Exhibit A


EIC
ENHANCED
TRANSIT
CORRIDORS
PLAN
PBOT
PORTLAND BUREAU OF TRANSPORTATION
June 2018

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Moving Ahead for Progress in the 21st Century (MAP-21), local government, and State of Oregon funds. The contents of this document do not necessarily reflect views or policies of the State of Oregon.

The City of Portland complies with all nondiscrimination, Civil Rights laws including Civil Rights Title VI and ADA Title II. To help ensure equal access to City programs, services and activities, the City of Portland will reasonably modify policies/procedures and provide auxiliary aids/services to persons with disabilities. Call 503.823.5282, TTY 503.823.6868 or Oregon Relay Service: 711 with such requests, or visit http://bit.ly/13EWaCg

To obtain a copy of this document or more information, please contact:

April Bertelsen
Portland Bureau of Transportation
1120 SW 5th Avenue, Suite 900
Portland, OR 97204
Phone: 503-823-6177 |
Email: April.Bertelsen@portlandoregon.gov
Website: www.portlandoregon.gov/transportation/ETCplan

Prepared in part by:

Granting agency:

Prepared in part by:

Acknowledgements

PORTLAND CITY COUNCIL

Ted Wheeler, Mayor

Chloe Eudaly, Commissioner

Nick Fish, Commissioner

Amanda Fritz, Commissioner

Dan Saltzman, Commissioner in Charge

PORTLAND BUREAU OF TRANSPORTATION

Dan Saltzman, Commissioner in Charge

Leah Treat, PBOT Director

Art Pearce, Policy Plans and Projects Group Manager

Mauricio Leclerc, Supervising Transportation Planner

PBOT PROJECT STAFF

April Bertelsen, Project Manager

Shane Valle

Zef Wagner

TRIMET

Eric Hesse

Kelly Betteridge

Steve Callas

Nathan Banks

OREGON DEPARTMENT OF TRANSPORTATION

Terra Lingley, TGM Grant Manager

Lidwien Rahman, TGM Grant Manager

CONSULTANT TEAM

Catherine Ciarlo, CH2M Project Manager

Kristin Hull, CH2M Project Manager

James McGrath, CH2M Design Lead

Shawn Kummer, CH2M

Eduardo Montejo, CH2M Planning Lead

Tom Shook, HDR

Jarrett Walker, Jarrett Walker + Associates

Michelle Poyourow, Jarrett Walker + Associates

Joey Reid, Jarrett Walker + Associates

Table of Contents


15 TO PORTLAND
3110
RADIO CAB

ENHANCED TRANSIT CORRIDORS

EXECUTIVE SUMMARY

PBOT
PORTLAND BUREAU OF TRANSPORTATION

PORTLAND FACES A CRISIS OF FREEDOM AND OPPORTUNITY.

PROLOGUE

Freedom means freedom to choose. We want to choose our careers, schools, friends, groups to belong to, and places to shop. You can also use the word opportunity to describe those same things.

But we have choices and opportunities only if we can get to them. Our crisis is that the places we need and want to go to are becoming harder to reach.

The city is growing denser, and density means more people trying to travel down every major street.

But the space available for travel can't grow with population. The options for expanding travel space – widening roads or building tunnels and viaducts – cost a fortune and sometimes damage our city. Mostly we have to get better at sharing the space we have.

CARS TAKE A LOT OF SPACE PER PERSON, SO IF WE ARE ALL GOING TO FIT DOWN THE STREET, WE NEED MORE PEOPLE TO TRAVEL WITHOUT DRIVING CARS.

Cars take up a lot of space per person, so if we are all going to fit down the street in a growing city, we need relatively more people to travel without driving cars. Otherwise we will continue to get in each other's way, which is what traffic congestion is. That means more people will find themselves cut off from jobs, schools, and other opportunities because it just takes too long to get to them.

These problems affect most community members sooner or later, but do not affect them equally. In the innermost neighborhoods, people live close to many opportunities that will be easy to reach no matter how gridlocked the streets are. But as people with low incomes move to outer neighborhoods in search of affordable housing, they end up having to travel longer distances to reach the same range of opportunities. If we give them no other choice than to go by car, we burden them with greater costs, and generate even more car traffic that our streets do not have room for. This is bad for our equity goals, bad for sustainability, and bad for quality of life.

Prosperity, too, is at stake. Businesses thrive only if customers and employees can reliably get to them in a reasonable amount of time. Those that compete for talent will lose out if their workers' commutes are just too difficult.

So when we talk about transportation, we're talking about sharing space so that everyone can have a life rich with opportunities. And when we talk about that, we're talking about almost everything we care about.

A growing city, a fixed right-of-way

Cars: 28 people / city block

Buses: 225 people / city block

Walking: 1000 people / city block

SO HOW CAN WE SHARE SPACE?

If you want to move across the city while taking only your fair share of scarce street space, there are two ways to do it:

1. **Use a vehicle that's not much bigger than your body, like a bicycle.**

2. **Share a vehicle with lots of other people, like transit.**

Both cycling and transit are critical to addressing the challenge of sharing space in a growing city.

Cycling is one of Portland's great success stories. The share of Portland commuters who ride a bike to work rose from 2% in 2000 to 7% in 2014, and keeps rising as the city expands its infrastructure.

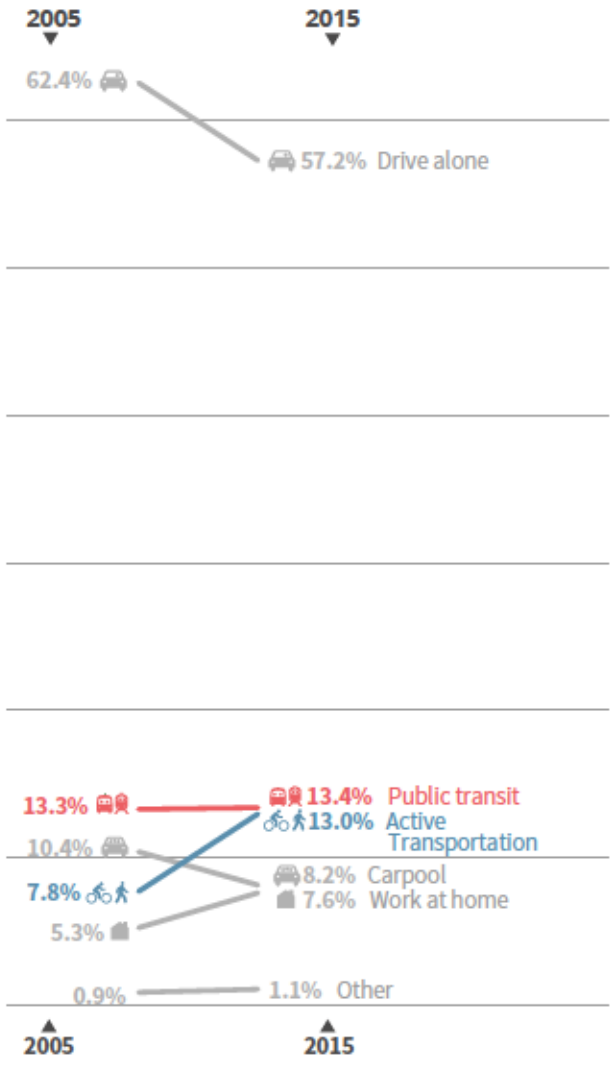
THE SHARE OF PORTLAND COMMUTERS WHO RIDE A BIKE TO WORK ROSE FROM 2% IN 2000 TO 7% IN 2014; IN THE SAME TIME SPAN, THE SHARE OF PORTLAND COMMUTERS WHO RIDE TRANSIT WAS STAGNANT AT 13%

Transit, by contrast, seems to be stuck. The share of Portland commuters who ride transit to work has hovered around 12 to 13% since before 2000. The City's adopted goals call for twice that number by 2035, but we don't seem to be moving in that direction.

There is room for debates about what new technologies may affect transit demand, including dynamic ridesharing, e-bikes, and so on. But what can't be debated is that **high-ridership transit is the most efficient way to move large numbers of people in scarce space.**

It's clear, too, that high-ridership transit must be more than just light rail. Most of our population, and many of our jobs and attractions, are still not on the light rail network or its planned extensions. If those places are going to be reachable in a way that uses space efficiently, buses have to be allowed to succeed. While the tools and strategies discussed in this plan apply to the streetcar as well, buses are inevitably the primary focus, as they are the main form of transit reaching most residents, for the foreseeable future.

How Portlanders Are Getting to Work
American Community Survey



Some nearby cities have even less space per person than we do, and they are showing the way. **Seattle, San Francisco, and Vancouver, Canada, are all aggressively investing in bus services and giving them the space they need.** Apart from the 40-year old transit mall, Portland has not done this to the same degree, either as a city or as a region. We have scattered fragments of transit lanes or signal priority, but no plan to achieve the quality of service that matches our transit ambitions.

We can learn one other thing from the denser cities nearby. **Even if you have a great regional transit agency, city governments must play a leading role.** The City of Portland makes countless decisions that determine the success or failure of transit. Planning and zoning bureaus govern how many people will live where transit can get to them easily. A bus's ability to move down the street depends largely on street design and signal technology, which (except for state highways) is the City transportation bureau's role.

All of the success stories in similar cities feature strong city leadership on transit. A key step in Seattle's transit renaissance was the city's decision, starting with the 2007 Seattle Transit Plan, to adopt its own transit vision and align its actions with that vision. Seattle's Department of Transportation has its own transit planning department that leads or coordinates these efforts. Today, Seattle has the fastest-growing transit ridership in the US, despite a rail network that is still much smaller than Portland's.

This report, the Enhanced Transit Corridors Plan, is the first step toward thinking about Portland's bus and streetcar services in the same way. It asks: **What does the city need to do to help more people move through the limited space on its streets, in a way that connects them with all the opportunities that make up a good life?**

DESPITE TRIMET'S BEST EFFORTS, PORTLAND'S BUSES ARE SLOWING DOWN.

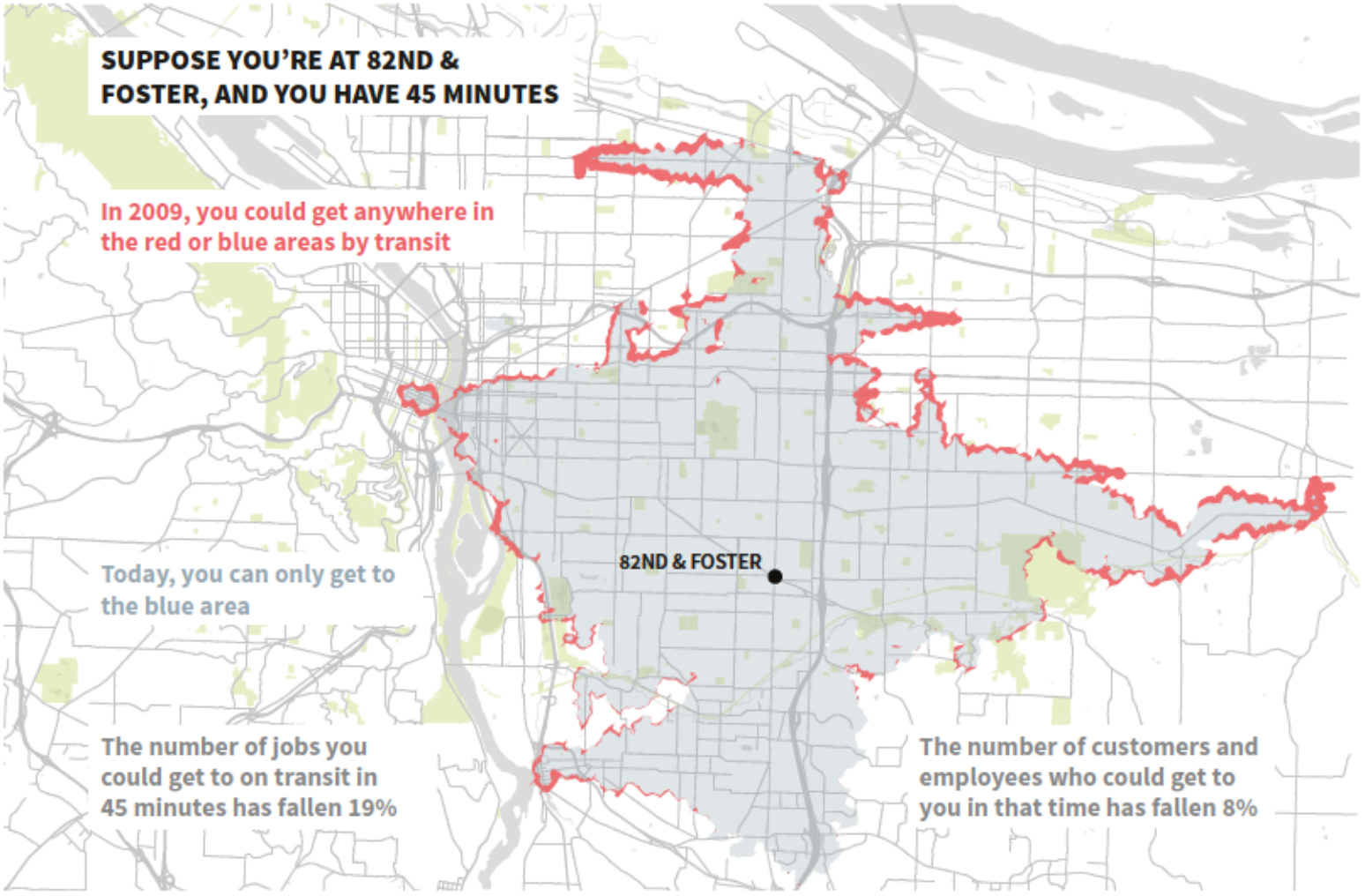
The average speed of most of the major bus lines has fallen by 7-9% in the last eight years. That drop is just gradual enough that it never feels like a sudden crisis, but it adds up over time to a big loss in freedom and opportunity.

Map below shows the area that someone at a particular point could get to on transit in 45 minutes, in 2009 and 2017. For example, if you live near 82nd & Foster, the number of jobs you could get to on transit in 45 minutes has fallen 19%. If you're a business at that location, the number of customers and employees who could get to you in that time has fallen 8%.

The Shrinking Reach of Transit

Reduction in access from 2009 to 2017

LOCATION	LOSS OF JOBS WITHIN 45 MINS	LOSS OF RESIDENTS WITHIN 45 MINS
15TH & DEKUM	12%	8%
162ND & DIVISION	10%	8%
C. CHAVEZ & BELMONT	6%	10%
HILLSDALE	8%	8%
MLK & KILLINGSWORTH	7%	9%
PIONEER COURTHOUSE	5%	11%
ST JOHNS	18%	10%



Places you used to get to easily now take too long. **Slower transit is pushing us apart, cutting us off from opportunity.** If the only way to get to opportunity is by car (whether driving yourself or paying someone else to drive you), people will go by car, making congestion worse. Some people even lose out on opportunities altogether, because they can't afford the high cost of driving.

What's more, as speeds drop, it takes a bus longer to drive the round-trip of its route, which means TriMet must put out more buses just to maintain the same frequency. If they didn't, slower buses would mean both slower rides and longer waits for passengers. TriMet is spending more money year after year to run the same frequency as service gets slower. **If the loss in speed could be halted, TriMet could spend that money on making service better**, with higher frequencies or longer hours.

Reliability is also a major problem. Random delays, many caused by traffic, make it hard for buses to stay on schedule, so the waiting time may be worse than published. This can lead to cascading delays all along the bus line, far from where the original delay occurred. This can have a major impact on people's daily lives. People who need to arrive at work on time, or who need to pick up kids from daycare or school, can't afford to have an unreliable transit system.

WHY IS TRANSIT DELAYED?

When we talk about average transit speed, we're really talking about delay. We don't really need buses to drive faster. What we need is for them to spend less time completely stopped, or stuck in traffic moving very slowly.

Transit delay has three major causes, which are also causes of poor reliability.

- **Traffic congestion and friction.** Buses get stuck in traffic, and they also get held up by little things. When general traffic is congested, often at bottlenecks approaching bridges, freeway ramps, and major signalized intersections, transit also gets stuck in this traffic if operating in mixed traffic. Additional little things that delay transit: A car blocks the lane while trying to parallel-park, or while waiting to make a turn. A delivery truck parks in the traffic lane. Even an open car door can be a problem. Buses can go around some of these obstacles, but not always. The streetcar, which lacks this ability, is even more vulnerable to them.

- **Stopping time.** Every time a bus pulls over to serve a stop, that reduces its speed. The more bus stops there are per mile, and the more likely each stop is to have a person waiting at it (or a person wanting to disembark at it), the more time a bus spends pulling over to stop, and then merging back into traffic again. The delay is exacerbated if drivers are unwilling to let buses back into the travel lane. Because every stop is more likely to be served in the peak travel times, this type of delay is at its worst level precisely when most passengers are trying to get to work or back home in a reasonable amount of time.

- **Dwell time.** Once the bus has stopped, its dwell time at the stop depends on how many passengers get on and off, and how fast they can do this.

TriMet has a lead role in dealing with many causes of dwell time at stops. The agency already uses low-floor buses with ramps that allow people to board and exit quickly in wheelchairs or mobility devices. Riders are encouraged to exit through the rear door, to speed up fare payment by boarding passengers at the front door. San Francisco speeds up boarding by allowing passengers to get on a bus using any door, just like on light rail and Streetcar in Portland. TriMet intends to try this on the Division Transit Project, and if it succeeds there, it could be extended over more of the network.

TriMet and the City share responsibility for placing bus stops, and deciding how many bus stops there should be per mile. Speed and reliability can be improved by asking passengers to gather at fewer stops. This has other benefits, too: the fewer stops there are, the better the amenities can be. Passengers also feel more secure waiting in groups than alone.

On traffic congestion and friction, though, the City of Portland must lead. On traffic congestion and friction, though, the City of Portland must lead. These kinds of delay are caused by street design, traffic signals, and sometimes law enforcement. The City mostly controls these things, so the City must lead in addressing them.

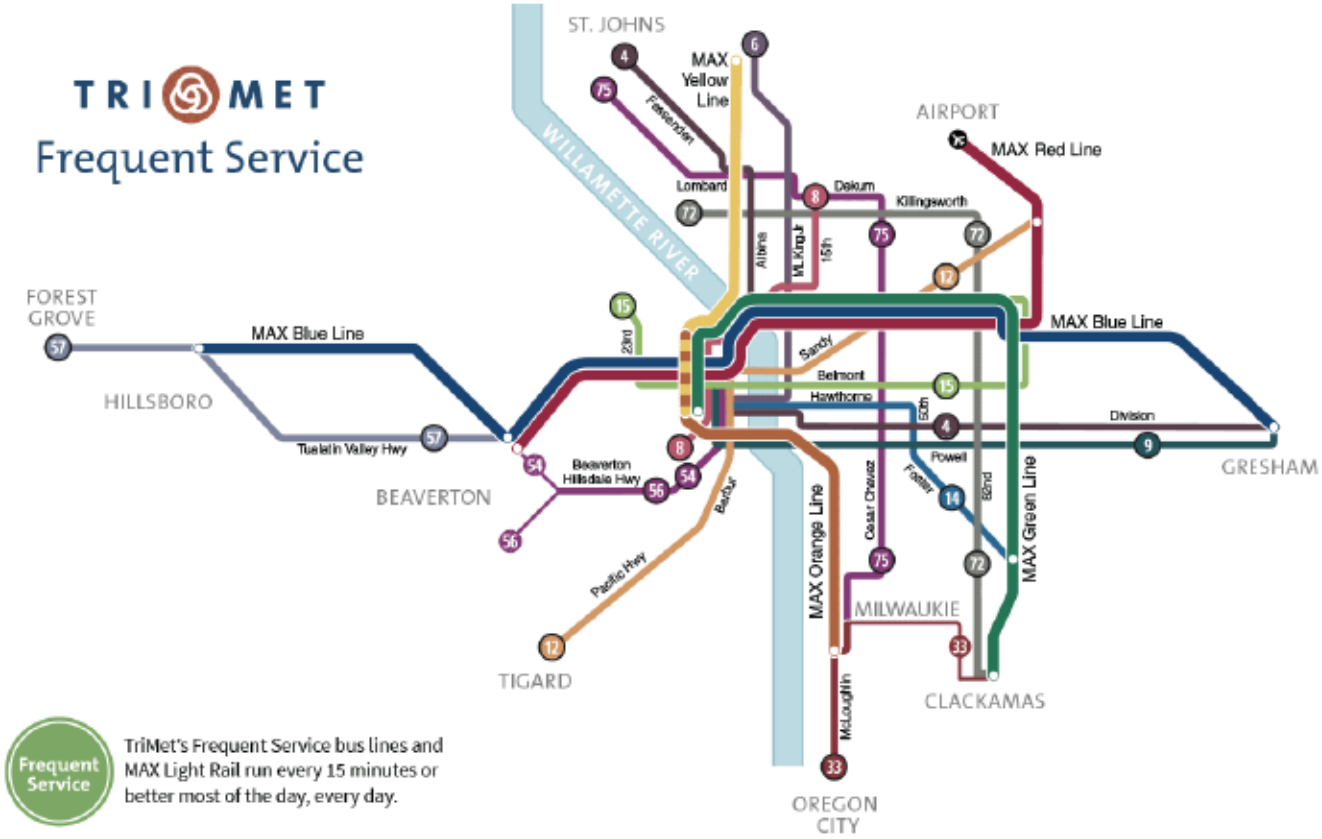
THE CITY OF PORTLAND MUST LEAD IN ADDRESSING CONGESTION'S IMPACT ON TRANSIT

ENHANCED TRANSIT: BUILDING ON FREQUENT SERVICE

TriMet designates a small set of major bus lines as the Frequent Service network. Frequent Service transit lines run every 15 minutes or better most of the day, every day. At this level of service, a bus is coming soon whenever you need it, and it is easy to transfer from one line to another to travel in many directions. For this reason, high frequency is associated with high ridership. Frequent bus lines are always among TriMet's busiest. They carry 58% of all bus ridership in the region. The streetcar is not formally part of TriMet's Frequent Service network, but aspires to the same level of service, so we treat it as part of that network.

The City's 2035 Comprehensive Plan and planning and zoning process is encouraging more density along much of the Frequent Service network, so over time an even larger share of the population will live on it. Therefore, it makes sense to focus our attention on those lines.

Enhanced Transit is the next step in improving the Frequent Service network so that even more people find it useful. **Enhanced Transit Corridors (ETC) are portions of the Frequent Service network that are high priorities for speed and reliability improvement**, as identified by this Plan.



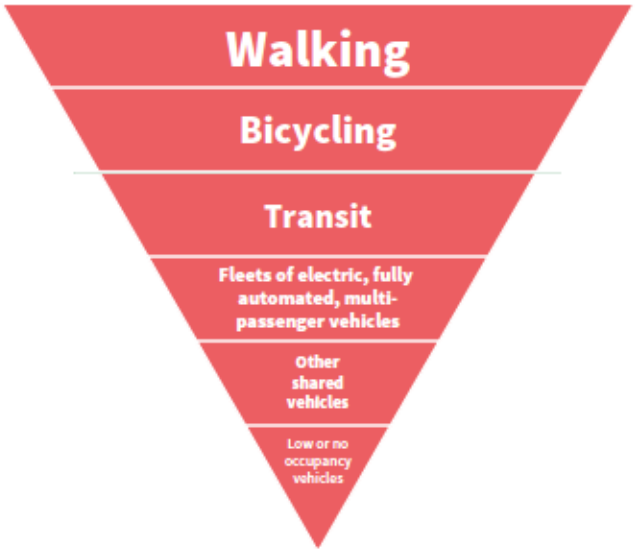
IMPROVING TRANSIT SPEED AND RELIABILITY IS CHALLENGING

WHY THIS IS HARD

The street design changes needed to improve speed and reliability have monetary costs, but **the real challenge is the impact on other modes of travel and other street uses.** Where transit needs more space, it will most likely take space that's now being used for another purpose, often as traffic lanes, signal time or on-street parking. There are many ways to mitigate these impacts but in most cases, there is no way to avoid them entirely.

Portland has adopted policy on modal hierarchy in the Portland 2035 Comprehensive Plan. Policy 9.6, the **transportation strategy for people movement, provides policy support for prioritizing transit over single-occupant vehicles**. The Enhanced Transit Corridors Plan is guided by this policy and provides tools for where and how to achieve it.

Portland's Transportation Strategy for People Movement



The design of individual streets requires choices about how strongly to implement this policy and which treatments from the Enhanced Transit toolbox to apply. This will require consideration for the street context and balancing multiple policies, including our Vision Zero policy and others. Many Enhanced Transit Corridors are also High Crash Corridors, so safety is of paramount concern. Care must be taken when implementing toolbox treatments that may reduce the safety and comfort of people walking or bicycling. In what circumstances is it acceptable to remove on-street parking? In what cases can car traffic capacity be reduced to create adequate space for transit? By how much? These are the difficult choices that must be made in the future, if Enhanced Transit is to succeed.

A key tool in building support for Enhanced Transit changes is tactical street redesign. In a tactical project, a proposed street redesign is implemented on a temporary basis, using tools that are easy to remove such as paint, signage, and movable traffic barriers. These experiments, implemented for a few months and evaluated at the end of that time, allow people to see what the impacts of the proposed street change really are before deciding whether to make them permanent.

THIS PLAN IS A FIRST STEP TOWARD ESTABLISHING CITY POLICIES AND PRACTICES THAT WILL IMPROVE THE USEFULNESS AND ATTRACTIVENESS OF TRANSIT

This plan does the following:

- Recommends a new approach to transit in Portland, focusing on High Capacity Transit, Enhanced Transit and Growing Transit (section 2.1).
- Recommends a New Vision for Transit that includes an initial network of Enhanced Transit corridors and other improvements to the transit system where addressing transit reliability, speed and capacity is most needed. A corresponding list of priority projects are recommended to be included in the Portland Transportation System Plan and the 2018 – 2040 Project list of the Metro 2018 Regional Transportation Plan (RTP) (section 2.2).
- Recommends additional policy recommendations, actions and next steps to be taken by the City to advance the implementation of enhanced transit in Portland (section 2.3).
- Recommends a City-wide Enhanced Transit Monitoring Program and on-going performance framework to improve transit reliability and speed. This program will set City-wide Enhanced Transit performance guidelines, help identify future Enhanced Transit projects and track transit performance on an on-going basis (section 2.4).
- Recommends an Enhanced Transit Capital and Operational Toolbox of treatments that are widely used in other cities to address these problems (such as bus lanes, signal priority and queue jumps) (chapter 3).
- Summarizes the planning process and initial analysis for identifying priority locations for bus speed and reliability improvements (chapter 4).
- Highlights a few examples of early implementation in Portland (chapter 5).
- Provides a look ahead to the Regional Enhanced Transit Concept Pilot Program, which provides an opportunity for Portland to advance project development and implementation of candidate locations (chapter 6).

Chapter 2 highlights the places in the city where the need for transit speed and reliability improvements are most urgent, but it does not recommend exactly what to do in each place. Instead, it lays out a process by which actions would be identified, developed, funded and implemented. The real goal is to set in motion a new approach to improving speed and reliability, to help meet the city's goals for transit ridership.
By improving speed and reliability, we make transit useful to go further. As a result, transit competes less with cycling and walking, and competes more with cars.

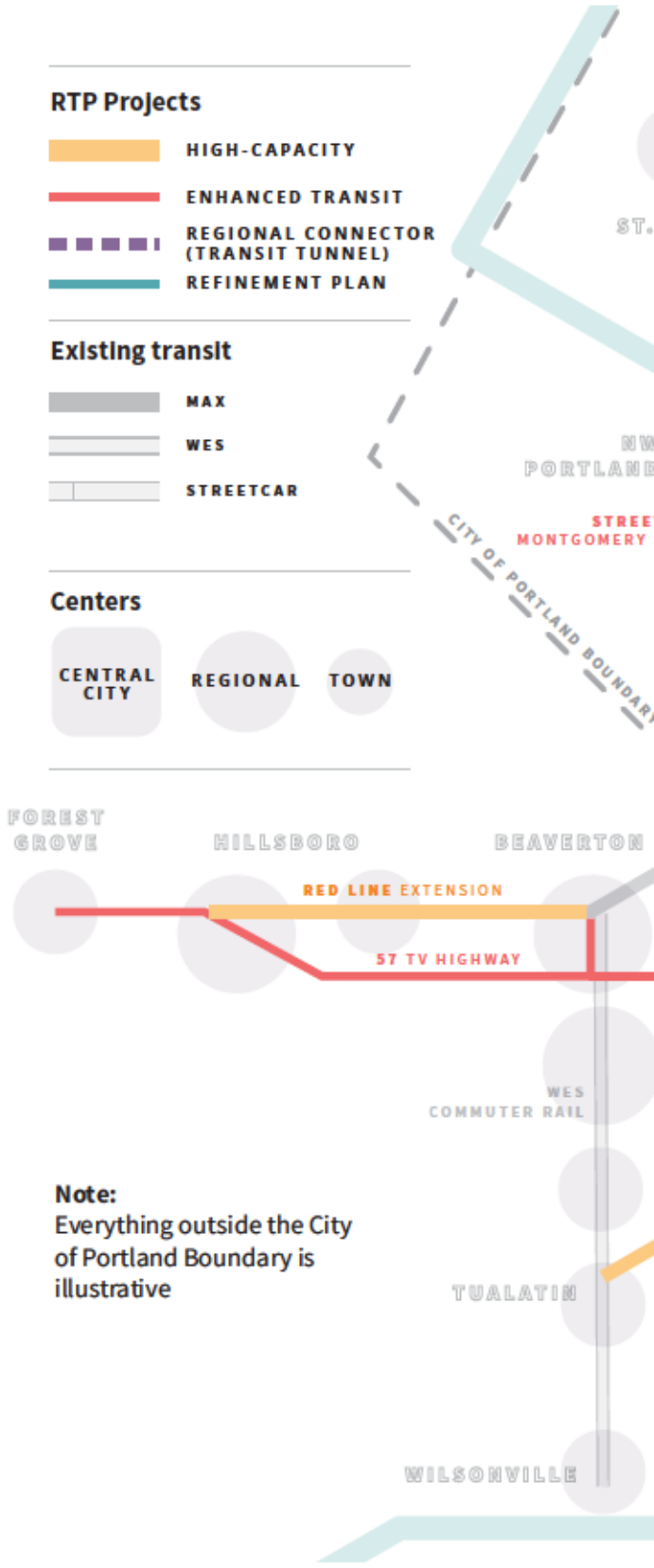
A VISION, WITH PRIORITIES

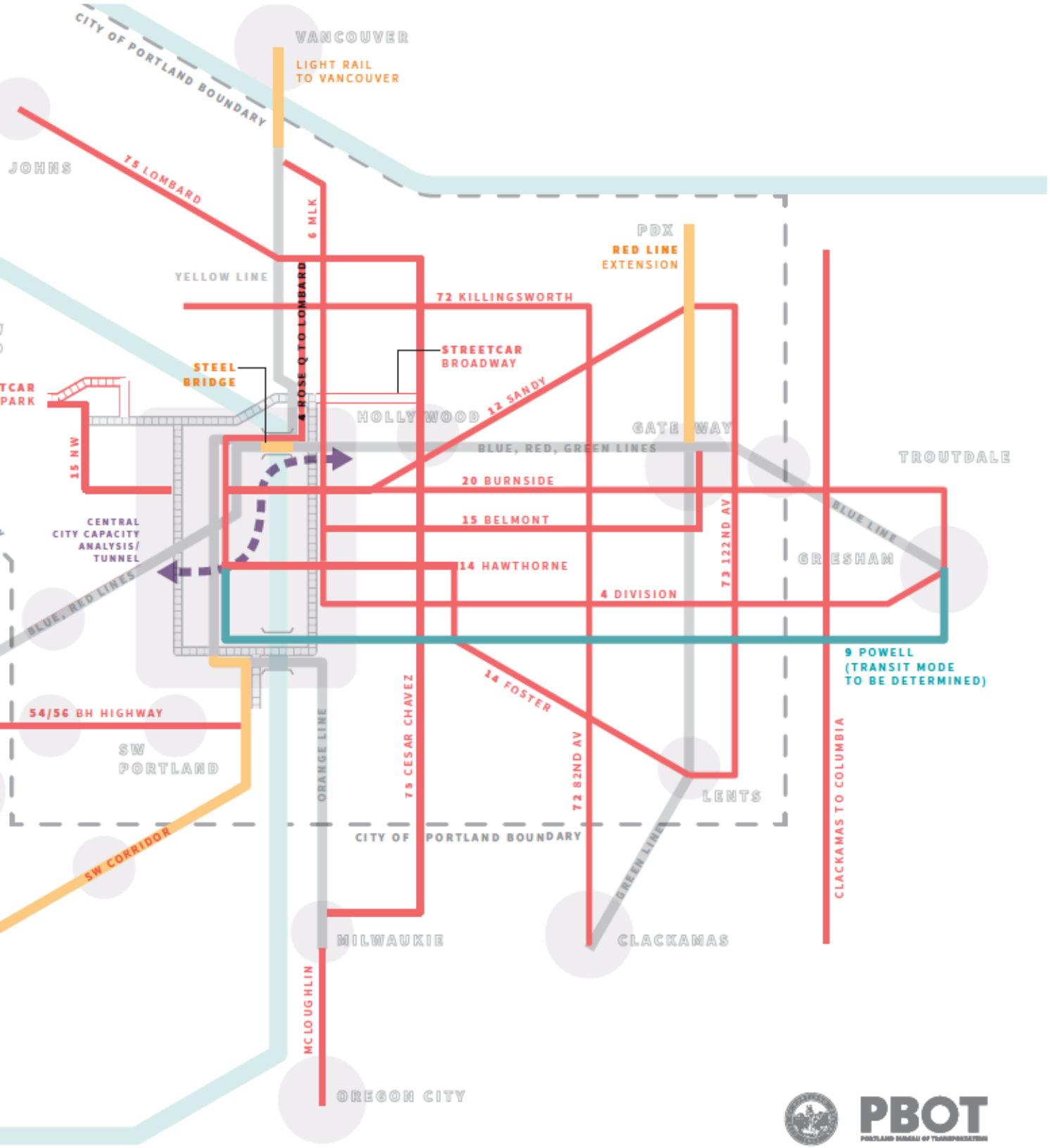
To the right is the long-term vision for an improved transit network, as developed by PBOT in coordination with TriMet for inclusion in the Regional Transportation Plan. The map shows light rail and streetcar improvements from other planning studies, along with a potential rapid transit project on Powell Blvd. The streetcar projects are from the recent Portland Streetcar Expansion Study and operational analysis of the existing streetcar line. This plan has added the following:

- **Enhanced Transit – speed and reliability improvements** – eventually applied to most of the Frequent Service network, including the streetcar and these planned new Frequent Service lines identified in the TriMet Service Enhancement Plans:
  - 122nd Ave (Line 73);
  - Burnside NW 23rd to NE 99th (Line 20);
  - SE Stark, from 99th to city limits (Line 20)

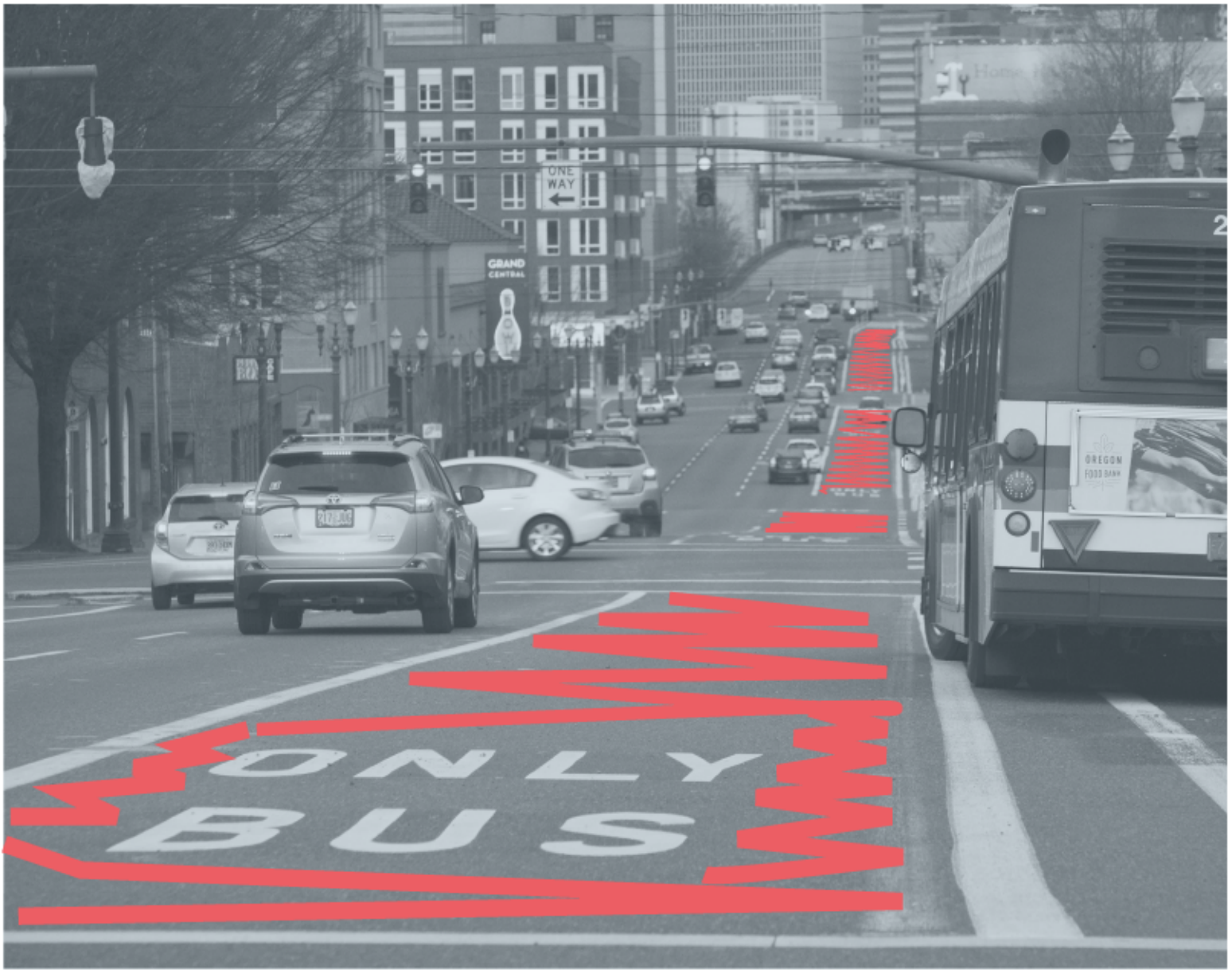
- **Enhancements on the approaches to bridges in the Central City** that are heavily used by buses, especially the Steel, Burnside, and Hawthorne Bridges. These points are critical because cars, buses, bicycles, and pedestrians are all concentrated there, maximizing their potential to obstruct each other and especially for cars to obstruct transit. They are also the places where an improvement to transit speed and reliability will have the most benefit, because so many buses and passengers benefit. The Central City in Motion project will develop these ideas in detail.

In addition to the main ideas above, **this report recommends numerous changes to City policies and practices**, as outlined in Sections 2.1 and 2.3. See the most important on the following pages.





PBOT
PORTLAND BUREAU OF TRANSPORTATION



WHAT DO WE RECOMMEND?

- **Establish an Enhanced Transit performance monitoring program (p. 19)**
- **Re-focus transit on serving longer trips (p. 20)**
- **Regularly commit City funds to plan and implement Enhanced Transit (p. 21)**
- **Include Enhanced Transit projects in the RTP for federal and regional funding (p. 21)**
- **Consider impacts to transit speed and reliability in every project (p. 21)**

RECOMMENDATION

Establish an Enhanced Transit performance monitoring program

This Plan includes a programmatic framework for on-going monitoring and investment in Enhanced Transit to improve transit capacity, reliability and speed in partnership with TriMet. This program will set City-wide Enhanced Transit performance guidelines, help identify future Enhanced Transit projects and track transit performance on an on-going basis.

Measuring the performance of transit is also about making transit riders count. When a bus is stuck in traffic or generally slow, so are all the people on that bus. This affects people further up the line waiting for the bus too.

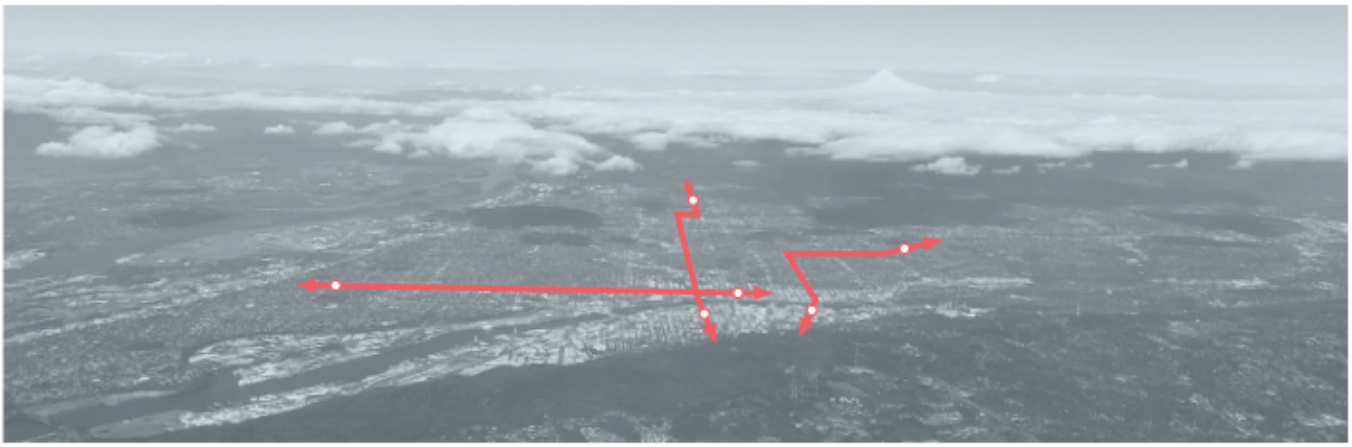
We want to understand where delay is happening, how long, and what the nature of the delay is. Understanding these symptoms and where they are most severe will help us diagnose the problems, identify effective treatments and learn how well they work after implementation. On-going monitoring will enable us to identify new problems as they arise, measure improvements and track progress towards our goals.

One of the primary Tier 1 performance measures identified in this Plan is Transit Peak Delay. Transit Peak Delay measures how much transit, and all the people on it, slows down during the peak congested time of the day. The greater the percentage is, the slower the bus is and the longer it takes the bus to travel a route segment during peak congested periods versus more free flow traffic conditions. A higher percentage value indicates a higher level of variability and greater delay during the peak.

This plan recommends the following thresholds while monitoring Transit Peak Delay. Crossing these thresholds would be a trigger to take a closer look and take actions to improve performance:

- Over 75% peak delay variation = urgent priority to take closer look in Tier 2
- 50%-75% peak delay variation = take a closer look in Tier 2
- Below 50% peak delay variation = acceptable, take a closer look only if there is other cause for concern

When transit trips cross the 50% peak delay threshold, that means it takes 50% longer to travel during the peak congested time of the day. For example, if a transit trip is 20 minutes in the off-peak, then it may be 10 minutes longer during the peak, for a total trip time of 30 minutes



RECOMMENDATION

Re-focus transit on serving longer trips

Transit is the optimal mode for trips that are more than about three miles long. For shorter trips, most people can go faster by bike and sometimes even by walking. Obviously, many people ride a bicycle longer distances and ride the bus for shorter ones, but this is a good general guideline that urban cities follow to develop transportation modes that work together rather than competing. The plan recommends that this focus on longer trips be established as city policy.

For short transit trips, the most important things to a potential passenger are finding a stop nearby and having a short wait for service, because the walking and waiting times make up a large proportion of the total travel time.

For long transit trips, the walking and waiting are proportionately less important, and the speed of travel, once you're on board, matters much more. To get the fastest possible trip, it makes sense to walk further to a faster service, as people already do to reach MAX stations.

Much of Portland's transit planning has focused on short trips. In the inner city, MAX, Streetcar, and buses have stops every few blocks, offering someone a short walk to service at the expense of a fast ride once they are on board. This easy "hop on, hop off" access has helped to foster great business districts and neighborhoods. But for the long trips that are increasingly a fact of life, especially for disadvantaged people in outer neighborhoods, the resulting service is just too slow.

The next generation of transit investment needs to shift the balance the other way.

Moving bus stops further apart is one key strategy to refocus transit on longer trips. The 2008 Downtown Transit Mall redesign was a first step in this direction, widening stop spacing from two blocks to four or more within downtown. The Streetcar has also removed some stops to speed up service. People need to have a reasonable walk to a transit stop, but asking people to walk a block further, especially in walkable areas with a good street grid, gets them (and everyone else) faster service. This in turn supports the city's transit goals.

The other key strategy to emphasize longer trips is to use street design and transit signal priority to move buses more quickly and reliably through congested streets, especially in the Central City and inner neighborhoods where congestion is worst. Improvements in the most congested parts of a bus line will benefit everyone riding anywhere along that line, and will benefit people riding longer distances the most.

RECOMMENDATION

Regularly commit City funds to plan and implement Enhanced Transit

Enhanced Transit costs money to plan and implement. The City will need to commit new ongoing funding to this effort. The City currently spends only $75,000 per year on the Transit Priority Spot Improvement Program, through which most Enhanced Transit projects would be funded. Given the high cost of infrastructure, especially signals, a recommended annual budget of $500,000 would enable PBOT to more aggressively attack transit speed and reliability problems. Consideration to increase this to $1,000,000 per year overtime would provide more benefit.

RECOMMENDATION

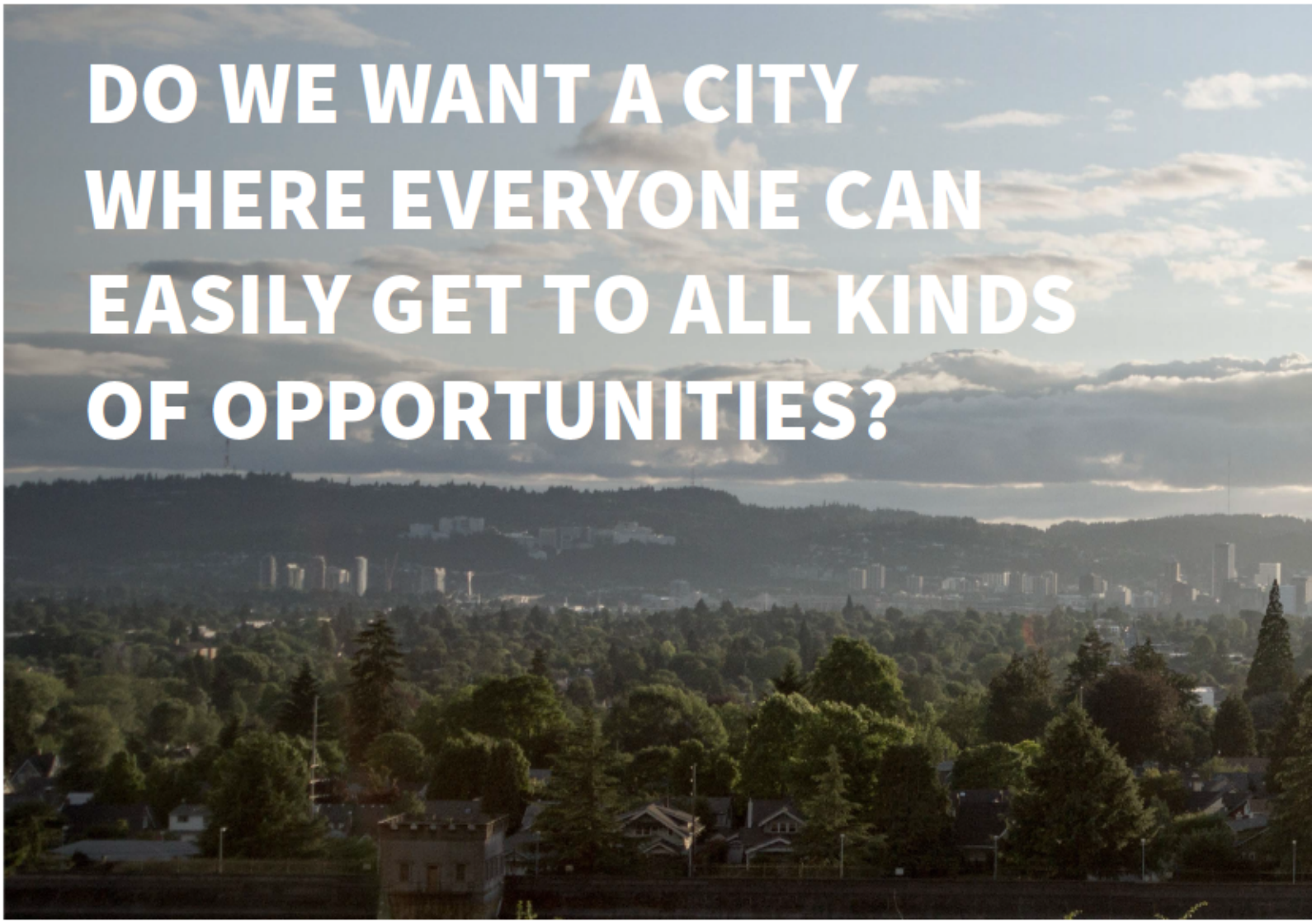
Include Enhanced Transit projects in the RTP for Federal and Regional funding

Federal and regional funding for transit improvements requires that the projects be in the Regional Transportation Plan (RTP), which is prepared by Metro. Portland's Enhanced Transit projects are recommended for inclusion in the RTP along with the other key projects in the New Vision for Transit (pages 16-17).

RECOMMENDATION

Consider impacts to transit speed and reliability in every project

Anything PBOT does along a Frequent Service street may affect the speed and reliability of transit service. For this reason, Enhanced Transit must be an approach to the whole task of street design, not just a separate set of projects. this Plan recommends that transit speed and reliability improvements be considered in any plan or project to physically improve streets that carry transit lines. It is also important to ensure that new projects of any kind do not unnecessarily harm transit speed or reliability. If a safety or active transportation project can't be feasibly designed to avoid negative impacts to a transit line, the City should try to mitigate these effects whenever possible through transit priority investments elsewhere along the line.



DO WE WANT A CITY WHERE EVERYONE CAN EASILY GET TO ALL KINDS OF OPPORTUNITIES?

ENHANCED TRANSIT, AFFORDABILITY, AND URBAN FORM

As a PBOT-led planning process, this Plan speaks primarily to actions that PBOT can take, mostly related to street design, in cooperation with TriMet and ODOT.

However, the real goal of Enhanced Transit – to improve transit's ability to expand people's access to opportunity -- obviously engages land use planning as well. Portland has a long tradition of transit-oriented land use planning, including not just MAX stations and streetcars but also the zoning of density in centers and along major frequent bus corridors such as Division and Hawthorne.

Enhanced Transit – eventually applied to the entire Frequent Service bus and streetcar network – increases the usefulness of transit on the affected corridors, and supports the planned higher densities and lower off-street parking requirements in the Zoning Code. These strategies play a critical role in the City's affordable housing agenda.

The current and planned frequent bus and streetcar network is a response to the current and planned land use, but better transit always creates new opportunities that the land use planning process can build on.

CONCLUSION

Transit is the only thing that can move large numbers of people through very little space, offering efficient freedom and opportunity to everyone. To succeed, however, transit needs its fair share of space, based on how many people it carries. The Enhanced Corridors Plan reflects the City's commitment to give transit the priority that it deserves.

While this plan talks mostly about where improvements are needed and how to develop and fund street design improvements for transit, the real work ahead is about shifting priorities. Transit needs greater priority over cars. Long transit trips need greater priority over shorter ones. This shift is difficult, because people are used to the priorities they have.

The best way through these controversies is to keep a focus on the big picture. Do we want a city where everyone can easily get to all kinds of opportunities? We know we do. This plan can get us there.

PBOT
PORTLAND BUREAU OF TRANSPORTATION

1. Introduction

The City of Portland and the region are at a critical point in the evolution of our transit network. Our buses and streetcars, along with all the people on them, are increasingly stuck in traffic and getting slower. They are most often delayed in congestion while full of passengers and late to pick up new passengers. This leads to longer travel times by transit. It causes people to be delayed, miss transfers to other transit lines and ultimately arrive late to their destinations

Each year resources for transit service hours are spent just trying to keep up schedules due to congestion, reducing the potential funding to increase transit service. TriMet spends roughly $1-2 million a year to add service just to keep up the same schedules.

All of this delay and unreliability shrinks people's access to places by transit within a reasonable travel time and makes transit less competitive with driving.

However, transit plays an important role in the transportation system and achieving City goals and policy as it grows. Demand for transit service is only expected to increase - the City is projected to gain approximately 140,000 new jobs and 260,000 new residents by 2035. These realities create a strong need for the City and TriMet to prioritize transit reliability and speed improvements in the Central City and on key corridors throughout the City.

This critical point calls for redoubling our efforts to improve transit. Doing so requires changing how we do business. Stopping the negative trends and instead bend the curve towards improving transit performance requires that we take swift and bold actions to re-allocate space and time within the right-of-way for transit, increase our investments in transit priority treatments and integrate stronger consideration for transit performance into all the ways in which we design, operate, permit, regulate and monitor the transportation system.

Between 2016 and early 2018, the Portland Bureau of Transportation (PBOT) led a planning process in coordination with TriMet to develop the Enhanced Transit Corridors (ETC) Plan. Enhanced Transit improves transit capacity, reliability, and travel time through capital and operational treatments of moderate cost. There are many ways that cities can enhance transit, to make it faster and more reliable: smart traffic signals, the placement of bus stops, the use of lanes and road striping, and other tools that are controlled by the City but very effective in enhancing TriMet service.

This plan identifies a new vision for frequent, reliable, high-ridership transit and how we can achieve it in Portland. Enhanced Transit is a key part of that vision. This plan identifies where transit priority, streamlining, and access treatments could be most beneficial on the planned TriMet Frequent Service network within the City of Portland, including buses and streetcar. Enhanced Transit improvements can provide the following benefits:

- Make it possible to get to more places sooner, which is the essence of how we make transit more useful.
- Help make transit more attractive and reliable for people to get to work, school, and to meet their daily needs.
- Benefit people who depend on transit while also making transit the logical choice for many trips that go by car today.
- Help make transit more efficient and cost-effective.

The overarching goals and outcomes of this plan:

- Make transit the logical choice for a greater number of trips.
- Improve access to opportunity for people who rely on transit.
- Increase transit ridership and improve the experience for current riders by improving transit capacity, reliability, and travel time.
- Support planned growth in centers and along corridors consistent with the Portland 2035 Comprehensive Plan.

In service to these boarder goals, this plan addresses the following objectives:

- Define and identify “Enhanced Transit Corridors” in Portland.
- Establish clear and objective operational performance measures and thresholds to define what success looks like for the most heavily used Frequent Service lines.
- Guide the prioritization of capital and operational investments in Enhanced Transit Corridors

While the City does not operate its transit directly, it controls transit's outcomes at least as much as TriMet does, through decisions that affect development patterns, walkability, and especially the degree to which transit is stuck in private car traffic. For these reasons, a City plan is needed to guide the City's actions toward better transit speed and reliability. This plan is a first step, focused on the protection of transit from traffic in particular.

This plan is guided by policy and informed by data, particularly transit operational data. The goals and objectives of this plan support and help implement the Portland Comprehensive Plan 2035, Climate Action Plan and Transportation System Plan. TriMet has a wealth of operational data. PBOT is working in close coordination with TriMet to share and utilize this data to better understand transit ridership and operational performance. This data analysis has illuminated where transit is most delayed and the nature of the delay, and significantly shaped the recommendations of this plan.

This is not intended to just be a static plan. This plan, and the planning process that led to it, is the start of a conversation about Enhanced Transit in Portland, establishing what it is, where it is most needed based on current conditions, and why we need to take action and invest locally and regionally. It also provides a programmatic framework for on-going monitoring and investment to improve transit capacity, reliability and speed in partnership with TriMet. More of this is described in the recommendations in Chapter 2.

The plan includes an Enhanced Transit Toolbox of transit priority treatments that can be deployed at various scales where the need for improvement has been established in this plan or in the future through the Enhanced Transit Program on-going monitoring. The Toolbox contains a combination of capital and operational treatments that could be applied to improve transit performance and/or to create safer, more predictable interactions with other travel modes. Learn more about the toolbox in *Chapter 3: Capital and Operational Toolbox.*

How these recommendations were reached is described in *Chapter 4: Planning Process.* Through the planning process, PBOT developed an evaluation framework for identifying bus lines where it is most important to explore improvements that increase transit reliability, speed, and capacity. The evaluation started with analyzing bus lines in the TriMet planned Frequent Transit Network, as identified in the recent TriMet Service Enhancement Plans. The Enhanced Transit plan draws on proven strategies from other cities across the country that have successfully implemented Enhanced Transit treatments. Stakeholder and public engagement were essential to understanding transit problems and evaluating potential improvements. Stakeholders and the general public provided feedback at key junctures to shape the plan, and will continue to play an integral part to the implementation of this plan's recommendations.

Frequent Service Lines

Frequent Service is defined transit lines that run every 15 minutes or better most of the day, every day.

To learn more about TriMet's Frequent Service Lines, please visit: **https://trimet.org/schedules/frequentservice.htm**

Since the initiation of this planning process, a few new developments occurred to help advance Enhanced Transit locally and regionally.

Midway through development of this plan, on July 13, 2017, City Council adopted Resolution No. 37304 to recommend PBOT develop new and expanded strategies to improve transit service and increase transit ridership throughout the City by developing an Enhanced Transit Program. Council directed PBOT to pursue bold strategies and transit treatments in the Enhanced Transit Corridors Plan, in addition to recommending projects, performance measures, and guidelines that will serve ongoing implementation. This direction from the City Council strongly influenced the recommendations included in this plan.

A new community advocacy organization called the Portland Bus Lane Project formed in mid-2017. They are working to improve the state of transit in the Portland Metropolitan region.

PBOT began installing small spot improvement projects to improve transit travel time and reliability through the new Transit Priority Program established during the 2016 update to the Transportation System Plan. Portland Streetcar Inc and PBOT began implementing transit travel time and reliability treatments on the City's streetcar lines. These are described more in *Chapter 6: Early Implementation.*

The City's Enhanced Transit planning process helped initiate conversation of Enhanced Transit at the regional level. The Enhanced Transit concept was introduced into Metro's Regional Transit Strategy as part of the 2018 Metro Regional Transportation Plan (RTP) update. Concurrently, Metro and TriMet initiated a pilot program in 2018 to build understanding around where enhanced transit tools may be applicable throughout the greater Portland region. JPACT and Metro Council allocated up to $5M of Regional Flexible Funds to support the pilot workplan. The Regional Enhanced Transit Concept pilot program is led by Metro and TriMet. This pilot program presents a great opportunity for the City of Portland to potentially advance project development and design for Enhanced Transit candidate segments. This is described in *Chapter 7: Looking Ahead*.

1.1 What is Enhanced Transit?

Enhanced Transit is a set of things that the City and TriMet can do to improve transit capacity, reliability and travel time along major Frequent Service bus lines. Enhanced Transit actions can include changes to the design and operation of streets and signals, typically owned and operated by the City. It can also include changes to transit vehicle fleet, station equipment and operation systems typically owned and operated by TriMet.

Enhanced Transit projects come in a variety of shapes and sizes; for example, the improvements might address bottlenecks, or a portion of a transit line experiencing delay, or in some cases, improvements to a full transit line. Treatments can be applied systematically across a transit network to improve multiple lines or through a corridor approach to improve one or more transit lines. Enhanced Transit is intended to be flexible and context-sensitive during design and implementation. Enhanced Transit encompasses a range investments comprised of capital and operational treatments of moderate cost. It can be deployed relatively quickly in comparison to larger High Capacity Transit (HCT) capital projects.

Exhibit 1. Example of Enhanced Transit: Westbound Pro-time Business Access and Transit (BAT) that becomes on-street parking off-peak on SE Madison Street, between SE 10th Avenue and SE Grand approaching the Hawthorne Bridgehead

The project team developed an Enhanced Transit Toolbox to identify types of transit priority improvements that can be deployed at various scales throughout the City.[1] The Toolbox contains a combination of capital and operational treatments that could be applied to improve transit performance and/or to create safer, more predictable interactions with other travel modes. Learn more about the toolbox in *Chapter 3: Capital and Operational Toolbox.*

Exhibit 2. Example of Enhanced Transit: Southbound Business Access and Transit (BAT) lane on SW 11th Avenue from SW Stark Street to SW Clay Street, shared with Portland Streetcar alignment. This is an example of how Enhanced Transit treatments can benefit both buses and streetcars.

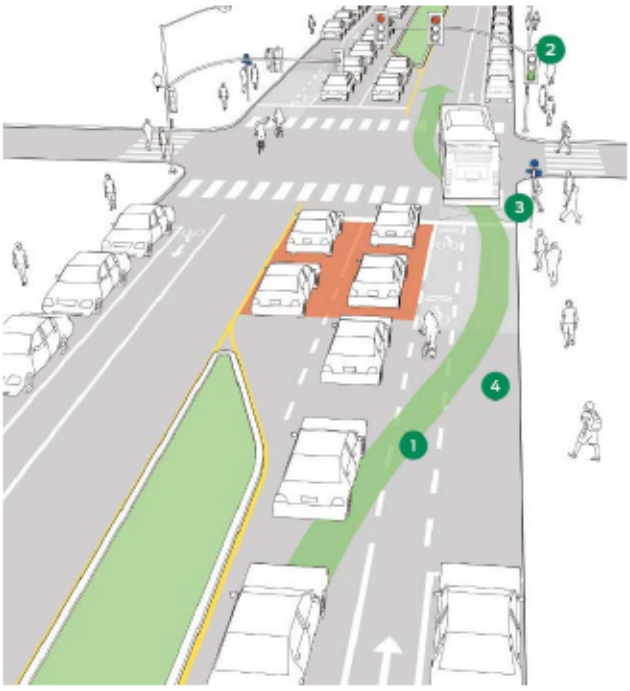


Exhibit 3. 'Queue jump', which uses a combination of laneway treatments, stop improvements, and signal priority to allow transit to 'jump' in front of vehicle platoon at intersections. Source: NACTO Transit Street Design Guide

[1] Memo #4: ETC Capital and Operational Toolbox can be found at: https://www.portlandoregon.gov/transportation/article/640269

On the spectrum of types of transit, Enhanced Transit typically falls in the middle of the spectrum, with a combination of transit running in mixed traffic, targeted priority treatments and possibly some exclusive transit guideway or dedicated lanes, as illustrated in Exhibits 4.

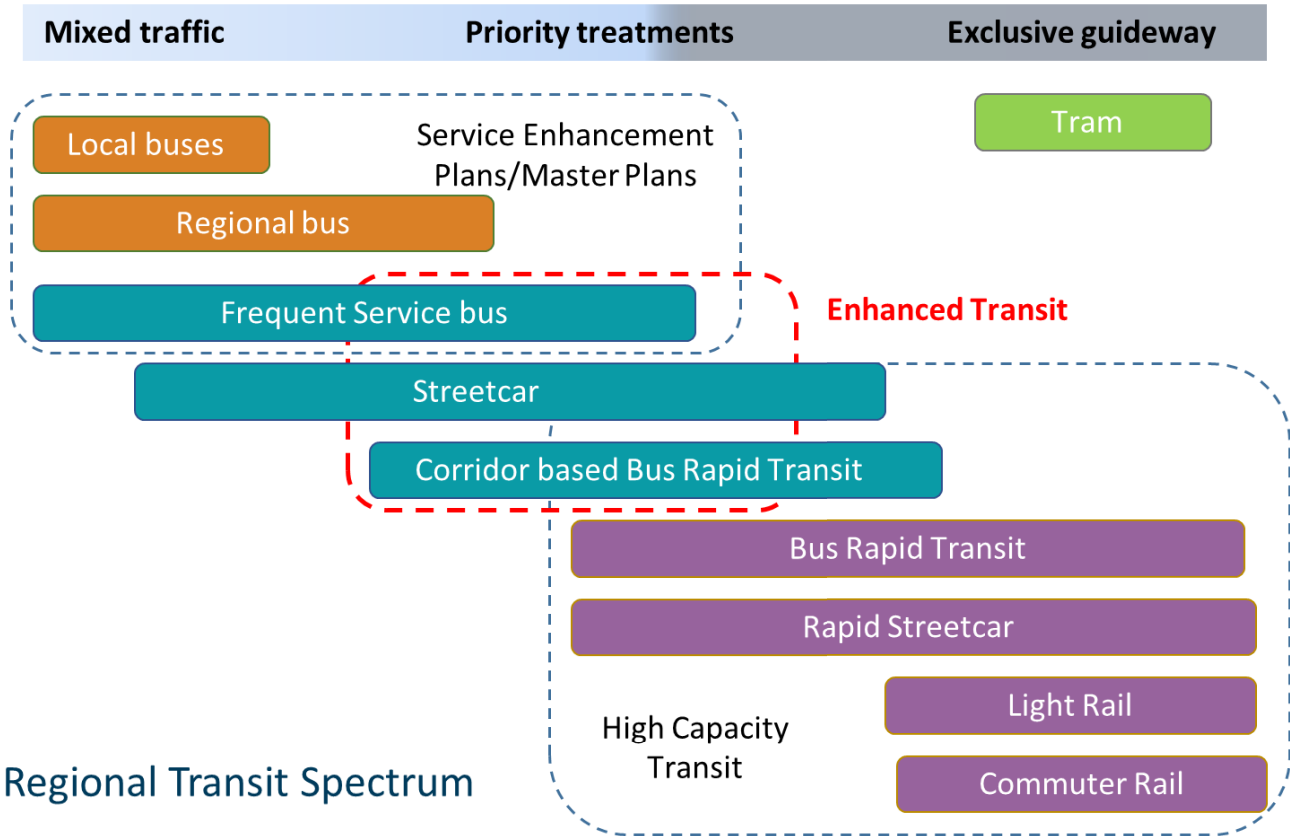


Exhibit 4. Regional Transit Spectrum, indicating how Enhanced Transit relates to other types of transit. The number of passengers carried per vehicle and the degree of transit priority and separation from general traffic increases across the spectrum from left to right. Enhanced Transit is in the middle.

1.2 Why This Plan?

Enhanced Transit projects will support the City's transportation and climate goals and policy, intended to shift transportation away from single occupant vehicles to transit, cycling and walking. The City has adopted a transit mode share goal of 25% of all trips by 2035 in its Climate Action Plan, while Metro's Regional Transportation Plan (RTP) calls for a tripling of 2005 transit mode share by 2035. Additionally, the 2035 Transportation System Plan Update, adopted by the City Council in December 2016, establishes an objective to reduce the number of miles Portlanders travel by car to 11 miles per day on average and for 70 percent of commuters to walk, bike, take transit, carpool, or work from home.

Transit ridership has not increased enough to meet our mode share goals. Since the year 2000, the citywide transit mode share has remained around 12%, short of these goals (Exhibit 5).

Mode Share and Mode split

Mode share and mode split refer to the same thing. Mode split is the percentage of trips taken by each of the possible modes of travel (motor vehicle, transit, bicycle, walk, ride share, etc.) Mode split does not refer to the number of trips. For example, the number of trips by a particular mode may increase, but the percentage of trips by that mode may stay the same or be reduced if there is also growth in the overall number of trips for other modes.

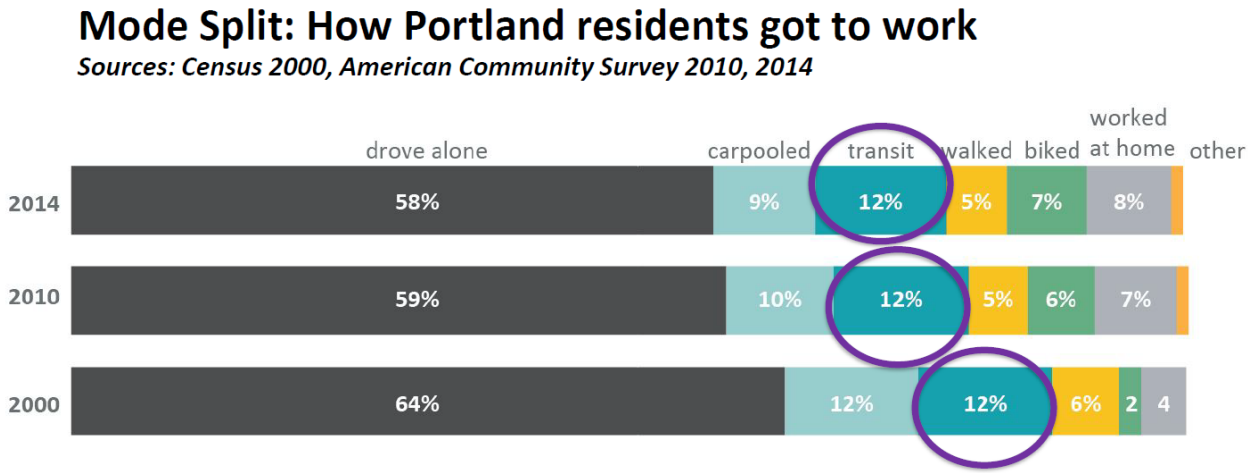


Exhibit 5. Portland Mode Split (2000 - 2014) In Portland, the share of people using transit to commute did not increase from 2010 to 2014.

TriMet's Frequent Service bus network play a critical role in the transit system in the City of Portland. They serve many corridors of the City not served by light rail or streetcar. Buses are the work horse of the transit system. Some bus and Portland Streetcar lines carry as many riders as the region's MAX Light Rail Lines (Table 1).

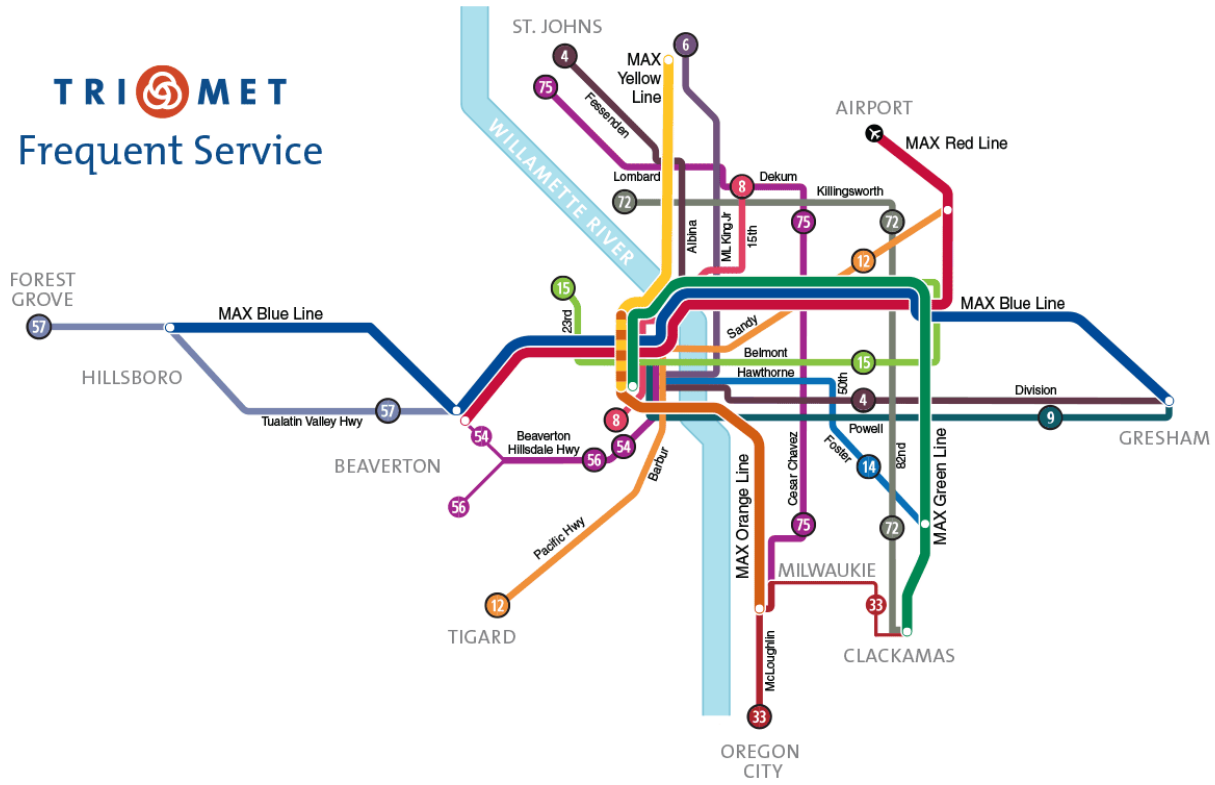


Exhibit 6. Current TriMet Frequent Service Network.

Table 1. Top 10 Transit Lines by Ridership (2015)

Top 10 Transit Lines (2015)			
Number of Boarding Rides			
1.	MAX Blue Line	6	MAX Yellow Line
2	MAX Green Line	7	Portland Streetcar
3	MAX Red Line	8	MAX Orange Line
4	Line 4 – Division/Fessenden	9	Line 20 – Burnside/Stark
5	Line 72 – Killingsworth/82nd Avenue	10	Line 75 – Cesar Chavez/Lombard

Meanwhile, buses and streetcars are increasingly stuck in traffic, leading to slower average travel speeds (Exhibit 6), longer travel times and less travel time reliability. Delay to transit is most pronounced during the peak congested times when more vehicles are on the roads. All of this makes bus and streetcar transit less competitive with driving.

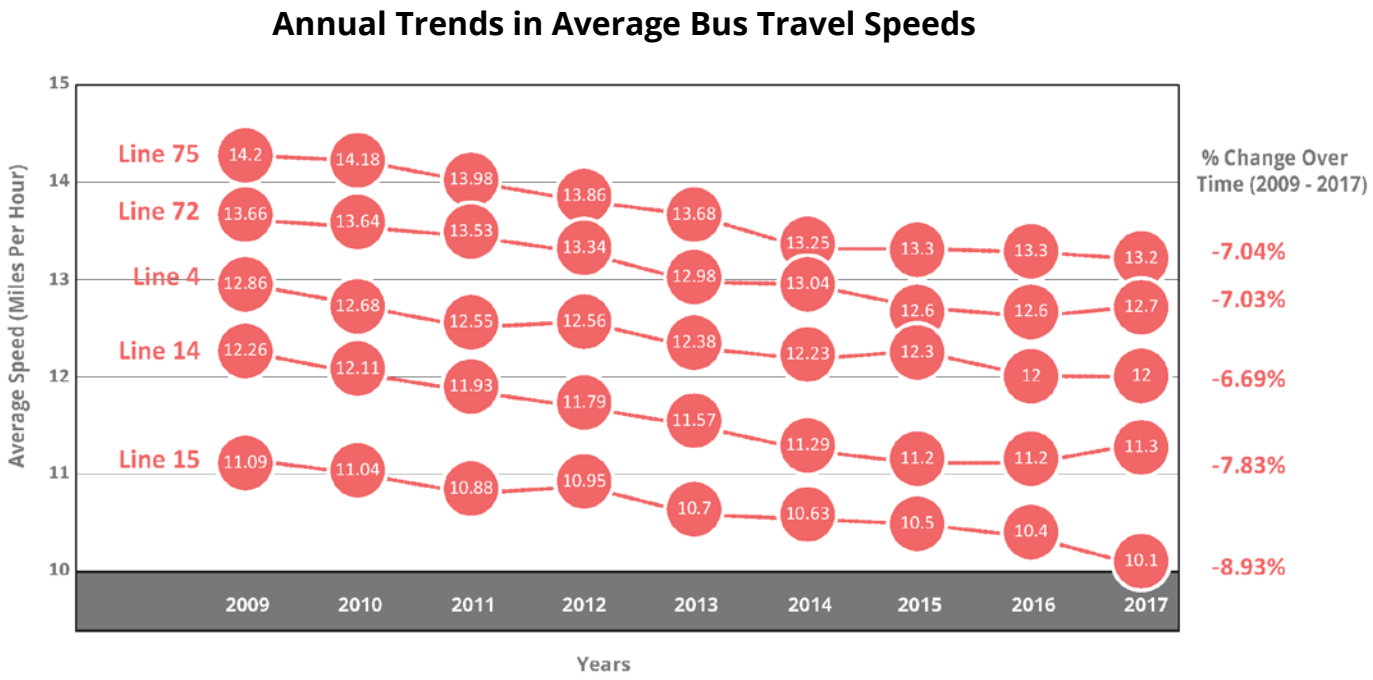


Exhibit 7. Average Transit Speed (2009 - 2017). Many bus lines have increasingly slower average speeds over recent years.

The following map (Exhibit 7) indicates where buses, and all the people on the bus, experience the most delay during the peak congested time of the day. This map displays bus travel speed variability over the course of the day and helps identify the influence of traffic congestion on delaying transit during typical peak periods. The greater the percentage is, the longer it takes the bus to travel the route segment during peak congested periods versus more free flow traffic conditions. A higher value indicates a higher level of variability and thus a higher delay. The time point segments colored red are where there is the greatest variability and delay to buses.

At the same time buses are increasingly stuck in traffic, demand for transit service is only expected to increase - the City is projected to gain approximately 140,000 new jobs and 260,000 new residents by 2035. As of the writing of this plan, TriMet spends roughly $1-2 million per year to add more buses to routes just to keep up with published route schedules and account for greater variability and longer travel times to complete a route. Without substantial improvements to the bus and streetcar network, it is very likely that transit service speed and reliability will continue to deteriorate.

These realities create a strong need for the City and TriMet to prioritize reliability and speed treatments for transit on key corridors throughout the City. The Enhanced Transit Corridors Plan is a significant first step toward implementing lower cost, flexible, and effective transit priority treatments that will in turn support more transit ridership throughout Portland.

Transit Delay During Peak Congestion Time

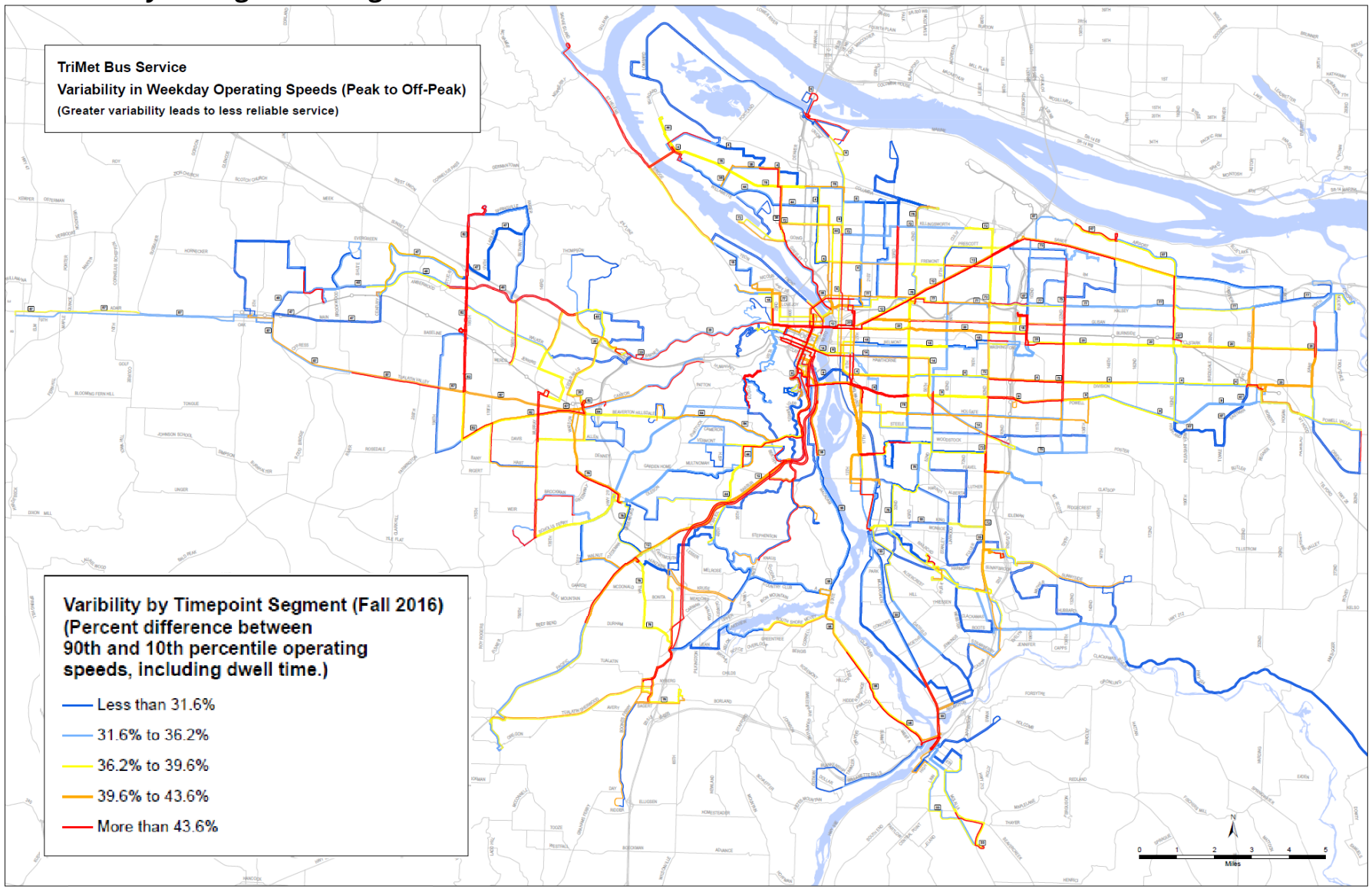


Exhibit 8. Regional Transit Delay During Peak Congestion Time: Transit Travel Speed Variability over the course of a day

1.3 Policy Background

Implementing the Enhanced Transit Corridors Plan will help to achieve multiple adopted City goals and policies and accommodate future growth. The Portland Plan and the Climate Action Plan established a mode split goal of 25% of all trips on transit by 2035, and the 2035 Regional Transportation Plan includes a goal of tripling transit mode share over 2005 levels. Increasing transit reliability, travel times and capacity are ways to increase transit ridership and help meet these mode split goals.

The need for the Enhanced Transit Corridors Plan was identified as a part of the Portland Comprehensive Plan update process. It was then included as a future planning need in the Portland 2035 Transportation System Plan, Section 12 Refinement Plans and Studies, in the TSP update adopted by City Council in December 2016.

The Enhanced Transit Corridors Plan supports multiple goals and policies in the Portland Comprehensive Plan 2035, including:

- Goal 9B, that Portland's transportation system is funded and maintained to achieve multiple goals and measurable outcomes for people and the environment. The transportation system is safe, complete, interconnected, multimodal, and fulfills daily needs for people and businesses.
- Policy 9.5, to increase the share of trips made using active and low-carbon transportation modes. Reduce Vehicle Miles Traveled (VMT) to achieve targets set in the most current Climate Action Plan and Transportation System Plan, and meet or exceed Metro's mode share and VMT targets.
- Policy 9.6, regarding the transportation strategy for people movement. Implement a prioritization of modes for people movement by making transportation system decisions according to the following ordered list:

    1. Walking
    2. Bicycling
    3. Transit
    4. Taxi / commercial transit / shared vehicles
    5. Zero emission vehicles
    6. Other single-occupant vehicles

    When implementing this prioritization, ensure that:
    - The needs and safety of each group of users are considered, and changes do not make existing conditions worse for the most vulnerable users higher on the ordered list.
    - All users' needs are balanced with the intent of optimizing the right of way for multiple modes on the same street.
    - When necessary to ensure safety, accommodate some users on parallel streets as part of a multi-street corridor.
    - Land use and system plans, network functionality for all modes, other street functions, and complete street policies, are maintained.
    - Policy-based rationale is provided if modes lower in the ordered list are prioritized.

- Policy 9.22, regarding public transportation, to coordinate with public transit agencies to create conditions that make transit the preferred mode of travel for trips that are not made by walking or bicycling.
- Policy 9.24, regarding transit service, in partnership with TriMet, to develop a public transportation system that conveniently, safely, comfortably, and equitably serves residents and workers 24 hours a day, 7 days a week.
- Policy 9.25, regarding transit equity, in partnership with TriMet, to maintain and expand high-quality frequent transit service to all Town Centers, Civic Corridors, Neighborhood Centers, Neighborhood Corridors, and other major concentrations of employment, and improve service to areas with high concentrations of poverty and historically under-served and under-represented communities.

The Enhanced Transit Corridors Plan helps to achieve policy elements in the Portland 2035 Transportation System Plan update adopted by City Council in December 2016. This includes:

- TSP Objective 9.26.h; by 2035, to reduce the number of miles Portlanders travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool, or work from home.
- TSP Policy 6.6 Transit Classification Description for Major Transit Priority Streets:

  Improvements. Employ transit-preferential measures, such as signal priority and bypass lanes. Provide transit signal priority at major intersections, prioritize transit stops or transit lanes over on-street parking, and provide enough lane width to accommodate standard transit vehicles. Consider the use of exclusive or semi-exclusive transit lanes where needed to reduce congestion-related transit delay. Design intersections of Major Transit Priority Streets with other Major Transit Priority Streets or Transit Access Streets to allow turning movements of a standard transit vehicle. Where compatible with adjacent land use designations, right-of-way acquisition or parking removal may occur to accommodate transit-preferential measures or improve access to transit. The use of access management should be considered where needed to reduce conflicts between transit vehicles and other vehicles. Carefully consider any street design changes to Major Transit Priority Streets that impact travel time in light of the potential costs and benefits to transit riders, while also taking into account other adopted goals and policies.

Implementing the Enhanced Transit Corridors Plan will help to achieve regional policy and actions in the Regional Climate Smart Strategy, adopted by the Metro Council in December 2014 and approved by the state in May 2015. This includes:

- Policy: Make transit convenient, frequent, accessible and affordable. The Strategy identifies four key ways to make transit service convenient, frequent, accessible and affordable. The first one is most relevant to Portland's ETC Plan:
  - Frequency. Increasing the frequency of transit service in combination with transit signal priority and bus lanes makes transit faster and more convenient.
- Near-term (2017-20) Action Item: Expand partnerships with transit agencies to implement capital improvements in frequent bus corridors (including dedicated bus lanes, stop/shelter improvements, and intersection priority treatments) to increase service performance.

1.4 Learning from Other Cities

Other cities across the country have proven strategies to improve transit travel times and reliability that Portland could use in our city. They are even more common overseas, in Central and South America, Europe and even relatively low-density countries like Australia. Enhanced Transit solutions are not new. Some have already been implemented on Portland. In recent years, they have been applied more aggressively in metropolitan areas across the country to improve bus service reliability, reduce transit travel times, and make transit more attractive to prospective riders.

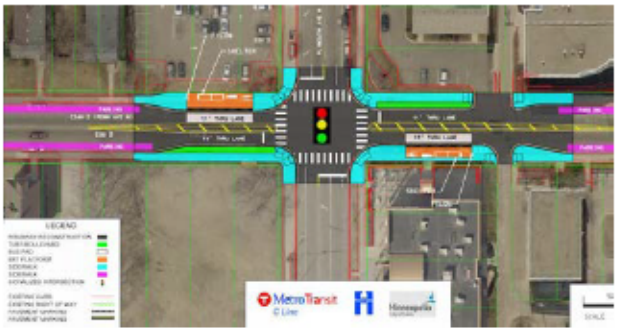
Seattle, for example, has seen great success in deploying Enhanced Transit solutions on its RapidRide bus routes. RapidRide routes have seen **ridership increase 87%** over previous service in each corridor. Minneapolis and San Francisco have similarly implemented Enhanced Transit treatments on their most heavily used corridors, resulting in speed, reliability, and safety improvements.

Seattle's Transit Master Plan, partly the inspiration for Portland's Enhanced Transit Corridors Plan, articulated a strong commitment to bus rapid transit and priority bus corridors within the city. In fact, this is the highest priority strategy in the Master Plan. With a rapidly increasing population and limited street space Seattle and King County Metro have aggressively funded and implemented Enhanced Transit projects to increase the utility of transit and serve more riders.

Metro RapidRide, King County, WA

King County Metro's RapidRide program provides frequent, high capacity bus service on some of the most heavily used transit corridors in metropolitan Seattle. RapidRide corridors make strategic use of Enhanced Transit treatments including bus only lanes, BAT lanes, and transit signal priority to improve transit travel time and reliability. RapidRide has included substantial stop consolidation. The system also features amenities typical of bus rapid transit, including off-board fare collection and level boarding to reduce dwell time at bus stops and speed up transit.[2]

Metro Transit, Minneapolis, MN



In 2011, Minneapolis Metro Transit studied how to improve transit travel times on its eleven highest-uses bus routes in metropolitan Minneapolis. The study found that traffic lights and rider boarding were two of the most significant transit delay factors in the corridor. The agency has since implemented improvements on many of these corridors, including intersection queue jumps, all-door boarding, and curb bulbouts to facilitate in-lane stops.[3]

---

[2] King County Metro. 2017. Seattle RapidRide Expansion Program Report. Retrieved from: https://www.seattle.gov/Documents/Departments/SDOT/TransitProgram/RapidRide/RREP_Plan_FINAL_062217_WEB.PDF

[3] Metro Transit. 2018. Arterial Transitway Corridors Study website. Retrieved from: https://www.metrotransit.org/abrt-study

San Francisco Municipal Transportation Agency, San Francisco, CA

The San Francisco Municipal Transportation Agency (SFMTA) has implemented Enhanced Transit treatments on several heavily trafficked corridors, including Mission and Market Streets. SFMTA was one of the first agencies to apply red-painted bus only lanes through a special project with CalTrans and FHWA. Not only have the red bus-only lanes improved transit reliability, they've increased safety – SFMTA found that the new red lanes, which provide a clear demarcation between transit and general purpose lanes, have reduced speeding and bus-car conflicts.[4] The agency has also added curb bulbouts to allow in-lane stops and upgraded their operations to accommodate all-door boarding on buses, reducing delay on the system.

[4] San Francisco Municipal Transit Authority. 2017. Red Transit-Only Lanes Work: Two New Studies Show Their Benefits. Retrieved from: https://www.sfmta.com/blog/red-transit-only-lanes-work-two-new-studies-show-their-benefits

2. Recommendations

The recommendations of this plan are organized into four distinct categories. The first category is comprised of a new approach to transit for Portland. The second category is a new vision for transit that includes an initial network of Enhanced Transit corridors and corridor segments that will form a bundle of Enhanced Transit capital projects in areas throughout the City with the greatest need for improved transit reliability, speed and capacity. These projects are recommended to be included in the Portland Transportation System Plan and the 2018 – 2040 Project list of the Metro 2018 Regional Transportation Plan (RTP).[5]

The third category of recommendations includes additional policy recommendations, actions and next steps to be taken by the City to advance the implementation of enhanced transit in Portland.

The fourth category of recommendations describes the start of a City-wide Enhanced Transit Monitoring Program and on-going performance framework. This program will set City-wide Enhanced Transit performance guidelines, help identify future Enhanced Transit projects and track transit performance on an on-going basis.

[5] As of the writing of this section, the inclusion of these projects is contingent on discussion and approval from other regional partners.

2.1 A New Approach to Transit for Portland

The recommendations in this section support the development of a new approach to transit in the City of Portland. Given that by its nature transit is a network of different transit services that support each other, this plan moves beyond strictly discussing Enhanced Transit investments to recommending an overall new vision for transit. At this point in time, the City of Portland lacks a Transit Master Plan that organizes the City's thinking and actions related to transit. This does not mean that the City lacks a larger vision for transit. On the contrary: Portland has been for decades leading the region and nation in recognizing the importance of transit and developing innovative approaches to transit. They include the building of our MAX system, North America's first modern streetcar and the Aerial Tram. The backing for this work has been the transit policies in the City's Comprehensive and Transportation System Plans that promote both the appropriate land uses to facilitate people's access to transit and organize development and growth, as well as the policy support for continued transit investments to meet our transportation goals (see section 1.3 above). Finally, this transit vision has been closely integrated with the rest of the region as part of Metro's 2040 Growth Concept, the Regional Transportation Plan (RTP) and TriMet's strategic plans.

Concurrent with this plan, the region has been updating its Regional Transportation Plan. The 2018 RTP contains a strong regional transit vision that calls for continued investments at all scales and creates a new category for "enhanced transit". The City of Portland strongly supports this strong vision and expects to be key player in its implementation.

To that end, the City of Portland is developing a new approach to transit to make transit more frequent, convenient, accessible and affordable for everyone. The three elements to this new approach include:

1. **High Capacity Transit (HCT)**. High capacity transit is made of our exclusive guideway (separated from traffic) transit corridors that have large vehicles carrying large numbers of people generally over longer distances. The MAX network is the region's HCT network. Southwest Corridor is the next planned HCT corridor in the region. Future HCT corridors may be "bus rapid transit" corridors where for a large part of the route the bus is in exclusive right-of-way.
2. **Enhanced Transit**. The main focus of this plan, this the type of transit consists of buses and streetcar of different types that carry people efficiently over long distances in a convenient and reliable manner. Enhanced transit lines make the bulk of TriMet's Frequent Service network, operate mostly in mixed traffic with some transit priority treatments. They may receive additional capital and service investments to make them more attractive to riders.
3. **Growing Transit**. Growing Transit is the network of future and improved transit lines that are not mature enough to be part of the frequent service network. They may be new bus lines or existing lines planned for more frequent service in growing parts of the city. Investments in transportation projects along these lines primarily focus on making it easier to access transit in parts of the city with underdeveloped pedestrian, bicycle networks and unsafe access to transit. Some of these lines may with time become part of the frequent service and Enhanced Transit network.

These three approaches are on a spectrum. They are not always separate and distinct efforts from one another. Each approach indicates a main emphasis to address the primary need in a given location. For example, an Enhanced Transit project may include elements of Growing Transit safety and access improvements, and vice versa. This Plan is primarily about Enhanced Transit, though it touches on these other approaches.

There is an important relationship between Growing Transit and Enhanced Transit. Bus lines that have low frequency, lower ridership, poor access to transit and little delay need more of a Growing Transit approach now. As the City and TriMet make improvements, ridership grows and the city grows, there may be a shift needed towards an Enhanced Transit approach to improve speed and reliability. Transit frequency and capacity are improved with each approach. If all goes well, ridership increases too. This is the virtuous upward spiral of transit investment.

Exhibit 9. A graphic conveying the Virtuous Upward Spiral of Transit Investment

There are many tracks by which projects can be built, whether they are High Capacity Transit, Enhanced Transit or Growing Transit. The various tracks are displayed in the following graphic. Enhanced Transit and Growing Transit improvement projects can be built through any of these tracks, depending upon the size, cost and funding sources. However, High Capacity Transit projects are predominantly implemented with partial funding through the Federal Transit Administration and led by Metro and TriMet.

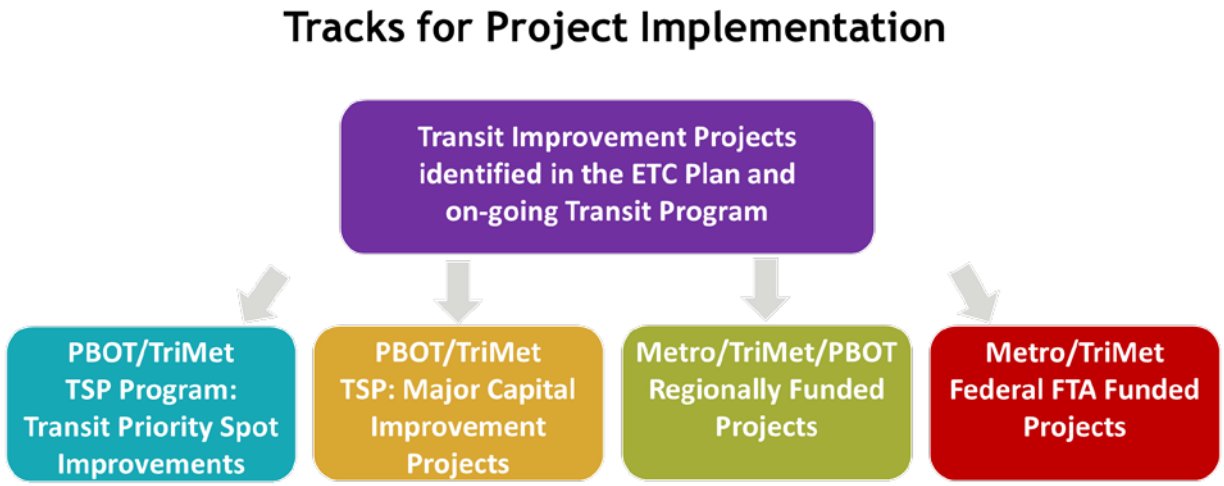


Exhibit 10. A graphic showing the various tracks for project implementation

The Transit Priority Spot Improvement TSP program is one of ten programs established in the Transportation System Plan. This program builds low-cost, quick, small projects that can help improve Growing Transit, Enhanced Transit or even access to Hight Capacity Transit. This program is meant to be opportunistic, that is, to be able to nimbly address transit operational delay issues or access to transit needs. Projects built through programs are typically well under $500,000. Project over $500,000 generally become Major Capital Improvement Projects in the TSP.

2.2 A New Vision for Transit: Initial Enhanced Transit Corridors and Recommended Projects

This planning process began focused on Enhanced Transit. It became apparent that a broader look was needed to address future transit needs. Therefore, we expanded our look to other elements of the transit system, including growing new bus lines and light rail. This led to a new vision for transit in Portland and how Enhanced Transit fits into it. The Vision has a corresponding list of capital projects. These projects are recommended to be included in the Portland Transportation System Plan and the 2018 – 2040 Project list of the Metro 2018 Regional Transportation Plan (RTP).[6]

The City of Portland and the region are at a critical point in the evolution of our transit network. Our buses are increasingly stuck in traffic, and each year resources for transit hours are spent just trying to keep up schedules due to congestion, reducing the potential funding to increase transit service. To find affordable housing, more people are living further from their place of work. Not all of these places are well served by transit. This critical point calls for redoubling our efforts to improve transit. This calls for a three-pronged strategy:

1. **More aggressively invest in adding new transit service, more Frequent Service transit lines and local infrastructure to provide safer access to transit.** This includes adding new service lines in areas not served by transit, increasing service on less frequent transit lines to become Frequent Service, and increasing service on existing Frequent Service transit lines where ridership demand and growth is increasing. The TriMet Service Enhancement Plans provide a vision for where to increase service. The City's Growing Transit Communities Plan provides a model for how the City can coordinate investments and partner with TriMet to improve access to transit where TriMet increases service frequency on new lines and on less frequent transit lines with transportation barriers.

2. **Focus primarily on Transit Speed and Reliability.** In past decades and until very recently, Portland emphasized local transit rider accessibility via short walking distances to transit stops closely spaced together over the travel time that it took to travel via transit. The intention was to increase transit ridership by providing convenient access and by using transit stations as ways to encourage transit-oriented development. Examples of this were the original MAX Blue line that used light rail as a local, free circulator for the downtown retail core, the streetcar and the closely spaced stops in inner Portland. At the time, this made sense and to a large degree we succeeded.

   But a known side effect of this approach has been that that it takes too long to cross places such as downtown Portland or to get to any destination in the city and region compared to driving. We are losing the attractiveness of transit every year as buses are stuck in traffic, not taking people where they want to go at a competitive travel time. Buses having to make a significant number of additional stops than necessary is making things worse. Over time, as Portland and the region keep growing, we have slowly moved towards emphasizing transit mobility (travel speed and reliability) more. Examples of this includes the newly designed Transit Mall (with stations further apart than the "cross Mall" alignment on Yamhill and Morrison), and the recent work by Portland Streetcar to eliminate some stops. Recent PBOT

[6] As of the writing of this section, the inclusion of these projects is contingent on discussion and approval from other regional partners.

capital projects have come with some bus stop consolidation. The result has been greater transit reliability, faster travel times and increased ridership—especially evident for streetcar. This new emphasis makes sense as the region has grown, increasing travel distances, multiplying destinations, and increasing travel times.

Enhanced Transit plus a number of new transit concepts emanating from Metro's Regional Transportation Plan (RTP), including a potential transit tunnel under the Central City in the next 20-40 years, can make transit more attractive and competitive while maintaining the basic accessibility that transit needs to attract riders. This new generation of transit projects will "supercharge" the move toward a faster and more reliable transit system. Enhanced Transit, improvements addressing the Steel Bridge/Rose Quarter bottleneck, the MAX red line extension and a potential future Central City tunnel are primarily proposed to increase the reliability and travel time of the network by improving the in-vehicle travel time, which, when multiplied by the personal time of the numerous transit riders traveling long distances from the region and from East Portland, lead to benefits that outweigh the cost of some people having to walk a little longer in inner Portland to get to their stop, particularly if these stops include better shelters and other improvements.

3. **A closer relationship and active cooperation between PBOT and transit operators, primarily TriMet**. For the City of Portland, this means developing the City's Enhanced Transit Monitoring Program. More about this in the following two sections of this chapter.

During the development of the Enhanced Transit Corridor Plan, the project team identified an initial network of Enhanced Transit Corridors along bus lines in the TriMet Planned Frequent Service Network (Exhibit 8). Based on the initial methodology developed during the planning process, the project team evaluated the segments of this network to assess where there was the greatest need and it was most important to focus capital investments to improve transit reliability, travel time and capacity. The results of this evaluation informed the development of a list of Enhanced Transit capital projects to improve this initial network of Enhanced Transit Corridor bus lines.

The list of Enhanced Transit capital projects identified during this planning process were combined with several streetcar projects and other major transit capital projects to form a New Vision for Transit in Portland (Exhibit 9). This Vision includes projects to address key bottlenecks and expansions to the MAX system, as well as an emerging concept of a Regional Connector, or potential transit tunnel under the Central City. This concept requires further study before it can become a project. This transit vision also includes many "growing transit" improvements, though they are too small in geographic scale to appear in the vision map.

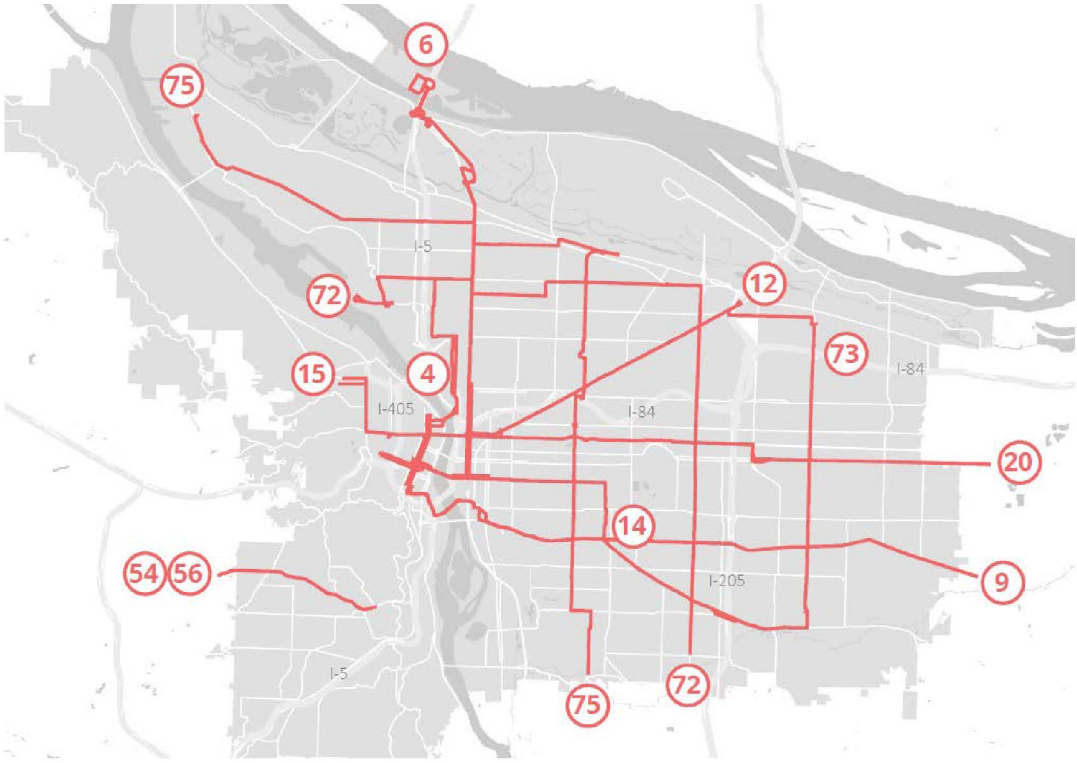


Exhibit 11. Initial Network of Enhanced Transit Corridors along Bus Lines

This Vision has a corresponding list of transit-related capital projects and studies that were submitted by the City of Portland and TriMet for the draft 2018 Regional Transportation Plan (RTP) update first round call for projects in July 2017. Exhibit 9 below organizes the RTP projects by mode, while Exhibit 10 organizes those same projects by RTP funding timeframes. Table 2, 3 and 4 describe the Enhanced Transit projects included in the Vision. Table 5 describes other transit projects reflected in the Vision. They are organized into three priority tiers based on the RTP 2018 Update funding timeframes (1 – 10 years Financially Constrained, 11 – 20 years Financially Constrained, and Strategic, for which the available revenue and timeframe are to be determined).

This plan recommends that these transit capital projects be added to the Portland Transportation System Plan (TSP) during the next update or future amendments to the TSP.

All the transit projects submitted by the City of Portland have been identified in coordination with TriMet. The recent Portland Streetcar Expansion Study informed streetcar project selection, and all streetcar projects were identified in coordination with Portland Streetcar, Inc. The recommendations include a set of initial Enhanced Transit Corridors to be included in the RTP Transit Vision, and a corresponding list of Enhanced Transit capital projects to improve existing bus lines identified through the development of this Plan. This planning process is described in *Chapter 4: Planning Process.* Future additional Enhanced Transit corridors and hot spots will be identified through the City's on-going Enhanced Transit Program or the Regional Enhanced Transit Concept pilot program described in the following sections.

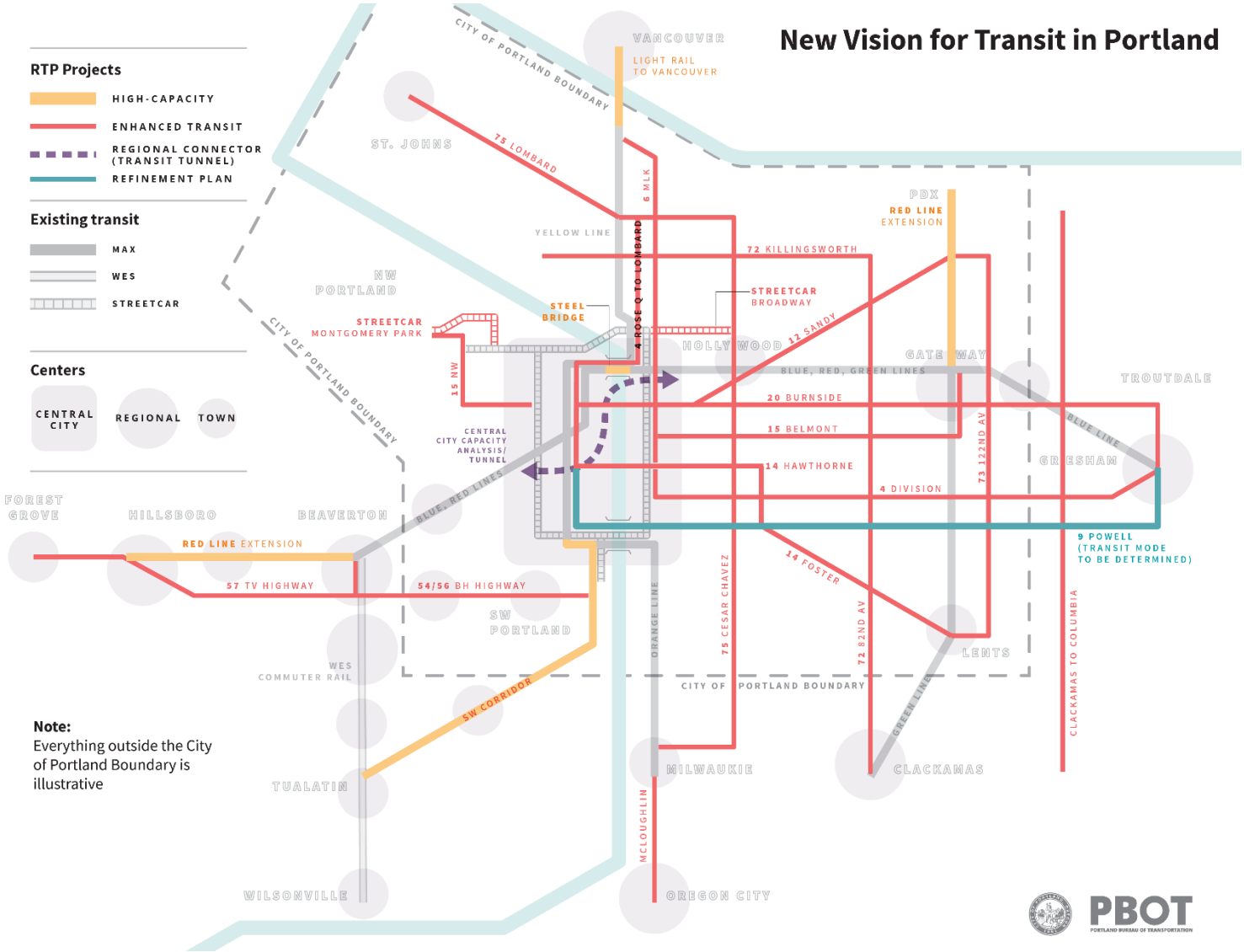


Exhibit 12. Recommended Transit Vision (by transit mode) and corresponding project for inclusion in the next Portland Transportation System Plan update and 2018 Metro RTP Update

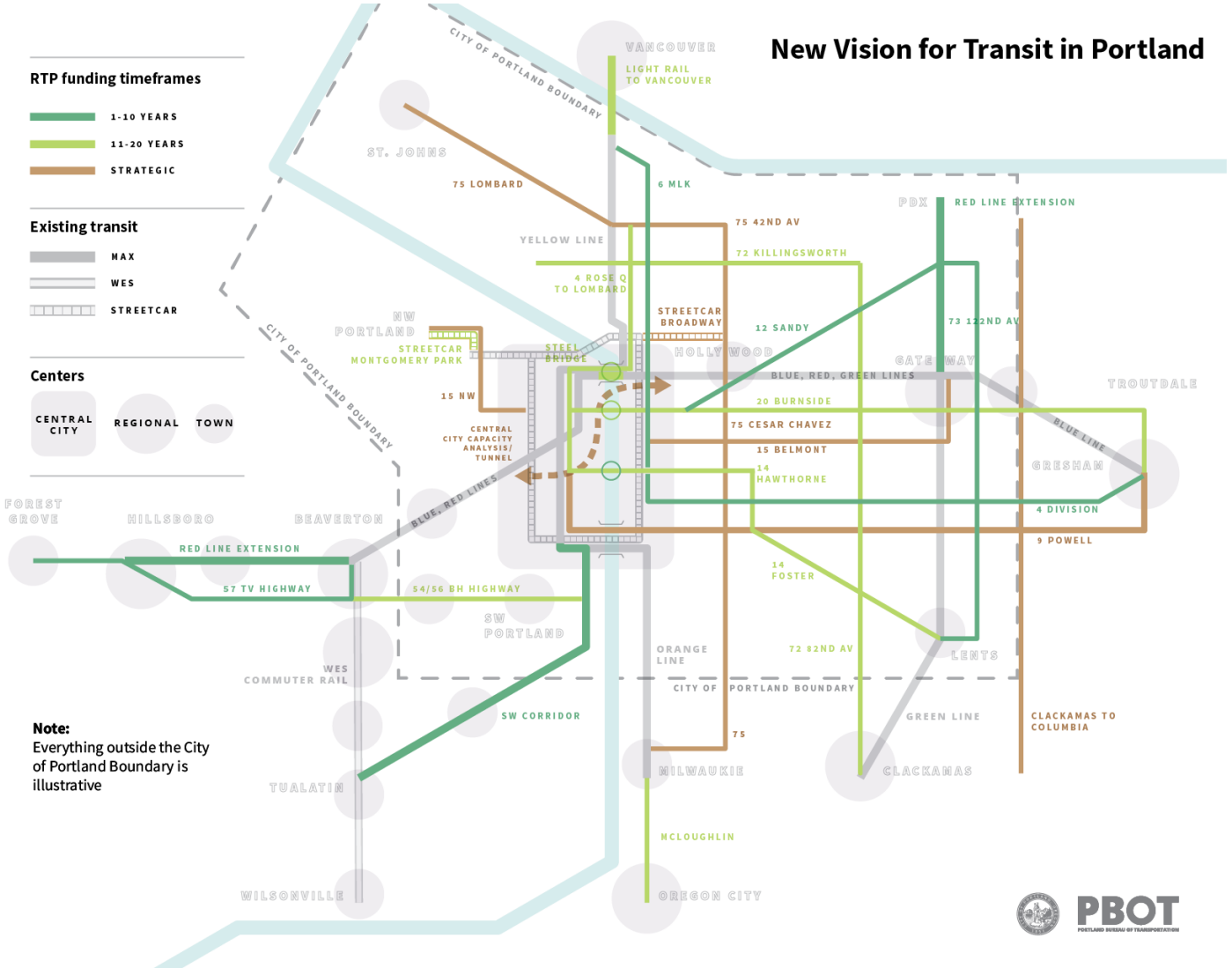


Exhibit 13. Recommended Transit Vision (by RTP Funding Timeframe) for inclusion in the next Portland Transportation System Plan update and 2018 Metro RTP Update

Table 2. Recommended Enhanced Transit Capital Projects, Tier 1 (1 - 10 Years)

Recommended Enhanced Transit Capital Projects for Portland TSP Update and Metro 2018 RTP Update								
TSP-ID	RTP ID	Lead Agency	Project/ Program Name	Project Start Location	Project End Location	Time Period	Cost Range	Constrained or Strategic
New	11863	Portland	82nd Ave Enhanced Transit Corridor	NE Killingsworth St	SE Clatsop St	Years 1 - 10	$5 million	Constrained
New	11867	Portland	SE Powell Blvd Enhanced Transit Corridor	SE Milwaukie Ave	I-205	Years 1 - 10	$5 million	Constrained
New	11868	Portland	122nd Ave Enhanced Transit Corridor	Lents Town Center	Parkrose / Sumner Transit Center	Years 1 - 10	$20 million	Constrained
New	11761	Portland	Central City Portals Transit Enhancement	Portland Central City	Portland Central City	Years 1 - 10	$5 million	Constrained
20125	11783	Portland	Portland Streetcar Operational Improvements	Portland Central City	Portland Central City	Years 1 - 10	$5 million	Constrained
60035	11319	TriMet	Streetcar Extension: Montgomery Park	NW Lovejoy / Northrup	Montgomery Park	Years 1 - 10	$80 million	Constrained
30042	12027	TriMet	NE MLK Jr Blvd Enhanced Transit Project	Central City	Jantzen Beach	Years 1 - 10	$30 million	Constrained
New	12028	TriMet	NE Sandy Blvd Enhanced Transit Project	Central City	Parkrose/Sumner Transit Center	Years 1 - 10	$30 million	Constrained
New	12029	TriMet	82nd Ave/Killingsworth Enhanced Transit Project	Swan Island	Clackamas Town Center	Years 1 - 10	$30 million	Constrained
New	12031	TriMet	SE Hawthorne/Foster Enhanced Transit Project	Central City	Lents Town Center	Years 1 - 10	$30 million	Constrained

Note: This document is for planning and agency coordination purposes in preparation for recommending candidate projects for the Metro RTP 2018 Update and the Portland Transportation System Plan (TSP) Update. The final project list and projects details may change.
Note: Other transit service enhancements identified in TriMet's Service Enhancement Plans will also be included in the RTP but are not included on this list.

Table 3. Recommended Enhanced Transit Capital Projects, Tier 2 (11 - 20 Years)

Recommended Enhanced Transit Capital Projects for Portland TSP Update and Metro 2018 RTP Update								
TSP-ID	RTP ID	Lead Agency	Project/ Program Name	Project Start Location	Project End Location	Time Period	Cost Range	Constrained or Strategic
40131	1102	TriMet	Streetcar Extension: Broadway-Weidler to Hollywood	NE Grand Ave	Hollywood Town Center	Years 11 - 20	$70 million	Constrained
New	11833	Portland	Inner North Portland Enhanced Transit Corridors	Portland Central City	N Lombard	Years 11 - 20	$5 million	Constrained
New	11834	Portland	SE Hawthorne/50th Ave Enhanced Transit Corridor	Central City	SE Powell Blvd	Years 11 - 20	$5 million	Constrained
New	11835	Portland	Cesar Chavez Blvd Enhanced Transit Corridor	Hollywood Town Center	SE Powell Blvd	Years 11 - 20	$5 million	Constrained
New	11836	Portland	N/NE Lombard St Enhanced Transit Corridor	St Johns Town Center	NE MLK Jr Blvd	Years 11 - 20	$5 million	Constrained
New	12030	TriMet	E Burnside/SE Stark Enhanced Transit Project	Central City	Gresham Town Center	Years 11 - 20	$30million	Constrained
New	12032	TriMet	SW Beaverton-Hillsdale Hwy Enhanced Transit Project	Central City	Washington County (54 to BTC and 56 to Washington Square)	Years 11 - 20	$30 million	Constrained

Note: This document is for planning and agency coordination purposes in preparation for recommending candidate projects for the Metro RTP 2018 Update and the Portland Transportation System Plan (TSP) Update. The final project list and projects details may change.
Note: Other transit service enhancements identified in TriMet's Service Enhancement Plans will also be included in the RTP but are not included on this list.

Table 4. Recommended Enhanced Transit Capital Projects, Tier 3 (Funding Timeframe TBD)

Recommended Enhanced Transit Capital Projects for Portland TSP Update and Metro 2018 RTP Update								
TSP-ID	RTP ID	Lead Agency	Project/ Program Name	Project Start Location	Project End Location	Time Period	Cost Range	Constrained or Strategic
New	12033	TriMet	SE Belmont Enhanced Transit Project	Central City	Gateway Transit Center	N/A	$30million	Strategic
New	12034	TriMet	Lombard/Cesar Chavez Enhanced Transit Project	St Johns Town Center	Milwaukie Town Center	N/A	$30 million	Strategic
40130	11318	TriMet	MLK Streetcar Extension	Broadway	Killingsworth	N/A	$65 million	Strategic
90102	11639	TriMet	Johns Landing Streetcar	SW Lowell	Willamette Park	N/A	$80 million	Strategic

Note: This document is for planning and agency coordination purposes in preparation for recommending candidate projects for the Metro RTP 2018 Update and the Portland Transportation System Plan (TSP) Update. The final project list and projects details may change.
Note: Other transit service enhancements identified in TriMet's Service Enhancement Plans will also be included in the RTP but are not included on this list.

Table 5. Other Recommended Transit Capital Projects, All Timeframes

Recommended Enhanced Transit Capital Projects for Portland TSP Update and Metro 2018 RTP Update								
TSP-ID	RTP ID	Lead Agency	Project/ Program Name	Project Start Location	Project End Location	Time Period	Cost Range	Constrained or Strategic
80040	11590	TriMet	Division Transit Project	Central City	Gresham	Years 1 - 10	$175 million	Constrained
80040	10922	TriMet	MAX Red Line Improvements Project	Fairplex/ Hillsboro Airport MAX	Portland Airport MAX	Years 1 - 10	$200 million	Constrained
80040	11587	TriMet	Southwest Corridor Project	Central City	Tigard, Tualatin	Years 1 - 10	$2.4 billion	Constrained
30033	10902	TriMet	Portland to Vancouver Light Rail	Expo Center	Downtown Vancouver	Years 11 - 20	$850 million	Constrained
New	10921	TriMet	Steel Bridge Transit Bottleneck	Central City - Old Town	Rose Quarter/ Lloyd District	Years 11 - 20	$700 million	Constrained
New	New	TriMet	SE Powell Blvd Transit Project	Central City	TBD	N/A	TBD	Strategic
New	12050	TriMet	Central City Capacity Analysis (Project Development & Project Engineering)	Central City (West)	Central City (East)	N/A	$200 million	Strategic

Central City Capacity Analysis: A study to analyze Central City transit capacity and identify preferred options to address transit bottlenecks, delays, layover needs and improve transit reliability, travel times and regional mobility. Include analysis of a potential tunnel option.

Note: This document is for planning and agency coordination purposes in preparation for recommending candidate projects for the Metro RTP 2018 Update and the Portland Transportation System Plan (TSP) Update. The final project list and projects details may change.

2.3 Additional Policy Recommendations, Actions and Next Steps

The following sections describe additional policy recommendations, actions, and next steps to be taken by the City of Portland to advance the implementation of Enhanced Transit in the Portland metro region and beyond. Policy recommendations are organized into local, regional, state, and federal policy actions.

Local

1. **Amend the Portland Transportation System Plan (TSP) to add major projects recommended in Chapter 2 of the ETC Plan. See Tables 2-5.**
2. **Continue to seek opportunities to integrate Enhanced Transit, or transit priority treatments, into PBOT plans and projects that are proposed along transit lines. Current opportunities already identified during this planning process include:**
    a. Line 73 through the 122nd Ave Safety, Access and Transit Plan and Project
    b. Line 20 through an Outer SE Stark Safety and Access planning process and Project
    c. Key bottlenecks in the Central City through the Central City in Motion Project
3. **Continue implementing small capital projects to improve transit reliability and travel time through PBOT Transit Priority Spot Improvement Program. Further develop guidance for this program that is informed by the framework for on-going transit performance developed in this ETC Plan.**
4. **Seek increased annual on-going funding for the PBOT Transit Priority Spot Improvement Program, with the goal of increasing funding to at least the recommended level in the TSP of $500,000 annually. Consider increasing the annual budget to $1 million over time. The current budget in Fiscal Year 17/18 is $75,000 annually.**
5. **Hire a Complete Streets Transit Coordinator (Funding for this position has been budgeted and approved. Hiring in 2018.)**
6. **Increase PBOT staff capacity to deliver projects. Create budget ties and add staffing capacity relative to available funding across PBOT in the following disciplines and sections:**
    a. Area and Projects Planning
    b. Project Management
    c. Traffic Signals and Lighting
    d. Traffic Engineering
    e. Civil Design Engineering
    f. Maintenance Operations
7. **Add policy to the Portland Transportation System Plan (TSP) supporting bus priority design as a part of capital projects. Consider policy language as follows:**
    a. "Direct Portland Bureau of Transportation staff to consider and incorporate transit priority treatments, such as those in the PBOT Enhanced Transit Corridors Plan, to improve transit speed and reliability during the planning and design phase of capital projects and permitted projects along streets served by transit lines."

8. **Add policy to the Portland TSP supporting use of transit as the preferred mode for trips longer than 3 miles.**
    a. Consider amending: Policy 9.22 Public transportation as follows: Coordinate with public transit agencies to create conditions that make transit the preferred mode of travel for trips that are longer than 3 miles or shorter trips not made by walking or bicycling (additions underlined).
    b. Or amending: Policy 9.23 Transportation to job centers. Promote and enhance transit to be more convenient and economical than the automobile for people travelling more than three miles to and from the Central City and Gateway. Enhance regional access to the Central City and access from Portland to other regional job centers.
9. **Pursue funding for next generation Transit Signal Priority installation and required signal infrastructure upgrades in Portland. Seek opportunities to integrate Freight Priority with Transit Signal Priority, particularly in Freight Districts and key freight routes.**
10. **Incorporate the performance measures from the Enhanced Transit Monitoring Program into PBOT traffic operation practices as guidelines.**
11. **Add various transit priority treatment design guidance from the Enhanced Transit Toolbox to the future PBOT Complete Street Design Guide.**
12. **Develop further design guidance for application of treatments in the ETC Toolbox, particularly Shared Bus/Bike Zones.**
13. **Forge deeper partnerships and coordination with TriMet on monitoring, identifying, developing, funding, designing and construction of Enhanced Transit projects, Growing Transit projects, High Capacity Transit projects and improved transit service.**
    a. **Regional ETC Pilot Program**
        i. Continue coordination between PBOT, TriMet and Metro on development of Enhanced Transit projects, including some for early implementation and a building a pipeline of project for future funding.
        ii. This could yield small projects that are less than $500K that could be built programmatically through the Transit Priority Spot Improvement program covered below or advance major Capital Improvement Projects over $500K that are already in the TSP and RTP or recommended for addition through the ETC Plan.
        iii. Between now and December 2018, identify projects most promising for early implementation and potential funding sources and develop an MOU.
        iv. In early 2019, at 30 percent design, select projects to advance to construction and commit funding through an IGA between City of Portland and TriMet.

    b. **On-going performance monitoring**
        i. Establish a general division of labor between TriMet and PBOT.
        ii. Coordinate on performance measures, data sharing, analysis, reporting and creation of a dashboard for transit for on-going monitoring. Meet bi-annually to review the data analysis findings and discuss what actions to take together.

iii. Coordinate on diagnosis of transit delay causes, identifying treatments to improve it and scoping projects. Meet bi-annually to deliberate this together.
iv. More details about monitoring partnerships is described in the section of this plan on the Portland Enhanced Transit Monitoring Program.

c. Programmatic Implementation of Transit Priority Improvements: projects under $500K built by PBOT through a future Enhanced Transit Program and the existing small spot improvements Transit Priority Program

i. Continue PBOT/TriMet partnerships to jointly fund and build transit priority and other Enhanced Transit treatments at a programmatic level. Continue this through the PBOT Transit Priority Spot Improvement TSP Program.
ii. PBOT and TriMet to develop and enter into an IGA to formalize an on-going partnership and commitment.
iii. Both TriMet and PBOT will seek to identify and allocate additional funding to increase the number of projects that can be built. Ideally, the additional funding would be a multiple year commitment or on-going. This could allow PBOT to budget, hire and dedicate staff FTE as needed to provide adequate staffing capacity for delivering projects.
iv. In turn, PBOT would dedicate staff FTE to manage projects, identify connection with existing planning and capital projects, solicit feedback from engineers, scope and design as needed, then submit work orders to Maintenance Operations for construction.
v. Develop a broader Enhanced Transit Program.
vi. Increase PBOT staff capacity to deliver projects.

d. Growing Transit Programmatic Implementation: projects under $500K built by PBOT

i. Continue PBOT/TriMet partnerships to jointly fund and build safety and access to transit improvement**,** concrete bus pads and similar improvements projects through existing IGA. These types of improvements have been bundled under the umbrella name of Growing Transit Communities.
ii. PBOT to continue seeking increased transit frequency by TriMet on bus lines with less than Frequent Service today and establishment of new lines per the TriMet Service Enhancement Plans.
iii. Both TriMet and PBOT will seek to identify and allocate additional funding to increase the number of projects that can be built. Ideally, the additional funding would be a multiple year commitment or on-going. This could allow PBOT to budget, hire and dedicate staff FTE as needed to provide adequate staffing capacity for delivering projects.
iv. These kinds of projects can be built through a variety of PBOT TSP programs, as they provide multi-modal benefit.

e. **Implementation of Enhanced Transit major capital improvement projects (over $500K)**
    i. Continue PBOT/TriMet partnerships to jointly fund and build major capital improvement projects.
    ii. Establish MOUs and IGAs as needed.
    iii. Include projects developed through the Reg ETC Pilot Program.
    iv. Coordinate on seeking project funding and writing grants.

f. **TriMet Service Improvements:**
    i. TriMet will strive for a new level of service on the highest performing routes that provides some combination of more frequency, articulated buses and/or improved stations. Place priority for implementing this new service on lines with high ridership, high equity scores and Enhanced Transit treatments to improve reliability and travel time.
        1. Current and short-term goal: better than 15 minutes headways for a majority of the day.
        2. Mid-term 10-year goal: get to 12-minute headways or better for a majority of the day.
        3. Long-term 20-year goal: get to 10-minute headways or better for a majority of the day.
    ii. PBOT supports TriMet pursing fleet changes and headway management tools to help advance Enhanced Transit. PBOT will work with TriMet to implement them. Fleet changes can include articulated buses, all-door boarding, off-board payment along with near-level boarding and related tools.

g. **Integrating Enhanced Transit treatments into other capital projects and private development through the review process.**
    i. TriMet will share transit operational performance data and maps across TriMet and with other agencies, including ODOT, and County and City Transportation Bureaus.
    ii. PBOT will integrate stronger consideration for transit performance into all the ways in which we design, operate, permit, regulate and monitor the transportation system.

h. **Long-range Planning Coordination**
    i. TriMet Service Enhanced Plans (SEPs)
    ii. Metro Regional Transportation Plan (RTP) Updates
    iii. Portland Transportation System Plan (TSP) Updates

Regional

1. **Recommend Enhanced Transit and other elements of the New Vision for Transit in Portland be incorporated into the Regional Transit Strategy and 2018 RTP Update, through supportive policy and projects.**

2. **Submit Enhanced Transit candidate project locations to the Metro Regional Enhanced Transit Concept Pilot Program to help advance project development.**
3. **Coordinate with regional partners to pursue implementation of a next generation technology Transit Signal Priority system that is regionally supported and coordinated.**

State

1. **Seek to amend State OAR 734-020-0300 to remove current limitations on the use of Bus Signal Priority.**
2. **Seek to amend the Oregon State Constitution to remove the restriction on spending transportation revenues on transit service, including revenue generated from congestion pricing.**

Federal

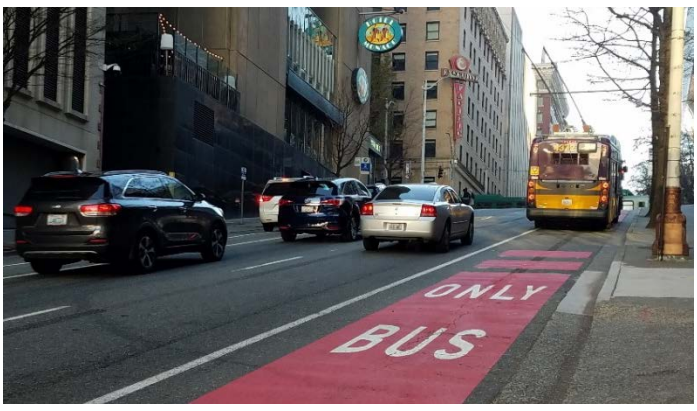
1. **Seek to use red lane markings for dedicated bus lanes. Either begin using them once they have been approved for use by the FHWA or explore and pursue a formal request to be added to the FHWA experimental study of red lane markings for dedicated bus lanes. Request funding and staff resources to incorporate this into the future PBOT staff work plan and budget.**

   To use red treatment in transit lanes, PBOT would need to formally submit a request to the FHWA to be added to the Red Transit Lane request to experiment, since they are not currently in the MUTCD. San Francisco is part of a formal experiment with the FHWA. Other cities have requested to be added to the experiment. This would be similar to the request to experiment the City previously made for the use of green painted "bike boxes." As PBOT learned from participating in that previous study, there are data collecting and reporting requirements. When a formal approval is issued, there are likely to be additional considerations and conditions that the City would need to abide by.

   PBOT is interested to participate in the FHWA study. As of this writing, the agency is exploring what that would involve. The City is considering a formal request to be added to the study and how t staff resources could be allocated towards this effort.

   Before submitting a request to FHWA to join the request to experiment, PBOT would be required to perform the following:

   a. Consider how to apply red lane treatments and experiment through the study;
   b. Assess what resources this would take, including staff time and costs;
   c. Secure any additional funding, if needed.



2.4 Portland Enhanced Transit Monitoring Program and On-going Performance

This section of the ETC Plan contains the recommendations for a City-wide Enhanced Transit Monitoring Program. This program will set City-wide Enhanced Transit performance guidelines, track the performance of buses and streetcar lines in the current and planned TriMet Frequent Service Network on an on-going basis and help identify future Enhanced Transit projects. The program recommendations include an on-going framework and process to identify, evaluate and manage transit improvements to improve overall transit operations within the City of Portland.

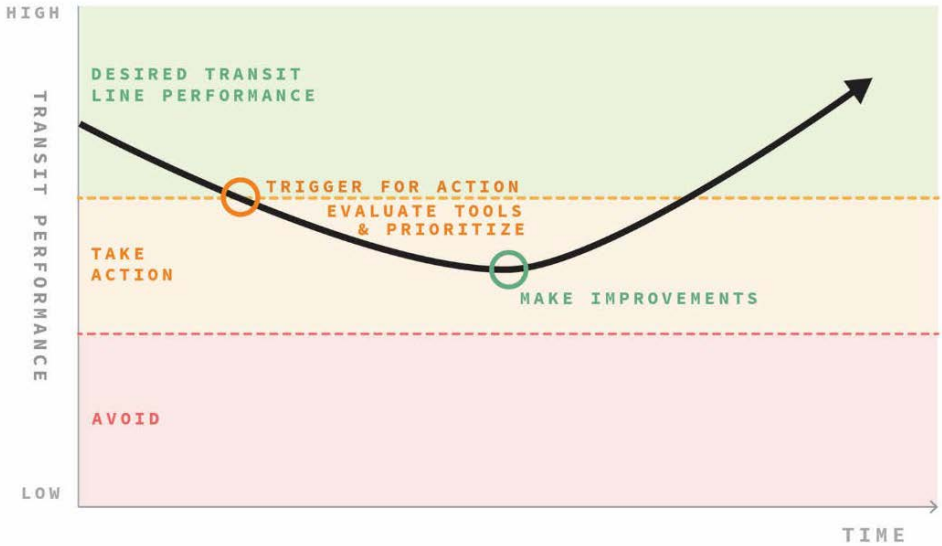
Measuring the performance of transit is also about making transit riders count. When a bus is stuck in traffic or generally slow, so are all the people on that bus. This affects people further up the line waiting for the bus too.

We want to understand where delay is happening, how long, and what the nature of the delay is. Understanding these symptoms and where they are most severe will help us diagnose the problems, identify effective treatments and learn how well they work after implementation. On-going monitoring will enable us to identify new problems as they arise, measure improvements and track progress towards our goals.

The evaluation conducted during the ETC planning process resulted in the initial network of Enhanced Transit Corridors and list of recommended projects in Section 2.2. This Enhanced Transit network and project list are a starting point. This was based on initial criteria and current conditions. Conditions and transit operations are likely to change. This may lead to new needs or increasing needs in already problematic locations. The initial criteria, evaluation and public feedback also informed the following recommendations for performance measures to use in on-going monitoring. In the future, additional Enhanced Transit hot spots, segments or lines may be added to the Enhanced Transit network and lead to new projects based on this on-going performance monitoring.

Monitoring transit performance and making improvements

An example of the **monitor→take action** cycle for an individual transit line



The recommended Enhanced Transit Program and on-going performance monitoring framework is summarized in Exhibit 11 and described in more detail on the following pages.

The recommended framework:

1. Identify the **Universe to Monitor** that includes bus and streetcar lines in the current and planned TriMet Frequent Service Network within the City of Portland. These are displayed in Exhibit 12 and 13. The exact subset of lines may change over time to reflect changes to this network by TriMet or Portland Streetcar Inc.
2. Establish **Tier 1 performance measures to monitor** the above Universe on a regular basis; ideally quarterly or at a minimum annually. Recommended performance measures:
    a. Transit Peak Delay: This measure captures how much transit, and all the people on it, slows down during the peak congested time of the day. The greater the percentage is, the slower the bus is and the longer it takes the bus to travel a route segment during peak congested periods versus more free flow traffic conditions. A higher percentage value indicates a higher level of variability and greater delay during the peak. This measure calculates the percent difference between 90th and 10th percentile transit run time, or alternatively the operating speed. Measure at the time point segment level.
    b. Transit Run Time Variability: This measure helps identify deficiencies in reliability that impact transit riders and the transit agency's ability to efficiently maintain a dependable schedule. Measure the variability of bus run time for each individual scheduled bus run. Measure compares optimal scheduled cycle time (run time plus layover) and identifies when and how much the run time exceeds scheduled time. It may indicate potential need to add additional resources (operators/vehicles) to maintain schedule. Instead, if this variability can be reduced, then schedules could be tightened and less operators/vehicles deployed to maintain the same schedule. With enough improvement, new frequency could be added. Measure at the route level.

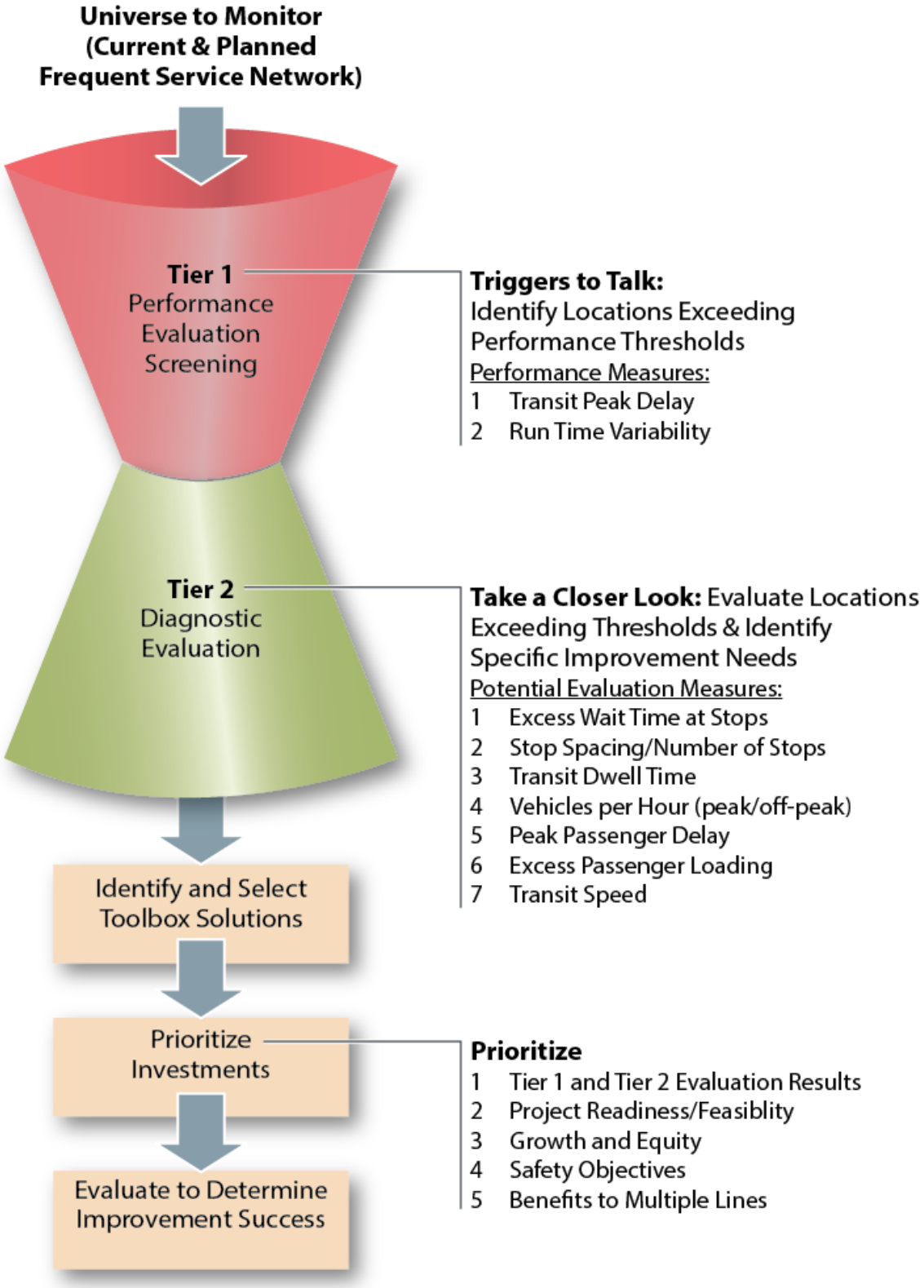


Exhibit 14. Framework for the Portland Enhanced Transit Monitoring Program

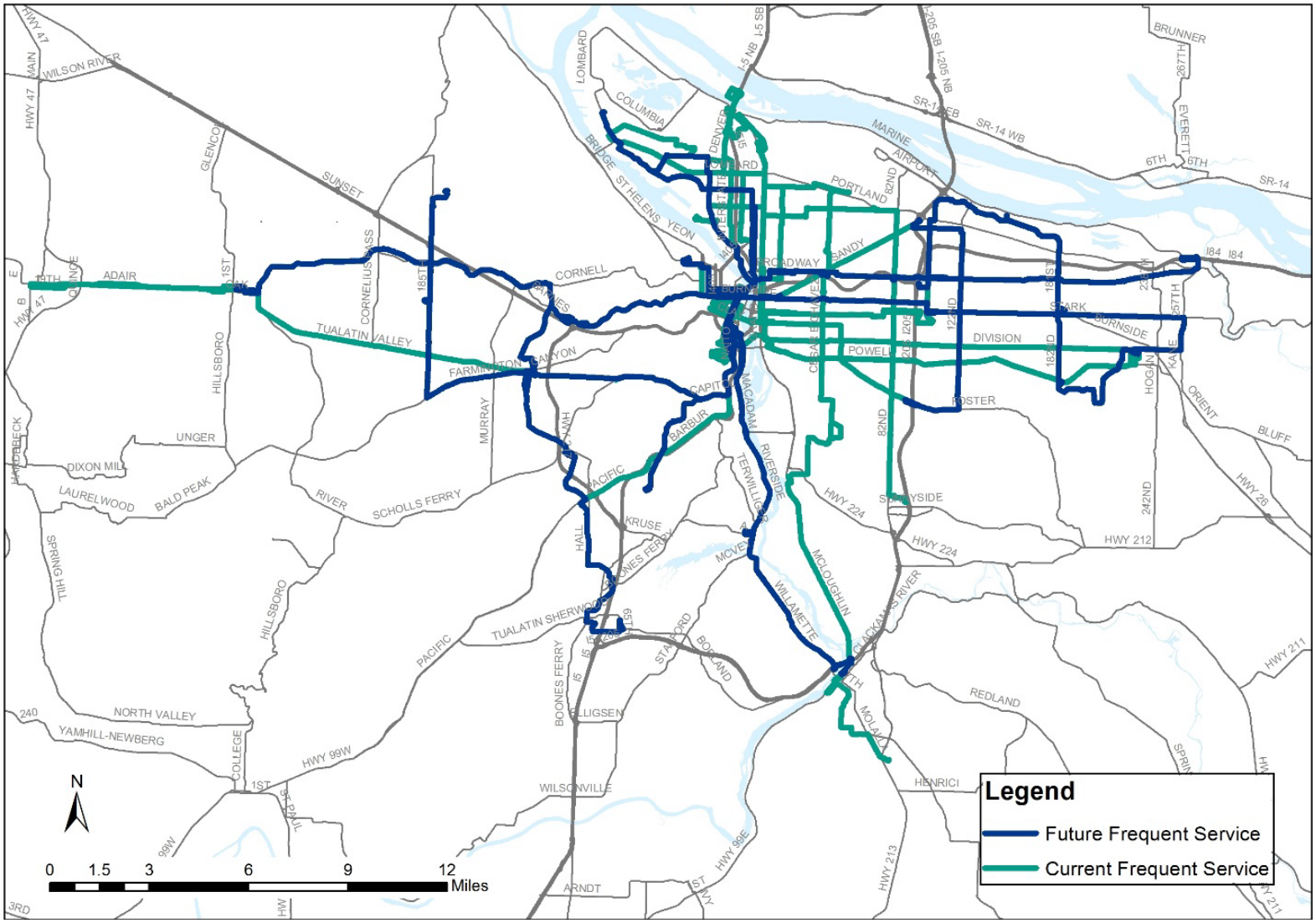


Exhibit 15. TriMet Current and Planned Future Frequent Service Bus Lines.

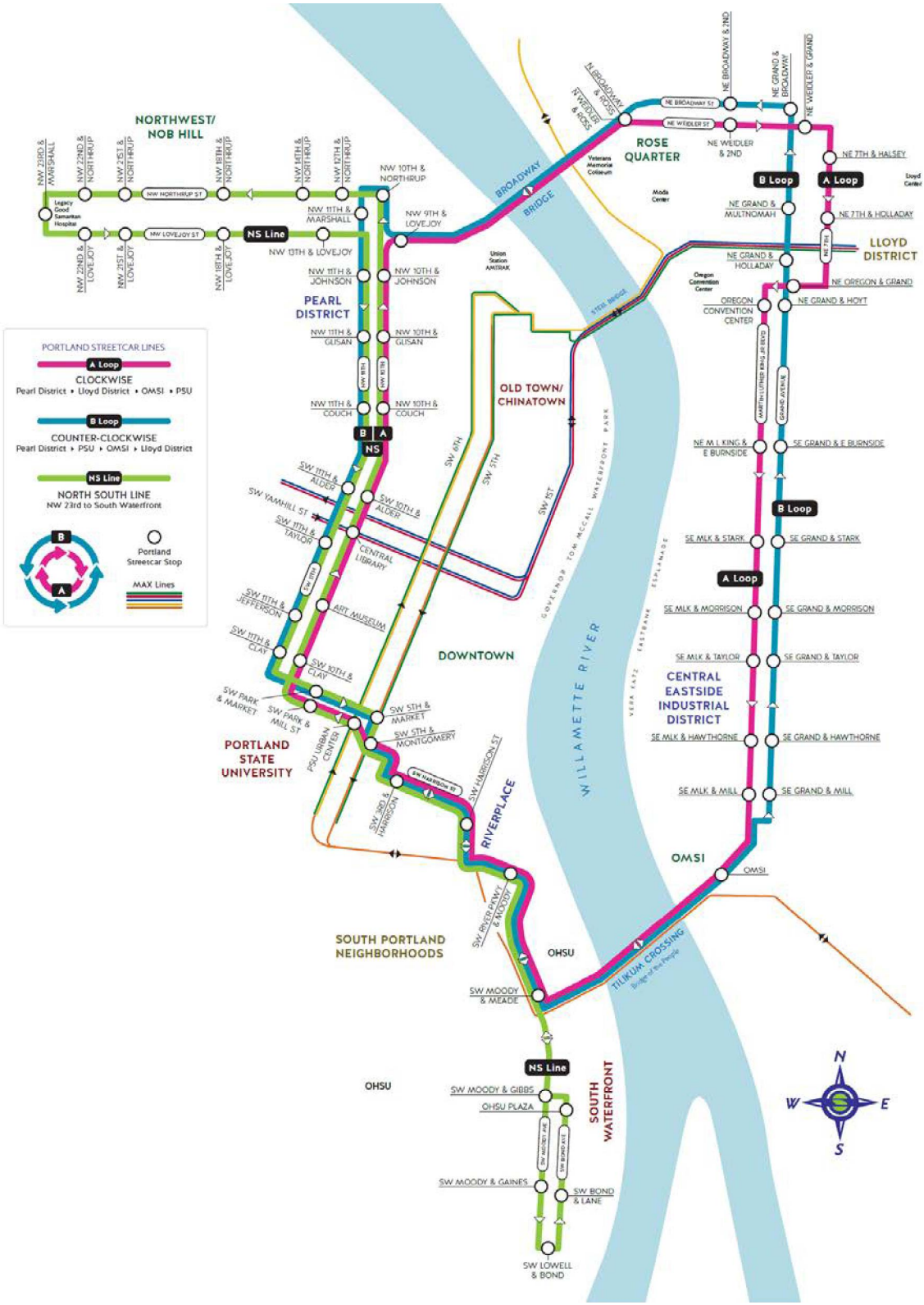


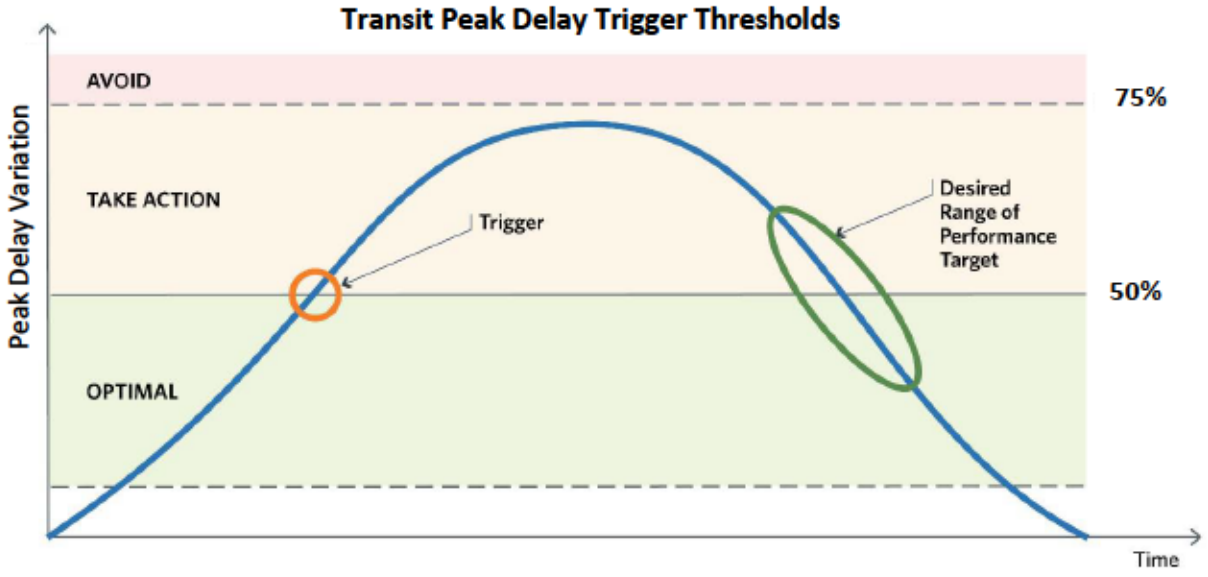
Exhibit 16. Current Portland Streetcar Network

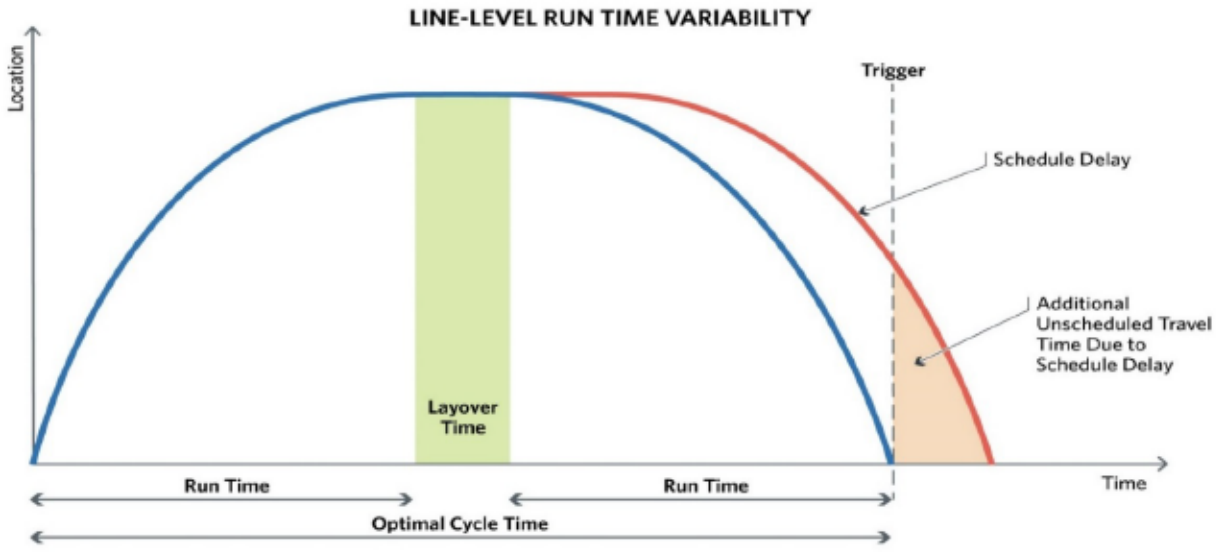
3. Establish **Tier 1 performance threshold levels** for evaluating when to initiate a closer look evaluation and discussion with TriMet and/or Streetcar Inc. Crossing these thresholds would be the **"Triggers to Talk"** and **"Take a Closer Look."** The result of the Tier 1 evaluation would be a sub-set of bus and streetcar lines that exceed the performance threshold levels and become **Enhanced Transit Candidates** to be further evaluated in the following steps. Staff may adjust these thresholds after a couple years of implementation and monitoring.

   Transit Peak Delay threshold:

   - Over 75% peak delay variation = urgent priority to take a closer look in Tier 2
   - 50%-75% peak delay variation = take a closer look in Tier 2
   - Below 50% peak delay variation = acceptable, take a closer look only if there is other cause for concern

   Line-level run time Variability: More study of the data, research and discussion is needed to recommend threshold levels.





4. Establish **Tier 2 diagnostic performance measures** for the closer look evaluation of the Enhanced Transit Candidates to help identify the types of delay occurring, more geographically specific locations of the delay and causes of delay to better diagnose the operational performance deficiencies and needs. These measures will help identify potential applicable treatments (Enhanced Transit tools) to address the nature of the delay and inform the prioritization of improvements. All or a subset of these diagnostic evaluation measures may be considered. Additional measures may be reviewed on a case by case basis depending on what may be causing an operational deficiency:

   Examples of recommended diagnostic performance measures (list is not exhaustive or exclusive):

   a. Transit Speed:
      i. Median speeds: 50th percentile operating speeds, exclusive of dwell time. Ideally, proportional to the posted speed limit by segment.
      ii. 90th and 10th percentile operating speeds
      iii. Peak delay: difference between 90th and 10th percentile operating speeds. (This criterion was formerly called 'Reliability' in the initial methodology)
      iv. Yearly trend (percentage difference from previous years).
   b. Transit Travel Time: same measures as above.
   c. Peak Passenger Delay: This measure helps capture the accumulative delay to all the people on buses. Measure how much time each bus is slowed down during peak travel and congested times (Transit Delay) multiplied by the number of passengers per bus (passenger load). Measured at the timepoint segment level and sub-timepoint segment level, to better pinpoint delay location. Helps quantify the influence service delay has on passengers and where the most passengers are experiencing the most delay.
   d. Transit Dwell Time: Measures open door time spent at stops. Dwell time can be defined as the 50th percentile dwell time proportional to the 50th percentile overall running time.
   e. Excess Passenger Wait Time at Stops
   f. Stop Spacing/Number of Stops
   g. Frequency of ramp deployments, which will indicate importance of locations with greater use by people with disabilities and one cause of increased dwell time.
   h. Number of Buses per Hour (Peak/Off-Peak)
   i. Excess Passenger Loading, which identifies trips with vehicle capacity deficiencies

5. **Identify Enhanced Transit Toolbox Solutions and Develop Projects.** Take a Closer Look to evaluate transit operations using the Tier 2 diagnostic performance measures above, apply the Enhanced Transit Toolbox, and evaluate benefits and impacts/trade-offs. The process to identify investment needs on candidate corridors will consider specific tools at specific locations and/or corridor-wide (both at a policy and capital improvement level). Determining the applicability of specific tools will require an evaluation of potential trade-offs and impacts, coordination with other projects, considering interaction with other modes and design constraints within existing corridor right-of-way. The safety impacts or benefits associated with applying transit priority tools are an important consideration in service to striving for the City's Vision Zero goal. Future study may be required along certain corridors and/or at specific locations.

    a. Identify recommended capital and operational improvements and develop projects.

    b. Determine the scale of the project and identify the appropriate track for project implementation. This could range from a small project appropriate for the PBOT Transit Priority Spot Improvement Program to a medium or large stand-alone capital project comprised of focused hot spot improvements, a series of improvements in a corridor segment or a full line improvement. It could also entail integrating Enhanced Transit improvements into an already existing capital project. New projects that exceed the threshold for the TSP program and are not already on the Portland Transportation System Plan Major Capital Improvements List should be recommended for addition to the TSP through a plan amendment or future update.

6. **Prioritize Investments.** Establish a framework for prioritizing projects for implementation within the context of local and regional decision making and leveraging other planned projects. Recommended prioritization criteria (list is not exhaustive or exclusive):

    a. Transit Operational Performance Need: Based on Tier 1 and Tier 2 performance measures evaluation results from the above-mentioned step 3 and 4.

    b. Project Readiness and Feasibility: Considerations for political support, design, impacts, scale, complexity, concurrent project(s), funding, and additional planning requirements.

    c. Growth: Aggregate household and job growth between base year and horizon year within a quarter mile of each corridor, which may dictate timeline for potential improvements

    d. Equity: Measured as the percentage of people of color, low income (households below 200% federal poverty level), limited English proficiency (LEP) households within a ¼ mile buffer compared to the City-wide average. Include a measure for People with Disabilities; either the percentage of People with Disabilities within a ¼ mile buffer or number of ramp deployments at stops.

    e. Safety Objectives: Higher considerations for projects on the Vision Zero High Crash Network.

    f. Benefits to Multiple Lines: Considerations to improve multiple lines using shared locations which have been identified for toolbox improvements.

7. **Evaluate.** Establish performance targets using different performance metrics to track success in improving transit performance. Identify guidelines for the desired range of transit operational performance. Recommended performance metrics (list is not exhaustive or exclusive):

    a. Transit Ridership Growth and Transit Mode Share, with the ultimate target being to achieve the City's mode split goal of 25% of all trips on transit by 2035, established in the Portland Plan and the Climate Action Plan.

    b. Transit Peak Delay, 20% or greater improvement above existing year 2017 levels.

    c. More study of the data, research and discussion is needed to recommend additional performance targets and guidelines for the desired range of transit operational performance. This could include improving performance above existing year 2017 levels by a desired percentage, such as a 10% - 20% improvement for individual measures. It could also include a range of fixed target values with desired percentage improvements used to inform the targeted fixed values.

8. Establish **roles, responsibilities, and agreements for partnering agencies** to guide decision making, implementation and maintenance for a successful ETC program. Establishing clear roles and responsibilities will provide direction for all partnering agencies involved in the evaluation and implementation of an Enhanced Transit program. The program requires collaboration and decision making by PBOT, TriMet, ODOT (on State-owned Highway facilities), and other partnering agency staff and decision makers. The proposed roles and responsibilities are intended to be flexible to include additional agencies, different categories, and adjusted timelines as necessary. The Table below details the specific recommended roles and responsibilities for the partnering agencies for different stages of the Enhanced Transit program performance evaluation and implementation.

Table 6. Recommended Agency Roles and Responsibilities

Categories	Agency Responsibilities			Timeline
	PBOT	TriMet	ODOT	
Overall Performance Evaluation Process	Lead Agency	Partner Agency The TriMet Data Analysis Group can provide initial data analysis, run reports and provide data in Excel.	Partner Agency	Quarterly or Annual; depending on funding availability
Candidate Corridor Selection	Collaborate to select corridors			Annual or depending on funding availability
Performance Data Production and Evaluation	Conduct evaluation using TriMet's performance data; provide projected growth and equity data	Produce performance data for each measure	N/A	Quarterly performance reporting in conjunction with corridor selection
Prioritization	Lead prioritization using result of evaluation	Coordination on corridor and segment prioritization		Annual in conjunction with corridor selection
Establish Triggers and Targets	Lead agency to consider adjustments to performance triggers and targets	Partnering agency to agree on adjustments to performance triggers and targets	N/A	Varies; Adjust periodically only if needed
Toolbox Application	Agencies collaborate on investment tool selection using TriMet breadcrumb data and investment tool triggers		Coordinate with partnering agencies if tools are identified on ODOT facility	Varies depending on identification of corridor deficiencies and need
Test for Readiness	Agency collaboration and coordination on project readiness			Assess readiness after projects have been identified for corridor improvement
Implementation	May lead capital project implementation on City owned	May lead or support project implementation.	May lead project implementation on ODOT	Varies depending on project

	facilities. Or approve through permit if led by others.	Lead service related implementation (vehicles, technology, procedures, etc.)	owned facilities. Or review for approval if led by others.	
Policy Changes	Include identified projects in City's TSP	Include identified projects in TriMet's budget	Consider and evaluate state funding availability for selected projects	Varies; HCT Projects will require RTP adoption, with Metro coordination
Evaluate Improvement Effectiveness	Lead agency to evaluate investment effectiveness on ETC corridors	Provide needed data to evaluate investment effectiveness on ETC corridors	N/A	In conjunction with project implementation
Maintenance	Maintain PBOT facilities	Maintain TriMet facilities	Maintain ODOT facilities	As needed

3. Capital and Operational Toolbox

The previous chapter outlined how the City will identify places where there is need to improve speed and reliability. This chapter summarizes the toolbox -- the range of techniques that could be used to make improvements. The Enhanced Transit Capital and Operational Toolbox provides a concept-level overview of 19 capital and operational treatments that can be applied to improve transit performance that also results in safer, more predictable interactions between travel modes. The Toolbox was developed with the intent to help the City of Portland, TriMet, and other regional partners define a set of context-sensitive solutions to address performance problems within TriMet's Frequent Service bus network that also respond to trends in growth and transportation funding policy. The full Toolbox is located in the Appendix.

The Toolbox consistently communicates contextual information to help inform decisions about the potential applicability and effectiveness of each treatment. Tools are organized into categories that reflect the purpose and function of specific tools. Within the categories, treatments are organized in descending order from most to least capital intensive. Individual Toolbox sheets provide an overview of each tool, including the type of problem it seeks to solve, key features, and typical context for application. The relative cost of implementing a given tool is visually represented using one to four $ dollar signs in the upper right-hand corner of each page, which allows for a quick visual comparison of treatments.

Although this set of tools was developed to address transit performance within TriMet's Frequent Service bus network, these tools are applicable in other regional and national contexts where strategic, localized improvements to existing bus lines can substantially address performance issues without needing to resort to corridor-wide investments in bus rapid transit systems or other capital-intensive approaches.

3.1 Toolbox Categories

The Toolbox is organized into four categories that reflect the purpose and function of specific tools. The categories also communicate the tactical "scale" of improvements, ranging from improvements that are only appropriate and/or feasible at the regional or corridor-wide scale, to improvements that are appropriate at stops, stations, and intersections.

Laneways and Intersection Treatments

The category refers to Enhanced Transit improvements that are deployed along a line, corridor, or intersection "hot spot" experiencing significant levels of transit delay. Examples include Dedicated Bus Lanes, Business Access and Transit (BAT) Lanes, and Pro-Time (Peak Period Only) Transit Lanes. Laneway and intersection solutions typically imply impacts to the road right-of-way, whether the specific improvement involves lane repurposing, roadway widening, or the potential acquisition of buildings and property. Solutions in this category are generally the most capital-intensive class of Enhanced Transit tools, but offer the highest level of bus transit priority via partially or fully dedicated roadway spaces for buses.

Dedicated Bus Lane on SW 5th Avenue, southbound approaching I-405 (Credit: CH2M)

Multi-Modal Interaction

This category of Enhanced Transit tools seeks to minimize transit delay in multi-modal environments while maximizing bicycle and pedestrian safety and comfort. Examples include curb-tight bike lane running behind stations, left-side bike lanes, dedicated bike signals, and shared bus/bike zones. These tools seek to clarify the interaction among bicycle riders, pedestrians, and transit vehicles to improve multi-modal integration and to reduce modal safety conflicts. The individual tools in this category range from laneway improvements to create shared or exclusive bus/bike spaces, to tactical improvements that can be done at stations to reduce multi-modal friction for both transit and other active transportation users.

Traffic island and bikes behind station at SW Moody and Gaines (Credit: TriMet)

Stops and Stations

Tools in this category aim to improve bus travel time by reducing delay associated with deceleration to, acceleration from, and dwell time at bus stops and stations. Examples include curb extensions at stops/stations, level or near-level boarding, and far-side bus stop placement. Some of these improvements can be deployed at individual stops , such as curb extensions at near-side stops that allow buses to stop for passengers in-lane, while simultaneously reducing the need to merge in and out of the traffic lane. Other stop and station improvements, such as level or near-level boarding, are more feasible at a large scale, on an entire bus line. Some tools would require additional policy guidance and interagency discussion before project development and multi-phase implementation.

Level boarding on Portland Streetcar (Credit: Railroadforums.com)

Operations/Other

The tools in this category range considerably in terms of purpose, function, and scale. Examples include headway management, transit signal priority (TSP) improvements, and rolling stock modifications. Given that most of these tools are only feasible and/or appropriate at the regional or corridor level, implementing these improvements requires additional policy guidance, design analysis, and interagency discussion before any specific application of the tools can be implemented.

Toolbox Applicability

Not all Toolbox treatments are possible in every street context. Some treatments can only be applied under specific conditions or with significant changes to the street and cross-section, which may not be feasible or practical. Some may have unacceptable impacts on other road users or adjacent properties. Toolbox treatments are also likely to involve trade-offs in the public right-of-way, or require acquisition of additional private property to widen the right-of way. For example, widening can impact adjacent properties and buildings. Trade-offs could also impact vehicle access and space for parking or other modes. Where such trade-offs arise, additional stakeholder and public engagement is often necessary.

Appropriate application of individual tools requires additional corridor-level analysis regarding the specific existing conditions and context – as well as the needs of other travel modes to assess which Toolbox treatments are likely to be feasible and effective in a corridor. This level of analysis is beyond the scope of this plan, but initial steps were taken to understand which tools could be applied in which contexts, and what kinds of transit benefits could be anticipated. Exhibit 14 describes which tools are most appropriate for different types of corridors and problems.[7]

[7] **The full ETC Capital and Operational Toolbox can be found on the City's project website:** https://www.portlandoregon.gov/transportation/article/640269

Exhibit 17. ETC Capital/Operational Toolbox Applicability Matrix

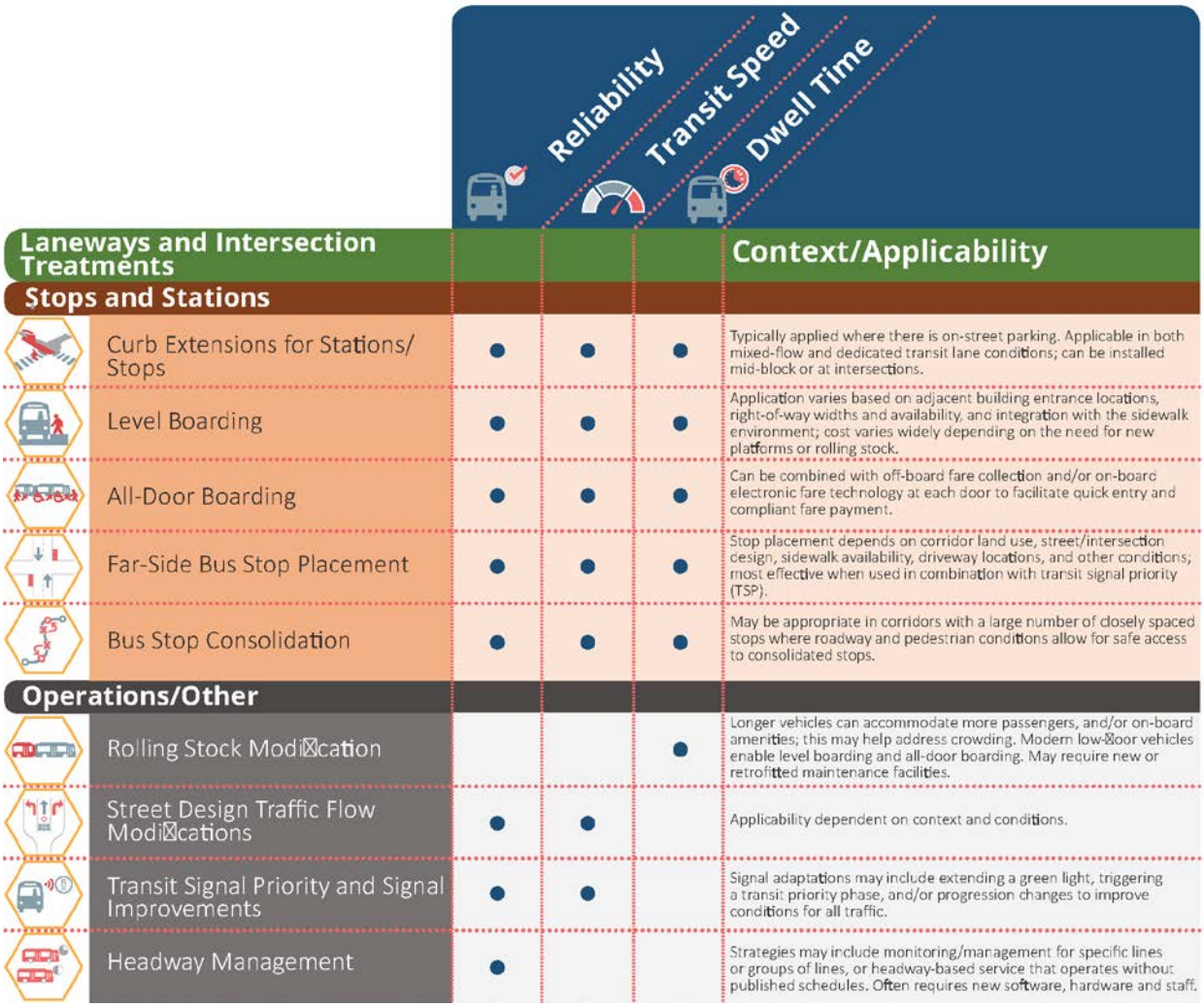


Exhibit 17. ETC Capital/Operational Toolbox Applicability Matrix (Continued)

3.2 Avoiding Multi-modal Operational and Policy Conflicts

Portland's Comprehensive Plan Policy 9.6, "Transportation Strategy for People Movement," Plan policy 9.6, (mentioned above) directs the City to "not make existing conditions worse for the most vulnerable users higher on the ordered list" associated with the policy, which in this case refers to people bicycling and walking. For this reason, great care must be taken when implementing those toolbox treatments that can reduce the safety and comfort of people walking or bicycling, or preclude the future provision of appropriate bicycle facilities on streets classified for bicycle use.

Applying some ETC toolbox treatments can result in conflicts for pedestrians or cyclists. Such conflicts between modes should be avoided where possible and otherwise minimized.

This can be facilitated by taking a Complete Streets approach in the project scoping and design phase and considering a range of design options. Depending upon the context and trade-offs, this may include analyzing the removal of on-street parking, repurposing of a travel lane, widening the sidewalk corridor in a manner that would create a sidewalk-level bicycle lane or other changes to the street cross-section.

During the development of this plan, the Shared Bus/Bike Zone treatment in the ETC Toolbox raised particular concern. The National Association of City Transportation Officials (NACTO) state in their "*Transit Street Design Guide*" that "bus-bike lanes are not high-comfort bicycle facilities, and are not a substitute for dedicated bikeways, particularly at peak periods and on high-volume bus routes. Special care must be taken not to require bicycle and bus traffic to mix at high speeds. As bus speeds and volumes increase, the number of passing events increases, eroding the comfort and, potentially, the safety of the facility for bicyclists." NACTO also suggests that these facilities are best applied on streets where there is no existing or planned bicycle facility. Indeed, the ETC Toolbox states that such facilities are "not ideal for either bicycle safety or bus operations."

4. Planning Process

This chapter summarizes the ETC planning process and provides a brief history of the work that went into the development of plan recommendations.

Key steps in the planning process included the development of methodology to screen and select ETC Candidate Corridors from TriMet's current and planned Frequent Service lines. The project team also used this methodology to evaluate the existing and projected conditions of Candidate Corridors, and to perform an initial ranking of Candidate Corridors based on level of transit need, projected future growth, and equity considerations. The initial ranking of Candidate Corridors also served as the first step developing an analysis framework for an on-going Enhanced Transit performance monitoring and implementation program. The lessons learned from this technical work formed the basis for how Enhanced Transit projects will be identified and prioritized in the future, not only within the City of Portland's new Enhanced Transit Program, but also within Metro's Regional Enhanced Transit Concept pilot program. Through this iterative planning process, the project team also identified ways to integrate Enhanced Transit opportunities into other City plans and projects, including the Central City in Motion project, the 122nd Avenue Area Safety Improvements project, and the Outer Stark Safety and Access project.

This chapter also includes a summary of the public and stakeholder outreach that was conducted in support of the development of this plan, with explanation of how the project team integrated public and stakeholder feedback into each step of the ETC planning process.

4.1 Initial Screening and Selection Process

The ETC planning process began in 2016, when staff from PBOT and TriMet worked together to develop an initial universe of ETC Candidate Corridors. The purpose of this screening process was to select less than a dozen bus corridors, segments, or hot spots from TriMet's existing and near-term planned Frequent Service network for further study and analysis as part of the ETC Plan.

Screening and Selection Methodology

The screening and selection process to identify ETC Candidate Corridors began with an interagency effort to update the existing and planned-near term TriMet Frequent Service network map to reflect current or upcoming transit projects. As a result, the project team added two additional lines for consideration: Line 20 – Burnside/SE Stark St and Line 73 – 122nd Ave. These lines were added to reflect TriMet's existing work plans to achieve Frequent Service on these routes. The project team also excluded some lines from consideration because transit improvement projects were already underway there, notably Division (Division Transit Project) and Barbur (SW Corridor Study).. Line 4 – SE Division (Division Transit Project) and Line 12 – SW Barbur Blvd (SW Corridor Project) were excluded from consideration to focus Plan resources in key corridors throughout the City that were not already being actively studied.

The project team then broke transit lines into proposed corridor segments, based on TriMet timepoint segments, to facilitate further analysis and interagency discussion. For analysis purposes, some lines passing through downtown Portland were truncated at the edge of the downtown core,

while others were truncated at Portland City limits based on discussions around jurisdictional ownership, relationships to other modes, and transit performance characteristics.

These analysis segments were then passed through a second screening process based on criteria and measures based on historic transit operations and reliability, ridership, and areas of forecasted future growth.

Criteria and Measures

The Project Team used the following **criteria and measures** to evaluate the universe of candidates. Criteria and measures were based on analysis of TriMet Automatic Vehicle Location (AVL) data.

- **Reliability Measure**: "Percentage difference between the 90th and 10th percentile revenue speed." It was used to identify segments along bus routes where the transit travel speed (inclusive of all activity, such as picking up passengers, while in revenue service) varied greatly throughout the course of a day between more free flow traffic conditions and more congested/delayed time of day.

  Reliability was the primary measure the Team used in the screening process. Lines with two or more segments with the highest speed variability were recommended as Candidate Corridors. The following measures helped to tip the balance in deciding which of the candidates on the cusp to include.

- **Ridership Passenger Loads Measure:** "90th percentile maximum load." This measure was used to identify segments where the passenger loads were greater.
- **Transit Speeds Measure:** "50th percentile revenue speed" divided by "posted speed limit." This measure was used to identify segments where buses were on average relatively slower than the posted speed, even off-peak.
- **Forecasted Future Growth** The following measures were used to help gauge corridors the City deems important in the Comprehensive Plan Update and forecasted for future higher densities.
  - Does the line serve a Center, Civic Corridor or Neighborhood Corridor?
  - Does it serve 2035 Forecasted Households Density or Employment Density?

TriMet Automatic Vehicle Location (AVL) Data

Like many transit agencies throughout the United States, TriMet has implemented AVL equipment to automatically determine and transmit the geographic location of a transit vehicle. AVL is beneficial to the agency in fleet management and asset management scenarios, and allows the agency to collect detailed transit performance and passenger census information. TriMet's AVL data formed the basis for the transit performance research conducted as part of the ETC Plan.

The project team aggregated all TriMet data to the segments between time points. The segments were then ranked and displayed in quintiles. Generally, the project team selected corridors segments as ETC Candidate Corridors if they had multiple segments in the top/bottom two quintiles, as they were interpreted to be most reflective of poor performance relative to those scoring in the remaining quintiles.

Candidate Corridor Recommendations

The project team recommended the following list of eleven (11) candidate corridors for further evaluation based on the screening and selection process described above (Exhibit 16).

- Line 4 – N Vancouver/Williams from Rose Quarter to N Fremont
- Line 6 – MLK Jr Blvd/Jantzen Beach
- Line 9 – SE Powell Blvd
- Line 12 – NE Sandy Blvd
- Line 14 – SE Hawthorne/Foster Rd
- Line 15 – West of downtown – W Burnside and NW 23rd up to Vaughn
- Line 20 – E Burnside/SE Stark St
- Line 54/56 – Beaverton-Hillsdale Hwy, both lines combine to provide Frequent Service
- Line 72 – Killingsworth/82nd Ave
- Line 73 – 122nd Ave
- Line 75 – Cesar Chavez/Lombard

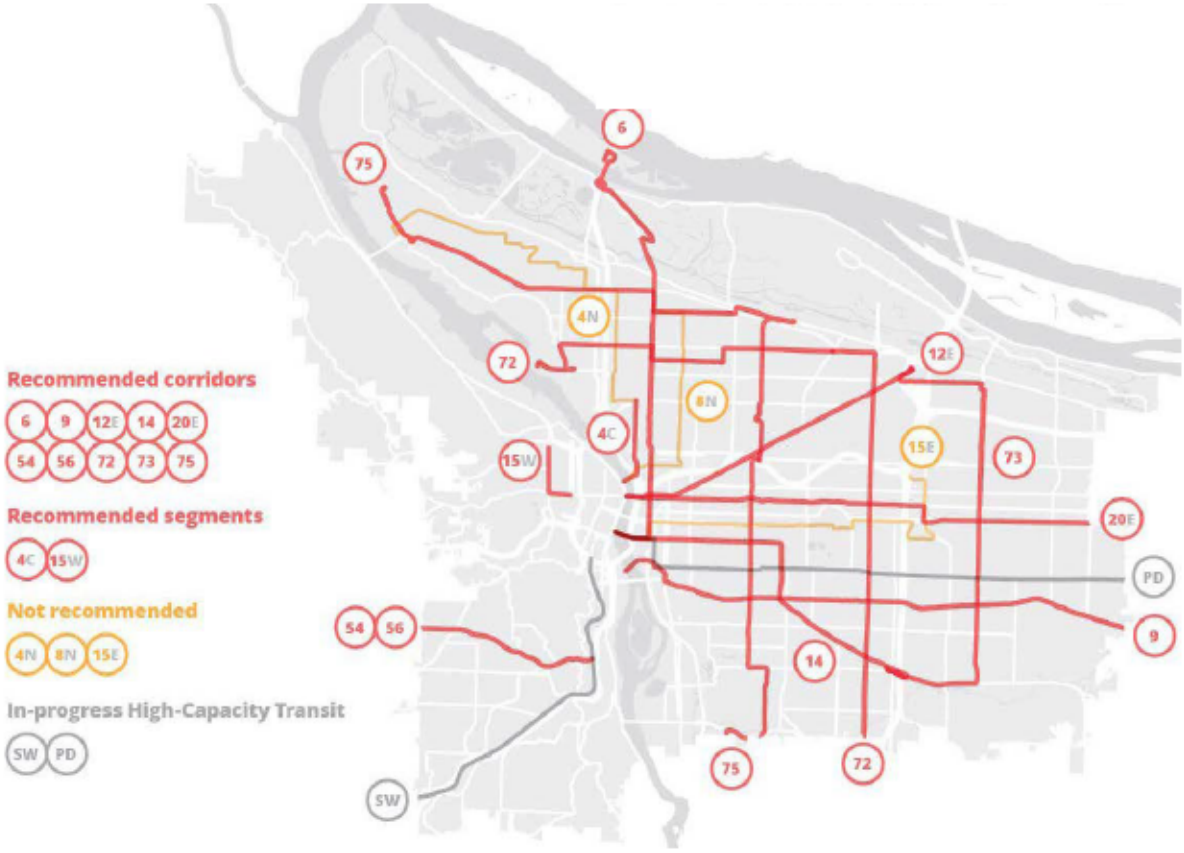


Exhibit 18. ETC Candidate Corridors – Recommended for further study as part of the ETC Plan

4.2 Existing and Projected Conditions

Building from the initial screening and selection process, the project team developed additional or revised criteria and performance measures to conduct a more detailed assessment of transit performance within selected ETC Candidate Corridors.

The existing and projected conditions analysis provided the basis for an initial corridor prioritization methodology, which helped support the final recommendations of this plan. The following section provides an overview of the corridor prioritization methodology, and how the prioritization of ETC segments fed into subsequent phases of the planning process.

Criteria and Performance Measures

The project team analyzed ETC Candidate Corridors in the context of future growth, equity, and relative transit performance. The analysis used TriMet AVL data at the **time point segment level**. The following measures were calculated for multiple segments along individual bus lines.[8]

Average Weekday Stop-Level Activity

Stop-level ridership describes passenger activity throughout the corridor. Activity is defined as the sum of boardings (riders getting onboard) and alightings (riders getting off) at stops. While this measure was not analyzed at the time point segment level or used to prioritize corridors, the information was included to give a better understanding of corridor conditions.

Average Existing Weekday Transit Trips

Average Existing Weekday Transit Trips is calculated using the Federal Transit Administration (FTA) Warrants ridership methodology used to rate projects. Trips are calculated by summing the average weekday passenger load entering the corridor and stop-level boardings along the line. This indicator provides information to determine rider benefit as part of the prioritization process. A higher value indicates a greater need for improvement and higher likelihood of rider impact.

What is a time point segment?

The ETC Plan used "time point segments" as the geographic units of analysis for evaluating transit performance along a given bus line.

TriMet schedules designate certain stops at timepoints, typically every mile or two along a route. The segment of a route between two timepoints is a timepoint segment.

As a bus travels along a given route, TriMet's AVL equipment retrieves and transmits vehicle data in timed intervals. This data is geographically referenced and is reproducible as a geographic unit of analysis. The data can then be aggregated as needed for analysis.

Time point segments allowed the project team to evaluate bus performance at a more detailed level than what is possible using route or corridor-level information, and formed the basis for much of the analysis conducted as part of the ETC Plan.

[8] The complete existing and projected conditions analysis, as well as detailed corridor profile sheets for each of the eleven (11) candidate corridors can be found in Existing Conditions and Methodology Memorandum and Appendix (May 2017): https://www.portlandoregon.gov/transportation/73694

Reliability

This indicator describes travel speed variability over the course of the day and helps identify the influence of traffic congestion on delaying transit during typical peak periods. The greater the percentage is, the longer it takes the bus to travel the route segment during peak congested periods versus more free flow traffic conditions. A higher value indicates a higher deficiency – and therefore a greater need for improvement. Reliability is defined as the percent difference between the 90th and 10th percentile operating speeds, including dwell time.

Transit Speed

This indicator identifies the overall operating speed and reveals a number of operating deficiencies across all time periods. A lower value indicates a higher deficiency – and therefore a greater need for improvement. Transit speed is defined as the 50th percentile (average) operating speed (exclusive of dwell time) proportional to the posted speed limit along each segment.

Dwell Time

This indicator describes open door time spent at bus stops, and helps to identify the influence of bus stop delay. A higher value indicates a high deficiency – and therefore a greater need for improvement. Dwell time is defined as the 50th percentile dwell time proportional to the 50th percentile overall running time.

Equity

This measure identifies locations where a concentration of equity populations live and suggests more need for transit improvements. A higher value indicates a greater need for improvement. Equity measures the percentage of people of color, low income (households below 200% federal poverty level), and limited English proficiency (LEP) households. The equity score is a composite index of scores for these three demographic factors. Equity scores are based upon quartile point values for each block group within a quarter mile distance from the candidate corridor. Block groups received a higher composite score if they scored above the city-wide average for low-income, LEP, or people of color. The project team conducted scoring at the time point segment-level and then aggregated to arrive at corridor-level findings.

Forecasted Future Growth (2010 – 2035)

This criterion measures aggregated household and job growth between base year (2010) and future year (2035) within a quarter mile of the corridor. The growth forecast is based on the Portland Comprehensive Plan 2035 Growth Scenario. It identifies locations where future land use suggests more transit demand and the need for additional transit capacity. A higher value indicates a greater need for improvement.

4.3 Candidate Corridor Evaluation

The project team evaluated the segments of this initial Enhanced Transit network to assess where there was the greatest need and it was most important to focus capital investments to improve transit reliability, travel time and capacity. The project team used the same criteria and performance measures above to develop a prioritization methodology to assess the Candidate Corridors segments. The evaluation approach was grounded in understanding transit operations and guided by transit policy and ridership demand. The evaluation results led to the development of the project list that was submitted for the Metro RTP Call for Projects in Summer 2017 and now recommended for the Portland Transportation System Plan (TSP) Update described in *Chapter 2: Recommendations.*

Initial Evaluation Results

The total scores resulting from the initial evaluation are displayed in Exhibit 17. A higher score indicates greater transit performance deficiency and a greater need for improvement based on future growth and equity considerations. The total score reports an aggregated index score comprising of transit performance, future growth, and equity indicators. Five percentile breaks were identified for each indicator, based on the indicator values for all ETC segments. Each ETC segment received a score between 1 and 5, depending on where the performance indicator fell within the percentile breaks. Scores for each indicator were then aggregated for each ETC segment to produce a Total Score. The complete evaluation process and methodology is documented in the Existing Conditions and Methodology Memorandum and Appendix (May 2017).[9]

Recommended for Initial Conceptual Toolbox Test Application or 'Closer Look'

Given limited project resources, PBOT staff recommended three (3) corridors based on this prioritization methodology to be advanced for further analysis and conceptual application of Enhanced Transit tools as Tier 1 The results led to the development of the project list that was submitted for the Metro RTP Call for Projects in Summer 2017 and now recommended for the Portland Transportation System Plan (TSP) Update described in *Chapter 2: Recommendations.* The initial evaluation results also helped the project team identify segments to include in the Closer Look, for a conceptual application of Enhanced Transit tools. (See *Appendix: Conceptual Toolbox Application*) This effort was primarily a learning exercise. Lessons learned from these corridors could apply across the City, informing future application of Enhanced Transit tools on streets experiencing similar transit performance issues. Given limited grant resources, PBOT staff recommended three (3) corridors based on this prioritization methodology to be advanced:

- **Line 72** – 82nd Avenue between I-84 and SE Powell Boulevard
- **Line 12** – Sandy Boulevard between NE 47th and Parkrose Transit Center
- **Line 6** – Martin Luther King, Jr. Boulevard from NE Killingsworth to NE Holladay Street.

[9] The complete evaluation process and methodology is documented in the Existing Conditions and Methodology Memorandum and Appendix (May 2017): https://www.portlandoregon.gov/transportation/73694

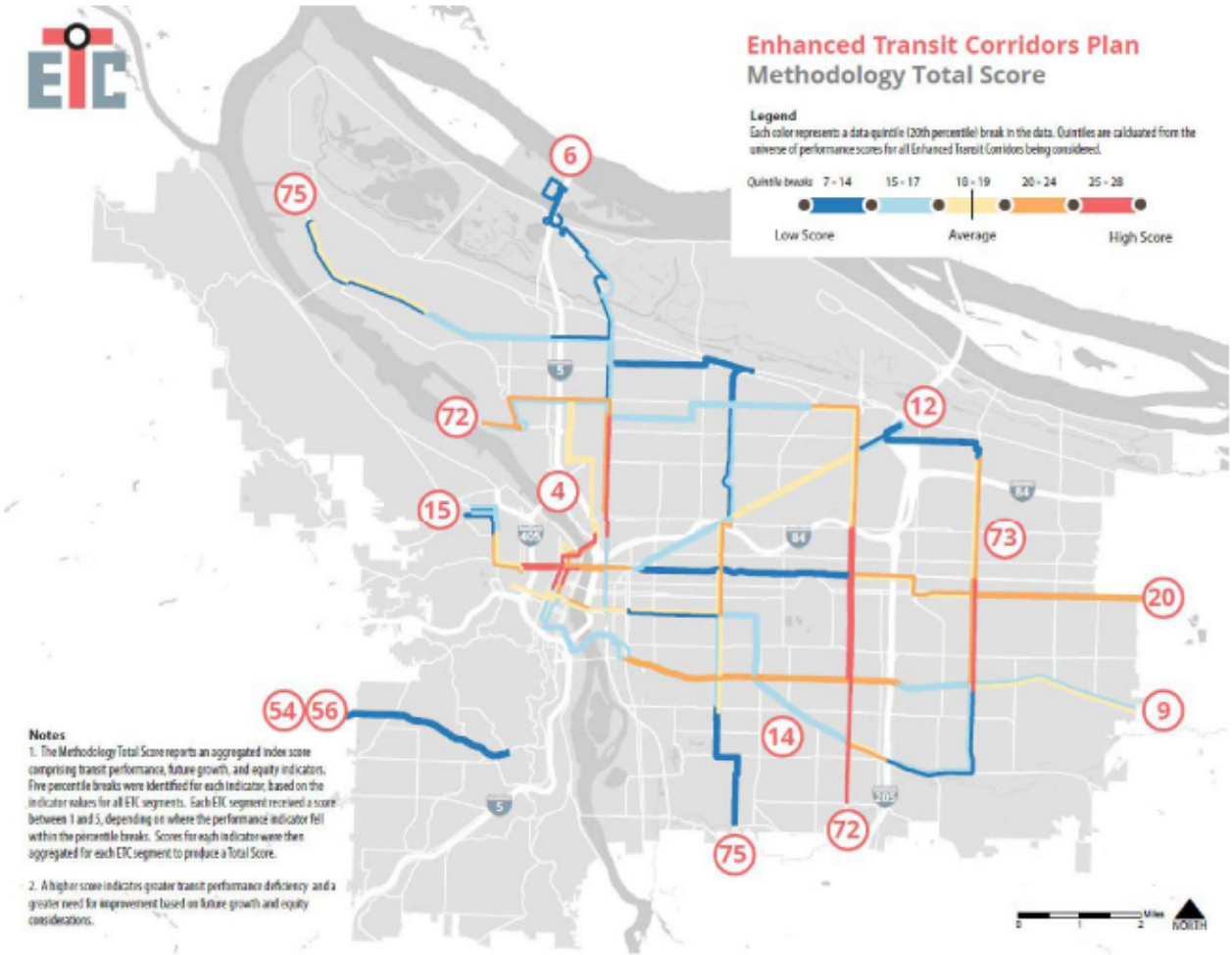


Exhibit 19. Initial Evaluation Results: Total composite scores by segment

4.4 Public Stakeholder Engagement

The project team sought input from community members and key stakeholder groups to inform recommendations and decisions at key milestones in the planning process. This even involved reaching out to people waiting at bus stops to raise awareness of the planning process and opportunities to participate and provide input. The following community outreach and engagement activities informed development of the recommended Enhanced Transit Corridors Plan:

Online Survey or other opportunity to provide input:

1. Spring 2017
2. Winter (Feb 26 - March 26) 2018

Public Open Houses:

1. June 21, 2017
2. February 19, 2018

Planning & Sustainability Commission Briefings:

1. March 4, 2017
2. June 13, 2017
3. April 10, 2018

Visit various stakeholder groups and committees one or more times:

- Bicycle Advisory Committee
- Pedestrian Advisory Committee
- Portland Freight Committee
- PBOT Bureau and Budget Advisory Committee
- PBOT Fixing Our Streets Oversight Committee
- Portland Commission on Disabilities ABE subcommittee
- TriMet Transit Equity Advisory Committee
- OPAL Bus Riders Union
- Transportation Justice Alliance
- Portland Bus Lane Project
- NECN Land Use and Transportation Committee
- East Portland Land Use and Transportation Committee
- EPAP General Meeting
- Businesses for a Better Portland
- Portland Business Alliance

5. Early Implementation

Although Enhanced Transit is still a relatively new concept in the City of Portland, the City has had some early success implementing Enhanced Transit treatments. The most notable example is the Portland Transit Mall, which repurposed travel lanes to give the MAX light rail lines priority through downtown Portland. Although the Enhanced Transit solutions being explored as part of this plan are much smaller in scale than the Portland Transit Mall, similar benefits have been realized by the City through smaller-scale investments in key locations throughout the City.

Many of the Enhanced Transit treatments that have been implemented in Portland to date seek to provide transit priority approaching bridgeheads for vehicles travelling to or from the City Center. Examples include the BAT (bus and right-turn only) lane on SE Belmont Street between SE 12th Avenue and the Morrison Bridgehead, the BAT/pro-time bus lane on SE Madison Street from SE 10th Avenue to the Hawthorne Bridgehead, and the W Burnside BAT lane/queue jump from NW 3rd Avenue to the Burnside Bridgehead. TriMet's Transit Priority Spot Improvements Program is planning to implement Enhanced Transit treatments in other contexts, such as on the Line 12: NE Sandy Boulevard approaching NE 72nd Avenue and Line 14: SE 50th approaching Powell. Other types of projects seek to benefit both buses and the Portland Streetcar, such as the planned BAT lane on NE Grand Avenue between SE Ash Street and NE Everette Street/I-84 (Spring 2018).

As City and regional planning efforts advance including the Metro Regional Transportation (RTP) 2018 Update, the Central City in Motion Plan, and emerging Regional Enhanced Transit Concept Pilot Program, project development will continue and more Enhanced Transit projects will be implemented City and region-wide. These already implemented ETC projects will lay the foundation for the future of Enhanced Transit in Portland.

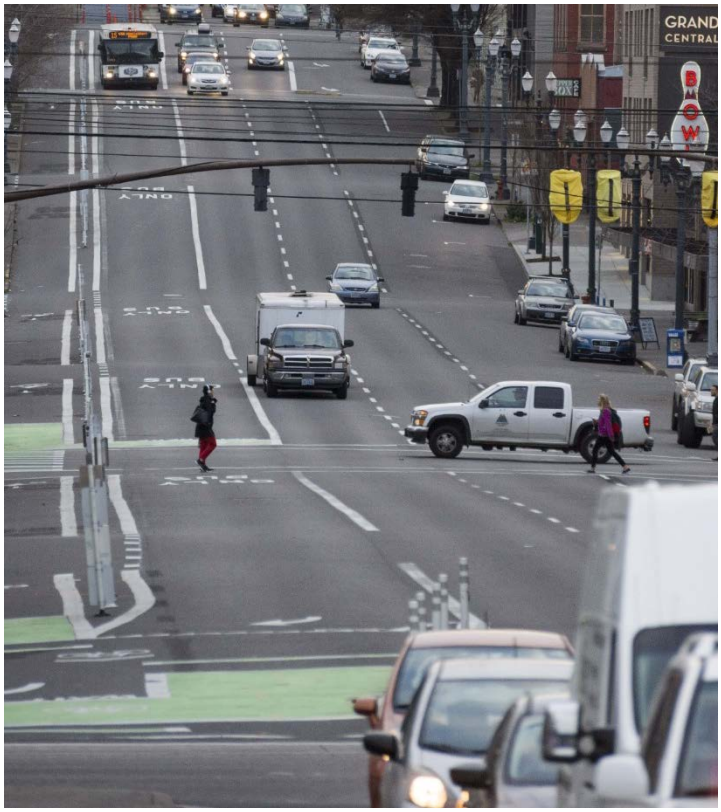


Exhibit 20. Westbound Pro-Time Bus Only/BAT Lane on SE Belmont Street from SE 12th Avenue to Morrison Bridgehead

Exhibit 21. Westbound BAT Lane/Queue jump on W Burnside at NW 3rd Avenue.

Exhibit 22. Westbound bus queue jump provided on NE Sandy Blvd approaching the signal at 72nd Ave. This is achieved with a right Turn Only, Except Bus treatments.

6. Looking Ahead: Regional Enhanced Transit Concept Pilot Program

The Enhanced Transit concept is being introduced into Metro's Regional Transit Strategy as part of the current Metro Regional Transportation Plan (RTP) update. Concurrently, Metro and TriMet are initiating a year-long pilot program to build understanding around where enhanced transit tools may be applicable throughout the greater Portland region as of the writing on this memorandum. It is called the Regional Enhanced Transit (RETC) Corridors Concept Pilot program. The City of Portland's local ETC planning process has provided an initial framework for achieving these goals around the region, leading to the development of a Regional Enhanced Transit (RETC) Corridors Concept Pilot Program led by TriMet and Metro. Metro is leading the initial phase of the Pilot Program because the Pilot will leverage regional funds, and because the pilot is technically applicable to jurisdictions outside of TriMet's service district (e.g. SMART). The purpose of RETC Pilot Project is to develop a near and long-term investment framework for implementing Enhanced Transit projects throughout the region.

Goals of the RETC Pilot Program:

- Improve transit reliability, speed, and capacity
- Identify, design and build an initial set of Enhanced Transit projects
- Develop a pipeline of more Enhanced Transit projects

Metro Council and the Joint Policy Advisory Committee on Transportation (JPACT) policy took action to dedicate $5 million in federal Regional Flexible Funds to fund the pilot program, in fall 2017. TriMet and Metro staff worked with the Transit Working Group for Metro's 2018 Regional Transportation Plan update and the Transportation Policy Alternatives Committee (TPAC) to formalized policy and process, including prioritization criteria, for the Enhanced Transit Corridors Concept Pilot Program. With the allocated funding, TriMet and Metro will jointly manage a program to support capital and operating partnerships with jurisdictions around the region to identify relatively low-cost, context-sensitive, and readily-deployable Enhanced Transit solutions to increase transit capacity, speed and reliability where needed.

As of the writing of this plan, the region is in the process of conducting a series of workshops with multiple jurisdictions to start exploring the feasibility of Enhanced Transit solutions around the Portland Metro area. The following sections describe the work done to prepare for the workshops, and the Regional Transit Vision that the RETC Pilot Project will serve.

6.1 Initial Screening Phase

The first step in the development of the RETC Pilot Program was to perform a high-level analysis of all TriMet Frequent Service bus lines within the Metro area to determine those with the highest levels of need. This process was built from the City of Portland's local ETC planning process, and relied on some of the same key transit performance criteria and performance measures:

- **Reliability**, defined as the percent difference between 90th and 10th percentile runtime speeds
- **Dwell time**, defined as the percentage of runtime stopped at stations
- **Ridership per mile**, defined as the number of riders divided by operating mile

Like the City of Portland's local ETC Candidate Corridor evaluation process, composite scores were assigned to each Frequent Service bus line to assign "transit need" priority. Reliability was weighted (x2) to arrive at a composite transit deficiency score between 5 and 20. Segments that scored less than 10 were removed from consideration, which left 177 segments throughout the region that scored 10 or greater. Enhanced Transit solutions will be studied and reviewed by jurisdictional stakeholders in early 2018. The allocation of workshops to individual jurisdictions was based on the number of high-priority transit segments within their respective jurisdictions (Table 9). Eight workshops are planned for the City of Portland, organized into Central City and non-Central City Enhanced Transit solutions.

Table 7. Regional ETC Pilot Program Segment Scoring and Workshop Allocation

Prioritized Universe (Score of 10 or higher)	Number of Segments*	Workshops Allocated (Total = 14)
Portland Central City	30	4
Portland Non-Central City	91	4
Multnomah County (Outside Portland)	1	1
Clackamas County	14	1
Washington County	27	3
ODOT	Varies	1
Already Studied (As part of ETC Plan or other effort)	14	N/A

Note: Not all segments will be reviewed in the workshops; some segments will be grouped based on relationship with Central City in Motion high priority bus routes, and other segments will be removed from consideration if feasible Enhanced Transit opportunities are not readily identified.

Based on this framework, each workshop will be focused on a single jurisdiction and associated time point segments.

6.2 Pilot Project Workshops

In early 2018, the Pilot program will fund a series of 14 staff workshops with regional jurisdictions to begin exploring the feasibility of Enhanced Transit solutions experiencing transit performance issues throughout the region.

The workshops have multiple stated purposes:

- Introduce partner jurisdictions to Regional Enhanced Transit Concepts program and engage them in potential solutions
- Evaluate a list of corridor segments and hot spots to explore potential design possibilities that achieve transit priority
- Reach a "go" or "no go" decision from the regional partners on which potential Enhanced Transit projects to advance for further consideration

Each workshop will assess Enhanced Transit tools in context to ascertain agency willingness to advance design and solution sets in specific locations. The level of design during these workshops will be pre-conceptual. "Fat-lines" on plan-view maps will be used to represent geometric/physical attributes of the Enhanced Transit solution (in the context of laneway and station solutions). Design options will identify key characteristics including potential right-of-way, access, turn movement, and parking impacts. In addition to these impacts, the workshop process will also identify the following issues and opportunities:

- **Ripeness:** testing the match between the ETC Toolkit and the problem set identified
- **Ownership:** Identification of ODOT-specific facilities/influence within the problem set
- **Scale:** Matching the problem areas to a network, corridor, or node scale and balancing the portfolio
- **Typology:** finding examples of similar problems across the geography to aggregate as a program

Enhanced Transit projects emerging from the workshop process will be eligible for further consideration via a Request for Interest (RFI) process led by Metro and TriMet. RFI responses will help the region determine which of time point segments and associated Enhanced Transit improvements should be advanced to 15% design and will help determine inclusion in the Metro Regional Transportation Plan (RTP) 2018 Update. Eventually, the region plans to advance these projects to 30% design, and eventually final design and construction as part of the Regional Transit Vision (Exhibit 24).

Key anticipated outcomes of the RETC workshops:

- Identify potential conceptual improvements in these corridors for future study and project development.
- Identify potential benefits, constraints, impacts, trade-offs and considerations.
- Determine which potential ETC projects to submit to the Regional ETC Pilot Program for additional study and refinement.

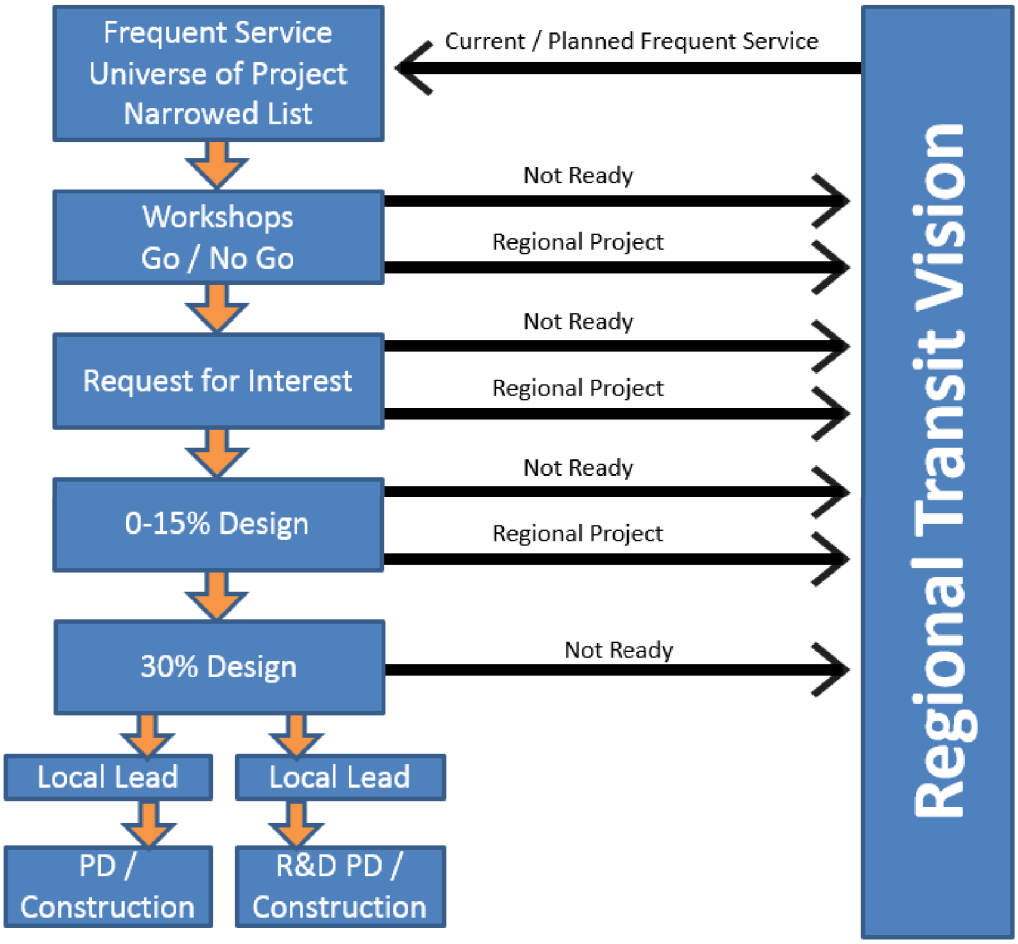


Exhibit 23. –Graphic to Explain How the Enhanced Transit Pilot Project Process can help advance Enhanced Transit projects and inform the Regional Transit Vision. Not all projects will advance to 0 – 15% or further, but that doesn't mean they shouldn't be constructed. Those projects not advancing can be included in the Regional Transit Vision, as part of the Regional Transit Strategy.

The City of Portland segments that are planned to be studied in the Pilot Project Workshops are displayed in Exhibit 25 and Exhibit 26. These candidate segments may be eligible for the Request for Interest (RFI) submittal process led by Metro and TriMet in late spring/early summer 2018. Candidate segments that are accepted through the RFI may advance to project development, additional analysis and 15% Design.

The City of Portland intends to submit a subset of promising candidate segments to the Regional ETC Pilot Program to help advance project development and implementation.

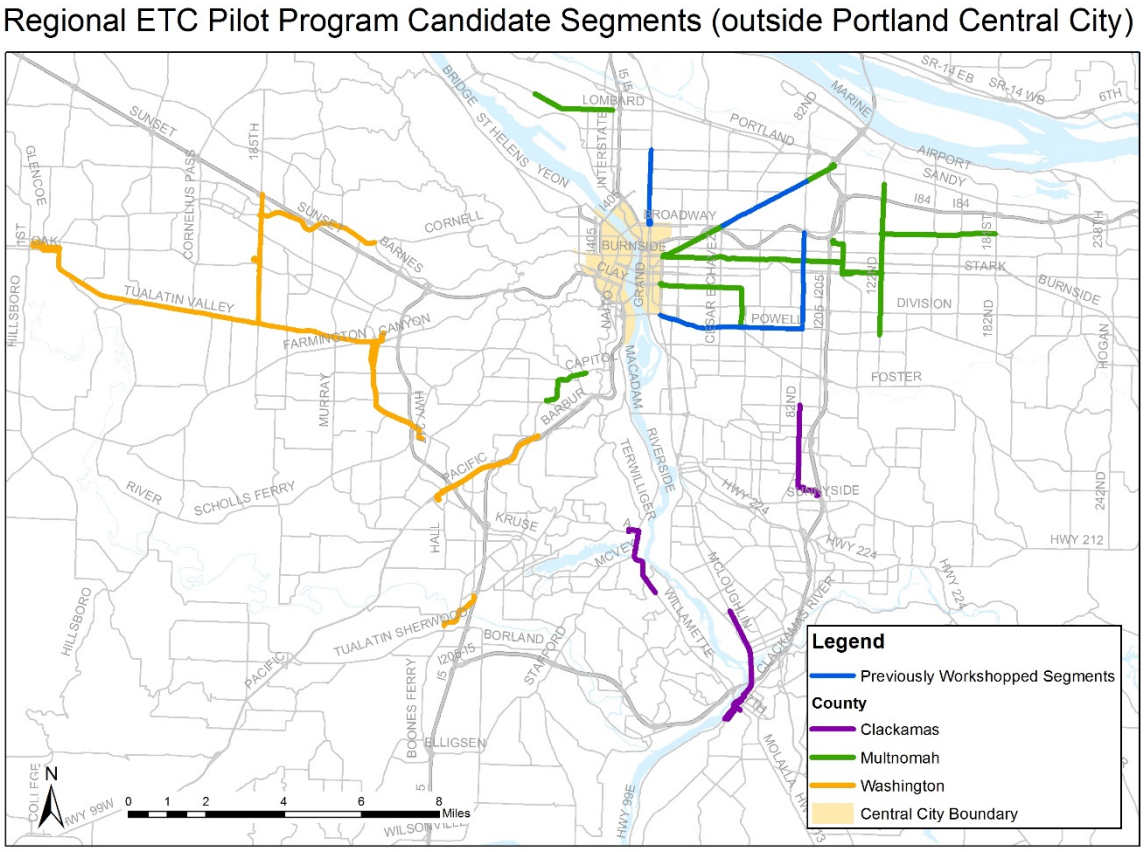


Exhibit 24. Regional ETC Pilot Program Candidate Segments – Outside Portland Central City.

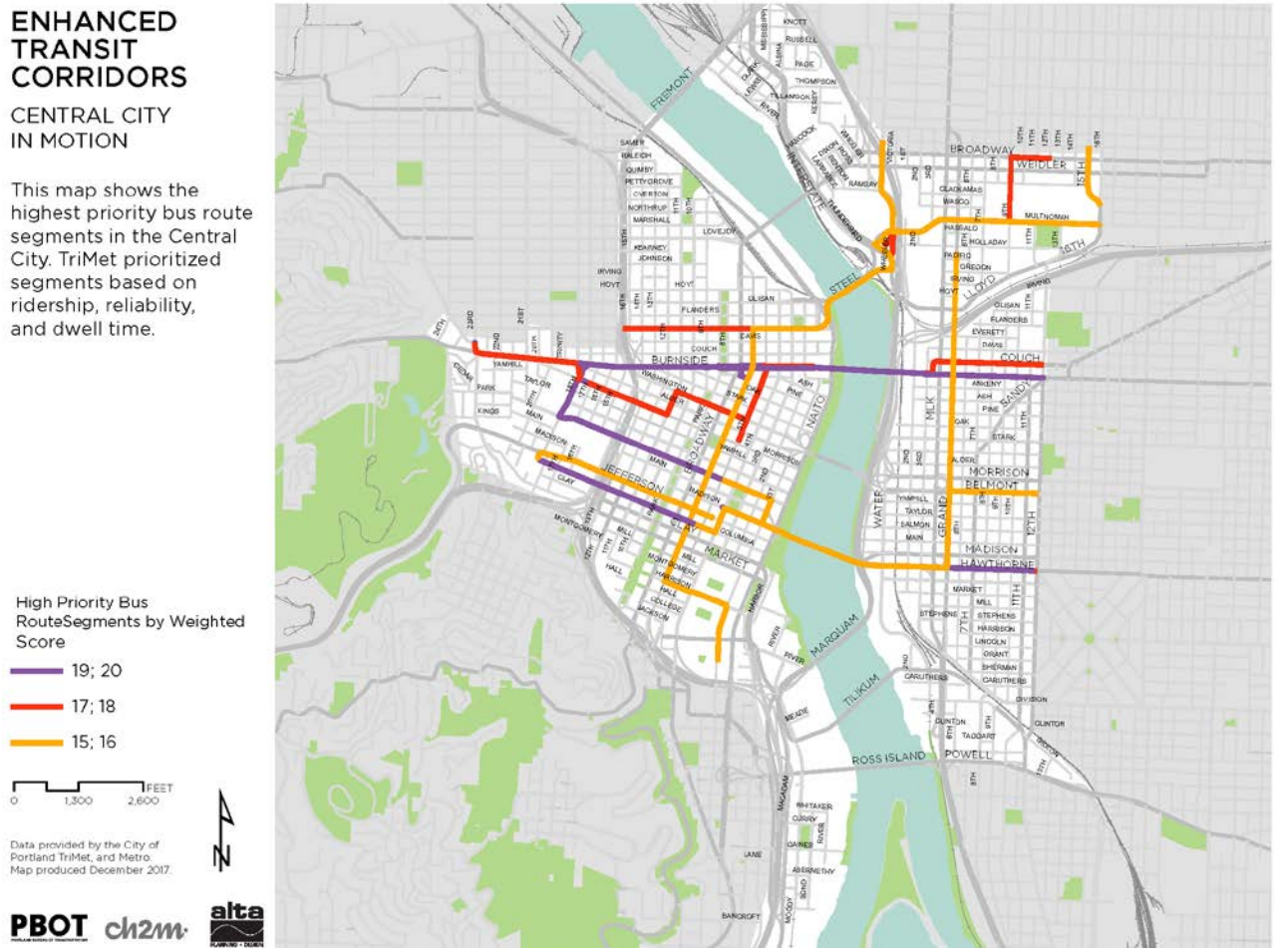


Exhibit 25. Regional ETC Pilot Program Candidate Segments – within Portland Central City.

Exhibit B

Portland Outside Central City

Regional ETC Pilot Program
Candidate Enhanced Transit Locations
For Submittal

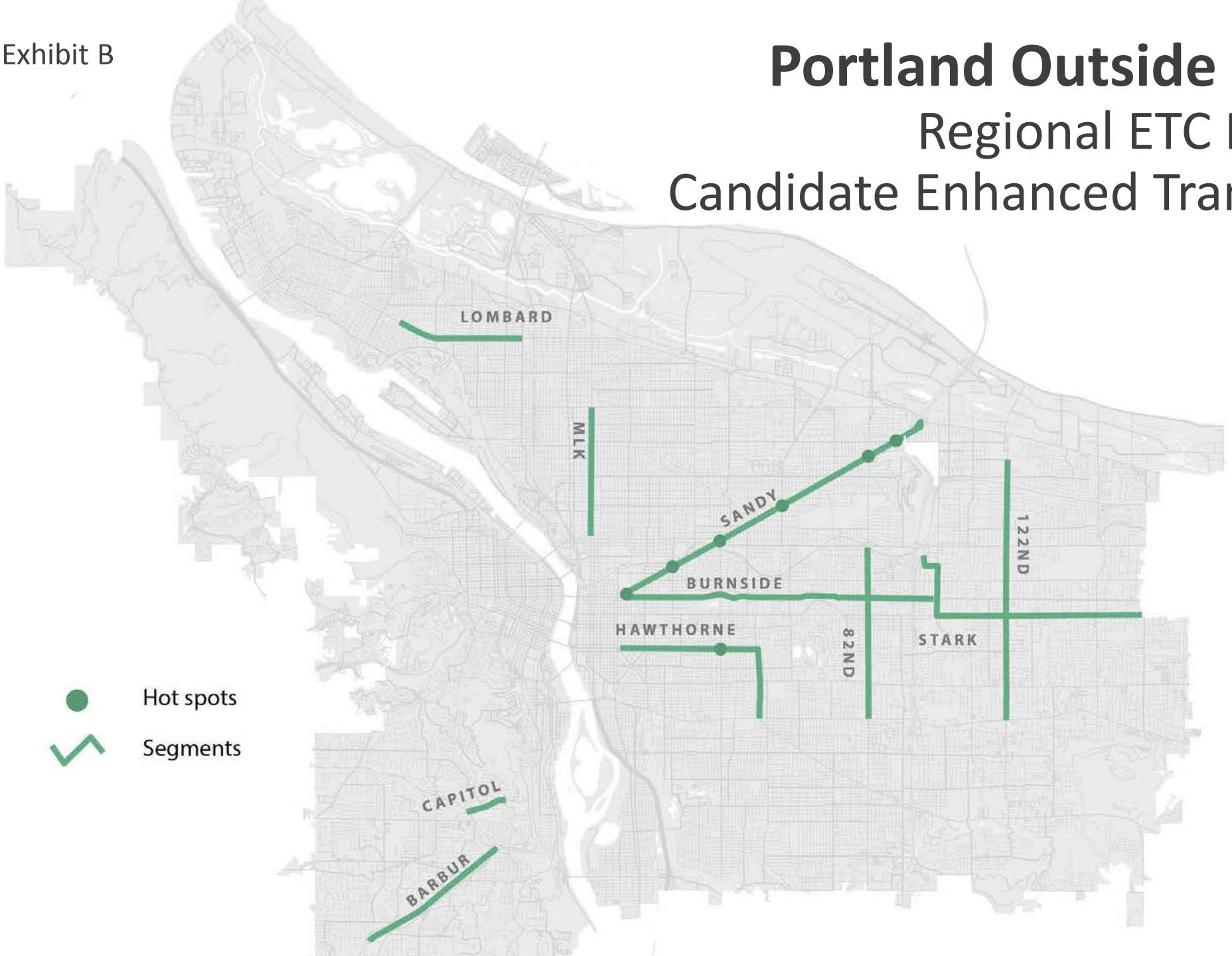
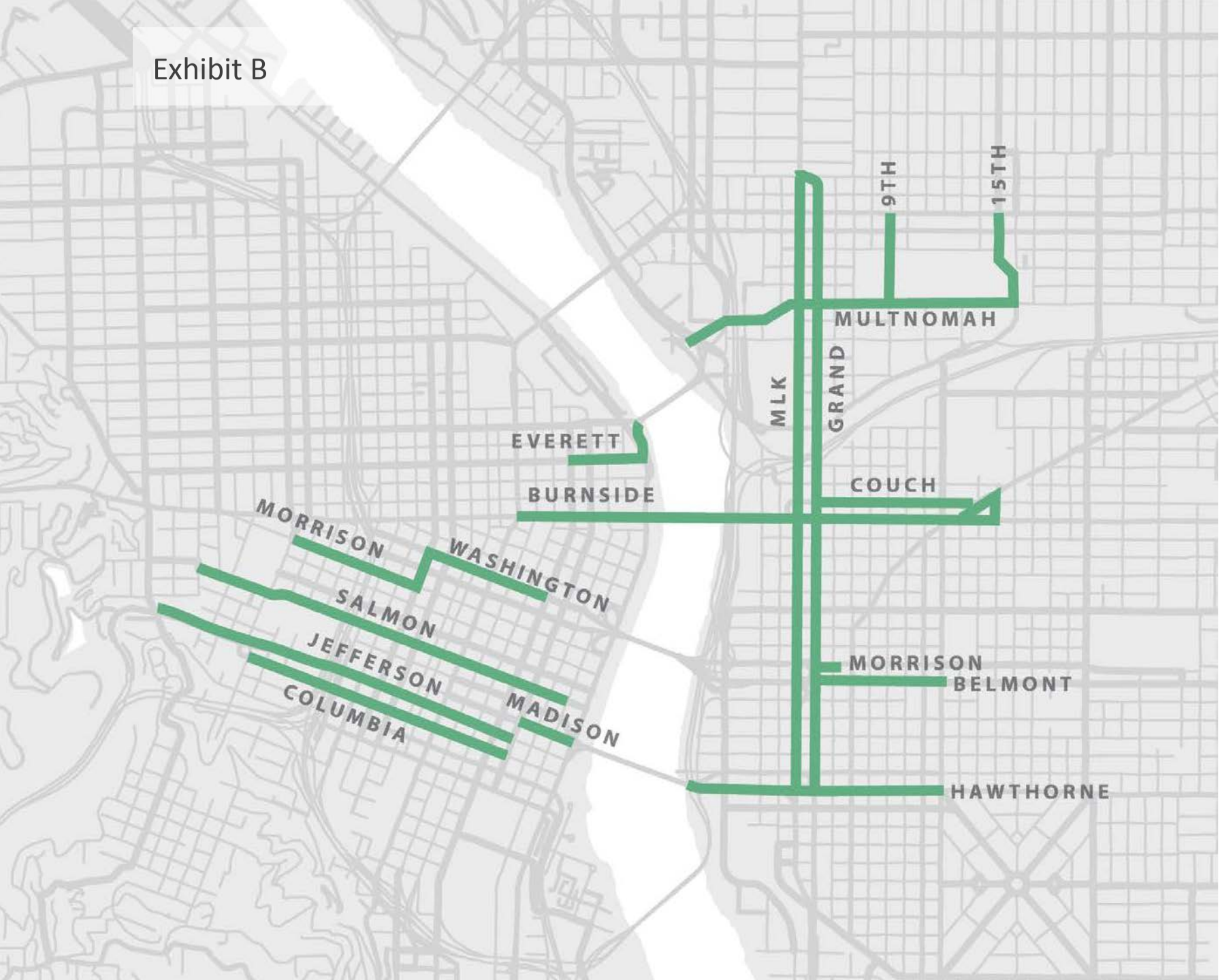


Exhibit B



Portland Central City

Regional ETC
Pilot Program
Candidate Enhanced
Transit Locations
For Submittal