I-205 Toll Project

Level 2 Toll Traffic and Revenue Study Report

Revised October 2022

Urban Mobility STRATEGY

Oregon Department of Transportation

Level 2 Toll Traffic and Revenue Study Report

Revised October 2022

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Oregon Department of Transportation

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
$/hour	dollars per hour
ACH	automated clearing house
ADT	average daily traffic
API	area of potential impact
ATR	automatic traffic recorder
AWDT	average weekday daily traffic
BOS	Back Office System
CAGR	compound annual growth rate
CON	construction
CSC	Customer Service Center
DTA	Dynamic Traffic Assignment
EA	Environmental Assessment
FHWA	Federal Highway Administration
FTE	full-time equivalent
FY	Fiscal Year
GEH Statistic	Geoffrey E. Havers Statistic
HB	House Bill
HOV	high-occupancy vehicle
hr	hour
I-	Interstate
LPT	license plate toll
mph	miles per hour
N/A	not applicable
NA	not available
NB	northbound
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
O&M	operations and maintenance
O-D	origin-destination
ODOT	Oregon Department of Transportation
OR	Oregon Route
PE	preliminary engineering
Project	I-205 Toll Project
R&R	repair and replacement
RFP	request for proposals
ROW	right-of-way
RTDM	Regional Travel Demand Model
RTP	Regional Transportation Plan
RTS	Roadway Toll Systems
SB	southbound
SHRP	Strategic Highway Research Program
SOV	single-occupancy vehicle
SP	stated preference
T&R	traffic and revenue
VOT	value-of-time
vpd	vehicles per day
VPFA	Value Pricing Feasibility Analysis
vph	volume per hour
VPPP	Value Pricing Pilot Program
YOC	year of collection
YOE	year of expenditure
Y-o-Y	year over year

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1 Introduction

1.1 Background and Objectives

In 2016, a Transportation Vision Panel was convened by the Oregon Governor to hold a series of 11 regional forums across Oregon to better understand how the transportation system affects local economies. Participants of the regional forums consistently identified the negative effect of congestion in the Portland metropolitan area as a key transportation issue, affecting commuters and businesses as well as producers who move their products across the state. In response, the Oregon Legislature passed House Bill (HB) 2017, which committed hundreds of millions of dollars to fund bottleneck-relief highway projects, freight rail enhancements, transit improvements, and upgrades to walking and biking facilities. In addition, Section 120 of the legislation directed the Oregon Transportation Commission to seek approval from the Federal Highway Administration (FHWA) to implement variable rate tolling on Interstate 5 (I-5) and I-205 in the Portland metropolitan area to help manage traffic congestion.

With this direction, the Oregon Transportation Commission and Oregon Department of Transportation (ODOT) prepared the Portland Metro Area Value Pricing Feasibility Analysis (VPFA) (ODOT 2021a) to study how and where congestion pricing could be applied. The VPFA evaluated several potential concepts for congestion pricing on I-5 and I-205 in the Portland metropolitan area. The analysis rejected all concepts that would construct new managed lanes or convert existing lanes to managed lanes due to freight restrictions, geographic constraints, the likelihood of land acquisitions, and insufficient improvements in traffic-flow. Instead, the VPFA determined that tolling should be applied across all lanes of I-5 and I-205 to reduce traffic congestion and generate revenue. Of the concepts evaluated, ODOT recommended moving forward with further analysis of tolling on all lanes of I-205 on or near the Abernethy Bridge in addition to tolling larger stretches of I-5 and I-205.

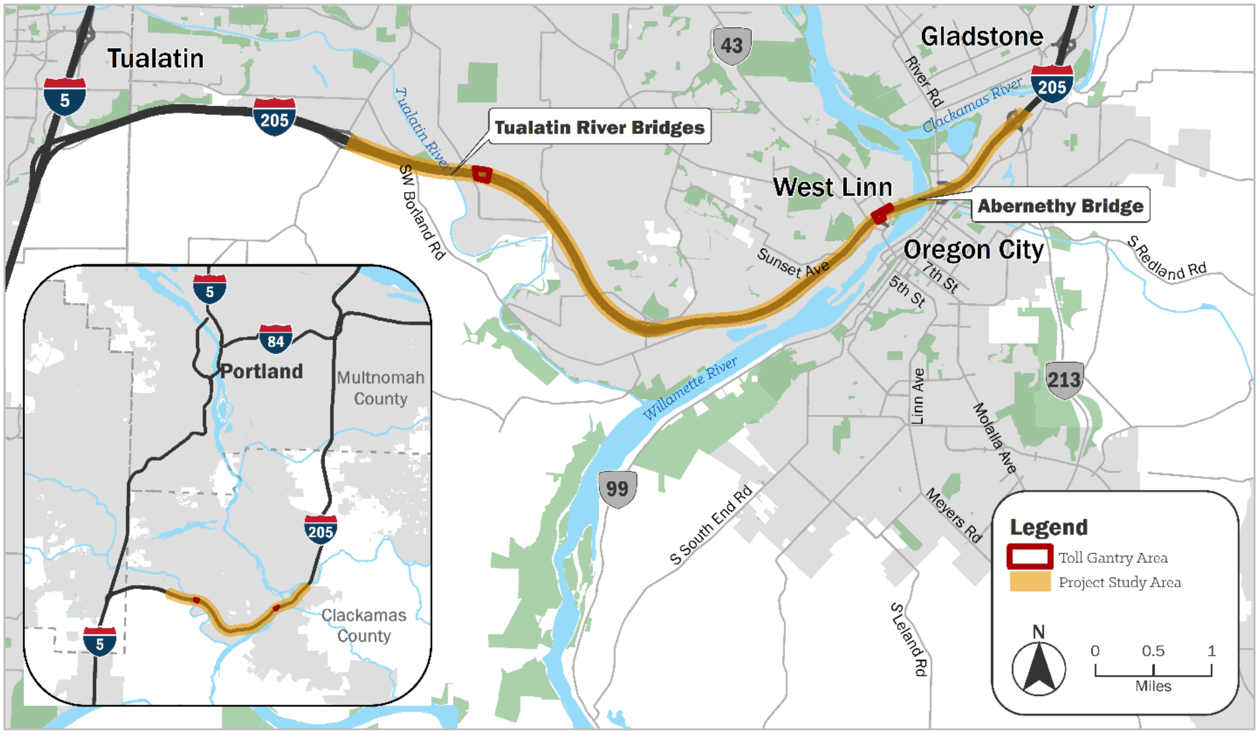
After conclusion of the VPFA, the Oregon Transportation Commission submitted an application to FHWA seeking approval to continue the process towards implementation of tolls on I-5 and I-205. The application identified two objectives for congestion pricing on I-5 and I-205: (1) to use variable rate tolls to manage traffic congestion and (2) to create a sustainable revenue source for surface transportation funding. Two federal toll programs were considered for these projects: Section 129 Mainline Tolling and the Value Pricing Pilot Program (VPPP). In January 2018, Oregon renewed its partnership status in the VPPP and indicated its intention to advance the proposed tolling projects for approval. ODOT then chose to seek FHWA approval under Section 129 to improve a portion of I-205 that includes the Abernethy Bridge and Tualatin River Bridges, naming this the I-205 Toll Project. ODOT named the longer-range project the Regional Mobility Pricing Project (RMPP), which would price all lanes of I-5 and I-205 and is seeking FHWA approval under the VPPP.

1.2 I-205 Toll Project: Description, Location, and Regional Context

ODOT is proposing to implement tolls on the Abernethy Bridge and Tualatin River Bridges of I-205 to generate funding for the I-205 Improvements: Stafford Road to OR 213 Project (I-205 Improvements Project) and to manage congestion on I-205 between Stafford Road and Oregon Route 213 (OR 213).

The I-205 Toll Project is located on I-205 approximately 5 miles south of Portland and crosses through the jurisdictions of Oregon City, West Linn, and Clackamas County. Figure 1-1 illustrates the segment of I-205 included in the I-205 Toll Project and the locations for placement of one toll gantry near the Abernethy Bridge and an another at the Tualatin River Bridges.

Figure 1-1. I-205 Toll Project Location with Toll Gantry Areas



1.2.1 Relationship to the Oregon Toll Program and the Regional Mobility Pricing Project

The Oregon Toll Program was created to manage and implement ODOT's toll projects throughout the state. Currently, ODOT is overseeing the I-205 Toll Project and RMPP as part of the Oregon Toll Program, in addition to the Interstate Bridge Replacement (IBR) Program in partnership with the Washington Department of Transportation (WSDOT). The RMPP is evaluating variable rate tolling on all lanes of I-5 and I-205 for over 55 miles of interstate through the Portland metropolitan area to manage congestion in a manner that generates revenue for transportation system investments. RMPP is in the planning phase and will enter the National Environmental Policy Act (NEPA) process in mid-2022. The RMPP analysis incudes evaluation of tolls on those sections of I-205 that are not being assessed for the I-205 Toll Project. ODOT plans to implement the I-205 Toll Project as a first step towards the RMPP, with tolling for the I-205 Toll Project expected to begin approximately one year before tolling begins on the longer stretches of I-5 and I-205 as part of the RMPP. The I-205 Toll Project Draft Environmental Assessment (EA) is scheduled to be released in late-2022.

1.3 I-205 Improvements Project

1.3.1 Project Description

The I-205 Toll Project would serve to implement the tolling that will help fund the I-205 Improvements Project. A priority project for ODOT, the I-205 Improvements Project includes the following project elements:

- Constructing seismic upgrades to eight bridges along I-205

- Constructing a third lane in each direction of I-205 between Stafford Road and OR 99E and constructing a northbound auxiliary lane from OR 99E to OR 213
- Constructing interchange improvements.

The I-205 Improvements Project would be constructed in two phases (Figure 1-2). Phase 1 would involve multiple contracts and subphases (A – D). In 2021, HB 3055 provided state financing tools that allow construction of Phase 1A to begin in 2022, prior to toll implementation. Phase 1A includes reconstructing the Abernethy Bridge and adjacent interchanges at OR 43 and OR 99. Funding through toll revenues is necessary to complete the remaining phases of the I-205 Improvements Project:

- Phase 1B (OR 99E to OR 213)
- Phase 1C (Sunset Bridge to OR 43)
- Phase 1D (10th Street to Sunset Bridge)
- Phase 2 (Stafford Road to 10th Street, including reconstruction of the Tualatin River Bridges)

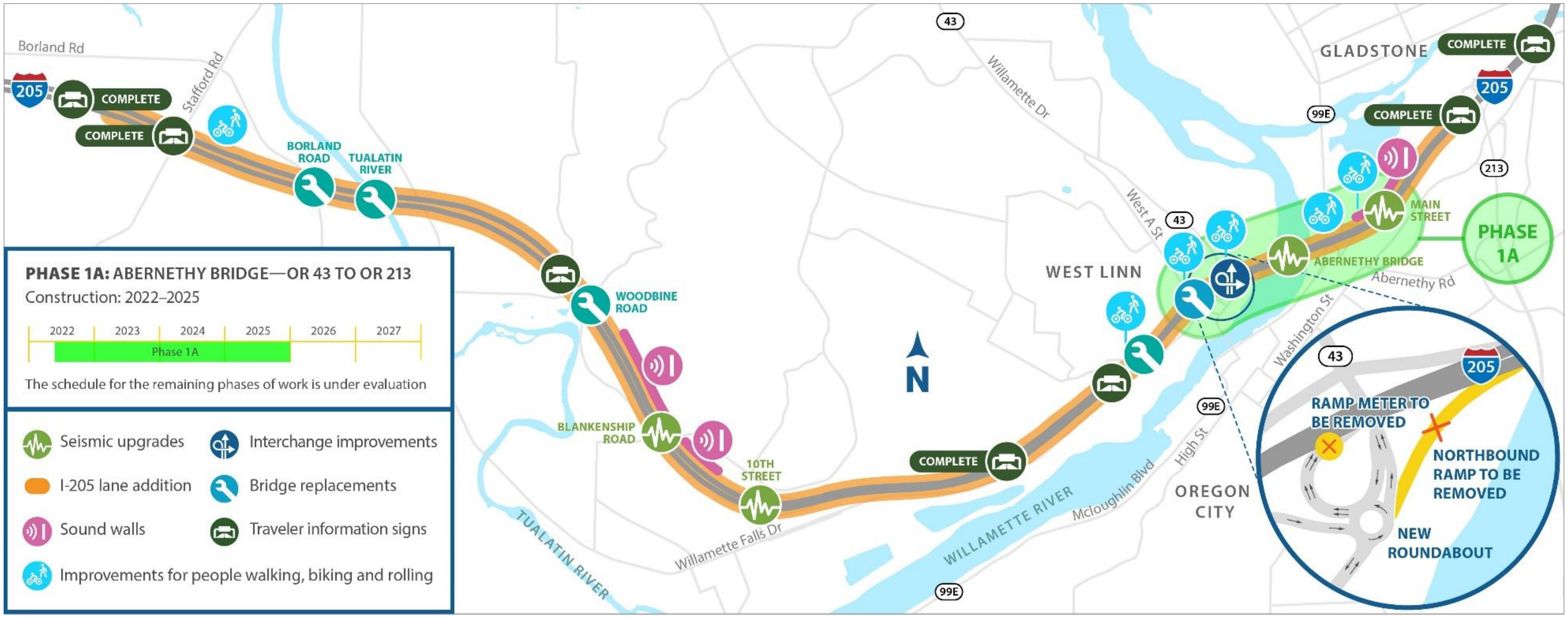
The I-205 Toll Project Draft EA is scheduled to be released in late-2022 and the Final EA is scheduled to be released in mid-2023. If tolling is approved upon the completion of the EA, tolls would be used to secure long-term financing, the proceeds of which would pay back short-term loans for Phase 1A and fund the subsequent construction phases (Phase 1B – Phase 1D and Phase 2) of the I-205 Improvements Project.

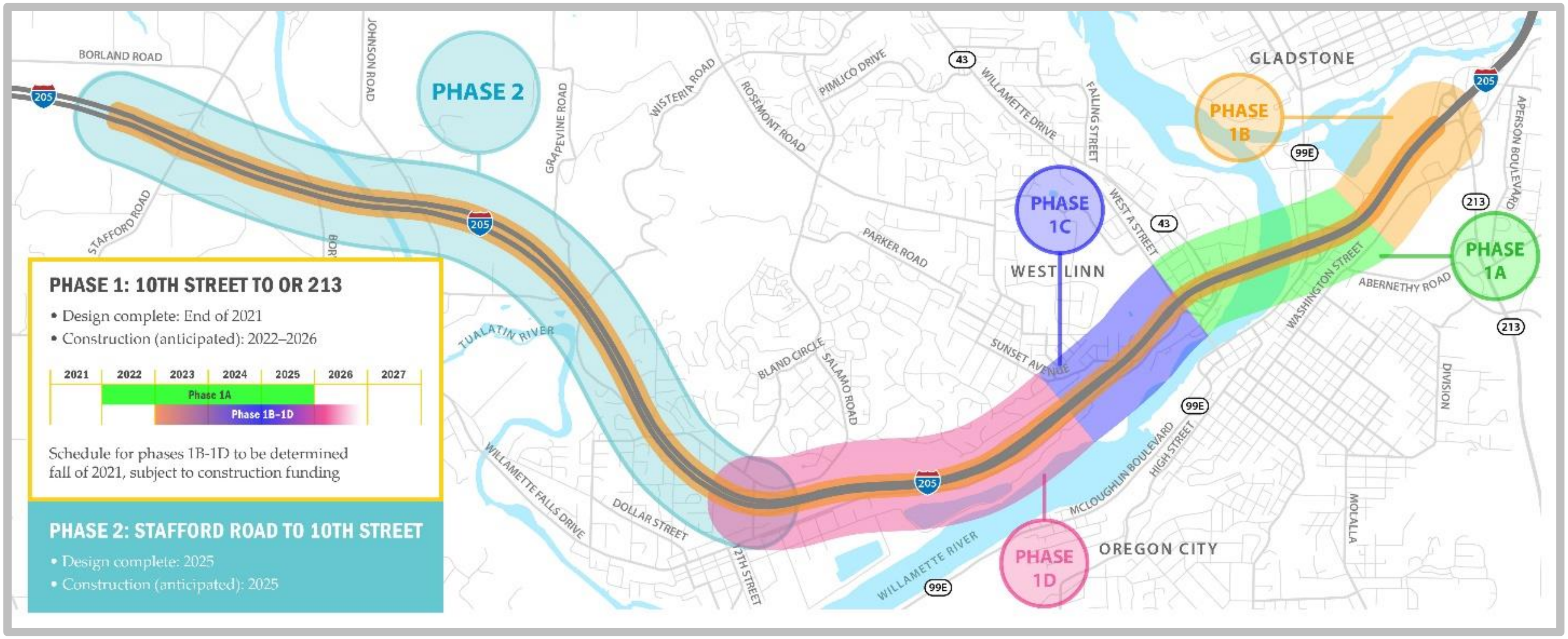
1.3.2 Project Status

The I-205 Improvements Project received a NEPA Documented Categorical Exclusion approval from FHWA in 2018. The Documented Categorical Exclusion and its associated technical reports described the short-term (construction) and long-term effects of the I-205 Improvements Project on air quality, biological resources, cultural and historic resources, environmental justice, hazardous materials, land use, noise, right-of-way, parks and recreational resources, socioeconomics, transportation, visual resources, water quality, and wetlands. The Documented Categorical Exclusion established environmental commitments for ODOT during and after construction of the I-205 Improvements Project.

ODOT is using this Level 2 Toll Traffic and Revenue Study's preliminary net toll revenue projections to assess the financial capacity of tolls to fund the I-205 Improvements Project as part of the project's financial plan.

Figure 1-2. I-205 Improvements Project Phases




PHASE 2
PHASE 1B
PHASE 1C
PHASE 1A
PHASE 1D
GLADSTONE
WEST LINN
OREGON CITY
BORLAND ROAD
JOHNSON ROAD
GRAPEVINE ROAD
WISTERIA ROAD
ROSEMONT ROAD
PIMLICO DRIVE
WILLAMETTE DRIVE
FAILING STREET
STAFFORD ROAD
PARKER ROAD
WEST A STREET
TUALATIN RIVER
BLAND CIRCLE
SALAMO ROAD
SUNSET AVENUE
WASHINGTON STREET
ABERNETHY ROAD
APERSON BOULEVARD
DIVISION
WILLAMETTE FALLS DRIVE
DOLLAR STREET
MCLOUGHLIN BOULEVARD
HIGH STREET
MOLALLA
WILLAMETTE RIVER
PHASE 1: 10TH STREET TO OR 213
• Design complete: End of 2021
• Construction (anticipated): 2022–2026
2021 2022 2023 2024 2025 2026 2027
Phase 1A
Phase 1B–1D
Schedule for phases 1B-1D to be determined fall of 2021, subject to construction funding
PHASE 2: STAFFORD ROAD TO 10TH STREET
• Design complete: 2025
• Construction (anticipated): 2025

1.4 Level 2 Traffic and Revenue Study Objectives

The purpose of this Traffic and Revenue (T&R) Study is to develop preliminary traffic and revenue forecasts for the I-205 Toll Project to inform the financial assessment that identifies the capacity of toll revenues to pay for the I-205 Improvements Project. The analysis evaluated two scenarios for annual traffic and revenue forecasts to determine the net toll revenue available to support capital funding contributions for the I-205 Improvements Project. Referred herein as Scenarios A and B, the two scenarios both assume that pre-completion tolling will begin concurrently on the Abernethy Bridge and Tualatin River Bridges and will differ only in the assumed timing for completing the I-205 Improvements Project. Scenario A assumes project completion with post-completion tolling on the bridge starting on April 1, 2027 (Fiscal Year [FY] 2027) while Scenario B assumes post-completion tolling will begin on October 1, 2028 (FY 2029).

In summary, the T&R study objectives are to:

- Forecast toll traffic volumes for the Build Alternative using the Portland Metro Regional Travel Demand Model (RTDM) and study corridor Dynamic Traffic Assignment (DTA) model.
- Document the methodology and assumptions for estimating future traffic, gross toll revenue, and the various adjustments and expenditure that yield net toll revenue.
- Provide preliminary annual net toll revenues for the two scenarios to help inform ODOT's toll financial capacity assessment that will determine the level of capital funding that tolling the Abernethy Bridge and Tualatin River Bridges could contribute for the I-205 Improvements Project, primarily via toll revenue bond financing.

The analysis and forecast results documented herein are also intended to inform the decision-making process for ODOT and OTC on assumptions, including the tolling start date, pre-completion tolling revenues, variable toll rate schedules by time of day, inclusion of various routine operating and maintenance costs assumed to be paid from gross toll revenues collected, and consideration of periodic repair and replacement expenditures and their timing. This Level 2 T&R study also provides the platform from which ODOT can support further toll scenario evaluation in coordination with the Oregon Transportation Commission and their rate setting process. Finally, this study's inputs and assumptions serve as the launch point for a subsequent Level 3 (investment-grade) T&R study that will update and validate the revenue projections with the purpose of obtaining a credit rating for a toll revenue bond issuance.

1.5 Study Approach

The toll traffic and revenue forecasts prepared for this study are derived from outputs generated from Metro's RTDM and DTA models. The RTDM was employed for this study as the accepted travel demand model for the region and reflects the adopted regional land use (population and employment) forecasts. The model has been calibrated by Metro and validated for the study area by the project modeling team (see Section 6.1). Additionally, a comparison of origin-destination (O-D) trip patterns in the RTDM with data obtained through StreetLight (see Section 3.3.4) shows a close fit, further validating the RTDM. The DTA model was used to estimate projected peak-period traffic volumes because it more accurately reflects travel conditions under very congested conditions—providing a better tool for simulating travelers' choices between paying a toll or choosing alternative toll-free routes with longer travel times. See Section 6.3.3 for a summary of DTA model calibration and validation for use in this study.

The project modeling team includes a combination of staff from Metro, ODOT and the WSP Consultant Team. Additionally, staff from the DTA model software developer provided strategic guidance throughout the DTA model development. Metro developed and maintains both the RTDM and DTA models for use on the I-205 Toll Project. This includes the existing base year (2015) and future years (2027 and 2045) No Build and Build models. The Consultant Team applied the models to conduct analysis and sensitivity tests, and to derive specific model outputs for analysis purposes.

Raw model volumes from both the RTDM for 20 of the 24-hourly average weekday volume estimates (everything except for the AM and PM peak 2-hour periods) and raw peak-period volumes from the DTA model were post-processed to obtain the projected 2027 and 2045 weekday traffic volumes used for preparing the annual toll traffic and revenue projections. See Chapters 7 and 9 for more discussion on the weekday traffic post-processing methods and weekday-to-annual expansion processes, respectively, the latter of which were used to prepare the annual traffic and revenue projections.

1.6 Report Structure

The remainder of this report is organized in the following chapters:

Chapter 2: Key Traffic and Revenue Findings
This chapter provides the key findings for the weekday toll traffic forecasts and annual toll traffic and revenue projections for the I-205 Toll Project Build Alternative.

Chapter 3: Traffic and Operations Profile
This chapter describes the existing roadway system within the vicinity of the I-205 Toll Project, focusing on traffic volumes and operations on I-205 itself, with some discussion on other roadways in the area, particularly those that may be used as an alternative route when tolling on I-205 is implemented.

Chapter 4: Value of Time Assumptions
This chapter documents the methodology to calculate value-of-time (VOT) assumptions used in the demand modeling underlying the travel choices and resultant toll traffic and revenue projections.

Chapter 5: Socioeconomic/Land Use Summary
This chapter presents the socioeconomic land use growth patterns, including the projected population and employment trends that may contribute to direct changes in the baseline socioeconomic growth assumptions.

Chapter 6: Modeling Methodology
This chapter documents the methodology for the demand modeling analysis in this study, which primarily used Metro's RTDM and I-205 subarea DTA model.

Chapter 7: Base Case Weekday Model Results
This chapter summarizes the RTDM and DTA raw model outputs for average weekday traffic volumes and the final forecasted average weekday volumes for each of the two toll point locations for the pre-completion case (future model year 2027) and the post-completion case (future model years 2027 and 2045) conditions. It provides the assumed toll rates for travel demand modeling and describes the post-processing approach.

Chapter 8: Sensitivity Tests
This chapter summarizes the results of the sensitivity tests involving different toll rate schedules and policy assumptions to evaluate, at a high-level, the range of potential changes in daily traffic volume and gross toll revenue on I-205.

Chapter 9: Annual Potential Gross Traffic and Revenue Forecasts
This chapter presents the I-205 annual toll traffic and gross toll revenue potential forecasts for Scenarios A and B and includes a discussion of the test assumptions, annual expansion factors, interpolation between forecast model years, and ramp-up factors. Annualized toll trips and toll revenue forecasts are provided for a 36-year forecast horizon. This chapter provides gross toll revenue potential charts for FYs 2025-60 under both scenarios.

Chapter 10: Annual Net Toll Revenue Forecasts
This chapter describes the process by which the forecasts for gross toll revenue potential are transformed into net toll revenue projections, and it presents the gross-to-net revenue projection steps for both scenarios. The scenarios both assume pre-completion tolling will begin concurrently but that there will be different fiscal years for the commencement for post-completion tolling. This chapter provides net toll revenue projection charts for FYs 2025-60 under both scenarios.

Chapter 11: References
This chapter lists the sources used to support the development of this study.

2 Key Traffic and Revenue Findings

This chapter describes the key findings from the traffic analysis and annual net revenue forecasts. This includes a summary of the operating and traffic conditions for the No Build Alternative versus the Build Alternative (the Build Alternative includes tolling and completion of the I-205 Improvements Project).[1] This chapter also provides the assumed variable toll schedule and forecasted average weekday traffic volumes for the Build Alternative and the No Build Alternative. The chapter then summarizes key findings for annual net revenue forecasts for the two scenarios and presents high-level findings from the sensitivity test results.

2.1 I-205 Operating Conditions: 2045 Build versus No Build

The traffic analysis indicates that, under the 2045 Build Alternative, I-205 between I-5 and 82nd Drive in both directions would experience better operating conditions as a tolled facility than under the No Build Alternative. These conditions are measured by the change in daily hours of congestion and average peak-hour travel times between the No Build Alternative and Build Alternative.

Table 2-1 summarizes a simple indicator of congestion based on volume to capacity ratios from the regional travel demand model. Heavy congestion includes any hour of the day where the volume to capacity ratio would be greater than 0.90, while moderate congestion is indicated where the volume to capacity ratio would be between 0.80 and 0.90. The results shown in the table indicate that under No Build conditions, certain I-205 segments are expected to be congested for up to 14 hours in a day. These conditions would substantially improve under the Build Alternative, with only one segment projected to be congested for 2 hours during a typical weekday under the proposed variable toll schedule.

Table 2-1. 2045 Build vs. No Build Daily Hours of Congestion on I-205

Alternative	Level of Congestion	Hours of Congestion by I-205 Segment							
		Stafford Rd – 10th St		10th St – OR 43		Abernethy Bridge		OR 99E – OR 213	
		NB	SB	NB	SB	NB	SB	NB	SB
No Build	Heavy	5	8	8	8	0	0	2	2
	Moderate	13	14	13	13	1	2	9	4
Build	Heavy	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	2

I- = Interstate; NB = northbound; OR = Oregon Route; SB = southbound

Table 2-2 compares expected peak-period travel times for the 2045 Build and No Build Alternatives. With the added capacity in both directions and application of congestion pricing through the corridor, the Build Alternative would reduce I-205 corridor travel times by 26% for both peak periods in the southbound direction, as well as by 28% for the AM peak period northbound. The Build Alternative would provide the most substantial benefits to northbound I-205 travelers between the I-5 ramps and Gladstone in the

1 Under the I-205 Toll Project Build Alternative, vehicles on I-205 would be assessed a toll at the Abernethy Bridge and the Tualatin River Bridges. Toll revenue would be used to fund Phases 1B, 1C, 1D, and 2 of the I-205 Improvements Project. Future conditions under the Build Alternative would include three travel lanes in each direction and seismic upgrades to bridges along I-205.

Under No Build Alternative, tolling would not be implemented and only Phase 1A of the I-205 Improvements Project would be constructed. Phases 1B, 1C, 1D, and 2 of the I-205 Improvements Project would not be constructed (i.e., I-205 between the Stafford Road interchange and the OR 213 interchange would remain as two lanes in each direction and seismic upgrades to seven other bridges along I-205 would not be constructed

PM peak period. These travelers would experience more than a 50% reduction in travel time, from 27 minutes in the No Build Alternative to just under 13 minutes in the Build Alternative.

Table 2-2. 2045 No Build and Build Alternative Average Peak-Hour Travel Times on I-205 between I-5 and 82nd Drive (minutes)

Corridor	From	To	Build*		No Build		Difference		% Difference	
			7-9 AM	4-6 PM	7-9 AM	4-6 PM	7-9 AM	4-6 PM	7-9 AM	4-6 PM
I-205 NB	I-5 ramps	Gladstone	10.7	12.7	14.9	27.2	-4.2	-14.5	-28%	-53%
I-205 SB	Gladstone	I-5 ramps	10.7	10.5	14.5	14.2	-3.8	-3.7	-26%	-26%

I- = Interstate; NB = northbound; SB = southbound; Build Alternative includes tolling of I-205

2.2 Summary of Traffic Conditions under the No Build and Build Alternatives

Under the 2045 No Build Alternative, bottleneck conditions would occur on northbound I-205 in both the AM peak period (7 a.m. to 9 a.m.) and PM peak period (4 p.m. to 6 p.m.), although more substantial congestion is projected in the PM peak period. During the AM peak period, northbound I-205 traffic would slow down from Stafford Road to 10th Street. During the PM peak period, northbound I-205 traffic would experience severe congestion from the I-5 connector to north of Stafford Road. Another bottleneck would occur at the 10th Street merge that would slow down traffic from Stafford Road to 10th Street. In the southbound direction, bottleneck conditions would occur on I-205 in both the AM peak (7 a.m. to 9 a.m.) and PM peak periods (4 p.m. to 6 p.m.). During both the AM and PM peak periods, southbound I-205 would slow down from OR 212 to OR 43 under the 2045 No Build Alternative.

Overall, the additional capacity and the congestion pricing strategy proposed as part of the Build Alternative are expected to provide better operating conditions with improved travel times and increased speeds in both directions. Under the 2045 Build Alternative, congestion is expected to decrease on northbound I-205 during the AM peak period and would decrease substantially during the PM peak period compared to the No Build Alternative. On southbound I-205, congestion would be reduced on a short segment from OR 212 to OR 213 in the southbound direction during the AM peak period, and traffic is expected to travel at much faster speeds south of OR 213 under the Build Alternative than it would with the No Build Alternative. Similarly, during the PM peak period, congestion would be reduced on a short segment from OR 212 to north of OR 213. Traffic speeds would increase starting just south of OR 213.

2.3 Weekday Toll Rates, Traffic and Revenue

Based on the modeling results for level of service, travel time, travel speeds, and VOT, a weekday variable toll schedule was identified to balance objectives for reducing congestion during peak travel times, encourage travel during nonpeak travel times, and generating revenue to support the financing for capital project expenditures. The resulting variable toll schedule, as presented in Figure 2-1, shows the segment (one-bridge) and through (two-bridge) trip toll rates assumed for autos connected to a customer with a registered account. These toll rates, shown here in year-of-opening dollars, are assumed to escalate annually with general price inflation, here conservatively assumed to be 2.15% per year.

Segment toll rates for registered customers in autos, in year-of-opening FY 2025 dollars, range from $0.55 in the overnight hours between 11:00 p.m. and 5:00 a.m. to $2.20 during the PM peak period between 4:00 and 6:00 p.m. Medium trucks are assumed to pay twice the auto rate, and heavy trucks are assumed to pay four times the auto rate. Through trips are assumed to pay at each of the two assumed toll points (one at the Abernethy Bridge and one at the Tualatin River Bridges), or double the assumed segment (one bridge) toll rate. Customers without a registered account are assumed to pay an additional $2.00 per toll trip (one or two segments) to cover the additional costs and potential leakage of collecting their toll via a mailed invoice.

Figure 2-1. One Segment and Through Trip Toll Rates (FY 2025 Dollars)

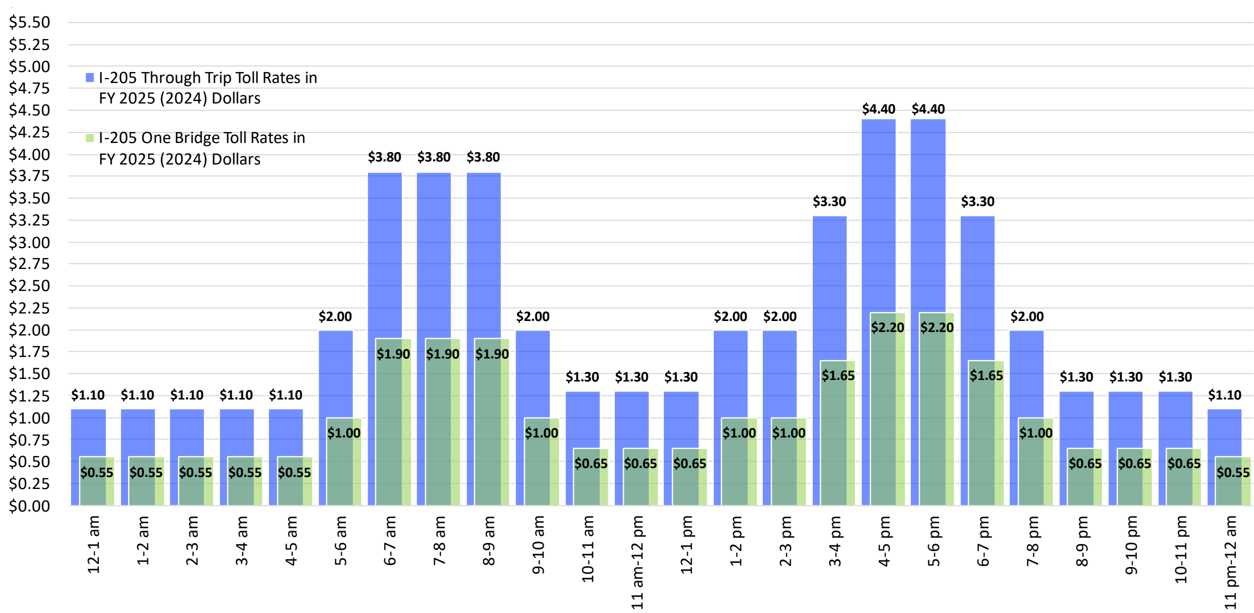


Table 2-3 presents average weekday traffic volumes in the 2015 base year at the two I-205 toll point locations in comparison to the 2027 and 2045 forecasted volumes for both the No Build and Build (toll) Alternatives. When comparing the No Build volumes with 2015 volumes, notable increases in traffic of 11 to 19 percent are expected .The Build Alternative, which includes widening for lane continuity with the 3-lane configuration of the rest of I-205 (as identified in the I-205 Improvements Project), along with tolling at the two bridge locations, is expected to reduce average weekday traffic volumes by approximately 28% in 2027, and between 17% and 20% in 2045 relative to the toll-free No Build case. The effects of the tolls changing travel behavior in 2045 are expected to be lower on a percentage basis than that projected in 2027, primarily because alternative routes in 2045 would be more congested and, thus, less attractive to drivers in comparison to paying a toll for a reliably fast trip on I-205.

Table 2-3. Average Weekday Traffic Volumes at I-205 Toll Locations

Toll Location	Average Weekday Daily Traffic Volumes				
		2027		2045	
	2015 Base	No Build	Build	No Build	Build
Abernethy Bridge	112,000	133,000	96,000	148,000	119,000
Tualatin River Bridges	100,000	111,000	79,000	123,000	102,000

2.4 Annual Traffic, Gross and Net Toll Revenue Forecasts

This section describes key findings for annual net revenue forecasts, which were evaluated over a 36-state fiscal year period from FY 2025 through FY 2060. Two scenarios were tested: Scenario A and Scenario B. Both scenarios assume that pre-completion tolls begin on the existing bridges on December 1, 2024 (FY 2025) but differ in the assumption for when the I-205 Improvements Project (widening) is finished and full post-completion toll operations commence. To derive the net revenue projections, modeled weekday daily traffic and gross toll revenue were annualized to allow for deduction of the annual toll collection and facility operations and maintenance (O&M) costs. Calculation of annual traffic and gross toll revenue potential assume 255 normal weekdays plus 110 weekend days and major weekday holidays per year, with weekend/holiday traffic and revenue factored downward based on historical patterns and the assumption of lower weekend toll rates.

In summary, pre-completion gross toll revenue potential for Scenario A would generate $49 million in FY 2025. In post-completion years, the gross toll revenue potential for Scenario A would generate $115 million in FY 2028 and $332 million in FY 2060. The adjusted gross toll revenue and fees for Scenario A would yield $43 million in FY 2025. In the post-completion years, the adjusted gross toll revenue and fees generated in Scenario A would range from $105 million in FY 2028 to $313 million in FY 2060. The costs of credit card fees, transponder purchase and inventory costs, state and consultant operations costs, Roadway Toll Systems (RTS) O&M costs, Customer Service Center (CSC) operations vendor O&M costs, and routine facility O&M costs for Scenario A would total $19 million in FY 2025. For Scenario A, the facility and toll O&M costs in the pre-completion years would range from $32 million in FY 2028 to $83 million in FY 2060. Lastly, the net toll revenue for Scenario A would yield $24 million in FY 2025, and in the post-completion years, the net toll revenue would range from $74 million in FY 2028 to $230 million in FY 2060. Table 2-4 provides an overview of the pre-completion and post-completion revenue generation for Scenario A.

Table 2-4. Pre- and Post-Completion Revenue Generation for Scenario A (YOC $ millions)

Scenario A: Pre-completion tolling starts December 1, 2024 | Post-completion tolling starts April 1, 2027	Gross Toll Revenue Potential	Adjusted Gross Toll Revenue & Fees	Facility and Toll O&M Costs	Net Toll Revenue	R&R Expenditures
FY 2025	49	43	(19)	24	-
FY 2026	92	83	(27)	56	-
FY 2027	104	95	(29)	65	-
FY 2028	115	105	(32)	74	-
FY 2030	121	112	(33)	79	(1)
FY 2045	208	196	(53)	143	(154)
FY 2060	332	313	(83)	230	(2)

FY = Fiscal Year; O&M = operations & maintenance; R&R = repair and replacement

Pre-completion gross toll revenue potential for Scenario B would generate $49 million in FY 2025. Post-completion gross toll revenue potential would range from $107 million in FY 2028 to $332 million in FY 2060. The adjusted gross toll revenue and fees would yield $43 million in FY 2025 and would range from $98 million in FY 2028 to $313 million in FY 2060. The facility and toll O&M costs would be $19 million in FY 2025 and would increase to $30 million in FY 2028 and reach $83 million in FY 2060. Lastly, for Scenario B, the net toll revenue generated from the pre-completion year in FY 2025 would be $24 million, and in the post-completion years, the revenue generation would reach $68 million in FY 2028 and $230 million in FY 2060. Table 2-5 provides an overview on the pre-completion and post-completion revenue generation for Scenario B.

Table 2-5. Pre- and Post-Completion Revenue Generation for Scenario B (YOC $ millions)

Scenario B: Pre-completion tolling starts December 1, 2024 | Post-completion tolling starts October 1, 2028	Gross Toll Revenue Potential	Adjusted Gross Toll Revenue & Fees	Facility and Toll O&M Costs	Net Toll Revenue	R&R Expenditures
FY 2025	49	43	(19)	24	-
FY 2026	92	83	(27)	56	-
FY 2027	102	93	(29)	64	-
FY 2028	107	98	(30)	68	-
FY 2030	121	112	(33)	79	(1)
FY 2045	208	196	(53)	143	(154)
FY 2060	332	313	(83)	230	(2)

FY = Fiscal Year; O&M = operations & maintenance; R&R = repair and replacement

With the expected growth in traffic and revenue, the annual net toll revenues would exceed $100 million starting in FY 2037 in both Scenarios A and B.

For revenue leakage attributed to expired credit cards for registered customers or unpaid toll bills for unregistered customers, it is likely that ODOT would be able to recover some of these revenues through various collection efforts, including the potential for levying a violation civil penalty. However, this study conservatively assumes that any initially unpaid toll revenue would remain unpaid and is therefore excluded from the adjusted gross and net toll revenue measures.

The toll traffic, gross, and net toll revenue forecast results are based on the current travel demand modeling outputs and operating assumptions, and they are subject to changes that could materially alter these results.

2.5 Toll Sensitivity Tests

As part of developing the balanced variable toll rate schedule shown in Figure 2-1, the Project Team modeled six toll rate sensitivity tests and compared them to a preliminary baseline toll rate schedule that is similar to but exhibits less variability than the final study toll rate schedule. This preliminary baseline had rates ranging from $1.73 midday to $3.45 in the peak periods in FY 2025 dollars for through trips (no overnight tolls were assumed and all modeled vehicle classes were assumed to pay the same toll).[2]

The toll rate sensitivity tests that were modeled varied from the preliminary baseline toll rate schedule as follows:

- Low toll test: 33% decrease in toll rates for all vehicle classes
- High toll test: 33% increase in toll rates for all vehicle classes
- Add low overnight tolls test: $1.15 toll (FY 2025 dollars) per through trip for all vehicle classes during overnight hours
- Add high overnight toll test: $1.73 toll (FY 2025 dollars) per through trip for all vehicle classes during overnight hours

[2] The preliminary baseline toll rate schedule corresponds to Alternative 3 from the *I-205 Toll Project Comparison of Screening Alternatives Report* (ODOT 2021b).

- Low-income discount test: 50% decrease in toll rate for the low-income vehicle class
- Truck toll multiplier test: 100% toll increase (double) for medium truck class and 200% toll increase (triple) for heavy truck class

Table 2-6 shows relative changes in daily traffic volumes and corresponding gross toll revenue for each of the six tests that were modeled compared to the preliminary baseline toll rate schedule. The estimated daily volume change is based on the total of the two tolled segments of I-205. These results are based on raw model outputs before post-processing and therefore should be considered approximate or high-level indicators of the tradeoffs.

Table 2-6. Potential Toll Rate to Preliminary Base Toll Rate Comparison

Impact Measure	Low Toll Test (-33% or 66% of Base Toll)	High Toll Test (+33% or 133% of Base Toll)	Low Overnight Toll Test ($1.15 for through trip)	High Overnight Toll Test ($1.73 for through trip)	Truck Toll Multiplier Test (2x and 3x Base Toll for Medium and Heavy Trucks)	Low-Income Discount Toll Test (50% of Base Toll for Low-Income Vehicle Class)
% Change in Daily Traffic Volume	+16%	-15%	-3%	-4%	-2%	+2%
% Change in Gross Toll Revenue	-22%	+13%	+2%	+2%	+15%	-1%

Results from the sensitivity tests show that peak hours have the greatest potential for increasing gross toll revenue with relatively limited additional diversion due to rerouting to avoid tolls. On the other hand, higher tolls during off-peak hours result in relatively high rates of diversion or other changes in travel behavior without substantially increasing gross revenues.

Results of the sensitivity tests of overnight tolls indicate that even the highest overnight toll rates tested would have a relatively small effect on total daily gross revenue.

3 Traffic and Operations Profile

This chapter describes the existing roadway system within the vicinity of the I-205 Toll Project. It focuses on traffic volumes and operations on I-205 itself, with additional information on other roadways in the area, particularly those that may be used as an alternative route when tolling on I-205 is implemented.

3.1 I-205 and the Existing Highway System

Table 3-1 lists the roadway characteristics of travel corridors in the I-205 project study area, including functional classifications, posted speeds, and presence of bicycle and pedestrian facilities. The table includes the key arterial corridors that either feed I-205 or provide a parallel, alternative route. Figure 3-1 provides a map of the I-205 Toll Project vicinity.

Table 3-1. Study Area Roadway Characteristics

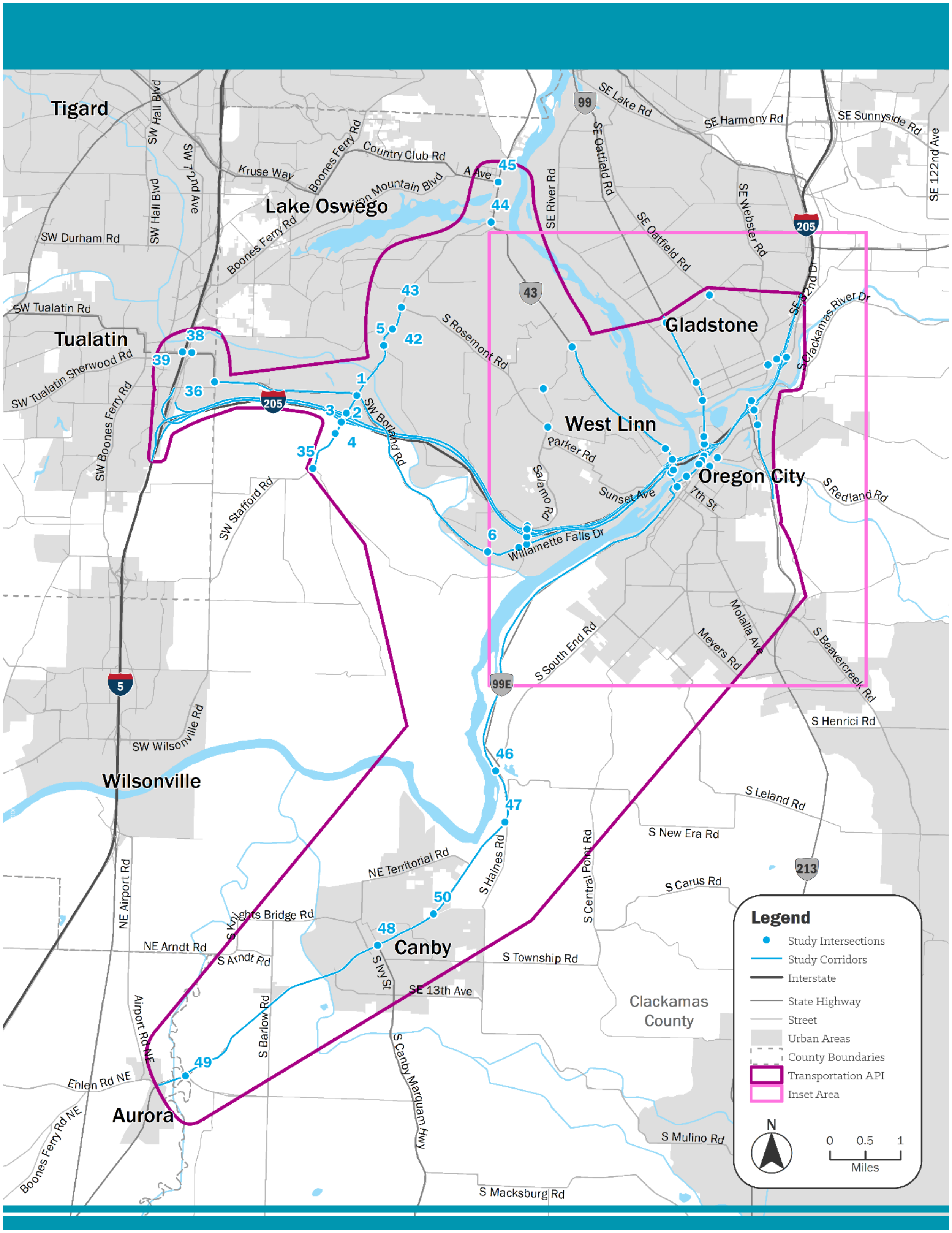
Street Name[1]	Functional Classification	Posted Speed	Bicycle Facilities	Pedestrian Facilities
I-205	Interstate	55 – 65 mph	No	No
SW Stafford Rd	Minor Arterial	35 – 40 mph	Partial	Partial
SW Borland Rd	Minor Arterial	35 – 45 mph	Partial	Partial
Willamette Falls Dr	Minor Arterial	20 – 45 mph	No	Partial
OR 43 (Willamette Dr)	Principal Arterial	25 – 35 mph	Partial	Partial
OR 99E (McLoughlin Blvd/1st Ave): *SE Jennings Avenue to S 2nd Street (Oregon City); and E Territorial Road to S Berg Parkway in Canby*	Principal Arterial	30 – 45 mph	Partial	Partial
OR 99E (McLoughlin Blvd): *S 2nd St (Oregon City) to E Territorial Rd; and S Berg Pkwy to NE Liberty St*	Minor Arterial	25 – 55 mph	Partial	Partial
OR 213	Principal Arterial	45 – 55 mph	Partial	Partial

Source: Functional classifications from ODOT map (ODOT 2020b)a); posted speeds from ODOT TransGIS (ODOT 2022d); bicycle and pedestrian facilities from 2022 Google Maps (n.d.).

[1] Notes: In the study area, OR 99E has two functional classifications, so it is split in the table to reflect the conditions for each classification level. Segment extents are provided in the first column.

API = Area of Potential Impact; I- = Interstate; mph = miles per hour; OR = Oregon Route

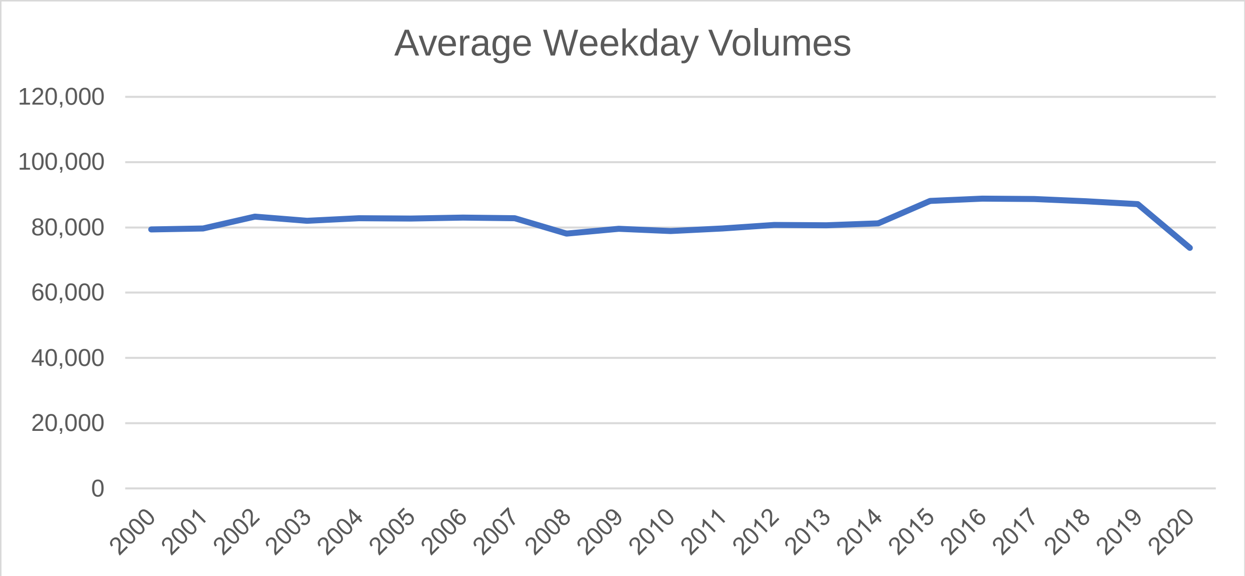
Figure 3-1. I-205 Toll Project Area



3.2 Historical Traffic Trends

Average daily traffic volumes on I-205 just west of Stafford Road are shown in Figure 3-2. This site was chosen because it is the location of a permanent ODOT traffic recorder, and though it is one segment west of the to be tolled Tualatin River Bridge segment, it provides a good indication of volume trends at the proposed bridge toll point between Stafford Road and 10th Street. Since 2000, volumes on I-205 at this location have been relatively steady, generally ranging between 80,000 and 90,000 vehicles per day (vpd). However, a notable change occurred between 2014 and 2015 when traffic increased by about 10,000 vpd and maintained that level before dropping to below 80,000 in 2020 due to the pandemic. The annual growth rate of I-205 average weekday traffic between 2000 and 2018 is just under 0.6%. This slow growth is reflective of a facility that is nearing capacity. This is supported by an analysis of current traffic patterns in the corridor, which indicates that trips currently divert from using I-205 during the peak periods of the day (see Section 3.3.6).

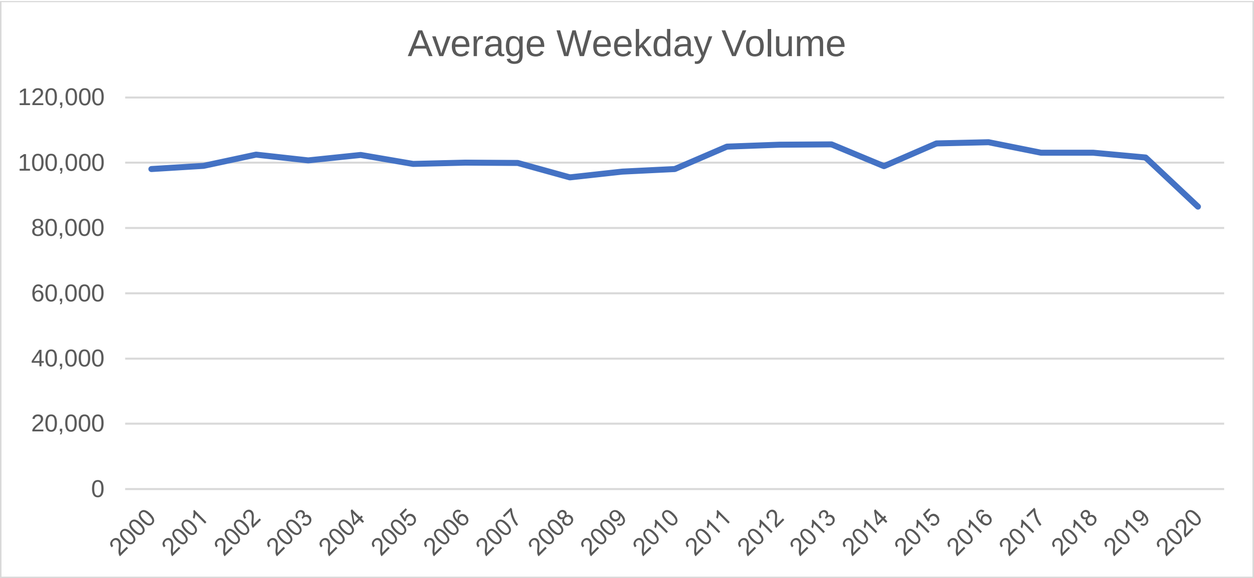
Figure 3-2. Daily Volumes on I-205 between I-5 and Stafford Road: 2000 – 2020



Source: Chart developed by WSP based on data from ODOT Published Traffic Counts (https://www.oregon.gov/odot/Data/Pages/Traffic-Counting.aspx?wp2555=p:1#g_08566484_0375_453c_b317_be4b6af5c3fc) (ODOT 2022a)

Figure 3-3 shows daily volumes on I-205 from 2000 to 2020 at the other toll point, which is located farther to the north and east at the Abernethy Bridge. While the volumes at this location are higher, they also hold relatively steady, ranging between 96,000 and 106,000 vpd before dropping to below 90,000 vpd in 2020 due to the pandemic. The annual growth rate for Abernethy Bridge weekday traffic from 2000 through 2018 is just under 0.3%. As with the I-205 segment shown in Figure 3-2, this slow growth reflects a facility that is nearing capacity and has little room to grow. This is also consistent with the fact that congestion has been steadily increasing on I-205, but actual volumes are increasing only slowly because the facility is capacity constrained. In other words, if additional capacity were provided, volumes through the corridor would be expected to increase more substantially.

Figure 3-3. Daily Volumes on I-205 Abernethy Bridge: 2000 – 2020



Source: Chart developed by WSP based on data from ODOT Published Traffic Counts (https://www.oregon.gov/odot/Data/Pages/Traffic-Counting.aspx?wp2555=p:1#g_08566484_0375_453c_b317_be4b6af5c3fc) (ODOT 2022a)

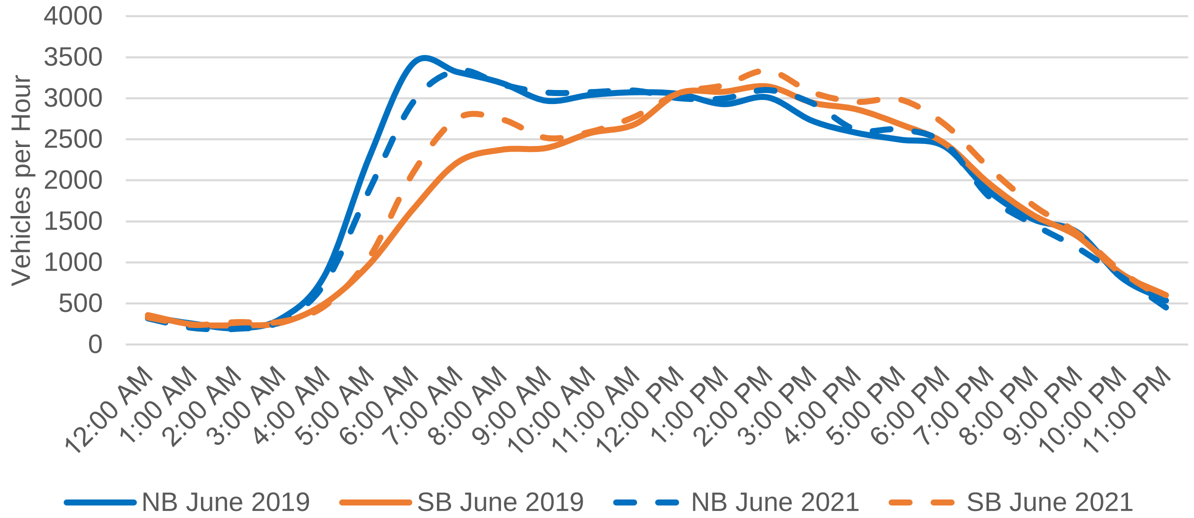
3.3 I-205 Traffic Profile

3.3.1 Average Weekday Traffic and Directionality

The Project Team obtained 24-hour volume data from ODOT's Automatic Traffic Recorder (ATR) 03-016 along I-205 near the I-5 junction for northbound and southbound traffic. Figure 3-4 illustrates the average weekday daily distribution of traffic in June 2019 (pre-pandemic) and 2021 (current conditions). In June 2019 (pre-pandemic), at this location, the northbound AM peak hour happens at about 6 a.m. and there is no distinct PM peak hour within a broad PM peak period. In the southbound direction, the AM peak hour is not distinct but occurs around 7 a.m. or 8 a.m., with volumes gradually rising higher through the midday into a broad afternoon PM peak period with a relatively indistinct peak in the 2 p.m. hour.

Compared to June 2019 (pre-pandemic) traffic volume data, current (June 2021) conditions show northbound traffic volumes that are lower during the AM peak hour and are either similar or higher during the PM peak hour. In the southbound direction, current (June 2021) traffic volumes are slightly higher than June 2019 (pre-pandemic) volumes during both the AM and the PM peak hours and are generally similar over the day.

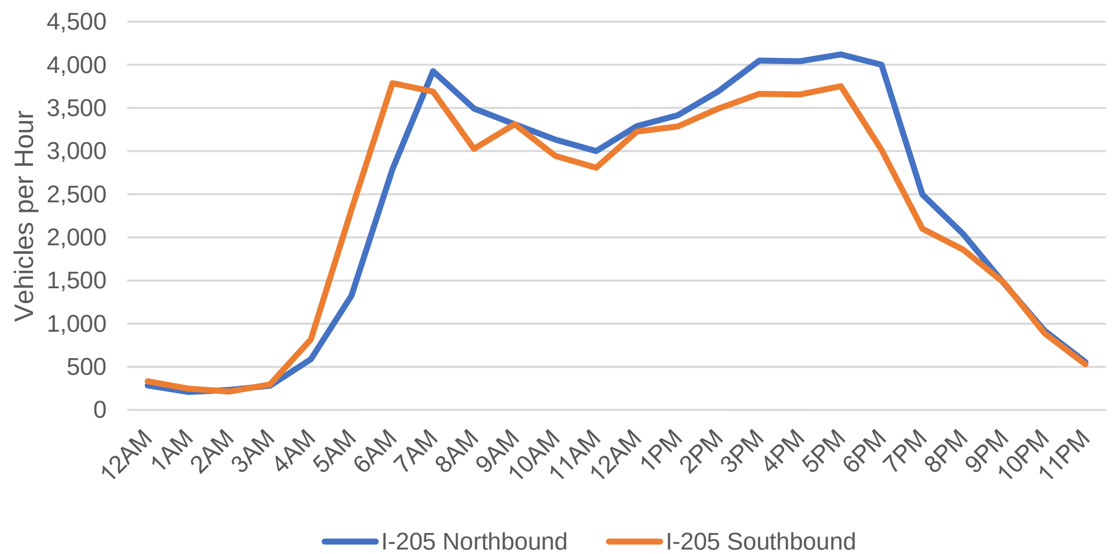
Figure 3-4. Pre-pandemic Year (2019) and during Pandemic (2021) I-205 Average Weekday 24-Hour Traffic Profile West of Stafford Road



Source: ODOT ATR 03-016, Weekday Days June 2019 and June 2021

Directional patterns of traffic flow were observed along other sections of the corridor as shown in Figure 3-5—a 24-hour profile at the Abernethy Bridge in May 2017, prior to the pandemic. At this location the southbound and northbound directions has similar volumes in the AM peak period and the northbound direction had higher volumes in the PM peak period. Figure 3-5 also shows that the AM and PM peak hours were more prominent in each direction than those between I-5 and Stafford Road in Figure 3-4, with the AM peak hour volumes occurring from 6 a.m. to 7 a.m. northbound and from 7 a.m. to 8 a.m. southbound. The PM peak hour occurred from 5 p.m. to 6 p.m. for both the northbound and southbound directions, though adjacent hours show similar volumes, especially northbound. Southbound peaks occurred generally at times similar to northbound peaks, although they were slightly lower than northbound peak volumes.

Figure 3-5. I-205 Average Weekday 24-Hour Traffic Profile on Abernethy Bridge – Historical Data (2017)

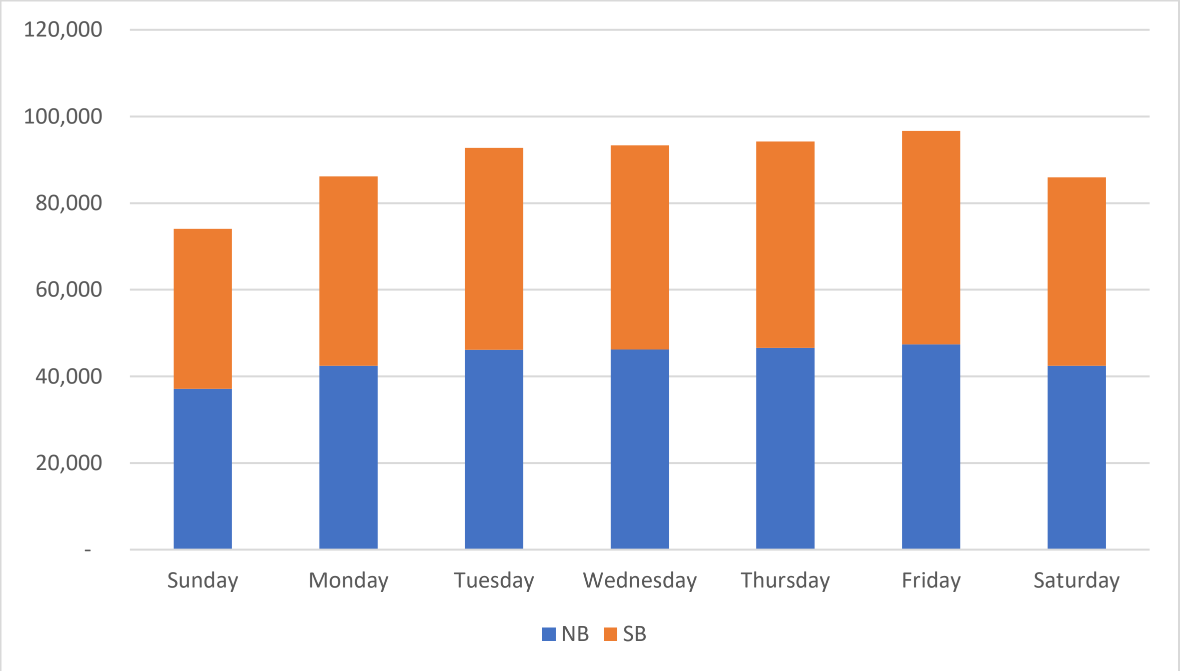


Source: ODOT 2022a

3.3.2 Day of Week/Daily Variations

To assess variations in volumes by day of week, traffic data for representative months in 2018 and 2019 were assessed. Figure 3-6 compares the results and indicates that daily traffic on the weekdays is generally higher than traffic on the weekends. Further analysis indicates that average volumes on Saturdays is approximately 93% of the full 5-weekday average, and the average volume on Sundays is 80% of the weekday average, Table 3-2 shows calculated average weekday daily traffic (AWDT) volume factors by day of week for I-205 west of Stafford Street. Factors closest to 1.0 indicate days of the week that best represent the weekday averages. As is common in many urban settings, Tuesdays, Wednesdays, and Thursdays tend to be most representative of the weekday average. Monday volumes are about 7% less than the weekday average, and Friday volumes are about 4% higher.

Figure 3-6. Average Daily Traffic Volumes by Day of Week – I-205 West of Stafford Road (2018/2019)



Source: ODOT ATR 03-016, for months of May 2018, October 2018, and May 2019

Table 3-2. Average Weekday Traffic Volume Factors by Day of Week – I-205 West of Stafford Road

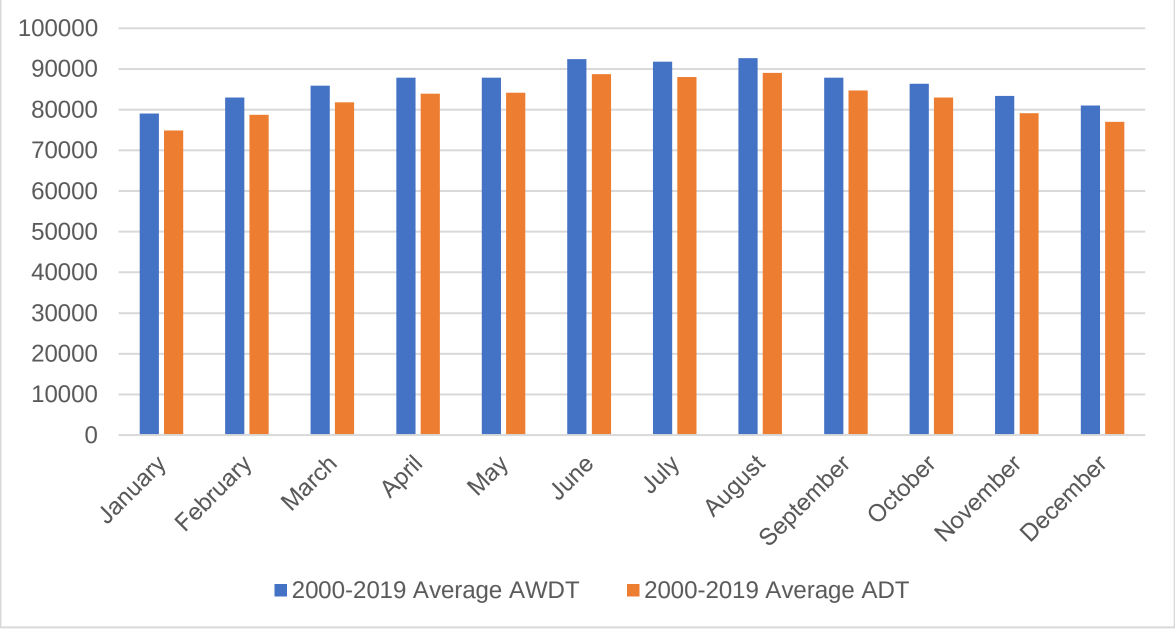
Direction	Monday	Tuesday	Wednesday	Thursday	Friday
Northbound	0.93	1.01	1.01	1.02	1.04
Southbound	0.93	0.99	1.00	1.02	1.05
Total	**0.93**	**1.00**	**1.01**	**1.02**	**1.04**

Source: ODOT ATR 03-016, for Months of May 2018, October 2018, and May 2019.
Note: Weekday traffic volume factors are calculated by dividing average volumes for a given day by the 5-day weekday average volume.

3.3.3 Seasonal Traffic Variations

Traffic volumes on I-205 vary throughout the year. Figure 3-7 compares the I-205 AWDT volumes and average daily traffic (ADT) volumes, inclusive of weekends, by month at ODOT's permanent traffic counter west of Stafford Road. These volumes are averaged by month across 20 years (2000-2019). Table 3-3 calculates the seasonal factors by month for these volumes (seasonal factor = monthly average/annual average). Months for which the factors are closest to 1.0 most closely reflect annual averages; for both AWDT and ADT, these months included March, April, May, September and October. The month with the highest average volume was August, and the lowest average volume was in January.

Figure 3-7. Average Weekday and Average Daily Traffic Volumes by Month – I-205 West of Stafford Road



Source: ODOT ATR 03-016, Year 2000 through 2019

Table 3-3. Traffic Volume Seasonal Factors by Month – I-205 West of Stafford Road

Month	Average Weekday Daily Traffic[1]	Average Daily Traffic[1]
January	0.913	0.905
February	0.958	0.952
March	0.992	0.988
April	1.015	1.014
May	1.015	1.017
June	1.067	1.072
July	1.060	1.063
August	1.070	1.076
September	1.015	1.024
October	0.997	1.002
November	0.963	0.956
December	0.935	0.930

Source: ODOT ATR 03-016, Year 2000 through 2019

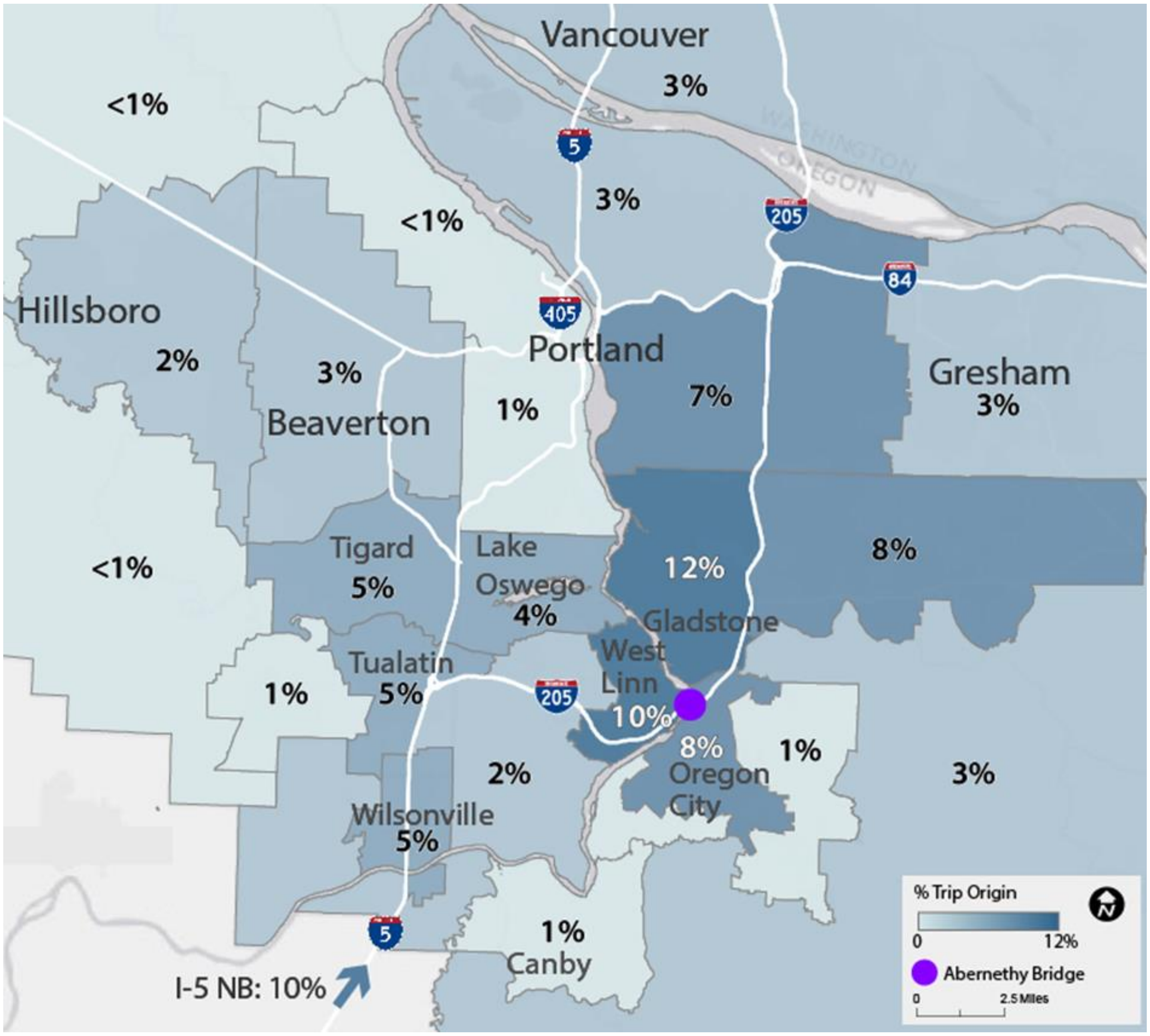
[1] Seasonal factors are calculated by dividing monthly average volumes by the annual average volume.

3.3.4 Trip Origin-Destination Patterns

ODOT commissioned the I-205 Corridor User Analysis to better understand travel characteristics of current users of the segment of I-205 currently being considered for tolling (ODOT 2021e). StreetLight data reflecting all weekdays in the calendar year 2019 was used for this analysis. This information was used to develop, screen, and analyze the alternatives for the I-205 Improvements Project. Key findings from the analysis are presented below.

Although I-205 corridor users come from the Portland metropolitan region and beyond, a large share of trips originate locally within the corridor. Figure 3-8 shows the origins of travelers crossing the Abernethy Bridge. Darker blue shading indicates those zones with higher percentages of trip origins. Abernethy Bridge users are most likely to have trip origins from nearby areas such as West Linn, Oregon City, Gladstone, and Clackamas. Fewer travelers come from areas farther away, including approximately 3% from Clark County, Washington. These O-D patterns were compared to the O-D patterns reflected in the RTDM and are extremely similar. This provided a strong validation for O-D patterns in the RTDM compared to actual 2019 data as obtained from StreetLight.

Figure 3-8. Regional Origins of I-205 Trips Crossing the Abernethy Bridge

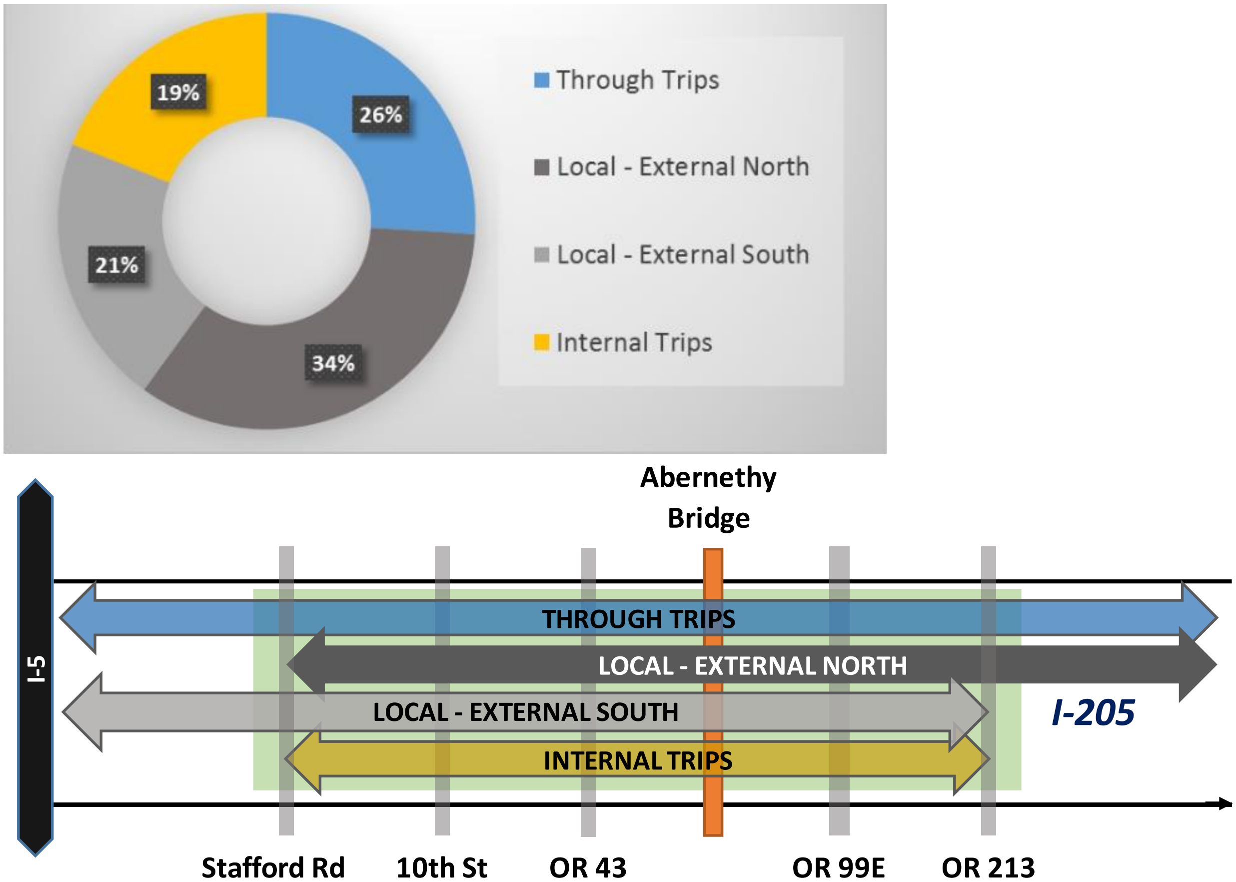


Source: Streetlight Insight Platform n.d.

3.3.5 Year 2019 Through Trips versus Internal-Based Trips

Figure 3-9 below summarizes the composition of trips in the project study area based upon 2019 Streetlight data. Through trips compose about one-quarter of the trips on the segment of I-205 between Stafford Road and OR 213. The remaining three-quarters of users access I-205 locally by entering or exiting at one of the five interchanges in this segment (Figure 3-9). Of all users in the Project segment (i.e., on I-205 between Stafford Road and OR 213), 19% take "internal" trips, which both enter and exit I-205 within the Project segment interchanges.

Figure 3-9. Trips Using the I-205 Project Segment

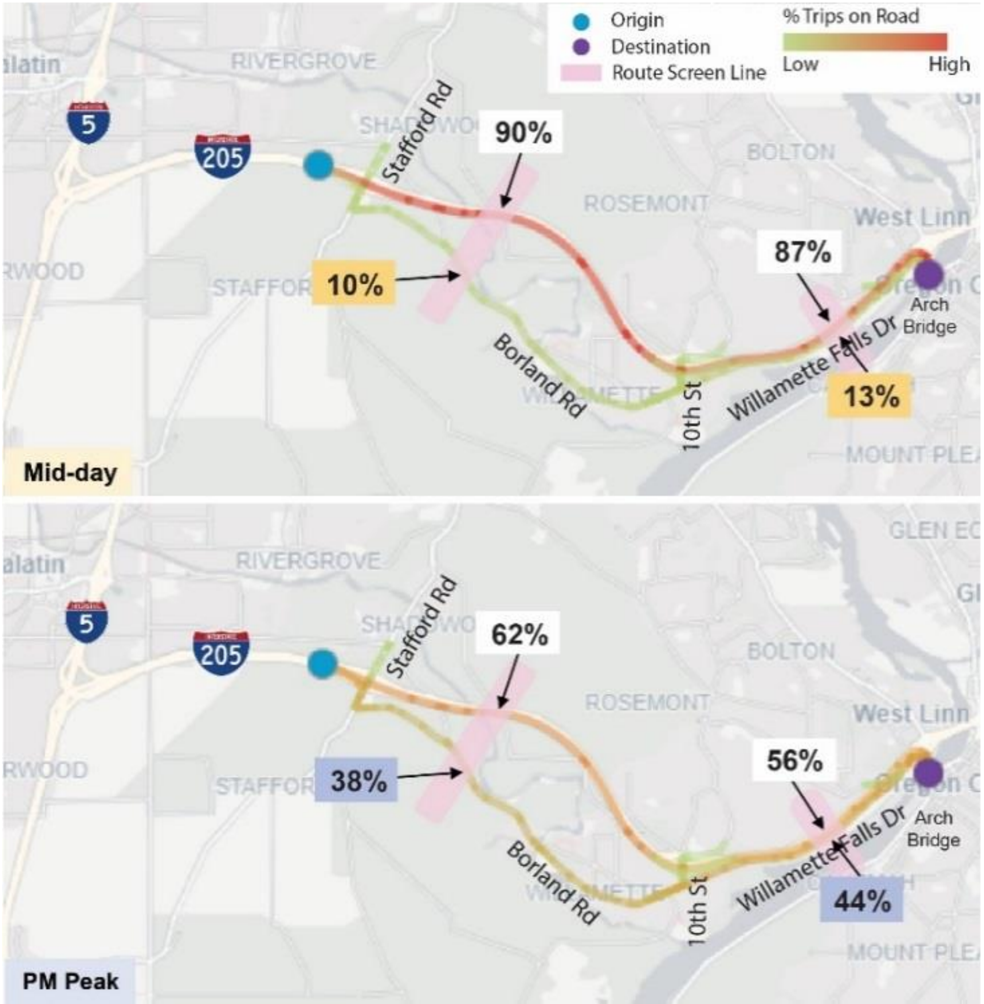


Note: I-205 Toll Project segment is indicated in green shading

3.3.6 Current Rerouting off I-205 during Times of Congestion

Vehicles currently reroute from I-205 to other roadways during higher demand periods when traffic congestion is present, as shown in Figure 3-10. For example, for northbound I-205 travelers to the Oregon City Arch Bridge, an estimated 10% to 13% of trips exit I-205 and take alternative roads (Borland Road or Willamette Falls Drive) during the midday period when there is minimal traffic congestion. However, during the PM peak period, the proportion of travelers choosing these alternative routes to the Arch Bridge increases to between 35% and 45%. This difference indicates that during the PM peak period, 20% to 30% of these travelers may be rerouting away from I-205 to local routes to avoid traffic congestion. Rerouting analyses for other origin/destination pairs indicate that shifts in traffic routing away from I-205 to local routes during peak travel times may be greater than 50% for some travel patterns. Borland Road, Willamette Falls Drive, OR 99E, Stafford Road, and Schaeffer Road were identified as alternative routes that experience the most rerouting.

Figure 3-10. Example of Existing Rerouting Pattern



Source: StreetLight Insight Platform n.d.

4 Value-of-Time Assumptions

This chapter documents the methodology by which updated VOT assumptions were developed for use in this study. The updated VOT was applied Portland Metro's RTDM for demand modeling in the NEPA alternatives analysis for the I-205 Toll Project as well as to prepare toll traffic and revenue projections for this study. Details about the methodology and process of VOT development can be found in *I-205 Toll Project Value-of-Time Assumption Review Memorandum* (ODOT 2021c).

4.1 Methodology

The Portland Metro RTDM uses VOT, expressed as dollars per hour ($/hour) to convert monetary toll costs into travel-time penalties (disbenefits) to represent travel choices regarding vehicle routing (traffic assignment) in the regional model network. Thus, for the same monetary toll, a higher VOT converts to a smaller time penalty for the tolled route, and therefore fewer diverted trips via rerouting to non-tolled roads or other changes in travel behavior to avoid paying the toll, including shift in travel mode, change in trip destination, frequency, and/or time of day when the toll is lower. Conversely, for the same toll, a lower VOT means more changes in travel behavior to avoid the tolled route.

Stated preference (SP) surveys are typically administered to statistically estimate traveler VOT by analyzing survey respondents' travel preference selections to a series of time and cost choices. SP surveys conducted for the I-5 Columbia River Crossing project in 2009 and 2013 serve as the basis of the RTDM's auto user VOT assumptions. These differentiate VOTs between peak and off-peak travel. For the I-205 Toll Project, an SP survey was developed for administration in March and April 2020 but ultimately was not completed due to the onset of the COVID-19 pandemic and concerns about getting unreasonable or biased responses. Instead, the Project Team conducted literature review of FHWA guidance and other studies to recommend updated VOTs for use in the RTDM for the NEPA Environmental Assessment and this T&R study.

The Project Team applied the federal guidance on valuation of travel time to estimate the base VOTs for the two auto vehicle classes (single-occupancy vehicle [SOV] and high-occupancy vehicle [HOV]), each segmented into three different income classes (low Income, medium income, and high income). While the guidance was developed for economic analysis, it provides a useful reference point for estimating VOT for demand modeling. Federal VOT guidance recommends estimating VOT for passenger-vehicle travel based on household income as a simplified and uniform approach to estimate VOT for both personal and business travel by all modes and all time periods.

For freight transportation, VOT estimation is more complex, and federal VOT guidance does not include a recommendation for freight VOT beyond using the truck drivers' compensation to represent the VOT of the operator, while recognizing that vehicle operating costs and the value and characteristics of the freight also further contribute to the willingness to pay for time savings. The federal VOT guidance reports that the weighted average hourly wage for heavy and light truck drivers from the National Occupational Employment and Wage Estimates is $27.20 (2015 dollars).

The Project Team also estimated the VOTs for auto travel based on the hourly compensation of workers (employees) to provide an alternative for comparison to the above federal VOT guidance approach based on the household income of residents. As recognized in the federal VOT guidance, the hourly employee compensation is theoretically equal to the VOT for "on-the-clock" business travel. In a household with more than one worker, household income includes the combined salary and wages of all workers. To implement this alternative approach for developing VOT estimates, the Project Team reviewed data on wages and industries located in the facility's travel shed. Employee compensation was estimated by increasing wages by 30% to reflect employer-provided benefits.

Finally, the Project Team reviewed research reports and tolling studies in other regions and recorded VOTs and methodologies used to estimate the VOTs in those studies that are relevant to the Portland Metro region. This provides points of comparison and reasonableness checks on the updated VOT recommendations.

The methodology for this analysis is detailed in the *I-205 Toll Project Transportation Technical Report (ODOT 2022c)* and the *I-205 Toll Project Transportation Methodology and Assumptions for Environmental Assessment Technical Memorandum* (ODOT 2022b).

4.2 Value-of-Time Calculations

Based on a review of federal VOT guidance for economic analysis, NCHRP 722, and other research and tolling studies for other facilities in the United States, the Project Team developed recommended updated VOT assumptions for the eight vehicle classes and two time periods for use in the Portland Metro RTDM. Table 4-1 summarizes these values along with key considerations and rationale. Note that the RTDM measures monetary costs in constant 2010 dollars.

Table 4-1. Value-of-Time Assumptions with Rationale (2010 Dollars per Hour)

Vehicle Class	Income Segmentation	Peak VOT	Off-Peak VOT	Rationale
SOV Auto	Low Income (<$25K)	$8	$6	▪ Base VOT calculated as 60% of hourly income for top of income bracket ($25,000) to reflect higher incomes of vehicle owners. ▪ Peak VOT calculated as base VOT times 1.1 and off-peak VOT calculated as base VOT times 0.9 to account for different trip purpose mix. ▪ Additional 1.05 factor applied to peak VOT to account for reliability.
	Medium Income ($25K—$100K)	$17	$14	▪ Base VOT calculated as 50% of hourly income for midpoint of bracket ($62,500). ▪ Peak VOT calculated as base VOT times 1.1 and off-peak VOT calculated as base VOT times 0.9 to account for different trip purpose mix. ▪ Additional 1.05 factor applied to peak VOT to account for reliability.
	High Income (>$100K)	$22	$17	▪ Base VOT calculated as 30% of hourly income for representative income of $130,000 for the bracket. ▪ Peak VOT calculated as base VOT times 1.1 and off-peak VOT calculated as base VOT times 0.9 to account for different trip purpose mix. ▪ Additional 1.05 factor applied to peak VOT to account for reliability.
HOV Auto	Low Income (<$25K)	$15	$10	▪ Peak HOV VOT calculated as 1.75 times SOV based on NCHRP 722. ▪ Off-Peak HOV VOT calculated as 1.5 times the SOV VOT, assuming higher likelihood of family travel during off-peak.
	Medium Income ($25K—$100K)	$30	$20	
	High Income (>$100K)	$38	$25	
Medium Trucks	Not Applicable	$39	$39	Metro RTDM
Heavy Trucks	Not Applicable	$61	$61	NCHRP 722

HOV = high-occupancy vehicle; NCHRP = National Cooperative Highway Research Program; RTDM = Regional Travel Demand Model; SOV = single-occupancy vehicle

Key consideration that led to these recommendations are as follows:

- Based on a review of other tolling studies, research reports and guidance, the relationship between VOT and income varies. The federal VOT guidance considers a VOT of up to 60% of hourly household income reasonable for personal trips, including commute trips. The review of studies showed that VOTs typically account for a higher share of hourly income for lower-income households than for higher-income households. Given these considerations, we assumed that the base VOT would account for 60% of hourly income in the lower-income segment, 50% of hourly income in the medium-income segment, and 30% in the higher-income segment. To develop peak and off-peak VOTs, we recommend multiplying these base VOT values by additional factors as described below.
- The bottom household-income segment in the RTDM is less than $25,000 (2010 dollars), which represents households in or near poverty. Because very low-income households are less likely to have access to an automobile, they are more likely to use transit or other nonmotorized travel options. As such, their trips are often less likely to be represented in auto demand matrices. Therefore, users in this income segment who are represented in the model's vehicle traffic assignment are more likely to have an income near the top end of the bracket.
- Employment data for the four counties in the region suggests that a relatively large portion (22%) of the jobs are in high-wage industries: management of companies, financial services, and technical and professional services. It is therefore reasonable to expect that household income of many of these workers will exceed the $100,000 threshold for the high-income segment. In the four counties that comprise most of the tolled facility's catchment area, the 2018 5-year American Community Survey estimate showed that households with income (2018 dollars) between $100,000 and $150,000 account for 18% of total households while households with incomes between $150,000 and $200,000 and above $200,000 account for 8% and 9%, respectively. Based on these considerations, $130,000 (2010 dollars) household income was assumed to represent the top income bracket for purposes of VOT estimation.
- Tolled roads offer travel-time reliability benefits in addition to improved average travel times. By including a buffer time for trips that are time-sensitive (such as business trips and many commute trips), travelers set aside more time for travel than the actual (average) in-vehicle time. Because regional models do not account for reliability improvements offered by tolled roads, it is reasonable to increase VOT to reflect the reliability benefits offered by a tolled roadway, particularly during congested peak hours when travel times are more inconsistent. Federal VOT guidance recognizes that the reliability of travel time is an important consideration that is tied to travel-time savings. The federal VOT guidance describes adding an allowance to the VOT as a possible approach to take into account reliability in the absence of reliability measures and a specified value of reliability. In the modeling for the Columbia River Crossing project, VOTs from the SP survey were increased by 10% to reflect reliability and the fact that not all drivers have information about the alternative routes available. Peak VOTs were conservatively increased by 5% to take travel-time reliability into account.
- National Cooperative Highway Research Program (NCHRP) 722 recommends auto peak VOTs between 1.2 to 1.3 times as large as off-peak VOTs for most trip purposes and income segments. The difference between peak and off-peak VOT may in part reflect the different trip-purpose mix during peak and off-peak periods. Federal VOT guidance recognizes that the conditions of the time saved could affect its value. For example, reducing stressful driving in heavily congested traffic conditions could be more valuable than saving time when there is no traffic congestion. Strategic Highway Research Program (SHRP) C04 recommends adding weights to congestion delays versus free-flow time of 1.5 to 2.0, if not accounting for reliability explicitly. In line with NCHRP 722 recommendations, the Columbia

River Crossing project SP survey conducted in 2013 found that peak VOTs were 1.2 times off-peak VOTs. Based on these considerations, the base VOT that was developed based on household income was multiplied by 1.1 for the peak period and by 0.9 for the off-peak period. Combined with the reliability adjustment, the resulting SOV peak VOTs are 1.28 times as large as off-peak VOTs.

- NCHRP 722 recommended HOV VOTs of 1.75 times SOV VOTs for two-person vehicles and 2.5 for higher occupancies. This reflects that some travel parties include children or other persons whose time is not factored into the route choice decision. SHRP C04 similarly found a factor of 1.7 for two-person vehicle occupancy and a factor of 2.4 for higher occupancies. It was conservatively assumed that HOV VOTs equal 1.75 of the SOV VOT during the peak period and 1.5 during the off-peak period. The distinction between the peak and off-peak periods is based on the assumption that during the off-peak periods, HOV trips are more likely to be family trips (including children).

- Studies using SP surveys find a very wide range of VOTs for trucks. NCHRP 925 found VOTs that range from $13 to $358 (2010 dollars) based on an SP survey of carriers and shippers. The study recommends using the most recent American Transportation Research Institute truck operational cost as a general VOT, which is $59.3 per hour (2010 dollars), in addition to the value of reliability developed by the study. NCHRP 722 recommends a VOT of $30 for medium trucks and for $61 for heavy trucks (2010 dollars). While federal guidance for truck VOT only includes driver compensation, it recognizes that truck drivers' route choice also includes vehicle operating cost and other factors that depend on the type of commodity, supply-chain considerations, and/or value of the freight. The RTDM truck VOT of $39 was used in previous studies, including the Columbia River Crossing project and the ODOT *Portland Metro Area Value Pricing Feasibility Analysis* (ODOT 2021a). Based on the higher VOTs found in other studies and to consider the effect of high vehicle operating costs and high value of reliability on truck route choice, it was reasonable to apply an increase for the heavy truck VOTs. Based on these considerations, , the NCHRP 722 VOT of $61 (2010 dollars) for heavy trucks and the previously applied Metro RTDM VOT of $39 (2010 dollars) for medium trucks were assumed.

4.3 Value-of-Time Assumptions Applied in Modeling

Table 4-2 shows VOT assumptions applied to the I-205 Toll Project's NEPA alternatives analysis and modeling. The VOTs range between $6 and $61 per hour (2010 dollars), depending on the type of vehicle, occupancy class, and time of day. Blended values were applied for peak shoulder/transition hours. All recommended values are rounded to the nearest dollar.

Table 4-2. Value of Time Assumptions (2010 Dollars per Hour)

Vehicle Class	Income Segmentation	Peak hours ($/hour)	Off-Peak hours ($/hour)	Shoulder/Transition hours[1] ($/hour)
SOV Auto	Low Income (<$25K)	$8	$6	$7
	Medium Income ($25K—$100K)	$17	$14	$16
	High Income (>$100K)	$22	$17	$20
HOV Auto	Low Income (<$25K)	$15	$10	$13
	Medium Income ($25K—$100K)	$30	$20	$27
	High Income (>$100K)	$38	$25	$34
Medium Trucks	Not Applicable	$39	$39	$39
Heavy Trucks	Not Applicable	$61	$61	$61

[1] Shoulder/transition-hour VOT estimates use a blended value between peak and off peak; shown rounded to the nearest integer value.

HOV = high-occupancy vehicle; SOV = single-occupancy vehicle; VOT = value of time

5 Socioeconomic/Land Use Summary

As discussed previously, the toll traffic and revenue forecasts included in this T&R study are based on the Portland Metro RTDM and DTA. The RTDM relies on projected future population, household, and employment growth estimates throughout the region to drive the model's forecasts for trips generated within each geographic transportation analysis zone (TAZ) throughout the region. Future population, household, and employment forecasts by TAZ —collectively referred to as socioeconomic projections or land use forecasts—are prepared using Metro's land use model, MetroScope. MetroScope simulates changes in measures of economic, demographic, land use, and transportation activity within the Portland metropolitan area.

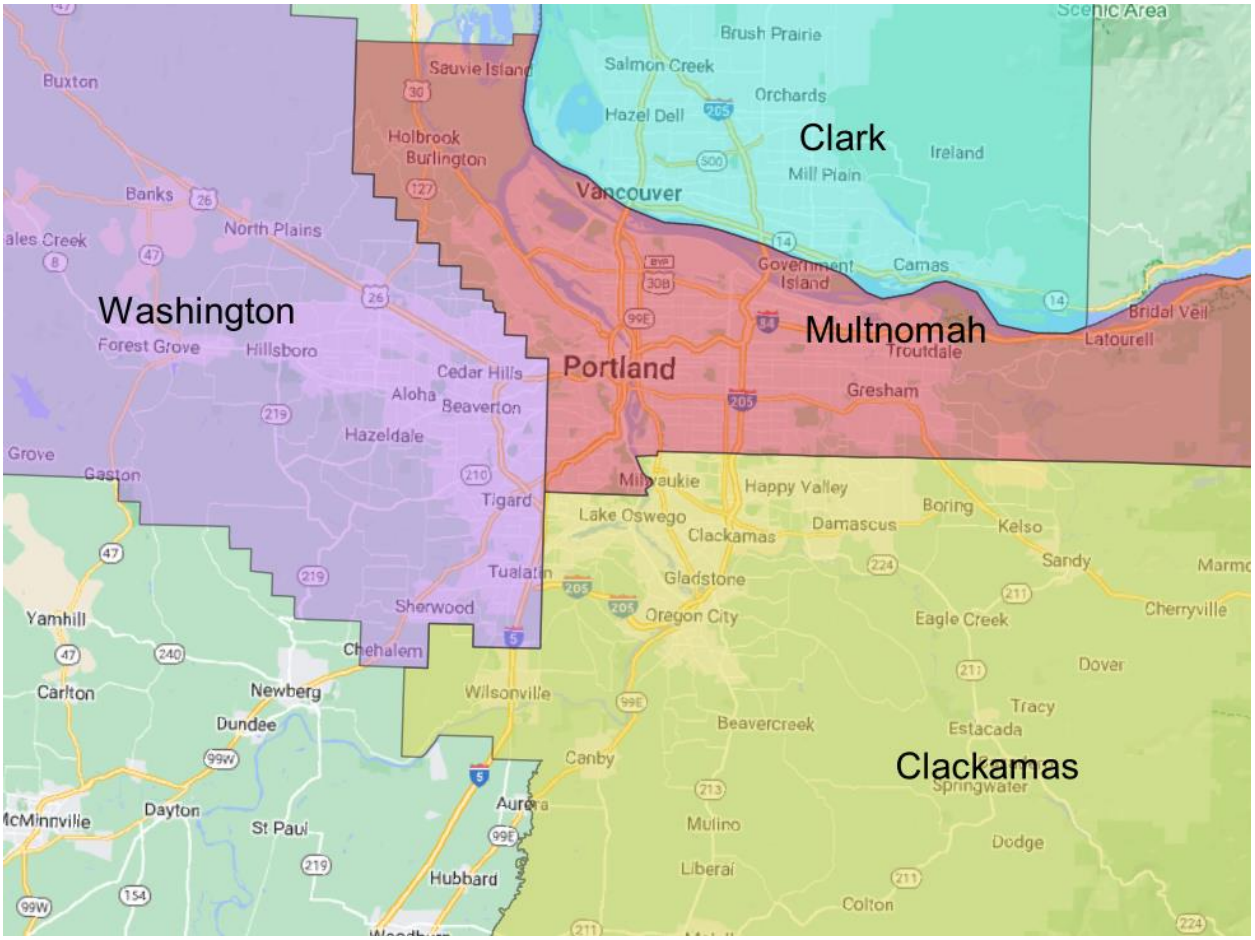
Because the demand modeling for the NEPA analysis and this T&R study was conducted by Metro, the T&R study team did not have the opportunity to prepare or independently revise the socioeconomic projections, which were developed before the onset of the COVID-19 pandemic. As such, this chapter summarizes the Project Team's review of the historical socioeconomic growth patterns and analyzes projected trends that contribute to direct changes in the baseline traffic growth assumptions.

As shown in Figure 5-1, the Portland Metro RTDM covers the following four counties:

- Clark County, in Washington State
- Multnomah County
- Washington County
- Clackamas County

The segments planned for tolling I-205 are within Clackamas County. However, the traffic volume profile indicates that 80% of the trips using Abernethy Bridge have a trip end that is either east of the Stafford Road interchange or west of the OR 213 interchange, and approximately 50% of the trips have an origin that is outside of the Clackamas County. Demographic changes in other counties could lead to changes in traffic patterns throughout the years.

Figure 5-1. Portland Metro Four-County Area



5.1 Historical Trends

5.1.1 Population

Table 5-1 summarizes the historical population of the Portland Metro four-county area and the compound annual growth rates (CAGR) for 2000-2010 and 2010-2020. Overall, the growth trends of four counties have been similar to the metro area as a whole. For all four counties, the annual growth rate between 2000 and 2010 is higher than the annual growth rate for the following decade. Clark County, across the river in Washington, exhibited the highest annual growth rates in both decades. Between the three Oregon counties, Washington County had the highest annual growth rates. The population forecasts from Metro for 2010 and 2020 are within 2% of comparable U.S. Census values. However, Metro's forecast shows higher annual growth rates from 2010 to 2020 than U.S. Census data, because the 2020 forecasts were prepared prior to the onset of the pandemic.

Table 5-1. Historical Population Levels and Growth Rates Compared to Model Forecast, by County

Year	US Census					Metro 4-County Forecast
	Multnomah	Washington	Clackamas	Clark	Total	
2000	660,486	445,342	338,391	345,238	**1,789,457**	**NA**
2010	735,334	529,710	375,992	425,363	**2,066,399**	**2,061,226**
2020	815,428	600,372	421,401	503,311	**2,340,512**	**2,381,355**
2000-2010 CAGR	1.08%	1.75%	1.06%	2.11%	**1.45%**	**NA**
2010-2020 CAGR	1.04%	1.26%	1.15%	1.70%	**1.25%**	**1.45%**

Source: County-level data is from U.S. Census Bureau Decennial Census. Metro four-county totals are from a forecast vintage that was prepared before the COVID pandemic and 2020 census.

CAGR = compound annual growth rate; NA = not available

5.1.2 Households

Table 5-2 summarizes the historical households of the Portland Metro four-county area and the CAGRs for 2000-2010 and 2010-2020. Trends in household growth have largely mirrored the growth rates for population, in that the growth rates are similar between the four counties, with Clark County in Washington state showing the highest annual growth rates. The household growth rates between 2010 and 2020 were slightly lower than that of population, indicating that the average household size is growing.

Table 5-2. Historical Household Levels and Growth Rates Compared to Model Forecast, by County

Year	US Census					Metro 4-County Forecast
	Multnomah	Washington	Clackamas	Clark	Total	
2000	272,098	169,162	128,201	127,208	**696,669**	**NA**
2010	304,540	200,934	145,790	158,099	**809,363**	**811,730**
2020	334,849	223,040	159,330	178,478	**895,697**	**930,147**
2000-2010 CAGR	1.13%	1.74%	1.29%	2.20%	**1.51%**	**NA**
2010-2020 CAGR	0.95%	1.05%	0.89%	1.22%	**1.02%**	**1.37%**

Source: 2010 and 2020 county-level data are from U.S. Census Bureau Decennial Census. 2020 county-level data is from American Community Survey 5-year estimates. Metro four-county totals are from a forecast vintage that was prepared before the COVID pandemic and 2020 census.

CAGR = compound annual growth rate; NA = not available

5.1.3 Employment

Table 5-3 summarizes the historical employments of the Portland Metro four-county area and the CAGR for 2001-2010 and 2010-2020. Similar to population and household trends, from 2001 to 2010, Clark County had the highest annual growth rate, followed by Washington County. There is a drop in numbers of employment for Multnomah County between 2001 and 2010, due to the Great Recession between 2007 and 2009. Employment grew steadily since the economy bottomed out in 2010, with annual growth ranging from 1.25% to 2.16% between 2010 and 2020.

Table 5-3. Historical Employment Levels and Growth Rates

Year	Observed Data					Metro 4-County Forecast
	Multnomah	Washington	Clackamas	Clark	Total	
2001	444,530	228,643	134,104	118,000	**925,277**	**NA**
2010	421,578	234,713	136,819	130,300	**923,410**	**916,407**
2020	477,522	285,978	158,999	161,400	**1,083,899**	**1,194,662**
2001-2010 CAGR	-0.59%	0.29%	0.22%	1.11%	**-0.02%**	**NA**
2010-2020 CAGR	1.25%	2.00%	1.51%	2.16%	**1.62%**	**2.69%**

Source: Data for Multnomah County, Washington County, and Clackamas County is from Quarterly Census of Employment and Wages from Oregon Employment Department. 2001 data is listed because 2000 data is not available. Data for Clark County is from Washington employment estimates from Washington State Employment Security Department.

CAGR = compound annual growth rate

5.2 Future Socioeconomic Projections

The Project Team reviewed the population, household, and employment projections inputs to the Metro RTDM for the selected geographies surrounding the I-205 corridor. The Project Team notes that the Metro socioeconomic forecasts reviewed in this chapter do not explicitly consider any permanent shift in socioeconomic and demographic impacts of the COVID-19 pandemic.

5.2.1 Population

Table 5-4 shows the population projection used in the RTDM model. Overall, the projection shows a homogenous growth trend between the four counties, with Washington County population growing only slightly faster than the rest of the counties.

The near-term growth rates (2015-2027) are higher than the long-term growth rates (2027-2045).

Table 5-4. Population Projection by County

County	2015	2027	2045	2015-2027 CAGR	2027-2045 CAGR
Multnomah	779,267	895,133	1,047,185	1.16%	0.88%
Washington	579,374	694,319	837,648	1.52%	1.05%
Clackamas	408,930	476,725	553,171	1.29%	0.83%
Clark	449,384	535,696	627,981	1.47%	0.89%
Total	**2,216,954**	**2,601,873**	**3,065,985**	**1.34%**	**0.92%**

Source: Metro RTDM inputs

CAGR = compound annual growth rate

5.2.2 Households

Table 5-5 shows the household projection used in the RTDM model. The projected growth rates for households are very similar to that of the population. The differences in growth rates between the four counties are small.

Table 5-5. Household Projection by County

County	2015	2027	2045	2015-2027 CAGR	2027-2045 CAGR
Multnomah	324,227	397,676	476,144	1.72%	1.01%
Washington	212,171	259,424	313,264	1.69%	1.05%
Clackamas	151,486	177,961	205,071	1.35%	0.79%
Clark	163,014	200,064	234,200	1.72%	0.88%
Total	**850,898**	**1,035,124**	**1,228,679**	**1.65%**	**0.96%**

Source: Metro RTDM inputs, 2015 numbers are projections

CAGR = compound annual growth rate

5.2.3 Employment

Table 5-6 shows the employment projection used in the RTDM model. Between 2015 and 2027, Clark County has the highest growth rate. The growth rates from 2027 to 2045 are close between the four counties. Multnomah County, where the City of Portland resides, has the smallest growth, likely because the area is already heavily developed.

Table 5-6. Employment Projection by County

County	2015	2027	2045	2015-2027 CAGR	2027-2045 CAGR
Multnomah	494,093	571,232	670,859	1.22%	0.90%
Washington	278,963	347,572	432,534	1.85%	1.22%
Clackamas	155,952	193,868	237,373	1.83%	1.13%
Clark	143,917	202,412	251,525	2.88%	1.21%
Total	**1,072,925**	**1,315,085**	**1,592,290**	**1.71%**	**1.07%**

Source: Metro RTDM

CAGR = compound annual growth rate

6 Modeling Methodology

This chapter documents the methodology for the modeling analysis, which primarily applied the following:

- Metro Regional Travel Demand Model (RTDM)
- I-205 subarea Dynamic Traffic Assignment (DTA) model

The RTDM does not incorporate changes in future travel patterns and traffic volumes due to any permanent shifts in behavior related to the COVID-19 pandemic. It is Metro's assertion that it is too early to determine if the pandemic has permanently affected trip-making or travel patterns. Notwithstanding this assertion, there is both regional and national evidence that the pandemic has accelerated remote work for many white-collar/office work occupations, potentially reducing work-commute trips and increasing discretionary trips that may have been previously chained to a commute trip. These shifting traffic patterns may continue to be different than pre-pandemic patterns. For example, while local traffic data analysis indicates that daily volumes are roughly at the same level as pre-pandemic levels, there are noticeably fewer AM peak period trips as more people work from home, offset by more midday and peak period, primarily discretionary trips such as shopping and running errands, etc.

Details about the modeling methodology are documented in *I-205 Modeling Methodology and Assumptions for Environmental Assessment Technical Memorandum* (ODOT 2022b).

6.1 Regional Travel Demand Model

The Metro RTDM is the primary tool used to estimate regional multimodal demand for travel. It estimates person trips for all modes and roadway network vehicle demand by hour for all 24 hours of an average weekday. The model version developed for the Metro 2018 Regional Transportation Plan (RTP) is called "Kate" and represents model years for 2015, 2027, and 2040. An updated 2045 scenario was developed to replace the 2040 scenario for the I-205 Toll Project. The future model years include assumptions about expected land use growth and changes to the regional transportation network including anticipated projects, as appropriate to the project analysis needs.

6.1.1 Model Refinements

The following enhancements and refinements are incorporated into the Metro RTDM for the I-205 Toll Project environmental analysis.

Network Refinements

The Metro RTDM modeling efforts for the environmental analysis will also incorporate network refinements in coordination with the I-205 DTA model calibration including, but not limited to, updates to free-flow speeds and road segment capacities.

Time of Day Choice

The Metro RTDM previously used time of day factors to break out trips by time of day. The factors were directional and developed from the 2010 to 2011 household activity survey (Metro 2015). This leads to limited temporal sensitivity when evaluating the impacts of tolling on travel behavior.

In order to better assess potential shifts in time-of-day travel choices due to toll rates that vary by time of day, a time-of-day choice model was developed. The model was first developed for Home-Based Work

(HBW) and Home-Based Other (HBO) trip purposes and then further extended to other trip purposes. As it was calibrated to existing time-of-day factors, the time-of-day model did not significantly affect the overall RTDM calibration. Details about the time-of-day choice model are documented in the Metro *Time-of-Day Model Development Summary for I-205 Toll Project Memorandum* (Metro 2021a).

Vehicle Trip Assignment Segmented by Income Class

The Metro RTDM has four vehicle classes: SOV, HOV, medium trucks, and heavy trucks. For the Environmental Assessment (EA) model runs, the passenger vehicles (SOVs and HOVs) are further segmented by the RTDM's annual household income classes—low income (less than $25,000), medium income ($25,000 to $100,000), and high income (more than $100,000)—to better assess how income effects willingness to pay tolls (all income values are in constant 2010 dollars). This results in a total of eight vehicle classes for roadway network assignment:

- Low-income SOV
- Medium-income SOV
- High-income SOV
- Low-income HOV
- Medium-income HOV
- High-income HOV
- Medium truck
- Heavy truck

Refining the vehicle classes as listed—together with updated VOTs for each of the eight vehicle classes (described in Chapter 4)—is intended to generate more realistic responses to tolling by representing a range of responses and potential changes in travel behaviors for travelers with different willingness to pay.

Updated Value-of-Time Assumptions

VOTs used in the model were updated to align with the eight vehicle classes identified in the previous section. As described in Chapter 4, updated VOT assumptions were developed based on detailed literature review, model practices in other regions, and consideration of the results from the most recent similar stated-preference survey in the region. Different VOTs were applied for travel during peak hours (6 – 9 a.m. and 4 – 6 p.m.), shoulder hours (5 – 6 a.m., 9 – 10 a.m., 3 – 4 p.m., and 6 – 7 p.m.), and all other off-peak hours. Details about the development of the VOT assumptions are documented in the *I-205 Toll Project Value-of-Time Assumption Review Memorandum*.

Toll rate schedule refinement

The toll rate schedule assumptions are refined for the EA to improve project outcomes. These assumptions were developed to balance the dual purposes of the I-205 Toll Project, as described in the Purpose and Need Statement: to generate revenue and manage congestion on I-205 while considering the overall project objectives including limiting potential diversion and rerouting onto other roadways. The refined toll rate schedule can be found in Table 7-1 and Figure 7-3.

6.1.2 Modeling Assumptions

General Assumptions for Environmental Assessment Alternatives

Tolling alternatives for the I-205 Toll Project were evaluated in conjunction with the I-205 Improvements Project, including proposed reconstruction of the Abernethy Bridge, seismic upgrades of other bridges, and widening of I-205 between the Stafford Road interchange at the south end and the OR 213 interchange at the north end. The I-205 Toll Project includes evaluation of two alternatives: Build and No Build. The No Build Alternative includes reconstruction of the Abernethy Bridge and adjacent interchange improvements on either side of the bridge, at OR 43 and OR 99E interchanges. The Build Alternative includes tolls and construction of all phases of the I-205 Improvements Project.

The I-205 Toll Project proposes implementation of tolls at two locations: one between the Stafford Road and 10th Street interchanges (near to or on the Tualatin River Bridges) and one between the OR 43 and OR 99E interchanges (near to or on the Abernethy Bridge over the Willamette River). ODOT intends to begin tolling I-205 prior to completion of the roadway improvements assumed in the 2045 Build Alternative. This includes tolling across the Abernethy Bridge during its construction. For this “Pre-Completion Tolling” scenario only two through lanes would be in place between Stafford Road and OR 213 (same as existing).

Table 6-1 outlines the general modeling assumptions used for the analysis in the I-205 Toll Project EA. The EA travel demand and traffic operations modeling were performed for the 2045 horizon year. Additional information was provided to support the analysis for the 2027 model year, as needed.

Table 6-1. General Modeling Assumptions for I-205 Toll Project Environmental Assessment

Model Parameters	Assumptions
Future evaluation year	2045
Land use	Based on growth assumptions consistent with the RTP for 2040, extrapolated to 2045. Land uses are held constant across alternatives.
Transportation network	Includes projects in RTP Financially Constrained Project list based on project completion year, as shown in Table 6-2 below, except for modifications within the affected area of the I-205 Toll Project, where noted.
Daily conditions	Average weekday conditions. Annual estimates (including weekends) are based on factoring weekday model results.
Value of time	Updated values applied to tolls are summarized in Table 4-2, segmented by vehicle type, income segmentation, and time of day. In the Metro RTDM, tolls and values of time are expressed in 2010 dollars.
Toll-paying vehicle classes	All modeled vehicle types (SOVs, HOVs, medium trucks, and heavy trucks) and income classes (low-income, medium-income, and high-income SOV and HOV) are assumed to be tolled. Monetary toll rates are summarized in Table 7-1 for through trips and in Figure **7-3** for each toll segment.
Toll rate pricing	Toll rates are assumed to vary by time of day following a fixed (known) daily schedule. No discounts or exemptions for any modeled vehicle types are assumed.[1]
Toll collection methods	Transponder tags or license-plate capture enforced by cameras. No toll booths or other vehicle delays are assumed.

[1] While vehicle exemption policies have not been finalized at this time, it is important to note that some potentially exempt vehicles (e.g., emergency responders) are not explicitly broken out in the RTDM. Transit vehicles are assigned separately from general motor vehicle traffic and are not assessed a toll charge.

HOV = high-occupancy vehicle; RTDM = Regional Travel Demand Model; RTP = Metro 2018 Regional Transportation Plan; SOV = single-occupancy vehicle

The Metro RTDM 2045 scenarios were developed using the 2040 RTP transportation network and the 2045 land use assumptions to reflect appropriate regional socioeconomic growth.

Regional Travel Demand Model Network and Land Use Assumptions

The financially constrained RTP network and land use assumptions were applied for the Metro RTDM scenarios used for the EA, except where noted below.

Land use assumptions include jurisdiction-reviewed forecasted growth in population, households, and employment. The summaries for the land use inputs to the RTDM can be found in Section 5. The transportation network assumes construction of reasonably likely-to-be-funded improvements, based on the RTP process. As noted in the previous section, the 2045 scenarios were constructed by using the 2040 RTP transportation network, assuming no additional major projects will be completed by 2045. A summary of key major system improvements assumed for the 2027 and 2040 financially constrained network (compared to the base year 2015 network) is shown in Table 6-2.

Table 6-2. Major System Improvements Included in Regional Transportation Plan Model Scenarios

Improvement	Year by which Completion Is Expected	In 2027 Network	In 2040 Network	Current Completion Status
I-5S: Lower Boones Ferry Exit to Lower Boones Ferry Entrance (Auxiliary Lane)	2018	√	√	Completed
I-5S: Lower Boones Ferry to I-205 (Auxiliary Lane)	2018	√	√	Completed
I-5 Rose Quarter (both directions)	2027	√	√	To be built by 2029
I-205N: I-84E Entrance to Killingsworth Exit (Auxiliary Lane)	2019	√	√	Not built
I-205S: I-84E Entrance to Washington/Stark (Auxiliary Lane)	2019	√	√	Completed
I-205N: Powell to I-84E Exit (Auxiliary Lane)	2019	√	√	Completed
I-205N: Sunrise to Sunnybrook (Auxiliary Lane)	2020	√	√	Completed
OR 217N: OR 99W to Scholls Ferry (Auxiliary Lane)	2024	√	√	Completed
OR 217S: Beaverton-Hillsdale to OR 99W (Auxiliary Lane)	2024	√	√	Completed
US 26: Widen to six lanes from Cornelius Pass to 185th (both directions)	2018	√	√	Completed
OR 224 Milwaukie Expressway Improvements[1]	2027	√	√	No update
I-5N: Braided Ramps I-205 to Nyberg	2040		√	To be built by 2040
I-5N: Nyberg to Lower Boones Ferry (Auxiliary Lane)	2040		√	To be built by 2045
I-5S: Wilsonville Rd to Wilsonville-Hubbard Hwy (Auxiliary Lane)	2040		√	To be built by 2040
I-5 Columbia River Bridge: Replace bridges, improve interchanges on I-5 (both directions), and implement tolls	2040		√	Not built
I-5S: Truck Climbing Lane (Marquam to Multnomah Blvd). PE and ROW and CON phases	2040		√	Not built
US 26: Widen to six lanes from Brookwood to Cornelius Pass (both directions)	2040		√	Not built
OR 217S: Braided Ramps Beaverton-Hillsdale Hwy to Allen Blvd	2040		√	Not built
OR 212/224 Sunrise Hwy Phase 2: SE 122nd to SE 172nd (CON)	2040		√	Not built

Source: Metro 2018

* TriMet improvements associated with the SW Corridor project are assumed to be included.

[1] Estimated year of 2027 as the project is currently on hold due to lack of funding.

CON = construction; I- = Interstate; OR = Oregon Route; PE = preliminary engineering; ROW = right-of-way

The I-205 Improvements Project (including widening of I-205 between OR 213 and Stafford Road interchanges and Abernethy Bridge replacement) was included in the 2018 financially constrained RTP, with an expected completion year of 2027. However, only Phase 1A of the Improvements Project will be included in the Project's No Build Alternative because ODOT has financing tools that allow this phase to move forward without near-term reliance on toll revenues (though once tolls are in place, they may be used to refinance this initial phase). Phase 1A includes reconstruction of the Abernethy Bridge and adjacent interchange improvements on either side of the bridge, at the OR 43 and OR 99E interchanges. The No Build Alternative, by excluding tolling, also excludes full construction of the I-205 Improvements Project, because it is assumed that tolling is needed to fund construction of Phases 1B, 1C, 1D, and 2. Therefore, Phase 1A is included in both the No Build and Build Alternatives. The No Build Alternative was evaluated as an alternative in the EA and used as a reference point for potential changes in travel patterns identified under the Build Alternative proposed for the I-205 Toll Project.

In addition to the improvements listed in Table 6-2, changes were made to the Metro RTDM networks to better reflect existing traffic conditions on the I-205 corridor and at the Oregon City Arch Bridge:

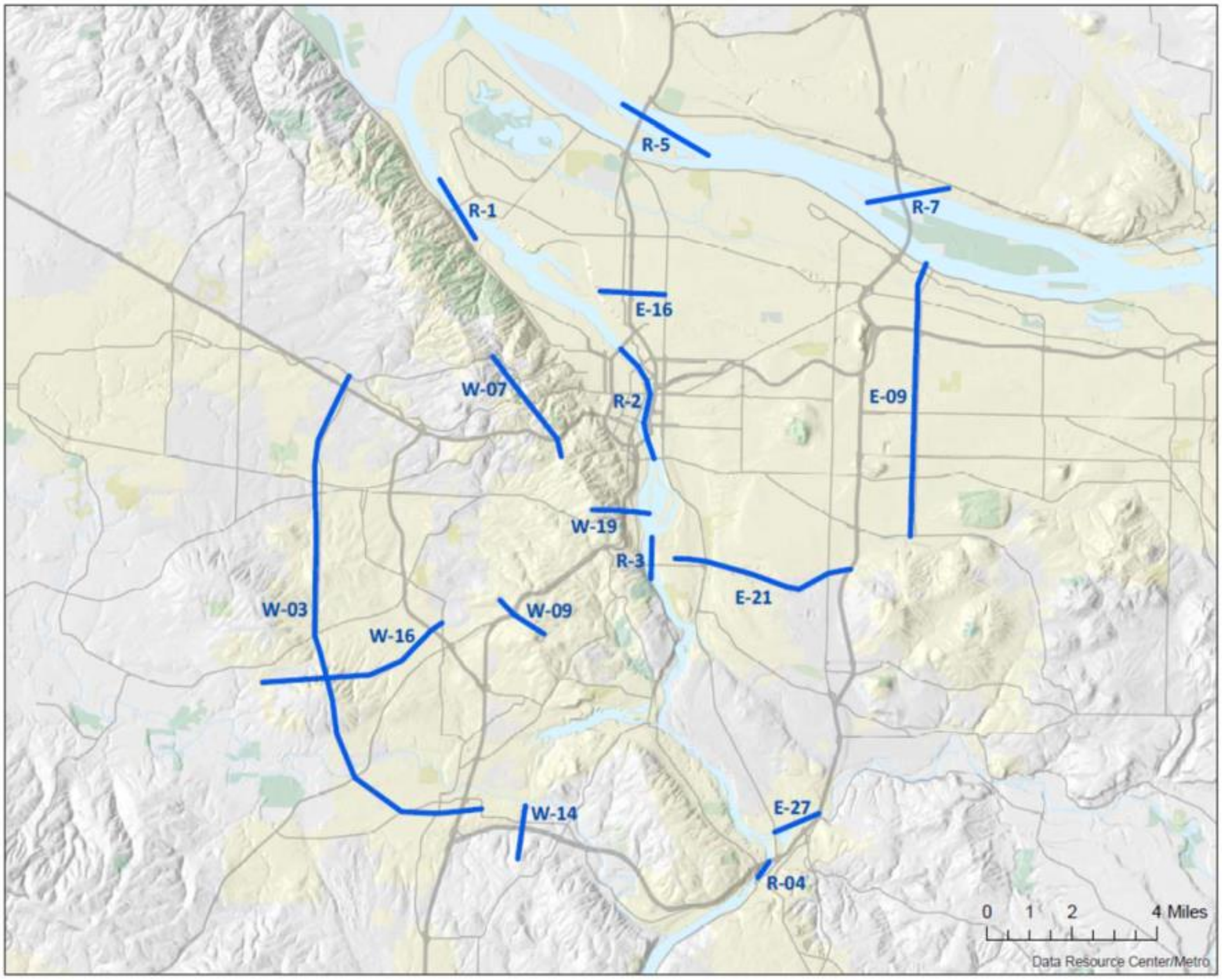
- The volume-delay function used to estimate speeds and travel times based on volume at the Oregon City Arch Bridge was changed to match the one used for ramp meters. Compared with the previous volume-delay function, this revision to a "steeper" volume-delay function curve assigns more delay under congested travel conditions when the traffic volume surpasses capacity.
- Heavy trucks were prohibited from trip routings using the Oregon City Arch Bridge to reflect the existing weight restriction not previously captured in the RTDM.
- A roadway connection was added between I-5 and OR 99E in the southern extent of the model network, approximately near Ehlen Road in Aurora, to allow diversion which may occur due to tolling in the southern part of the study area.
- Roadway network parameters on the I-205 corridor (such as free flow speed and capacity) were adjusted based on additional calibration performed during the subarea DTA model development process.

6.1.3 Model Validation

Metro's RTDM was validated to 2015 conditions, using observed data including 2014 Highway Performance Monitoring System and 2015 auto and freight counts. Details about the model validation are documented in *2017 Kate v1.0 Trip-Based Demand Model Validation Report for Base Year 2015*. Model assignment results for average weekday, AM 2-hr (hr), and PM 2-hr peak periods are within FHWA's acceptable range compared to counts across 16 cutlines, except for AM 2-hr peak period Arterials. The validation also showed the model captures the diurnal traffic pattern across the 16 cutlines well. Figure 6-1 shows the titles and locations of the 16 cutlines.

Among the 16 cutlines, W-14 and R-04 are the most relevant to the I-205 Toll Project. Table 6-3 shows model volume comparison at the two cutlines for average weekday, PM 2-hr (4 to 6 p.m.), and AM 2-hr (7 to 9 a.m.). The validation shows the RTDM tends to over-estimate at both cutlines. Model estimated average weekday volumes at cutline W-14 are close to the counts (5% to 6% higher than the counts). On the other hand, the model overestimates daily volume at cutline R-04 by approximately 20%. To address any variance between modeled and observed volumes, the traffic projections used to develop revenue projections are adjusted to account for calibration error.

Figure 6-1. Metro Regional Travel Demand Model Validation Cutlines



Source: Metro Validation Report (Metro 2021b)

Table 6-3. Metro RTDM 2015 Base Year Model Cutline Volume Validation

	Cutline	Model	Count	Difference from Count
AWD	**South/West**			
	R-04	74,556	62,413	+19%
	W-14	56,513	53,618	+5%
	North/East			
	R-04	74,762	61,320	+22%
	W-14	54,315	51,440	+6%
PM (4-6 pm)	**South/West**			
	R-04	10,959	8,269	+33%
	W-14	7,052	6,688	+5%
	North/East			
	R-04	10,909	8,850	+23%
	W-14	8,579	7,290	+18%
AM (7-9 am)	**South/West**			
	R-04	10,333	8,917	+16%
	W-14	8,836	7,735	+14%
	North/East			
	R-04	10,577	8,365	+26%
	W-14	6,396	6,156	+4%

Source: Metro Validation Report (Metro 2021b)

AWD = average weekday

6.2 Toll Rate Application in the Regional Travel Demand Model

Monetary toll costs are converted to travel-time penalties in the RTDM using VOTs ($/hour) by vehicle class and market segment as described in Chapter 4. All monetary values, including VOT in the RTDM, are expressed in constant 2010 dollars. During the traffic assignment step, these penalties along the paths are combined with path travel time to represent vehicle routing choices in the regional model network. A simulated trip will be compelled to select the path between its origin and destination that has the shortest combined travel time.

6.3 Dynamic Traffic Assignment Model

As part of the I-205 Toll Project, ODOT and partner agencies requested traffic analysis and modeling support to evaluate toll project impacts along segments of I-205 in the south part of the Portland Metropolitan area. The primary base for these volumes is the RTDM; however, in addition to the RTDM, the Project Team used a DTA model to gauge segment-level volume changes for the more congested AM and PM peak periods. The DTA modeling platform is superior at evaluating travel route choices during highly congested peak travel periods, because it blends the traffic assignment capabilities of the RTDM with the intersection/link operational analysis characteristics of traffic microsimulation tools, thereby providing more realistic delay calculations on alternative routes to a tolled I-205. The approach bridges the gap between the more commonly used macroscopic and microscopic paradigms. Development of the subarea DTA model is documented in the *I-205 Toll Project Modeling Methodology and Assumptions for EA Technical Memorandum* (ODOT 2022b). A subarea DTA model based on Portland Metro's regional DTA model was developed and refined for this purpose. The subarea DTA model was developed using the Dynameq software package as a collaborative effort between the Project Team, including staff from ODOT, Metro Modeling, and the consultant team.

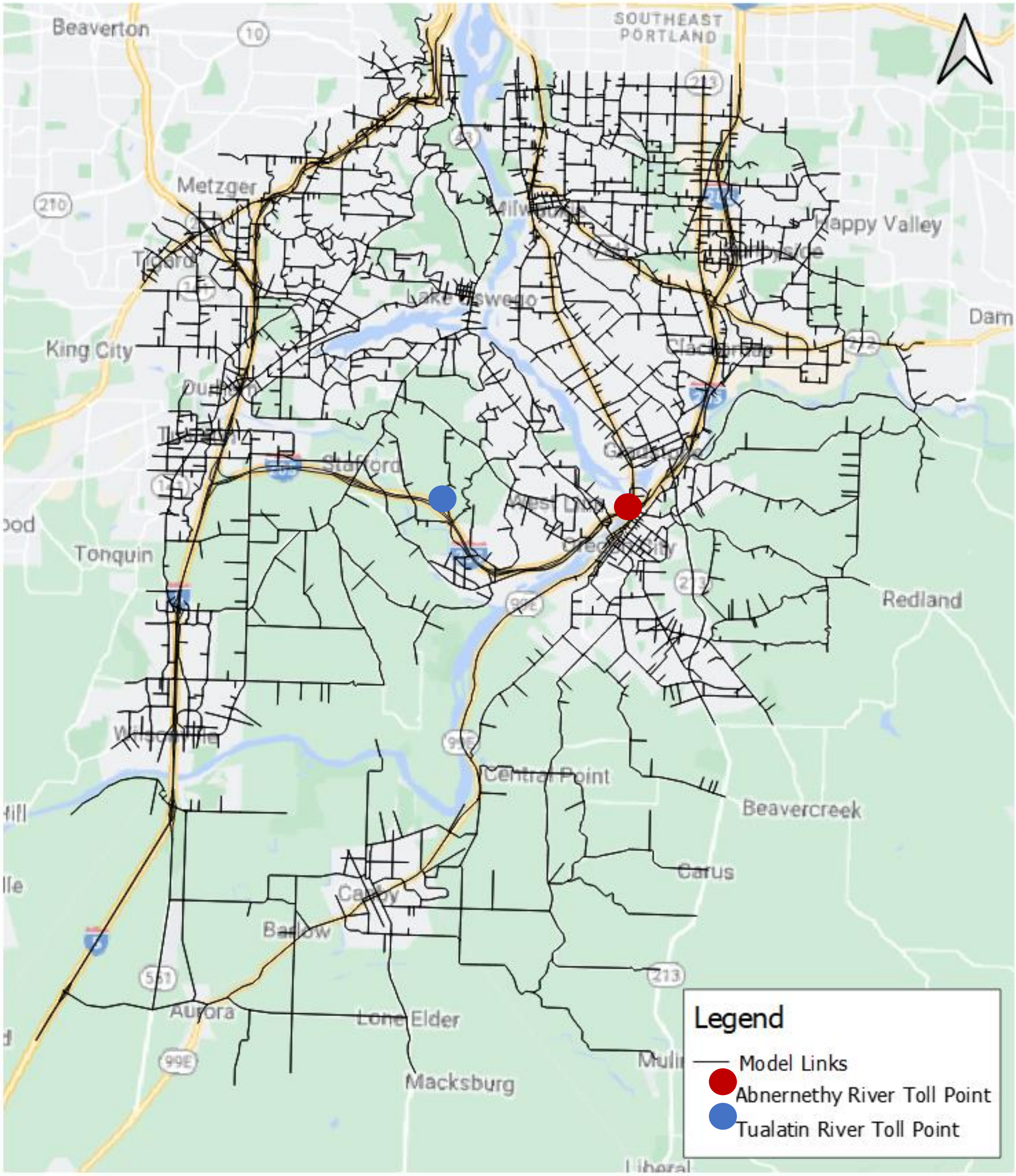
This section documents the modeling assumptions used for the subarea DTA model and provides results from the calibration of the base year model.

6.3.1 Modeling Assumptions

Study Area

The study area of the DTA model includes an approximately 17-mile section of the I-205 corridor extending from I-5 in the west to SE Foster Road in the east. It also includes I-5 from Ehlen Road in the south to OR 10 in the north. The model area includes all freeway interchanges along these sections of I-205 and I-5, as well as the signalized intersections within the model boundary. These intersections are included to evaluate path choice to and from I-205 and I-5, as well as travel patterns parallel to these freeways. The study area is highlighted in Figure 6-2.

Figure 6-2. Study Are of I-205 Dynamic Traffic Assignment Model



Source: Dynameq software n.d.

Time Horizon

The DTA model was developed and calibrated for the same base year of 2015 as the RTDM and updated to represent future 2027 and 2045 horizon years under various scenarios (baseline conditions and with testing strategies). These time horizons are the same as provided with the RTDM.

Time of Day

The DTA model was developed to analyze two average weekday periods: a morning peak period from 7 to 9 a.m. and an afternoon peak period from 4 to 6 p.m. Warm-up and cool down periods of 60 minutes each were incorporated before and after each modeled peak period. This contrasts with the RTDM, which provides hourly forecasts for all 24 hours of the day.

Vehicle Classes

The subarea DTA model includes the following vehicle classes: SOV, HOV, Medium Trucks and Heavy Trucks, and Transit. O-D demand matrices for each class (except Transit) and day period were provided by the RTDM in a resolution of 15-minutes. Each auto vehicle class (SOV and HOV) was further broken out into three sub-classes segmented by income-level. These were used to represent a range of differences in perceived willingness to pay the monetary toll cost, consistent with the vehicle travel demand estimation process in the Metro RTDM and regional DTA model.

Value of Time

Monetary toll costs are represented as equivalent time penalties in the traffic models, based on estimated VOTs in a manner consistent with the RTDM. These VOTs represent willingness to pay and differ depending on the modeled vehicle class. These “toll in minutes” were defined in such a way as to reflect a range of willingness to pay a toll for the different auto and truck vehicle classes. For the DTA model, the perceived time to cross a toll link or segment depended on the simulated travel time plus the VOT and toll cost in minutes for the specific vehicle class.

There are no tolled facilities in the base year (2015), so a VOT assumption was not needed for the initial calibration. For the future horizon DTA models, segmented demand matrices were used, as described above. These assumptions are consistent between the Metro RTDM, regional DTA, and subarea DTA models.

6.3.2 Data Collection

Observed data were used in the calibration and validation of the DTA model, including volumes, speeds, and travel time.

Traffic counts for model comparison and calibration were primarily extracted from ODOT’s Regional Integrated Transportation Information System database. Intersection turning movement traffic counts were collected for AM peak period (7 to 9 a.m.) and PM peak period (4 to 6 p.m.) at a variety of locations within the study area. Observed speed data for I-205 was provided by INRIX and Metro. Point-to-point travel times along key road sections were also obtained from INRIX. Base year signal timing and phasing data for ramp termini intersections and arterial intersections were synthesized by the Dynameq software for the study area. For the critical (to the DTA model) intersection of 7th Street and Main Street in downtown Oregon City, field observation yielded the existing signal timing plan. Metering rates for signalized on-ramps were specified by ODOT and were coded by Metro into the regional Dynameq model and subsequently passed through to the DTA subarea model. When Dynameq signal generation was run for the subarea model, ramp meter controls were excluded and their original coding preserved.

6.3.3 Model Calibration and Validation Procedures

Figure 6-3 outlines the eight-step process used to develop and establish the calibrated Dynameq model.

Figure 6-3. Dynamic Traffic Assignment Calibration Procedure

A) Develop and Implement calibration documentation procedure

B) Checking network coding details – number of lanes, speeds, intersection coding

C) Condensing observed data for analysis, for example importing into Dynameq and spreadsheet

D) AM and PM periods to be calibrated separately, focusing on one, followed by the other

E) Identify model result inconsistencies and adjust model/network parameters, for example response time factors, free speeds, link/intersection delay outliers

F) Calibrate demand through the I-205 corridor, using targeted demand adjustments, then returning to step E) if required

G) Monitor aggregate goodness of fit measures for corridor and individual link level calibration criteria using histogram of GEH

H) Return to step E) if required

The hourly volume is calibrated against the counts based on the GEH (Geoffrey E. Havers) Statistic. The GEH Statistic formula is commonly used in traffic modeling to assess model fit. The expression for the GEH Statistic is shown below.

$$GEH = \sqrt{\frac{2(m-c)^2}{m+c}}$$

Notes:
m = output traffic volume from the simulation model (vph)
c = input traffic volume (vph)

Traffic volume and travel time calibration criteria are shown in Table 6-4 through Table 6-6 for portions of the network considered to be in either the focus area or the impact area. The area type categories were used to conceptualize validation criteria having different importance relative to the proximity of the I-205 corridor. As shown in Figure 6-4, the focus area contains all I-205 mainline links plus some additional important locations near the I-205 mainline. This area had higher calibration requirements. The impact area included the rest of the calibration links in the subarea model.

Figure 6-4. I-205 Dynamic Traffic Assignment Model Subarea and Focus Area

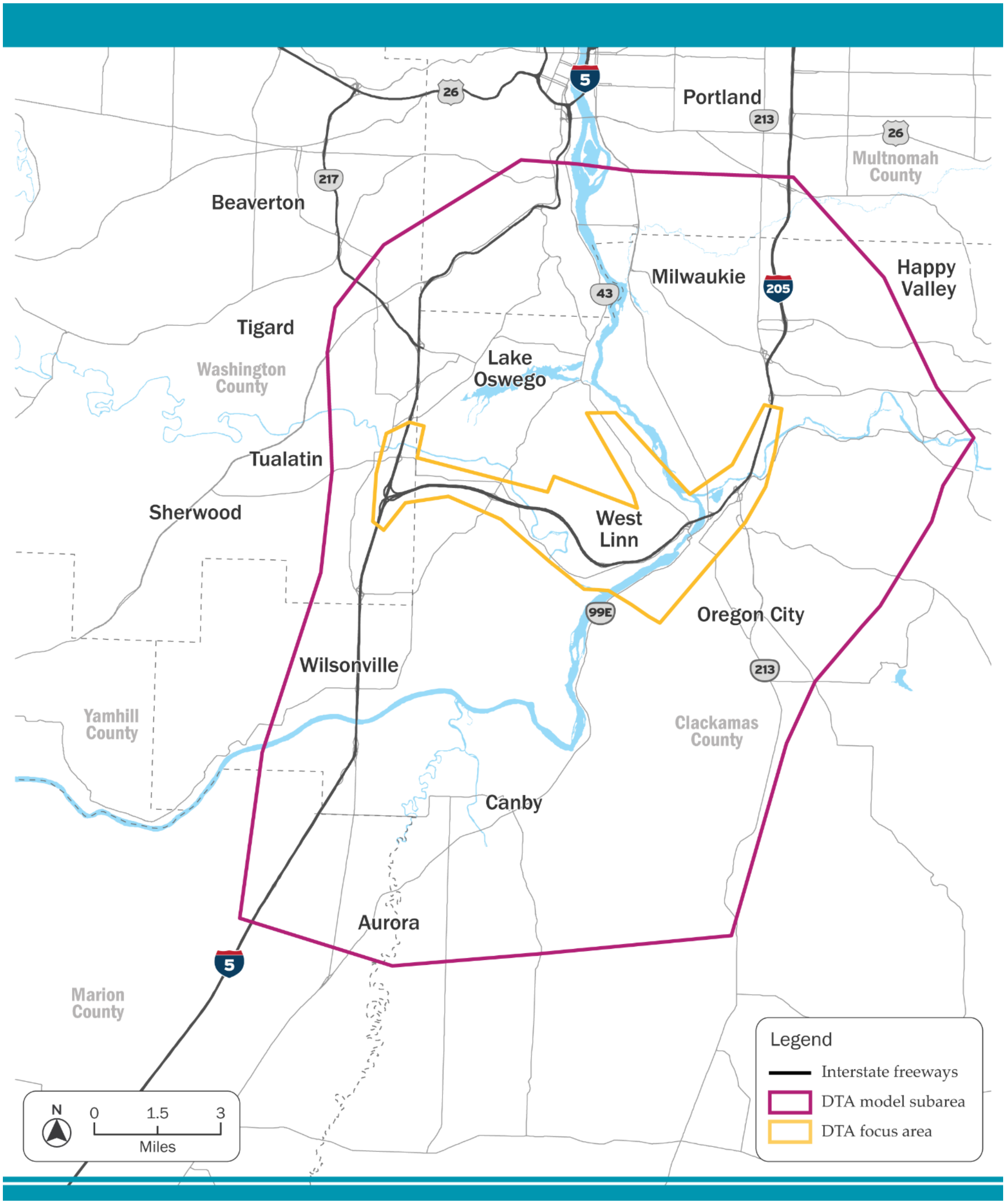


Table 6-4. Segment-Level Volume Validation Criteria

Volume	Focus Area Criteria		Impact Area Criteria	
	GEH Statistic	Target Percent	GEH Statistic	Target Percent
1,500+ vph	< 5	80.0%	< 5	75%
	< 10	90.0%	< 10	85%
	< 15	100.0%	< 15	100%
1,000 – 1,500 vph	< 5	75.0%	< 5	70%
	< 10	80.0%	< 10	75%
	< 15	100.0%	< 15	100%
500 – 1,000 vph	< 5	65.0%	< 5	60%
	< 10	80.0%	< 10	70%
	< 15	100.0%	< 15	100%
100 – 500 vph	< 5	55.0%	< 5	50%
	< 10	55.0%	< 10	50%
	< 15	100.0%	< 15	100%

GEH Statistic = Geoffrey E. Havers Statistic; vph = vehicles per hour

Table 6-5. Aggregate Volume Validation Criteria

Roadway Type	Scatter Plot Goodness-of-fit	DTA Model Area
Freeways	Trendline Slope	1.0 +/- 0.04
	Trendline y-intercept	+/- 5% maximum link Count
	Trendline R2	0.95
Arterials	Trendline Slope	1.0 +/- 0.08
	Trendline y-intercept	+/- 10% maximum link Count
	Trendline R2	0.9

DTA = Dynamic Traffic Assignment

Table 6-6. Corridor Travel Time Validation Criteria

Roadway Type	Criteria Corridor Travel Time Range	Criteria	Target Percent	
			Focus Area Corridors	Impact Area Corridors
Freeways	Observed path time <= 7 minutes	+/- 1 minute	90%	80%
	Observed path time > 7 minutes	+/- 15% of path time	90%	80%
Arterials	Observed path time <= 7 minutes	+/- 1 minute	85%	75%
	Observed path time > 7 minutes	+/- 15% of path time	85%	75%

6.3.4 Model Calibration and Validation Results

2015 Base Year AM Dynamic Traffic Assignment Model

Table 6-7- to

Table 6-9- show the number of links that fall under different ranges of the GEH statistic when compared against the observed traffic counts in the AM peak period. Table 6-7- include statistics for all links considered for calibration. These include all I-205 mainline links, some I-5 links, and some major arterial links in the subarea.

Table 6-9- contains statistics for I-205 mainline links only, while

Table 6-8- contains statistics for all I-205 mainline links plus some additional important locations near the I-205 mainline. As shown in the tables, the model is better calibrated for the 7 to 8 a.m. hour than for the 8 to 9 a.m. hour.

Table 6-7-. 2015 Base Year AM GEH Statistic for Calibration Links

Calibration Links, 7 – 8 a.m.					Calibration Links, 8 – 9 a.m.				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	42	63.6%	80.0%	1	< 5	39	59.1%	80.0%
2	< 10	15	86.4%	90.0%	2	< 10	14	80.3%	90.0%
3	< 15	8	98.5%	100.0%	3	< 15	9	93.9%	100.0%
4	>= 15	1	100.0%		4	>= 15	4	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Table 6-8-. 2015 Base Year AM GEH Statistic for I-205 Corridor Links

I-205 Corridor Links, 7 – 8 a.m.					I-205 Corridor Links, 8 – 9 a.m.				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	37	72.5%	80.0%	1	< 5	30	58.8%	80.0%
2	< 10	10	92.2%	90.0%	2	< 10	12	82.4%	90.0%
3	< 15	3	98.0%	100.0%	3	< 15	8	98.0%	100.0%
4	>= 15	1	100.0%		4	>= 15	1	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Table 6-9-. 2015 Base Year AM GEH Statistic for I-205 Mainline Links

I-205 Mainline Links, 7-8 AM					I-205 Mainline Links, 8-9 AM				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	19	73.1%	80.0%	1	< 5	13	50.0%	80.0%
2	< 10	7	100.0%	90.0%	2	< 10	8	80.8%	90.0%
3	< 15	0	100.0%	100.0%	3	< 15	5	100.0%	100.0%
4	>= 15	0	100.0%		4	>= 15	0	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Travel time data for 192 freeway segments and 272 arterial segments from the model were compared to the observed data. Table 6-10 shows the number and percentage of segments that satisfy the calibration criteria for freeways and arterials in the 2015 base year AM peak period. Figure 6-5 and Figure 6-6 show the percentage of travel time segments that are within the calibration range for every 15-minute time interval on freeways and arterials, respectively. More than 80% of the travel time measurements for the various segments along freeways and arterials from the model are comparable against the observed data.

Table 6-10. 2015 Base Year AM Travel Time Comparison

Freeways				Freeways			
Hours	Slower	Within	Faster	Hours	Slower	Within	Faster
7 – 9 a.m.	4%	86%	9%	7 – 9 a.m.	8	166	18
Arterials				Arterials			
Hours	Slower	Within	Faster	Hours	Slower	Within	Faster
7 – 9 a.m.	12%	81%	7%	7 – 9 a.m.	33	221	18

Figure 6-5. 2015 Base Year AM Travel Time Comparison at Freeways

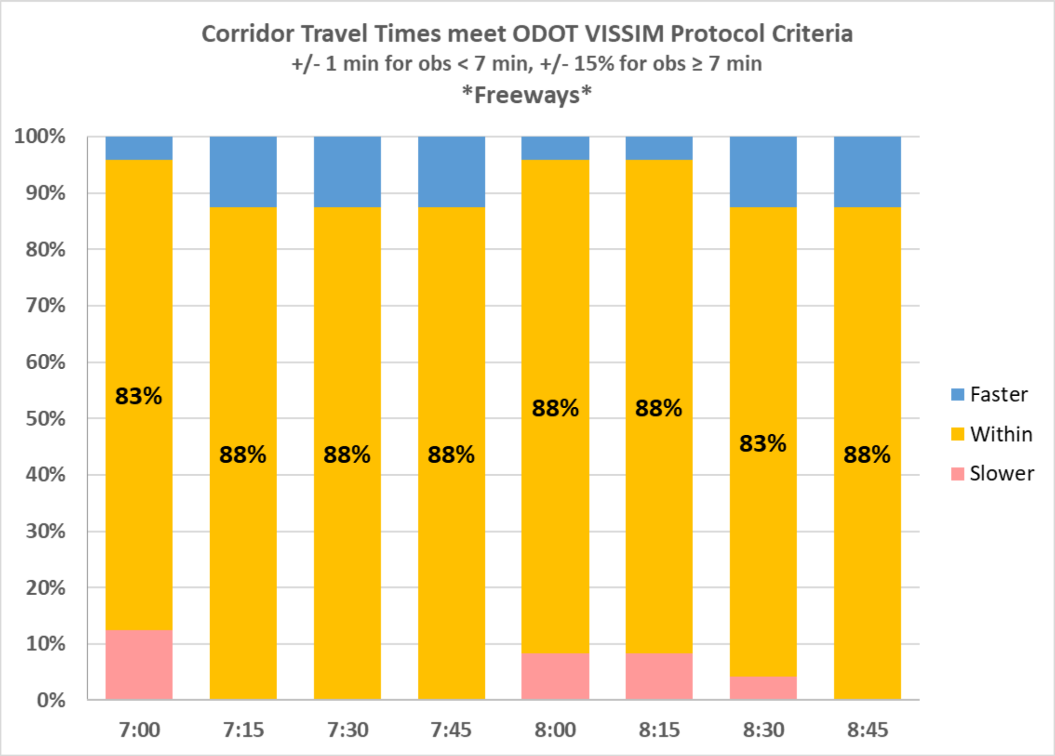


Figure 6-6. 2015 Base Year AM Travel Time Comparison at Arterials

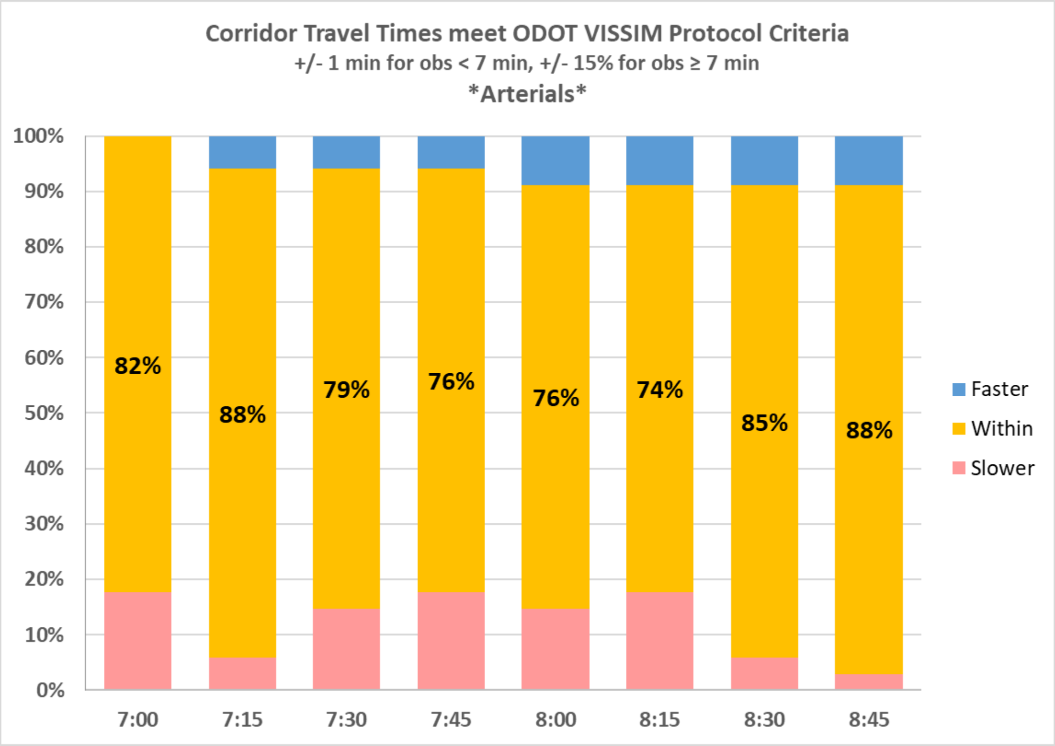


Figure 6-7 and Figure 6-8 show the 2015 base-year speed contour plots from INRIX and the models along I-205 in the AM peak period for the southbound and northbound directions, respectively. These figures show that model simulated speeds are similar to the observed data.

Figure 6-7. AM 2-hr Peak, I-205 Southbound Direction

INRX Speed-Contour Plot, 7 – 9 a.m.	Dynameq Space-Contour Plot, 7 – 9 a.m.

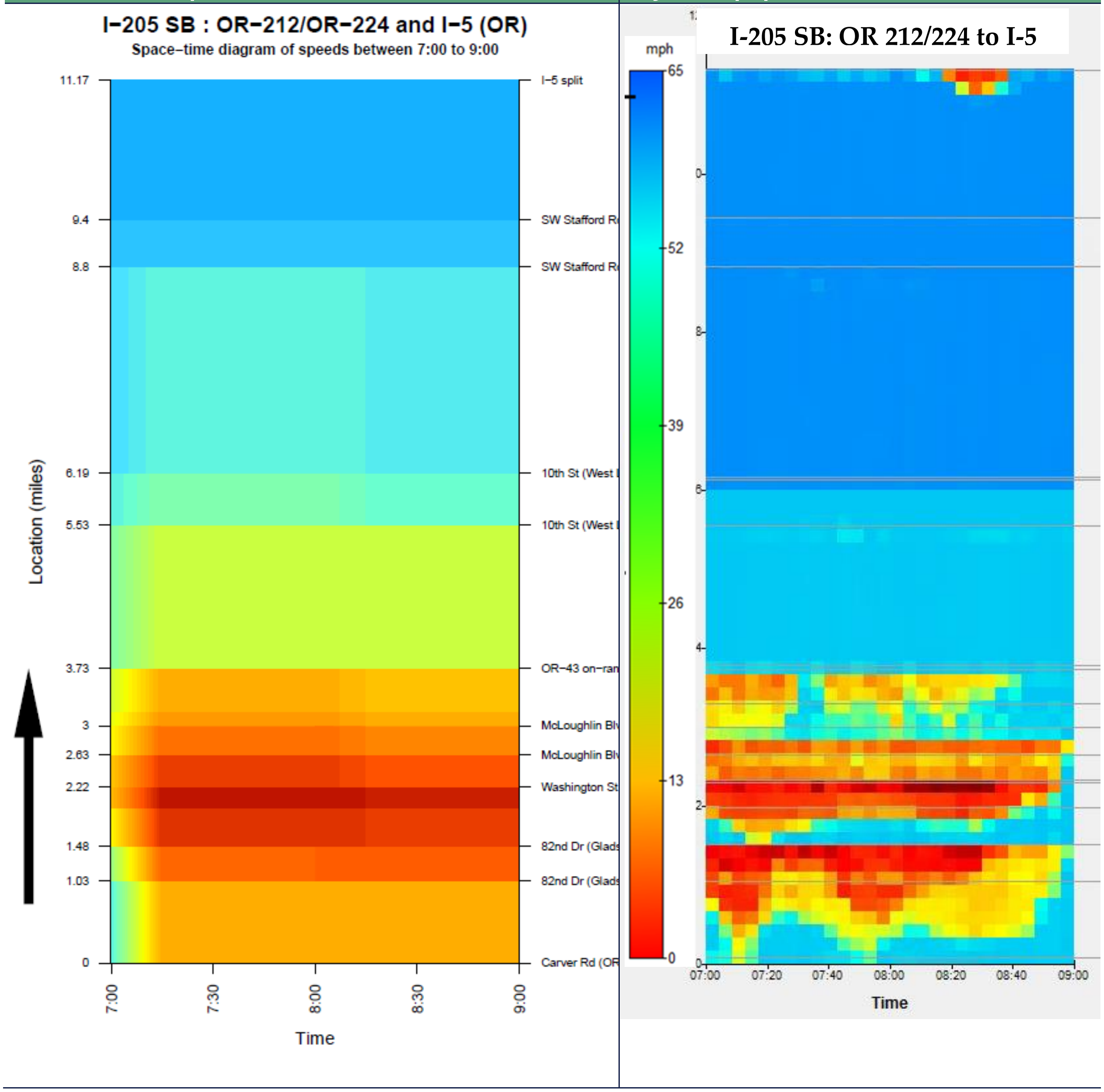
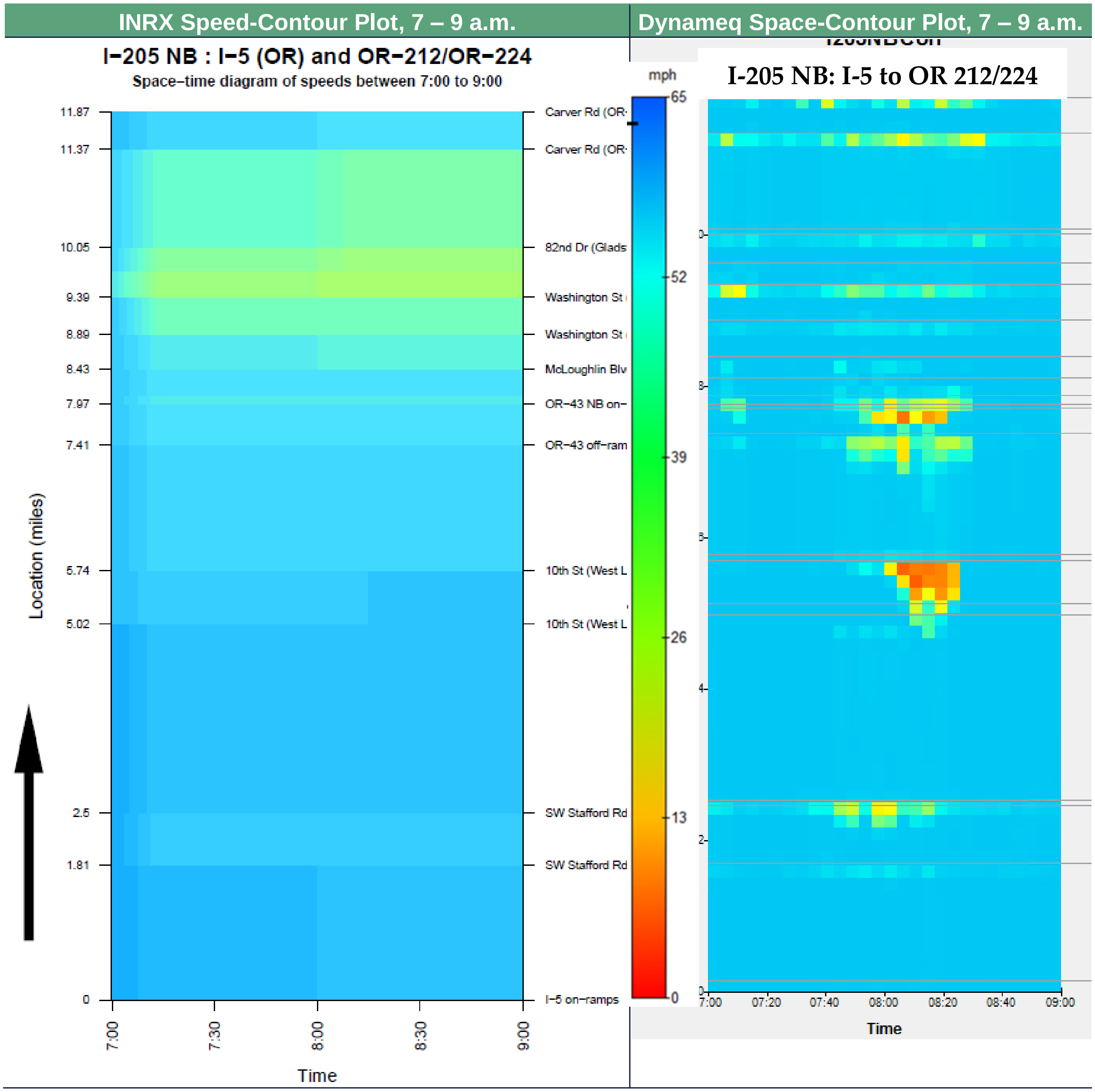


Figure 6-8. AM 2-hr Peak, I-205 Northbound Direction



2015 Base Year PM Peak Period Dynamic Traffic Assignment Model

Table 6-11 to Table 6-13 show the number of links that fall under different ranges of the GEH statistic when compared against the observed year 2015 traffic counts in the PM peak period. Based on the tables, the PM peak-period model is better calibrated at 4 – 5 p.m. than at 5 – 6 p.m.

Table 6-11. 2015 Base Year PM GEH Statistic for Calibration Links

Calibration Links, 4 – 5 p.m.					Calibration Links, 5 – 6 p.m.				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	42	62.7%	80.0%	1	< 5	39	58.2%	80.0%
2	< 10	15	85.1%	90.0%	2	< 10	19	86.6%	90.0%
3	< 15	8	97.0%	100.0%	3	< 15	6	95.5%	100.0%
4	>= 15	2	100.0%		4	>= 15	3	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Table 6-12. 2015 Base Year PM GEH Statistic for I-205 Corridor Links

I-205 Corridor Links, 4 – 5 p.m.					I-205 Corridor Links, 5 – 6 p.m.				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	35	68.6%	80.0%	1	< 5	30	58.8%	80.0%
2	< 10	10	88.2%	90.0%	2	< 10	16	90.2%	90.0%
3	< 15	5	98.0%	100.0%	3	< 15	3	96.1%	100.0%
4	>= 15	1	100.0%		4	>= 15	2	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Table 6-13. 2015 Base Year PM GEH Statistic for I-205 Mainline Links

I-205 Mainline Links, 4 – 5 p.m.					I-205 Mainline Links, 5 – 6 p.m.				
	GEH Statistic	Satisfied	Model	Target		GEH Statistic	Satisfied	Model	Target
1	< 5	22	84.6%	80.0%	1	< 5	16	61.5%	80.0%
2	< 10	3	96.2%	90.0%	2	< 10	7	88.5%	90.0%
3	< 15	1	100.0%	100.0%	3	< 15	2	96.2%	100.0%
4	>= 15	0	100.0%		4	>= 15	1	100.0%	

GEH Statistic = Geoffrey E. Havers Statistic

Table 6-14 shows the number of segments that satisfy the calibration criteria for freeways and arterials in the PM peak period for the 2015 base year. Figure 6-9 and Figure 6-10 show the percentage of travel time segments that are within the calibration range for every 15-minute time interval for freeways and arterials, respectively. More than 80% of the 2015 PM peak-period travel time measurements for the various segments along freeways from the model are comparable against the observed data. The arterials meet the criteria at 78% of the segments.

Table 6-14. 2015 Base Year PM Travel Time comparison

Freeways				Freeways			
Hours	Slower	Within	Faster	Hours	Slower	Within	Faster
4 – 6 p.m.	3%	82%	15%	4 – 6 p.m.	6	158	28
Arterials				**Arterials**			
Hours	**Slower**	**Within**	**Faster**	**Hours**	**Slower**	**Within**	**Faster**
4 – 6 p.m.	8%	78%	14%	4 – 6 p.m.	23	212	37

Figure 6-9. 2015 Base Year PM Travel Time Comparison for Freeways

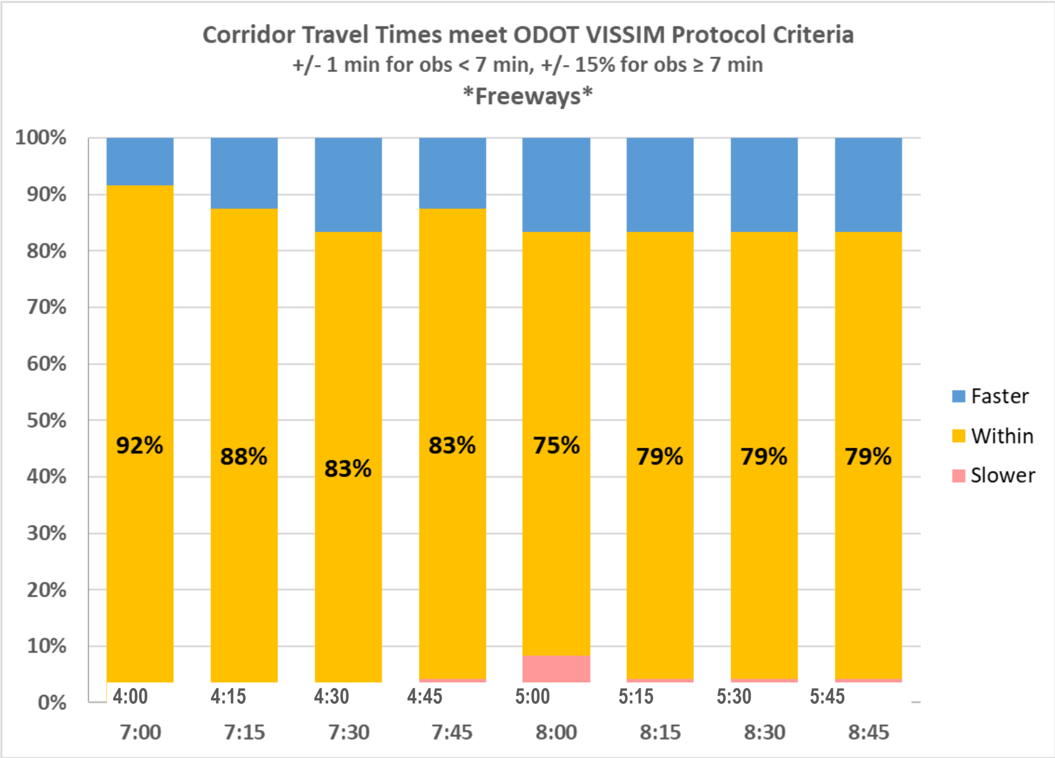


Figure 6-10. 2015 Base Year PM Travel Time Comparison for Arterials

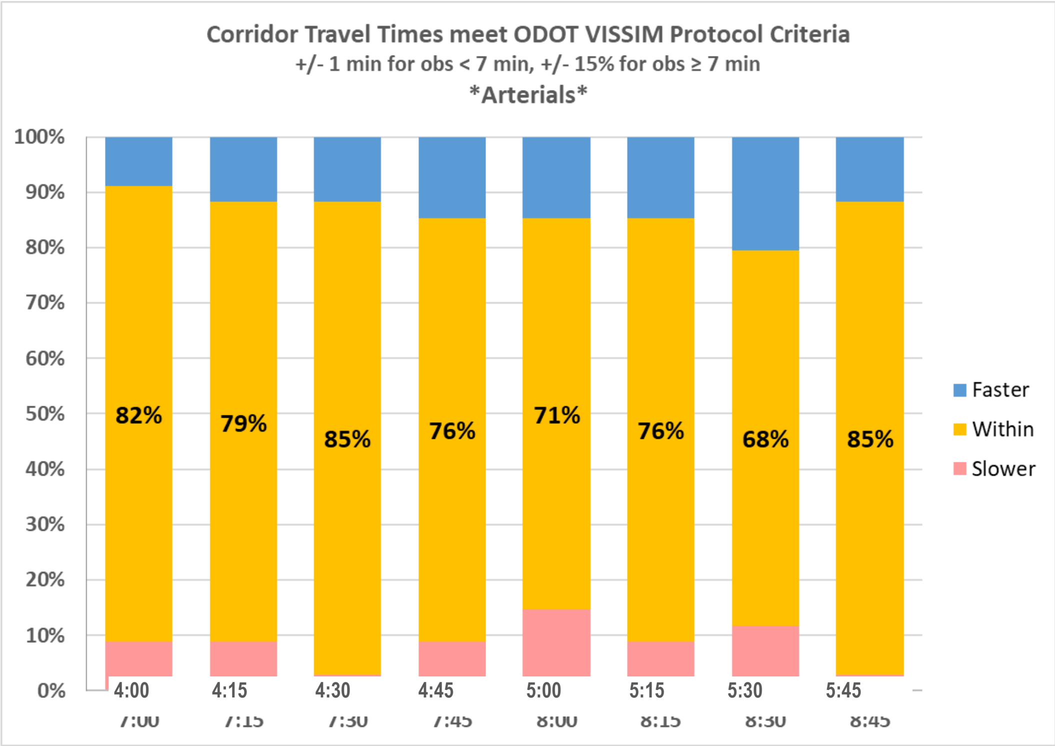


Figure 6-11 and Figure 6-12 show the 2015 base year speed contour plots from INRIX and the models along I-205 in the PM peak period for the southbound and northbound directions, respectively. These figures show that model simulated speeds are similar to the observed data.

Figure 6-11. 2015 Base Year PM 2-hr Peak, I-205 Southbound Direction

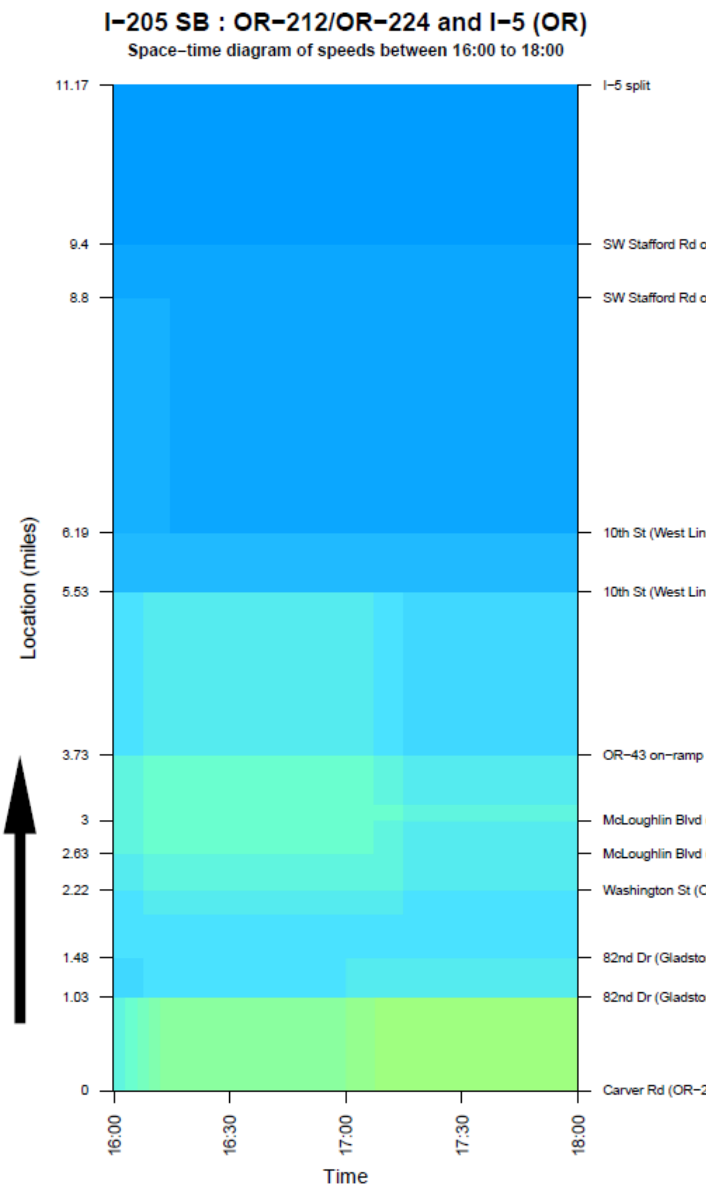
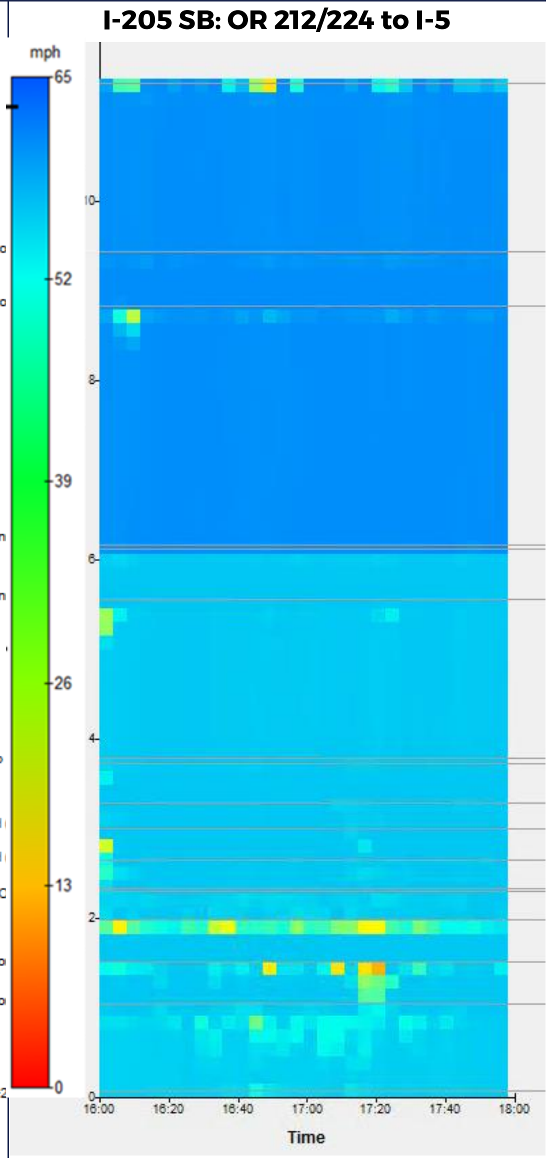
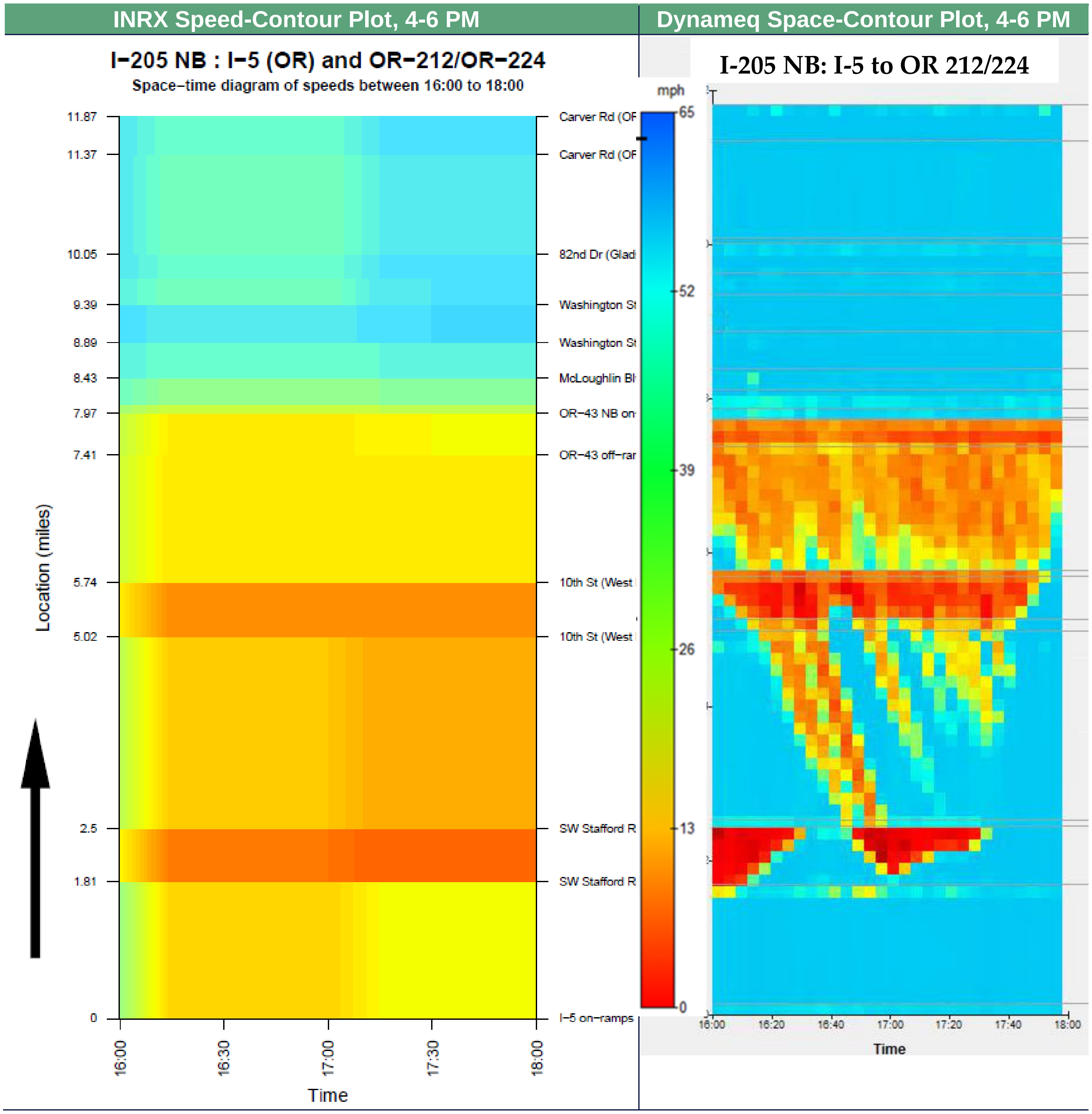
INRX Speed-Contour Plot, 4-6 PM	Dynameq Space-Contour Plot, 4-6 PM
	

Figure 6-12. 2015 Base Year PM 2-hr Peak, I-205 Northbound Direction

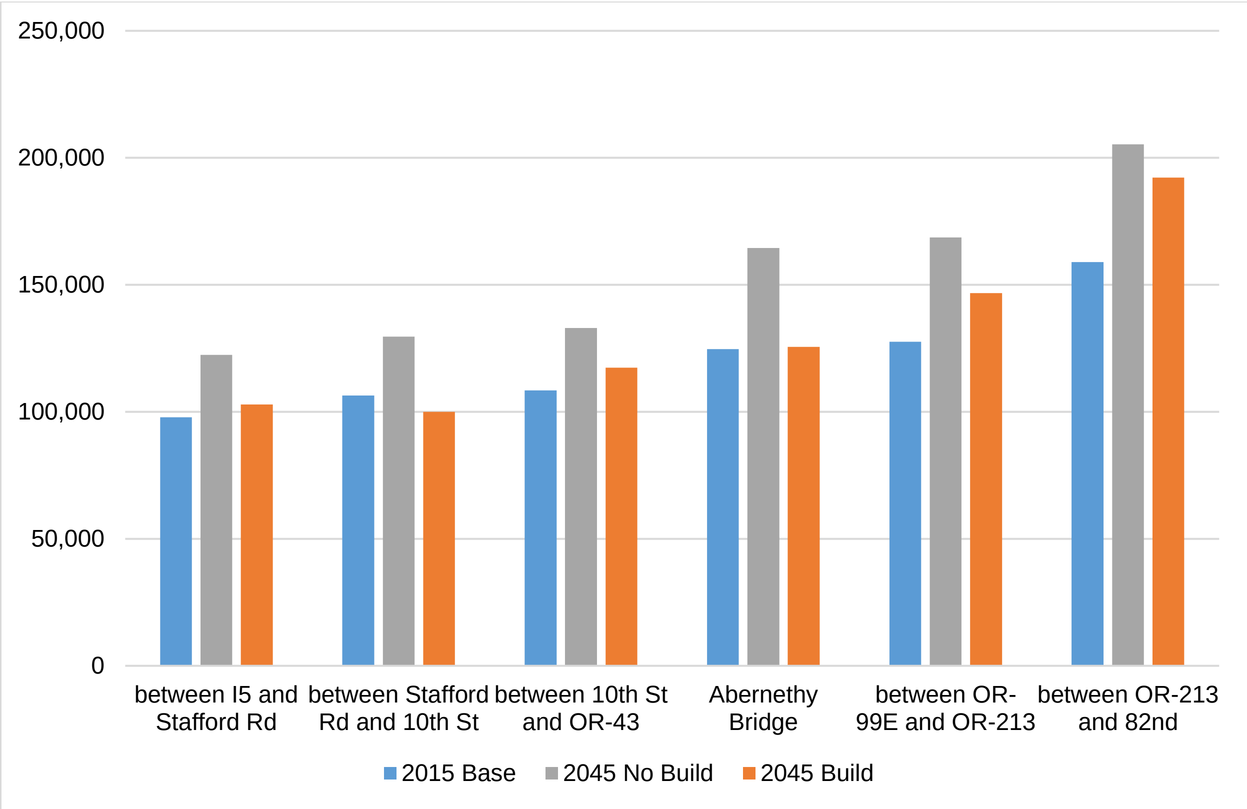


7 Base Case Weekday Model Results

7.1 Context and Findings from the Weekday Model Outputs

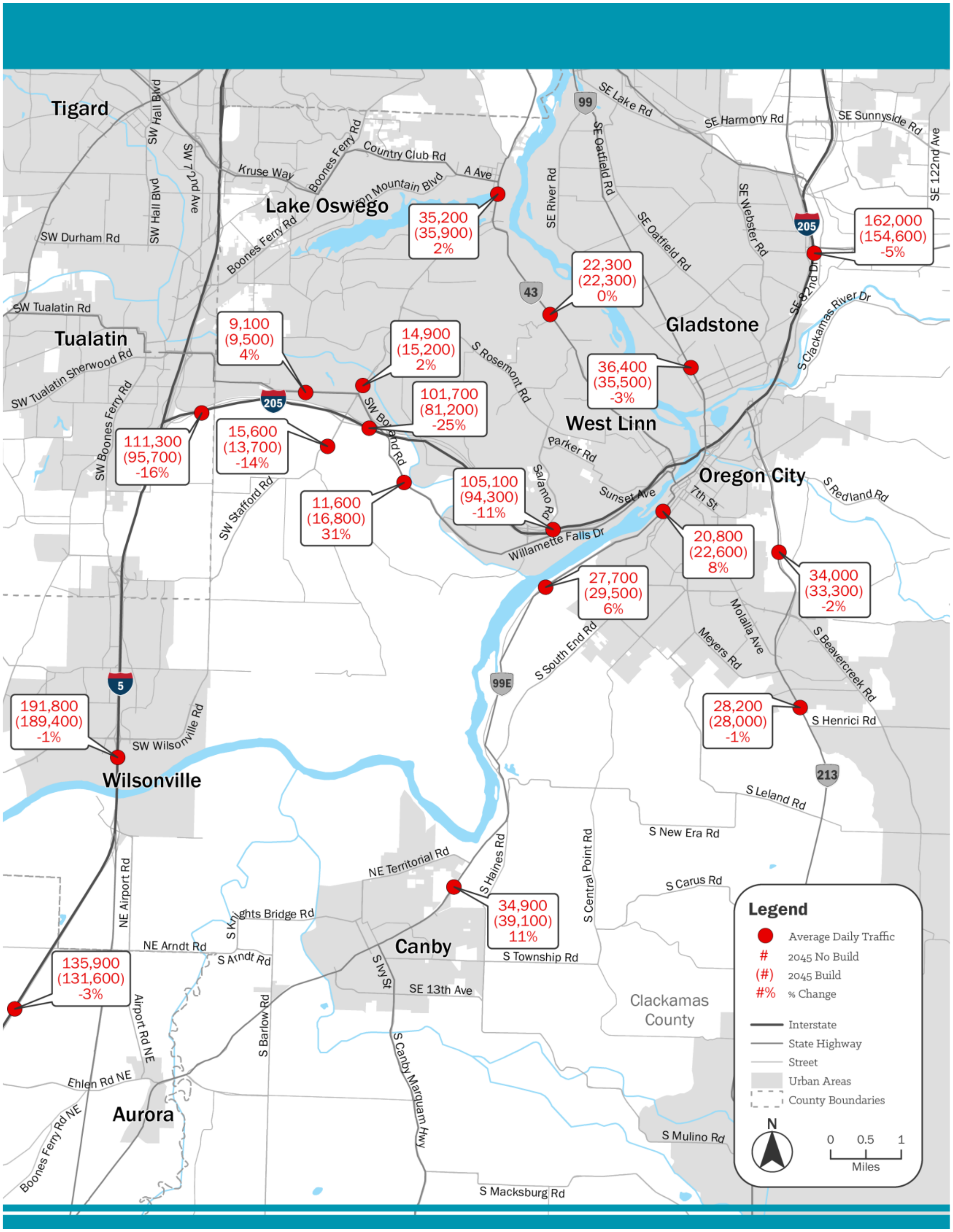
The calibrated RTDM was used for developing daily traffic forecasts for I-205 and the surrounding areas for the 2045 No Build and Build Alternatives. Figure 7-1 displays raw model average weekday volume results for each I-205 segment between I-5 and 82nd Drive. The figure compares the calibrated 2015 base year results with 2045 No Build and Build Alternative results. Volumes between Stafford Road and OR 213 ranged between 106,000 and 128,000 vehicles per weekday (total for both directions) in 2015. For 2045 No Build, without the I-205 Improvements Project or tolling, average weekday volumes are expected to increase by 22% to 32% depending on location, with total volumes ranging from 129,000 to 169,000 vehicles per weekday. With the increased capacity provided by the I-205 Improvements Project coupled with tolling on the facility in the 2045 Build Alternative, weekday volumes are projected to fall between the year 2015 Base Year and 2045 No Build volumes, though they are generally expected to be closer to the 2015 Base Year volumes.

Figure 7-1. Regional Travel Demand Model Average Weekday Daily Volumes by I-205 Segment for 2015 Base Year, 2045 No Build, and 2045 Build Alternatives



Assuming that the bulk of the demand indicated by the 2045 No Build Alternative volumes also would exist under the 2045 Build Alternative, it is clear that the toll on I-205, designed in part to manage congestion on I-205, would cause some diversion, including rerouting to alternative routes. Figure 7-2 shows projected daily traffic volumes in both directions of travel at various study area locations for both the No Build and Build Alternatives. It also indicates the percentage change in Build Alternative volumes expected at each location in comparison to No Build Alternative volumes. These volumes are based on

Figure 7-2. Projected 2045 No Build vs. Build Alternative Average Weekday Traffic Volumes on Key Roadways in Area of Potential Impact



RTDM daily volume forecasts. The analysis projects both decreases and increases in daily traffic volumes depending on location. Surrounding roadway volumes are included for locations that feed into the area of potential impact or could be used as diversions routes. For some facilities that are used to connect to I-205, such as Stafford Road, daily volumes would decrease along with the projected decrease in overall daily volumes for I-205. Larger changes in local roadway volumes would occur closer to the tolled segment of I-205 between Stafford Road and 10th Street. Borland Road and Willamette Falls Drive are parallel routes that are projected to see more daily traffic volume under the Build Alternative as compared with the No Build Alternative. This increase would result from changes in how local drivers access the tolled segment of I-205.

The surrounding roads between 10th Street and OR 43 would see a slight decrease in daily volumes under the Build Alternative as compared to the No Build Alternative. The I-205 segment in this area would not be tolled and would have an additional lane of capacity in both directions under the Build Alternative. Therefore, instead of localized rerouting for toll avoidance along this part of the corridor, I-205 would likely attract traffic away from local streets because of the expected improvements in traffic performance caused by the additional capacity. Near the Abernethy Bridge, traffic volumes would increase in downtown Oregon City and across the Arch Bridge because a portion of travelers would reroute their trips to avoid the toll on the Abernethy Bridge. Much of this volume increase would occur during less congested, off-peak travel times.

OR 99E currently serves as an alternative route for connections between I-5 south of the Ehlen Road interchange and the I-205/Oregon City area when traffic on I-5 and I-205 is congested. Analysis shows a general increase in daily traffic volumes under the Build Alternative as compared to the No Build Alternative in and around Canby. With the added capacity to I-205 under the Build Alternative and the associated reduction of congestion, some of the traffic currently rerouting during congested peak periods is expected to return to I-205 because of the improved travel times.

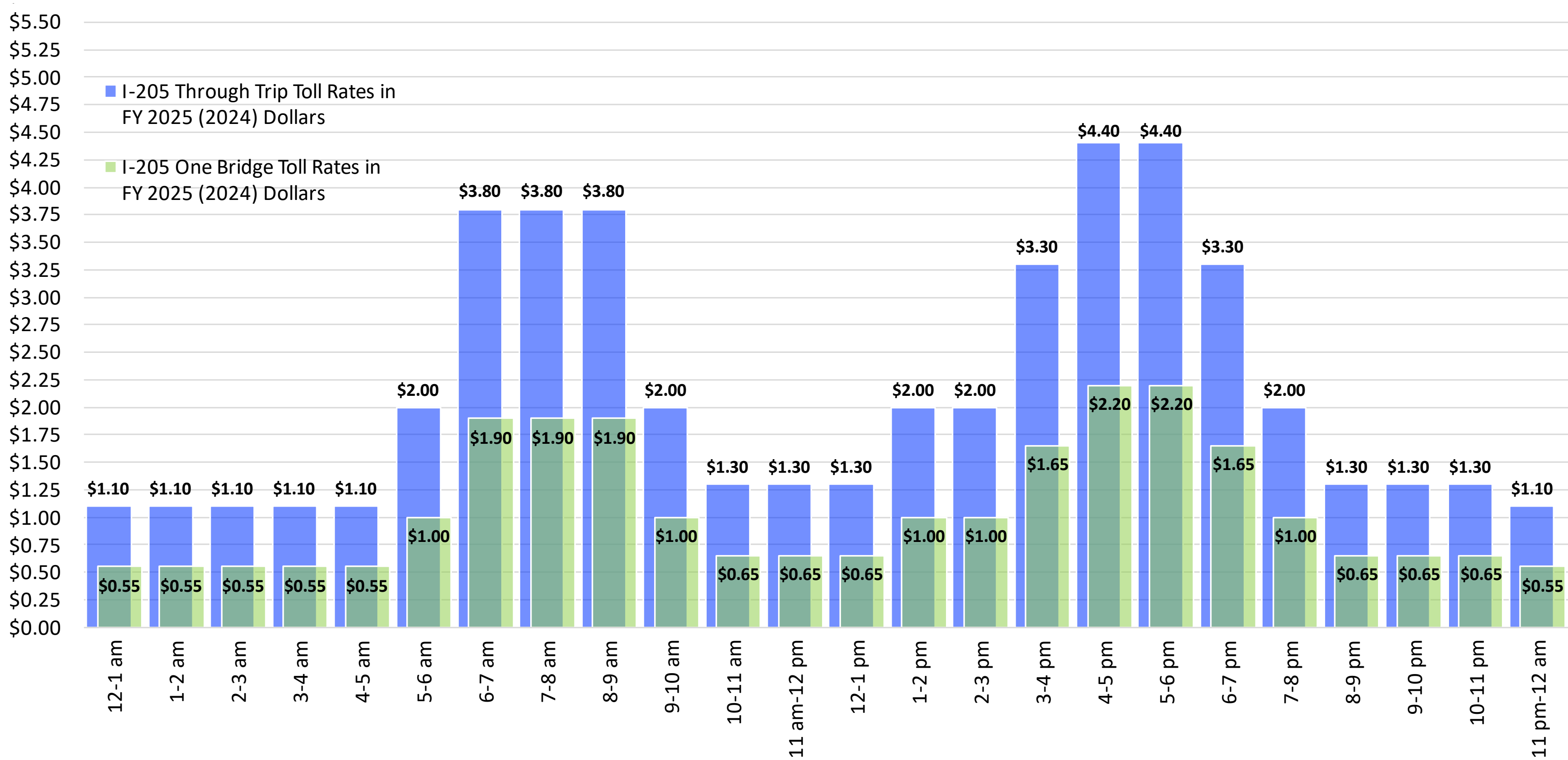
7.2 Toll Rate Schedule in model year, FY 2025

Table 7-1 presents the through trip toll rate schedule modeled for this study by the three vehicle classes for registered customers, expressed in year-of-opening FY 2025 dollars. Figure **7-3** illustrates the one segment (bridge) and through trip (two segments/bridges) toll rates for registered customer autos, expressed in year-of-opening FY 2025 dollars. Toll rates are assumed to remain constant in real terms over time, meaning that they will escalate to keep pace with general price inflation, assumed to be 2.15% per year. Tolls for unregistered customers are assumed to be $2.00 higher per trip (one or two segments) to cover the additional costs of processing a toll bill by mail and potential leakage associated with this payment method.

Table 7-1. Through Trip Toll Rate Assumptions by Time Period (FY 2025 Dollars)

Period	Hours	Auto Toll	Medium Truck Toll	Heavy Truck Toll
PM Peak	4 – 6 p.m.	$4.40	$8.80	$17.60
AM Peak	6 – 9 a.m.	$3.80	$7.60	$15.20
Shoulder	3 – 4 p.m., 6 – 7 p.m.	$3.30	$6.60	$13.20
Transition	5 – 6 a.m., 9 – 10 a.m., 1 – 3 p.m., 7 – 8 p.m.	$2.00	$4.00	$8.00
Off Peak	10 a.m. – 1 p.m., 8 – 11 p.m.	$1.30	$2.60	$5.20
Overnight	11 p.m. – 5 a.m.	$1.10	$2.20	$4.40

Figure 7-3. One Segment and Through Trip Toll Rates (FY 2025 Dollars)



7.3 Forecasted Weekday Trips by Time-Period

Average directional hourly volume forecasts over the course of a typical weekday were developed for future years 2027 and 2045 at the two toll locations along I-205—the Abernethy Bridge and Tualatin River Bridges. The primary base for these volumes is the RTDM; however, in addition to the RTDM, the Project Team used the aforementioned DTA model, outlined in Section 6, to gauge segment-level volume changes for the more congested AM and PM peak periods. Consequently, hourly volume forecasts for the hours between 7 and 9 a.m. and 4 and 6 p.m. are based on DTA model results. All other hourly forecasts are based on the RTDM results. Future year (2027 and 2045) Build Alternative volumes were post-processed to address base year model calibration differences that likely affected future year forecasts. This included the following steps:

- Hourly 2015 observed volumes were compared to 2015 Base Year raw model hourly estimates.
- The proportionate difference between 2015 actual volumes and estimated raw model volumes was applied to the raw Future No Build model volumes to produce adjusted Future No Build forecasts.
- The difference between the Future Build and No Build raw model estimated volumes was then applied to the 2045 No Build post-processed forecasts to develop post-processed 2045 Build hourly forecasts.

For the weekday peak periods, the DTA volumes were generally higher than the RTDM volumes. This expected result is due to the inability of the RTDM to reflect true travel-time impacts caused by overly congested conditions on alternative routes. The DTA model, which includes the effects of traffic signals and queues that back up into adjacent intersections, provides a more realistic depiction of the true travel times on toll-free alternative routes under congested conditions. The reason why the DTA model projects higher volumes on I-205 during the peak periods is because it more accurately reflects the extremely slow travel times on alternative routes using the local arterial system. Because I-205 in the Build Alternative has added capacity, and the surrounding network is so congested, the DTA model projects that more corridor users will choose to pay the toll than use the congested alternative routes. Hourly DTA volumes were post-processed for use in the traffic analyses summarized in the *I-205 Toll Project Transportation Technical Report (ODOT 2022c)*, and the methodology for that process is documented in the report. Additionally, to make sure that volumes from DTA model were in alignment with those from the RTDM, a process that shifted volumes between adjacent hours to better balance the transition between DTA output and RTDM output was conducted.

The RTDM forecasts traffic volumes by direction across multiple vehicle classes. The sum of the hourly forecasts by vehicle type equals the total vehicle volume forecasts. For the post-processed volumes, the breakdown of vehicle classifications reflected in the model were compared to actual classification counts. For the base year 2015, it was found that the model substantially underestimated the percentage share of trucks at both the toll point locations. Conversely, the model projected roughly a doubling of the truck percentages by the year 2045, reflecting much higher growth than autos. To provide a reasonable truck mix for 2027, the existing truck percentage shares were applied to the post-processed total model volumes. Additionally, for year 2045, the growth rates in modeled truck traffic were constrained to maintain constant medium and heavy truck shares at their 2027 levels. This results in more conservative traffic and revenue projections for trucks in future years relative to the model forecasts in which the toll traffic forecasts limit truck growth rates to those of autos.

In addition to the forecasted volumes at each toll location, trips that were projected to travel through both toll locations were also estimated.

7.3.1 FY 2027 Forecasted Weekday Trips by Time Period

Hourly traffic forecasts by vehicle classification at each of the two toll point locations were developed for years 2027 and 2045. Additionally, traffic volume estimates from implementing tolling prior to completion of the I-205 Improvements Project were also estimated.

Pre-Completion Tolling Results

Under the Build Alternative, ODOT would begin tolling I-205 prior to completion of the Improvements Project. For this study, pre-completion tolling is assumed to begin on December 1, 2024. This includes tolling across the Abernethy Bridge and the Tualatin River Bridges during construction. For the pre-completion tolling period (extending until April 1, 2027, under T&R Study Scenario A and October 1, 2028, under Scenario B), only two through lanes would be in place between Stafford Road and OR 213 (same as existing).

While tolling is anticipated to begin in late 2024, the I-205 Improvements Project is not expected to be completed until the second quarter of 2027 at the earliest. Traffic data and demand modeling for 2027 was used to develop and back-cast pre-completion toll volumes because it represents the last year of the construction phase and an assessment of the highest potential rerouting during this period. Table 7-2 summarizes the expected change in daily traffic volumes on I-205 through the Project corridor as a result of tolling during of the I-205 Improvements Project construction period from late 2024 to 2027 and compares them to traffic volumes under the No Build Alternative during that same period, traffic volumes in 2015, and traffic volumes for the Build Alternative in 2027 with the I-205 Improvements Project construction complete. Daily volumes shown are before the consideration of tolling ramp-up effects applied to annual forecasts and described in Chapter 9. Table 7-3 shows the change in daily volumes with pre-completion tolling and the Build Alternative in comparison to the No Build Alternative. Analysis indicates tolling both the Abernethy Bridge and Tualatin River Bridges together could result in an average daily traffic reduction of 20% to 30% through the I-205 corridor, with the largest reductions occurring on the two segments that include the toll gantries.

Table 7-2. Projected Average Weekday Pre-Completion Toll Volumes on I-205

Segment	Vehicle Trips Total Daily Volumes			
		Pre-Completion Tolling[1]		
	2015 Base	No Build	Abernethy Bridge and Tualatin River Bridges	2027 Build
Between I-5 and Stafford Rd	97,904	109,246	78,671	81,842
Between Stafford Rd and 10th St	106,376	118,752	72,293	76,782
Between 10th St and OR 43	108,443	121,695	87,785	92,641
Abernethy Bridge	124,658	144,516	94,740	97,519
Between OR 99E and OR 213	127,523	147,655	117,212	119,290
Between OR 213 and 82nd Dr	158,989	181,487	162,619	164,047
Average	**120,649**	**137,225**	**102,220**	**105,353**

[1] Tolling is expected to start in late 2024.

I- = Interstate; OR = Oregon Route

Table 7-3. Projected Changes in Average Weekday Pre-Completion Toll Volumes on I-205 – No Toll vs. Tolled Conditions

Segment	Change in Volume from No Build		% Change in Volume from No Build	
	2027 Pre-Completion Tolling[1]	2027 Post - Completion (Build Case)	2027 Pre-Completion Tolling*	2027 Post - Completion (Build Case)
Between I-5 and Stafford Rd	-30,575	-27,404	-28%	-25%
Between Stafford Rd and 10th St	-46,459	-41,970	-39%	-35%
Between 10th St and OR-43	-33,910	-29,054	-28%	-24%
Abernethy Bridge	-49,776	-46,997	-34%	-33%
Between OR 99E and OR 213	-30,443	-28,365	-21%	-19%
Between OR 213 and 82nd Dr	-18,868	-17,440	-10%	-10%
Average	**-35,005**	**-31,872**	**-26%**	**-23%**

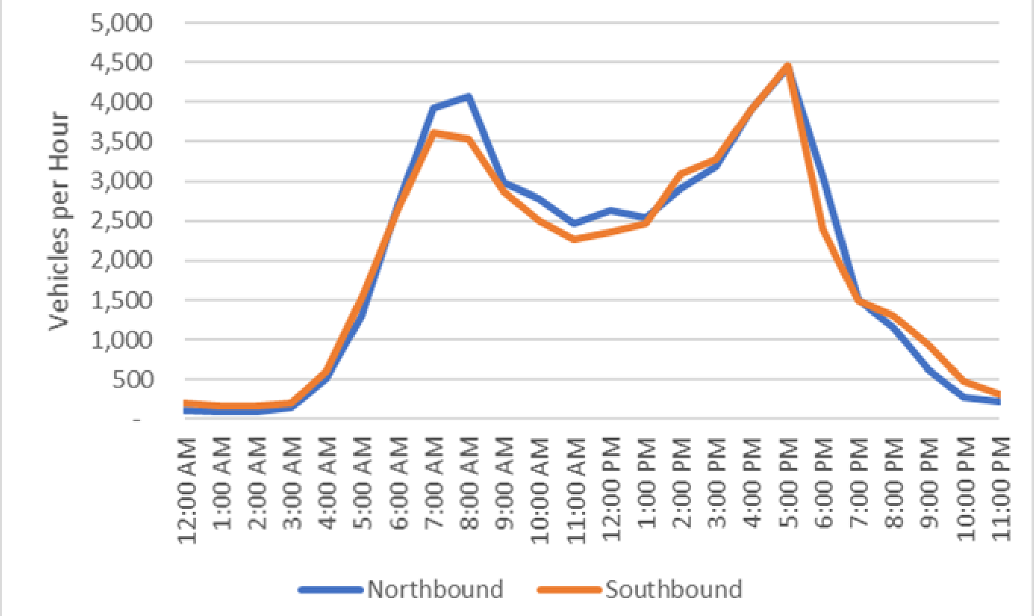
[1] Tolling is expected to start in late 2024.

I- = Interstate; OR = Oregon Route

FY 2027 Post-Completion Tolling Results.

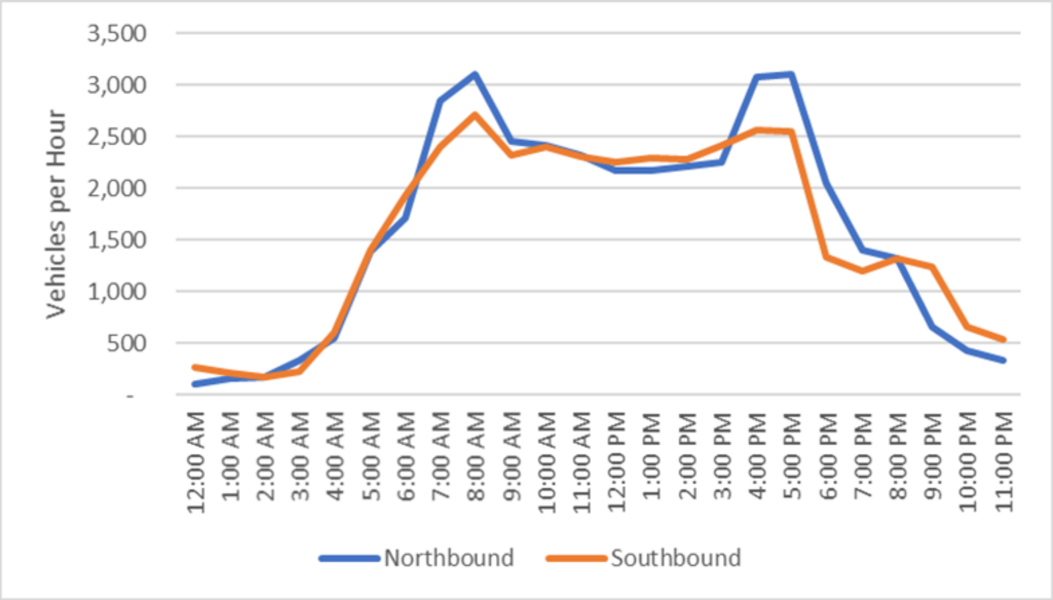
Year 2027 Build hourly volume forecasts for total vehicles are shown in Figure 7-4 and Figure 7-5 for the Abernethy Bridge and Tualatin River Bridges, respectively. These volumes reflect the scenario when the I-205 Improvements Project is completed by 2027 and tolling is applied. Detailed breakout of the forecasts by hour and vehicle classification is included in Appendix A. Generally, in comparison to historical volumes (e.g., year 2017, see Figure 3-5) year 2027 Build volumes are projected to be slightly lower in the AM peak period, and slightly higher in the PM peak period across the Abernethy Bridge, and generally slightly lower between I-5 and Stafford Road in both peak periods (see Figure 3-4. In 2045, Build Alternative volumes are expected to increase from 2027 on the Abernethy Bridge by about 5 percent in the AM peak period, and 15 percent in the PM peak period. Between I-5 and Stafford Road, 2045 Build Alternative volumes are expected to increase by roughly 7 percent in the AM peak period, and 23 percent in the PM peak hour.

Figure 7-4. Projected FY 2027 Build Alternative Weekday Volumes at Abernethy Bridge



Source: ODOT 2022a

Figure 7-5. Projected FY 2027 Build Alternative Weekday Volumes at Tualatin River Bridges

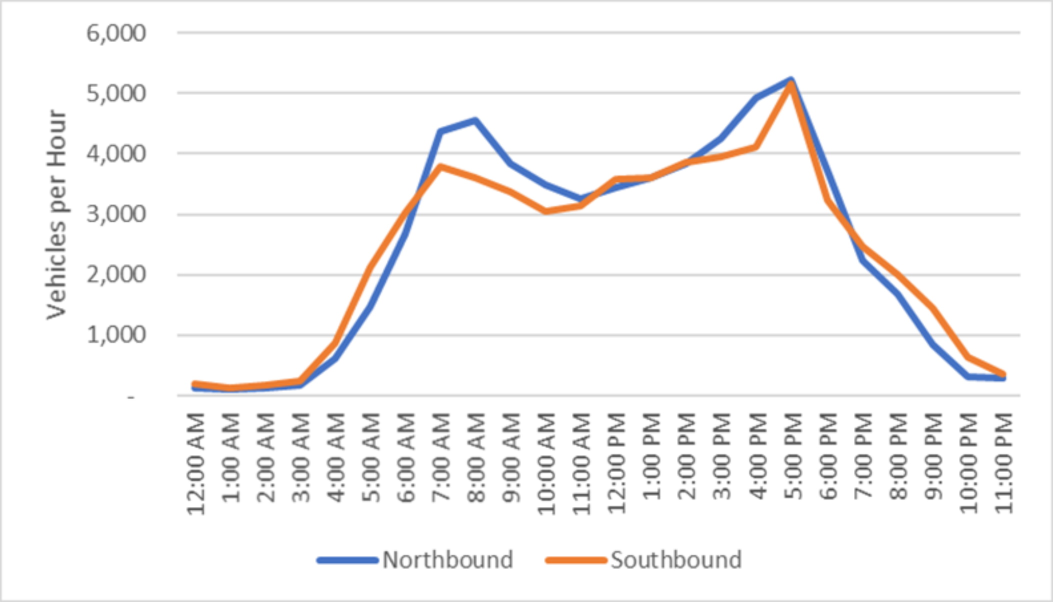


Source: ODOT 2022a

7.3.2 FY 2045 Forecasted Weekday Trips by Time-Period

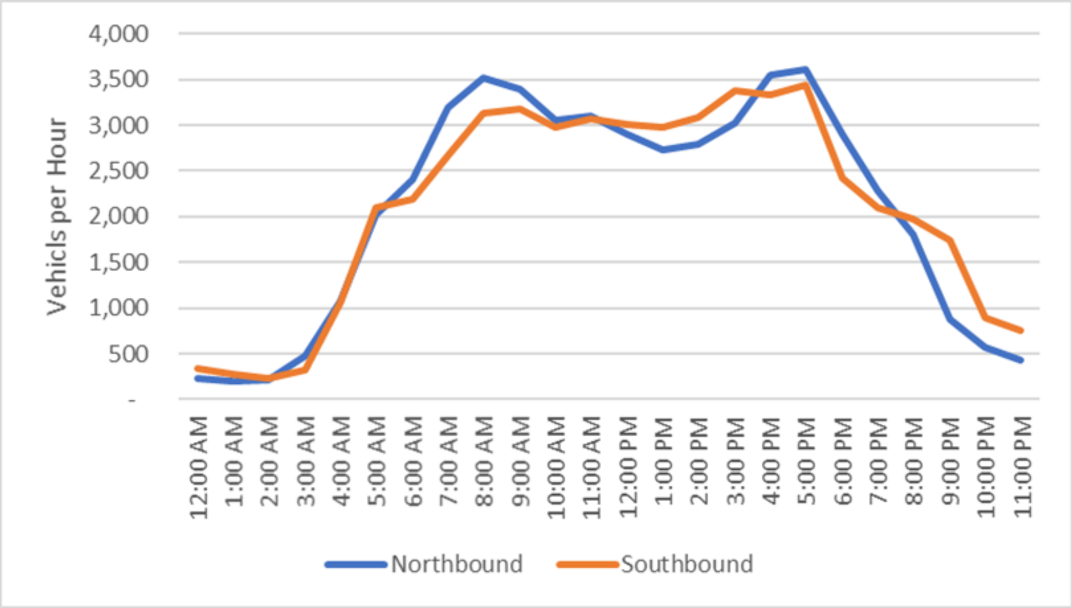
Year 2045 Build hourly volume forecasts for total vehicles are shown in Figure 7-6 and Figure 7-7 for the Abernethy Bridge and Tualatin River Bridges, respectively. Detailed breakout of the forecasts by hour and vehicle classification is included in Appendix A.

Figure 7-6. Projected FY 2045 Build Alternative Weekday Volumes at Abernethy Bridge



Source: ODOT 2022a

Figure 7-7. Projected FY 2045 Build Alternative Weekday Volumes at Tualatin River Bridges



Source: ODOT 2022a

8 Sensitivity Tests

As described in Section 6, Metro's RTDM was refined in preparation of the I-205 Toll Project EA, during which the balanced variable toll rate schedule used for the EA analysis and this toll T&R study were developed (see Figure **7-3**). This process included performing a series of sensitivity tests with different toll rate schedules and policy assumptions to evaluate potential changes in daily traffic volume and gross toll revenue due to these assumptions. The reference point for these tests, referred to herein at the preliminary baseline schedule, is also referred to as Alternative 3 in the *I-205 Toll Project Comparison of Screening Alternatives Report* (ODOT 2021d). The preliminary baseline toll schedule includes toll points at both the Abernethy Bridge and Tualatin River Bridges and is similar to but exhibits less variability than the subsequent toll rate schedule adopted for this study and the NEPA work, with rates ranging from $1.73 midday to $3.45 in the peak periods in FY 2025 dollars for through trips. Additionally, no overnight tolls were assumed in this preliminary baseline toll schedule, and all modeled vehicle classes were assumed to pay the same toll.

8.1 Technical Approach

The preliminary baseline toll rate schedule, combined with the sensitivity tests pivoting around it, helped to shape the subsequent toll rate schedule underlying the revenue projections presented in this study and the NEPA analysis. In particular, the sensitivity tests provide indicative percentage changes in daily traffic volumes and gross toll revenues that would result from the various toll policy tests.

The Metro RTDM was used to perform the sensitivity tests that compare alternative toll scenarios to aforementioned preliminary baseline toll schedule. All cases maintain the full set of I-205 corridor improvements. The tests reflect six different sets of toll rate schedule and policy assumptions described below, with changes in modeled daily traffic volumes and gross toll revenues reported relative to the preliminary baseline toll schedule.[3]

8.2 Tests

The six toll rate sensitivity tests modeled vary from the preliminary baseline toll schedule as follows:

- Low toll test: 33% decrease in toll rates for all vehicle classes
- High toll test: 33% increase in toll rates for all vehicle classes
- Add low overnight tolls test: $1.15 toll (FY 2025 dollars) per through trip for all vehicle classes during overnight hours
- Add high overnight toll test: $1.73 toll (FY 2025 dollars) per through trip for all vehicle classes during overnight hours
- Low-income discount test: 50% decrease in toll rate for the low-income vehicle class
- Truck toll multiplier test: 100% toll increase (double) for the medium truck class and 200% toll increase (triple) for the heavy truck class

[3] The DTA modeling approach described in Section 6.3 was not incorporated in the Sensitivity Test, as they were designed to test and provide direction for toll rate scheduled refinement and policy development prior to developing the Level 2 toll T&R forecast.

8.3 Results

Table 8-1 shows relative changes in daily traffic volumes and gross toll revenues for each of the six tests modeled compared to the preliminary baseline (Alternative 3) reference point. The estimated daily volume change is shown for the total of the two tolled segments of I-205. These results are based on raw model outputs before post-processing and therefore should be considered approximate or high-level indicators of the tradeoffs.

Table 8-1. Comparison of Potential Toll Rate Tests to Base Toll Rate

Impact Measure	Low Toll Test (-33% or 66% of Base Toll)	High Toll Test (+33% or 133% of Base Toll)	Low Overnight Toll Test ($1.15 for through trip)	High Overnight Toll Test ($1.73 for through trip)	Truck Toll Multiplier Test (2x and 3x Base Toll for Medium and Heavy Trucks)	Low-Income Discount Toll Test (50% of Base Toll for Low-Income)
% Change in Daily Traffic Volume	+16%	-15%	-3%	-4%	-2%	+2%
% Change in Gross Toll Revenue	-22%	+13%	+2%	+2%	+15%	-1%

Results from the sensitivity tests showed that peak hours have the greatest potential for increasing gross toll revenue with relativity limited additional diversion due to rerouting to avoid tolls. On the other hand, higher tolls during off-peak hours are expected to result in relatively high rates of diversion or other changes in travel behavior without substantially increasing gross revenues.

Results of the sensitivity tests of overnight tolls indicate that even the highest overnight toll rates tested would have a very small impact on total daily gross revenue. Because overnight demand is relatively low and congestion at these hours is not an issue, applying tolls during these hours does not contribute significantly to gross or net toll revenues. However, there may be other policy reasons for maintaining even a low toll during all hours of the day.

9 Annual Potential Gross Traffic and Revenue Forecasts

This chapter presents the I-205 annual gross traffic potential and revenue forecasts for the two scenarios analyzed and includes a discussion of the assumptions, annual expansion factors, interpolation between forecast model years, ramp-up factors, and annualized toll trips and toll revenues forecasts over a 36-year forecast horizon.

9.1 Traffic and Revenue Scenarios

Table 9-1 summarizes the key differences between the two scenarios considered (Scenarios A and B), both of which include pre-completion tolling starting concurrently on both the Abernethy Bridge and Tualatin River Bridges, but which differ in their duration to align with early and late bookend dates for completing the I-205 Improvements Project.

Table 9-1. I-205 Pre-Completion Tolling Timelines – Scenarios A and B

Tolling Phase (Both Bridges)	Scenario A	Scenario B
Pre-Completion Tolling	December 1, 2024 (FY 2025)	December 1, 2024 (FY 2025)
Post-Completion Tolling	April 1, 2027 (FY 2027)	October 1, 2028 (FY 2029)

Source: ODOT

FY = Fiscal Year

9.2 Annualization Assumptions

Annualized toll traffic and revenue projections were generated over a 36-year forecast horizon by factoring the typical weekday traffic and revenue values modeled for forecast years 2027 and 2045, as presented in Chapter 7. Traffic is measured as the volume of distinct customer trips, where a trip may include travel across only one or both toll bridges.

Separate annual expansion factors were developed for converting the average weekday toll trips and toll revenues to annual values. The travel demand modeling tools are designed for and applied to replicate a typical weekday. Absent a weekend travel demand model to predict trip O-D patterns and trip purposes, weekday-to-annual expansion factors were developed using existing weekend and weekday traffic relationships, taking into consideration differences in congestion levels and timing that may result in lower road use at lower average toll rates on weekends relative to weekdays.

Calculation of annual traffic and revenues from weekday values assumes 255 normal weekdays plus 110 weekend days and major weekday holidays per year.

Future year I-205 overall corridor traffic levels for the 110 weekend days/holidays were estimated from pre-pandemic corridor count data, which exhibits a weekend share of weekday average daily traffic of about 86.4%. Applying this to the 110 weekend days/holidays yields weekday-to-annual traffic expansion factor of 350 for corridor traffic. In other words, the annual toll trips correspond to the volume of toll trips for 350 weekdays.

Slightly lower overall weekend traffic volumes, a broad midday peak period with typically lower congestion than weekday peak periods, and potentially lower average VOTs (willingness to pay tolls) among weekend users are expected to result in a weekend toll rate schedule with lower overall average toll rates. Accounting for these variables, a weekday-to-annual revenue expansion factor of 315 was established. Compared to a typical weekday, a weekend day is assumed to serve about 86% as much traffic, generating about 55% as much revenue.

9.3 Traffic and Revenue Forecast Horizon

Using the two model forecast year weekday data points for traffic and revenues (FY 2027 and FY 2045), intermediate year values were determined via exponential interpolation using the compound annual growth rates calculated for each pair of forecast year values. Additionally, toll trip growth rate dampening adjustments reduce the annual traffic and constant dollar revenue growth beyond FY 2045 by half to allow for slower growth in the outer years. It is a customary and conservative practice to limit traffic and revenue growth in the outer years of the forecast horizon where uncertainty about travel behavior, socioeconomic growth, and technological change is highest.

9.4 Toll Rates and Escalation Assumptions

The demand modeling tools incorporate monetary costs such as toll rates and values of time in constant dollars. A value that remains unchanged over time when expressed in constant dollars is equivalent to it keeping pace with general price inflation when expressed in future year of collection (or year of expenditure) dollars. Escalation to year-of-collection (YOC) dollars captures the general inflation expected in all prices, including wages and salaries that underlie travelers' willingness to pay tolls, and thus the toll rates that would be necessary to maintain the operating objectives true to the modeling assumptions. This study applies 2.15% annual escalation to convert the modeled toll rates, and thus the toll revenue projections, to the relevant YOC dollars that would prevail over time.

The following list explains the toll rates as modeled and used for gross and net revenue calculations.

- The RTDM employs "prices" in constant 2010 dollars. It is worth noting that the year of the "prices" is non-influential as long as the year is the same for all costs in the model (time, tolls, etc.), since the model only considers trade-offs between travel options "priced" the same way.
- For I-205, the same 2010 dollar toll values were applied for both the 2027 and 2045 forecast years, meaning that the real toll remains constant over time. A constant real toll means that the toll has the same relationship to all other prices in all years. For example, if the toll is equivalent to the price of a dozen eggs in 2027, it will also be equivalent to the price of eggs in 2045. This also means that the actual tolls collected will keep pace with general price inflation that is expected for the costs of other goods and services.
- To be consistent with how tolls were modeled, the posted toll rates actually charged to customers will need to escalate a small amount each year (or alternatively a somewhat larger amount every couple of years) so that they remain constant in real terms. Therefore, the toll revenue calculations escalate the toll rate to each forecast year's YOC dollars based on an assumed forecast for annual inflation. For the I-205 Toll Project, price inflation is assumed to be 2.15% per year, which is slightly below the 30-year average rate of change in the CPI-U (consumer price index for all urban consumers) for 1991-2020 to err on the side of conservatism. By design, this conservative estimate as a long-term assumption helps to avoid overstating projected revenue for a given level of traffic.
- The variable toll rate schedule modeled for the two I-205 bridges was escalated to the state fiscal year of opening, FY 2025, based on the assumed December 1, 2024 start date, and then rounded to the nearest $0.05. These rates are described as being in FY 2025 (or calendar year 2024) dollars.

- YOC toll rates for subsequent forecast years add 2.15% to the prior year's toll rates, rounded to the nearest $0.01.

The toll rates paid by users depend on the toll payment method and vehicle type. Registered account users are assumed to pay the lowest base toll rates per trip applicable at any given time of the day. Unregistered License Plate Toll (LPT) Bill By Mail users are assumed to pay a fixed additional toll increment of $2 per trip on top of the base toll rate, regardless of vehicle type or whether the trip includes one or both toll points (i.e., bridges). The increment covers the additional costs of toll collection from unregistered users via mail. Additionally, no escalation is assumed for this $2 toll increment such that it declines in real terms over time. This assumption is conservative from a revenue standpoint and also allows for technological progress including new payment methods to potentially reduce the real cost of collecting payment from unregistered users.

Figure 9-1, Figure 9-2, and Figure 9-3 illustrate the toll rate schedule in YOC dollars for registered account user trips on the I-205 Toll Project.

9.5 Toll Payment Types and Shares

This study assumed two toll payment methods for users of I-205:registered account users (account tied to a transponder pass or license plate) and unregistered users (identified by their license plate for a toll bill by mail). The percentage shares for registered account and unregistered users varies depending on the forecast year and the vehicle type.

For autos, the model assumes 75% of all trips in FY 2025 will be registered account users, increasing by 1% per year until reaching a ceiling of 85% in FY 2035. For medium and heavy trucks, the model assumes 80% of all trips in FY 2025 will be registered account users, increasing by 1% per year until reaching a ceiling of 90% in FY 2035. Once these ceilings have been reached in FY 2035, the registered account user shares of trips are assumed to stay flat for autos, medium trucks, and heavy trucks at 85%, 90%, and 90%, respectively over the remainder of the forecast horizon.

The increasing share of registered account users (especially among frequent users of I-205) over time is anticipated for multiple reasons, including the price differential between registered and unregistered toll trips, the proliferation of open road tolling in Oregon, and the increasing ease and convenience of having a registered account for electronic payment. Unregistered users are assumed to pay an additional toll increment of $2 per trip to cover the additional costs of collection via mail, and the percentage share of such trips is anticipated to decrease over time. Higher initial shares of registered account user trips are assumed for medium and heavy trucks, considering their current participation in the weight mile tax program, their commercial trip purposes, and the higher penetration of transponder usage observed in truck fleets. These assumptions are consistent with trends observed in toll facilities around the country.

Table 9-2 summarizes the input assumptions for toll payment types and shares on the I-205 Toll Project.

Table 9-2. I-205 Toll Payment Types and Shares – Input Assumptions

Customer Payment Method	Vehicle Type	FY 2025	FY 2035
Registered Account	Autos	75%	85%
	Medium and Heavy Trucks	80%	90%
Unregistered LPT Toll Bill By Mail	Autos	25%	15%
	Medium and Heavy Trucks	20%	10%

FY = Fiscal Year; LPT = license plate toll

Figure 9-1. I-205 Toll Rate Schedule in Year of Beginning Tolling FY 2025 (2024) Dollars

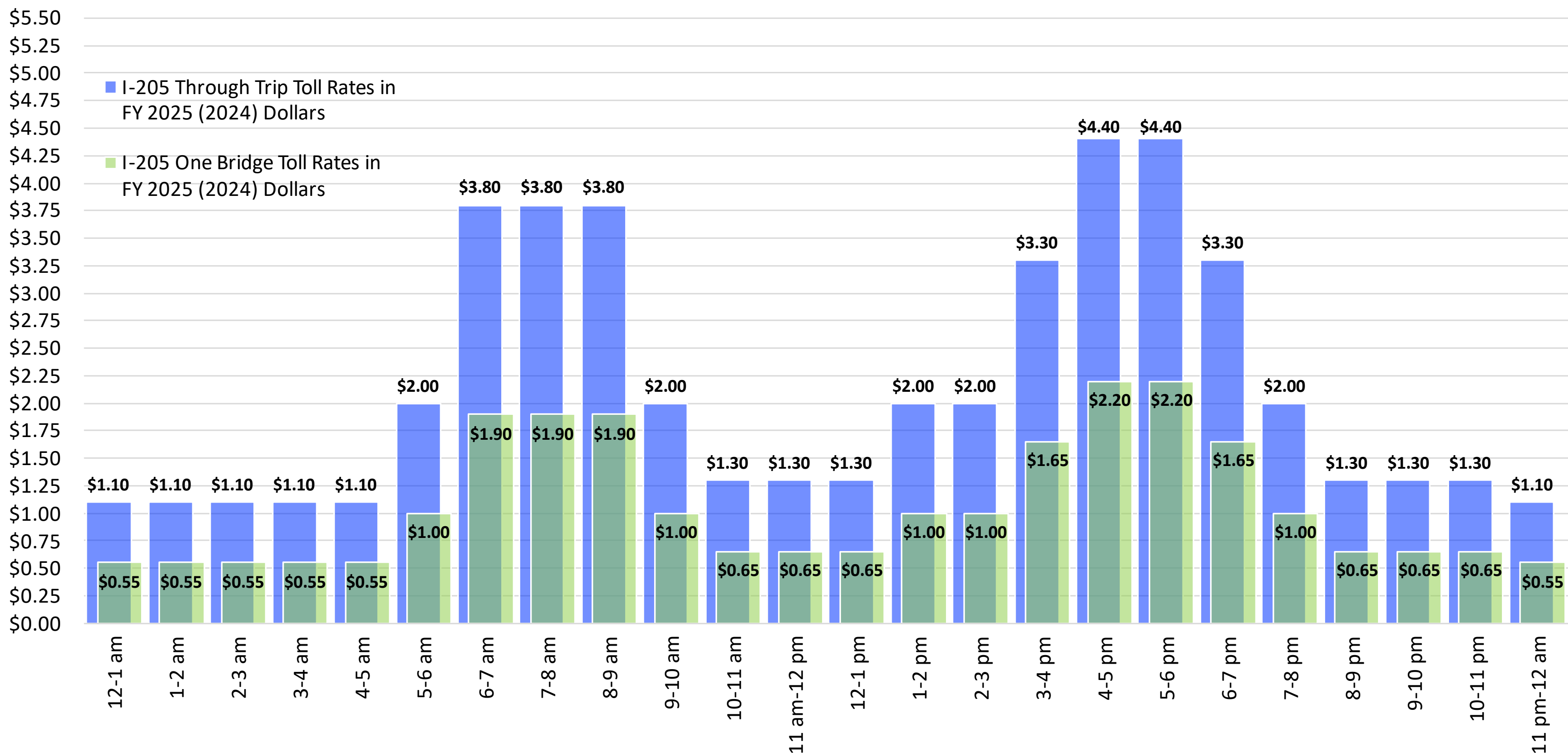


Figure 9-2. I-205 Toll Rate Schedule in Scenario A Year of Project Completion FY 2027 (2026) Dollars

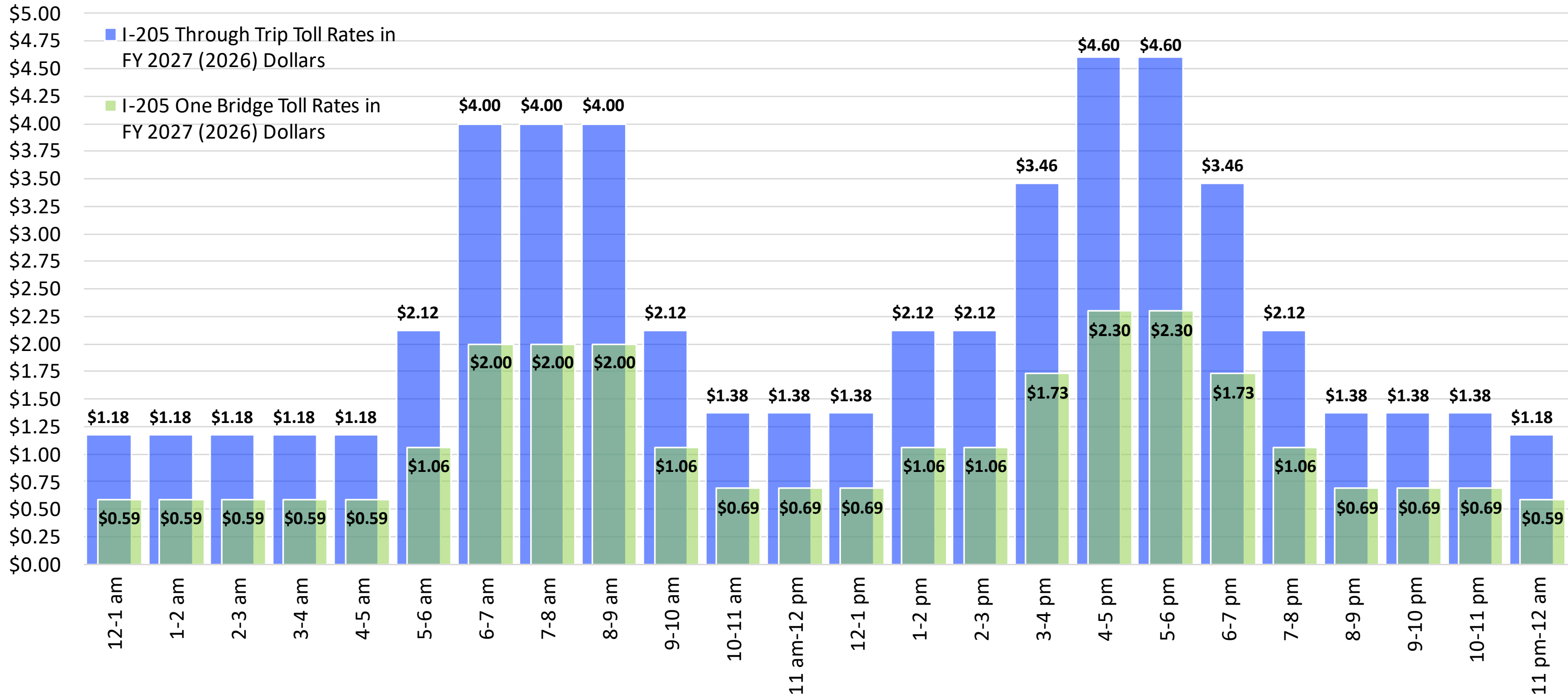
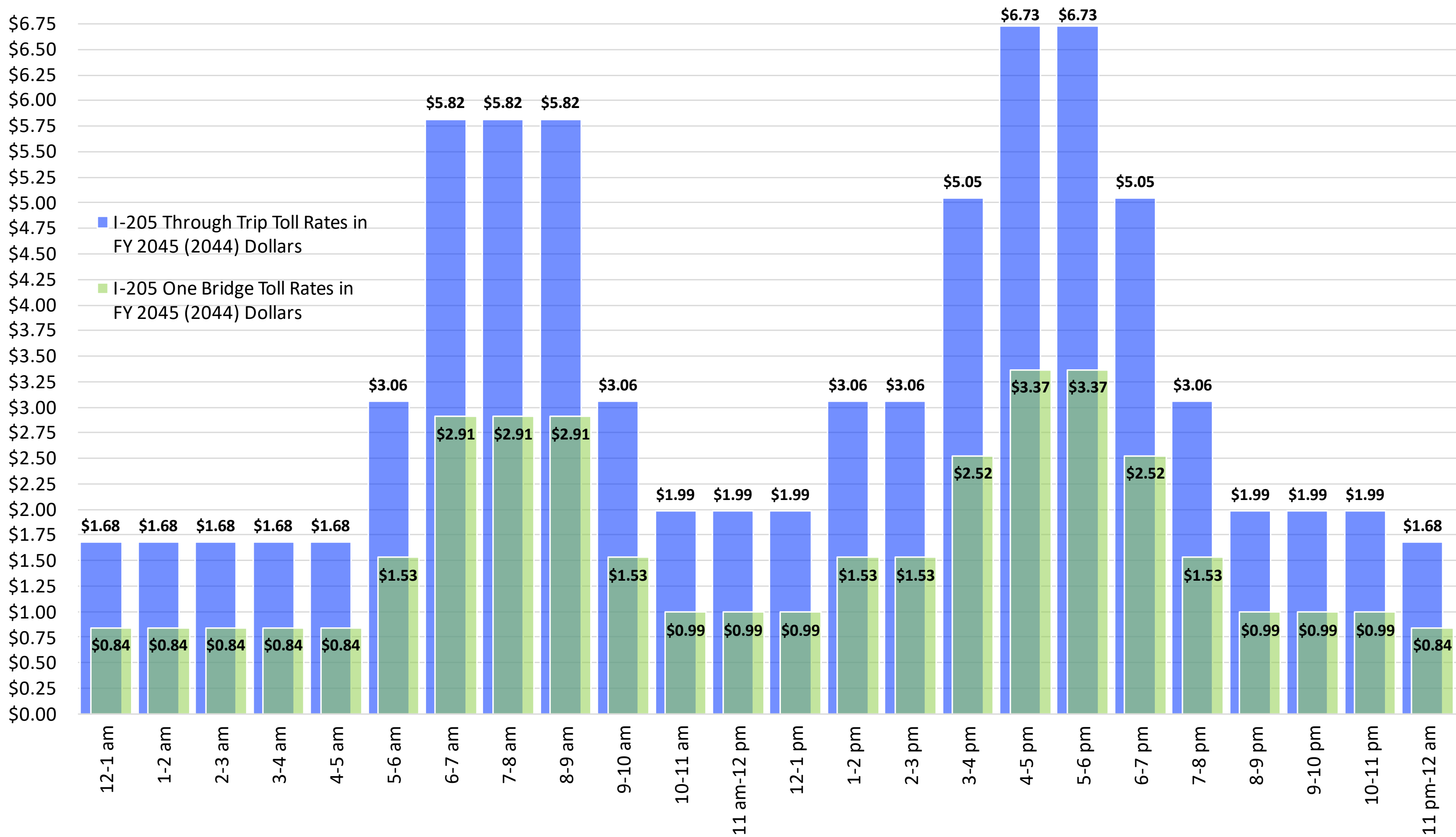


Figure 9-3. I-205 Toll Rate Schedule in Future FY 2045 (2044) Dollars



9.6 Annual Traffic and Revenue Forecast Ramp-Up Assumptions

When a toll facility opens, it may take some time for travelers to become accustomed to how it works, obtain an electronic payment account, and evaluate alternatives to discover what mode, route, and time of day works best for each trip. This process of potential customers determining their best travel options and developing a sense of when using the toll road is cost-beneficial is referred to as ramp-up. A ramp-up period may last for one or several years depending on the characteristics of the roadway and the customers' familiarity with, acceptance of, and benefits derived from tolling.

Longer and steeper ramp-up periods are assumed for new roads (greenfield projects), roads with good substitutes (express lanes), and areas new to tolling, relative to additions to existing roads in areas where tolling is already prevalent and/or substitute routes are less attractive. A moderate ramp-up profile is assumed for I-205, noting it would be a brownfield project with less attractive substitutes, but it would involve the conversion to a tolled facility where tolling is a new concept.

Table 9-3 summarizes the ramp-up assumptions applied to the I-205 Toll Project for this study during the first 24 months of operation with no adjustments thereafter. Ramp-up assumptions are unchanged across Scenarios A and B.

Table 9-3. I-205 Traffic & Revenue Study Ramp Up Assumptions

Time Period	Ramp Up Factor	Traffic & Revenue Reduction Percentage
0 – 12 months (December 1, 2024 – November 30, 2025	85%	-15%
12 – 24 months (December 1, 2025– November 30, 2026)	95%	-5%
Thereafter (December 1, 2026, onward)	100%	0%

9.7 Annual Toll Trip and Potential Gross Toll Revenue

The figures in this section present the I-205 Toll Project annual toll trip and potential gross toll revenue projections for Scenarios A and B. Figure 9-4 shows the total toll trips and the toll trips distribution by payment method for the FY 2025-60 forecast horizon for Scenario A. Figure 9-5 shows the Scenario A total gross toll revenue potential for the same forecast horizon, with revenue amounts shown in YOC dollars. Figure 9-6 and Figure 9-7 provide the same trip and revenue charts for Scenario B with its later I-205 Improvements Project completion date.

Figure 9-4. I-205 Toll Trip Forecasts – Scenario A

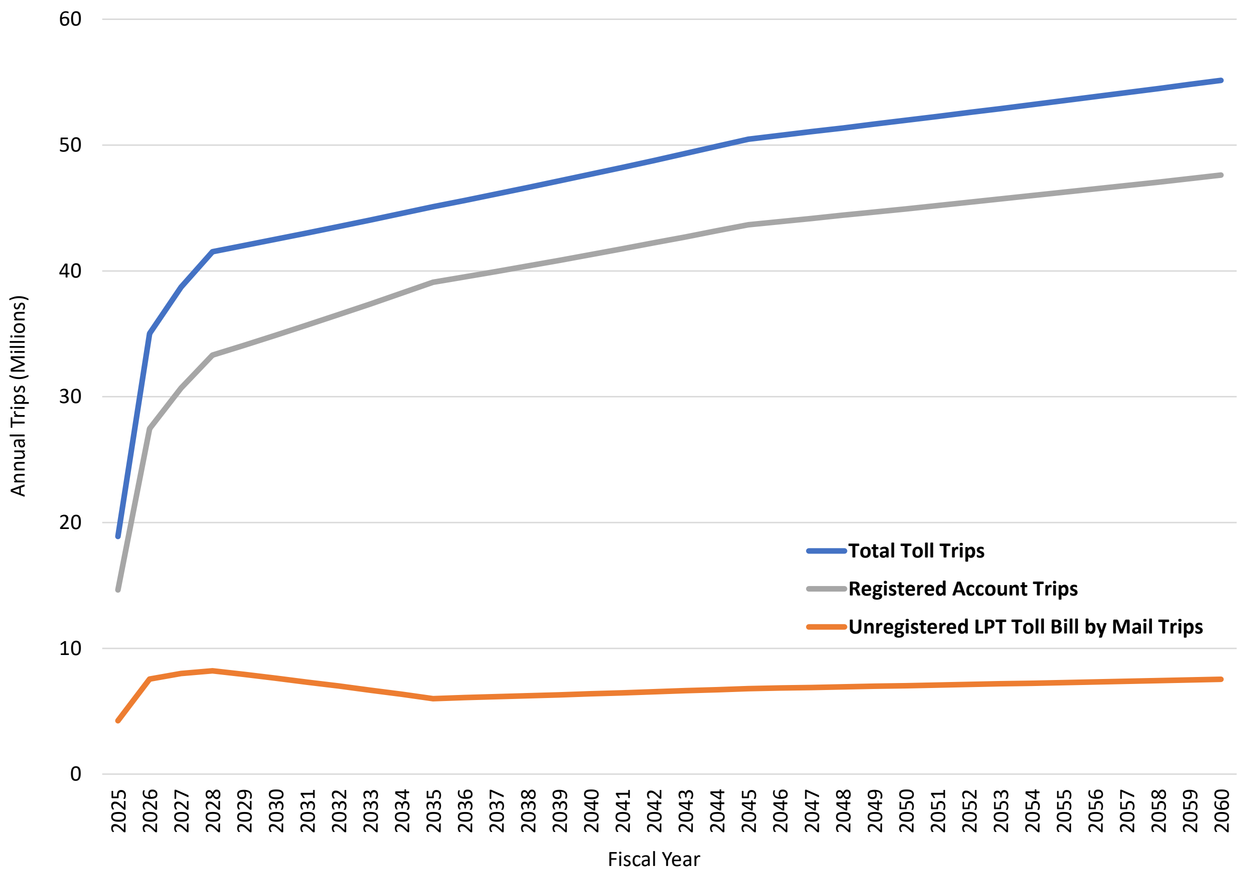


Figure 9-5. I-205 Gross Toll Revenue Potential Projections – Scenario A (YOC Dollars)

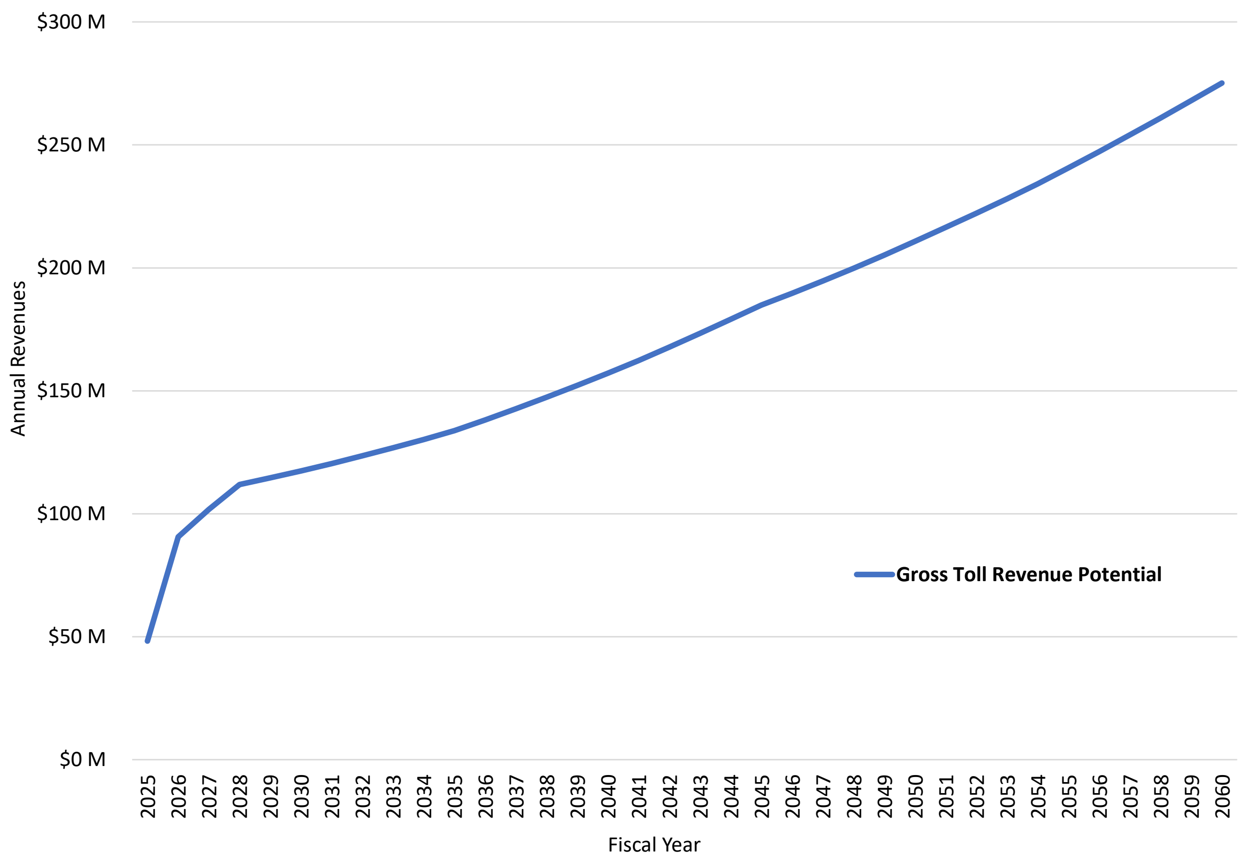


Figure 9-6. I-205 Toll Trip Forecasts – Scenario B

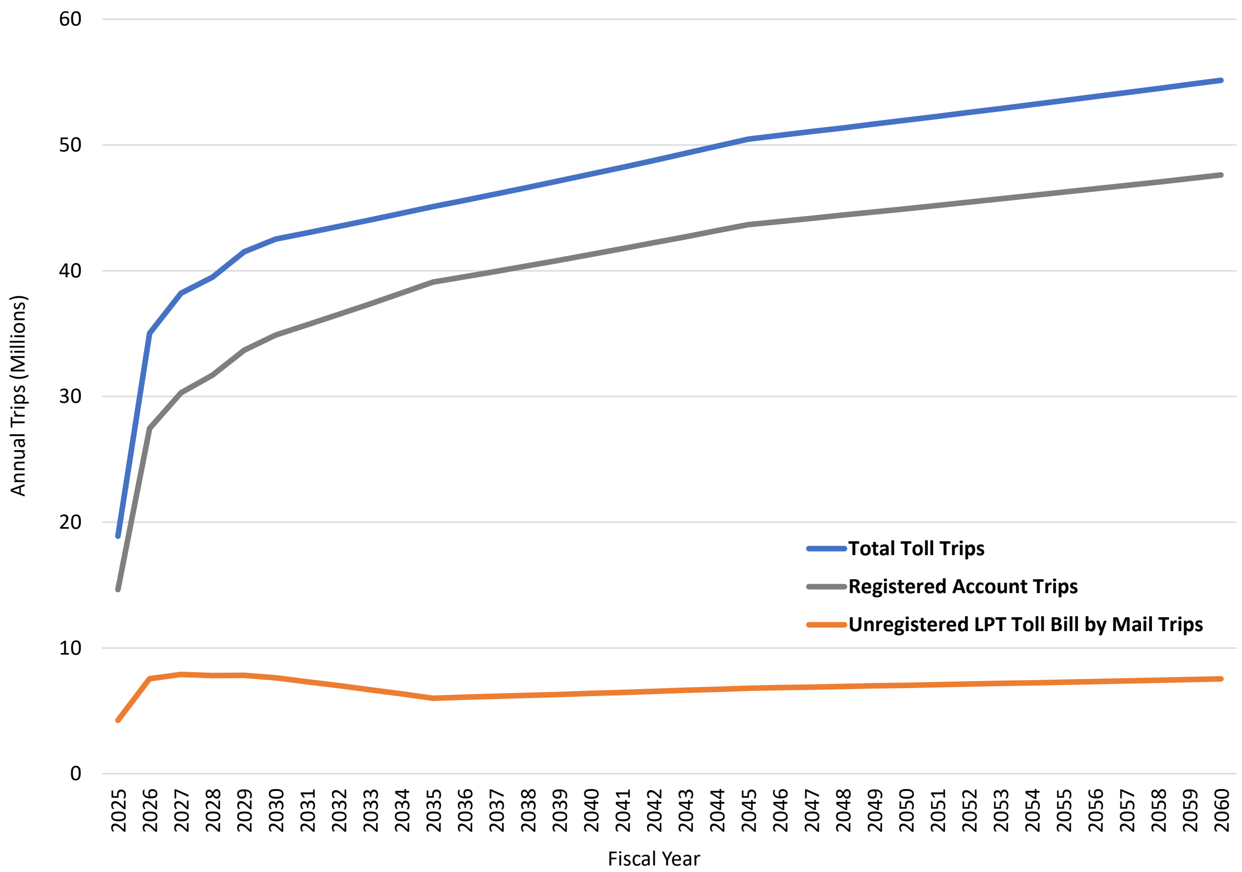
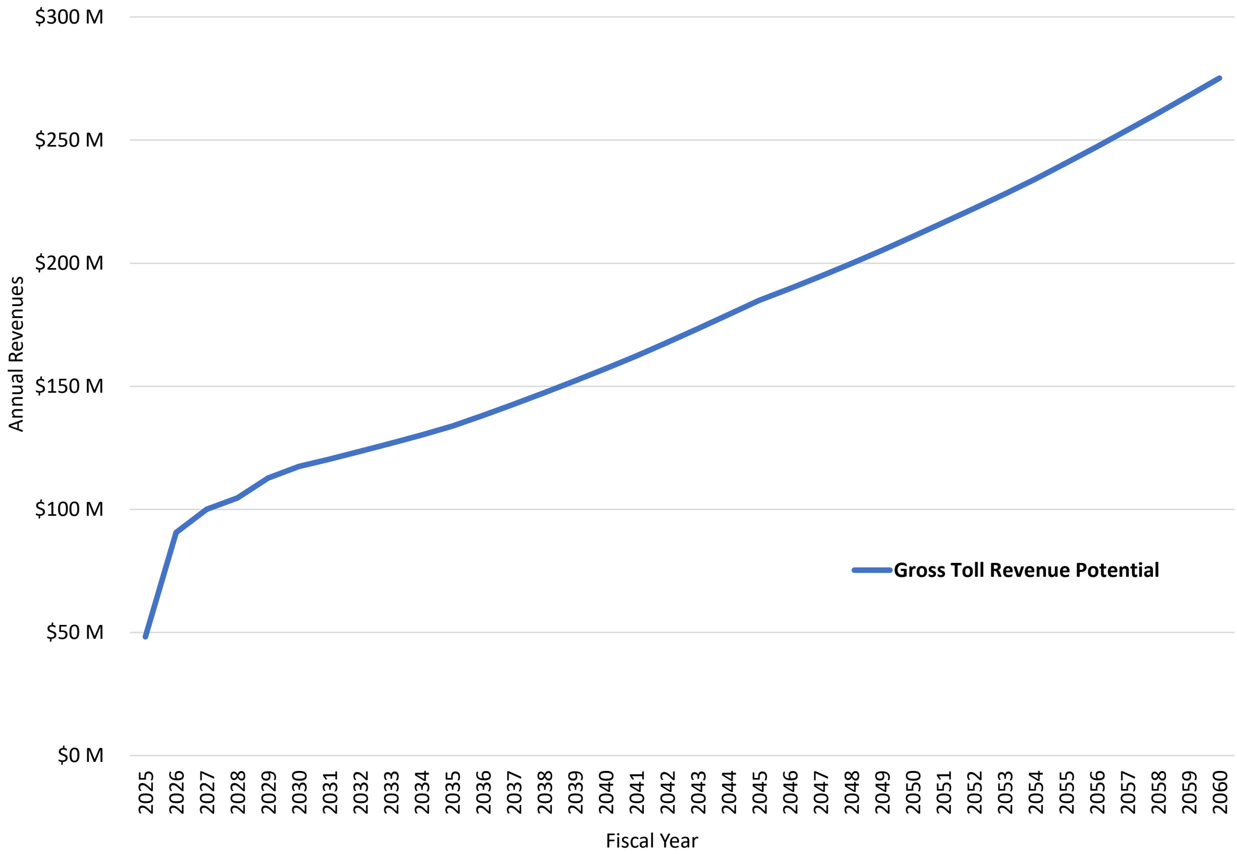


Figure 9-7. I-205 Gross Toll Revenue Potential Projections – Scenario B (YOC dollars)



10 Annual Net Toll Revenue Forecasts

This chapter describes the process by which the forecasts for gross toll revenue potential are transformed into net toll revenue projections—the cash flows available to support initial capital investment and ongoing capital repair and replacement (R&R) activities. The net revenue projections were prepared for Scenarios A and B, consistent with the toll trips and gross toll revenue potential forecasts documented in Chapter 9. Detailed gross-to-net toll revenue projections for Scenarios A and B are provided for the FY 2025-60 forecast horizon in Appendix A; the table columns in the appendix tables refer to the items covered below.

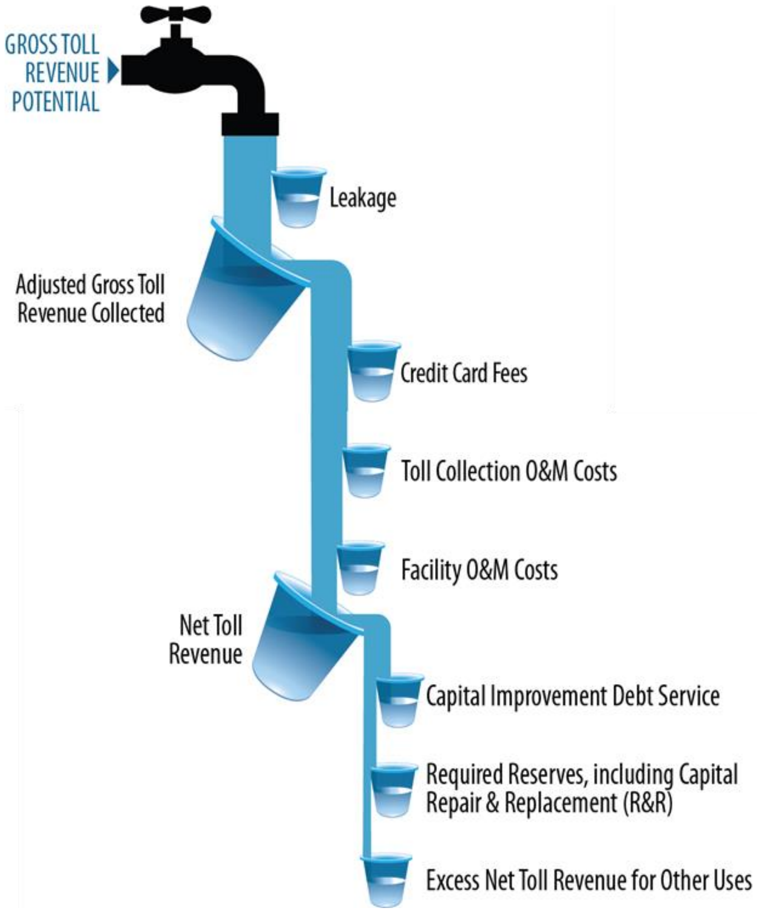
10.1 Gross-to-Net Toll Revenue Process

Starting with the annual toll trips and gross toll revenue potential forecasts, adjustments are made for revenue leakage, rebilling fees, and routine O&M costs associated with both toll collection and facility (roadway and bridge) maintenance functions.

10.1.1 Flow of funds chart

Figure 10-1 illustrates the flow of funds or "waterfall" of revenue adjustments and expenditures that are deducted from gross toll revenue potential as components of the net revenues available to support project financing, as well as showing the likely primary uses of net toll revenues.

Figure 10-1. Net Revenue Waterfall



The primary components of net toll revenues in the waterfall include the following:

- Revenue and fee adjustments:
  - Leakage
  - Pay-by-mail rebilling fees
- O&M costs:
  - Credit card fees
  - Toll collection O&M costs
  - Facility O&M costs

The primary uses of net toll revenues in the waterfall include the following:

- Debt service on capital investments or improvements financed by borrowing against future net toll revenues (not estimated as part of this study)
- R&R costs (typically funded by making regular deposits to a reserve account from which the periodic expenditures are made)
  - Periodic toll equipment R&R and vendor re-procurement costs
  - Periodic facility R&R costs
- Excess net toll revenue for other uses, which may include pay-as-you-go capital improvement expenditures (not estimated as part of this study).

This chapter is organized around this waterfall by presenting the assumptions and values for each "bucket." Consistent with the toll trip and gross toll revenue potential forecasts, the projections for the revenue adjustments and O&M expenditure items that yield net revenues were prepared for the FY 2025-2060 forecast horizon. As this chapter covers the net revenue components in the waterfall diagram, the text in the following sections, when appropriate, references annual values for each component in the T&R tables by the respective table column number in Appendix A.

Note that while the waterfall generally follows the structure of the T&R tables in Appendix A, the subsequent uses of the net toll revenues in the bottom three buckets may eventually follow a separate, more detailed flow of funds in the I-205 Improvements Project financial plan.

10.2 Adjusted Gross Toll Revenue Collected

Forecasted Toll Trips (columns 3, 6, and 8) and projected Gross Toll Revenue Potential (columns 9 through 11) by payment type discussed in previous sections serve as the initial inputs used in the net revenue forecasts. Toll trips by two primary payment methods (registered account customers and unregistered "pay-by-mail" users) serve as the basis to calculate potential revenue leakage or uncollectible revenue, which arises from Revenue Not Recognized (column 12) and which represents unbillable tolls and Unpaid Revenue (column 13) resulting from nonpayment of toll bills. Adjusted Gross Toll Revenue Collected (column 14) is what remains after deducting leakage estimates from gross toll revenue potential.

Forecasts for uncollectible revenue leakage are based on a toll collection activity workflow model, which estimates the probability that a toll trip will result in uncollectible revenue based upon the intended payment method and a variety of decision points in the toll trip workflow process. The leakage and collection rates assumed in this workflow model are informed by industry standards and available benchmark measures for similar electronic toll collection facilities. For the overall forecast horizon, total revenue leakage is projected to be 7.7% of gross toll revenue potential.

10.2.1 Revenue Not Recognized

Revenue not recognized is unbillable revenue that occurs primarily when a license plate image is unreadable or when the vehicle owner and address from a readable license plate cannot be identified. While more prevalent for unregistered customers where reliance is upon license plate identification to develop a toll bill by mail, this can also arise for a registered account customer if they do not have a transponder pass in the vehicle or if there is an equipment error reading the transponder, requiring the toll collection system to default to a license plate image.

Unreadable License Plates

Noting the recent improvements in license plate image readability, the assumptions for the readable share of license plate images are a function of whether or not the front and rear plates are obscured, dirty, or missing, weather conditions impacting the in-lane cameras, interfacing issues between the RTS lane system vendor, the Back Office System (BOS) software, and the CSC operating procedures for reviewing license plate images. These assumptions include the following:

- The assumed share of total image-based trips (unregistered customers plus registered customers identified via license plate) with readable license plates after manual review is 94.5% in FY 2025, 95.0% in FY 2026, and 95.5% under steady state operations from FY 2027 onwards.
- The 95.5% plate readability/4.5% unreadable assumptions consider that the CSC and BOS vendor contracts will include specific requirements and performance indicators to align with industry best practices to improve plate image review productivity and accuracy.
- Readability assumptions may be revised upward in future forecasts pending additional experience confirming recent RTS-related trends.

Unidentified Owner/Address

After a license plate is successfully read, the system would check to see if the plate belongs to a registered customer, and if so, the account would be debited with the appropriate toll in the same way as would occur with a successful transponder read. If the license plate number is not associated with a registered customer account, then further processing would be initiated to obtain a valid owner name and address for the vehicle from the Department of Motor Vehicles for Oregon plates. For out-of-state plates, a contracted vendor would likely provide a license plate lookup service to provide the vehicle owner's name and address. The lookup costs are assumed to be embedded within the vendor contract pricing.

Unregistered customer toll bill by mail trips for which the vehicle owner name and address cannot be identified from the license plate are also deemed as revenue not recognized (unbillable). Any license plates from other countries, such as Canada and Mexico, are automatically assumed to be unbillable.

The expected rate of unidentified owners/addresses from readable license plates is assumed to be in line with typical industry experience. An unidentified owner rate of 10.5% of image-based transactions with readable license plates is assumed for FY 2025 and 7.5% in FY 2026, then leveling off at 4.5% for FY 2027 and beyond as the toll operations vendors resolve any initial issues. This steady-state rate includes a factor to account for potential issues related to the inability to read or identify owners from temporary licenses, as well as from Canadian or other out-of-country plates.

The combined total revenue not recognized from unreadable plates and from readable plates with unidentified owners are shown in column 12 of the T&R tables for Scenarios A and B in Appendix A.

10.2.2 Unpaid Toll Revenue

Unpaid toll revenue results from customer nonpayment of toll bills after 80 days from date of travel, which is assumed to include two toll invoicing cycles. While primarily the result of unregistered customer, a registered account customer may also be mailed a toll bill if the credit or debit card linked to their account is expired. Following ODOT's guidance, this study conservatively excludes any subsequent revenue recovery from unpaid toll bills after 80 days. Additionally, this study excludes any civil penalty (violation) revenue collection as a result of delinquent toll bills more than 80 days past due. In the future, with appropriate policy direction from the Oregon Transportation Commission, these additional revenue items could be incorporated to reduce projected leakage.

The forecast for unpaid toll revenue assumes 60% of the first toll bills mailed will be paid and 37% of second toll bills mailed will be paid, with a cumulative toll bill payment rate of 74.8%.

Unpaid toll revenue is shown in column 13 of the T&R tables for Scenarios A and B in Appendix A.

10.3 Adjusted Gross Toll Revenue and Fees

Adjusted Gross Toll Revenue and Fees (column 16) results from adding in rebilling fees associated with toll bills that go unpaid at the first invoice but are paid with a rebilling fee on the second invoice by mail. There are two additional revenue items that factor into Adjusted Gross Toll Revenue and Fees, which after discussion with ODOT, have been conservatively excluded for this study. The first is revenue from delinquent toll bills and, if applicable, civil penalty fees recovered through a violation adjudication process. The processes for revenue recovery and augmentation via these items have not yet been determined. The second excluded item is revenue from transponder pass sales. Following ODOT's guidance, it is assumed that every year, a limited number of sticker tags transponders will be distributed free-of-charge by ODOT to registered account customers. For transponders above this quota, which are assumed to be sold rather than distributed free-of-charge, it has yet to be determined whether ODOT will sell transponders at cost-recovery prices or provide subsidized discount pricing. At this moment, this study assumes the remaining transponders will be sold by ODOT such that projected costs will be fully offset by transponder sales revenues and as such, any sales revenue has been conservatively omitted.

10.3.1 Pay-by-Mail Second Invoice Rebilling Fees

Unregistered customers who do not pay the first invoice received by mail for one or more toll trips are assumed to be charged a rebilling fee of $5.80 with the second toll bill. The fee is applied on a per toll bill basis when a toll bill includes any toll trips being billed for a second time. Unlike the base tolls but similar to the $2.00 charge per toll trip invoiced by mail, the $5.80 fee amount does not escalate over time with inflation. Rebilling fee revenues are primarily driven by the forecasted volume of unregistered customer (pay-by-mail) trips, with secondary effects coming from potential changes in the rate of payment of first and second toll bills.

The projections for rebilling fees only include trips for which the $5.80 fee per unpaid first toll bill is successfully collected on the second toll bill before 80 days have elapsed. For this study, following ODOT's guidance, no overdue rebilling fees are assumed to be collected for unpaid second toll bills, and no recovery efforts are assumed beyond mailing a second toll invoice.

As noted previously, the forecast assumptions regarding first and second toll bill payment rates are as follows:

- A 60% first toll bill payment rate assumption means that 40% of the first toll bills mailed will go unpaid and thus be subject to a rebilling fee on the second toll bill.
- 37% of the above unpaid first toll bills are assumed to be paid on the second toll bill within 80 days from the date of travel contributing to rebilling fee revenue.
- This results in 14.8% of toll trips billed by mail being paid after the second invoice along with the $5.80 rebilling fee.

Annual projections of pay-by-mail rebilling fees are shown in column 15 of the T&R tables for Scenarios A and B in Appendix A.

10.4 Net Toll Revenues

This section documents the anticipated expenditures that would be paid from Adjusted Gross Toll Revenues and Fees as the components of Net Toll Revenues, which include costs for O&M activities but exclude downstream uses of net toll revenue such as debt service and contributions to various reserve accounts, including those for periodic capital repair and rehabilitation costs. As shown in the waterfall in Figure 10-1, the I-205 net toll revenue expenditure components include credit card fees, toll collection O&M costs, and facility O&M costs. Additional details including sub-categories for each of these expenditure components are provided in the following sections, with the annual projections shown in columns 17 through 23 of the T&R tables for Scenarios A and B in Appendix A. All costs are expressed in year of expenditure dollars (YOE dollars) unless noted otherwise.

10.4.1 Credit Card Fees

As a convenience to customers and to facilitate electronic toll collection, it is assumed ODOT will accept credit and debit (bank) cards for the payment of tolls. Credit card transactions are assumed to be processed by a third-party vendor that would charge set fees for the service. These banking fees typically involve a fixed amount per transaction and a variable component as a percentage of the transaction amount. The credit card fee rates would be based on negotiations with credit card companies.

For this study, a credit card fee rate of 2.75% is assumed to be applicable to 92% of adjusted gross toll revenue and fees anticipated to be collected via bank cards. There is no additional adjustment factor currently assumed for any fees related to customer account balance refunds (credit transactions) when accounts are closed. This assumption may be subject to revision as the I-205 Toll Project evolves and more information becomes available around payment options likely to be used on the Project.

It is assumed ODOT will also accept automated clearing house (ACH) payments directly from a customer bank account as an alternative means of account replenishment that does not carry the credit card fee. Pay-by-mail customers are also assumed to have the option of paying their bills by check, or even cash, in person at one of the potential customer retail locations. These alternatives account for the approximately 8% of revenues collected that are not subject to bank card processing fees.

Annual projections of credit card fees over the forecast horizon are shown in column 17 of the T&R tables included in for Scenarios A and B in Appendix A.

10.4.2 Toll Collection O&M Costs

Toll collection O&M expenditures include all administrative and technical functions required for processing toll trips and collecting revenue from customers. Beginning with the task of identifying a trip, to recording the trip, to ultimately collecting payment, the toll collection process requires involvement and coordination by various distinct parties across multiple functions:

- Transponder purchase, inventory, and sales, including the coordination with transponder pass manufacturers and third party (non-CSC) resellers
- State and consultant operations costs (includes ODOT Toll Division, ODOT Accounting and Financial Services, and consultants)
- RTS vendor O&M costs
- BOS vendor O&M costs and CSC operations vendor O&M costs

Based on ODOT's guidance, and to err on the conservative side, the toll collection O&M costs have been estimated assuming I-205 as a standalone toll facility, with no economies of scale resulting in I-205 cost savings considered from future expansion of toll facilities in Oregon such as the I-5 Interstate Bridge Replacement tolls or the RMPP. Costs associated with the operating functions noted above are depicted in columns 18 through 22 of the T&R tables for Scenarios A and B in Appendix A. Specific details regarding the toll collection cost activities and cost assumptions included in the annual total toll O&M cost forecast values are provided below by cost subcategory.

The Toll Collection O&M costs are subject to cost inflation. Based on historic and projected cost increases for similar facilities, an annual increase of 2.5% is assumed.

Transponder Purchase and Inventory Costs

It is assumed that ODOT will purchase, maintain inventory, and distribute transponders directly to customers via online/mail orders, at CSC retail locations, and though third-party retailers. Transponder purchase, inventory, and distribution costs are determined by trends in the registered account base as well as the purchase of new or replacement transponders occurring with changes in the vehicle fleet and their owners as well as with the availability of new transponder technology.

Following ODOT's guidance, it is assumed that every year, ODOT will distribute a limited number of sticker tag transponders free of charge to registered account customers. The transponder costs included in column 18 of the T&R tables in Appendix A reflect purchase and inventory costs related to this free-of-charge distribution. For the remaining transponders that are sold to customers, it has yet to be determined whether ODOT will sell transponders at cost-recovery prices or provide subsidized discount pricing. For this study, it is assumed that any transponders sold by ODOT will be at cost-recovery pricing, resulting in no impact on net revenues. As such, the costs estimate here are the net costs—those only for transponders that are distributed free-of-charge.

The forecast assumptions include initial higher ramp-up and initial distribution costs for FY 2025 ahead of the start of tolling in December 2024. Thereafter, a maintenance level of costs related to packaging, mailing, and inventory management are estimated to escalate in line with traffic growth and a 2.5% per year inflation escalation, consistent with other cost escalation assumptions.

Transponder purchase and inventory costs are projected to be about $22.5 million (YOE dollars) over the forecast horizon, as shown in column 18 of the T&R tables for Scenarios A and B in Appendix A.

State and Consultant Operations Costs

As with other previously noted costs and based on ODOT's guidance to err on the conservative side, the state and consultant operations costs have been estimated assuming that I-205 is the only toll facility in the region, thereby excluding any economies of scale from other future toll facilities that would lower I-205's share of these system-wide costs. The ODOT Toll Division would likely be responsible for general management, vendor oversight, marketing, financial planning and analysis, accounting, and administrative services. A total of 14 state full-time equivalent (FTE) employees are estimated to be required for smooth functioning and operations of the I-205 Toll Project. The salary and wages assumed are in line with industry standards and market observations. In addition to costs associated with salaries and wages, state operations costs include the following items:

- Benefits (assumed to be 37% of salaries and wages)
- Rent, office supplies and materials, printing, computers and equipment, telephone and communications, purchased services, records retention, human resources support, vehicle operations, miscellaneous goods, and services

In both the near- and longer-term forecasts, state operations costs are escalated by 2.5% per year to account for average inflationary increases in costs over time.

Consultant costs are expected to include all associated fees related to ongoing General Toll Consultant support, T&R forecasting work, net revenue projections analysis, finance, marketing, and other consulting tasks. Approximately $2.2 million (FY 2025 dollars) of consultant costs have been budgeted for FY 2025, with an annual escalation of 2.5% per year through the forecast horizon (FY 2025-60).

For the FY 2025-60 forecast horizon, state and consultant operations costs total about $492 million in YOE dollars. Annual projections of state and consultant operations costs over the forecast horizon are shown in column 19 of the T&R tables included in Appendix A for Scenarios A and B.

Roadway Toll System O&M Costs

RTS includes all equipment and software required to identify a toll trip and transmit data about that trip from the roadway to the CSC for processing. Sometimes referred to as "lane systems," this equipment includes transponder readers, cameras, and other communication devices that need regular maintenance to ensure that the system is functioning properly. The RTS O&M costs are also assumed to include maintenance of the gantries and associated civil infrastructure work.

RTS O&M activities are assumed to be performed by a private vendor, in conjunction with ODOT maintenance staff. The contract would require the vendor to provide ongoing maintenance of the toll collection system and infrastructure through the contract period. The 10-year RTS vendor contract for toll equipment is assumed to begin in FY 2025 with the installation of the permanent toll collection system on I-205. ODOT is expected to perform necessary routine maintenance to equipment gantries and associated civil infrastructure or other ancillary roadside equipment. After the initial RTS vendor contract expires, ODOT would have the option to rebid the contract or assume responsibility for all RTS maintenance functions (the forecast assumes the equipment and services vendor contract is rebid). Examples of maintenance activities include:

- Realigning/recalibrating cameras and transponder readers
- Cleaning camera lenses
- Maintaining equipment data connections
- Monitoring/auditing equipment performance

The costs are assumed to include O&M of tolling system and equipment for all toll lanes at both the mainline and ramp toll zones, for both the Abernethy Bridge and Tualatin River Bridges. The vendor costs are estimated to be consistent with industry standard observations on other similar project contracts. Annual costs are assumed to increase by 2.5% per year over the forecast horizon.

Annual projections of RTS O&M costs over the forecast horizon are shown in column 20 of the T&R tables for Scenarios A and B in Appendix A. In addition to routine maintenance, periodic capital repair and replacement of RTS equipment will be required. These costs are detailed in a later section as uses of net toll revenues.

Customer Service Center Operations and Back Office System Vendor Costs

Vendor O&M costs have been forecasted for both the BOS software and CSC operations components. Whether performed by one or two separate vendors, the collective CSC and BOS functions entail processing toll trips, collecting toll revenue, maintaining customer accounts, and interfacing with customers via telephone and at customer walk-in centers.

CSC/BOS cost forecast values are based on an estimate of resource requirements at market rates to provide the various CSC systems software and operating functions. The estimate is determined using a bottom-up, activity-based benchmarking approach from similar project contracts for toll facilities in the United States. The costs comprise transaction-dependent (variable) and non-transaction-dependent (fixed) costs. The CSC/BOS cost forecasts assumed for the I-205 Toll Project are consistent with having a single vendor for BOS software and CSC operations functions, plus the addition of a risk contingency. The contract term is assumed to start in FY 2025 and continue for 10 years, which would likely be divided into a base contract period plus an extension period. At the end of 10 years, it is anticipated a new contract would be rebid and follow a similar cycle for the remainder of the forecast period.

The labor and associated cost requirements are based on the total number of trips. The all-inclusive BOS costs are estimated to be about $0.74 million in FY 2025 and to escalate at 2.5% per year annually through the forecast horizon.

The CSC operations tasks would primarily include call center operations, back-office processing, image review, toll bill printing and mailing, transponder inventory management, collection oversight, and retail front office services. The CSC operations costs are estimated on a trip basis with an initial cost assumption of approximately $0.32 per trip, which covers associated FTEs, operations, and equipment. CSC operations costs per trip are also assumed to escalate by 2.5% per year through the forecast horizon. For Scenario A, the CSC operations costs are estimated to be about $6.13 million in FY 2025, increasing quickly to around $13.18 million in FY 2027 as the number of trips grows through the ramp up period. The CSC operations costs continue to grow through the forecast horizon, with growth in number of trips and per trip costs.

Annual projections of BOS and CSC operations costs over the forecast horizon are shown in columns 21 and 22, respectively, of the T&R tables for Scenarios A and B in Appendix A.

10.4.3 Facility O&M Costs

Routine O&M of I-205 Toll Project physical assets is critical to providing continuous, uninterrupted toll revenue generation. Proper maintenance of the facilities also ensures that the expected level of service is provided to motorists. Typically, facility O&M activities include lane restriping, lighting maintenance, routine bridge repairs, pothole and pavement repair, traffic operations, signage, litter pickup, etc. These activities help to preserve safety and travel reliability along the corridor. The I-205 Toll Project construction funding is expected to be supported by tolls, and the facility O&M costs are assumed to be paid from future toll revenues generated from the toll facility.

The maintenance limits assumed for estimating the facility O&M costs stretch from Stafford Road to OR 213. In late 2021 and early 2022, ODOT, in coordination with the consultant team, assessed and refined the facility O&M (and R&R) estimates based on the most up-to-date maintenance work and pricing information available for the corridor. This update assumes future maintenance costs for the existing roadway as well as the expanded bridge decks with additional travel lanes. The updated O&M costs served as primary inputs for the future facility O&M cost forecasts. A standard contingency of 10% relating to potential unforeseen expenditures was included, and furthermore, a 2.5% annual inflation factor was used to estimate future costs to YOE dollars. This inflation factor is consistent with assumptions for other O&M related costs.

For the FY 2025-60 forecast horizon, facility O&M costs total about $50 million in YOE dollars. Annual projections of facility O&M costs are shown in column 23 of T&R tables for Scenarios A and B in Appendix A.

10.4.4 Annual Net Toll Revenue Forecast Results

This section presents the net toll revenue results for Scenarios A and B for the I-205 Toll Project. Figure 10-2 and 10-3 show the draft net toll revenue projections for Scenarios A and B, respectively.

Figure 10-2. I-205 Toll Project Net Toll Revenue Projections – Scenario A (YOC dollars)

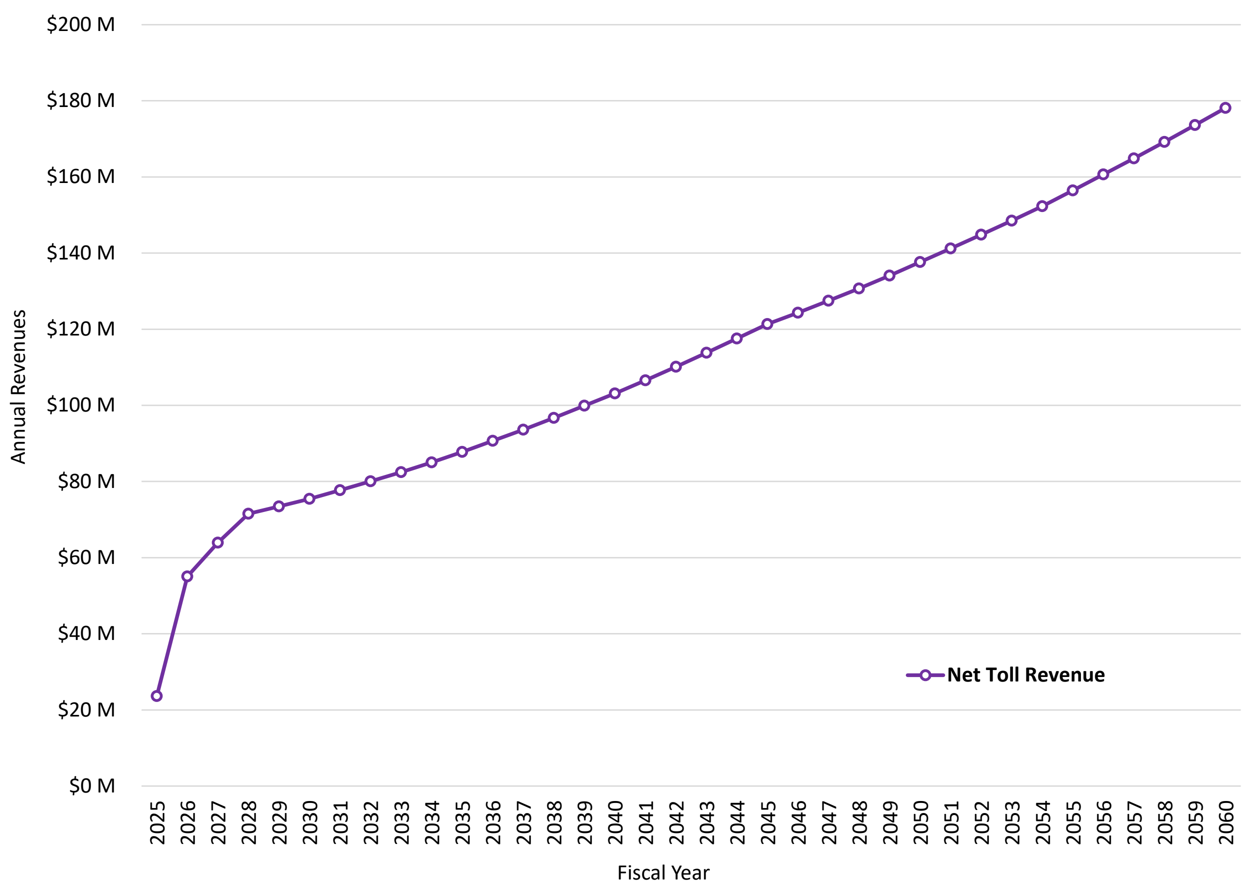
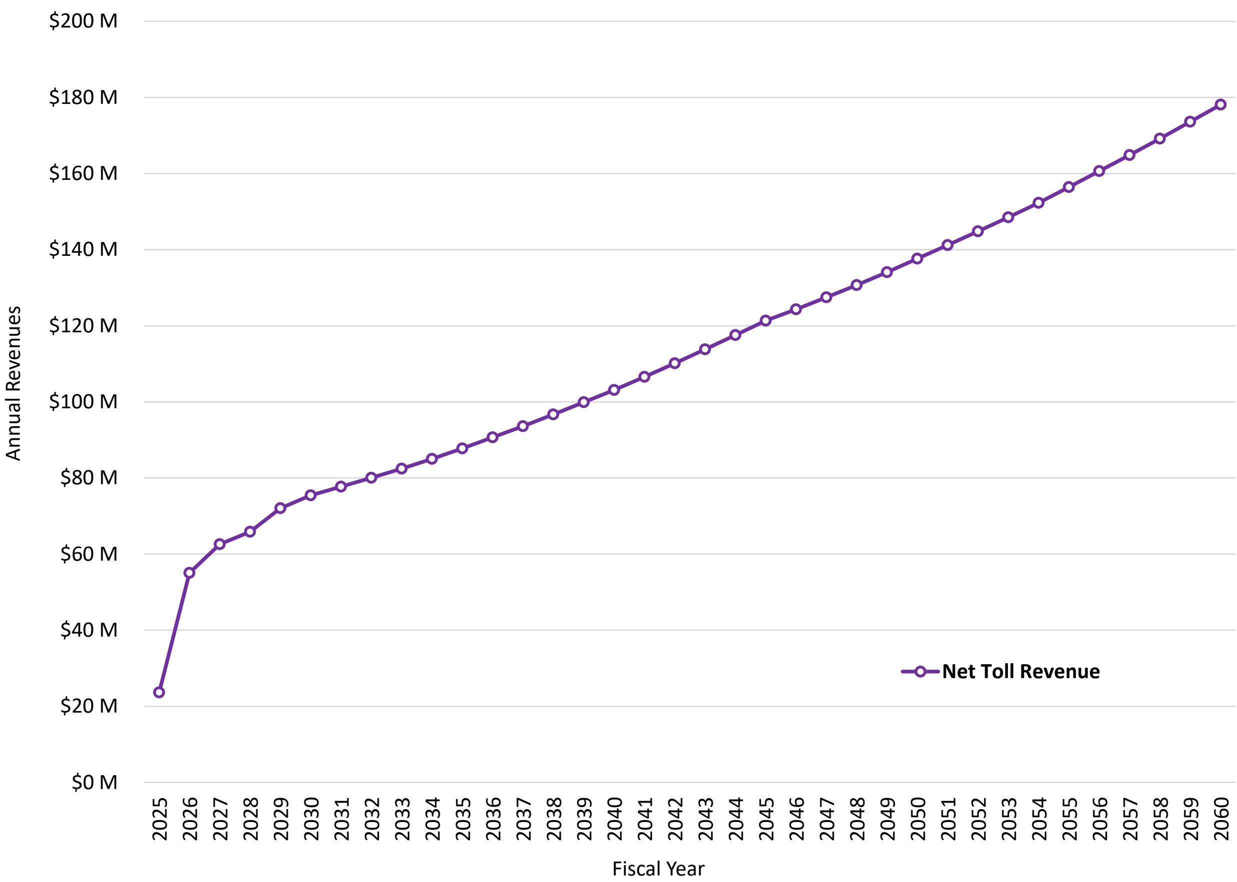


Figure 10-3. I-205 Toll Project Net Toll Revenue Projections – Scenario B (YOC dollars)



10.5 Periodic Repair and Replacement

R&R costs include periodic investments to preserve and/or renew capital above and beyond the routine activities included in annual O&M costs. For the I-205 Toll Project, periodic R&R costs are not included as a component in determining net toll revenues; rather, they are assumed to be a downstream use of net toll revenues. The R&R costs are divided into two main categories: Periodic Toll Equipment R&R and Vendor Re-procurement Costs, and Periodic Facility R&R Costs.

10.5.1 Periodic Toll Equipment Repair and Replacement and Vendor Re-procurement Costs

Toll-related R&R costs include the periodic repair, rehabilitation, and replacement of the RTS hardware and equipment located in the roadway at the toll collection point. In addition to hardware and equipment, the R&R cost forecast includes the administrative and technical-related costs incurred by ODOT to periodically re-procure the RTS vendor contract as well as test and implement the toll collection equipment hardware. Furthermore, toll equipment R&R costs include costs to periodically re- procure BOS and CSC operations vendor contracts, as well as test and implement the new systems software.

Consistent with related assumptions noted previously, this study assumes that I-205 is the only toll facility in the region, and thus would incur all of the periodic RTS, CSC, and BOS vendor re-procurement costs. If other toll facilities, such as the I-5 Interstate Bridge Replacement or RMPP, are implemented, then these re-procurement costs would be shared across multiple facilities, thereby lowering I-205's share of the total costs.

Roadway Toll System Repair and Replacement Costs

RTS R&R cost projections conservatively assume that the RTS toll equipment vendor will be replaced every 10 years. The initial 10-year RTS vendor contract cycle for toll equipment is assumed to begin in FY 2025 with the installation and testing of the permanent toll collection system on I-205. Future replacements are scheduled every 10 years thereafter, including re-procurement of new vendor, testing, and implementation. The gantry structures are assumed to be in place prior to commencement of tolling operations and the replacement of gantries and related civil works will occur every 20 years. A 2.5% annual inflation factor was used to estimate future replacement costs in YOE dollars. RTS equipment replacement and implementation and testing, spare parts, network equipment, gantries, toll rate signs, integration, transition, and coordination support are all included in the RTS R&R costs.

Back Office System and Customer Service Center Vendor Repair and Replacement Costs

The BOS and CSC R&R cost projections assume that the BOS and CSC vendor will be replaced every 10 years. The initial 10-year BOS and CSC vendor contract cycle is scheduled to start in FY 2025, and future replacements are scheduled every 10 years thereafter, including re-procurement of new vendor, testing, and implementation of systems. The BOS and CSC operations vendor re-procurement costs include requests for proposals (RFPs) development, vendor solicitation, system development, design and installation, start-up and transition support, and a data warehouse (for systems). The underlying costs for the periodic BOS and CSC vendor re-procurements are assumed to escalate at 2.5% per year.

For the FY 2025-60 forecast horizon, Periodic Toll Equipment R&R and Vendor Re-procurement Costs total about $286 million in YOE dollars and these annual projections are shown in column 25 of the T&R Tables for Scenarios A and B included in Appendix A.

10.5.2 Periodic Facility Repair and Replacement Costs

The periodic facility R&R costs apply to the I-205 Toll Project roadway and structures and include major maintenance activities such as pavement resurfacing, deck overlay and deck sealing, bridge joint sealing and replacement, bridge railing repairs, and painting. ODOT provided estimates for anticipated future expenditures and the frequency intervals for the various maintenance activities. The maintenance works are scheduled considering the existing asset condition, performance requirements and with the objective of ensuring smooth and safe operations of the highway corridor. Bridge deck overlay and painting works are planned to be completed every 20 years, while joint repairs and bridge deck rail major maintenance are scheduled to be conducted in 10-year intervals, with a shorter 5-year interval for deck-sealing works.

Based on feedback from ODOT and consistent with standard industry practices, a 25% contingency has been factored into the periodic replacement costs to account for unexpected expenditures and budget for design and planning works. Furthermore, an annual escalation of 2.5% has been considered to estimate future year facility R&R costs in YOE dollars.

For the FY 2025-60 forecast horizon, Periodic Facility R&R Costs total about $252 million in YOE dollars, and the projected costs through the forecast horizon can be found in column 26 of the T&R tables for Scenarios A and B in Appendix A.

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Appendix A: Toll Traffic and Revenue Projections

This appendix includes year 2027 and 2045 traffic volume forecasts with vehicle classification breakouts for the two toll point locations along I-205. It also includes the detailed T&R / net toll revenue tables for the study, toll rate schedule and associated toll traffic and revenue projections for Scenarios A and B. Both scenarios assume pre-completion tolling, starting on December 1, 12/1/2024, while the I-205 Improvements Project is under construction. The two scenarios differ in their assumptions as to when the I-205 Improvements Project is completed, with the completion data assumption for Scenario A on April 1, 2027, and Scenario B on October 1, 2028.

Each T&R table shows the toll trip and gross toll revenue potential forecasts and the various adjustments, fees, and expenditures that yield the net toll revenue available for debt service, as well as other ODOT-related downstream uses of net toll revenues.

This appendix includes the following tables:

- Weekday Hourly Toll Traffic Forecasts with Vehicle Classification
- Toll Traffic and Revenue Projections – Scenario A
- Toll Traffic and Revenue Projections – Scenario B

Table A-1. Weekday Hourly Toll Traffic Forecasts by Bridge and Vehicle Classification

Abernethy Bridge

Post-Processed Hourly Volume Forecasts by Vehicle Classification

		2027 Build Alternative									2045 Build Alternative								
Direction	Time	SOV_Low	SOV_Medium	SOV_High	HOV_Low	HOV_Medium	HOV_High	Medium_Truck	Heavy_Truck	Total 2027 Build_ Vehicle_Adj	SOV_Low	SOV_Medium	SOV_High	HOV_Low	HOV_Medium	HOV_High	Medium_Truck	Heavy_Truck	Total 2027 Build_ Vehicle_Adj
NB	00 to 01	0	28	41	0	10	9	2	22	112	0	33	52	0	12	11	2	28	139
SB	00 to 01	0	59	69	1	13	19	3	41	204	0	54	72	1	12	19	3	42	203
NB	01 to 02	0	21	28	0	7	7	2	26	91	0	26	36	0	9	8	3	33	114
SB	01 to 02	0	42	55	0	10	14	5	37	164	0	32	48	0	7	12	5	31	136
NB	02 to 03	0	19	22	0	12	12	5	22	92	0	23	30	0	15	15	6	29	118
SB	02 to 03	0	31	44	1	14	19	10	44	163	0	30	48	1	13	20	10	49	171
NB	03 to 04	0	23	44	0	11	12	6	44	140	0	26	62	0	11	15	8	58	180
SB	03 to 04	0	53	48	1	14	12	10	56	195	0	63	62	1	16	15	14	71	242
NB	04 to 05	0	103	227	0	31	47	22	85	515	0	146	265	0	30	51	28	106	626
SB	04 to 05	0	266	175	1	42	30	26	71	610	0	344	232	3	60	46	47	128	861
NB	05 to 06	0	292	619	2	80	122	29	157	1301	0	365	685	3	72	127	35	182	1470
SB	05 to 06	0	650	540	5	121	87	41	82	1526	0	917	700	11	167	128	69	136	2128
NB	06 to 07	0	696	1309	12	174	284	75	166	2715	0	624	1363	11	149	276	79	172	2672
SB	06 to 07	0	1073	830	15	259	181	104	184	2647	0	1215	966	16	283	200	127	223	3030
NB	07 to 08	0	1088	1792	19	244	378	150	252	3923	0	1155	2080	17	235	418	177	288	4370
SB	07 to 08	0	1513	1122	23	356	254	154	185	3607	0	1623	1179	22	349	251	172	202	3799
NB	08 to 09	0	915	1735	30	369	518	234	273	4074	0	1207	1868	26	324	526	281	314	4545
SB	08 to 09	0	1085	1132	33	451	358	223	247	3529	0	1253	1086	29	402	330	241	262	3603
NB	09 to 10	0	900	1003	25	271	347	176	260	2983	0	1083	1355	34	321	456	239	343	3831
SB	09 to 10	0	961	778	33	337	284	171	306	2870	0	1173	890	39	364	325	213	377	3381
NB	10 to 11	0	919	854	20	260	296	173	253	2775	0	1103	1115	33	306	379	227	330	3493
SB	10 to 11	0	914	690	27	264	244	135	222	2496	6	1071	864	33	314	306	175	282	3050
NB	11 to 12	0	848	725	19	252	267	140	222	2474	0	1068	979	35	317	364	197	302	3262
SB	11 to 12	0	783	623	26	241	233	133	233	2270	6	1037	880	37	323	337	194	330	3143
NB	12 to 13	0	930	772	26	268	259	152	227	2634	0	1180	1064	38	336	352	212	269	3450
SB	12 to 13	0	863	723	25	224	225	119	184	2363	54	1197	1105	38	337	359	197	300	3587
NB	13 to 14	0	854	758	13	275	284	150	206	2541	0	1168	1111	33	365	403	225	300	3606
SB	13 to 14	0	821	769	19	270	275	130	186	2470	0	1197	1127	36	365	398	205	285	3612
NB	14 to 15	0	1027	838	29	300	317	180	216	2907	6	1299	1131	38	389	421	253	298	3837
SB	14 to 15	0	1039	981	31	320	337	165	218	3091	58	1225	1263	35	355	420	217	278	3851
NB	15 to 16	0	1073	987	33	391	372	136	201	3194	0	1507	1297	41	464	470	191	273	4244
SB	15 to 16	0	1001	1191	33	366	410	110	173	3284	0	1233	1468	34	378	478	141	220	3952
NB	16 to 17	0	1164	1348	41	511	479	165	202	3911	0	1689	1593	44	557	555	219	259	4917
SB	16 to 17	0	1022	1560	41	467	537	133	145	3906	0	1217	1637	36	411	520	149	154	4123
NB	17 to 18	0	1489	1576	42	541	494	123	182	4447	0	1897	1789	42	574	554	153	222	5232
SB	17 to 18	0	1283	1834	40	462	560	105	172	4456	0	1542	2168	39	467	613	130	205	5166
NB	18 to 19	0	852	1084	34	402	441	100	150	3063	0	1186	1258	35	427	507	127	191	3731
SB	18 to 19	0	600	933	28	329	349	56	102	2397	0	892	1269	32	383	440	80	141	3238
NB	19 to 20	0	512	461	0	209	209	31	81	1503	0	735	735	0	278	303	54	137	2242
SB	19 to 20	0	485	537	0	173	221	32	51	1498	0	730	949	16	258	363	60	93	2468
NB	20 to 21	0	405	337	4	191	147	18	67	1168	0	587	498	7	259	211	28	103	1693
SB	20 to 21	0	413	461	8	128	198	25	72	1305	0	590	748	15	188	317	42	117	2017
NB	21 to 22	0	213	192	0	102	78	8	33	626	0	282	253	0	138	105	13	48	838
SB	21 to 22	0	253	387	3	95	152	10	47	948	0	402	603	6	124	234	17	75	1461
NB	22 to 23	0	69	83	0	43	42	4	26	267	0	79	98	0	48	45	4	30	305
SB	22 to 23	0	127	177	0	50	84	9	34	481	0	158	248	0	62	115	11	47	642
NB	23 to 24	0	76	70	0	29	25	4	26	230	0	89	93	0	35	31	5	37	291
SB	23 to 24	0	82	119	1	27	43	9	27	309	0	94	148	1	28	52	11	32	366
										94475									117435

Tualatin River Bridge

Post-Processed Hourly Volume Forecasts by Vehicle Classification

2027 Build Alternative

Direction	Time	SOV_Low	SOV_Medium	SOV_High	HOV_Low	HOV_Medium	HOV_High	Medium_Truck	Heavy_Truck	Total 2027 Build_ Vehicle_Adj
NB	00 to 01	0	41	32	1	8	7	7	13	108
SB	00 to 01	0	101	86	2	15	16	21	28	270
NB	01 to 02	0	54	40	1	9	9	12	37	160
SB	01 to 02	0	72	63	1	12	12	19	30	210
NB	02 to 03	0	58	40	2	16	15	11	29	170
SB	02 to 03	0	46	44	2	16	17	16	34	175
NB	03 to 04	0	96	81	2	19	19	41	71	330
SB	03 to 04	0	76	60	1	13	11	23	37	221
NB	04 to 05	0	182	169	3	26	30	59	84	553
SB	04 to 05	0	260	194	3	35	30	29	48	599
NB	05 to 06	0	455	467	7	75	86	148	156	1393
SB	05 to 06	0	627	475	6	92	78	61	65	1405
NB	06 to 07	0	454	652	0	118	148	194	145	1710
SB	06 to 07	0	621	764	0	215	143	104	84	1931
NB	07 to 08	0	813	1062	7	180	210	326	245	2843
SB	07 to 08	0	819	923	0	235	179	159	88	2403
NB	08 to 09	0	651	1156	0	294	326	350	323	3100
SB	08 to 09	0	665	1056	0	347	289	180	175	2710
NB	09 to 10	0	782	693	23	205	210	278	261	2451
SB	09 to 10	0	834	676	23	253	208	170	162	2325
NB	10 to 11	0	823	658	24	207	196	255	252	2416
SB	10 to 11	0	923	668	27	241	204	179	166	2407
NB	11 to 12	0	807	619	25	212	194	229	231	2316
SB	11 to 12	0	866	641	28	239	209	162	162	2306
NB	12 to 13	0	749	587	23	199	182	228	205	2173
SB	12 to 13	0	856	652	26	210	192	161	150	2247
NB	13 to 14	0	759	589	0	212	196	225	183	2166
SB	13 to 14	0	806	700	0	245	220	172	152	2295
NB	14 to 15	0	790	624	9	205	192	209	188	2219
SB	14 to 15	0	823	715	0	232	213	161	140	2283
NB	15 to 16	0	683	737	9	264	222	184	149	2248
SB	15 to 16	0	713	872	0	288	276	156	112	2417
NB	16 to 17	0	816	1079	15	362	317	304	180	3072
SB	16 to 17	0	567	1044	0	360	346	149	103	2568
NB	17 to 18	0	966	1153	14	338	289	203	144	3108
SB	17 to 18	0	692	1038	0	305	299	115	109	2557
NB	18 to 19	0	533	792	0	265	251	124	85	2050
SB	18 to 19	0	275	567	0	207	192	51	45	1336
NB	19 to 20	0	505	423	0	164	154	78	79	1402
SB	19 to 20	0	432	397	0	138	140	48	44	1199
NB	20 to 21	0	481	363	17	165	152	63	73	1314
SB	20 to 21	0	508	437	17	130	150	40	42	1323
NB	21 to 22	0	252	187	8	76	66	28	39	656
SB	21 to 22	0	467	427	15	109	130	38	56	1243
NB	22 to 23	0	163	125	6	50	45	17	28	434
SB	22 to 23	0	247	215	8	65	76	25	28	664
NB	23 to 24	0	125	89	3	29	28	21	34	329
SB	23 to 24	0	194	181	6	44	53	28	34	541
										76358

2045 Build Alternative

Direction	Time	SOV_Low	SOV_Medium	SOV_High	HOV_Low	HOV_Medium	HOV_High	Medium_Truck	Heavy_Truck	Total 2027 Build_ Vehicle_Adj
NB	00 to 01	0	84	68	1	14	15	14	29	226
SB	00 to 01	0	121	114	2	18	21	27	39	342
NB	01 to 02	0	65	50	1	10	10	14	45	196
SB	01 to 02	0	90	89	2	14	17	26	40	277
NB	02 to 03	0	69	49	2	18	19	14	36	207
SB	02 to 03	0	58	63	3	20	23	22	46	236
NB	03 to 04	0	131	124	3	24	27	61	105	476
SB	03 to 04	0	106	88	2	17	16	33	53	315
NB	04 to 05	0	322	355	5	47	61	117	165	1072
SB	04 to 05	0	454	348	5	61	54	52	88	1063
NB	05 to 06	0	618	721	8	100	132	221	228	2027
SB	05 to 06	0	922	711	9	139	119	94	97	2091
NB	06 to 07	0	563	1023	0	139	195	280	213	2412
SB	06 to 07	0	723	873	0	216	159	123	97	2191
NB	07 to 08	0	887	1255	8	164	222	375	280	3191
SB	07 to 08	0	960	996	0	243	187	178	99	2663
NB	08 to 09	0	940	1251	3	242	305	407	367	3515
SB	08 to 09	0	970	1115	0	342	290	213	203	3133
NB	09 to 10	0	1017	1024	26	265	300	394	364	3391
SB	09 to 10	0	1154	928	28	331	291	238	205	3175
NB	10 to 11	0	993	876	25	251	260	331	322	3057
SB	10 to 11	0	1115	861	29	295	270	229	183	2982
NB	11 to 12	0	1029	864	29	278	275	315	311	3100
SB	11 to 12	0	1104	876	34	309	300	229	216	3069
NB	12 to 13	0	965	823	26	256	240	312	276	2898
SB	12 to 13	0	1084	924	29	278	266	230	198	3009
NB	13 to 14	0	895	773	14	263	260	292	233	2730
SB	13 to 14	0	1048	934	0	304	293	233	166	2978
NB	14 to 15	0	938	822	18	257	243	275	241	2794
SB	14 to 15	0	1080	1017	0	294	295	225	176	3087
NB	15 to 16	0	1016	956	12	305	279	258	204	3030
SB	15 to 16	0	1043	1254	0	336	353	214	174	3375
NB	16 to 17	0	1149	1124	17	362	332	361	206	3552
SB	16 to 17	0	1000	1277	0	359	376	189	135	3335
NB	17 to 18	0	1274	1230	16	355	323	243	169	3610
SB	17 to 18	0	1049	1392	0	333	362	159	151	3446
NB	18 to 19	0	905	1045	3	320	325	182	120	2899
SB	18 to 19	0	662	958	0	309	307	95	84	2415
NB	19 to 20	0	830	693	0	253	250	131	129	2286
SB	19 to 20	0	725	721	0	226	257	87	77	2092
NB	20 to 21	0	650	511	23	226	202	89	101	1802
SB	20 to 21	0	710	687	23	188	245	61	62	1976
NB	21 to 22	0	330	256	10	101	90	38	50	876
SB	21 to 22	0	612	632	18	144	199	55	80	1741
NB	22 to 23	0	212	171	7	64	59	23	38	574
SB	22 to 23	0	316	310	10	81	109	35	38	900
NB	23 to 24	0	163	122	4	36	36	29	45	434
SB	23 to 24	0	256	271	7	54	74	40	48	749
										100998

Table A-2. Toll Traffic, Gross and Net Revenue Projections – Scenario A

I-205 Toll Project | DRAFT Taffic and Net Toll Revenue Projections | Scenario A: Pre-completion Tolling beginning 12/01/2024 | Post-completion Tolling beginning 04/01/2027

Annual Toll Trips, Gross Toll Revenue Potential and Net Revenues | FY 2025-60

Revised 10/24/2022

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Registered Account Trips			Unregistered LPT Toll Bill by Mail Trips				Toll Revenue Potential			Less:	Less:		Plus:		Less:	Less:	Less:	Less:	Less:	Less:	Less:		Uses of Net Toll Revenue	
Fiscal Year	Weighted Average Toll per PCE Trip[1]	Annual Toll Trips (millions)[2]	PCE Toll Trips (millions)[3]	Weighted Average Toll per PCE Trip[1]	Annual Toll Trips (millions)[2]	PCE Toll Trips (millions)[3]	Total Toll Trips (millions)	Registered Account Customers ($ millions)[4]	Unregistered Pay-by-Mail Customers ($ millions)[5]	Total Gross Toll Revenue Potential ($ millions)	Revenue Not Recognized ($ millions)[6]	Unpaid Toll Revenue ($ millions)[7]	Subtotal: Adjusted Gross Toll Revenue Collected ($ millions)	Pay-by-Mail Second Invoice Rebilling Fees ($ millions)[8]	Subtotal: Adjusted Gross Toll Revenue & Fees ($ millions)	Credit Card Fees ($ millions)[9]	Transponder Purchase and Inventory Costs ($ millions)[10]	State and Consultant Operations Costs ($ millions)	Roadway Toll Systems (RTS) O&M Costs ($ millions)	CSC Back Office System (BOS) Vendor O&M Costs ($ millions)	CSC Operations Vendor O&M Costs ($ millions)	Routine Facility O&M Costs ($ millions)[11]	Total Net Toll Revenue ($ millions)	Periodic Toll Equipment R&R and Vendor Reprocurement Costs ($ millions)[12]	Periodic Facility R&R Costs ($ millions)[13]
2025	$1.71	14.63	18.75	$3.09	4.25	5.24	**18.89**	32.11	16.16	**48.27**	(2.93)	(3.79)	**41.55**	1.31	**42.87**	(1.08)	(1.00)	(6.84)	(2.62)	(0.74)	(6.04)	(0.88)	**23.66**	-	-
2026	$1.75	27.46	35.18	$3.12	7.57	9.30	**35.02**	61.53	29.05	**90.58**	(4.22)	(7.08)	**79.28**	2.45	**81.73**	(2.07)	(0.25)	(8.55)	(2.69)	(0.75)	(11.49)	(0.90)	**55.03**	-	-
2027	$1.79	30.69	39.33	$3.17	8.01	9.82	**38.70**	70.59	31.16	**101.75**	(3.38)	(7.92)	**90.45**	2.71	**93.16**	(2.36)	(0.29)	(9.13)	(2.75)	(0.77)	(13.01)	(0.92)	**63.93**	-	-
2028	$1.86	33.31	42.67	$3.24	8.22	10.06	**41.53**	79.31	32.58	**111.89**	(3.58)	(8.32)	**100.00**	2.81	**102.80**	(2.60)	(0.32)	(9.50)	(2.82)	(0.79)	(14.31)	(0.95)	**71.51**	-	-
2029	$1.90	34.09	43.68	$3.28	7.92	9.68	**42.02**	82.85	31.75	**114.60**	(3.53)	(8.21)	**102.86**	2.73	**105.60**	(2.67)	(0.34)	(9.65)	(2.89)	(0.81)	(14.84)	(0.97)	**73.43**	-	(1.06)
2030	$1.94	34.89	44.70	$3.32	7.63	9.29	**42.51**	86.51	30.87	**117.38**	(3.48)	(8.05)	**105.85**	2.66	**108.51**	(2.75)	(0.35)	(9.79)	(2.97)	(0.83)	(15.39)	(0.99)	**75.45**	-	(1.09)
2031	$1.98	35.70	45.75	$3.37	7.32	8.89	**43.02**	90.49	29.96	**120.45**	(3.43)	(7.88)	**109.14**	2.59	**111.72**	(2.83)	(0.37)	(9.93)	(3.04)	(0.85)	(15.96)	(1.02)	**77.72**	-	-
2032	$2.02	36.52	46.82	$3.42	7.01	8.49	**43.53**	94.60	28.99	**123.59**	(3.38)	(7.71)	**112.51**	2.51	**115.02**	(2.91)	(0.39)	(10.07)	(3.12)	(0.87)	(16.56)	(1.04)	**80.06**	-	-
2033	$2.06	37.36	47.91	$3.47	6.68	8.07	**44.05**	98.85	27.95	**126.80**	(3.31)	(7.52)	**115.96**	2.43	**118.39**	(3.00)	(0.41)	(10.20)	(3.19)	(0.90)	(17.17)	(1.07)	**82.45**	-	-
2034	$2.11	38.22	49.01	$3.52	6.35	7.63	**44.57**	103.34	26.84	**130.18**	(3.25)	(7.32)	**119.61**	2.35	**121.95**	(3.09)	(0.43)	(10.34)	(3.27)	(0.92)	(17.81)	(1.10)	**85.01**	(34.23)	(7.03)
2035	$2.16	39.09	50.14	$3.57	6.01	7.19	**45.10**	108.09	25.69	**133.78**	(3.18)	(7.11)	**123.48**	2.26	**125.75**	(3.18)	(0.45)	(10.47)	(3.36)	(0.94)	(18.47)	(1.12)	**87.76**	(35.09)	(7.21)
2036	$2.21	39.52	50.70	$3.62	6.08	7.28	**45.60**	111.82	26.36	**138.18**	(3.28)	(7.30)	**127.60**	2.29	**129.89**	(3.29)	(0.47)	(10.77)	(3.44)	(0.96)	(19.15)	(1.15)	**90.66**	-	-
2037	$2.26	39.95	51.28	$3.67	6.16	7.37	**46.11**	115.64	27.06	**142.70**	(3.37)	(7.50)	**131.82**	2.32	**134.14**	(3.39)	(0.48)	(11.09)	(3.53)	(0.99)	(19.84)	(1.18)	**93.63**	-	-
2038	$2.31	40.39	51.86	$3.72	6.23	7.46	**46.63**	119.62	27.77	**147.40**	(3.47)	(7.71)	**136.22**	2.35	**138.56**	(3.51)	(0.50)	(11.42)	(3.61)	(1.01)	(20.57)	(1.21)	**96.73**	-	-
2039	$2.36	40.84	52.45	$3.77	6.31	7.56	**47.15**	123.70	28.51	**152.22**	(3.57)	(7.93)	**140.72**	2.37	**143.10**	(3.62)	(0.52)	(11.76)	(3.70)	(1.04)	(21.32)	(1.24)	**99.89**	-	(1.36)
2040	$2.41	41.29	53.05	$3.82	6.39	7.65	**47.68**	127.91	29.27	**157.17**	(3.67)	(8.15)	**145.36**	2.40	**147.76**	(3.74)	(0.54)	(12.11)	(3.80)	(1.06)	(22.10)	(1.27)	**103.14**	-	(1.39)
2041	$2.47	41.76	53.65	$3.88	6.47	7.75	**48.22**	132.32	30.06	**162.37**	(3.78)	(8.38)	**150.22**	2.43	**152.65**	(3.86)	(0.56)	(12.47)	(3.89)	(1.09)	(22.91)	(1.30)	**106.56**	-	-
2042	$2.52	42.22	54.27	$3.94	6.55	7.85	**48.77**	136.92	30.88	**167.80**	(3.89)	(8.62)	**155.29**	2.46	**157.76**	(3.99)	(0.58)	(12.85)	(3.99)	(1.12)	(23.75)	(1.34)	**110.15**	-	-
2043	$2.58	42.70	54.90	$3.99	6.63	7.95	**49.33**	141.63	31.72	**173.35**	(4.00)	(8.86)	**160.49**	2.49	**162.98**	(4.12)	(0.60)	(13.23)	(4.09)	(1.15)	(24.62)	(1.37)	**113.80**	-	-
2044	$2.64	43.18	55.53	$4.05	6.71	8.05	**49.89**	146.47	32.59	**179.06**	(4.12)	(9.12)	**165.82**	2.52	**168.34**	(4.26)	(0.62)	(13.63)	(4.19)	(1.18)	(25.52)	(1.40)	**117.54**	(50.66)	(99.56)
2045	$2.70	43.67	56.18	$4.11	6.80	8.15	**50.47**	151.43	33.46	**184.89**	(4.24)	(9.37)	**171.28**	2.55	**173.83**	(4.40)	(0.64)	(14.04)	(4.30)	(1.20)	(26.46)	(1.44)	**121.35**	(51.93)	(102.05)
2046	$2.75	43.92	56.51	$4.16	6.84	8.20	**50.76**	155.54	34.16	**189.70**	(4.34)	(9.58)	**175.78**	2.57	**178.35**	(4.51)	(0.66)	(14.43)	(4.40)	(1.23)	(27.28)	(1.47)	**124.35**	-	-
2047	$2.81	44.17	56.84	$4.22	6.89	8.26	**51.06**	159.79	34.88	**194.67**	(4.44)	(9.79)	**180.44**	2.59	**183.03**	(4.63)	(0.68)	(14.83)	(4.51)	(1.27)	(28.13)	(1.51)	**127.47**	-	-
2048	$2.87	44.42	57.17	$4.28	6.94	8.32	**51.36**	164.20	35.62	**199.82**	(4.54)	(10.01)	**185.26**	2.60	**187.87**	(4.75)	(0.71)	(15.24)	(4.63)	(1.30)	(29.00)	(1.55)	**130.70**	-	-
2049	$2.93	44.68	57.51	$4.35	6.99	8.37	**51.66**	168.77	36.39	**205.16**	(4.65)	(10.24)	**190.27**	2.62	**192.90**	(4.88)	(0.73)	(15.66)	(4.74)	(1.33)	(29.90)	(1.59)	**134.07**	-	(1.74)
2050	$3.00	44.93	57.85	$4.41	7.04	8.43	**51.97**	173.56	37.19	**210.75**	(4.76)	(10.48)	**195.52**	2.64	**198.15**	(5.01)	(0.75)	(16.10)	(4.86)	(1.36)	(30.83)	(1.63)	**137.62**	-	(1.78)
2051	$3.07	45.19	58.19	$4.48	7.08	8.49	**52.27**	178.43	38.01	**216.44**	(4.87)	(10.72)	**200.85**	2.66	**203.51**	(5.15)	(0.77)	(16.54)	(4.98)	(1.40)	(31.79)	(1.67)	**141.21**	-	-
2052	$3.13	45.45	58.54	$4.54	7.13	8.55	**52.58**	183.37	38.84	**222.21**	(4.99)	(10.97)	**206.26**	2.67	**208.93**	(5.29)	(0.80)	(17.00)	(5.11)	(1.43)	(32.77)	(1.71)	**144.82**	-	-
2053	$3.20	45.71	58.88	$4.61	7.18	8.61	**52.89**	188.40	39.68	**228.08**	(5.11)	(11.22)	**211.76**	2.69	**214.45**	(5.43)	(0.82)	(17.47)	(5.23)	(1.47)	(33.79)	(1.75)	**148.49**	-	-
2054	$3.27	45.98	59.23	$4.68	7.23	8.67	**53.21**	193.62	40.55	**234.17**	(5.23)	(11.47)	**217.47**	2.71	**220.18**	(5.57)	(0.85)	(17.96)	(5.36)	(1.50)	(34.84)	(1.80)	**152.29**	(56.10)	(11.53)
2055	$3.34	46.24	59.58	$4.75	7.28	8.73	**53.52**	199.20	41.48	**240.68**	(5.36)	(11.74)	**223.58**	2.73	**226.31**	(5.73)	(0.87)	(18.46)	(5.50)	(1.54)	(35.93)	(1.84)	**156.44**	(57.50)	(11.81)
2056	$3.42	46.51	59.94	$4.83	7.33	8.79	**53.84**	204.88	42.43	**247.31**	(5.49)	(12.03)	**229.79**	2.74	**232.54**	(5.88)	(0.90)	(18.97)	(5.64)	(1.58)	(37.04)	(1.89)	**160.64**	-	-
2057	$3.49	46.78	60.30	$4.90	7.38	8.85	**54.17**	210.66	43.40	**254.06**	(5.62)	(12.31)	**236.12**	2.76	**238.89**	(6.04)	(0.93)	(19.50)	(5.78)	(1.62)	(38.20)	(1.93)	**164.88**	-	-
2058	$3.57	47.06	60.66	$4.98	7.43	8.91	**54.49**	216.54	44.37	**260.91**	(5.76)	(12.60)	**242.55**	2.78	**245.33**	(6.21)	(0.96)	(20.04)	(5.92)	(1.66)	(39.39)	(1.98)	**169.17**	-	-
2059	$3.65	47.33	61.02	$5.06	7.48	8.97	**54.81**	222.61	45.37	**267.98**	(5.90)	(12.90)	**249.18**	2.80	**251.98**	(6.38)	(0.99)	(20.60)	(6.07)	(1.70)	(40.61)	(2.03)	**173.60**	-	(2.23)
2060	$3.73	47.61	61.39	$5.14	7.53	9.03	**55.14**	228.80	46.40	**275.20**	(6.04)	(13.21)	**255.95**	2.82	**258.77**	(6.55)	(1.02)	(21.18)	(6.22)	(1.74)	(41.88)	(2.08)	**178.10**	-	(2.28)
Totals FY 2025-60		1,463.48	1,881.44		249.05	299.90	**1,712.54**	5,064.10	1,207.45	**6,271.56**	(152.13)	(333.12)	**5,786.30**	91.39	**5,877.69**	(148.71)	(22.54)	(491.82)	(150.22)	(42.13)	(898.69)	(50.29)	**4,073.29**	(285.50)	(252.15)

Footnotes

1 Reflects the average revenue per passenger car equivalent (PCE) based on the time-of-day variable weekday and weekend toll schedules.

2 Annual auto and truck customer toll trips in both travel directions; a toll trip comprises continuous travel through one or both toll points on I-205.

3 Converts truck trips to their passenger car equivalent (PCE) number of trips from the toll multiples paid; medium trucks are counted as two cars (2x) and large trucks as four cars (4x).

4 Gross toll revenue potential from registered account customers before any adjustments for uncollectible revenue, fees, and credits.

5 Gross toll revenue potential from unregistered customers identified for a toll bill by mail from their license plate, before adjustments for uncollectible revenue/fees. The revenue from unregistered (non-account) customers assumes an additional toll increment of $2.00 per trip regardless of vehicle type to offset higher collection costs / leakage via payment by mail.

6 Revenue not recognized can result from unreadable vehicle license plate imagess or the inability to identify the vehicle owner's name and address from a readable license plate image, resulting in unbillable revenue. License plate images are used identify unregistered customers and for registered customers if their transponder pass is not correctly read or missing.

7 Recognized but unpaid toll revenue after 80 days (two toll billing cycles) from date of travel.

8 Late payment rebilling fee per invoice assessed to unregistered pay-by-mail customers who don't pay their first invoice within 30 days.

9 Credit card fees estimated at 2.75% of applicable gross toll revenues collected via bank card; no additional factor currently assumed for any fees related to account balance refunds.

10 Includes transponder purchase and inventory costs related to free-of-charge distribution of sticker tags transponders by ODOT to registered account customers.

11 Includes annual facility operations and maintenance (O&M) costs that are routinely incurred for roadways and bridges, plus a standard ODOT contigency for unforeseen expenses.

12 Includes periodic RTS/CSC/BOS vendor re-procurement costs, system testing and acceptance, as well as periodic RTS equipment repair and replacement (R&R) costs.

13 Includes periodic roadway and bridge facility major maintenance, repair and replacement (R&R) costs .

Key Assumptions

- Pre-completion tolling has been considered for both Abernethy and Tualatin bridges. Post-completion is assumed to start once all imporvements are complete.
- Ramp-up reduction factors of 85% (-15%) for the first 12 months and 95% (-5%) for the second 12 months of toll operations are applied to the traffic and revenue forecasts to allow for the time it takes for users to become accustomed to tolling, determine their best travel options and/or obtain a registered account.
- Tolls are assumed to escalate annually by 2.15% in alignment with projected general price inflation.
- For autos, registered account customers are assumed to comprise 75% of all trips in the first year, increasing by 1% per year until reaching a ceiling of 85%.
- For medium and large trucks, registered account customers are assumed to comprise 80% of all trips in the first year, increasing by 1% per year until reaching 90%.

Table A-3. Toll Traffic, Gross and Net Revenue Projections – Scenario B

I-205 Toll Project | DRAFT Taffic and Net Toll Revenue Projections | Scenario B: Pre-completion Tolling beginning 12/01/2024 | Post-completion Tolling beginning 10/01/2028

Annual Toll Trips, Gross Toll Revenue Potential and Net Revenues | FY 2025-60

Revised 10/24/2022

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	Registered Account Trips			Unregistered LPT Toll Bill by Mail Trips				Toll Revenue Potential			Less:	Less:		Plus:		Less:	Less:	Less:	Less:	Less:	Less:	Less:		Uses of Net Toll Revenue	
Fiscal Year	Weighted Average Toll per PCE Trip[1]	Annual Toll Trips (millions)[2]	PCE Toll Trips (millions)[3]	Weighted Average Toll per PCE Trip[1]	Annual Toll Trips (millions)[2]	PCE Toll Trips (millions)[3]	Total Toll Trips (millions)	Registered Account Customers ($ millions)[4]	Unregistered Pay-by-Mail Customers ($ millions)[5]	Total Gross Toll Revenue Potential ($ millions)	Revenue Not Recognized ($ millions)[6]	Unpaid Toll Revenue ($ millions)[7]	Subtotal: Adjusted Gross Toll Revenue Collected ($ millions)	Pay-by-Mail Second Invoice Rebilling Fees ($ millions)[8]	Subtotal: Adjusted Gross Toll Revenue & Fees ($ millions)	Credit Card Fees ($ millions)[9]	Transponder Purchase and Inventory Costs ($ millions)[10]	State and Consultant Operations Costs ($ millions)	Roadway Toll Systems (RTS) O&M Costs ($ millions)	CSC Back Office System (BOS) Vendor O&M Costs ($ millions)	CSC Operations Vendor O&M Costs ($ millions)	Routine Facility O&M Costs ($ millions)[11]	Total Net Toll Revenue ($ millions)	Periodic Toll Equipment R&R and Vendor Reprocurement Costs ($ millions)[12]	Periodic Facility R&R Costs ($ millions)[13]
2025	$1.71	14.63	18.75	$3.09	4.25	5.24	18.89	32.11	16.16	48.27	(2.93)	(3.79)	41.55	1.31	42.87	(1.08)	(1.00)	(6.84)	(2.62)	(0.74)	(6.04)	(0.88)	23.66	-	-
2026	$1.75	27.46	35.18	$3.12	7.57	9.30	35.02	61.53	29.05	90.58	(4.22)	(7.08)	79.28	2.45	81.73	(2.07)	(0.25)	(8.55)	(2.69)	(0.75)	(11.49)	(0.90)	55.03	-	-
2027	$1.79	30.30	38.84	$3.16	7.90	9.70	38.21	69.35	30.66	100.01	(3.32)	(7.80)	88.88	2.67	91.56	(2.32)	(0.28)	(9.08)	(2.75)	(0.77)	(12.84)	(0.92)	62.59	-	-
2028	$1.82	31.69	40.62	$3.20	7.80	9.56	39.49	74.02	30.60	104.62	(3.35)	(7.84)	93.42	2.67	96.09	(2.43)	(0.30)	(9.30)	(2.82)	(0.79)	(13.61)	(0.95)	65.88	-	-
2029	$1.89	33.68	43.16	$3.27	7.83	9.56	41.50	81.47	31.28	112.74	(3.48)	(8.05)	101.22	2.70	103.92	(2.63)	(0.33)	(9.60)	(2.89)	(0.81)	(14.66)	(0.97)	72.03	-	(1.06)
2030	$1.94	34.89	44.70	$3.32	7.63	9.29	42.51	86.51	30.87	117.38	(3.48)	(8.04)	105.86	2.66	108.53	(2.75)	(0.35)	(9.79)	(2.97)	(0.83)	(15.39)	(0.99)	75.46	-	(1.09)
2031	$1.98	35.70	45.75	$3.37	7.32	8.89	43.02	90.49	29.96	120.45	(3.43)	(7.88)	109.14	2.59	111.72	(2.83)	(0.37)	(9.93)	(3.04)	(0.85)	(15.96)	(1.02)	77.72	-	-
2032	$2.02	36.52	46.82	$3.42	7.01	8.49	43.53	94.60	28.99	123.59	(3.38)	(7.71)	112.51	2.51	115.02	(2.91)	(0.39)	(10.07)	(3.12)	(0.87)	(16.56)	(1.04)	80.06	-	-
2033	$2.06	37.36	47.91	$3.47	6.68	8.07	44.05	98.85	27.95	126.80	(3.31)	(7.52)	115.96	2.43	118.39	(3.00)	(0.41)	(10.20)	(3.19)	(0.90)	(17.17)	(1.07)	82.45	-	-
2034	$2.11	38.22	49.01	$3.52	6.35	7.63	44.57	103.34	26.84	130.18	(3.25)	(7.32)	119.61	2.35	121.95	(3.09)	(0.43)	(10.34)	(3.27)	(0.92)	(17.81)	(1.10)	85.01	(34.23)	(7.03)
2035	$2.16	39.09	50.14	$3.57	6.01	7.19	45.10	108.09	25.69	133.78	(3.18)	(7.11)	123.48	2.26	125.75	(3.18)	(0.45)	(10.47)	(3.36)	(0.94)	(18.47)	(1.12)	87.76	(35.09)	(7.21)
2036	$2.21	39.52	50.70	$3.62	6.08	7.28	45.60	111.82	26.36	138.18	(3.28)	(7.30)	127.60	2.29	129.89	(3.29)	(0.47)	(10.77)	(3.44)	(0.96)	(19.15)	(1.15)	90.66	-	-
2037	$2.26	39.95	51.28	$3.67	6.16	7.37	46.11	115.64	27.06	142.70	(3.37)	(7.50)	131.82	2.32	134.14	(3.39)	(0.48)	(11.09)	(3.53)	(0.99)	(19.84)	(1.18)	93.63	-	-
2038	$2.31	40.39	51.86	$3.72	6.23	7.46	46.63	119.62	27.77	147.40	(3.47)	(7.71)	136.22	2.35	138.56	(3.51)	(0.50)	(11.42)	(3.61)	(1.01)	(20.57)	(1.21)	96.73	-	-
2039	$2.36	40.84	52.45	$3.77	6.31	7.56	47.15	123.70	28.51	152.22	(3.57)	(7.93)	140.72	2.37	143.10	(3.62)	(0.52)	(11.76)	(3.70)	(1.04)	(21.32)	(1.24)	99.89	-	(1.36)
2040	$2.41	41.29	53.05	$3.82	6.39	7.65	47.68	127.91	29.27	157.17	(3.67)	(8.15)	145.36	2.40	147.76	(3.74)	(0.54)	(12.11)	(3.80)	(1.06)	(22.10)	(1.27)	103.14	-	(1.39)
2041	$2.47	41.76	53.65	$3.88	6.47	7.75	48.22	132.32	30.06	162.37	(3.78)	(8.38)	150.22	2.43	152.65	(3.86)	(0.56)	(12.47)	(3.89)	(1.09)	(22.91)	(1.30)	106.56	-	-
2042	$2.52	42.22	54.27	$3.94	6.55	7.85	48.77	136.92	30.88	167.80	(3.89)	(8.62)	155.29	2.46	157.76	(3.99)	(0.58)	(12.85)	(3.99)	(1.12)	(23.75)	(1.34)	110.15	-	-
2043	$2.58	42.70	54.90	$3.99	6.63	7.95	49.33	141.63	31.72	173.35	(4.00)	(8.86)	160.49	2.49	162.98	(4.12)	(0.60)	(13.23)	(4.09)	(1.15)	(24.62)	(1.37)	113.80	-	-
2044	$2.64	43.18	55.53	$4.05	6.71	8.05	49.89	146.47	32.59	179.06	(4.12)	(9.12)	165.82	2.52	168.34	(4.26)	(0.62)	(13.63)	(4.19)	(1.18)	(25.52)	(1.40)	117.54	(50.66)	(99.56)
2045	$2.70	43.67	56.18	$4.11	6.80	8.15	50.47	151.43	33.46	184.89	(4.24)	(9.37)	171.28	2.55	173.83	(4.40)	(0.64)	(14.04)	(4.30)	(1.20)	(26.46)	(1.44)	121.35	(51.93)	(102.05)
2046	$2.75	43.92	56.51	$4.16	6.84	8.20	50.76	155.54	34.16	189.70	(4.34)	(9.58)	175.78	2.57	178.35	(4.51)	(0.66)	(14.43)	(4.40)	(1.23)	(27.28)	(1.47)	124.35	-	-
2047	$2.81	44.17	56.84	$4.22	6.89	8.26	51.06	159.79	34.88	194.67	(4.44)	(9.79)	180.44	2.59	183.03	(4.63)	(0.68)	(14.83)	(4.51)	(1.27)	(28.13)	(1.51)	127.47	-	-
2048	$2.87	44.42	57.17	$4.28	6.94	8.32	51.36	164.20	35.62	199.82	(4.54)	(10.01)	185.26	2.60	187.87	(4.75)	(0.71)	(15.24)	(4.63)	(1.30)	(29.00)	(1.55)	130.70	-	-
2049	$2.93	44.68	57.51	$4.35	6.99	8.37	51.66	168.77	36.39	205.16	(4.65)	(10.24)	190.27	2.62	192.90	(4.88)	(0.73)	(15.66)	(4.74)	(1.33)	(29.90)	(1.59)	134.07	-	(1.74)
2050	$3.00	44.93	57.85	$4.41	7.04	8.43	51.97	173.56	37.19	210.75	(4.76)	(10.48)	195.52	2.64	198.15	(5.01)	(0.75)	(16.10)	(4.86)	(1.36)	(30.83)	(1.63)	137.62	-	(1.78)
2051	$3.07	45.19	58.19	$4.48	7.08	8.49	52.27	178.43	38.01	216.44	(4.87)	(10.72)	200.85	2.66	203.51	(5.15)	(0.77)	(16.54)	(4.98)	(1.40)	(31.79)	(1.67)	141.21	-	-
2052	$3.13	45.45	58.54	$4.54	7.13	8.55	52.58	183.37	38.84	222.21	(4.99)	(10.97)	206.26	2.67	208.93	(5.29)	(0.80)	(17.00)	(5.11)	(1.43)	(32.77)	(1.71)	144.82	-	-
2053	$3.20	45.71	58.88	$4.61	7.18	8.61	52.89	188.40	39.68	228.08	(5.11)	(11.22)	211.76	2.69	214.45	(5.43)	(0.82)	(17.47)	(5.23)	(1.47)	(33.79)	(1.75)	148.49	-	-
2054	$3.27	45.98	59.23	$4.68	7.23	8.67	53.21	193.62	40.55	234.17	(5.23)	(11.47)	217.47	2.71	220.18	(5.57)	(0.85)	(17.96)	(5.36)	(1.50)	(34.84)	(1.80)	152.29	(56.10)	(11.53)
2055	$3.34	46.24	59.58	$4.75	7.28	8.73	53.52	199.20	41.48	240.68	(5.36)	(11.74)	223.58	2.73	226.31	(5.73)	(0.87)	(18.46)	(5.50)	(1.54)	(35.93)	(1.84)	156.44	(57.50)	(11.81)
2056	$3.42	46.51	59.94	$4.83	7.33	8.79	53.84	204.88	42.43	247.31	(5.49)	(12.03)	229.79	2.74	232.54	(5.88)	(0.90)	(18.97)	(5.64)	(1.58)	(37.04)	(1.89)	160.64	-	-
2057	$3.49	46.78	60.30	$4.90	7.38	8.85	54.17	210.66	43.40	254.06	(5.62)	(12.31)	236.12	2.76	238.89	(6.04)	(0.93)	(19.50)	(5.78)	(1.62)	(38.20)	(1.93)	164.88	-	-
2058	$3.57	47.06	60.66	$4.98	7.43	8.91	54.49	216.54	44.37	260.91	(5.76)	(12.60)	242.55	2.78	245.33	(6.21)	(0.96)	(20.04)	(5.92)	(1.66)	(39.39)	(1.98)	169.17	-	-
2059	$3.65	47.33	61.02	$5.06	7.48	8.97	54.81	222.61	45.37	267.98	(5.90)	(12.90)	249.18	2.80	251.98	(6.38)	(0.99)	(20.60)	(6.07)	(1.70)	(40.61)	(2.03)	173.60	-	(2.23)
2060	$3.73	47.61	61.39	$5.14	7.53	9.03	55.14	228.80	46.40	275.20	(6.04)	(13.21)	255.95	2.82	258.77	(6.55)	(1.02)	(21.18)	(6.22)	(1.74)	(41.88)	(2.08)	178.10	-	(2.28)
Totals FY 2025-60		1,461.06	1,878.38		248.43	299.15	1,709.49	5,056.19	1,204.50	6,260.69	(151.80)	(332.36)	5,776.53	91.18	5,867.71	(148.45)	(22.52)	(491.52)	(150.22)	(42.13)	(897.64)	(50.29)	4,064.94	(285.50)	(252.15)

Footnotes

1 Reflects the average revenue per passenger car equivalent (PCE) based on the time-of-day variable weekday and weekend toll schedules.

2 Annual auto and truck customer toll trips in both travel directions; a toll trip comprises continuous travel through one or both toll points on I-205.

3 Converts truck trips to their passenger car equivalent (PCE) number of trips from the toll multiples paid; medium trucks are counted as two cars (2x) and large trucks as four cars (4x).

4 Gross toll revenue potential from registered account customers before any adjustments for uncollectible revenue, fees, and credits.

5 Gross toll revenue potential from unregistered customers identified for a toll bill by mail from their license plate, before adjustments for uncollectible revenue/fees. The revenue from unregistered (non-account) customers assumes an additional toll increment of $2.00 per trip regardless of vehicle type to offset higher collection costs / leakage via payment by mail.

6 Revenue not recognized can result from unreadable vehicle license plate imagess or the inability to identify the vehicle owner's name and address from a readable license plate image, resulting in unbillable revenue. License plate images are used identify unregistered customers and for registered customers if their transponder pass is not correctly read or missing.

7 Recognized but unpaid toll revenue after 80 days (two toll billing cycles) from date of travel.

8 Late payment rebilling fee per invoice assessed to unregistered pay-by-mail customers who don't pay their first invoice within 30 days.

9 Credit card fees estimated at 2.75% of applicable gross toll revenues collected via bank card; no additional factor currently assumed for any fees related to account balance refunds.

10 Includes transponder purchase and inventory costs related to free-of-charge distribution of sticker tags transponders by ODOT to registered account customers.

11 Includes annual facility operations and maintenance (O&M) costs that are routinely incurred for roadways and bridges, plus a standard ODOT contigency for unforeseen expenses.

12 Includes periodic RTS/CSC/BOS vendor re-procurement costs, system testing and acceptance, as well as periodic RTS equipment repair and replacement (R&R) costs.

13 Includes periodic roadway and bridge facility major maintenance, repair and replacement (R&R) costs .

Key Assumptions

- Pre-completion tolling has been considered for both Abernethy and Tualatin bridges. Post-completion is assumed to start once all imporvements are complete.
- Ramp-up reduction factors of 85% (-15%) for the first 12 months and 95% (-5%) for the second 12 months of toll operations are applied to the traffic and revenue forecasts to allow for the time it takes for users to become accustomed to tolling, determine their best travel options and/or obtain a registered account.
- Tolls are assumed to escalate annually by 2.15% in alignment with projected general price inflation.
- For autos, registered account customers are assumed to comprise 75% of all trips in the first year, increasing by 1% per year until reaching a ceiling of 85%.
- For medium and large trucks, registered account customers are assumed to comprise 80% of all trips in the first year, increasing by 1% per year until reaching 90%.