional industrial lands and intermodal facilities.

Some of the potential outcomes of the proposed study are:

- 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 will recommend prioritized freight projects for the next RTP and Regional Freight Plan based on the new freight measures, congestion, unreliability, accessibility, and the highest tonnage and value of commodities within each mobility corridor.

CHAPTER 10

MEASURING PROGRESS

In 2012, the 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. Fixing America's Surface Transportation (FAST Act) passed Congress in December 2015, replacing MAP-21. The FAST Act did not make any major changes to the performance requirements of MAP-21 and did not add any new performance measures.

Performance-based planning

For the first time, MAP-21 established a performance-based planning framework intended 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 choices. The objective of the new framework was to ensure States and MPOs invest federal resources in projects that collectively will make progress toward the achievement of the national goals identified in MAP-21.

National performance goals related to freight

The legislation established seven national performance goals for the federal-aid highway program and directed the USDOT to develop performance measures for each goal area. The following are the performance goals that relate to system reliability, and freight movement and economic vitality:

- **System reliability** – To improve the efficiency of the surface transportation system.
- **Freight movement and economic vitality** – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

MAP-21 directed state transportation departments, transit agencies, and metropolitan planning organizations (MPOs) to incorporate a performance-based approach in their planning, including measures and targets, that are to be used in transportation decision-making. States, transit agencies and MPOs must set targets for measures specified by USDOT and track and report progress toward meeting these targets.

Performance measures have been identified through MAP-21 and subsequent USDOT rulemaking that must be reflected in the 2018 RTP. The table below summarizes the federal performance measures identified for the performance goals related to freight and compares them to the current 2014 RTP Targets/Measures:

Table 6: MAP-21 National Goal Areas, Federal Performance Measures, and Existing RTP Measures

National Goal Areas	Federal Performance Measure(s)	2014 RTP Target(s) / Measure
System reliability	Percent of reliable person-miles traveled [17] on Interstate System and on the non-Interstate National Highway System	None – though reliability is called out as recommended as a system monitoring measure. Also, there's a target labeled "freight reliability" but it measures delay, not reliability.
Freight movement and economic vitality	Percent of Interstate System miles with reliable truck travel times[18]	By 2040, reduce vehicle hours of delay per truck trip by 10% compared to 2010.

10.1 Freight Performance Target

The 2014 RTP Performance Targets had identified one freight performance target. The performance target was called Freight Reliability, and was defined as:

- By 2040, reduce vehicle hours of delay per truck trip by 10 percent compared to 2010.

This is not a true reliability measure. Reliability is a measure of the variability in travel time, not simply the delay in travel time. Researchers have devised feasible, data-driven methods to measure roadway reliability.

Staff recommends discussing how the region could support and apply such techniques to freight and mobility corridors. Staff is currently proposing that the freight performance target

[17] Reliable defined as the ratio of the 80th percentile travel time of a reporting segment to a "normal" travel time (50th percentile), using data from FHWA's free National Performance Management Research Data Set or equivalent. Data are collected in 15-minute segments during all time periods other than 8 p.m.-6 a.m. local time. The measures are the percent of person-miles traveled on the relevant NHS areas that are reliable

[18] The ratio will be generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment. Then, the Index will be generated by multiplying each segment's largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate. Reporting is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.)

would be replaced by the federal performance measure for ***Freight movement and economic vitality*** *using the same methodology:*

- Percent of Interstate System miles with reliable truck travel times[2].

(To be completed later)

10.2 Freight Monitoring Measures

Freight monitoring measures should tell users how the freight system is performing over time to identify where and when adjustments in the freight network are needed.

Travel time reliability on throughways *and intermodal connectors*
Generally travel time reliability is the comparison of how long it takes to travel along a roadway route during a certain time of day (example - 4:00-4:15 PM) on a weekday using many samples, and comparing each sample to how long it would take to travel that route at that time of day under normal conditions (50th percentile of all samples). Higher frequencies of times with a high level of variability from the norm, means high unreliability.

(This is placeholder language and will be completed later)

10.3 Freight System Evaluation Measures

Truck Vehicle Hours of Delay (VHD) on all facilities
This measure uses the Metro travel forecasting model to calculate the hours of truck delay for all roadway facilities within the Metro Planning Area (MPA) during 2015 and various future years. The calculations have been made for the average weekday during the following times of day: 7AM to 9AM (morning peak), 1PM to 3PM, and 4PM to 6PM (evening peak). The 1PM to 3PM time-slot was chosen as the afternoon period that trucks travel in to avoid peak hours of congestion.

(To be completed later)

Truck Vehicle Hours of Delay (VHD) on the Regional Freight Network
This measure uses the Metro travel forecasting model to calculate the hours of truck delay for just the roadways on the Regional Freight Network map within the Metro Planning Area (MPA), during 2015 and various future years. Once again, the calculations have been made for the average weekday during the following times of day: 7AM to 9AM (morning peak), 1PM to 3PM, and 4PM to 6PM (evening peak).

(To be completed later)

Cost of Truck VHD on all facilities and on the Regional Freight Network
This measure uses the Truck VHD numbers that were calculated for both all roadway facilities and for the just the Regional Freight Network, and factors them up by two different values of time for trucks, to obtain the cost of truck delay. The value of time factor for

medium trucks* is $28.20 per hour and represents 35% of the truck fleet. The value of time factor for heavy trucks* is $30.72 per hour and represents 65% of the truck fleet.

(This is placeholder language and will be completed later)

Freight Evaluation Measure and Refinement of Regional Mobility Policy (In development)

Freight Mobility and Industrial Access Measure

This measure is being developed and tested as part of the 2018 RTP Systems Evaluation work. The process has consisted of 1) choosing two industrial areas; one being the Tualatin Industrial Area off Tualatin-Sherwood Road; and the second being Marine Terminals 5 and 6, and the rail yards off Marine Drive; 2) calculating the number of trucks at certain times of day (modeled) that are coming into or leaving these area (zones); and 3) measuring the hours of delay (modeled) that these trucks are experiencing (within the region) at these times of day as they travel to and from these areas.

(This is placeholder language and will be completed later)

Refinement of the Regional Mobility Policy

The U.S. Department of Transportation issued new regulations for states and Metropolitan Planning Organizations that will require greater monitoring of mobility on the freeway system and setting targets for system performance.

To meet the new federal mandate and the growing challenges on the freeway system, ODOT and Metro propose to work in partnership after the completion of the 2018 RTP (2019–20) on a refinement to our regional mobility policy. This will allow the refinement work to build on a rich data set and updated policy framework from the RTP, with the goal of better informing system management and investments in the region.

The mobility policy is principally an issue for the freeways, state highways and on the region's principal arterial system, which are an important part of the regional freight network.

ACRONYMS

GLOSSARY

APPENDIX A

2018 REGIONAL TRANSPORTATION PLAN FREIGHT PRIORITIES PROJECT LIST

2018 RTP Freight Projects and Programs (final draft) - Appendix A

RTP Investment Category	County	Nominating Agency	2018 RTP ID	Project Name	Start Location	End Location	Primary Purpose	Description	Estimated Cost (2016 dollars)	Time Period	Financially Constrained?
Freight	Clackamas County	Milwaukie	11624	Local Street Improvements in Tacoma Station Area	Location-specific	Location-specific	Increase freight access to indust & intermodal fac	Construct street improvements on Stubb St, Beta St, Ochoco St, Hanna Harvester Dr, and Mailwell Dr. (TSAP)	$ 5,600,000	2028-2040	No
Freight	Clackamas County	Wilsonville	11764	Boones Ferry Road Extension	Commerce Circle	Ridder Road	Increase freight access to indust & intermodal fac	Construct 3-lane section with bike lanes and sidewalk	$ 2,100,000	2028-2040	Yes
Freight	Multnomah County	Gresham	10446	181st: at Burnside	181st/Burnside	181st/Burnside	Increase system efficiency	Optimize intersection operation. Transit/Enhanced Transit Corridor supportive project.	$ 1,000,000	2028-2040	Yes
Freight	Multnomah County	Gresham	10495	181st: at Halsey	Halsey St.	Halsey St.	Relieve current congestion	add 2nd LT lane to N & S legs, add RT lane to EB WB SB.	$ 1,089,615	2028-2040	Yes
Freight	Multnomah County	Gresham	10496	181st: at I-84	181st/I-84	181st/I-84	Increase freight access to indust & intermodal fac	Freight mobility improvements subject to refinement study. Transit/Enhanced Transit Corridor supportive project.	$ 1,000,000	2028-2040	Yes
Freight	Multnomah County	Multnomah County	11600	Marine Drive at 223rd	Marine Drive at 223rd	Marine Drive at 223rd	Increase freight access to indust & intermodal fac	Widen to accommodate freight traffic and provide bike/ped facilities	$ 10,630,000	2028-2040	No
Freight	Multnomah County	Port of Portland	10363	SW Quad Access	NE 33rd Ave.	SW Quad	Increase freight access to indust & intermodal fac	Provide street access from 33rd Ave. into SW Quad.	$ 6,290,303	2018-2027	Yes
Freight	Multnomah County	Port of Portland	10379	Marine Dr. Improvement Phase 2	BNSF grade crossing on Marine Drive	BNSF grade crossing on Marine Drive	Increase freight access to indust & intermodal fac	Construct rail overcrossing on Marine Dr.	$ 14,503,785	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11207	T6 Modernization	Terminal 6	Terminal 6	Increase freight access to indust & intermodal fac	Provide improvements to container terminal including crane electronics and storm water improvements.	$ 8,504,000	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11208	T4 Modernization	Terminal 4		Increase freight access to indust & intermodal fac	Renovate operation areas at T4 to create intermodal processing areas. Rail spur relocation and expansion, grain elevator demolition, wharf removal	$ 15,845,078	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11306	T6 Second Entrance from Marine Drive	N. Bybee Lake Rd.	N. Pacific Gateway	Increase freight access to indust & intermodal fac	Construct 2nd entrance from Marine Drive and internal rail overcrossing to Terminal 6. .	$ 12,756,000	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11307	T6 Suttle Road entrance	Terminus of N. Suttle Road	Terminal 6	Increase freight access to indust & intermodal fac	Access to the east end of Terminal 6 off the terminus of Suttle Road.	$ 3,189,000	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11309	Cully Blvd. Grade separation	Columbia	Lombard	Increase system efficiency	Construct roadway overcrossing at NE Cully Blvd. over Kenton line.	$ 37,205,000	2028-2040	No
Freight	Multnomah County	Port of Portland	11353	West Hayden Island Rail Access	BNSF Rail Bridge	West Hayden Island	Increase freight access to indust & intermodal fac	Advance rail-dependent development.	$ 3,189,000	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11354	West Hayden Island Rail Yard	West Hayden Island	West Hayden Island	Increase freight access to indust & intermodal fac	Advance rail development on West Hayden Island.	$ 10,098,500	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11355	Barnes to Terminal 4 Rail	Terminal 4	Barnes Yard	Increase freight access to indust & intermodal fac	Improve Rail Access to Terminal 4.	$ 4,543,000	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11357	Terminal 6 Rail Support Yard Improvements	Terminal 6	Terminal 6	Increase freight access to indust & intermodal fac	Increase Terminal 6 rail capacity.	$ 10,630,000	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11649	T2 Redevelopment	Terminal 2	Terminal 2	Increase freight access to indust & intermodal fac	Construct rail, rail scale, and crane modernization.Table3[[#Headers],[RTP Investment Category]]	$ 4,783,500	2018-2027	Yes

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Freight	Multnomah County	Port of Portland	11651	T2 Track Reconfiguration and Siding	Terminal 2	Terminal 2	Increase freight access to indust & intermodal fac	Construct rail loops and support siding.	$ 9,460,700	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11652	Bonneville Rail Yard Build Out	Bonneville Rail Yard	Bonneville Rail Yard	Increase freight access to indust & intermodal fac	Construct two interior yard tracks at Bonneville Yard and complete the double track lead from the wye at the east end of the yard to UP Barnes Yard.	$ 3,826,800	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11653	Ramsey Yard Utilization	Columbia Slough	Bonneville Yard	Increase freight access to indust & intermodal fac	Connect the existing set out track along the west side of the main lead with the industrial lead near the south end to provide a location to store a unit train.	$ 1,807,100	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11654	Time Oil Road Reconstruction	Lombard	Rivergate Boulevard	Increase freight access to indust & intermodal fac	Reconstruct Time Oil Road	$ 9,567,000	2028-2040	Yes
Freight	Multnomah County	Port of Portland	11659	Rivergate Blvd. Overcrossing	N. Lombard	Time Oil Road	Relieve current congestion	Relieve a congestion point in Rivergate Industrial Area, improve rail access to Terminal 5.	$ 22,263,790	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11743	Troutdale Airport Master Plan Transportation Improvements	Sundial Road	Swigert Way/Graham Road	Increase freight access to indust & intermodal fac	Implement transportation improvements developed as part of the Troutdale Airport Master Plan	$ 5,000,000	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11949	North Portland Junction: Undoing the "X"	UPRR Peninsula Junction	North Portland Junction	Increase freight access to indust & intermodal fac	Eliminate the at-grade crossing of UPRR and BNSF tracks at North Portland Junction.	$ 33,598,000	2028-2040	No
Freight	Multnomah County	Port of Portland	11953	Six mph Curves Railroad Improvements	Steel Bridge	Just north of Steel Bridge	Increase system efficiency	Realign the curves just north of the Steel Bridge to improve rail speed and capacity.	$ 23,600,000	2028-2040	No
Freight	Multnomah County	Port of Portland	11955	Railroad Bridge and Track Improvements	Columbia Slough Rail Bridge	Columbia River Rail Bridge	Increase system efficiency	Improve rail track conditions on approaches to Willamette River and Columbia Rive bridges to increase railroad speed and capacity.	$ 10,751,000	2028-2040	No
Freight	Multnomah County	Port of Portland	11956	Rivergate Columbia Slough Rail Bridge	Terminal 6	Terminal 5	Increase freight access to indust & intermodal fac	Construct a rail bridge across Columbia Slough to provide rail connection to South Rivergate from Terminal 6.	$ 10,840,000	2028-2040	No
Freight	Multnomah County	Portland	10218	Burgard-Lombard Street Improvements	N Burgard St & Columbia Blvd	Burgard Viaduct	Increase freight access to indust & intermodal fac	Construct roadway improvements, including pedestrian and bicycle facilities.	$ 2,635,000	2018-2027	Yes
Freight	Multnomah County	Portland	10331	Columbia Blvd / Railroad Bridge Replacement	N Columbia Blvd over BNSF railroad	N Columbia Blvd over BNSF railroad	Keep system in good repair	Replace the existing fracture critical Columbia Blvd bridge (#078) over railroad tracks with a new structure, and perform seismic upgrades on parallel bridge (#078A).	$ 4,000,000	2028-2040	Yes
Freight	Multnomah County	Portland	10337	Marine Dr & 33rd Intersection Improvements	Marine Dr & 33rd Ave, NE	Marine Dr & 33rd Ave, NE	Increase freight access to indust & intermodal fac	Signalize intersection to improve freight operations.	$ 1,000,000	2018-2027	Yes
Freight	Multnomah County	Portland	10340	Cornfoot Rd Corridor Improvements	NE 47th Ave	NE Alderwood Rd	Increase freight access to indust & intermodal fac	Improve roadway and intersections to improve freight operations. Construct a multi-use path on the north side of Cornfoot Rd to separate pedestrians and bicyclists from motor vehicle traffic. Install guardrails where needed.	$ 7,000,000	2018-2027	Yes
Freight	Multnomah County	Portland	10376	Columbia Blvd Freight Improvements: Design/Construction	NE 60th Ave.	NE 82nd Ave.	Increase system efficiency	Construct street and intersection modifications to improve freight reliability and access to industrial properties.	$ 14,000,000	2028-2040	No
Freight	Multnomah County	Portland	11570	Columbia/Alderwood Intersection Improvements	NE Columbia Blvd & Alderwood Rd	Columbia/Alderwood	Increase system efficiency	Improve intersection and install traffic signal at Columbia & Alderwood.	$ 5,050,654	2018-2027	Yes

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Freight	Multnomah County	Portland	11796	Going St Connected/Automated Vehicle Connection	Swan Island Industrial Area	I-5	Increase system efficiency	Design and construct a Connected/Automated Vehicle connection between Swan Island and I-5.	$ 5,000,000	2028-2040	Yes
Freight	Multnomah County	Portland	11799	Suttle Rd Freight Street Improvements	N Portland Rd	T6	Increase freight access to indust & intermodal fac	Improve Suttle Rd to meet Freight District Street standards, separate rail and truck movements, provide pedestrian access to nearby bus line, and enable future T6 entrance Port project.	$ 9,000,000	2028-2040	Yes
Freight	Multnomah County	Portland	11800	Columbia Blvd Pedestrian Overpass Replacement	N Columbia Blvd west of N Midway Ave	N Columbia Blvd west of N Midway Ave	Increase freight access to indust & intermodal fac	Replace the pedestrian overpass near George Middle School with either an at-grade crossing or a higher overpass to enable the use of Columbia Blvd as an over-dimensional freight route.	$ 3,000,000	2018-2027	Yes
Freight	Multnomah County	Portland	11801	Columbia Blvd Railroad Undercrossing Improvement	N Columbia Blvd at railroad bridge near I-5	N Columbia Blvd at railroad bridge near I-5	Increase freight access to indust & intermodal fac	Lower the Columbia Blvd undercrossing at the UP Railroad Bridge just west of I-5 to enable the use of Columbia Blvd as an over-dimensional freight route.	$ 3,000,000	2028-2040	Yes
Freight	Multnomah County	Portland	11802	N Portland Rd over Columbia Slough Bridge Replacement	N. Portland Rd at Columbia Slough	N. Portland Rd at Columbia Slough	Increase freight access to indust & intermodal fac	Replace the weight-restricted N. Portland Road bridge over the Columbia Slough to enable the use of N. Portland Road as an over-dimensional freight route and include a connection for the Columbia Slough Trail.	$ 7,500,000	2028-2040	Yes
Freight	Multnomah County	Portland	11841	Central Eastside Access and Circulation Improvements	Central Eastside	Central Eastside	Increase freight access to indust & intermodal fac	Improve access and circulation in the Central Eastside by adding new signals and crossings at Hawthorne & Clay ramp, Salmon & Grand, Salmon & MLK, Washington & Grand, Washington & MLK, Ankeny & MLK, Ankeny & Sandy, 16th & Irving, and modifying signals at Stark & Grand, Clay & Grand, and Mill & MLK. Improve Clay Street from Water to Grand and add multimodal safety improvements.	$ 5,205,879	2018-2027	Yes
Freight	Multnomah County	Portland	11871	Going/Greeley Interchange Improvements	N Going/Greeley	N Going/Greeley	Increase freight access to indust & intermodal fac	Redesign Going/Greeley interchange including climbing lane on Going to improve truck movement between Swan Island, Lower Albina, and I-5.	$ 16,750,000	2028-2040	No
Freight	Multnomah County	Portland	11880	Cully Blvd Rail Overcrossing	NE Cully Blvd (over Kenton line)	NE Cully Blvd (over Kenton line)	Increase freight access to indust & intermodal fac	Construct roadway overcrossing at NE Cully Blvd. over Kenton line.	$ 35,000,000	2028-2040	No
Freight	Multnomah County	Portland	12004	Columbia Blvd Freight Improvements: Project Development	NE 60th Ave	NE 82nd Ave	Increase freight access to indust & intermodal fac	Alternatives analysis and project development to identify preferred street and intersection modifications to improve freight reliability and access to industrial properties.	$ 1,000,000	2018-2027	Yes
Freight	Washington County	Wilsonville	10588	Grahams Ferry Road Improvements	Day Road	Washington/ Clackamas County line	Increase freight access to indust & intermodal fac	Widen Grahams Ferry Road to 3 lanes, add bike/pedestrian connections to regional trail system and fix (project development only) undersized railroad overcrossing.	$ 13,200,000	2028-2040	Yes
Freight	Multnomah County	Gresham	10445	181st at Glisan: Intersection Improvements	181st/Glisan	181st/Glisan	Relieve current congestion	Construct Gresham/Fairview Trail between Halsey and Sandy. This ultimately connects the regional trail between the Springwater Trail and Marine Dr. Trail.	$ 4,899,153	2018-2027	Yes
Freight	Multnomah County	Multnomah County	10394	Replace RR Over-crossing on 223rd Ave.	2000' north of I-84		Build complete street	Reconstruct railroad bridge on 223rd Ave, 2000' north of I-84 to accommodate wider travel lanes, sidewalks and bike lanes.	$ 7,441,000	2018-2027	Yes
Freight	Multnomah County	Port of Portland	11952	Columbia River Rail Bridge Improvements	Columbia River Rail Bridge	Columbia River Rail Bridge	Increase system efficiency	Replace Existing swing span with lift span and relocate position to mid-river channel.	$ 35,548,800	2028-2040	No
Freight	Multnomah County	Portland	10244	Kittridge Bridge Seismic Retrofit	NW Kittridge/Yeon Bridge	NW Kittridge/Yeon Bridge	Keep system in good repair	Retrofit existing seismically vulnerable bridge (#010) across railroad tracks to ensure emergency response and access to petroleum supplies located along the Willamette River in the event of an earthquake.	$ 15,249,213	2028-2040	No

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Roads and Bridges	Clackamas County	Clackamas County	10002	Johnson Creek Blvd. Improvements	55th Ave	82nd Ave.	Increase freight access to indust & intermodal fac	Widen to 3 lanes with bikeways and pedestrian facilities from 55th Ave to 82nd Ave improving freight access to industrial area and increasing accessibility for historically marginalized communities.	$ 14,237,510	2028-2040	Yes
Roads and Bridges	Clackamas County	Clackamas County	10023	82nd Dr. Improvements	Hwy 212	Strawberry Lane Intersection	Relieve current congestion	Widen to a consistent 4 lane cross section and include bike/ped improvement and ADA accessibility improvements as necessary. Not including intersection improvements at Strawberry Lane.	$ 18,521,712	2028-2040	No
Roads and Bridges	Clackamas County	Clackamas County	11514	82nd Drive/Strawberry Lane Intersection	82nd Dr/Strawberry Lane intersection	N/A	Relieve current congestion	Install traffic signal and turn lanes on eastbound and northbound approaches, improve ADA accessibility as necessary.	$ 1,520,870	2028-2040	Yes
Roads and Bridges	Clackamas County	Happy Valley	10033	172nd Ave & 190th Connector	Clatsop	Sunnyside Rd.	Relieve current congestion	Widen 172nd to 5 lanes; construct connector between 172nd and 190th Ave using adopted alignment; project includes bike lanes, sidewalks and continuous left turn lane; last connector in n/s freight route alternative to I-205 between I-84 and Hwy-212.	$ 39,841,240	2028-2040	Yes
Roads and Bridges	Clackamas County	Happy Valley	10041	162nd Ave. Extension South Phase 1	Rock Creek Blvd.	Hwy. 212	Relieve current congestion	Extend 162nd Ave from Rock Creek Blvd to Hwy-212; construct new, 3 lane roadway with continuous left turn lane, sidewalks, bike lanes, intersection improvements at Hwy. 212/162nd on all four approaches. Project terminates at industrial employment sector.	$ 5,315,000	2018-2027	Yes
Roads and Bridges	Clackamas County	Happy Valley	11135	Rock Creek Blvd. improvements	Hwy. 212/224 (planned Sunrise Corridor Rock Creek Interchange)	177th Ave.	Increase freight access to indust & intermodal fac	Construct new 5 lane road from Sunrise Corridor Rock Creek interchange to 162nd Ave; Widen existing alignment of Rock Creek Blvd to five lanes from 162nd to 177th Ave. Facility improvements include continuous left turn lane, sidewalks, bike lanes and traffic signals.	$ 23,673,010	2018-2027	Yes
Roads and Bridges	Clackamas County	Milwaukie	10000	Linwood/Harmony Rd./ Lake Rd. Intersection	Railroad Ave / Linwood Ave / Harmony Rd Intersection	Railroad Ave / Linwood Ave / Harmony Rd Intersection	Relieve current congestion	Railroad crossing and intersection improvements based on further study of intersection operations including bikeways and pedestrian facilities to be undertake jointly by the City of Milwaukie and the County	$ 21,300,000	2028-2040	Yes

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Roads and Bridges	Clackamas County	Milwaukie	11537	Group 4--Pedestrian Improvements at Hwy 224	Harrison St	Freeman Way	Relieve current congestion	Intersection Improvements at Hwy 224 and 37th Ave = Consolidate the two northern legs of 37th Ave and International Way into one leg at Hwy 224. Intersection Improvements at Hwy 224 and Oak St = Add left-turn lanes and protected signal phasing on Oak St approaches. Study of Pedestrian Crossings on Hwy 224 = Examine alternatives for improving pedestrian crossings at five intersections along Hwy 224 (Harrison St, Monroe St, Oak St, 37th Ave, Freeman Way). Intersection Improvements at Hwy 224 and Oak St = Improve pedestrian crossing. Intersection Improvements at Hwy 224 and 37th Ave = Improve pedestrian crossing. Hwy 224 Crossing Improvements at Oak and Washington St = Improve intersection crossing safety for bicyclists at Washington St and Oak St. Intersection Improvements at Hwy 224 and Freeman Way = Improve pedestrian crossing. Intersection Improvements at Hwy 224 and Harrison St = Improve pedestrian crossing. Intersection Improvements at Hwy 224 and Monroe St = Improve pedestrian crossing. Intersection Improvements at Harrison St and Hwy 224 = Add left-turn lanes and protected signal phasing on Harrison St approaches.	$ 3,100,000	2028-2040	Yes
Roads and Bridges	Clackamas County	Milwaukie	11623	Group 11--Intersection Improvements in North Industrial Area	Ochoco St	Harrison St	Relieve current congestion	Signage and Intersection Improvements at McLoughlin Blvd and Ochoco St = Establish signage for trucks and improve intersection. (TSAP) Intersection Improvements at McLoughlin Blvd and 17th Ave = Prohibit left-turn movement from 17th Ave to northbound McLoughlin Blvd and include in Hwy 224 & Hwy 99E Refinement Plan. Intersection Improvements at Main St and Mailwell Dr = Upgrade intersection turning radii to better accommodate freight movements.	$ 2,300,000	2028-2040	No
Roads and Bridges	Clackamas County	Oregon City	10119	OR 213 & Redland, Phase 2	Redland Road	Redland Road Undercrossing	Relieve current congestion	Add third through lane in both northbound & southbound directions. This is Phase 2 of the completed Jughandle Project. (TSP D79)	$ 9,800,000	2028-2040	Yes
Roads and Bridges	Clackamas County	Oregon City	10140	OR 213 Widening	Clackamas Community College	Conway Drive	Relieve current congestion	Add one Southbound through lane and one Northbound through lane, bike lanes, and sidewalks. (TSP D77, W31)	$ 5,200,000	2028-2040	Yes
Roads and Bridges	Clackamas County	Oregon City	10144	Hwy 99E & I-205 SB Interchange Access	Dunes Drive	I-205 SB Ramp Terminus	Relieve current congestion	Dual left turn lanes on 99E approach to SB I-205 ramp, ramp widening to accommodate approach. (Closely related to TSP D75, D76 but not actually these projects)	$ 3,000,000	2028-2040	No
Roads and Bridges	Clackamas County	Oregon City	11544	Meyers Road Extension (West)	OR 213	High School Avenue	Relieve current congestion	Construct new 3 lane roadway, sidewalks, buffered bike lanes, WB right turn lane and center turn lanes to serve adjacent Clackamas Community College & underdeveloped industrial properties. (TSP D46)	$ 4,500,000	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	10416	Hogan Corridor Improvements	Stark	Burnside	Increase system efficiency	Interim capacity improvements and access controls.	$ 20,346,310	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10417	Hogan: Palmquist to Rugg - New Arterial Connection	Palmquist	Rugg Rd.	Relieve future congestion	Complete project development and construct new principal arterial connection with multi-use path.	$ 36,152,117	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10430	Orient: South City limits to Kane Dr. widening	South City Limits	Kane Dr	Build complete street	Upgrades to arterial 4 lane standards.	$ 9,567,000	2028-2040	No

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Roads and Bridges	Multnomah County	Gresham	10434	Burnside: 212th to Hogan Road	Wallula	Hogan	Build complete street	Complete boulevard design improvements on Burnside from Wallula/212 to Hogan. Improve intersection of Burnside at Division by adding eastbound RT and signal, and also improve the intersection of Burnside and Hogan.	$ 34,595,974	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10443	Sandy: 181st to 202nd Widening	181st Ave.	202nd	Relieve current congestion	Widens Sandy Blvd. to 5 lanes with sidewalks, bike lanes from 181st to 202nd Ave.	$ 5,000,000	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	10445	181st at Glisan: Intersection Improvements	181st/Glisan	181st/Glisan	Relieve current congestion	Improve Intersection.	$ 1,107,505	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	10493	181st: I-84 to Sandy Widening	Sandy	I-84	Relieve current congestion	Add southbound aux lane & widen RR overcrossing.	$ 1,000,000	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10497	181st: at Stark and Sandy Intersections	Sandy	Stark	Increase system efficiency	At Sandy: Northbound right turn, 2nd westbound left turn. Overlap eastbound right turn. At Stark, add 2nd left turn lane on east and west legs.	$ 2,003,107	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10503	Burnside at Powell	Powell	Powell	Increase system efficiency	At Powell: eliminate EB and WB left turn lanes.	$ 1,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	10511	Hogan at Stark: Turn Lane Additions	Stark	Stark	Relieve future congestion	Add right turn lanes on all approaches and second northbound and southbound left turns.	$ 3,500,000	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	10512	Hogan: Powell to Burnside Blvd. Design and Intersection Improvements	Powell	Burnside	Relieve current congestion	Improve to boulevard standards, and intersection improvements at Burnside, Division and Powell.	$ 9,289,906	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	10527	Hogan: Powell to Palmquist Widening	Powell	Palmquist	Build complete street	Improve to arterial standards.	$ 13,228,630	2028-2040	No
Roads and Bridges	Multnomah County	Gresham	10533	190th: 30th to Cheldelin	30th	Cheldelin	Serve new urban area	Improve existing road to major arterial standards, signalize 190th @ Giese, Butler, Richey, Cheldelin.	$ 30,448,832	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	11261	181st/182nd: ACM with Transit Priority Treatment	Glisan	Powell	Relieve current congestion	Includes the ACM project with transit signal priority added to traffic signals along a facility.	$ 4,252,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	11262	181st: ACM with Adaptive Signal Timing and Transit Priority Treatment	I-84	Glisan	Increase system efficiency	Provide real time and forecasted traveler information on arterial roadways including current roadway conditions, congestion information, travel times, incident information, construction work zones, current weather conditions and other events that may affect traffic conditions. Transit/Enhanced Transit Corridor supportive project.	$ 3,933,100	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	11264	US 26: Portland to Gresham Roadside Travel Time Information	Portland	Gresham	Increase system efficiency	Provide real time traveler information on westbound US 26 for different routes (arterial and freeway) between Portland and Gresham. The project or a portion of the project is outside the designated urban growth boundary as of March 2014.	$ 1,169,300	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	11682	181st: Stark to I-84 Rockwood Safety Corridor	I-84	Stark	Reduce crashes	Safety corridor: 181st/Rockwood {I-84 - Stark}	$ 2,019,700	2018-2027	Yes
Roads and Bridges	Multnomah County	Gresham	11687	Powell at Eastman: Left Turn Lane Addition	Powell at Eastman	Powell at Eastman	Relieve current congestion	Powell and Eastman {additional southbound left turn}	$ 1,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	10431	190th/Highland: 11th to 30th Widening	200' south of SW 11th	30th	Build complete street	Reconstruct and widen street to five lanes with sidewalks and bike lanes. Widen and determine the appropriate cross-section for Highland Drive and Pleasant View Drive from Powell Boulevard to 190th Ave.	$ 20,884,252	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	10454	181st: Glisan to Yamhill Boulevard Improvements	Glisan	Yamhill	Build complete street	Complete boulevard design improvements.	$ 12,160,785	2028-2040	Yes
Roads and Bridges	Multnomah County	Gresham	10473	223rd at Stark: Lane Additions	223rd at Stark	223rd at Stark	Increase system efficiency	Add EB and NB RT lanes and 2nd NB and SB LT lanes.	$ 5,500,000	2018-2027	Yes

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Roads and Bridges	Multnomah County	Gresham	10498	182nd: Powell and Division Intersections	181st at Division	181st at Powell	Relieve current congestion	At Division: add second westbound left turn lane (TIF P1). At Powell, add northbound and southbound double left turn lanes (TIF P2 and TSP8).At Powell add SB and NB lanes. Transit/Enhanced Transit Corridor supportive project.	$ 1,788,678	2028-2040	Yes
Roads and Bridges	Multnomah County	Multnomah County	10386	Glisan Street Multi-Modal Improvements	202nd Ave./Gresham-Fairview Trail	207th Ave./Salish Ponds Natural Area	Build complete street	Reconstruct Glisan Street to provide multimodal connection between Gresham-Fairview Trail and Salish Ponds Natural Area. Include bike lanes, sidewalks, two travel lanes in each direction, and on-street parking. 4 lanes. Design green-street treatment for drainage improvements, including Fairview Creek culvert replacement. South side of Glisan St is in Gresham, north is City of Fairview.	$ 12,224,500	2028-2040	No
Roads and Bridges	Multnomah County	Multnomah County	10399	Reconstruct Sandy Blvd.	201st Ave.	230th	Increase system efficiency	Reconstruct Sandy Blvd to minor arterial standards with bike lanes, sidewalks and drainage improvements, utilizing recommendations from TGM grant.	$ 7,906,594	2018-2027	Yes
Roads and Bridges	Multnomah County	Multnomah County	10401	Reconstruct Marine Drive	Interlachen	I-84	Increase system efficiency	Reconstruct Marine Drive between Interlachen and the frontage roads in Troutdale.	$ 14,882,000	2028-2040	No
Roads and Bridges	Multnomah County	Multnomah County	11297	NE 207th Ave. ACM	Sandy	Glisan	Increase system efficiency	Install upgraded traffic signal controllers, establish communications to the central traffic signal system, provide arterial detection (including bicycle detection where appropriate) and routinely update signal timings. Provide real-time and forecasted traveler information on arterial roadways including current roadway conditions, congestion information, travel times, incident information, construction work zones, current weather conditions and other events that may affect traffic conditions.	$ 1,647,650	2028-2040	No
Roads and Bridges	Multnomah County	Multnomah County	11300	238th/ 242nd/ Hogan Drive ACM	Sandy	Palmquist	Increase system efficiency	Improve arterial corridor operations by expanding traveler information and upgrading traffic signal equipment and timings. Includes the ACM project with signal systems that automatically adapt to current arterial roadway conditions.	$ 4,889,800	2028-2040	Yes
Roads and Bridges	Multnomah County	Multnomah County	11373	NE 238th Drive Freight and Multimodal Improvements	Halsey St.	Glisan St	Increase freight access to indust & intermodal fac	Construct southbound travel lanes with passing lane and northbound travel lane. Add bike and pedestrian facilities on both northbound and southbound sides.	$ 9,567,000	2018-2027	Yes
Roads and Bridges	Multnomah County	Port of Portland	11951	Columbia Boulevard Rail Overcrossing	Columbia Boulevard at Penn Junction	Columbia Boulevard at Penn Junction	Relieve future congestion	Grade separate Columbia Blvd. at Penn Junction to eliminate three at-grade crossings.	$ 28,935,000	2028-2040	No
Roads and Bridges	Multnomah County	Portland	10237	Southern Triangle Access Improvements	Powell (12th/Ross Island Bridge)	Hawthorne Bridge (railroad mainline)	Increase access to jobs	Improve vehicle access to the Southern Triangle district from eastbound Powell Blvd, and improve vehicle access from CEID to westbound Powell and southbound I-5.	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Portland	10242	Interstate-Larrabee Overpass	N Interstate/Larrabee Bridge	N Interstate/Larrabee Bridge	Keep system in good repair	Remove the existing weight-restricted, low-clearance, poor-condition Interstate to Larrabee southbound flyover ramp (Bridge #153) and replace with a new overpass including a multi-use path to connect the future N Portland Greenway Trail to the Broadway Bridge. Assess the costs and benefits of providing vehicle access on the new structure as part of project development.	$ 5,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Portland	10334	11th/13th Ave Rail Overcrossing	NE 11th Ave & NE Lombard Pl	NE 11th Ave & NE Lombard Pl	Increase system efficiency	Construct roadway overcrossing at NE 11th/13th over Kenton line.	$ 35,000,000	2028-2040	No

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Roads and Bridges	Multnomah County	Portland	10335	NE 42nd/47th Ave Bridge & Corridor Improvements	NE Killingsworth St	NE Columbia Blvd	Keep system in good repair	Replace the weight-restricted NE 42nd Ave Bridge (#075) over NE Portland Hwy and the adjacent railway, and add pedestrian and bicycle facilities to the bridge and the roadway from Killingsworth to Columbia. This project will remove the weight restriction, improve vertical clearance for over-dimensional freight, and provide pedestrian and bicycle facilities.	$ 12,000,000	2018-2027	Yes
Roads and Bridges	Multnomah County	Portland	10336	Columbia & Cully Intersection Improvements	NE Cully Blvd & Columbia Blvd	NE Cully Blvd & Columbia Blvd	Increase freight access to indust & intermodal fac	Reconstruct intersection to provide signalization, left turn pockets, enhancing turning radii and improving circulation for trucks serving expanding air cargo facilities south of Portland.	$ 5,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Portland	11117	Willbridge Industrial Area Rail Overcrossing	NW Balboa	NW St Helens Rd	Increase system efficiency	Provide an alternative crossing of the BNSF Railroad to improve connectivity and safety between US 30 and the industrial properties served by NW Front Avenue in the Willbridge area of the NW Industrial District.	$ 23,113,022	2028-2040	No
Roads and Bridges	Multnomah County	Portland	11793	SE Yamhill /Taylor Couplet	SE Water	SE Grand	Increase system efficiency	Improve traffic safety and capacity by converting Yamhill and Taylor to couplet operation between Water and Grand Ave, including new traffic signals at Yamhill / MLK, Yamhill / Grand, and Taylor / Water. As part of the project, reconfigure the ramp from Belmont viaduct to MLK.	$ 3,000,000	2028-2040	Yes
Roads and Bridges	Multnomah County	Portland	11807	NE 33rd Ave Bridge Replacement	33rd Ave, NE (over railroad tracks and Columbia Blvd)	33rd Ave, NE (over railroad tracks and Columbia Blvd)	Keep system in good repair	Replace the existing seismically vulnerable 33rd Ave bridge (#009) over railroad tracks and provide pedestrian and bicycle facilities on the new structure. Improve and signalize the intersection of 33rd & Columbia, and remove the seismically vulnerable, fracture critical ramp over Columbia (#009A). Project design will consider freight movement needs, consistent with policies, street classification(s) and uses.	$ 9,200,433	2028-2040	Yes
Roads and Bridges	Washington County	Cornelius	10798	Davis Street Extension - West	4th Ave	7th Ave	Increase system efficiency	Construct new collector.	$ 4,130,629	2028-2040	No
Roads and Bridges	Washington County	Cornelius	10795	Holladay Street Extension - West	4th Ave	Yew St.	Increase freight access to indust & intermodal fac	Construct new collector.	$ 2,657,500	2028-2040	Yes
Roads and Bridges	Washington County	Cornelius	10802	29th Avenue Traffic Signals and Crossing Gates	TV Hwy (OR 8)	S. Alpine St.	Relieve future congestion	Install traffic signals at intersection of Hwy 8 and 29th Avenue and install crossing gates and signals at S. 29th railroad crossing between Baseline and Alpine Streets.	$ 2,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Forest Grove	10774	OR 47/23rd Ave Extension	OR HWY 47	24th Avenue	Increase access to jobs	Intersection improvement with connections to Martin Road intersection improvement.	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Forest Grove	11661	Hwy 47/ Martin Road Intersection	OR 47	Martin Road	Relieve current congestion	Construct improvement (e.g. roundabout) at Highway 47 intersection with Holladay Street extension, Martin Road and 23rd Avenue extension.	$ 5,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Forest Grove	11950	Hwy 47/ Purdin Rd./Verboort Intersection	HWY 47	Purdin Road	Relieve future congestion	Add a northbound right turn slip lane on the south leg of the roundabout and a southbound right turn slip lane on the south leg of the roundabout to the overall roundabout intersection.	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Forest Grove	10780	OR 47/ Pacific Avenue Intersection Improvements	OR 47	OR 8	Relieve future congestion	Construct intersection improvement to add a west-bound left turn lane.	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	10817	Aloclek Dr Gap Completion	Cornelius Pass Rd	Amberwood Dr	Build complete street	Complete missing segment of Aloclek Dr between Cornelius Pass Rd and Amberwood Dr as three-lane road with bike lanes and sidewalks	$ 2,126,000	2028-2040	No

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Roads and Bridges	Washington County	Hillsboro	10824	Cornell Rd Turn Lanes and Bike/Ped Improvements (Main to Arrington)	Main St	Arrington Rd	Build complete street	Widen roadway from four to five lanes with bike/ped facilities	$ 9,830,624	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	10831	Century Blvd Extension and Over-Crossing (North Hillsboro)	Bennett St	Wagon Way	Relieve future congestion	Construct three-lane road including US 26 overpass with bike/ped facilities; connect existing segments to provide new north-south connectivity	$ 13,733,960	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11140	Brookwood Pkwy Widening	Ihly Way	Cornell Rd	Relieve future congestion	Widen roadway to five lanes (two through lanes in each direction with left-turn lane at intersections) with bike/ped facilities	$ 9,567,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11145	Airport Rd Bike/Ped Gaps	Brookwood Pkwy	48th Ave	Build complete street	Complete missing bike lanes and sidewalk	$ 1,594,500	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	11169	Cornell Rd & 25th Ave Intersection Improvements	N/A	N/A	Relieve future congestion	Widen 25th Ave to provide double southbound left-turn lanes and second northbound through lane	$ 6,378,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11170	Cornell Rd & Brookwood Pkwy and Cornell & 48th Ave Intersection Improvements	N/A	N/A	Relieve future congestion	Widen Cornell to provide double left-turn lanes in both eastbound and westbound at Brookwood intersection; and double eastbound left-turn lanes at 48th	$ 4,704,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11280	Ronler Dr Extension	Cornelius Pass Rd	215th Ave	Increase system efficiency	Construct three-lane extension with bike/ped facilities	$ 1,000,000	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	11284	Farmington Rd Widening and Bike/Ped Improvements, Phase 1	185th Ave	198th Ave	Serve new urban area	Widen roadway from two to five lanes with bike/ped facilities	$ 8,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11285	Farmington Rd Widening and Bike/Ped Improvements, Phase 2	198th Ave	209th Ave	Serve new urban area	Widen roadway to five lanes with bike/ped facilities; new signal at 209th Ave	$ 7,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11392	TV Hwy & River Rd Intersection Improvements	N/A	N/A	Relieve future congestion	Construct eastbound right-turn lane and second northbound left-turn lane; modify traffic signal; improve bike and ped crossing of TV Hwy	$ 2,126,000	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	11905	25th Ave Turn Lanes and Bike/Ped Improvements	Cornell Rd	Griffin Oaks St	Build complete street	Widen roadway from two to three lanes (one through lane in each direction and center turn lane) with bike/ped facilities	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	10553	209th Ave Widening and Improvements, Phase 1	TV Hwy	Kinnaman Rd	Serve new urban area	Widen roadway from two/three lanes to five lanes; improve from rural to urban standard with bike facilities and sidewalks; improve intersections and railroad crossing; new signals at Blanton and Kinnaman; project to serve South Hillsboro UGB area	$ 22,327,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	10821	Huffman St Extension, Phase 1	Brookwood Pkwy	Sewell Rd	Serve new urban area	Construct five-lane road with bike/ped facilities	$ 8,387,070	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	10822	Starr Blvd Reconstruction and Improvements, Phase 1	Evergreen Rd	Huffman St (future extension)	Serve new urban area	Construct three-lane road with bike/ped facilities	$ 5,315,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	10836	Evergreen Rd Widening and Bike/Ped Improvements	Glencoe Rd	15th Ave	Serve new urban area	Widen roadway from three to five lanes, complete missing sidewalks, and upgrade to buffered bike lanes	$ 5,782,720	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11147	Schaaf Rd Reconstruction	Helvetia Rd	New north-south collector	Serve new urban area	Reconstruct rural gravel road to three-lane roadway with bike/ped facilities	$ 4,252,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11149	Helvetia Rd Turn Lanes and Bike/Ped Improvements	Schaaf Rd	West Union Rd	Serve new urban area	Widen roadway to three lanes (one through lane in each direction and center turn lane) with bike/ped facilities	$ 4,252,000	2028-2040	No

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Roads and Bridges	Washington County	Hillsboro	11150	Jacobson Rd Turn Lanes and Bike/Ped Improvements	Helvetia Rd	Century Blvd	Increase freight access to indust & intermodal fac	Widen roadway from two to three lanes (add center turn lane); complete bike/ped facilities; reconfigure intersection with Helvetia Rd to right-in, right-out only	$ 2,657,500	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	11341	West Union Rd Widening and Improvements	Helvetia Rd	Cornelius Pass Rd	Serve new urban area	Widen to three lanes from Helvetia to Century, and five lanes from Century to Cornelius Pass, including bike/ped facilities along entire length	$ 12,000,000	2028-2040	No
Roads and Bridges	Washington County	Hillsboro	11364	Starr Blvd Reconstruction and Improvements, Phase 2	Huffman St (future extension)	Meek Rd	Serve new urban area	Construct three-lane road with bike/ped facilities	$ 4,252,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11383	New North-South Collector (North Hillsboro)	Jacobsen Rd	Schaaf Rd	Serve new urban area	Construct three-lane roadway with bike/ped facilities	$ 2,657,500	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11387	Meek Rd Improvements, Phase 1	Sewell Rd	Starr Blvd	Serve new urban area	Widen and improve roadway to three lanes with bike/ped facilities	$ 6,909,500	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11388	30th Ave Construction	Evergreen Rd	Meek Rd	Serve new urban area	Construct three-lane industrial collector with bike/ped facilities	$ 10,500,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11890	Huffman St Extension, Phase 2	Sewell Rd	Jackson School Rd	Serve new urban area	Construct five-lane road with bike/ped facilities	$ 6,500,000	2018-2027	Yes
Roads and Bridges	Washington County	Hillsboro	11906	25th Ave Extension	Evergreen Rd	Huffman St	Serve new urban area	Construct three-lane roadway with bike/ped facilities; realign intersection at Evergreen to avoid airport clear zone	$ 4,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11907	Jackson School Rd Improvements	Evergreen Rd	Storey Creek (UGB)	Serve new urban area	Improve roadway from rural to urban standard and widen to three lanes with bike/ped facilities	$ 11,400,000	2028-2040	Yes
Roads and Bridges	Washington County	Hillsboro	11910	Meek Rd Improvements, Phase 2	Jackson School Rd	Sewell Rd	Increase freight access to indust & intermodal fac	Improve Meek Rd to address safety for industrial access to/from Jackson School Rd	$ 3,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Sherwood	10674	Oregon-Tonquin Roundabout	SW Oregon Street	SW Tonquin Rd	Relieve future congestion	Reconstruct and realign three leg intersection with a roundabout (partial two-lane roundabout) approx 400 feet northeast of existing roundabout at SW Oregon St & Murdock Rd. ROW, PE, design & construction. Potential for signal in-lieu of dual-roundabout system if better for development and once SW 124th Ave project is completed. If roundabout, project will include rapid flashing beacons at new roundabout and retrofit of adjacent roundabout to meet MUTCD suggestions for pedestrian crossings at roundabouts. This is currently a Washington County facility but would likely become Sherwood's upon completion of project to TSP standards.	$ 2,400,000	2018-2027	Yes
Roads and Bridges	Washington County	Sherwood	10699	Oregon Street	SW Murdock Rd	SW Langer Farms Pkwy	Build complete street	Widen existing substandard 2-lane road (no sidewalks, no median) to a 3-lane collector meeting current TSP standards (8' sidewalks, 5' landscape strip, 12' travel, 14' median, 12' travel, 5' landscape, 8' sidewalks, plus 2 on-street bike lanes or 4' added to each 8' sidewalk). On-street bike lanes vs. 2 multi-use paths TBD with future development.	$ 5,700,000	2018-2027	Yes
Roads and Bridges	Washington County	Sherwood	10700	Arrow St	SW Langer Farms Parkway	SW Gerda Lane	Link land use with transportation investments	Construct 3-lane collector street to TSP standards between SW Langer Farms Parkway and SW Gerda Lane.	$ 8,200,000	2028-2040	No
Roads and Bridges	Washington County	Sherwood	11404	Baler Way Extension	SW Langer Farms Parkway	SW Tualatin-Sherwood Road	Link land use with transportation investments	Extend SW Baler Way (3-lane collector) between SW Tualatin-Sherwood Road and SW Langer Farms Parkway, possibly SW Pacific Highway depending upon results of widening of SW Tualatin-Sherwood Road project by Washington County.	$ 3,800,000	2018-2027	Yes

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Roads and Bridges	Washington County	Sherwood	12046	Tonquin Area East-West Collector	SW 124th Avenue	SW Tonquin Road	Relieve future congestion	Construct 3-lane collector status road between SW 124th Avenue and SW Tonquin Road through the Tonquin employment area to serve recent UGB annexation area.	$ 10,500,000	2028-2040	Yes
Roads and Bridges	Washington County	Sherwood	12047	Brookman Road Intersection Realignment	SW Pacific Highway	SW Brookman Road	Relieve future congestion	Realigns and relocates the SW Brookman Road intersection with SW Pacific Highway (OR 99W) to accommodate the expansion of SW Brookman Road for future development	$ 15,500,000	2028-2040	Yes
Roads and Bridges	Washington County	Tigard	10751	Hwy. 217 Overcrossing	Hunziker Road	Beveland	Relieve current congestion	Realign Hunziker Road to meet Hampton Street at 72nd Ave, remove existing 72nd/Hunziker Road intersection, provide bicycle, pedestrian and transit facilities. Project to be refined based on SW Corridor High Capacity Transit recommendations.	$ 30,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Tigard	10755	72nd Ave. Improvements - 99W to Hunziker	99W	Hunziker Road	Build complete street	Improve as determined by study, with bikeways and sidewalks.	$ 14,400,000	2018-2027	Yes
Roads and Bridges	Washington County	Tigard	10768	Upper Boones Ferry Intersection Improvements	Durham Road	I-5	Relieve current congestion	Construct intersection improvements at Durham Road and Upper Boones Ferry Road to provide dual southbound right-turns, dual eastbound left-turns, eastbound right-turns, existing and improve signal timing. Install bike lanes on both sides of the streets from just south of Durham Rd to just north of Durham Rd.	$ 5,000,000	2028-2040	No
Roads and Bridges	Washington County	Tigard	10770	OR 99W Intersection Improvements (PE)	64th Ave.	Durham Rd.	Increase system efficiency	Project development phase: Provide increased capacity at priority intersections, including bus queue bypass lanes in some locations, improved sidewalks, priority pedestrian crossings, and an access management plan, while retaining existing 4/5-lane facility from I-5 to Durham Road. See 2035 Tigard TSP Project #66 for specific improvements.	$ 5,000,000	2028-2040	No
Roads and Bridges	Washington County	Tigard	11995	Hunziker Core Industrial Street	Hunziker Road	Tech Center Drive	Increase freight access to indust & intermodal fac	Construct new street with sidewalks and bike lanes from Hunziker Road (along Wall Street) to Tech Center Drive to improve freight access and connectivity to Tigard Triangle	$ 8,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Tualatin	10715	Herman	124th	Tualatin	Reduce crashes	Upgrade to standards. Improve the intersection of 118th and Herman Road.	$ 5,300,000	2018-2027	Yes
Roads and Bridges	Washington County	Tualatin	10738	Teton	Tualatin	Avery	Relieve current congestion	Reconstruct/widen to 3 lanes, Add bike lanes to Teton from Avery to Tualatin Rd. Right Turn Lane from Teton (N) to Tualatin-Sherwood Road (W). Signalize the intersection of Teton at Tualatin. Add southbound turn pocket on Teton to Avery and signalize intersection.	$ 5,151,298	2028-2040	Yes
Roads and Bridges	Washington County	Tualatin	11417	Blake Street Extension	115th	124th Ave	Increase access to jobs	Build the roadways from from the SW Concept Plan including; Extend Blake Street to create an east - west connection between 115th and 124th. Install signal at Blake and 124th. Extend 120th south to 124th.	$ 11,161,500	2018-2027	Yes
Roads and Bridges	Washington County	Tualatin	11420	Nyberg	I-5 on-ramp	I-5 on-ramp	Relieve current congestion	Add an additional on-ramp lane for vehicles traveling westbound on SW Nyberg Street to I-5 northbound (northeast quadrant of the Nyberg Interchange). Reduce the pedestrian island and improve illumination to enhance safety.	$ 1,138,473	2028-2040	No
Roads and Bridges	Washington County	Tualatin	11423	Avery	Teton	Tualatin-Sherwood	Build complete street	Widen to 3-lanes	$ 3,826,800	2028-2040	Yes
Roads and Bridges	Washington County	Tualatin	10716	Myslony	112th	124th Ave	Increase access to jobs	Reconstruct/widen from 112th to 124th to fill system, includes bridge. Improve the intersection of 124th and Myslony.	$ 10,000,000	2018-2027	Yes

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Roads and Bridges	Washington County	Tualatin	10717	Cipole Street Reconstruction	OR 99W	Tualatin-Sherwood	Increase access to jobs	Reconstruct/widen to 3 lanes from 99W to Tualatin-Sherwood Road and include shared-use path for the Ice Age Tonquin Trail, includes signal at Cipole and Herman. The project or a portion of the project is outside the designated urban growth boundary as of March 2014.	$ 21,291,890	2028-2040	No
Roads and Bridges	Washington County	Tualatin	10718	Herman	Cipole	124th Ave	Increase access to jobs	Reconstruction/ widen to 3-lanes from Cipole to 124th.	$ 2,736,162	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	10560	Farmington Rd. Improvements	185th	Kinnaman Rd.	Relieve current congestion	Widen roadway from 2/3 lanes to 4 lanes with turn lanes at major intersections, bike lanes, sidewalks, access management, realignment of Rosa/179th intersection.	$ 29,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	10561	Jenkins Rd. Improvements	158th Ave.	Murray	Relieve current congestion	Widen roadway from three to five lanes with bike lanes and sidewalks.	$ 7,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	10575	West Union Rd.	Cornelius Pass Rd.	185th Ave.	Relieve current congestion	Widen from two to five lanes with bike lanes and sidewalks.	$ 22,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	10578	Merlo/158th Improvements	170th Ave.	Walker Rd.	Relieve current congestion	Widen roadway to five lanes with bike lanes and sidewalks	$ 13,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	10587	Cornelius Pass Rd. Improvements	Frances St.	T.V. Hwy.	Relieve current congestion	Widen to five lanes with bike lanes and sidewalks	$ 16,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	10590	Tonquin Rd. Improvements	Grahams Ferry Rd.	124th	Build complete street	Realign and widen to three lanes with bike lanes and sidewalks and street lighting.	$ 11,400,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	10591	Glencoe Rd. Improvements	Evergreen Rd.	Jackson Ave.	Increase travel options/alt. to driving alone	Widen to three lanes with bike lanes and sidewalks.	$ 27,700,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	11452	Scholls Ferry Rd. Improvements	West of Tile Flat Rd.		Reduce crashes	Realign Curves to Improve Safety.	$ 4,600,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	11486	Roy Rogers Rd.	Scholls Ferry Rd.	UGB	Relieve current congestion	Widen to five lanes with bike lanes and sidewalks	$ 21,300,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	11487	Boones Ferry Improvements	Basalt Creek East-West Arterial	Day Rd.	Relieve future congestion	Widen from 3 lanes to 5 lanes with bike lanes, sidewalks and street lighting	$ 1,200,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	11490	Day Rd Overcrossing	Boones Ferry Rd	Elligsen Rd	Relieve future congestion	Extend new 4-lane overcrossing over I-5 from Boones Ferry Rd to Elligsen Rd.	$ 46,900,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	11914	Roy Rogers Rd	UGB	Chicken Creek Bridge	Relieve current congestion	Widen roadway to 4-5 lanes, includes sidewalks and bike lanes	$ 25,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	11915	Scholls Ferry Rd	Tile Flat Rd.	Roy Rogers Rd.	Relieve future congestion	Widen roadway to 5 lanes, includes sidewalks and bike lanes	$ 8,300,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	11924	Grahams Ferry Road (Tonquin to Day)	Tonquin Rd.	Day Rd.	Relieve future congestion	Widen roadway to 5 lanes, includes sidewalks and bike lanes	$ 6,000,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	10557	Murray/TV Hwy. Intersection	Farmington Rd.	TV Hwy.	Relieve current congestion	Intersection improvement at TV Hwy. and Farmington with Murray Blvd.	$ 26,600,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	10559	Cornell Improvements	Hwy. 26	Murray Blvd.	Relieve current congestion	Widen Cornell from three to five lanes with bike lanes and sidewalks.	$ 25,000,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	10568	Tualatin-Sherwood Rd. Improvements	Langer Farms Pkwy.	Teton Ave.	Relieve current congestion	Widen from three to five lanes with bike lanes and sidewalks.	$ 35,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	10596	Scholls Ferry Rd. Improvements	Hwy. 217	121st Ave.	Relieve current congestion	Widen to seven lanes with bike lanes and sidewalks.	$ 21,000,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	10598	Southern Arterial	Hwy. 99W	I-5	Relieve future congestion	Purchase ROW. Construct 2/3 lane arterial with bike lanes and sidewalks.	$ 116,000,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	11436	East-West Arterial Overcrossing	Boones Ferry Rd	East of I-5	Relieve future congestion	Extend new 4-lane overcrossing over I-5 from Boones Ferry Rd to 65th and Stafford Rd.	$ 40,400,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	11469	124th Ave Improvements	Tualatin-Sherwood Rd.	Grahams Ferry Rd	Relieve future congestion	Widen 124th from 2 lanes to 5 lanes with bike lanes and sidewalks	$ 14,900,000	2028-2040	No

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RTP Investment Category	County	Nominating Agency	2018 RTP ID	Project Name	Start Location	End Location	Primary Purpose	Description	Estimated Cost (2016 dollars)	Time Period	Financially Constrained?
Roads and Bridges	Washington County	Washington County	11470	Basalt Creek Parkway	Grahams Ferry Rd.	Boones Ferry Rd	Increase access to jobs	Extend new 5 lane Arterial with bike lanes, sidewalks and street lighting.	$ 31,700,000	2028-2040	Yes
Roads and Bridges	Washington County	Washington County	11737	Cornell @ 185th Intersection Improvements	185th Ave.	Cornell Rd	Relieve future congestion	Prioritize near-term improvements such as signal timing, transit prioritization, traffic operations, monitoring, and specific turn lane configurations. Intersection improvements (and/or other reasonable replacement improvements) are to be implemented and prioritized as funding allows. If, after such improvements have been considered and motor vehicle traffic congestion becomes unacceptable, then these intersections could be considered as candidates for grade separation and/or other improvements to meet travel needs.	$ 22,300,000	2028-2040	No
Roads and Bridges	Washington County	Washington County	11903	Roy Rogers Rd.	Chicken Creek Bridge	Borchers Rd	Relieve current congestion	Widen roadway to 5 lanes, includes sidewalks and bike lanes	$ 11,000,000	2018-2027	Yes
Roads and Bridges	Washington County	Washington County	11923	Grahams Ferry Road (Helenius to Tonquin)	Helenius St	Tonquin Rd	Build complete street	Widen roadway to 3 lanes, includes sidewalks and bike lanes	$ 4,000,000	2028-2040	No
Roads and Bridges	Washington County	Wilsonville	11489	Boones Ferry / I-5 off ramp improvements	SB I-5 off ramp	Boones Ferry Rd	Relieve current congestion	construct second right-turn lane	$ 1,063,000	2028-2040	Yes
Roads and Bridges	Washington County	Wilsonville	11798	Elligsen Road Urban Upgrade	Parkway Center Drive	65th	Build complete street	Reconstruct street to 3 lanes with buffered bike lanes and sidewalks. (TSP project UU-P3)	$ 6,000,000	2028-2040	No
Roads and Bridges	Washington County	Wilsonville	10853	Garden Acres Road Extension	Day Road	Ridder Road	Increase freight access to indust & intermodal fac	Construct three lane road extension with sidewalks and bike lanes and reconstruct/reorient Day Road/Grahams Ferry Road/Garden Acres Road intersection.	$ 14,260,000	2018-2027	Yes
Roads and Bridges	Washington County	Wilsonville	11243	Day Road Improvements	Grahams Ferry Rd.	Boones Ferry Rd.	Relieve future congestion	Widen street from 3 to 5 lanes with bike lanes, sidewalks and street lighting. Improve structural integrity for increased freight traffic and provide congestion relief.	$ 10,560,000	2018-2027	Yes
Roads and Bridges	Washington County	Wilsonville	11809	Java Road Connection and Signal	Grahams Ferry Road	Garden Acres Road	Increase access to jobs	Construct new Java Road with buffered bike lanes and sidewalks, disconnect Clutter Street from Grahams Ferry Road, and install traffic signal at Grahams Ferry Road.	$ 1,500,000	2028-2040	No
Throughways	Clackamas County	ODOT	10890	OR 212/224 Sunrise Hwy Phase 2: I-205 to SE 172nd (PE, ROW)	I-205	172nd Ave.	Relieve current congestion	Conduct preliminary engineering (PE) and acquire right-of-way (ROW) on the OR 212/224 Sunrise Corridor from I-205 to SE 172nd Ave consistent with the Final Environmental Impact Statement (FEIS)/Record of Decision (ROD).	$ 70,000,000	2018-2027	Yes
Throughways	Clackamas County	ODOT	11301	OR 212/224 Sunrise Hwy Phase 2: I-205 to SE 172nd (CON)	I-205	172nd Ave.	Relieve current congestion	Construction (CON) improvements on the OR 212/224 Sunrise corridor from I-205 to SE 172nd Ave consistent with the FEIS/ROD.	$ 100,000,000	2028-2040	Yes
Throughways	Clackamas County	ODOT	11350	OR 224 Milwaukie Expressway improvements	I-205	Rusk Rd	Increase system efficiency	Construct a third westbound lane on Milwaukie Expressway (Hwy-224) from I-205 to Rusk Rd	$ 12,000,000	2018-2027	Yes
Throughways	Clackamas County	ODOT	11585	I-205 Abernethy Bridge (PE and ROW)	OR99E Interchange	Oswego Hwy (OR 43) Interchange	Relieve current congestion	Widen bridge to address recurring bottlenecks on the bridge.	$ 8,000,000	2018-2027	Yes
Throughways	Clackamas County	ODOT	11969	I-205 Abernethy Bridge (CON)	OR99E Interchange	Oswego Hwy (OR 43) Interchange	Relieve current congestion	Widen both directions of the I-205 Abernethy Bridge and approaches to address recurring bottlenecks on the bridge. Install Active Traffic Management (ATM) on northbound and southbound I-205. Preliminary Engineering (PE) and Right-of-Way (ROW) phase.	$ 200,000,000	2028-2040	Yes
Throughways	Clackamas County	ODOT	11981	I-205 Northbound Auxiliary Lane, Sunrise Expressway Entrance to Sunnybrook	Sunrise Expressway Entrance	Sunnyside/ Sunnybrook Exit	Increase system efficiency	Provide I-205 NB auxiliary lane between Sunrise Expressway entrance ramp and the Sunnyside Road/Sunnybrook Blvd interchange exit ramp.	$ 7,000,000	2018-2027	Yes

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RTP Investment Category	County	Nominating Agency	2018 RTP ID	Project Name	Start Location	End Location	Primary Purpose	Description	Estimated Cost (2016 dollars)	Time Period	Financially Constrained?
Throughways	Clackamas County	ODOT	11990	I-5 Southbound: Wilsonville Rd to Wilsonville-Hubbard Hwy	Wilsonville Rd	Wilsonville-Hubbard Hwy	Increase system efficiency	Add an auxiliary lane on I-5 from Wilsonville Road to the Wilsonville-Hubbard Highway, including improvements to the Boone Bridge. PE, ROW and Construction Phases.	$ 80,000,000	2028-2040	Yes
Throughways	Clackamas County	ODOT	11992	I-205 Operational Improvements	Columbia River	I-5	Increase system efficiency	Construct improvements to address bottlenecks and improve safety on I-205. Specific improvements as identified in operational analysis, mobility corridor analysis and refinement planning.	$ 20,000,000	2028-2040	No
Throughways	Clackamas County, Multnomah County	ODOT	11305	I-205 Active Traffic Management	Columbia River	I-5	Increase system efficiency	Construct improvements to address recurring bottlenecks on I-205. Specific improvements as identified in operational analysis, Mobility Corridor analysis, refinement planning and Active Traffic Management Atlas.	$ 15,000,000	2018-2027	Yes
Throughways	Multnomah County	ODOT	10893	I-5 Columbia River Bridge	Victory Blvd.	Washington state line	Relieve current congestion	Replace I-5/Columbia River bridges and improve interchanges on I-5. Project adds protected/buffered bikeways, cycle tracks and a new trail/multiuse path or extension.	$ 3,169,866,000	2028-2040	Yes
Throughways	Multnomah County	ODOT	11304	I-5 South Operational Improvements	Marquam Bridge	Region Boundary	Increase system efficiency	Construct improvements to address recurring bottlenecks on I-5 south of the central city. Specific improvements as identified in operational analysis, Mobility Corridor analysis and refinement planning.	$ 15,000,000	2018-2027	Yes
Throughways	Multnomah County	ODOT	11370	I-205 Northbound Auxiliary Lane Powell to I-84	Powell Entrance Ramp	I-84	Increase system efficiency	Design and construct an auxiliary lane on northbound I-205 from Powell Blvd to the I-84 interchange.	$ 15,000,000	2018-2027	Yes
Throughways	Multnomah County	ODOT	11583	I-5 Northbound: Lower Boones Ferry to Carman Auxiliary Lane Extension	Lower Boones Ferry Rd. Interchange	Carman Dr. Interchange	Increase system efficiency	Extend existing auxiliary lane between the Lower Boones Ferry Road interchange and the Carman Drive interchange.	$ 22,500,000	2028-2040	No
Throughways	Multnomah County	ODOT	11974	I-405 Operational Improvements	Fremont Bridge	I-5	Increase system efficiency	Construct operational improvements to address bottlenecks and improve safety on I-405. Specific improvements as identified in operational analysis, mobility corridor analysis, and refinement planning	$ 50,000,000	2028-2040	No
Throughways	Multnomah County	ODOT	11993	I-84 Operational Improvements	I-5	Troutdale	Increase system efficiency	Construct improvements to address bottlenecks and improve safety on I-84. Specific improvements as identified in operational analysis, mobility corridor analysis and refinement planning	$ 20,000,000	2028-2040	No
Throughways	Multnomah County, Washington County	ODOT	11971	US 26 (Sunset Highway) Operational Improvements	I-405	West MPO Boundary	Increase system efficiency	Construct Improvements to address bottlenecks and improve safety on US 26 (Sunset Highway) Specific improvements as identified in operational analysis, mobility corridor analysis, and refinement planning	$ 50,000,000	2028-2040	No
Throughways	Region-wide	ODOT	11991	I-5 Freight Operational Improvements	Columbia River	South MPO Boundary	Increase system efficiency	Construct improvements to address bottlenecks and improve safety on I-5. Specific improvements as identified in operational analysis, mobility corridor analysis and refinement planning.	$ 200,000,000	2028-2040	No
Throughways	Washington County	Hillsboro	11279	US 26 & 185th Ave Interchange Refinement Study and Implementation	N/A	N/A	Relieve future congestion	Conduct interchange refinement study and implementation	$ 26,575,000	2028-2040	No
Throughways	Washington County	Hillsboro	11393	US 26 Widening - Brookwood to Cornelius Pass	Brookwood Pkwy/Helvetia Rd	Cornelius Pass Rd	Relieve future congestion	Widen US 26 from four to six lanes	$ 26,575,000	2028-2040	Yes
Throughways	Washington County	ODOT	11302	I-5/OR 217 Interchange Phase 2	I-5/OR 217 Interchange	N/A	Relieve current congestion	I-5/OR 217 Interchange Phase 2 - southbound OR 217 to southbound I-5 entrance ramp; southbound I-5 exit to Kruse Way loop ramp.	$ 53,000,000	2028-2040	No

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RTP Investment Category	County	Nominating Agency	2018 RTP ID	Project Name	Start Location	End Location	Primary Purpose	Description	Estimated Cost (2016 dollars)	Time Period	Financially Constrained?
Throughways	Washington County	ODOT	11402	I-5 Northbound: Auxiliary Lane Extension Nyberg to Lower Boones Ferry	Nyberg Rd. Interchange	Lower Boones Ferry Rd. Interchange	Increase system efficiency	Extend existing auxiliary lane.	$ 13,500,000	2028-2040	Yes
Throughways	Washington County	ODOT	11582	OR 217 Capacity Improvements	US 26 (Sunset Hwy)	I-5	Relieve current congestion	Construct as a 6-lane freeway, adding 3rd through lane in each direction, and complete interchange reconstruction with ramp and overcrossing improvements	$ 398,500,000	2028-2040	No
Throughways	Washington County	ODOT	11976	OR 217 Northbound Auxiliary Lane Extension Scholls Ferry to Allen/Denney	Scholls Ferry Road	Allen/Denney Interchange	Increase system efficiency	Extend OR 217 auxiliary lane from Scholls Ferry to Allen/Denney interchange by filling in the existing auxiliary lane and modifying related ramp connections	$ 50,000,000	2028-2040	No
Throughways	Washington County	ODOT	11978	OR 217 Interchange, Safety, and Operational Improvements	US 26 (Sunset Highway)	I-5	Increase system efficiency	Design and construct improvements to OR 217 between US 26 and Allen/Denney interchange to improve safety, reliability and mobility	$ 75,000,000	2028-2040	No
Throughways	Washington County	ODOT	11986	OR 217 Northbound Auxiliary Lane 99W to Scholls Ferry (CON)	99W	Scholls Ferry	Increase system efficiency	Extend OR 217 Northbound (NB) auxiliary lane from OR 99W to Scholls Ferry. Construction (CON) phase	$ 50,000,000	2018-2027	Yes
Throughways	Washington County	ODOT	11987	OR 217 Southbound Auxiliary Lane Beaverton Hillsdale Hwy to 99W (CON)	Beaverton-Hillsdale Hwy	OR99W	Increase system efficiency	Extend Southbound (SB) auxiliary lane from Beaverton-Hillsdale Hwy to OR 99W. Build collector/distributor road from Allen Blvd to Denny Rd. Construction Phase	$ 45,000,000	2018-2027	Yes
Throughways	Washington County	ODOT	11988	OR 217 Southbound Braided Ramps Beaverton-Hillsdale Hwy to Allen Blvd	Beaverton-Hillsdale Hwy	Allen Blvd	Increase system efficiency	Design and construct braided ramps on southbound OR 217 at Canyon Rd and Beaverton Hillsdale Hwy.	$ 50,000,000	2028-2040	Yes
Throughways	Washington County	ODOT	12019	OR 217 Northbound Auxiliary Lane 99W to Scholls Ferry (PE, ROW)	OR99W	Scholls Ferry Interchange	Increase system efficiency	Extend OR 217 Northbound (NB) auxiliary lane from OR 99W to Scholls Ferry. ROW and PE phase	$ 7,500,000	2018-2027	Yes
Throughways	Washington County	Washington County	10599	Hwy. 217/72nd Ave. Interchange Improvements	OR 217/72nd Avenue	OR 217/72nd Avenue	Relieve future congestion	Complete interchange reconstruction with additional ramps and bridge structure replacement	$ 21,300,000	2028-2040	No
Throughways	Clackamas County	ODOT	11586	I-205 Southbound and Northbound widening (PE, ROW)	Oswego Hwy Interchange	Stafford Rd Interchange	Relieve current congestion	Widen highway to address recurring bottlenecks. The project or a portion of the project is outside the designated urban growth boundary as of March 2014.	$ 8,000,000	2018-2027	Yes
Throughways	Clackamas County	ODOT	11904	I-205 Southbound and Northbound widening (CON)	Oswego Hwy Interchange	Stafford Rd Interchange	Relieve current congestion	Widen Interstate 205 by one lane in both directions to address recurring bottlenecks. Construction (CON) phase.	$ 200,000,000	2028-2040	Yes
Throughways	Clackamas County	ODOT	12020	OR 212/224 Sunrise Project Phase 3	I-205	172nd Ave	Relieve current congestion	Construct remaining improvements in the Sunrise Corridor consistent with the FEIS/ROD	$ 475,000,000	2028-2040	No
Throughways	Clackamas County	West Linn	11242	I-205 / 10th Street Improvements	Willamette Falls Drive	Blankenship Rd / Salamo Road	Relieve current congestion	Construct a long-term interchange improvement to provide congestion relief, address safety issues, and improve bike/ped connectivity.	$ 7,800,000	2018-2027	Yes
Throughways	Multnomah County	ODOT	10867	I-5 from I-405 to I-84 (Rose Quarter/Lloyd District) PE, NEPA, ROW	I-84	Greeley St.	Reduce crashes	Conduct preliminary engineering and National Environmental Policy Act review, and right of way work to improve safety and operations on I-5, connection between I-84 and I-5, and multimodal access to and connectivity between the Lloyd District and Rose Quarter.	$ 15,000,000	2018-2027	Yes
Throughways	Multnomah County	ODOT	11176	I-5 from I-405 to I-84 (Rose Quarter/Lloyd District) Construction	I-84	Greeley St.	Reduce crashes	Construct improvements to enhance safety and operations on I-5, connection between I-84 and I-5, and multimodal access to and connectivity between the Lloyd District and Rose Quarter.	$ 375,000,000	2018-2027	Yes

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RTP Investment Category	County	Nominating Agency	2018 RTP ID	Project Name	Start Location	End Location	Primary Purpose	Description	Estimated Cost (2016 dollars)	Time Period	Financially Constrained?
Throughways	Multnomah County	ODOT	11984	I-5 Southbound Truck Climbing Lane	Marquam Bridge	Multnomah Blvd	Keep system in good repair	I-5 Truck Climbing Lanes SB (Marquam to Multnomah Blvd). Preliminary Engineering (PE) and Right-of-Way (ROW) and Construction (CON) phases	$ 100,000,000	2028-2040	Yes
Throughways	Washington County	ODOT	11989	I-5 Northbound Braided Ramps I-205 to Nyberg	I-205	Nyberg Rd	Relieve current congestion	Replace the inside merge at I-205 entrance by constructing braided ramps.	$ 50,000,000	2028-2040	Yes
Throughways	Washington County	Tualatin	11420	Nyberg	I-5 on-ramp	I-5 on-ramp	Relieve current congestion	Add an additional on-ramp lane for vehicles traveling westbound on SW Nyberg Street to I-5 northbound (northeast quadrant of the Nyberg Interchange). Reduce the pedestrian island and improve illumination to enhance safety.	$ 1,138,473	2028-2040	No

Total Cost of Financially Constrained RTP Freight Projects and Programs	$ 5,772,020,404
Total Cost of Strategic (non-Financially Constrained) RTP Freight Projects and Programs	$ 2,358,837,102
Total Cost of "Freight" Investment Category	$ 479,150,870
Total Cost of "Roads and Bridges " Investment Category	$ 1,548,452,163
Total Cost of "Throughways" Investment Category	$ 6,103,254,473
Grand Total Cost of all 2018 RTP Freight Projects and Programs	$ 8,130,857,506
	$ 8,130,857,506
Cost of Financially Constrained "Freight" Investment Category	$ 230,378,857
Cost of Financially Constrained "Roads and Bridges " Investment Category	$ 905,987,525
Cost of Financially Constrained "Throughways" Investment Category	$4.6 billion

APPENDIX B

REGIONAL FREIGHT AND GOODS MOVEMENT TASK FORCE MEMBERS

Engaging stakeholders to develop a regional freight plan

The center point for the engagement of stakeholders was the Metro Council appointed Regional Freight and Goods Movement Task Force. The 33-member task force included representatives from the multimodal freight industry, community and government agencies. The group was charged with guiding the formation of policy and strategy recommendations for the region's multimodal freight transportation system. Metro Councilor Rod Park served as chairperson for the task force. The list of members included:

Steve Akre
OIA Global Logistics

Grant Armbruster
Columbia Sportswear

Steve Bates
Redmond Heavy Haul

Scott Bricker
Bicycle Transportation Alliance

Katy Brooks
Port of Vancouver

Gary Cardwell
NW Container Service

Terry Cleaver
Columbia Grain

Lynda David
Southwest Washington RTC

Tom Dechenne
Norris, Beggs & Simpson

John Drew
Far West Fibers

Ann Gardner
Schnitzer Steel Industries

Pete George
PW George Consulting

Cam Gilmour
Clackamas County

Van Hooper
Sysco Foods

Tom Hughes
City of Hillsboro

Monica Isbell
Starboard Alliance

Susie Lahsene
Port of Portland

Brian McMullen
WSDOT

Jeanne Morgan
Xerox

James Nave
Union Pacific RR

Rod Park
Metro

Michael Powell
Powell's Books

Warren Rosenfeld
Calbag Metals

Robert Russell

Paul Smith
City of Portland

John Speight
Portland & Western RR

Paul Thalhofer
City of Troutdale

Jason Tell
ODOT

Elizabeth Wainwright
Merchants Exchange

Tracy Ann Whalen
ESCO Corporation

Rick Williams
Lloyd District TMA

The RFGM Task Force met 11 times between July 2006 and October 2007. Additionally, the task force worked in ad hoc subcommittees to tackle specific issues, such as a regional vision for freight, freight---related RTP goals and objectives, and project prioritization criteria, and brought back recommendations to the full task force. Task Force members also participated in a combined Metropolitan Policy Advisory Committee and Joint Policy Advisory Committee on Transportation meeting held in October 2007.

The long---standing Metro committee on regional freight coordination, the Regional Freight Advisory Committee, served as the technical advisory committee on this plan, providing data, input on analysis, and review of memorandums and reports. The committee is loosely comprised of transportation agencies in the region with an interest in freight issues. Active participants include:

- Oregon Department of Transportation
- Washington County
- Washington Department of Transportation
- Multnomah County
- Metro
- City of Gresham
- Southwest Washington Regional Transportation Council
- City of Milwaukie Port of Portland
- City of Portland
- Port of Vancouver
- City of Tualatin
- FHWA
- City of Wilsonville
- Clackamas County

APPENDIX C

METRO FREIGHT MODEL

FREIGHT MODEL SUMMARY

This purpose of the Freight Demand Modeling and Data Improvement Project was to replace the current trip-based truck model developed by Oregon Metro (Metro) that utilizes fixed commodity flows with a truck tour model designed to reflect decisions made by shippers, receivers, truck operators, terminal managers, and others. The model simulates movement of individual shipments throughout the supply chain, including both direct shipments and those that travel through transshipment facilities. Shipments are allocated to trucks of various classes, and the movements of all freight vehicles are simulated over the course of a typical weekday.

Key participants in the project included Metro, the Oregon Department of Transportation (ODOT), the Port of Portland, and local agencies throughout the region.

The objectives of the project were to:

- Develop tools to enable a more comprehensive analysis of infrastructure needs and policy choices pertaining to the movement of goods;
- Develop more detailed network assignments by truck type to support regional environmental analysis, as well as local traffic operations and engineering analysis;
- Develop freight forecasts that are responsive to changes in economic forecasts, changing growth rates among industrial sectors, and changing rates of economic exchange and commodity flows between sectors; and
- Replace the trip-based truck model with more realistic tour-based model.

2.1 Current Metro Models

Metro has deployed commodity-flow based truck models for almost 20 years. These models have utilized data based on the Freight Analysis Framework (FAF) and prepared under contract for Metro and the Ports of Portland and Vancouver. The current model is based on FAF3, which utilized data gathered in the 2007 Commodity Flow Survey (CFS), together with data from several other sources.

Commodities are grouped into 16 categories, and assigned to major "gateways" by long-haul mode and direction. Long-haul truck-borne commodities enter and exit at major highway cordons. The commodities are segmented by carrier type (private, common carrier, truckload, and LTL). A portion of the commodities in each group is routed through warehouse, distribution, and consolidation facilities based on a 2006 survey. They are distributed to individual Transportation Analysis Zones (TAZ's) based on employment types associated with each group and then assigned to medium and heavy vehicles based on load factors. External-internal and internal-external truck flows are derived by designating

a portion of the truck volumes at each external station as through trips, in accordance with the 2006 survey.

Daily heavy and medium truck trips are factored into time periods using data from a region-wide truck count database. The trips are factored to passenger-car-equivalents and assigned to the network using multi-class assignment techniques. The current truck model does not include local delivery vehicles or non-freight commercial vehicles, and there is no feedback of network travel costs into the model.

Metro's current trip-based passenger model, code-named "Kate", was estimated in 2016 and calibrated and validated in the spring of 2017. The main model inputs are households by size, income, and life cycle; and employment by sector. A series of demographic models is used to estimate household attributes not included in the inputs, such as the number of workers, number of school-age children, and number of household vehicles. Fixed trip generation rates are assigned to households based on specific attributes (e.g., persons, workers, and age of head of household) for eight trip purposes. Destination choice for home-based work trips is further segmented into three income classes. The mode choice model assigns seven travel modes - drive alone, drive-with-passenger, auto passenger, walk-to-transit, drive-to-transit, walk, and bike. The drive alone and drive-with-passenger modes are assigned to the network as SOV and HOV vehicles, respectively. Public transit submodes (bus, LRT, streetcar, commuter rail) are determined in the transit assignment path choice, but are not segmented in the demand model. There is full feedback and equilibration of the demand model (destination choice, mode choice, and assignment path choice) with auto network costs.

There is a separate airport model that estimates person-trips to Portland International Airport for all purposes and modes, a separate bicycle route choice model that interacts with mode choice, and a special events model that is used for certain types of transit studies.

2.2 Model User Needs

Early in the study, a series of stakeholder interviews were held with potential users of the freight model output to identify key freight-related issues and challenges, important impacts to measure for decision-making, expected use of a freight model or outputs, and the level of interest in freight model development from their perspective. The stakeholder groups were:

- Oregon Metro
- ODOT
- Port of Portland
- Local agencies
- Portland Freight Committee

The key freight-related issues and challenges identified by the groups include the following:

- Multimodal analysis (rail, air, water, pipeline) in addition to truck;
- Local truck movements for pick-up and delivery (last mile connections and congestion);
- Impacts of distribution centers (new and existing) and industrial land development;
- Economic impacts of freight; and
- Operational impacts of local truck movements (reliability, road diets and impacts to bike/pedestrian movements).

The model addresses all of these issues, except pipeline transport, either directly or indirectly. Pipeline movements could be added to the mode choice models in future enhancements. Other issues, such as economic and operational impacts, will require additional tools which Metro may choose to develop.

The stakeholder groups also identified a set of impacts that will be important to measure:

- Shifts in imports and exports (representing global shifts in freight to the U.S.);
- Shifts in national commodity flow movements due to Portland improvement projects;
- Greenhouse gas (GHG) emissions;
- Roadway operational improvements;
- Rail capacity and speed improvements;
- Shifts in transloading at the Ports of Portland and Vancouver;
- Distribution of oil arriving by pipeline; and
- Economic benefits of freight movements.

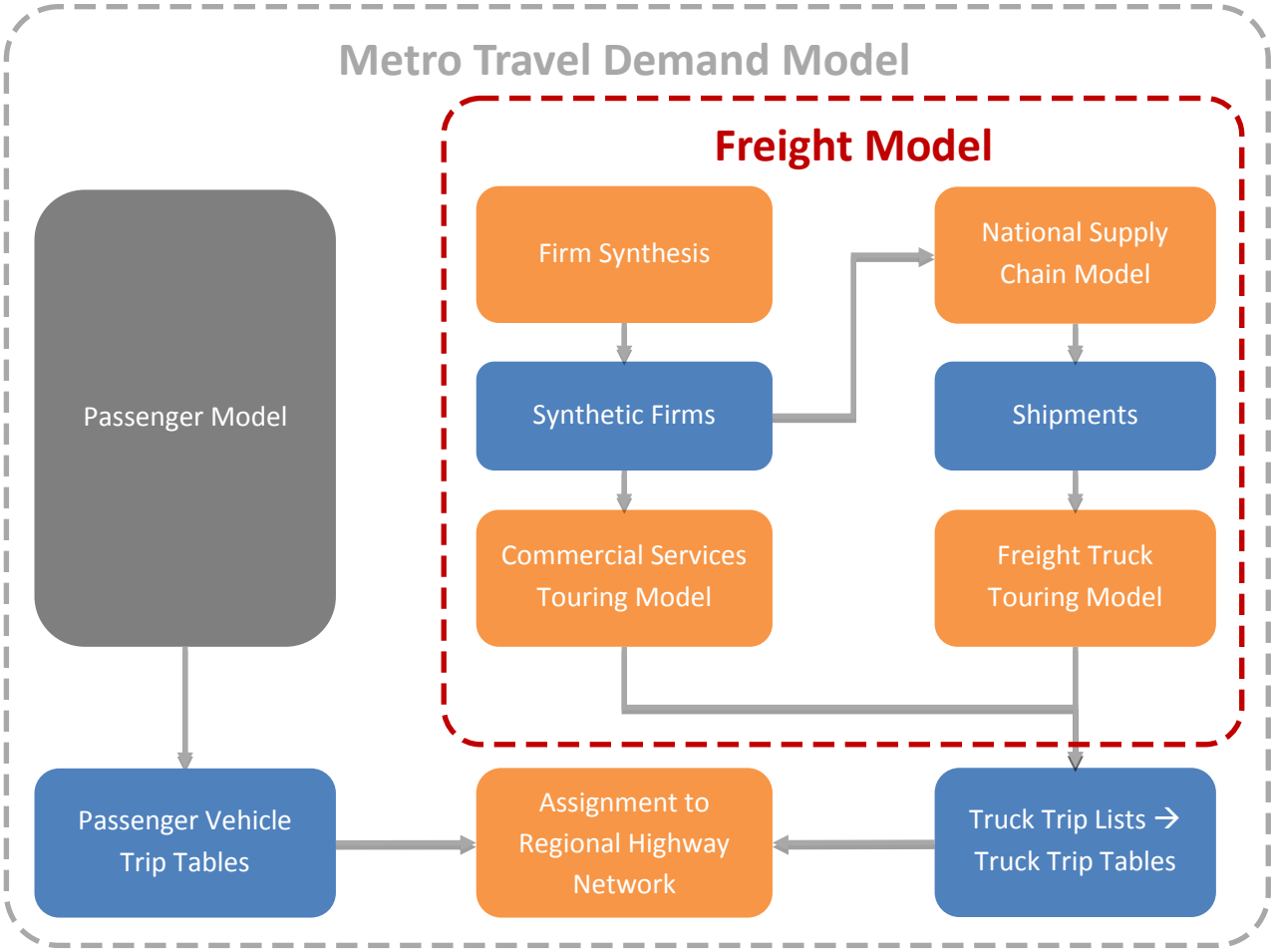
The model represents imports and exports, but does not explicitly model global freight movements, so the impacts of global changes could be represented by adjusting these inputs as a scenario analysis. Operational analysis would benefit from integrating truck movements produced by the model with an operational model, such as VISSIM, capable of evaluating localized operational improvements. Although pipelines are not included directly in the model, the distribution of oil to consumers arriving by pipeline to the port is represented by truck movements.

The stakeholder interviews were also used to identify how the model or its outputs might be used by the various groups. The responses focused on the ability to evaluate possible investments or policies to improve freight mobility and the need to communicate the freight movement story to decision-makers and the public.

2.3 Model Overview

Figure 1 shows the integrated model system containing Metro's passenger travel demand models (gray boxes) that are used to estimate personal travel by auto and other modes. The freight and commercial vehicle travel demand models being developed in this SHRP 2 C20 project are shown in orange, with the output datasets shown in blue.

Figure 1. Integrated Freight Model System



There are there primary modeling systems that comprise the Metro freight model:

- The **national supply chain model** simulates the transport of freight between supplier and buyer businesses in the United States, in this case focusing on movements that involve Portland. Its output, a list of commodity shipments by mode, is used in two ways. First, in the Metro model, a model component connected to the national supply chain model converts the annual shipment flows to daily vehicle trip tables that can be assigned to the regional highway network in Metro's model, along with trips tables from the passenger model. Secondly, as indicated by the blue arrow, the list of commodity shipments by mode is extracted from the supply chain model and used an input to the freight truck touring model.
- The **freight truck-touring model** simulates truck movements within the Portland region that deliver and pick up freight shipments at business establishments. The model is a tour-based model, and builds a set of truck tours including transfer points at which the shipment is handled before delivery/after pickup for shipments with a more complex supply chain (i.e., a warehouse, distribution center, or consolidation center) and the suppliers and buyer of shipments where those are within the model region. The shipment list from the national supply chain model is used as the demand input for the freight truck touring model and describes the magnitude and location of delivery and pick up activity in the region that must be connected by truck movements. The model will generate trip lists by vehicle type and time of day so that the outputs from this model can be combined with the outputs from the commercial services touring model and appropriate trip tables from Metro's passenger model for highway assignment.
- The **commercial services touring model** simulates the remainder of the travel of light, medium, and heavy trucks that is for commercial purposes, i.e., providing services and goods delivery to households and services to businesses. As with the freight truck touring model, the commercial services touring model is a tour-based model, but this time demand is derived from the characteristics of the business establishments and households in the region and as such is not affected by the national supply chain model. That is, while the freight truck touring model simulates truck tours based on commodity flows, the commercial services touring model generates and simulates truck and light-duty vehicle movements based on demand for services and goods from the region's industries.

For each of these model systems, we describe the analytical engine, the input and output databases, and the integration of the models into Metro's regional travel demand modeling system (trip-based model, Kate version).

The outputs from the both the freight truck touring model and the commercial services touring model are lists of truck trips and tours and are aggregated to represent trip tables. In this case, a trip list from each model with trip start and end location and trip timing information is

aggregated into zone to zone trips by time period that can be assigned to the regional highway networks in the Metro travel model along with trips tables from the passenger model.

2.4 Model Development Process

2.4.1 Implementation Plan

To guide the model development process, an implementation plan was developed detailing the initial demonstration model transfer, software requirements, integration with the current Metro travel models, external linkages, and desired enhancements/customizations of the model. The questions considered in the plan included:

- Extent to which the freight model would be integrated with Metro's passenger travel demand modeling system;
- Maintenance of the model and its data elements, including possible coordination with external partners such as the Ports and ODOT;
- Integration of the truck touring model with a national supply chain model approach;
- Sensitivity to long-haul movements across the U.S. for shipments that travel to, from or through Portland;
- Resources available in the project to implement the supply chain model components;
- Resources needed to acquire and maintain necessary data inputs, both initially and in the future; and
- Software and hardware requirements, tailored to meet Metro's freight model performance objectives and staff capabilities.

2.4.2 Data Plan

A data plan was developed to identify data needs and how they would be met in fulfillment of project objectives, as developed through Metro staff discussion and the stakeholder interviews. The data plan was intended to identify currently available data and a flexible set of options to accommodate Metro's approach to model integration and data collection funding. The freight model required three types of data to support model development and application:

- Behavioral data for model estimation;
- Observed travel data outcomes for model calibration and validation; and
- Model input data describing transport networks and zone systems, warehousing and major distribution facilities, employment/establishments, households, supply chain relationships and national commodity flows.

The behavioral and observed travel data was required for the development of the working updated model. The model input data was needed for implementation of the working enhanced demonstration model.

2.4.3 Data Collection

The final data plan was implemented to collect and prepare the required data for model estimation, calibration, and validation. The behavioral data collection for model estimation comprised the following tasks:

- Design of truck travel diary survey questionnaire;
- Development of survey tools, including an online survey application (rSurvey) and a mobile survey application (rMove);
- Development of a survey sampling plan, including holding focus group meetings to obtain information to guide the plan development and introduce prospective survey participants to the project;
- Survey recruitment;
- Survey data collection, including the development and hosting of a project website, conducting a pilot survey, and conducting the full survey; and
- Processing and summarization of the survey data.

The observed travel data for model calibration and validation consisted of truck counts and commodity flow survey data. The truck count data was used for the development of the truck touring model, while the commodity flow data was used both as input data for the supply chain model and setting calibration targets for the supply chain model. The following steps were involved in the truck count data collection:

- Compilation of raw count data;
- Initial data checking;
- Count adjustment;
- Aggregation of counts to model time periods and vehicle classifications;
- Import of data to GIS;
- Import of data to model network; and
- Final data checking

The commodity flow data was derived from the Freight Analysis Framework by Metro. As specified in the data plan, the model input data consisted of the commodity flow data, industry input-output tables, zone systems, networks, employment data, and TAZ household data by Metro. These are discussed in Section 3.3.

2.4.4 Model Development Approach

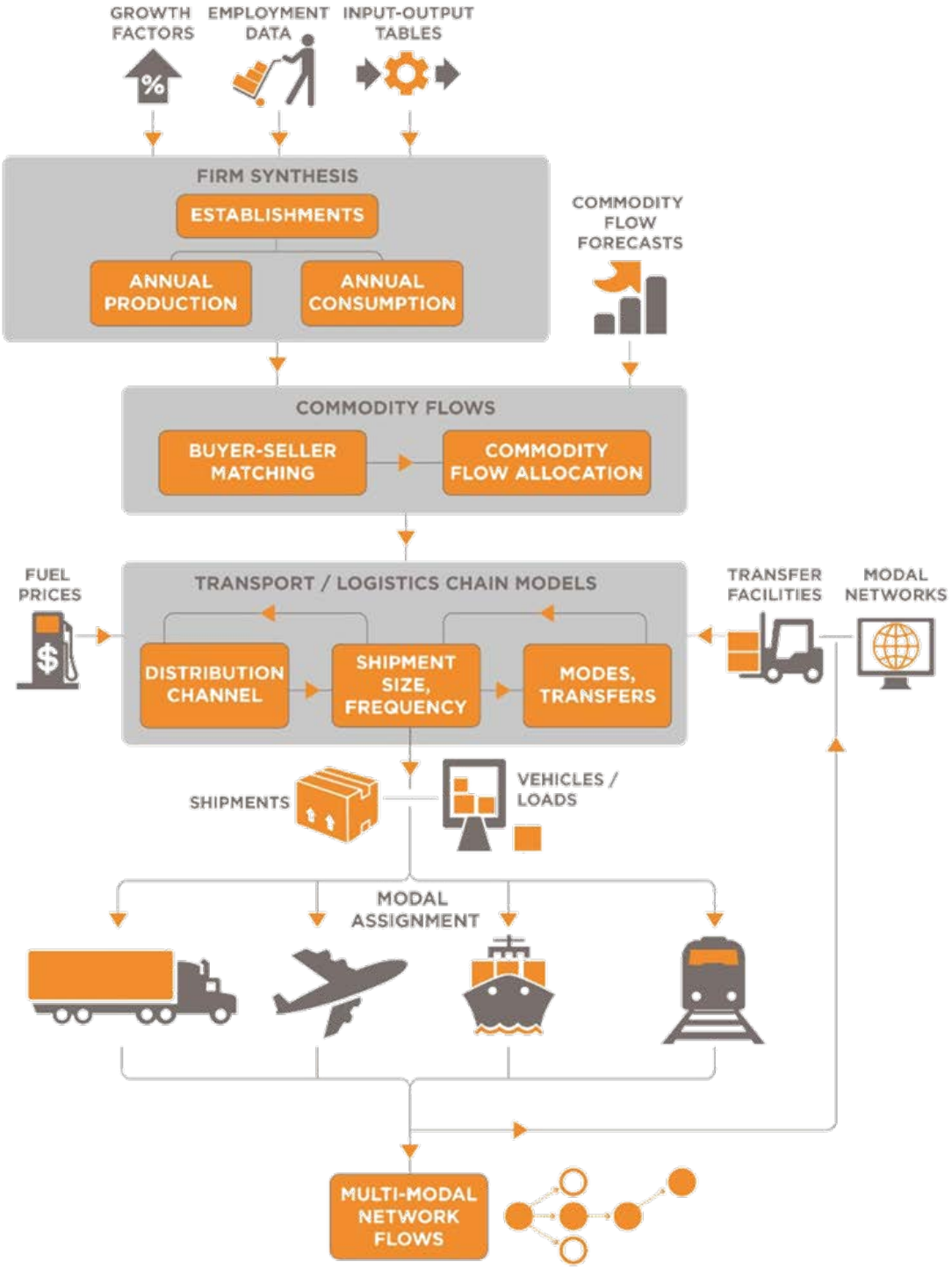
The Portland freight model is based on a combined supply chain and tour-based framework developed with Federal Highway Administration research funding by RSG and implemented in Chicago, Florida, Piedmont and Baltimore with rFreight™ software. This framework is comprised of several steps that simulate the transport of freight between each supplier and buyer business in the United States, with additional imports and exports from international businesses.

Supply Chain Models

Figure 2 shows these supply chain processes, with major input and output data identified. The steps are introduced in this section and further detail is provided in Section 4 on model development. The modeling system includes the selection of business locations, trading relationships between businesses, and the resulting commodity flows, distribution channel, shipment size and mode and path choices for each shipment made annually:

1. **Firm Synthesis.** Synthesizes all firms in the United States and a sample of international firms
2. **Supplier Firm Selection.** Selects supplier firms for each buyer firm by type
3. **Goods Demand.** Predicts the annual demand in tonnage for shipments of each commodity type between each firm in the United States
4. **Firm Allocation.** Allocates firms in each county to traffic analysis zones within the Portland region
5. **Distribution Channels.** Predicts the level of complexity of the supply chain (e.g., whether it is shipped directly or whether it passes through one or more warehouses, intermodal centers, distribution centers, or consolidation centers)
6. **Shipment Size and Frequency.** Estimates discrete shipments delivered from the supplier to the buyer
7. **Modes and Transfers.** Predicts four primary modes (road, rail, air, and waterway) and transfer locations for shipments with complex supply chains

Figure 2. National Supply Chain Model Structure



The model incorporates a multimodal transportation network that provides supply side information to the model including costs for different paths by different modes (or combinations of modes). While the model is focused on Oregon and Portland, it also encompasses freight flows between Oregon and the rest of the world. The rail, air and waterway freight movements are not assigned in the current work. The highway assignments are described below as part of the truck touring model process.

The supply chain models were transferred from the Baltimore/Maryland model and calibrated using the locally collected data sources. The primary purpose of the supply chain models in the Portland freight model is to produce individual shipments of goods into, out of, and through the Portland region. These models were calibrated to achieve reasonable external flows by mode. The model components of the supply chain were not calibrated individually, since the focus of the project is on the tour-based models in the Portland region.

The supply chain models rely on commodity flow forecasts, so adjustments to growth forecasts need to be translated into adjustments to commodity flow forecasts for scenario analysis or evaluation of different growth forecasts. A separate model component for procurement markets (that RSG has developed) could be deployed as an enhancement to allow a more structured scenario analysis of growth forecasts, but this is not part of the current work. This modeling framework does provide for the future inclusion of this procurement market game model and is currently an element of exploratory research at the FHWA.

Truck Touring Models

The supply chain model is integrated with a regional truck touring model, which is a sequence of models that takes shipments from their last transfer point to their final delivery point. The integrated modeling system connects the national supply chain models with the regional truck touring models. The final transfer point is the last point at which the shipment is handled before delivery (i.e., a warehouse, distribution center, or consolidation center for shipments with a more complex supply chain or the supplier for a direct shipment). It performs the same function in reverse for shipments at the pick-up end, where shipments are taken from the supplier to distances as far as the first transfer point. For shipments that include transfers, the tour-based truck model accounts for the arrangement of delivery and pick-up activity of shipments into truck tours.

A commercial services touring model is also developed to provide a comprehensive representation of all trucks. This model has the same structure and features of the regional truck touring model, but demand is generated from businesses and households in the region rather than from goods movement. These commercial services include utilities, business and personal services.

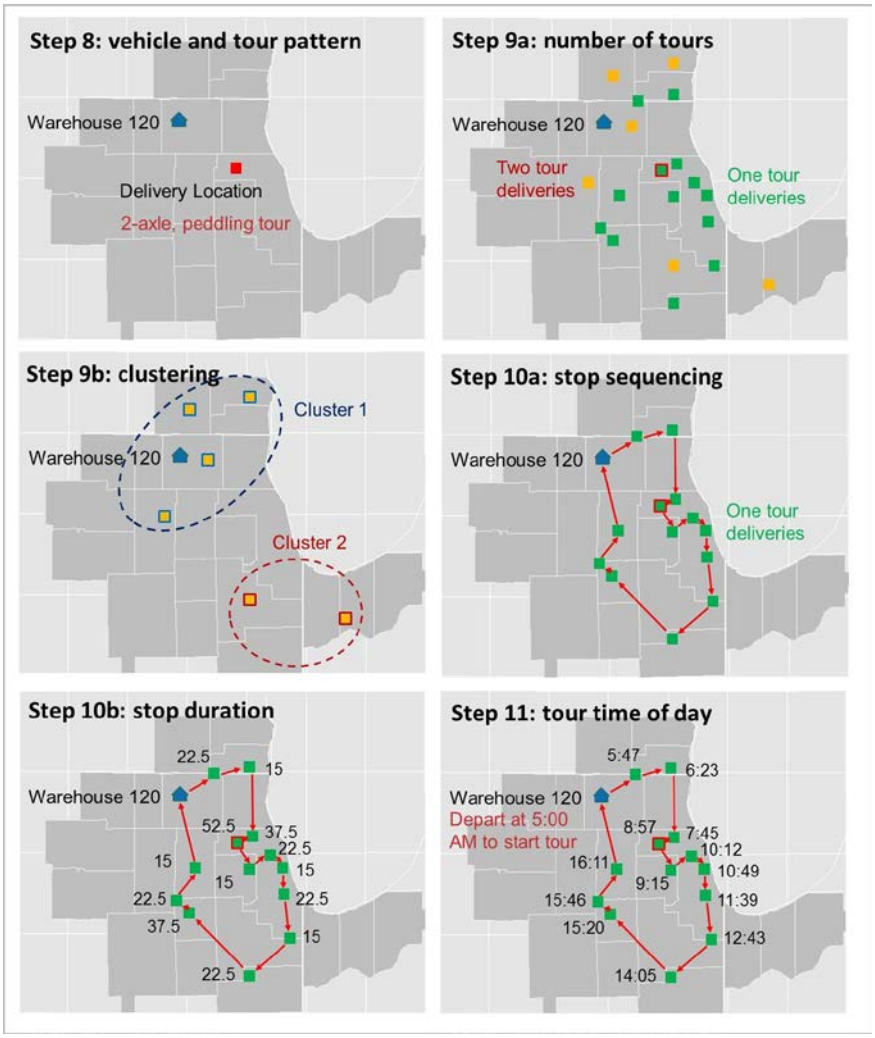
The regional freight truck and commercial vehicle touring models were transferred from the work done in Baltimore. These were calibrated and validated using locally collected data.

The model produces trip lists for all the freight delivery trucks and commercial vehicles in the region that can be assigned to a transportation network. The truck touring model components predict the elements of the pick-up and delivery system within the Portland region through several modeling components, as shown in Figure 3:

1. **Vehicle and tour pattern choice**. Predicts the joint choice of whether a shipment is delivered on a direct- or a multi-stop tour and the size of the vehicle that makes the delivery.
2. **Number of tours and stops**. Predicts the number of multi-stop tours required to complete all deliveries and estimates the number of shipments that the same truck delivers.
3. **Stop sequence and duration**. Sequences the stops in a reasonably efficient sequence but not necessarily the shortest path. Predicts the amount of time taken at each stop based on the size and commodity of the shipment.
4. **Delivery time of day**. Predicts the departure time of the truck at the beginning of the tour and for each subsequent trip on the tour.

The Portland freight model is integrated with the passenger travel model for highway assignment and can become part of the Portland travel demand modeling system.

Figure 3. Truck Touring Model Steps



ACKNOWLEDGEMENTS

If you picnic at Blue Lake or take your kids to the Oregon Zoo, enjoy symphonies at the Schnitz or auto shows at the convention center, put out your trash or drive your car – we've already crossed paths.

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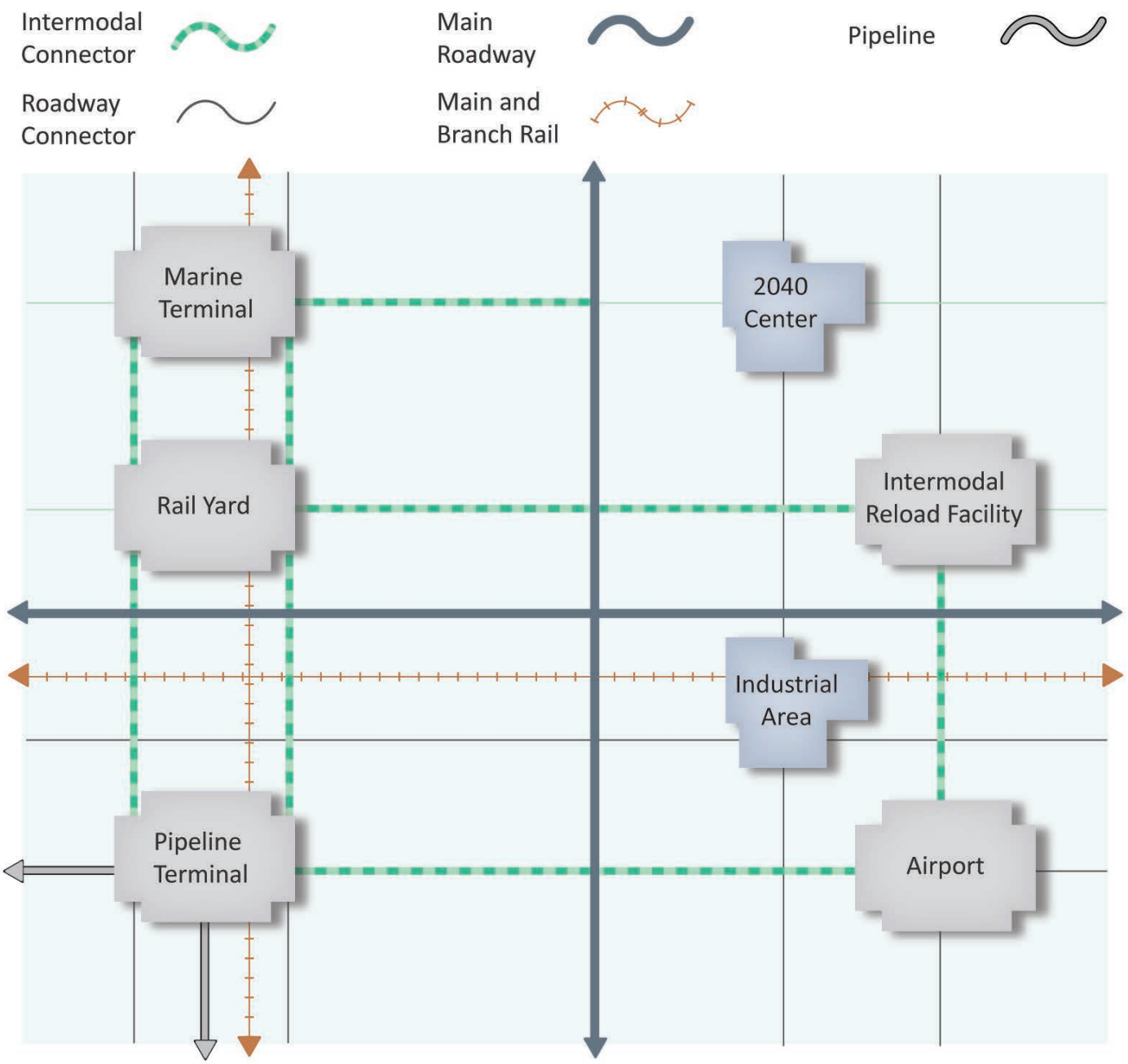
Regional Freight Concept



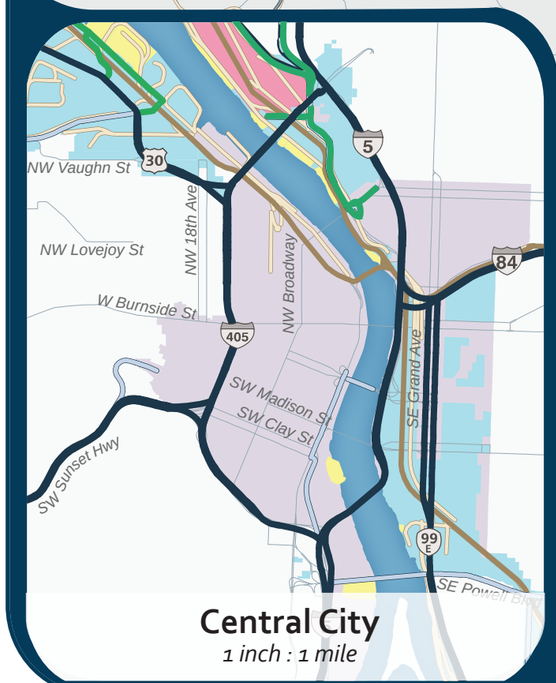
Regional Freight Network [DRAFT]

December 19, 2017

- Main rail lines
- Branch rail lines
- Main roadway routes
- Roadway connectors
- Clark County routes
- Regional intermodal connectors
- Marine facilities
- Rail Yards
- Employment
- Industry
- Urban centers
- Metropolitan planning area
- County boundaries
- Airports
- Extent indicator *see inset maps on back*

(dotted lines indicate planned projects, and do not identify specific alignments)

1 inch : 3 miles

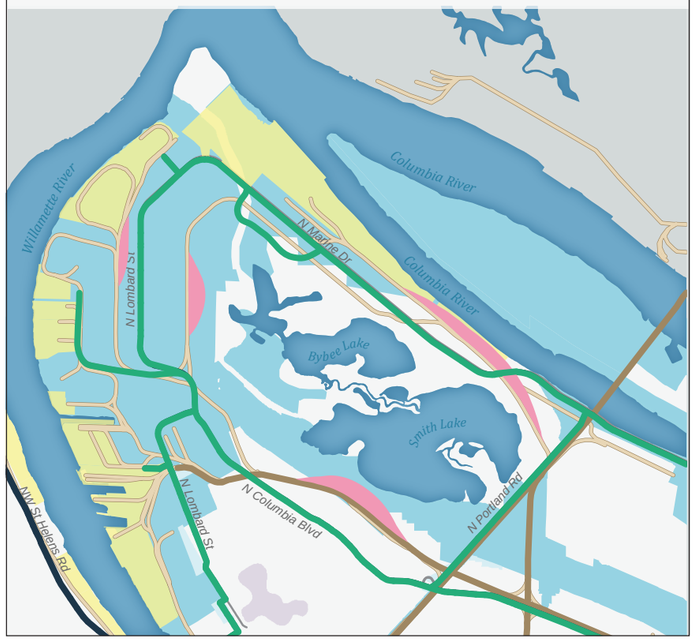


Central City
1 inch : 1 mile

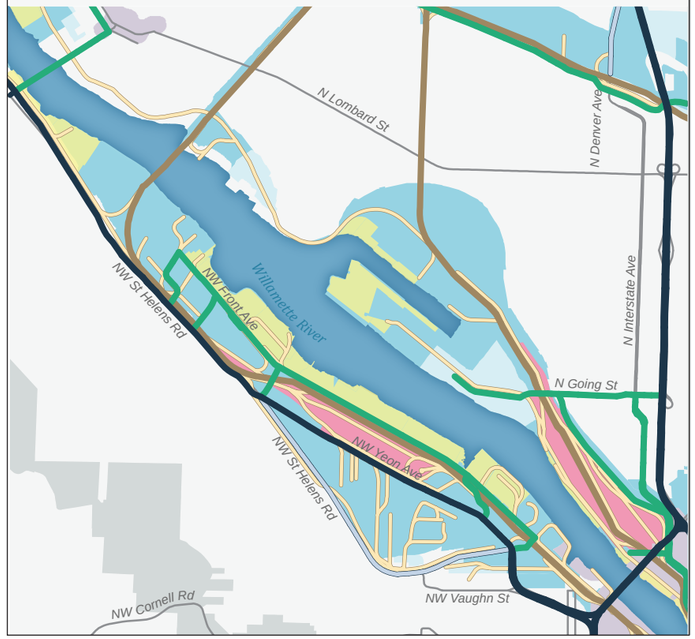
Metro

[DRAFT]

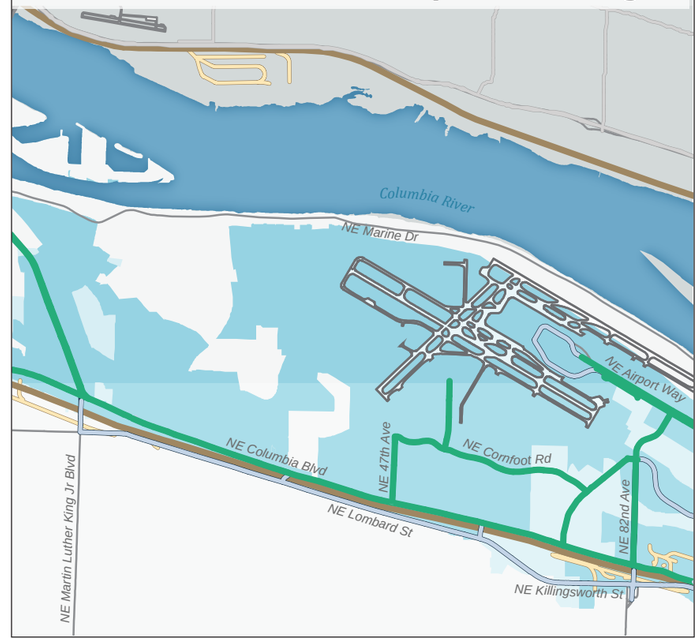
1. North Portland Marine Terminals



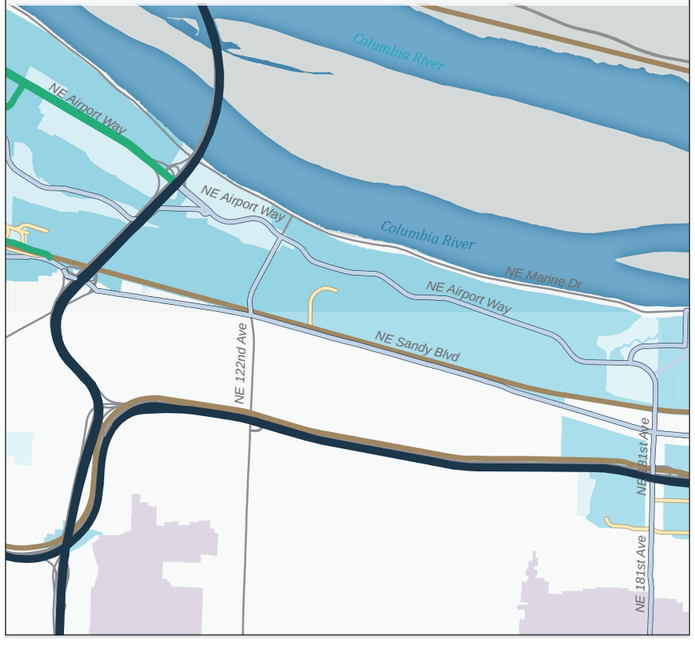
2. NW Industrial and Swan Island Areas



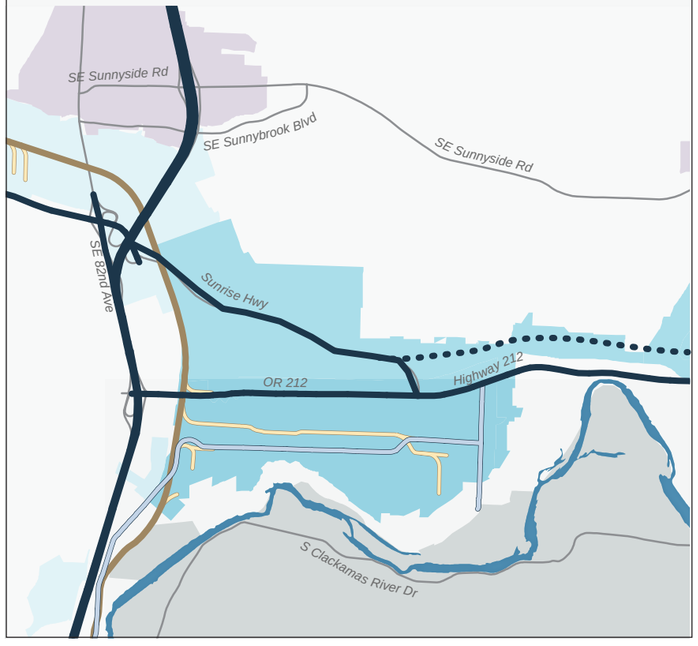
3. Portland International Airport + Airfreight



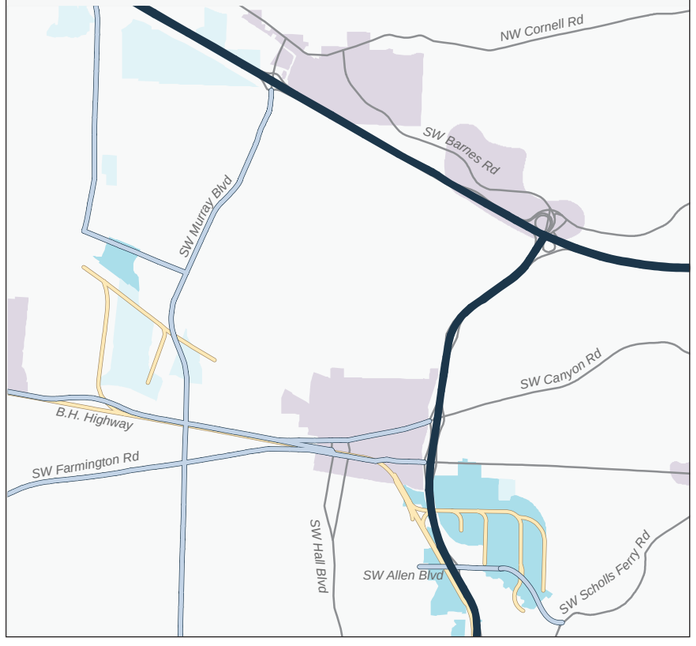
4. Kenton Rail Line / Columbia Corridor



5.Clackamas Industrial Area



6. Beaverton Industrial + Branch Rail Lines



Legend

(dotted lines indicate planned projects, and do not identify specific alignments)

- Main rail lines
- Branch rail lines
- Main roadway routes
- Roadway connectors
- Regional intermodal connectors
- Marine facilities
- Rail Yards
- Employment
- Industry
- Urban Centers
- Urban Growth Boundary
- County Boundaries
- Airports

All insets adhere to the following scale:

1 inch : 1 mile

October 18, 2017