

2023 Regional Transportation Plan



Chapter 7

System Analysis

2023 Regional Transportation Plan

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TABLE OF CONTENTS

Introduction	7-1
Purpose	7-1
Chapter organization	7-1
Our Growing region	7-2
Mobility	7-5
Mode share	7-6
Access to jobs.....	7-6
System completeness	7-7
Throughway reliability	7-8
Transit investments and performance.....	7-11
Safety	7-16
Equity	7-18
Economy.....	7-20
Analyses under development	7-21
Climate and environment	7-22
Pricing impacts the region’s progress toward climate goals	7-23
Pricing projects in the 2023 RTP and their impacts	7-26

TABLE OF FIGURES

Figure 7.1: Forecasted regional population, employment, and household growth (Metro Regional Forecast Distribution)	7-3
Figure 7.2: 2020 Base Year Throughway Travel Speed Reliability Performance (Metro travel model)	7-9
Figure 7.3: 2030 Throughway Travel Speed Reliability Performance (Metro travel model).....	7-10
Figure 7.4: 2045 Throughway Travel Speed Reliability Performance (Metro travel model).....	7-11
Figure 7.5: Transit service and ridership, indexed to 2003 levels, 2003-22 (source: TriMet ridership data)	7-13
Figure 7.6: Daily VMT per capita by scenario vs. regional climate target (source: Metro/RSG VisionEval analysis).....	7-25
Figure 7.7: Throughways that are tolled under the 2023 RTP (Source: ODOT).....	7-27

TABLE OF TABLES

Table 7.1: Forecasted changes in regional growth and the travel network, 2020-2045 (Metro Regional Forecast Distribution)	7-2
Table 7.2: Summary of draft system analysis results: mobility	7-5
Table 7.3: 2023 RTP transit performance results	7-14
Table 7.4: Summary of draft system analysis results: Safety.....	7-16
Table 7.5: Summary of draft system analysis results: equity	7-18
Table 7.6: Summary of draft system analysis results: economy.....	7-20
Table 7.7: Summary of draft system analysis results: climate and environment.....	7-22
Table 7.8: Climate scenarios and associated assumptions	7-24
Table 7.9: Key elements of the three 2023 RTP projects that include tolling	7-28

INTRODUCTION

Purpose

This chapter presents the results of the RTP system analysis conducted on the draft financially constrained project list in Chapter 6. The analysis assesses the RTP's impact on the five RTP goal areas: mobility, safety, equity, climate and economy. The RTP uses several different performance measures to capture the region's progress in each of these goal areas and compares the results to targets described in Chapter 2. The targets that are established through the state and federal rules that govern the RTP or that are included in policies adopted by the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council. The system analysis uses Metro's travel model and other analytical tools. The analysis accounts not only for the projects and policies in the RTP, but also for factors such as projected population and job growth.

Chapter organization

This chapter consists of five sections, each of which summarizes the RTP's performance with respect to the five RTP goals: mobility, safety, equity, economy, and climate. These sections all follow the same structure. Each begins with a table that summarizes the results for performance measures related to the goal in question. For each measure, the tables include a sentence describing the measure followed by rows with numbers showing the associated target and data on results and targets for the years 2020, 2030, and 2045. The tables use **blue text to indicate where the RTP meets targets**, **orange text to indicate where it doesn't**, and **purple text to indicate mixed results**. The text below the tables **highlights key findings in bold**, provides additional context to help interpret results, and discusses any performance measures or analyses that are still pending.

Metro sometimes cannot estimate results for certain years, and targets sometimes do not apply to all years for which the tables below show data. Blank cells in a table mean that a result or target is not available for a particular year for the measure in question.

The draft system analysis results are described alongside key takeaways from the high-level project list assessment completed as part of the evaluation process. The high-level project list assessment takes a simple, yes-or-no approach to reviewing whether individual projects in the draft RTP project list have certain features that support RTP goals and considers the share of the RTP spending devoted to different types of projects. The high-level project list assessment and system analysis in combination with public feedback received will inform policymakers and regional technical and policy advisory committees as they work together to finalize the draft RTP and projects lists for adoption in Fall 2023.

OUR GROWING REGION

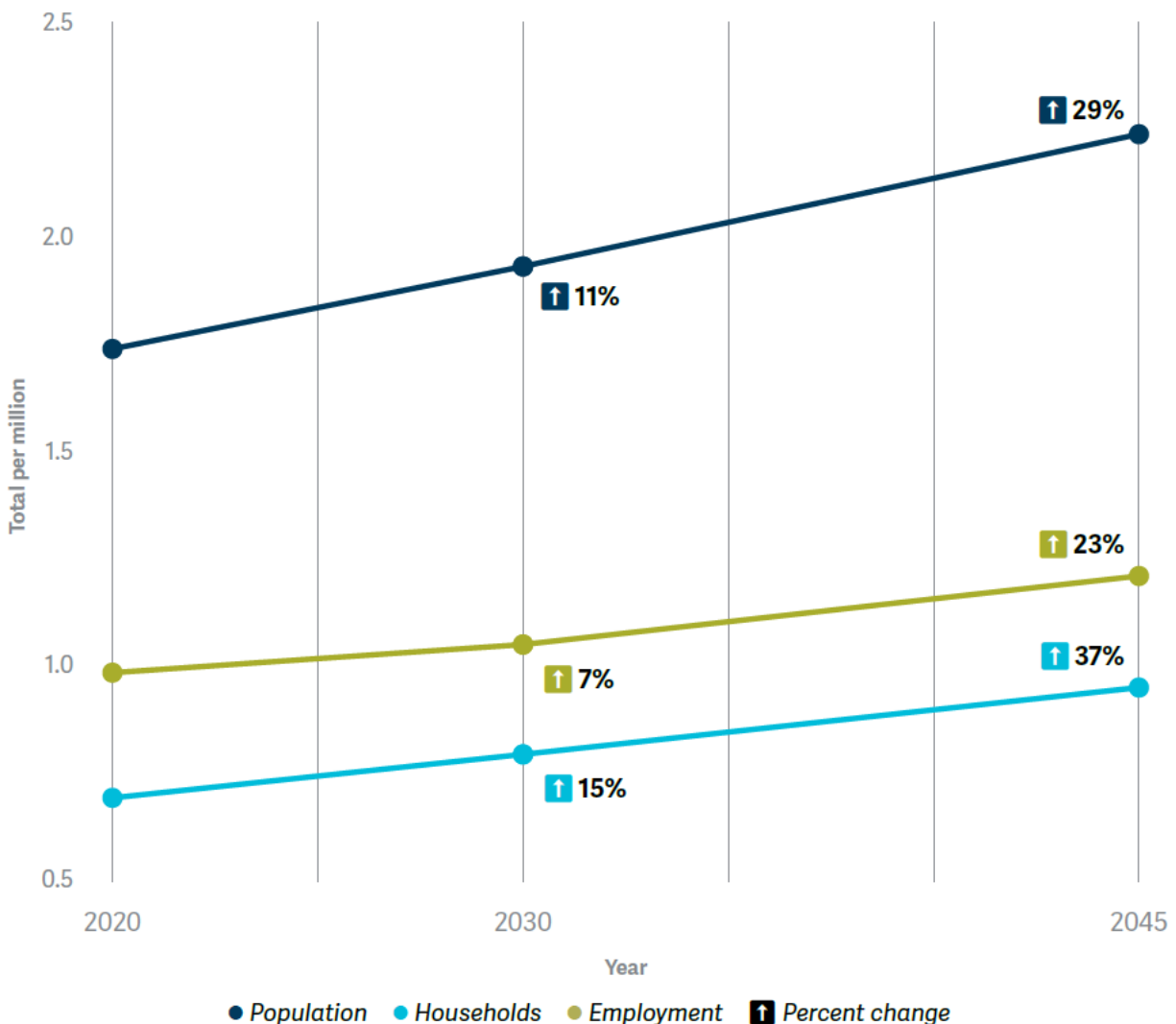
The system analysis focuses on how the RTP advances the region toward meeting its transportation goals. That said, other factors like regional population and employment growth and the historical development of the region's transportation system, also influence progress toward these goals. Table 7.1 summarizes how the region and its travel network are growing and changing.

Table 7.1: Forecasted changes in regional growth and the travel network, 2020-2045

	2020	2030	2045
<i>Population and employment</i>			
Total population	1,740,943	1,933,475	2,242,128
% change in population vs. 2020		11%	29%
Total households	693,123	794,613	950,634
% change in households vs. 2020		15%	37%
Total employment	985,260	1,050,958	1,210,997
% change in employment vs. 2020		7%	23%
<i>Travel network</i>			
Total road miles	3,723	3,754	3,789
% change in road miles vs. 2020		1%	2%
Total arterial miles	3,491	3,525	3,556
% change in arterial miles vs. 2020		1%	2%
Total lane miles	5,510	5,640	5,776
% change in lane miles vs. 2020		2%	5%
Total throughway lane miles	627	645	663
% change in throughway lane miles vs. 2020		3%	6%
Total transit network miles	1,240	1,275	1,294
% change in transit network miles vs. 2020		3%	4%
Total regional pedestrian network miles	597	646	724
% change in regional pedestrian network miles vs. 2020		8%	21%
Total regional bicycle network miles	626	691	756
% change in regional bicycle network miles vs. 2020		10%	21%
Total regional trail network miles	247	273	330
% change in regional trail network miles vs. 2020		11%	34%

Figure 7.1 visualizes forecasted population, household, and employment growth.

Figure 7.1: Forecasted regional population, employment, and household growth (Metro Regional Forecast Distribution)



This information – which comes from the regional growth distribution adopted by the Metro Council for the RTP and other local and regional planning efforts, and from the project information that agency partners submit to the RTP – forms part of the background assumptions that Metro uses to analyze the impact of the RTP on regional goals. It highlights how the region is growing and changing and provides additional context for interpreting some of the results described in this section.

The region is forecasted to grow significantly between now and 2045. During that time, more than one-half million people are expected to move to the region, growing its population by 29 percent, while employment grows by 23 percent. Though the COVID-19 pandemic slowed population and job growth in the Portland region and in many other major metro areas, this growth is expected to pick up again in the future. Population and employment growth has a strong

influence on congestion, and therefore on related performance measures such as access to jobs and corridor travel times. The region's goals are to improve access to jobs and reduce travel times on key corridors regardless of how much growth occurs, but all other things being equal these goals are harder to achieve when the region is growing more rapidly. Comparing the change in these performance measures to overall population and employment growth can help to distinguish whether growth or other issues are the driving factors behind the changes shown in the system analysis.

The motor vehicle network is much more extensive than other networks. The system analysis focuses on measuring system completion for different networks and in different communities where RTP policies prioritize investment. This is an important way of understanding the RTP's progress toward the region's vision for the transportation network, but those visions always build on the existing network, which was developed over several decades during which transportation agencies primarily focused on moving vehicles. Table 7.1 summarizes the current extent of different networks and the planned growth of those networks under the RTP. It illustrates why so many of the goals described above focus on completing the transit and active transportation networks – as of 2020, all those networks are less than a third of the size of the region's road network, and that is still the case in 2045 even with the RTP prioritizing transit and active transportation investments.

MOBILITY

Table 7.2: Summary of draft system analysis results: mobility

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>The RTP aims to triple transit, bike, and pedestrian mode shares relative to the base year.</i>						
Transit mode share	4.1%		4.5%		5.4%	12.2%
Pedestrian mode share	7.5%		7.5%		7.8%	22.6%
Bicycle mode share	3.7%		3.8%		3.9%	11.1%
<i>The RTP prioritizes improving access to jobs via driving and transit relative to the base year.¹</i>						
% of regional jobs accessible by transit	7%		8%	7%	8%	7%
% of regional jobs accessible by driving	41%		42%	41%	37%	41%
<i>The RTP aims to provide the same level of access to jobs via transit (or greater) as via driving so that transit offers the same efficiency and convenience as driving.</i>						
% of regional jobs accessible by transit	7%	41%	8%	42%	8%	37%
<i>The RTP aims to complete the motor vehicle, transit, bicycle, trail and pedestrian networks by 2035.</i>						
% of the motor vehicle network that is complete	98%	100%	99%	100%	99%	100%
% of the transit network that is complete	70%	100%	72%	100%	73%	100%
% of the pedestrian network that is complete	57%	100%	62%	100%	69%	100%
% of the bicycle network that is complete	55%	100%	60%	100%	66%	100%
% of the trail network that is complete	43%	100%	48%	100%	58%	100%
<i>The RTP prioritizes completing the bicycle and pedestrian system near transit (relative to the regional average) in order to provide safe and convenient access to stations and stops.</i>						
% of the pedestrian network near transit that is complete	63%	57%	68%	62%	74%	69%
% of the bicycle network near transit that is complete	60%	55%	66%	60%	71%	66%
<i>The RTP aims to have no more than four hours in a day when average travel speeds fall below 35 miles per hour on the region's controlled-access throughways and below 20 miles per hour on other designated throughways with traffic signals so that the region's throughways are reliable.</i>						
% of controlled-access throughway miles that fall below 35 MPH for more than 4 hours per day	15%	0%	10%	0%	16%	0%
% of other designated throughway miles with traffic signals that fall below 20 MPH travel speeds for more than 4 hours per day	0%	0%	0%	0%	0%	0%

¹ Access to jobs analysis involves measuring the average number of jobs that are accessible via 45 minutes via transit and 30 minutes via driving during peak travel hours across all of the travel analysis zones used in Metro's travel model. See the equity section below for more detail on the type of jobs and destinations that are captured in this analysis.

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>The RTP aims to increase the share of households and jobs that are located within walking distance of frequent transit service² relative to the base year.</i>						
% of households located within walking distance of a frequent transit station	54%		56%	54%	54%	54%
% of jobs located within walking distance of a frequent transit station	64%		67%	64%	67%	64%
<i>The RTP seeks to improve mobility by filling gaps in the transportation network and by designing the transportation system for multimodal travel.</i>						
% of the capital RTP spending invested in projects that fill gaps in the transportation network			30%		29%	
% of the capital RTP spending invested in projects that include multimodal design elements			95%		91%	
% of the capital RTP spending invested in projects that fill gaps and include multimodal design elements			29%		28%	

Since the RTP is a transportation plan, it has many different performance measures related to mobility, including three new measures to support the regional mobility policy – system completeness, throughway reliability, and vehicle miles traveled (discussed in the climate section). For some of these measures the RTP meets performance targets, whereas for other measures it falls short.

Mode share

The RTP increases transit use and multimodal travel, but does not meet the region’s targets to triple transit, walking and bicycling mode share. Metro’s travel models forecast that the investments in the RTP help to increase the share of trips that people make using these modes, but only by small amounts. Transit mode share is forecast to grow by 1.3% between 2020 and 2045 – a relative increase of over 30% – which is significant, but still far short of adopted targets. Walking and bicycling mode shares increase by much smaller amounts than transit mode shares.

Access to jobs

The RTP generally improves access to jobs. The percentage of the region’s jobs that are accessible by transit increases between 2020 and 2045. Access to jobs by transit also increases between 2020 and 2030, but then it declines between 2030 and 2045. Generally, the investments

² “Frequent transit service” refers to service with headways of 15 minutes or less. Metro uses different walking distances to analyze proximity to different types of transit service, consistent with research that shows people are willing to walk longer to reach higher-quality service. This analysis defines “walking distance” as ¼ mile for bus, 1/3-mile for streetcar, and ½ mile for rail.

in the RTP help to keep both roads and transit vehicles moving more efficiently, which increases access to jobs. Increasing congestion near some job centers appears to be contributing to declining motor vehicle access to jobs in the later years of the plan.

Driving currently offers much better access to jobs than transit does, and the RTP does not change this even though it improves access to jobs via transit. The RTP improves access to jobs via transit more than it does access to jobs via driving. However, driving currently offers access to five to ten times as many destination as transit does depending on when you are traveling, where you want to go, and where within the region you are starting from, and the RTP does not change the fact that driving offers much better access than transit does. In order to give people the ability to choose from a variety of seamless and well-connected travel options and services that easily get them where they need to go, transit needs to offer the same level of access as driving does. Providing equal access via transit and driving is an aspirational goal for the greater Portland region – and almost any other U.S. city – due to a decades-long history of auto-oriented development, but closing the gap between transit and driving access has far-reaching benefits for the region.

System completeness

None of the region's transportation networks are complete, but the motor vehicle network is much closer than others. A goal of the RTP mobility policy is to complete all the planned infrastructure networks included in the plan – motor vehicle, transit, pedestrian, bicycle and trail. None of these networks are complete, but the motor vehicle network, which will be 99% complete in 2045 when other networks are only 58 to 73% complete, is much closer than the other networks. Completing all networks in the RTP is important to meeting goals, but the fact that the motor vehicle network is so much more complete than others contributes to the challenge of providing a variety of seamless and connected travel choices. Additional work is being completed by Metro staff to develop approaches for defining system completeness for transportation system management and operations (TSMO) network and transportation demand management programs.

The region has historically prioritized completing pedestrian and bicycle facilities near transit, and the RTP upholds this priority. The pedestrian and bicycle networks are currently more complete near transit than in other locations in the region, and though the RTP does slightly less to complete these networks near transit than in other parts of the region, they will still be more complete in 2045.

The RTP generally improves access to frequent transit, if only slightly. In order for the transit system to be useful, stops and stations have to be located near common origins and destinations, particularly for the frequent service that gets riders where they need to go efficiently. The RTP slightly increases the share of jobs that are near transit, and in the short term, the share of households that are located near transit as well. However, the share of households that are projected to be within walking distance of transit in 2045 is similar to the base year share. Though the RTP expands the transit system, this planned growth may not be keeping pace with new development.

Almost all of the RTP projects include design elements that support travel by transit, foot or bike. However, slightly under a third of the RTP spending goes toward projects that close gaps in regional transportation networks. Increasing this share could help the RTP better complete the transportation system.

Throughway reliability

The RTP meets the throughway reliability thresholds for throughways with traffic signals, but not for some limited-access throughways. The plan is expected to maintain current levels of reliability. The throughway performance measure and thresholds aim to identify future transportation needs on region's throughways using travel speed as a proxy for reliability. The draft policy proposes a minimum throughway performance threshold of no more than four hours per weekday with travel speeds below 35 miles per hour on controlled access freeways (e.g., I-5, I-84, I-205, I-405, US 26 and OR 217) or 20 miles per hour on non-freeways with traffic signals (e.g., OR 99E, US 30, OR 212). If average speeds fall below the relevant speed threshold for more than a total of four hours in a day, it indicates the system is failing at that location and a transportation need exists.

All signalized throughways in the region are projected to meet this threshold, but a portion of the limited-access throughways are not. In spite of the fact that some throughways do not meet regional mobility threshold, the RTP generally maintains current levels of reliability through 2045, with some notable exceptions along OR 217, US 26, and I-84. Reliability is generally projected to improve between now and 2030 as the region invests in projects that improve reliability, including strategic projects to address bottlenecks, pricing strategies, and multimodal investments such as high capacity transit and system management strategies that help to slow growth in travel on the region's throughway system. Reliability then declines back to 2020 levels in 2045 due to continued population and employment growth. Figure 7.2, Figure 7.3, and Figure 7.4 show how throughway reliability changes over time under the RTP and locations that do not meet the throughway reliability thresholds.

Figure 7.2: 2020 Base Year Throughway Travel Speed Reliability Performance (Metro travel model)

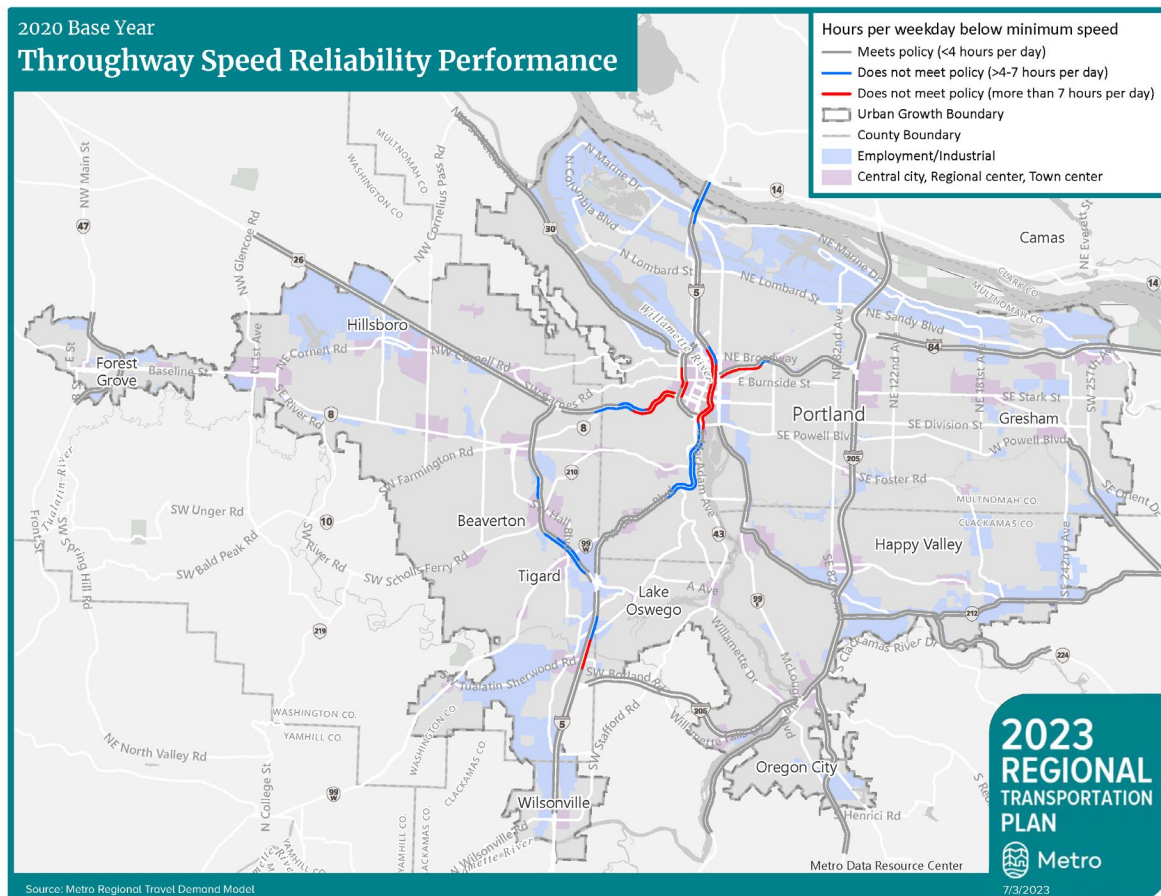


Figure 7.3: 2030 Throughway Travel Speed Reliability Performance (Metro travel model)

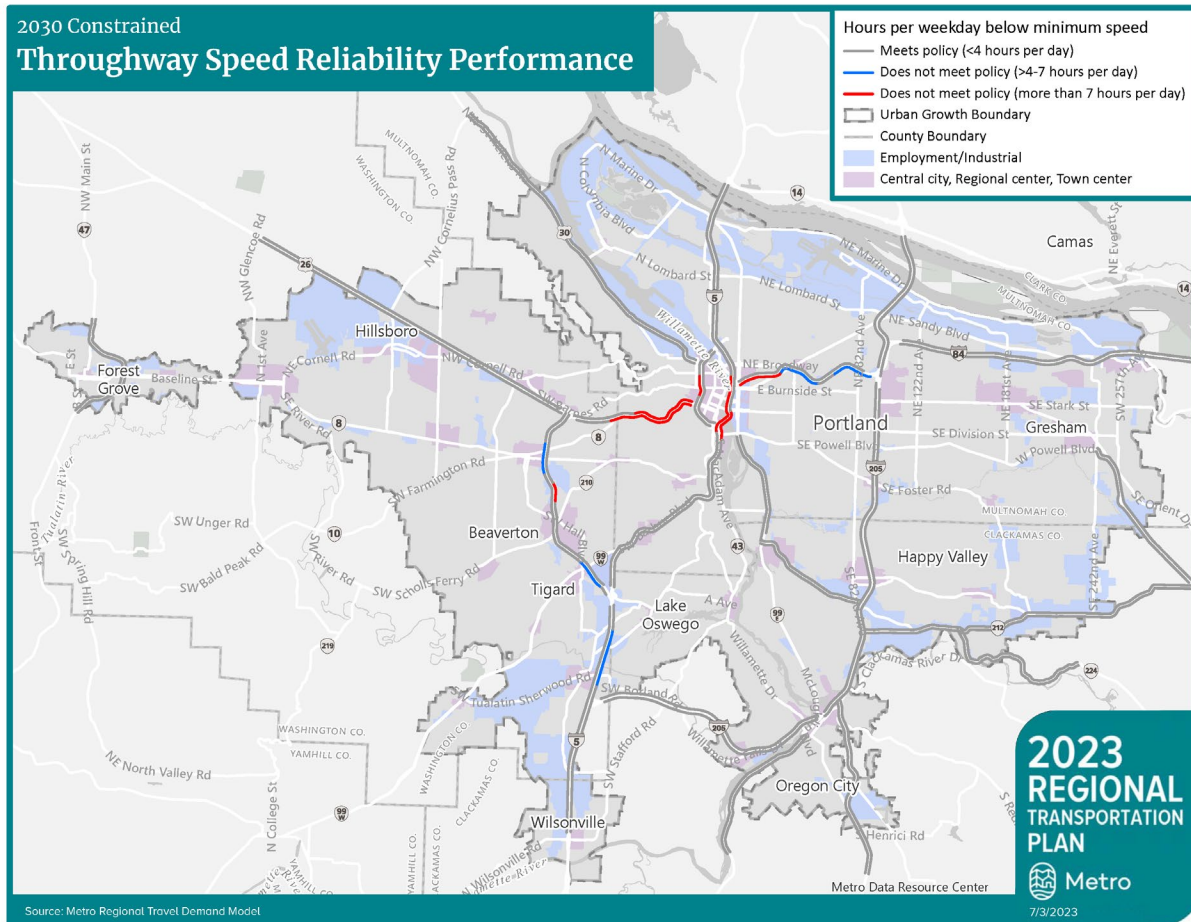
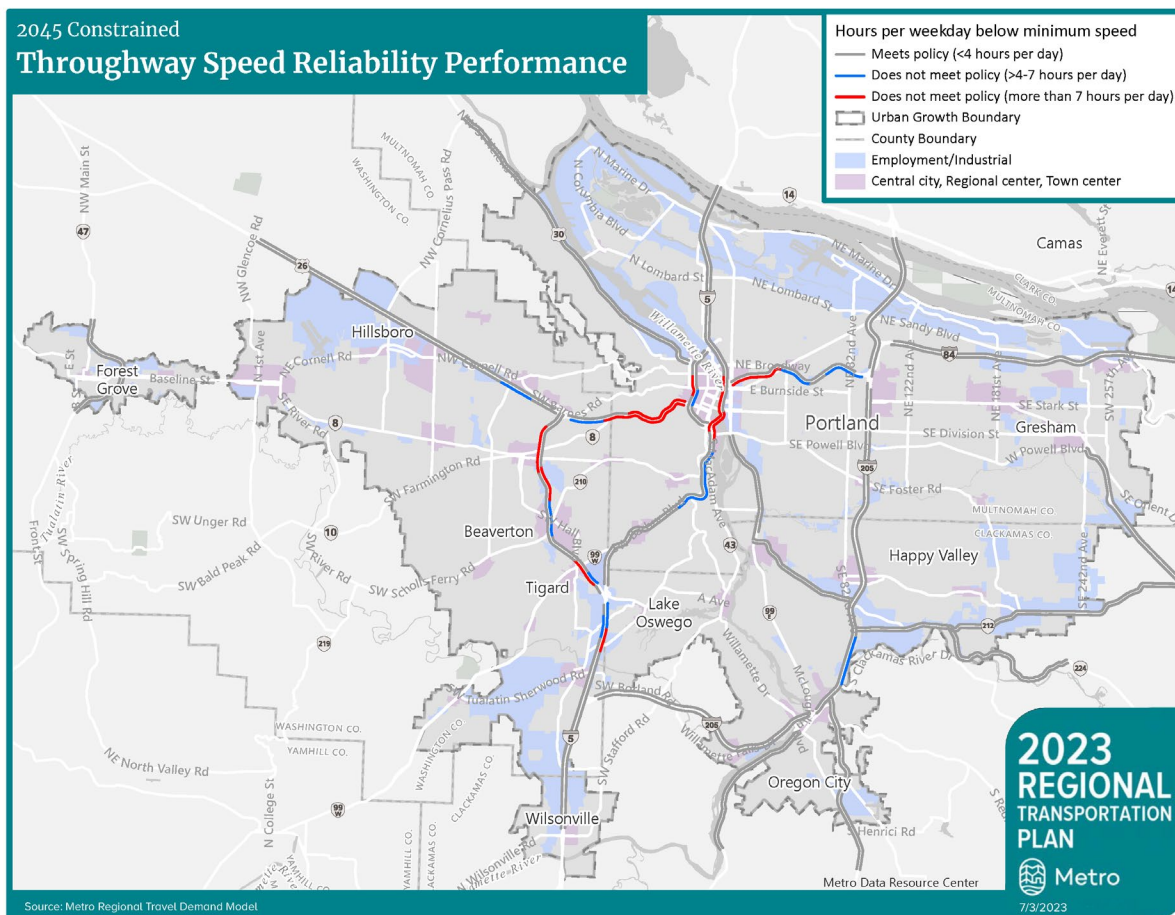


Figure 7.4: 2045 Throughway Travel Speed Reliability Performance (Metro travel model)



The investments in the RTP help to preserve future throughway capacity for longer-distance movement of goods, services and people, and enhance access to the region's industrial areas, ports and intermodal facilities. However, more evaluation of future pricing strategies is needed to better understand their effect on the region's parallel arterials, low-income households and land use patterns to ensure any unintended consequences are identified and addressed in design and implementation. Corridor-level evaluation is also needed upon completion of the 2023 RTP update to address deficiencies and specific investment needs identified in this analysis. See Appendix I for more details on the throughway reliability analysis and results for individual throughway segments.

Transit investments and performance

The RTP relies on a thriving, affordable and efficient transit system to achieve regional mobility, equity and climate goals. Currently, the transit system is facing significant challenges, including recovering from severe service and ridership declines due to the COVID-19 pandemic, ongoing challenges hiring drivers, concerns about riders' and drivers' safety, and inflationary increases in the cost of new infrastructure and service. The RTP makes significant investments in transit,

including \$2.8 billion in transit capital projects and \$28 billion for transit service and operations. These investments still deliver significant benefits for the region, even when accounting for the challenges that transit has faced recently.

Chapter 3 contains maps showing how the transit system evolves over the course of the RTP as new projects are delivered. These projects include major near-term regional investments such as new high-capacity transit lines along TV Highway, 82nd Avenue, and the Montgomery Park streetcar line, Better Red and Division FX frequent bus service, and Better Bus improvements throughout the region that help buses move more quickly through traffic, all of which are anticipated to be built by 2030. The 2045 network includes light rail on the I-5 Interstate Bridge and along Southwest Corridor; concentrated Better Bus investments in key corridors including Lombard, Cesar Chavez and SW 185th; and additional high-capacity transit projects.

The RTP accounts for several recent changes to the transit system when evaluating the impact of these projects on regional goals:

The pandemic changed riders' behavior, and transit agencies are adjusting service accordingly. The region's transit system has historically been designed to connect workers to job centers, particularly during peak commuting hours, but commute trips fell dramatically during the pandemic, and given the persistence of working from home it seems likely that a lower share of workers will be using transit for their commutes going forward. TriMet's Forward Together service concept³ increases service in equity focus areas and focuses more on providing good service throughout the day and less on providing frequent transit during peak hours compared to previous plans. These changes are included in the RTP transit network along with the projects listed above.

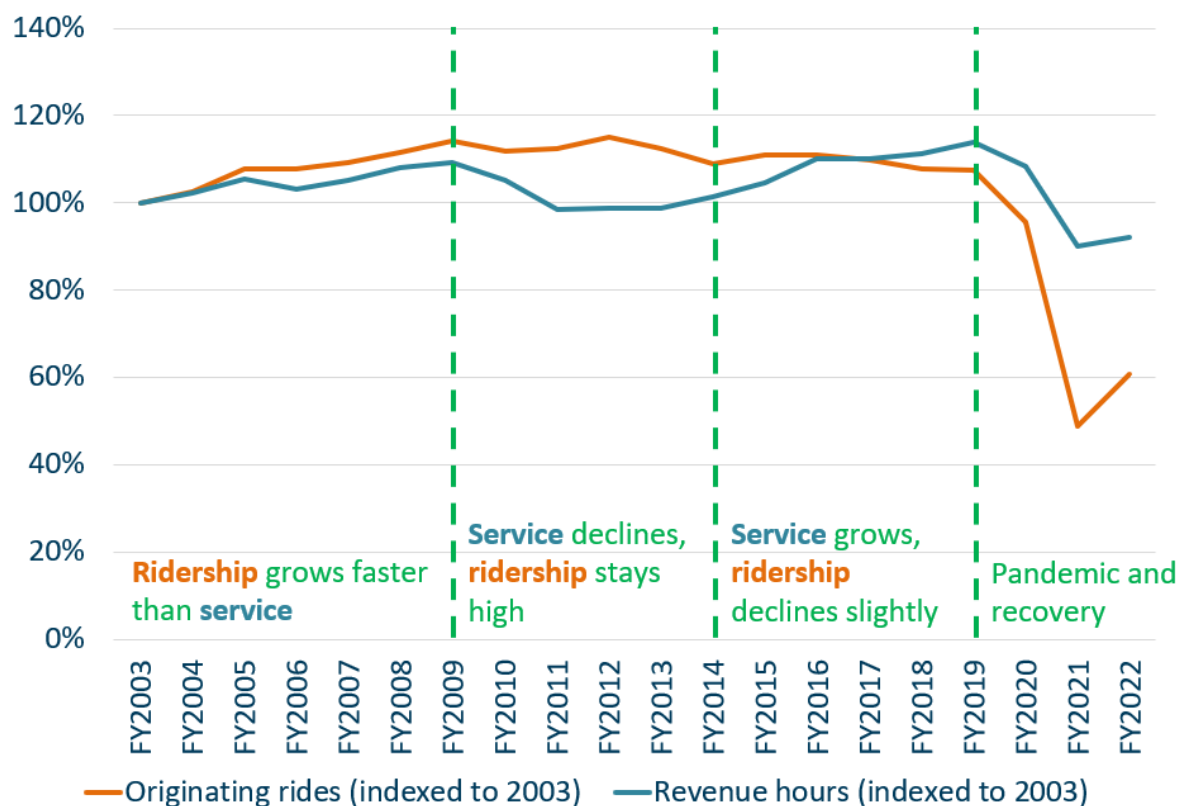
The cost of building and operating transit has gone up. Inflation has increased the cost of most of the investments included in the RTP, which means that the region's transportation dollars do not stretch as far. This is particularly true for transit because the RTP is required to account for not only the cost of building new transit facilities, but also the cost of operating new transit projects. This increases the cost of building out the regional transit network, and delays progress toward completing that network.

Recent transit investments have been less effective at drawing new riders. Figure 7.5 shows how TriMet service and ridership⁴ has changed since 2003. Service and ridership are both indexed to 2003 levels, which means that the graph focuses on how those variables have changed over the past two decades.

³ <https://trimet.org/forward/>

⁴ TriMet annual performance report, 2003-22, <https://trimet.org/about/performance.htm>. This data does not include all transit services in the region, but since TriMet serves over 90 percent of transit rides in the region its data typically reflects regional trends, and the way that TriMet reports this data makes it easy to use this data to track those trends over time.

Figure 7.5: Transit service and ridership, indexed to 2003 levels, 2003-22 (source: TriMet ridership data)



The past two decades of transit performance can be broken down into four phases:

- From 2003 to 2009, ridership grew faster than service (14% vs. 9%). New investments in transit were relatively effective at drawing new riders during this period.
- From 2010 to 2013, service declined, but ridership remained at high levels.
- From 2014 to 2019, service increased significantly while ridership declined slightly. This suggests that new transit service was not very effective at drawing new riders.⁵

⁵ Transit agencies in cities across the U.S. observed similar trends during this period, during which total U.S. non-rail transit trips fell by almost nine percent and rail trips fell by roughly two percent. (See Federal Transit Administration, National Transit Database: 2019 National Transit Summaries and Trends, <https://www.transit.dot.gov/ntd/2019-national-transit-summaries-and-trends-ntst>.) Analyses pointed to several potential explanations for this decline, including an increased preference among travelers for (and, as the economy strengthened, ability to afford) private vehicles, declining gas prices, competition from transportation network companies and other emerging modes, and declining housing affordability, which may have led many lower-income people who are more likely to rely on transit to move to communities where transit was not accessible. (See TransitCenter, Who's on Board 2019: How to Win Back America's Transit Riders, <https://transitcenter.org/publication/whos-on-board-2019/>.)

- From 2020 to 2022, transit ridership and service both suffered severe declines and then recovered slowly.

During every RTP update, Metro calibrates its travel model that is used in the RTP system analysis to existing data to capture changing dynamics in how people travel. The 2023 RTP update uses a travel model that is calibrated to data from 2014-19, whereas the previous RTP update used data from 2013 and before. **This leads the 2023 RTP to make more modest assumptions about how many riders will use new transit service.**

In spite of the challenges discussed above, transit service, ridership and mode share still increase significantly under the 2023 RTP, as shown in Table 7.3.

Table 7.3: 2023 RTP transit performance results

Measure	2020	2030 Constrained	2045 Constrained
Total daily transit revenue hours	7,390	8,856	10,192
Increase in total daily revenue hours	0%	20%	38%
Total daily transit trips	255,159	313,925	440,270
Increase in total daily trips	N/A	23%	73%
Transit mode share (all trips)	4.1%	4.5%	5.4%
Transit mode share (work)	7.2%	8.1%	9.5%
Transit mode share (non-work)	2.9%	3.2%	3.9%

Transit mode share is forecast to increase from 4.1% to 5.4% over the lifetime of the RTP – a relative increase of over 30 percent. This is short of the RTP’s ambitious target to increase transit, bike, walk and mode share by 200 percent, but it is nonetheless a significant increase. Even though some workers will replace transit commutes with working from home on some days, transit will likely continue to serve commutes because commutes tend to be long-distance trips for which transit is a particularly useful alternative to driving.

In spite of signs that new transit service has recently been less effective at attracting riders, the RTP still expects that growth in ridership will outpace growth in transit service. This is because **the RTP contains accounts for several other changes that support transit service, including population growth, land use changes that locate more people and jobs near transit, and new tolls and parking pricing** (see the Climate section for further discussion), which encourage some drivers to shift to using transit.

Much has changed about transit, but transit’s importance to the region has not changed, and neither has the evidence about what makes transit service effective at drawing riders. All other things being equal, transit services tend to draw more riders – which means that they also support progress toward the region’s mobility and climate goals – when they:

- Serve areas that are plentiful with housing and jobs.
- Serve areas where high concentrations of people of color and people with low incomes live and work, such as equity focus areas.
- Arrive frequently.

- Connect origins and destinations quickly.

These principles continue to guide transit planning efforts in the region, including the High-Capacity Transit Strategy that is included in the 2023 RTP update.

SAFETY

Table 7.4: Summary of draft system analysis results: Safety

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>The RTP aims to eliminate transportation related fatalities and serious injuries for all users of the region's transportation system by 2035, and to maintain progress toward this goal in interim years.</i>						
Number of fatalities	93	52				
Fatalities per 100 million vehicle miles traveled	0.9	0.5				
Number of serious injuries	512	384				
Serious injuries per 100 million vehicle miles traveled	4.8	3.6				
Number of non-motorized fatalities and serious injuries	129	95				
<i>The RTP seeks to advance safety by funding projects that benefit safety in the most dangerous locations on the region's transportation network.</i>						
% of the capital RTP spending invested in projects identified as safety projects			74%		73%	
% of the capital RTP spending invested in projects located on high injury corridors or intersections			46%		59%	
% of the capital RTP spending invested in safety projects that are located on high injury corridors or intersections			38%		51%	

The region is not on track to meet its target of reducing fatal and serious injury crashes to zero by 2035. Table 7.4 shows baseline 2020 results for several different indicators that examine different types of crashes (fatal crashes, serious injuries, and non-motorized crashes involving vulnerable users) using different indicators (both rates and absolute values) and compares them to 2020 targets that represent a sixteen percent reduction in crashes compared to 2014, when the region adopted these safety targets, and a fifty percent reduction by 2025. By every **safety measure that the RTP tracks, the region's streets are getting less safe**, and the RTP is not meeting the interim 2020 targets that it established to maintain progress toward the 2035 Vision Zero goal.

The needs assessment and Urban Arterials Brief prepared in Fall 2022 contain more information on where crashes are occurring in the region and who is affected by different types of crashes that helps to explain and contextualize the results above.⁶ Key findings include:

- Pedestrians experience a disproportionately high number of traffic deaths.
- Traffic fatalities are decreasing among bicyclists.

⁶ <https://www.oregonmetro.gov/sites/default/files/2022/11/29/2023-RTP-Needs-Assessment-fact-sheets.pdf> and <https://www.oregonmetro.gov/sites/default/files/2022/10/24/Safe%20and%20healthy%20urban%20arterials%20policy%20brief.pdf>

- A majority of serious crashes and bike/ped crashes occur in equity focus areas (see the Equity section for more information).
- Speed, alcohol, and/or drugs continue to be the most common contributing factors in severe and fatal crashes in the region.
- Serious crashes, and particularly fatal pedestrian crashes, are increasing both in the Greater Portland region and nationally. The growing popularity of SUVs and other heavier and larger models of passenger vehicles is contributing to these trends; by 2025, light-trucks, SUVs, vans and pickups are estimated to make up 78 percent of sales. Research indicates that crashes involving SUVs and similar weight vehicles are more likely to be serious and to injure or kill pedestrians and bicyclists.⁷

More than two thirds of capital funding in the RTP goes to projects that lead agencies identified as safety projects, and over half of the capital budget goes toward projects that are on the high-injury network, which includes the relatively small share of roads and intersections where most of the serious crashes in the region occur. However, a smaller share of the near-term (2023-30) RTP spending is devoted to these projects than of the total budget, which suggests that there may be additional opportunities to prioritize near-term investments in safety. See Chapter 3 for a map of the high injury network that is used in these safety analyses.

⁷ Tyndall, Justin. "Pedestrian Deaths and Large Vehicles." *Economics of Transportation*, Volumes 26–27, June–September 2021. <https://www.sciencedirect.com/science/article/abs/pii/S2212012221000241?via%3Dihub>, and Monfort, Samuel S.; Mueller, Becky C. "Pedestrian injuries from cars and SUVs: updated crash outcomes from the Vulnerable Road User Injury Prevention Alliance (VIPA)." *Traffic Injury Prevention (TIP)*, Insurance Institute for Highway Safety, May 2020. <https://www.iihs.org/topics/bibliography/ref/2203>.

EQUITY

Table 7.5: Summary of draft system analysis results: equity

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>Safety is a critical issue in equity focus areas. The RTP aims to eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, particularly in equity focus areas, which experience higher rates of serious crashes.</i>						
Serious crashes in Equity Focus Areas (EFAs)	65%	35%				
Pedestrian- and bicyclist-involved crashes in Equity Focus Areas (EFAs)	75%	25%				
<i>The RTP prioritizes completing the bicycle and pedestrian system in equity focus areas (relative to other communities) to provide safe streets for the most vulnerable travelers.</i>						
% of the pedestrian network that is complete within EFAs	70%	45%	76%	49%	81%	58%
% of the pedestrian network near transit that is complete within EFAs	73%	53%	78%	56%	83%	64%
% of the bicycle network that is complete within EFAs	61%	49%	68%	53%	75%	58%
% of the bicycle network near transit that is complete within EFAs	64%	55%	72%	60%	77%	65%
<i>The RTP prioritizes improving access to jobs within equity focus areas (relative to other communities).⁸</i>						
% of regional jobs accessible by transit in equity focus areas	8%	5%	9%	5%	11%	5%
% of regional jobs accessible by driving in equity focus areas	42%	40%	43%	40%	40%	33%
<i>The RTP seeks to advance equity by funding projects that benefit equity in the communities that have the greatest needs.</i>						
% of the capital RTP spending invested in equity projects (transit or walk/bike investments)			68%		75%	
% of the capital RTP spending invested in projects located in equity focus areas			36%		36%	
% of the capital RTP spending invested in equity projects that are located in equity focus areas			27%		26%	

⁸ The results shown here measure access to all jobs during peak hours. Community feedback has emphasized that marginalized people particularly prioritize access to community places such as schools, grocery stores and community services and access to jobs that they are qualified for, and that marginalized people are less likely to commute during peak hours and more likely to need to travel throughout the day. Metro staff analyzed access to jobs by wage level and access to community places, and also access during off-peak periods. All of these analyses show the same basic patterns as the results in Table 7.5 – access to destinations via transit and auto is slightly better in equity focus areas than in other communities, and access to destinations via auto is much higher than access via transit – and this memorandum does not reproduce those results in order to conserve space. The final RTP will include complete results of the accessibility analysis.

The RTP achieves mixed results on equity – it invests equitably, but these investments do not undo longstanding transportation inequities in safety and access to jobs. The region’s bicycle and pedestrian networks are currently more complete in many Equity Focus Areas (EFAs) where people of color, low-income people and people who speak limited English are concentrated, and the RTP continues to invest in completing those networks. However, recent data shows that these areas continue to experience three times the number of crashes that involve people walking and biking – who are particularly vulnerable to death and injury during crashes – and almost twice as many fatal and serious injury crashes as other parts of the region.

Similarly, **people living in some EFAs currently have significantly better access to jobs via transit and driving than people living in non-EFAs, and the RTP continues to improve access to jobs in these communities relative to others.** However, despite continued efforts to grow transit service during this and previous RTP cycles, **driving in general continues to offer much more efficient and convenient access to jobs than transit does.** Both community feedback and research emphasize that people of color and people with low incomes are more likely to rely on transit. This suggests that an equitable transportation system is one in which transit offers the same level of access to jobs as driving – and even with the investments in the RTP the region still falls short of providing equal access via driving and transit.

Over two thirds of RTP capital spending goes toward projects that invest in the transportation equity needs identified by EFA residents, and over one third goes toward projects in EFAs, with a slightly higher share of long-term funding than near-term funding devoted to these priorities. See Chapter 3 for a map of the equity focus areas that are used in these analyses.

ECONOMY

Table 7.6: Summary of draft system analysis results: economy

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>The RTP aims to decrease driving and transit travel times along regional mobility corridors relative to the base year.</i>						
% change in average mid-day corridor ⁹ travel times vs. 2020 - driving			0.7%	0%	3.7%	0%
% change in average evening peak corridor travel times vs. 2020 - driving			1.5%	0%	3.8%	0%
% change in average off-peak corridor travel times vs. 2020 - transit			- 3.4%	0%	- 3.8%	0%
% change in average evening peak corridor travel times vs. 2020 - transit			- 1.2%	0%	- 1.6%	0%
<i>The RTP prioritizes completing the bicycle and pedestrian system in job and activity centers (relative to the regional average) in order to provide safe and convenient options for short trips and connections to transit.</i>						
% of the pedestrian network that is complete within centers, station communities, and mixed-use areas	74%	57%	77%	62%	80%	69%
% of the bicycle network that is complete within centers, station communities, and mixed-use areas	63%	55%	69%	60%	74%	66%
% of the pedestrian network that is complete within employment and industrial areas	39%	57%	44%	62%	52%	69%
% of the bicycle network that is complete within employment and industrial areas	55%	55%	58%	60%	64%	66%
<i>The RTP supports the economy by prioritizing by filling gaps in the transportation network and by designing the transportation system for multimodal travel.</i>						
% of the capital RTP spending invested in projects located in planned job centers and growth areas			89%		88%	
% of the capital RTP spending invested in projects located in areas that currently have higher-than-average concentrations of jobs			84%		80%	

The RTP achieves mixed results on regional economic goals. It reduces transit travel times along the corridors that connect the region's centers, but driving times along these corridors increase, particularly in 2045, due to increased congestion. However, travel times increase at a much slower pace than the region's population and employment grows (under 4% by 2045, compared to 29% growth in population and 23% growth in jobs), which suggests that the RTP

⁹ Metro uses mobility corridors that link different regional centers for the purposes of travel analysis (<https://www.oregonmetro.gov/mobility-corridors-atlas>) and forecasts driving and transit times between key destinations along each corridor using its travel model. The averages presented for this metric are based on the longest-distance route along each corridor for which forecasted both driving and transit travel times are available, and, in the case of peak-hour results, the route corresponding with the direction of peak travel.

helps traffic move more efficiently along these corridors than it would otherwise given the pressure that new growth and new trips put on the transportation system.

In order to help workers take advantage of the faster and more frequent transit connections that the RTP provides, the RTP must also complete the bicycle and pedestrian networks in the communities where jobs are located. Doing so gives transit commuters safe and convenient connections from transit stations to their places of work. The bicycle and pedestrian network is already more complete than average in centers, station communities and other mixed-use areas where many of the region's office, service, and other jobs are located, and the RTP continues to prioritize investment in these areas. However, even with the investments planned in the RTP, the pedestrian and bicycle networks – particularly the former – are not nearly as complete in employment and industrial areas that are home to many of the region's manufacturing and transportation jobs as it is in the rest of the region. Many businesses in these areas need freight access and ample floor space for manufacturing or warehousing, which can pose challenges to creating convenient and safe walking and biking environments, and new transit options, particularly smaller and more flexible service that can serve routes with many dispersed stops, are needed to give people a car-free option that connects within walking or biking distance of their jobs. However, completing these networks, especially the pedestrian network, can help transit riders safely and conveniently complete the last mile of their commutes.

The RTP invests heavily in projects that are located both in planned job centers and in the places where jobs are currently concentrated, which reflects a continued emphasis on investing in transportation facilities that support current and planned growth.

Analyses under development

Note: The RTP uses **freight-related performance measures** to examine economic performance. The final draft of the 2023 RTP update will include versions of the travel reliability measure discussed in the Mobility section that are focused on examining the variations in travel times and speed on the regional freight network. Metro staff are working to update these measures through the Freight and Commodities Movement Study, and will share freight performance measure results with RTP policy and technical committees as part of the Freight and Commodities Movement Study results in July 2023.

CLIMATE AND ENVIRONMENT

Note: This section will be updated in consultation with ODOT, DLCD and DEQ.

Table 7.7: Summary of draft system analysis results: climate and environment

Measure	Base year value	Base year target	2030 result	2030 target	2045 result	2045 target
<i>The RTP aims to reduce greenhouse gas emissions and vehicle miles traveled in order to meet regional climate targets set by the state which are to reduce vehicle miles traveled per person by 35% by 2050, with a 30 percent reduction by 2045 and a 25% reduction by 2040, compared to 2005.</i>						
% reduction in VMT per capita (relative to 2005)					22-40% ¹⁰	30%
% reduction in GHG emissions per capita (relative to 2005)					22-40% ¹⁰	30%
<i>The RTP aims to reduce total greenhouse gas emissions in order to meet State goals.</i>						
Total GHG reductions (metric tons)	10,831		9,109	10,831	9,300	10,831
<i>The RTP aims to keep criteria pollutants from mobile sources below thresholds set by the federal government.</i>						
Total summer carbon monoxide emissions (lbs)	261,097		111,508	261,097	77,805	261,097
Total winter carbon monoxide emissions (lbs)	206,410		85,266	206,410	71,579	206,410
Total summer volatile organic compound emissions (lbs)	11,734		2,836	11,734	2,374	11,734
Total winter particulate matter 10 exhaust (lbs)	375		125	375	62	375
Total winter particulate matter 2.5 exhaust (lbs)	336		111	336	55	336
<i>The RTP aims to keep air toxics from mobile sources below current levels.</i>						
Diesel particulate matter (pounds)	404		132	404	63	404
Acrolein (pounds)	7		1	7	1	7
Benzene (pounds)	306		53	306	39	306
1,3-butadiene (pounds)	37		2	37	1	37
Formaldehyde (pounds)	126		19	126	10	126
Arsenic (grams)	66		72	66	82	66
Chromium 6 (grams)	0		0	0	0	0
Naphthalene gas (grams)	8		2	8	1	8
<i>The RTP seeks to advance climate and resilience by funding high-impact greenhouse gas reduction strategies and projects on key emergency routes.</i>						
% of the capital RTP budget invested in high- or moderate-impact Climate Smart Strategies			32%		28%	

¹⁰Metro reports a range of results for per capita VMT and GHG reductions in order to account for the uncertainty surrounding the state's plans to implement the changes to transportation pricing assumed in the Statewide Transportation Strategy (see discussion later in this section). According to the state rules governing regional climate targets, the RTP meets its targets as long as the targets are within this range of uncertainty.

% of the capital RTP budget invested in projects located on Emergency Transportation / Seismic Lifeline routes		73%	72%
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The RTP meets its targets to reduce criteria pollutant and air toxic emissions. These emissions are known to cause health and respiratory issues for people and damage the environment, so meeting this goal also supports public health and the general health of the region’s ecosystem. Progress toward this target is largely driven by the fact that the next generation of vehicles is expected to produce less pollution than the cars that are currently on the road. The region’s success in reducing per capita VMT also helps to ensure that increases in driving don’t counteract the benefits of cleaner vehicles.

The RTP meets state-mandated regional climate targets by implementing the projects and programs in the constrained RTP project list in combination with state-led actions identified in the Oregon Statewide Transportation Strategy (STS), which is Oregon’s strategy to reduce transportation-sector GHG emissions. The STS includes state-led pricing actions, in addition to implementation of clean vehicle and fuel programs and regulations at the state and federal level. The fleet and technology actions cover variables such as the share of zero-emission vehicles, the carbon intensity of fuels, the balance of cars and trucks in the passenger fleet, and vehicle turnover. The state-led pricing-actions assumed in the STS assume that the state will implement extensive changes to how transportation revenues are collected in Oregon, both to replace the gas tax, which is not producing enough revenue to meet Oregon’s transportation needs, and to reduce GHG emissions by managing demand for driving and encouraging the use of cleaner modes and vehicles. The following subsection provides more detail about how the transportation investments in the RTP work alongside the technology and pricing assumptions in the STS – particularly the latter – to meet the region’s climate targets.

Pricing impacts the region’s progress toward climate goals

The RTP climate targets are designed to ensure that the region and state work together to meet Oregon’s transportation-sector GHG reduction goals. The climate analysis must reflect both the transportation investments and policies in the RTP and the impact of state vehicle and fuel regulations as reflected in the Statewide Transportation Strategy (STS). **More discussion of the role of state-led pricing actions in meeting the region’s climate targets and mobility goals is recommended,** because the RTP climate analysis reveals that these actions have a significant impact on VMT and GHG emissions, and the mobility analysis shows how pricing helps to maintain reliable travel times on throughways.

The STS contemplates several additional revenue mechanisms, including a road user charge that levies per-mile fees on drivers, carbon taxes, and additional road pricing beyond what is currently included in the 2023 RTP. These changes are not reflected in the RTP because they are not yet adopted in state policies or regulations, but the climate analysis for the RTP is allowed to include

them because these state-led pricing actions are identified in STS and were assumed when the state set the region's climate targets.¹¹

In order to illustrate the impact that the pricing envisioned in the STS has on progress toward the region's climate targets, Metro staff developed four scenarios that represent different assumptions regarding the implementation of the pricing actions included in the STS:

- **RTP23 + adopted plans (AP):** Includes all RTP investments and throughway pricing, as well as currently adopted plans and policies assumed in the STS, and excludes the pricing and revenue mechanisms described as “additional” under the scenarios below.
- **RTP23 + STS:** Includes RTP investments and throughway pricing as well as all additional pricing and revenue mechanisms included in the STS. These consist of a combination of fees and taxes that are modeled as per-mile fees.
- **Target 1:** Includes RTP23 investments and throughway pricing as well as the amount of additional pricing and revenue mechanisms from the STS that are necessary to meet regional climate targets by using pricing to manage travel demand.
- **Target 2:** Includes RTP23 investments and throughway pricing as well as the amount of additional pricing and revenue mechanisms from the STS that are necessary to meet regional climate targets by using pricing to manage travel demand – assuming that all revenues from these new pricing mechanisms generated within the region are reinvested in increasing transit service.¹² To create this scenario, the consulting team supporting this analysis tested several different levels of pricing and corresponding increases in transit service until they identified the scenario that meets regional climate targets using the smallest amount of additional pricing.

Table 7.8 describes the assumptions behind these two scenarios, and Figure 7.6 illustrates the VMT reductions that each scenario achieves.

Table 7.8: Climate scenarios and associated assumptions

	RTP23 + AP	RTP23 + STS	Target 1 (pricing)	Target 2 (pricing + transit)
Throughway pricing	RTP pricing on portions of I-5 and I-205 averaging \$0.11/mi.	STS pricing on the entire throughway and arterial network averaging \$0.13/mi. (\$0.17/mi. on	\$0.09/mi. on the entire throughway network.	\$0.07/mi. on the entire throughway network.

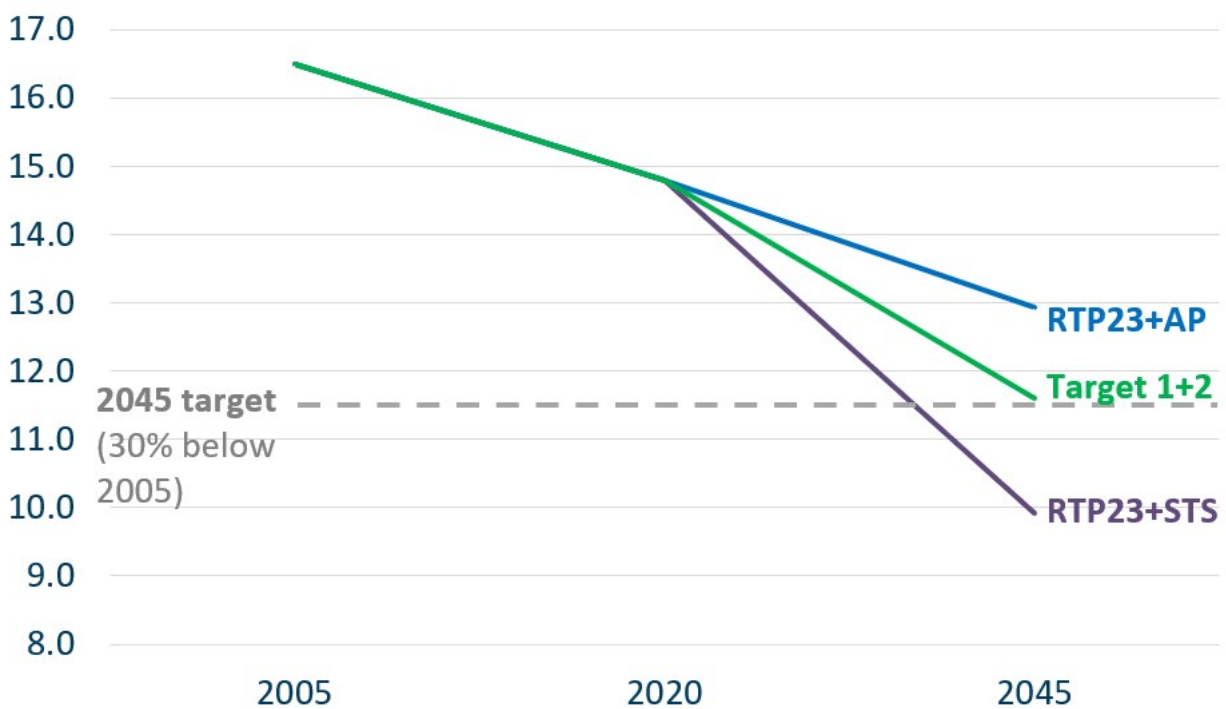
¹¹ OAR 660-044-0030(4)(a):

https://secure.sos.state.or.us/oard/viewSingleRule.action;JSESSIONID_OARD=Pk5WeLsr40n1ZMdFGJr943D9KeHyA7LSgdLuG_bsnXZJvNrXnl8xl-286176765?ruleVrsnRsn=293065

¹² This scenario assumes that 50 percent of revenues from the STS pricing and revenue mechanisms for toward funding increases in transit service, and that investments in transit service would be consistent with the mix of transit modes (e.g., local bus, frequent bus, light rail) and transit service costs reflected in the 2023 RTP constrained investments. See the appendix for a technical discussion of the development of the Target 2 scenario.

	RTP23 + AP	RTP23 + STS	Target 1 (pricing)	Target 2 (pricing + transit)
		throughways and (averaging \$0.17/mi.		
Per-mile fees	None	Maximum allowable STS levels, roughly \$0.10/mi.	\$0.06/mi.	\$0.05/mi.
Transit service	RTP levels of transit service	RTP levels of transit service	RTP levels of transit service	77% increase above RTP levels of transit service
VMT reductions (vs. 2005 levels)	22%	40%	30%	30%
Meets targets?	No	Yes (exceeds)	Yes (meets)	Yes (meets)

Figure 7.6: Daily VMT per capita by scenario vs. regional climate target (source: Metro/RSG VisionEval analysis)



These results demonstrate that **there are multiple paths to meeting regional climate targets through a combination of increased pricing and other climate strategies** including demand management, system management, and increased investment in alternatives to driving. The two target scenarios shown above represent two pathways to meeting the region’s targets – one that does so entirely by using additional pricing to cover the gap between RTP emissions and regional targets and one that covers this gap through a combination of pricing and reinvestment in transit – but there are likely other pathways to meeting (or exceeding) regional targets that involve

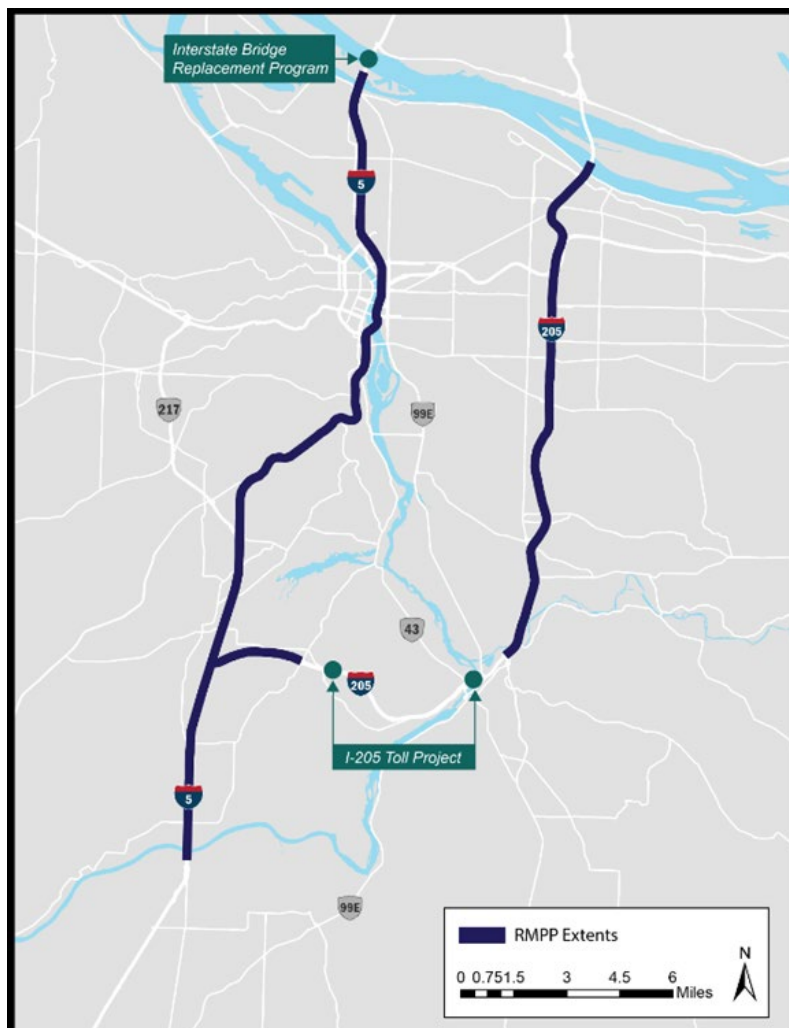
either different mixes of pricing and reinvestment of pricing revenues in the high- and moderate-impact GHG reduction strategies identified in the region's Climate Smart Strategy. **Any new pricing program has the potential to produce new revenues that can be reinvested in GHG reduction strategies.**

This reinvestment is critical, because the results above show that **the region can meet its climate targets while also advancing mobility and equity goals if revenues from new pricing programs are reinvested in other GHG reduction strategies.** Relying on pricing alone to reduce VMT and GHG emissions from driving, as tested in the Target 1 scenario, would require charges of 9 cents per mile on throughways and 6 cents per mile on roads throughout the region to meet regional climate targets. If revenues from new pricing are invested in transit, which also reduces VMT and GHG emissions, the region could meet its targets at while charging drivers roughly 25% less than under Target 1. Lower levels of pricing and higher levels of transit service would both minimize additional costs for drivers and provide affordable alternatives to priced vehicle trips.

Pricing projects in the 2023 RTP and their impacts

Three different projects in the 2023 RTP implement pricing in the form of tolls on the region's throughways: the Regional Mobility Pricing Project (RMPP), which levies tolls along most of Interstates 5 and 205 within the region; and the Interstate Bridge Replacement Program and I-205 Tolling projects, which include tolls on I-5 and I-205 within their respective project areas. Though further analysis of pricing and its impact on regional climate and mobility goals is recommended, the pricing currently included in the RTP has significant benefits for the climate and throughway reliability results discussed above. Figure 7.7 shows the planned extent of tolling under the 2023 RTP; the I-5 Bridge and I-205 Toll Projects are shown as green dots with call-outs while the Regional Mobility Pricing Project corridors are shown as dark blue lines.

Figure 7.7: Throughways that are tolled under the 2023 RTP (Source: ODOT)



Tolls for these three RTP projects are intended to both manage travel demand and raise transportation revenues. The exact tolling extents and rates of these projects have already evolved significantly as the projects have developed, and they will continue to evolve as the projects progress through their respective federal planning processes. The evolutionary nature of this work means that **the tolling that is represented in the RTP is unlikely to match the final tolling that is implemented in the region.**

The version of the three tolling projects currently included in the 2023 RTP update are based on what was considered to be the best approximation of those projects' current plans as of April 1st, 2023. Collectively, these projects envision charging higher prices in the highest demand hours of the day (peak periods), and in the most congested portions of I-5 and I-205 (as well as in the extents of the I-5 Bridge Replacement and I-205 Tolling Projects) and lower prices in lower demand hours of the day (off-peak periods) and in less congested areas. Two of these projects also include significant changes to the motor vehicle and transit networks, which combine with tolling

to influence travel behavior. Table 7.9 summarizes the elements of each of the three tolling projects that are captured in RTP update.

Table 7.9: Key elements of the three 2023 RTP projects that include tolling

Project	Elements captured in the RTP
I-5 Interstate Bridge Replacement Program	<ul style="list-style-type: none"> • Variable rate tolls for drivers crossing the river ranging from \$2.05 - \$3.15 between 5 AM and 11PM, with a minimum overnight toll of \$1.50 • A new I-5 Columbia River crossing with three through lanes, safety shoulders, and one auxiliary lane in each direction • A 1.9-mile extension of the MAX Yellow Line, including three new stations, from the existing Expo Center Station to a terminus near Evergreen Boulevard in Vancouver • A new arterial bridge for local traffic with a shared use path for pedestrians and bicyclists • Improvements to seven interchanges • Wider shoulders to accommodate express bus-on-shoulder service along I-5 between Victory Boulevard in Portland and State Route 500 in Vancouver
I-205 Toll Project	<ul style="list-style-type: none"> • Toll rate assumptions for the I-205 Toll Project Draft Environmental Assessment¹³ include variable rate tolls for drivers crossing the Tualatin River and Abernethy bridges ranging from \$0.55 - \$2.20 (per bridge) between 5 AM and 11PM, with a minimum overnight toll of \$0.55 (per bridge) • Addition of a third through lane in both directions of I-205 between the Stafford Road exit and OR 43 • A northbound auxiliary lane between OR 99E and OR 213 • Seismic bridge upgrades along I-205; replacement of the Tualatin River Bridges
I-5 and I-205 Regional Mobility Pricing Project	<ul style="list-style-type: none"> • Preliminary modeling assumptions for the Regional Mobility Pricing Project include variable rate tolls for drivers on: <ul style="list-style-type: none"> ○ I-205 between the Columbia River (north) and the intersection of I-5 (south). ○ I-5 between the Columbia River (north) and the Boones Ferry Bridge (south). Tolls vary by location, direction of travel, congestion levels, and time of day; no tolls are assumed overnight. • Consideration of toll rate schedules will be part of the environmental review process, as well as the traffic and revenue analysis, both of which will occur in 2023-24

It is important to note that **the RTP does not account for how rates might be discounted for low-income travelers and other marginalized communities, how revenues might be reinvested to provide affordable and convenient alternatives to tolled trips, or for other adjustments to mitigate the impacts of tolling.** These details are not available yet, and will be determined as the projects listed above progress.

The large-scale, aggregate nature of Metro’s travel model makes it challenging to detail the regional impacts of any single project, even one as potentially significant as tolling. Instead of attempting to isolate the impacts of tolling, Metro staff identified several qualitative findings

¹³ [I-205 Toll Project Draft Environmental Assessment](#)

about tolling's impacts based on the modeling results for the constrained RTP scenario and on Metro's experience supporting tolling analyses in the region:

- **Tolling is expected to reduce total VMT.** VMT is likely to decline both during peak periods and throughout the day on the tolled portions of I-5 and I-205, as solo drivers whose trips would be priced shift to carpooling or using transit. There is likely to be some re-routing of traffic to parallel arterials, which would increase VMT on these facilities. However, the potential increase in VMT on parallel arterials is smaller than the anticipated decrease on the tolled throughways, leading to a net reduction in VMT.
- **Tolling is expected to reduce congestion on I-5 and I-205.** Since tolling reduces VMT on I-5 and I-205, it also frees up capacity, reducing vehicle hours of delay on those tolled throughways both during peak periods and throughout the day. The anticipated diversion to parallel arterials discussed above is not expected to produce substantial additional delay on arterials since most diversion is expected to occur in the off-peak periods, when arterials have excess capacity. Also, some vehicles that presently reroute to arterials to avoid congestion on I-5 and I-205 would choose to pay the toll and benefit from a more efficient trip. As ODOT proceeds to develop these projects, it intends to optimize pricing in order to reduce congestion on throughways. Pricing is one of the reasons that the RTP maintains existing levels of throughway reliability even as the region grows. According to FHWA, removing even as few as five percent of the vehicles from a congested roadway could enable traffic to flow much more efficiently.¹⁴
- **Tolling will likely lead to an increase in carpooling.** Average vehicle occupancy is expected to increase along all tolled throughways, and particularly on the portions of I-5 that also have High Occupancy Vehicle (HOV) lanes that only allow vehicles with two or more people to use them during peak periods. This increase in carpooling is one of the factors contributing to the VMT and congestion reductions discussed above.
- **Tolling will likely encourage people to shift when they travel.** Travelers who have flexible schedules and are price-sensitive are expected to shift some of their trips to shoulder or off-peak periods instead of paying higher tolls during peak travel times. This "peak-spreading" is one of the factors contributing to tolling's impact on congestion.

As noted previously, more evaluation of future pricing strategies is needed to better understand their effect on the region's parallel arterials, low-income households and land use patterns to ensure any unintended consequences are identified and addressed in design and implementation.

¹⁴ <https://ops.fhwa.dot.gov/publications/congestionpricing/sec2.htm>