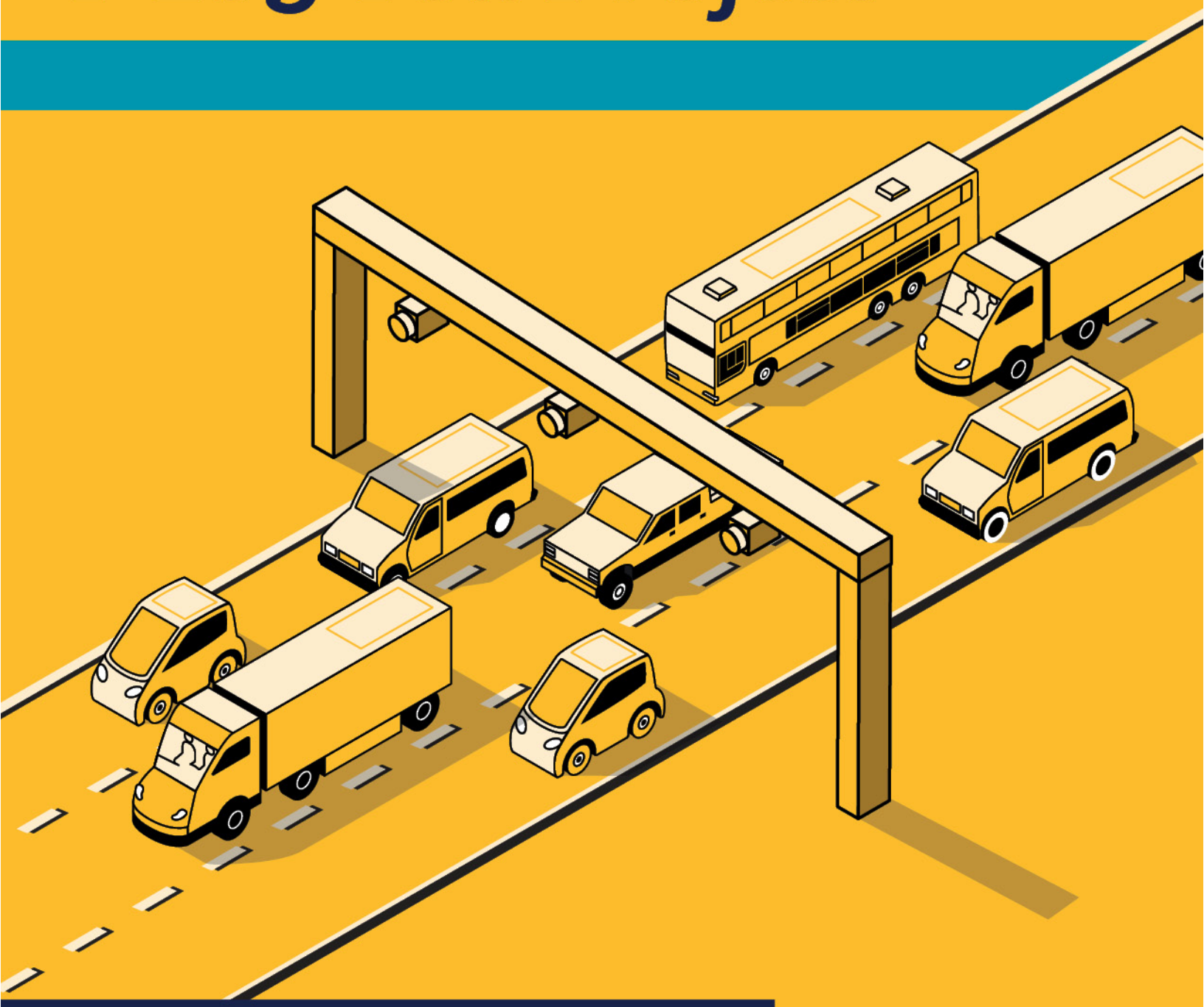
Attachment A Materials for Public and Stakeholder Review

A.2 DRAFT COMPARISON OF ALTERNATIVES REPORT AND EXECUTIVE SUMMARY

I-205 Toll Project

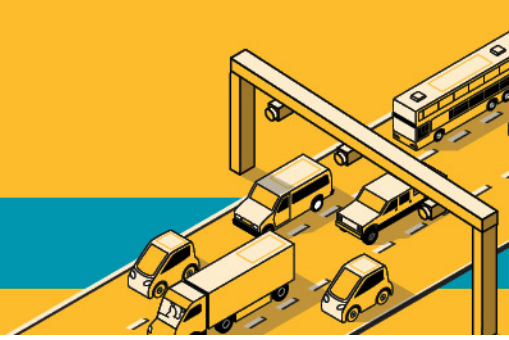


DRAFT Comparison of Screening Alternatives

Revised August 14, 2020

Oregon Department of Transportation

I-205 Toll Project



DRAFT

COMPARISON OF SCREENING ALTERNATIVES

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ACRONYMS AND ABBREVIATIONS

ALT	Alternative
BOS	Back office system
CSC	Customer service center
DTA	Dynamic Traffic Assignment
FHWA	Federal Highway Administration
HOV	High-occupancy vehicle
NEPA	National Environmental Policy Act
O&M	Operation and maintenance
ODOT	Oregon Department of Transportation
OR 213	Oregon Route 213
OTC	Oregon Transportation Commission
RTS	Roadway toll system
SOV	Single-occupancy vehicle
VHT	Regional vehicle hours traveled
VMT	Regional vehicle miles traveled
VPFA	Value Pricing Feasibility Analysis
VPPP	Value Pricing Pilot Program

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INTRODUCTION

This report summarizes the evaluation of initial screening alternatives for the Interstate 205 (I-205) Toll Project (Project). For the purposes of this report, the alternatives constitute different geographic locations where tolls will be charged (toll gantries) and different structures for assessing tolls (e.g., single point, segment-based, and toll-zone based). The objective of the evaluation is to narrow the number of alternatives using available quantitative and qualitative data on evaluation criteria and performance measures to identify those alternatives that appear best suited to advance into more detailed analysis under the National Environmental Policy Act (NEPA).

The report is structured as follows:

1. Overview of the alternatives evaluated
2. Summary of the evaluation criteria and performance measures used in conducting the evaluation
3. Identification of toll rate assumptions used in the modeling
4. Summary of how each alternative performed in the evaluation
5. Detailed technical assessment based on the evaluation criteria and associated performance measures
6. Recommendations on alternatives that should be advanced for further study during the NEPA process.

The report will make use of recurring technical terminology as follows:

- **Through-trip**: Trips that require travel along the entire length of the tolled area on I-205
- **Local-trip**: Trips that enter or exit I-205 at points within the tolled area and do not travel the full length of the tolled area
- **Diversion**: Avoidance of tolls by either changing route, destination, mode of travel, or time of travel
- **Rerouting**: A subset of diversion where an alternative route is selected rather than taking the tolled route

1.0 ALTERNATIVES

Tolling on I-205 is intended to manage congestion on I-205 between Stafford Road and Oregon Route 213 (OR 213) and generate revenues to fund congestion relief projects. Starting from the Value Pricing Feasibility Analysis (VPFA) and its recommended strategy for tolling on I-205 on or near the Abernethy Bridge (known as "Concept E"), a series of "build alternatives" were developed. These alternatives test how different toll structures and gantry locations affect I-205 and regional travel and assess potential traffic rerouting to alternative local and regional routes off of I-205 while generating similar levels of net revenue. Additional information on the development of screening alternatives can be found in the I-205 Initial Range of Alternatives Technical Memorandum (dated February 28, 2020).

The alternatives developed are shown in Table 1 below. Although different in construction and location effects, Alternatives 1 and 2 operate in the same way from the perspective of the Portland Metro regional travel demand model, which was used to generate the data for the performance measures utilized in the evaluation; thus, Alternative 2 can be thought of as an operational variant of Alternative 1 and, as such, does not receive separate discussion in this report.

Table 1: I-205 Toll Project Alternatives

Alternative	Description
Alt 1	Abernethy Bridge Toll (Concept E from VPFA)
Alt 2	Abernethy Bridge Toll with Off-Bridge Gantries
Alt 3	Bridge Tolls - Abernethy Bridge and Tualatin River Bridge
Alt 4	Segment-Based Tolls - Between Stafford Road and OR 213
Alt 5	Single Zone Toll – Between Stafford Road and OR 213

1.1 Alternative 1: Abernethy Bridge Toll (Concept E from VPFA)

Under Alternative 1, vehicles would be assessed a toll to cross the Abernethy Bridge in any direction, as shown in Figure 1. This configuration relies on a single mainline toll gantry at the bridge and is the simplest alternative. During the peak hours, toll rates vary on the bridge based on the direction of travel. More information on the toll rates assumed for each alternative is provided in the next section.

Figure 1: Alternative 1

1.2 Alternative 2: Abernethy Bridge Toll with Off-Bridge Gantries

Alternative 2 comprises tolling points on approaches to the Abernethy Bridge (south of OR 43 and north of OR 99E) and on the bridge itself, as shown in Figure 2. Vehicles would be assessed a single toll for crossing the bridge. Vehicles would not be assessed separate tolls upon passing each gantry; rather, the additional gantries located on the approaches would determine if a vehicle has traversed the bridge or made a trip that would have otherwise occurred on the bridge (i.e., the vehicle exited I-205 at OR 43 or OR 99E, crossed the Oregon City Arch Bridge, and then got back on I-205 on the other side of the Willamette River).

Figure 2: Alternative 2

This approach is intended to limit the incidence of I-205 through trips rerouting via the Oregon City Arch Bridge to avoid the toll, as some drivers may be expected to do without dramatically increasing the distance travelled. Alternative 2 represents a refinement of Alternative 1 that reduces undesirable rerouting of through trips around the toll point. As previously discussed, the regional travel demand model does not substantially differentiate between Alternative 1 and Alternative 2, so separate results are not presented for Alternative 2 in this report.

1.3 Alternative 3: Bridge Tolls - Abernethy Bridge and Tualatin River Bridge

Alternative 3 is a segment-based approach to tolling where I-205 would be tolled between Stafford Road and 10th Street as well as between OR 43 and OR 99E, as shown in Figure 3. Vehicles would be assessed a toll for each segment traveled. This alternative relies on mainline toll gantries on the Abernethy Bridge (over the Willamette River) and the I-205 bridge over the Tualatin River. This alternative would charge half the total toll assessed for through trips at two tolling points and is intended to reduce the likelihood of vehicles rerouting onto the Oregon City Arch Bridge (as seen under Alternative 1).

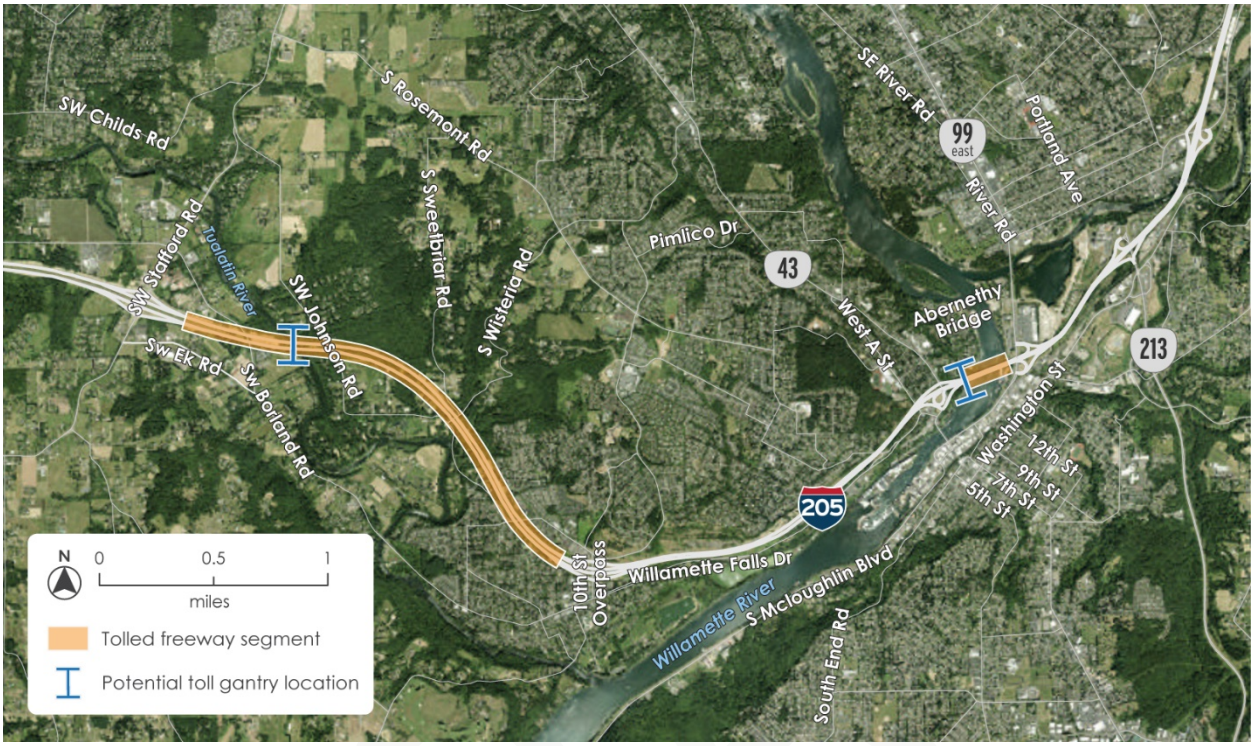

Figure 3: Alternative 3

Toll amounts would be split equally between the two bridges, making the toll on the Abernethy Bridge half of what it would be in Alternative 1. Therefore, users entering or exiting I-205 at the 10th Street or OR 43 interchanges would generally pay half the toll amount assessed for a through trip on I-205.[1]

[1] Unlike in Alternative 1, where peak hour toll rates vary slightly by direction of travel, the peak tolls in Alternative 3 are assumed to be the same for each segment regardless of the direction of travel.

1.4 Alternative 4: Segment-Based Tolls - Between Stafford Road and OR 213

Like Alternative 3, Alternative 4 is a segment-based approach to tolling. The four tolled segments in this alternative include I-205 between Stafford Road and 10th Street, 10th Street and OR 43, the Abernethy Bridge (between OR 43 and OR 99E), and OR 99E to OR 213, as shown in Figure 4. Vehicles are assessed a toll for each segment traveled for a total of up to four segments. This alternative relies on mainline toll gantries and is intended to distribute the total toll assessed for trips over multiple tolling points. This should mitigate the effect of rerouting relative to the full toll being assessed on the Abernethy Bridge only.

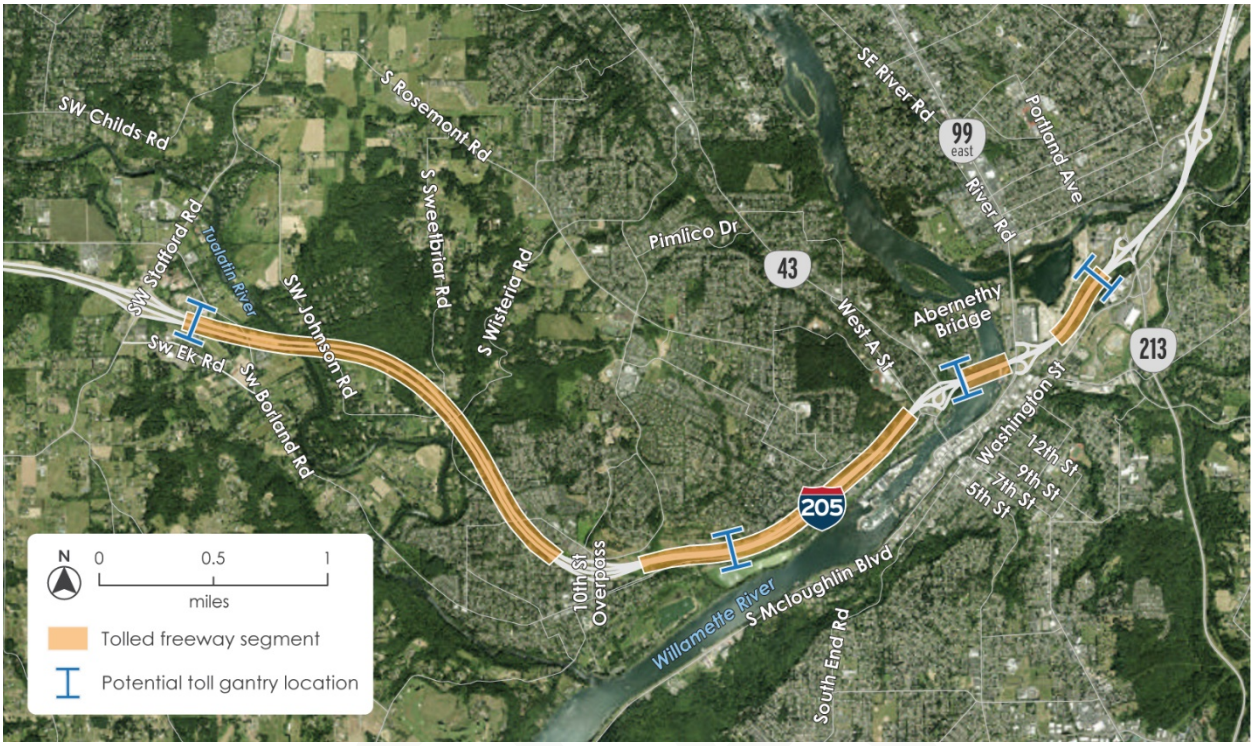

Figure 4: Alternative 4

Equivalent toll amounts would be applied on each segment and in each direction, as in Alternative 3. Therefore, those who use fewer segments would pay a proportionally lower toll amount[2].

[2] Relative to Alternatives 1 through 3, the off-peak toll rates are up to one-third higher for through trips. This was done to keep the minimum off-peak single segment toll sufficiently high to cover the per-unit cost of collection and contribute to net toll revenues.

1.5 Alternative 5: Single Zone Toll – Between Stafford Road and OR 213

Alternative 5 is a single-zone toll, where any vehicles entering the tolled zone on I-205 would be assessed the full amount of the toll regardless of distance traveled. The tolled zone extends between the Stafford Road and OR 213 interchanges, as shown in Figure 5. Alternative 5 could include mainline toll gantries as well as ramp-based gantries, such that the gantries would be located at each entry point within the toll zone. This strategy is aimed at minimizing undesirable rerouting patterns by removing the financial incentive for some vehicles to exit I-205 earlier (or enter later) in their trip than they otherwise might with a toll in place.

Figure 5: Alternative 5

Alternative 5's single toll for using any of the highway in the toll zone offers a lower price for through trips and a higher price for shorter distance trips, relative to Alternative 4.

1.6 Assumed Toll Rates

The Oregon Transportation Commission (OTC) will ultimately determine toll rates prior to project implementation. While ODOT or the OTC have not at this time decided on tolling policies and rates, initial assumptions are necessary for the assessment of screening alternatives. Specifically, toll rate assumptions must be included within the Portland Metro regional travel demand model, the primary tool used to provide quantitative performance measures identified for the assessment.

Initial toll rate assumptions for modeling are summarized in Table 2. Segment-based tolling alternatives (Alternatives 3 and 4) vary total toll amounts depending on the number of I-205 segments traveled; Table 2 compares the total toll amount paid for a through trip (not per segment). Rates were based on those used for modeling Concept E (pricing on the Abernethy Bridge) in the VPFA with minor refinements as translated to Alternatives 3, 4, and 5. The original Concept E tolls at the Abernethy Bridge attempted balance throughput and revenue-generating objectives. During peak times, the tolls are closer to the minimum values required to manage demand for maximum throughput when congestion delays would otherwise be prevalent. During off-peak times when demand is lower, the toll rates are also lower, though now more tailored toward generating revenue. Rates used in the current screening and evaluation are therefore a function and tool of the modeling and do not necessarily reflect at what levels future toll rates might actually be set. They are thus presented as percentages indexed to the set of through trip toll rates most commonly applied in each time period (Alternative 3). Discussion on how rates were determined for each alternative is provided below.

Table 2: Through Trip Toll Rate Schedule Summary

Time Period	Alt 1	Alt 3	Alt 4	Alt 5
Overnight Toll (11 p.m. to 5 a.m.)	No toll	No toll	No toll	No toll
Off-peak Toll (5 to 6 a.m., 10 a.m. to 2 p.m., and 7 p.m. to 11p.m.)	100%	100%	133%	67%
Shoulder Toll (6 to 7 a.m., 9 to 10 a.m., 2 to 3 p.m. and 6 to 7 p.m.)	100%	100%	100%	67%
Peak Toll (7 to 9 a.m. and 3 to 6 p.m.)	100%/ 117%*	100%	100%	67%

*Varies by direction of travel

Differences in the toll rate assumptions by alternative were designed with the goal of all alternatives generating similar levels of net revenue, allowing for a better assessment of rerouting effects. Since each alternative has a different geographic coverage of I-205 and would thus serve differing numbers of toll trips, each alternative requires different toll rates to generate the same amount of net toll revenue after operating expenditures. Furthermore, each alternative creates incentives for through trips and shorter trips differently, requiring further differentiation in rates.

For example, Alternative 5 covers the same larger portion of the I-205 corridor as Alternative 4, but under Alternative 5, the cost of a through trip on I-205 would be the same as that for a local trip. As such, the average toll across all trip lengths is lowest under Alternative 5. In addition, whereas Alternative 1 tolls only trips crossing the Abernethy Bridge, Alternatives 4 and 5 essentially toll all trips traveling anywhere on I-205 between Stafford Road and OR 213. Tolling more trips under equivalent toll rates will yield higher gross revenues. More toll points (gantries) requires additional maintenance expenditures and more transactions increases toll collection operating costs. As a result, net revenues may not vary as much as gross revenues across the alternatives. Therefore, the development of assumed toll rate differentials took into consideration the number of potential users, the share of users who pay the full toll amount regardless of distance traveled, and the potential for shorter distance trips (e.g., those traveling on a single tolled segment) to pay a toll without generating revenue (due to transaction costs), with the goal of producing similar net revenues. Additional information on the assumptions supporting toll rate development can be found in the I-205 Toll Policy Assumptions Technical Memorandum (dated April 3, 2020).

1.7 Performance Measures and Evaluation Criteria

Alternatives advanced for further evaluation in the NEPA process will undergo very detailed analysis and additional assessments of impacts before the preferred alternative[3] is identified. A broad list of evaluation criteria and performance measures will be developed and applied in these subsequent rounds of project work. This initial round of analysis is focused on a more limited subset of key measures. This initial assessment relies on quantitative measures derived from the Metro regional travel demand model and qualitative measures as assessed by the project team where appropriate.

While the alternatives are compared to one another for the purposes of evaluation, the model-derived performance measures for each alternative were calculated based on future-year (2027) regional travel demand model results relative to the No Build Alternative. The No Build Alternative is consistent with the financially constrained improvements identified in the Regional Transportation Plan with three modifications noted below:

- Heavy trucks were prohibited from using the Oregon City Arch Bridge, consistent with the weight restrictions applied at the bridge.
- A roadway connection was added between Interstate 5 (I-5) and OR 99E in the southern extent of the model network, approximately near Ehlen Road in Aurora, Oregon.
- The No Build Alternative does not include the widening of I-205 between the Stafford Road interchange at the south end and the OR 213 interchange at the north end (I-205 Widening and Seismic Improvements Project) because this project is not funded and does not have an anticipated construction date.
- The No Build Alternative does not assume tolling.

[3] A preferred alternative is expected to be identified for implementation after evaluation in the NEPA process.

The model results represent average weekday conditions within the identified reporting time period (unless noted otherwise). The time periods for reporting were selected to represent peak and off-peak conditions and include:

- Morning (a.m.) peak: 7 to 8 a.m.
- Afternoon off-peak: 2 to 3 p.m.
- Afternoon (p.m.) peak: 5 to 6 p.m.
- Evening off-peak: 8 to 9 p.m.
- Daily: 24 hours

Table 3 summarizes the evaluation criteria and associated performance measures that were used in the evaluation of the alternatives. Results are summarized in succeeding sections.

Table 3: Performance Measures and Evaluation Criteria for Initial Screening of Alternatives

CATEGORY	EVALUATION CRITERIA	PERFORMANCE MEASURES
Transportation System Demand	• Change in regional system vehicle travel demand and performance	• Regional vehicle miles traveled (VMT) for freeway and non-freeway travel • Regional vehicle hours traveled (VHT) for freeway and non-freeway travel
I-205 Traffic	• Change in vehicle throughput on I-205	• Vehicle throughput on I-205 segments between Stafford Road and OR 213
Diversion Effects	• Mode shift to high-occupancy vehicles (HOV), transit and active transportation, bus, pedestrians, and bike	• Regional person trips by mode
	• Change in volume on non-tolled roads (rerouting)	• Qualitative level of rerouting • Change in average weekday daily traffic volume on selected major roadways
Cost and Revenue	• Adjusted gross toll revenue collected	• Annual gross toll revenue less estimated revenue leakage in 2027
	• Toll operating and maintenance (O&M) costs	• Cost associated with toll collections (roadway equipment maintenance, back office systems software, customer service center operations, banking fees, financial reporting, and management / administrative activities)
	• Net toll revenues	• Adjusted gross toll revenue collected less toll O&M costs and highway O&M costs
	• Initial toll system capital and procurement costs	• Capital costs associated with implementing the physical toll infrastructure and procuring toll vendor services
Implementation and Operations	• Difficulty of implementation	• Qualitative – Relative effort associated with implementation
	• Operational Flexibility	• Qualitative – Ability to react to differing traffic conditions in the Project vicinity
	• Scalability to a future tolling system	• Qualitative – Potential to integrate with future tolling system including other regional roadways
	• Federal program eligibility	• Qualitative – Eligibility under current federal tolling authority

Note: Changes refer to comparisons between the build alternatives and the No Build Alternative

2.0 GENERAL ASSESSMENT

All of the alternatives considered could provide a tolling system on I-205 that would both manage congestion and raise revenue. However, as this report will show, there are tradeoffs among the alternatives, and there is no single alternative that scores best in all criteria. This section provides a general overview of the performance of each alternative within the major evaluation categories.

Relative performance summarized in Table 4 refers to performance effectiveness in comparison to the other build alternatives within each category. The summary is based on the professional judgment of the project team taking into consideration the results of multiple evaluation criteria and performance measures.

Table 4: Performance Comparison Summary

Category	Alt 1	Alt 3	Alt 4	Alt 5
Transportation System Demand	**Worse** outcomes than other alternatives	**Average** or typical outcomes among alternatives	**Average** or typical outcomes among alternatives	**Better** outcomes than other alternatives
I-205 Traffic	**Average** or typical outcomes among alternatives	**Average** or typical outcomes among alternatives	**Worse** outcomes than other alternatives	**Better** outcomes than other alternatives
Diversion Effects	**Average** or typical outcomes among alternatives	**Average** or typical outcomes among alternatives	**Average** or typical outcomes among alternatives	**Average** or typical outcomes among alternatives
Cost and Revenue	**Worse** outcomes than other alternatives	**Better** outcomes than other alternatives	**Substantially Better** outcomes than other alternatives	**Average** or typical outcomes among alternatives
Implementation and Operations	**Average** or typical outcomes among alternatives	**Substantially Better** outcomes than other alternatives	**Better** outcomes than other alternatives	**Substantially Worse** outcomes than other alternatives

2.1 Common Findings

Several findings and observations are consistent across the alternatives. For example, all of the alternatives can be expected to meet the project purpose of managing congestion on I-205 and generating revenue. Improved performance on I-205 is due to the addition of travel lanes relative to the No Build Alternative as well managing demand through tolling. Furthermore, all of the alternatives would result in relatively small changes in various regional performance measures. For example, each alternative is expected to slightly reduce regional VMT, VHT, and single-occupancy vehicle (SOV) travel. Mode shift for any of the alternatives is generally small, with reductions in SOVs and increases in HOVs constituting the majority of the shift. All of the alternatives generally produce similar regional rerouting effects with slight increases or decreases in traffic volumes on roadways spread throughout the region. These volume changes are typically higher in the off-peak periods of the day than during peak periods. None of the alternatives significantly increase traffic volumes on I-5 or other major regional freeway routes and have negligible effect on peak period congestion levels on these roadways.

2.2 Alternative 1: Single Point Toll – Abernethy Bridge

Summary: This represents a relatively straightforward tolling configuration that reduces traffic volume on the Abernethy Bridge and I-205 while resulting in concentrated rerouting effects in Oregon City.

2.2.1 Traffic on I-205

Of all the alternatives, Alternative 1 results in the largest potential reduction in vehicle throughput (volume) on any single segment of I-205. Traffic volume decreases on the Abernethy Bridge could approach 50 percent compared to the No Build Alternative (baseline), which is indicative of a large rerouting effect in the area of the bridge. Rerouting would be concentrated near the bridge and lower volume reductions would be seen elsewhere on the I-205 corridor.

2.2.2 Local effects

Alternative 1 would cause substantial rerouting effects across the Oregon City Arch Bridge and in downtown Oregon City with daily volume increases of up to 90 percent or more in places. Changes in local circulation would occur as travelers shift between adjacent interchanges (OR 43 and OR 99E) to access or exit from I-205. There is potential for sustained rerouting effects throughout the day in Oregon City. Furthermore, Alternative 1 could result in off-peak volume increases of up to 60 percent on OR 99E in Canby.

2.2.3 Other assessments

Alternative 1 is the least difficult alternative to implement in terms of complexity with its single toll point. Alternative 1 is also likely to be eligible for approval under Federal tolling authority (Title 23, Section 129). However, it is the least effective alternative in reducing regional VHT and creates the greatest increase in VHT on non-freeways. It also has the lowest net revenue-generation potential among the alternatives.

2.3 Alternative 3: Bridge Tolls - Abernethy and Tualatin River Bridges

Summary: Alternative 3 represents a relatively straightforward tolling approach in terms of implementation and operation. However, it results in rerouting effects on alternative routes to I-205 via Borland Road/Willamette Falls Drive and through downtown Oregon City.

2.3.1 Traffic on I-205

Alternative 3 substantially reduces volume on the segment of I-205 between Stafford Road and 10th Street where a second toll point is applied. However, this alternative results in the lowest amount of volume reduction between OR 99E and OR 213 just north of Abernethy Bridge.

2.3.2 Local effects

While the effect is smaller than in Alternative 1, Alternative 3 results in daily volume increases of up to 40 percent across the Oregon City Arch Bridge and in downtown Oregon City. In addition, tolling the I-205 segment between Stafford Road and 10th Street could result in the

doubling of daily vehicle volumes on Borland Road between Stafford Road and West Linn. However, locations in West Linn that are east of 10th Street generally would not see significant volume increases as I-205 would remain untolled between 10th Street and OR 43. Alternative 3 could result in off-peak volume increases of up to 60 percent on OR 99E in Canby.

2.3.3 Other assessments:

Alternative 3 is likely to be eligible for approval under Federal tolling authority (Title 23, Section 129). The segment-based approach to tolling is scalable to other roadways or the regional network, although the untolled segment between 10th Street and OR 43 could encourage some travelers to get on and off I-205 to avoid paying tolls.

2.4 Alternative 4: Segment-Based Tolls - Between Stafford Road and OR 213

Summary: Alternative 4 represents a tolling approach that could be expanded to the region. It results in rerouting along the entire segment of I-205 between Stafford Road and OR 213. However, effects are more dispersed and, in general, less likely to be concentrated on specific routes or locations than under other alternatives.

2.4.1 Traffic on I-205

Alternative 4, because of its geographic coverage, both captures the largest number of potential toll trips and results in the greatest diversion off of I-205 in terms of overall volume change along the corridor. This is in part due to the assumption of relatively higher off-peak toll rates for through trips in Alternative 4 so as to keep the single segment minimum toll above the unit cost of collection.

2.4.2 Local Effects

Rerouting under Alternative 4 could impact some West Linn roadways. Daily traffic volume could increase by more than 50 percent on Willamette Falls Drive between West Linn and Oregon City. Traffic volumes on some roadways in Gladstone could also increase by up to 80 percent. Oregon City would also see volume increases due to rerouting though the scale of shift is less than in Alternatives 1 through 3.

2.4.3 Other assessments

Alternative 4 captures the largest number of trips on I-205 and therefore has the highest potential gross and net toll revenues (before repair and replacement costs). The tolling configuration is highly scalable to a larger regional tolling system focused on congestion management and is adaptable to future changes in technology or travel behavior.

Alternative 4 may not be eligible under Federal tolling authority under the allowances of Section 129; in this case, application and approval would be required under the Federal Value Pricing Pilot Program (VPPP). Approval under VPPP is a discretionary action of the U.S. Secretary of Transportation.

Finally, Alternative 4 has the greatest potential increase in regional rerouting and non-freeway VMT increase. As noted above, this potential outcome is affected by the assumption of higher off-peak toll rates for through trips in Alternative 4. Revised toll rate schedule assumptions could be considered to improve this outcome; Alternative 4 offers the most flexibility among the alternatives tested for refining tolls by location/distance traveled, time of day, and travel direction. As such, Alternative 4 offers the greatest degree of flexibility for managing traffic operations near the project area.

2.5 Alternative 5: Single Zone Toll - Between Stafford Road and OR 213

The tolling configuration proposed in Alternative 5 would be the most challenging to adapt to manage congestion at the regional scale. It features lower assumed toll rates for through trips on I-205, which limits regional rerouting as well as some of the more local rerouting patterns observed in other alternatives.

2.5.1 Traffic on I-205

Alternative 5 has the least volume reduction on I-205, meaning that it is the most effective at retaining traffic volumes on I-205 and limiting rerouting effects. This is accomplished through the single-zone toll structure, which has the effect of discouraging short trips on I-205 while encouraging longer trips and through trips to stay on I-205. This is because of the lower (relative to other alternatives) toll rates for those trips and higher relative toll rates for shorter trips.

2.5.2 Localized effects

While Alternative 5 reduces regional rerouting, there are more concentrated rerouting patterns near the outermost tolled segments on I-205. For example, daily traffic volumes in Gladstone could potentially double as vehicles accessing OR 99E could attempt to cut through central Gladstone. Borland Road between Stafford Road and 10th Street could also potentially see daily volumes double. Alternative 5 has the lowest impact on the Oregon City Arch Bridge and through downtown Oregon City, though daily traffic volume could still increase up to 30 percent.

2.5.3 Other assessments

Alternative 5 generally produces the strongest regional outcomes, including the greatest improvement to regional VHT and the lowest increase in non-freeway VHT. However, it creates concentrated rerouting effects east of Stafford Road and in Gladstone. Net toll revenues for Alternative 5 are lower than any alternative besides Alternative 1. In addition, the zone tolling concept would be more challenging to scale to other segments of I-205 or other state highways and still effectively manage congestion. Finally, Alternative 5 would not likely be eligible under Section 129 Federal tolling authority, in which case, application and approval would be required under the Federal VPPP.

3.0 ALTERNATIVES EVALUATION

This section presents the detailed results of the alternatives evaluation. Evaluation results are presented for the following evaluation categories:

- Transportation System Demand
- Changes in I-205 Traffic
- Diversion Effects
- Cost and Revenue
- Implementation and Operations

In general, most of the performance results are summarized at the daily level. Cost and revenue measures apply annually. More detailed information on performance during peak and off-peak periods can be found in the Appendix.

3.1 Transportation System Demand

The evaluation looks at how changes in the vicinity of I-205 could affect vehicle demand over the entire Portland Metropolitan Area, which includes Clark County and the city of Vancouver in southwest Washington.[4] The performance measures used to assess the change in transportation system demand include:

- Regional VMT for freeway and non-freeway travel
- Regional VHT for freeway and non-freeway travel

3.1.1 Change in VMT

As shown in Table 5, all of the alternatives slightly reduce regional VMT, with the greatest decline occurring in Alternative 4 followed by Alternative 3. All alternatives also result in a shift in vehicle travel demand away from freeways to non-freeway routes. Overall, Alternative 5 results in the smallest shift in vehicle demand from freeways to non-freeways and has the lowest overall VMT reduction.

Table 5: Change in Regional Daily VMT (2027)

Type of VMT	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-338,000	-413,000	-463,000	-213,000
Non-Freeway	+117,000	+179,000	+185,000	+94,000
Total	-221,000	-234,000	-278,000	-119,000

While these numbers can appear significant, it is important to note that the scale of the shift for all alternatives reflects a very low percentage (less than 1 percent) of overall regional VMT. A significant part of this change is likely occurring nearer to the Abernethy Bridge rather than farther away. As such, the effect of these changes is captured in other criteria, specifically in the I-205 Traffic criterion and the Diversion Effects criterion. For this reason, regional impacts on

[4] Specifically, the area covered by the Portland Metro regional travel demand model.

VMT are not a differentiating factor in the evaluation of alternatives. Additional results for specific peak and off-peak hours are included in the appendix. The daily patterns identified above generally apply to peak/off-peak changes as well; however, peak period results show some potential to reduce VMT on both freeways and non-freeways.

3.1.2 Change in VHT

As shown in Table 6, all of the alternatives would result in a slight decline in regional VHT with the highest decline occurring under Alternative 5 followed by Alternative 4. All would reduce daily freeway VHT while increasing non-freeway VHT. The highest increase in non-freeway VHT and the lowest decrease in total VTH would occur under Alternative 1.

Table 6: Change in Regional Daily VHT (2027)

Type of VHT	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-11,400	-13,300	-14,300	-10,200
Non-Freeway	+10,300	+8,900	+9,300	+5,000
Total	-1,100	-4,400	-5,000	-5,200

As with VMT, the scale of the shift for the alternatives reflects a very low percentage (less than 1 percent) of overall regional VHT. While the changes reported would not substantially affect regional VHT, the relative performance of Alternatives would vary in the vicinity of the Project.

Additional results for specific peak and off-peak hours are included in Appendix B. Unlike VMT, there are some notable changes in VHT performance depending on time of day. During off-peak hours there is potential the alternatives, as currently structured, may slightly worsen traffic conditions. For example, the alternatives increase non-freeway VHT from between 600 (Alternative 5) and 1,100 (Alternative 1) vehicle hours between 2 p.m. and 3 p.m. and from 400 (Alternative 5) to 600 (Alternative 4) vehicle hours from 8 p.m. to 9 p.m. These increases in non-freeway VHT offset decreases in freeway VHT during in all alternatives. These changes are small relative to total regional VHT and are not necessarily enough to substantially differentiate alternatives from one another.

In contrast, the alternatives show the potential to improve traffic conditions in the transportation system during peak hours. While all alternatives show an overall VHT reduction due to travel time savings on the freeway, Alternatives 4 and 5 also show the potential to slightly reduce non-freeway VHT during peak hours. Alternatives 3, 4 and 5 generally result in the lowest overall VHT increases during off-peak hours and show the largest VHT decreases during peak hours.

3.2 Changes in I-205 Traffic

All alternatives are expected to reduce vehicle throughput on tolled segments of I-205 because of the toll diversion. Tolling causes some drivers to divert their trips to other routes (rerouting) or destinations, other modes (mode shift), or other times of day. As shown in Table 7, all alternatives reduce daily traffic volumes on all segments of I-205 relative to the No Build

Alternative due to this diversion.[5] As expected, the scale of diversion on I-205 varies by both alternative and roadway segment.

Table 7: Change in I-205 Daily Vehicular Volumes (Relative to 2027 Baseline)

I-205 Segment	Alt 1	Alt 3	Alt 4	Alt 5
Stafford Road to 10th Street	-17%	-36%	-31%	-17%
10th Street to OR 43	-23%	-24%	-36%	-11%
OR 43 to OR 99E	-48%	-33%	-33%	-17%
OR 99E to OR 213	-28%	-19%	-40%	-30%

Additional tables providing detail on changes in throughput during specific hours of the day can be found in Appendix C. As the tables show, volume reductions during the a.m. and p.m. peak periods are less than the reductions observed during the off-peak periods or for the overall day, meaning that diversion is worse (on a percentage basis) during the off-peak hours. This is likely due to more traffic congestion during the peak hour on other roads, making them less attractive as an alternate route. Thus, even with higher tolls during peak hours, I-205 would retain a greater percentage of traffic volume during the peak periods because travel times are likely longer on available alternatives. Two of the alternatives, Alternatives 1 and 5, show a small increase in volume on some sections of I-205 during peak hours, which may be due to improved traffic conditions on the freeway because of the toll and the assumption of additional capacity available from the I-205 Widening and Seismic Improvements Project, which is included in the modeling of all build alternatives.

3.3 Diversion Effects

The changes in travel behavior that constitute diversion away from I-205 include increases in travel via other modes or vehicle trips using alternative routes. This section summarizes the scale of mode shifts and rerouting changes. Rerouting changes are summarized for key locations on regional roadways, where changes are generally the same across alternatives, and on local roadways near the tolled portion of I-205, where changes vary substantially between alternatives.

3.3.1 Mode shift

Mode shift was assessed based on change in regional person trips by mode as summarized in Table 8. All of the build alternatives perform at very similar levels in terms of changing regional share of person trips by mode. Each alternative has the primary effect of reducing SOV travel, though when considering the Portland region as a whole, these shifts are very small: less than 0.1 percent of regional person trips would change. These model results indicate that the potential for any of the alternatives to meaningfully shift travel modes at the regional level is small.

[5] The current regional travel demand model maintains a constant number of total daily person trips across all alternatives. While potential changes in mode and destination are represented, the model has limited sensitivity to potential time of day shifts due to tolling.

The limited shifts identified are primarily from SOV to HOV mode. The potential shift to transit is very small; perhaps only a few hundred person trips per day. Trips converted to active modes are likely to have been local trips, as opposed to freeway based through trips, since active modes of transportation (bicycle and pedestrian travel) are not permitted on interstate facilities.

Table 8: Change in Daily Person Trips by Mode (2027)

Type of trip	Alt 1	Alt 3	Alt 4	Alt 5
SOV	-6,000	-5,500	-6,500	-4,500
HOV	+4,000	+4,500	+5,000	+4,000
Transit	+500	<+500	<+500	<+500
Active (Bicycle, Pedestrian)	+1,500	+1,000	+1,500	+500

Note: Values rounded to nearest 500

3.3.2 Rerouting

Rerouting refers to changes in vehicle routing from tolled segments of I-205 to non-tolled roadways. Tolling on I-205 is likely to cause rerouting as some travelers will choose to use an alternate route to avoid the toll rather than changing other behavior (such as travel using another mode). This preliminary analysis of rerouting effects is based on a qualitative assessment of the change in average weekday daily traffic volume on selected major roadways. As such, discussion is broken down into two primary categories:

- Regional-level impacts: Assessment of rerouting on major regional roadways outside of the vicinity of I-205 and the Abernethy Bridge including I-5
- Local-level impacts: Assessment of rerouting on roadways and areas within the vicinity of I-205 from Stafford Road to OR 213

Each area discussed has specific locations for the analysis using intersections, road segments, or "screenlines," which summarize the effects on multiple parallel roadways that could serve similar rerouting options.

Additional and more detailed analysis on rerouting effects will be undertaken on alternatives advancing from this screening. Alternatives will be analyzed using a Dynamic Traffic Assignment (DTA) model that provides more granularity than the regional travel demand model.

3.3.2.1 Regional Rerouting

The scale of regional rerouting is evident in the volume changes at two locations on I-205 outside the geographic limits of the proposed alternatives: at I-205 just east of the interchange with I-5 and at I-205 north of 82nd Drive overcrossing of I-205 in Gladstone. Both of these locations lie just outside of the extents of the proposed alternatives and would serve regional through trips. Daily volume reductions at these two locations are shown in Table 9 below. Additional information on volume changes at select I-205 locations can be found in Appendix D.

Table 9: Daily Percentage Change in Volume at Select I-205 Locations (2027)

I-205 Locations	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Road	-10 to -20%	-20 to -30%	-20 to -30%	-10 to -20%
I-205 north of 82nd Drive Overcrossing	-5 to -10%	-5 to -10%	-10 to -20%	-5 to -10%

As seen in Table 9, all of the alternatives result in some level of volume reduction on I-205 outside of any tolled segments. While nearby (local) rerouting is more directly tied to the diversion from tolled segments, regional rerouting effects are better understood by considering the scale of diversion on the segments located outside of the tolled area.

In terms of daily volume changes, Alternatives 3 and 4 generally result in larger volume reductions (more regional diversion) than Alternatives 1 and 5. This is likely due to the smaller tolled area in Alternative 1 and the assumption that through trips would pay a lower toll with the zone-toll approach of Alternative 5. Alternatives 3 and 4 would reduce volumes on I-205 west of Stafford Road by approximately 20 to 30 percent, while Alternatives 1 and 5 would result in a slightly smaller decrease of 10 to 20 percent. North of the 82nd Drive overcrossing, the percent change is smaller with most alternatives resulting in a 5 to 10 percent decrease in daily traffic volume.

The percentage of traffic volume diverted from I-205 and the resulting rerouting onto other regional roadways are generally far more significant during off-peak hours. For example, Alternative 4 could result in up to 60 percent traffic volume reduction on the I-205 segment west of Stafford Road from 8 p.m. to 9 p.m. but less than a five percent decrease during the a.m. peak hour from 7 a.m. to 8 a.m. Additional results for specific peak and off-peak hours are included in Appendix D.

Reductions at these locations do not correspond to an equivalent increase onto other highways or adjacent routes during the same hours. Some trips would shift to other modes (such as transit or carpooling), travel to a different destination, and some may choose to travel at different times of the day. Furthermore, rerouting changes may be spread across multiple routes that do not show a single concentrated rerouting effect. By examining volume changes on other roadways in multiple locations, the aggregate effects of rerouting can be better assessed.

The following subsections describe rerouting effects on regional roadways and key locations outside of the general vicinity of the Project. The differences between the alternatives at the regional level are generally small. Areas discussed include:

- I-5
- Other regional highways
- Portland area bridges

I-5

Locations along I-5 assessed for rerouting effects are shown in Figure 7 and include north of Interstate 405 (I-405), at the Marquam Bridge, east of Terwilliger Boulevard, north of OR 217, north of I-205, and at the Boone Bridge.

Tolling I-205 could result in small changes to daily volumes on I-5, as shown in Table 10. The percentage increases to I-5 from rerouting are smaller during the peak periods than for the daily period values shown in Table 10 (see Appendix E for peak and other time periods).

Other Regional Highways

Other regional highways evaluated for rerouting effects are shown in Figure 9. These include:

- U.S. 26 west of Skyline Blvd and Scholls Ferry Rd
- OR 217 north of 99W
- OR 217 east of I-5
- I-84 east of I-5
- I-205 north of I-84

All of the alternatives would have only minor impacts on other regional highways, as demonstrated in Table 12. The scale of shift is smaller during peak hours than off-peak hours, as shown in more detailed results for each location provided in Appendix G.

Portland Bridges

Portland bridges for which rerouting effects were individually assessed include two bridges over the Willamette River nearest to the alternatives (the Sellwood Bridge and the Ross Island Bridge) and a downtown bridge screenline that compiles effects on the Steel Bridge, Broadway Bridge, Burnside Bridge, Morrison Bridge, and Hawthorne Bridge, as shown in Figure 8.[6] None of the alternatives are anticipated to result in a significant rerouting effect on these bridges. However, the Sellwood Bridge, as the next Willamette River crossing to the north of I-205, could see increases in volume, particularly during off-peak periods. More detailed results for specific peak and off-peak hours for each location are provided in Appendix F.

[6] The I-5 Marquam Bridge was included in the I-5 assessment and is therefore not included in the screenline for downtown bridges.

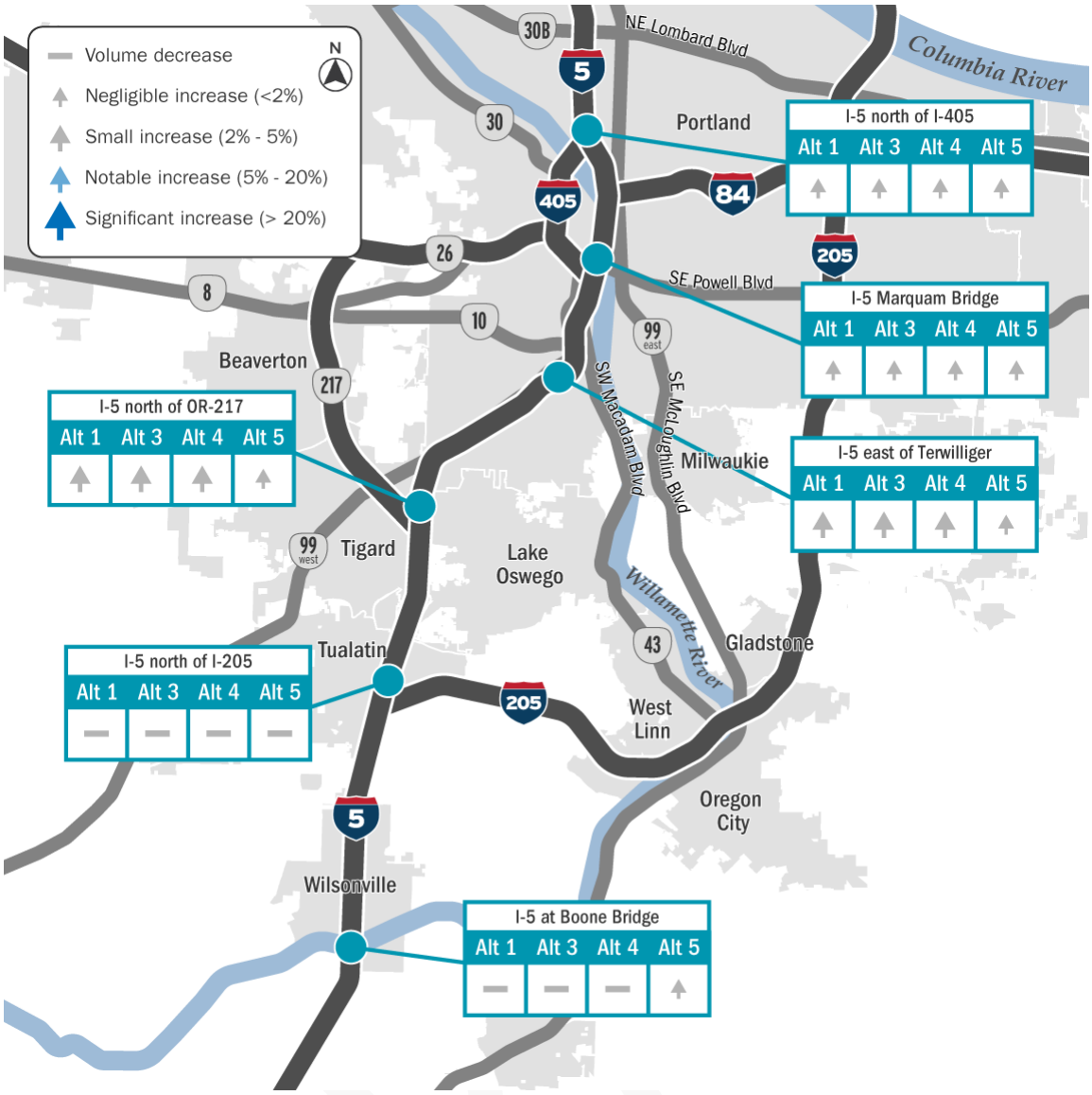

Figure 6: Locations Assessed for Rerouting Effects on I-5

Table 10: Percentage Change in Daily Volume on I-5

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 east of Terwilliger Blvd	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 north of OR 217	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 north of I-205	-0 to -2%	-2 to -5%	-2 to -5%	-2 to -5%
I-5 at Boone Bridge	-2 to -5%	-2 to -5%	-2 to -5%	0 to +2%

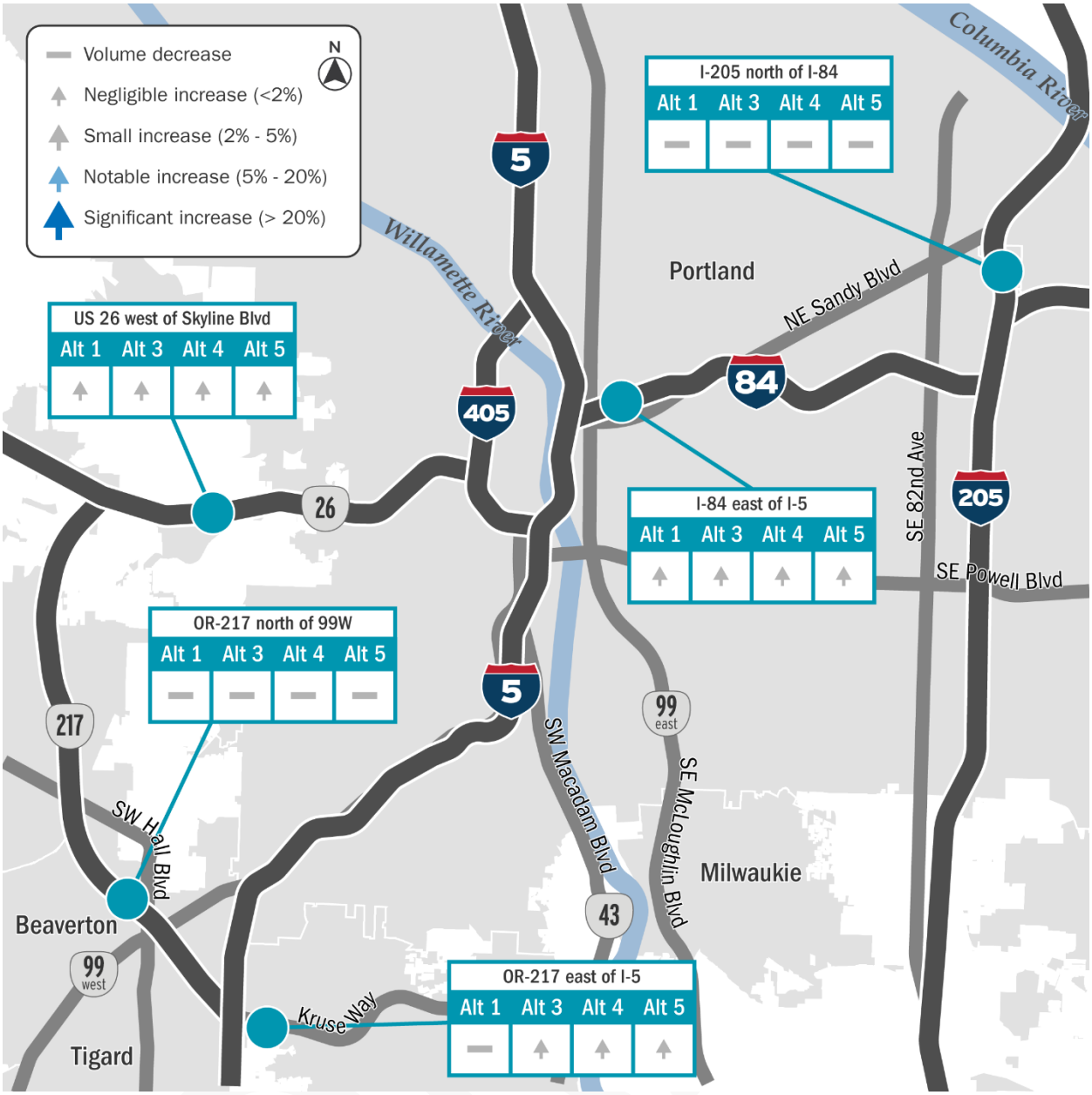

Figure 7: Other Regional Highways Assessed for Rerouting Effects

Table 11: Percentage Change in Daily Volume on Other Regional Highways

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
U.S. 26 west of Skyline Blvd and Scholls Ferry Rd	0 to +2%	0 to +2%	0 to +2%	0 to +2%
OR-217 north of 99W	0 to -2%	0 to -2%	-2 to -5%	0 to -2%
OR-217 east of I-5	0 to -2%	0 to +2%	0 to +2%	0 to +2%
I-84 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%

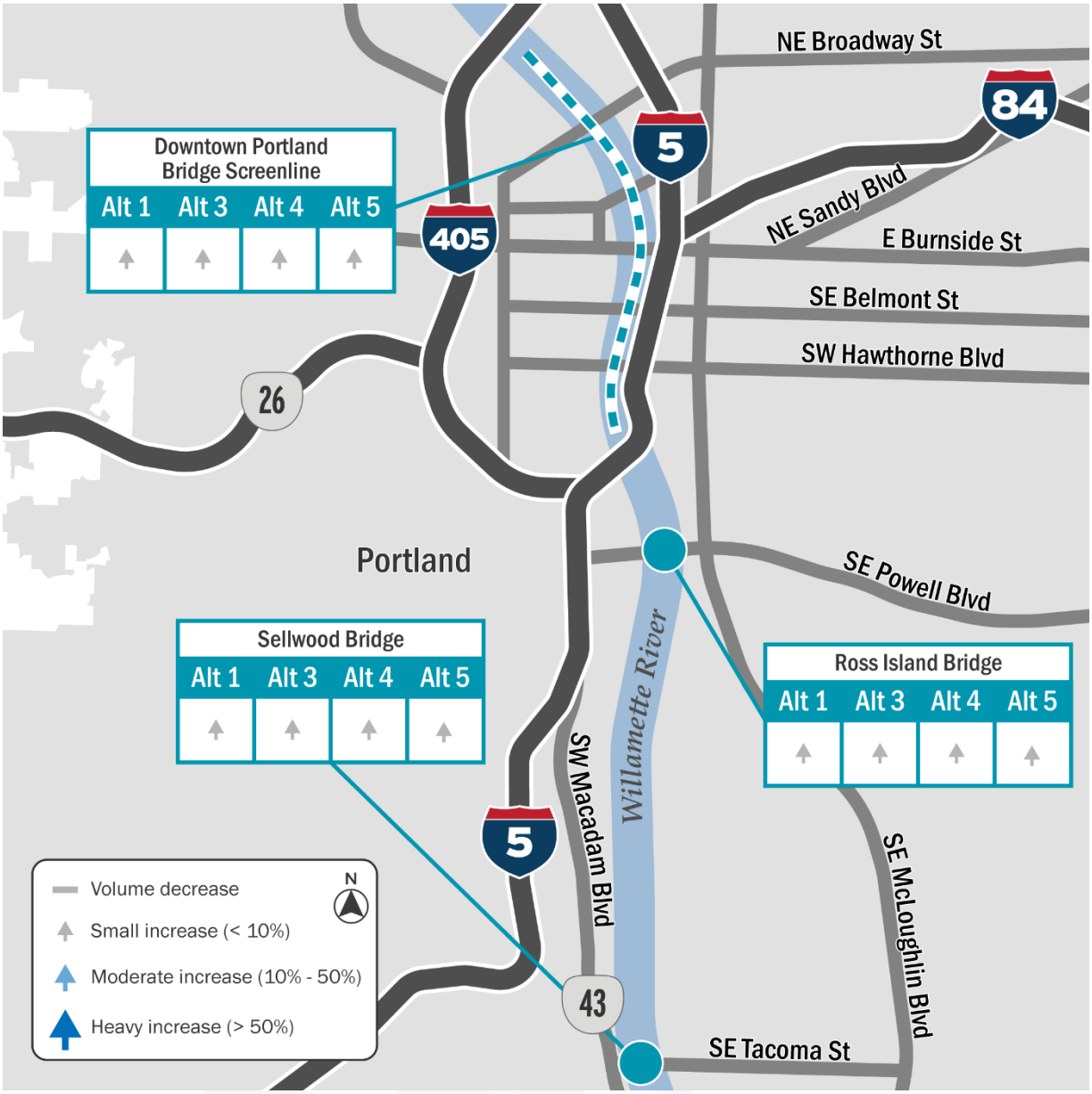

Figure 8: Portland Bridges Assessed for Rerouting Effects

Table 12: Percentage Change in Daily Volume on Portland Bridges

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	+2 to +5%	+2 to +5%	+2 to +5%	<+2%
Ross Island Bridge	+2 to +5%	+2 to +5%	+2 to +5%	+2 to +5%
Sellwood Bridge	+5 to +10%	+5 to +10%	+5 to +10%	+2 to +5%

3.3.2.2 Local and Adjacent Rerouting

This section discusses rerouting effects on roadways within areas and communities near the segment of I-205 between Stafford Road and OR 213. Areas assessed include:

- Roadways near the alternatives
- Oregon City
- West Linn
- Gladstone

Roadways Near the Alternatives

Roadways near I-205 that could be used as alternative routes were assessed for potential rerouting effects are shown in Figure 10 and include:

- OR 43 south of Terwilliger Boulevard
- Borland Road east of Stafford Road
- Borland Road east of SW 65th Avenue
- Stafford Road south of Ek Road
- Stafford Road east of SW 65th Avenue
- OR 99E through Downtown Canby

These roadways could see significant changes in volume: both increases and decreases. This is not surprising as roadways closer to the proposed toll section or on potential alternative routes should be affected more by the change than more distant regional roads overall.

Alternatives 3 and 5 show the greatest potential to affect the identified locations north of I-205. On OR 99E in Canby, Alternatives 1 through 4 show a potential to increase daily traffic volume by as much as 40 percent while Alternative 5 shows the lowest potential effect. Other locations, such as Stafford Road south of I-205 show a potential decrease in traffic volume under all alternatives.

In general, these changes in volume, both increases and decreases, would occur largely during off-peak hours rather than during peak hours. Daily percent changes are shown in Table 14. These changes as well as peak and off-peak changes are shown in Appendix H.

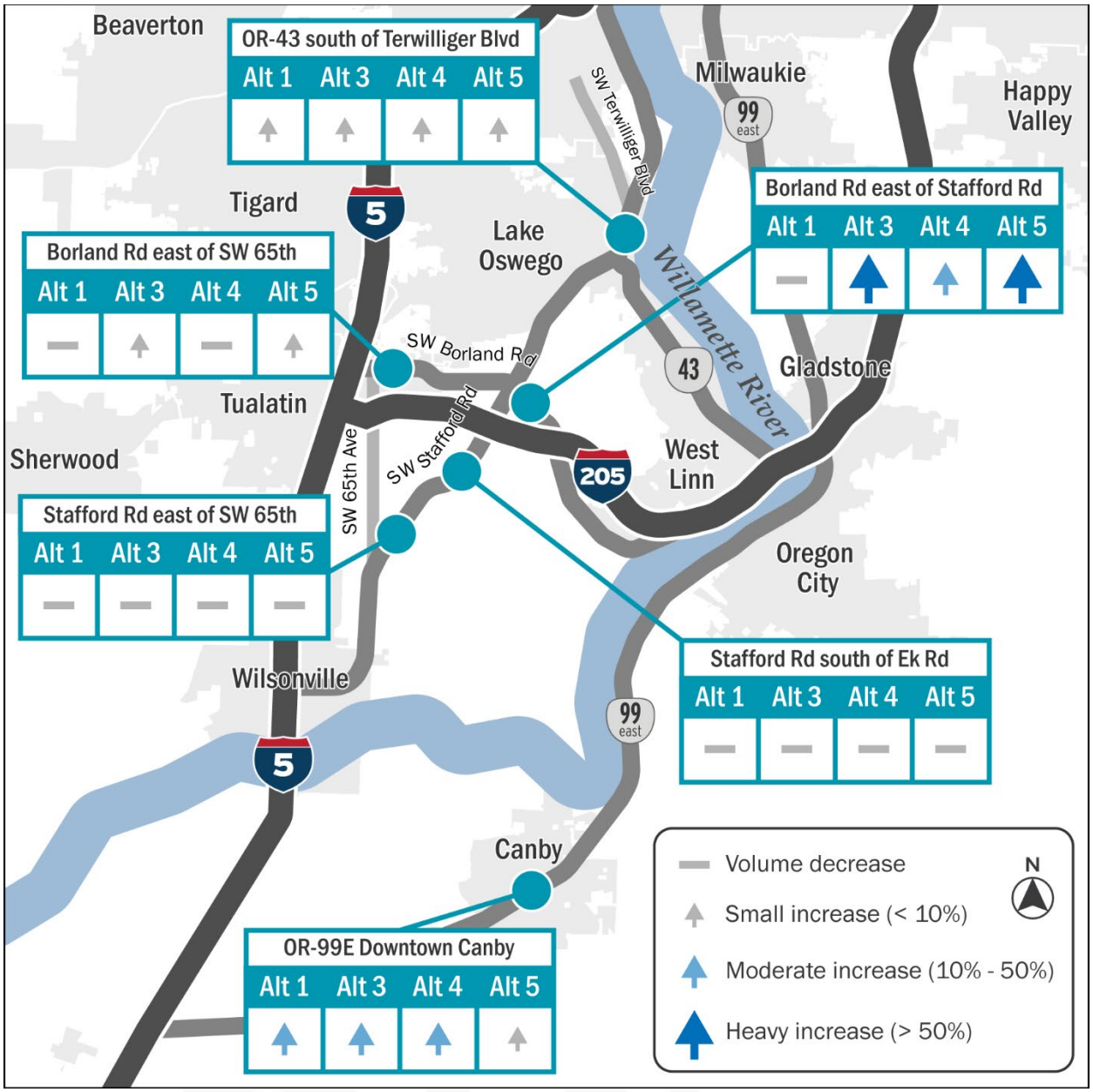

Figure 9: Roadways Near the Alternatives Assessed for Rerouting Effects

Table 13: Percentage Change in Daily Volume on Nearby Roadways

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+5 to +10%	+5 to +10%	+5 to +10%	+5 to +10%
Borland Rd east of Stafford Rd	-40 to -50%	+90 to +100%	+30 to +40%	+90 to +100%
Borland Rd east of SW 65th Ave	-10 to -20%	<+2%	-5 to -10%	+5 to +10%
Stafford Road south of Ek Rd	-10 to -20%	-10 to -20%	-10 to -20%	-5 to -10%
Stafford Road east of SW 65th Ave	-10 to -20%	-10 to -20%	-10 to -20%	-2 to -5%
OR 99E Downtown Canby	+30 to +40%	+30 to +40%	+20 to +30%	+2 to +5%

Oregon City

The locations for the assessment of rerouting in Oregon City are shown in Figure 10, which include:

- OR 213 south of the I-205 interchange
- OR 99E near the Oregon City south city limits
- Oregon City Arch Bridge

The Oregon City rerouting assessment also includes two screenlines:

- Downtown Oregon City screenline (east of the Oregon City Arch Bridge/7th Street) includes:
  - OR 99E McLoughlin Boulevard
  - Main Street
  - Railroad Avenue
- North Oregon City Screenline (west of OR 213) includes:
  - Washington Street
  - Abernethy Road
  - S. Anchor Way

Roadways in Oregon City could see significant changes in traffic circulation resulting in both increases and decreases in traffic volume. The larger changes are increases, particularly related to travel through downtown Oregon City and the I-205 interchange with OR 43. The most concentrated and significant impact evident in Alternative 1. Alternatives 4 and 5 would have a more significant increase in traffic volume on roadways included in the north Oregon City screenline (west of OR 213). OR 213 south of I-205 could see decreases in volume under all alternatives except Alternative 5.

Traffic volume increases tend to be less during peak hours than off-peak hours. In addition to volumes compared to the baseline, there are also significant differences in volume changes between alternatives. Daily changes in volume are shown in Table 14 with other hours shown in Appendix I.

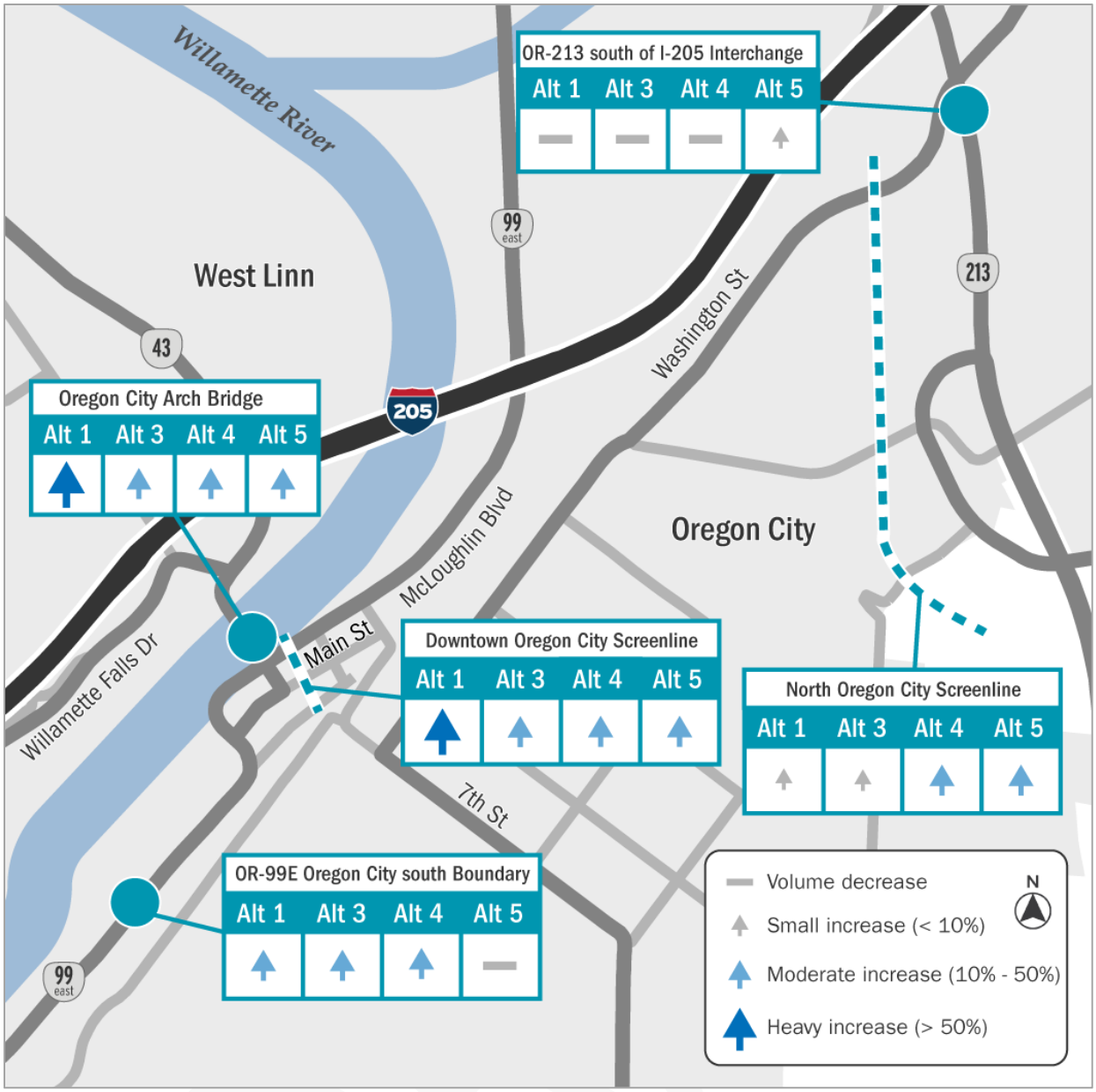

Figure 10: Oregon City Rerouting Assessment Locations

Table 14: Percentage Change in Volume in Oregon City

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-5 to -10%	-5 to -10%	-5 to -10%	+5 to +10%
OR 99E Oregon City South Boundary	+20 to +30%	+20 to +30%	+10 to +20%	-5 to -10%
Oregon City Arch Bridge	+80 to +90%	+30 to +40%	+30 to +40%	+20 to +30%
Downtown Oregon City Screenline	+80 to +90%	+40 to +50%	+30 to +40%	+10 to +20%
North Oregon City Screenline	+5 to +10%	+2 to +5%	+30 to +40%	+20 to +30%

West Linn

The locations for rerouting assessment in West Linn, as shown in Figure 11, include the following roadways:

- OR 43 south of Glenmorrie Drive
- Willamette Falls Dr east of A Street
- Sunset Avenue west of Willamette Falls Drive (over I-205)
- Rosemont Road north of Santa Anita Drive
- Salamo Road east of 10th Street
- Willamette Falls Drive east of 10th Street

The West Linn assessment also includes the following screenline locations (located just north of I-205):

- OR 43
- A Street

Roadways in West Linn could see significant changes in traffic circulation, both increases and decreases in volume depending on the roadway, alternative, and time of day. Alternative 4 has the greatest potential rerouting effect in most of West Linn. Changes in traffic volume tend to be less during peak hours than during off-peak hours. Daily changes are shown in Table 15. Peak hour changes as well as off-peak changes are shown in Appendix J.

Gladstone

Locations selected for rerouting assessment in Gladstone, as shown in Figure 12, include OR 99E at the Clackamas River and a screenline including several roadways west of Oatfield Road near the I-205 interchange at 82nd Drive such as East Gloucester Street, East Dartmouth Street, and E. Arlington St.

Roadways in Gladstone could see significant changes in volume, both increases and decreases depending on location and alternative, and taken as a whole, there would generally be increases in traffic volumes in Gladstone along the roads studied. Changes in traffic volume tend to be less during peak hours than during off-peak hours. In addition to volumes compared to the baseline, there are also significant differences in volume changes between alternatives, as Gladstone would be substantially more affected by rerouting in Alternatives 4 and 5. Daily changes in volume are shown in Table 16. Peak hour and off-peak changes are shown in Appendix K.

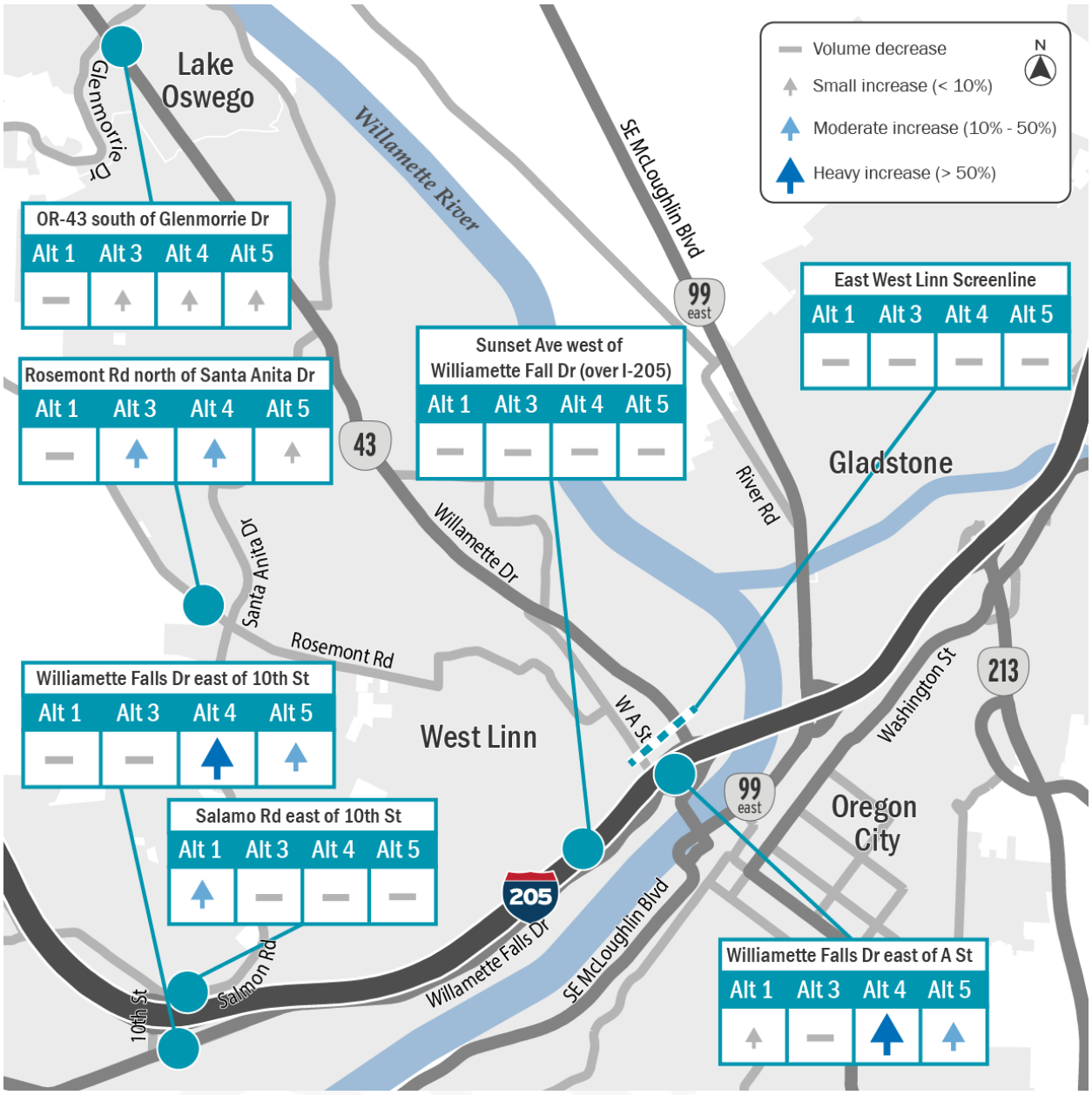

Figure 11: West Linn Rerouting Assessment Locations

Table 15: Percentage Change in Volume in West Linn

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-10 to -20%	+2 to +5%	+2 to +5%	<+2%
Willamette Falls Dr east of A St	+2 to +5%	-5 to -10%	+50 to +60%	+10 to +20%
East West Linn Screenline	-20 to -30%	-10 to -20%	-5 to -10%	-10 to -20%
Sunset Ave west of Willamette Falls Dr (over I-205)	<+2%	-5 to -10%	-5 to -10%	-10 to -20%
Rosemont Rd north of Santa Anita Dr	-40 to -50%	+10 to +20%	+10 to +20%	+5 to +10%
Salamo Rd east of 10th St	+30 to +40%	-40 to -50%	-10 to -20%	-30 to -40%
Willamette Falls Dr east of 10th St	-10 to -20%	-40 to -50%	+90 to +100%	+10 to +20%

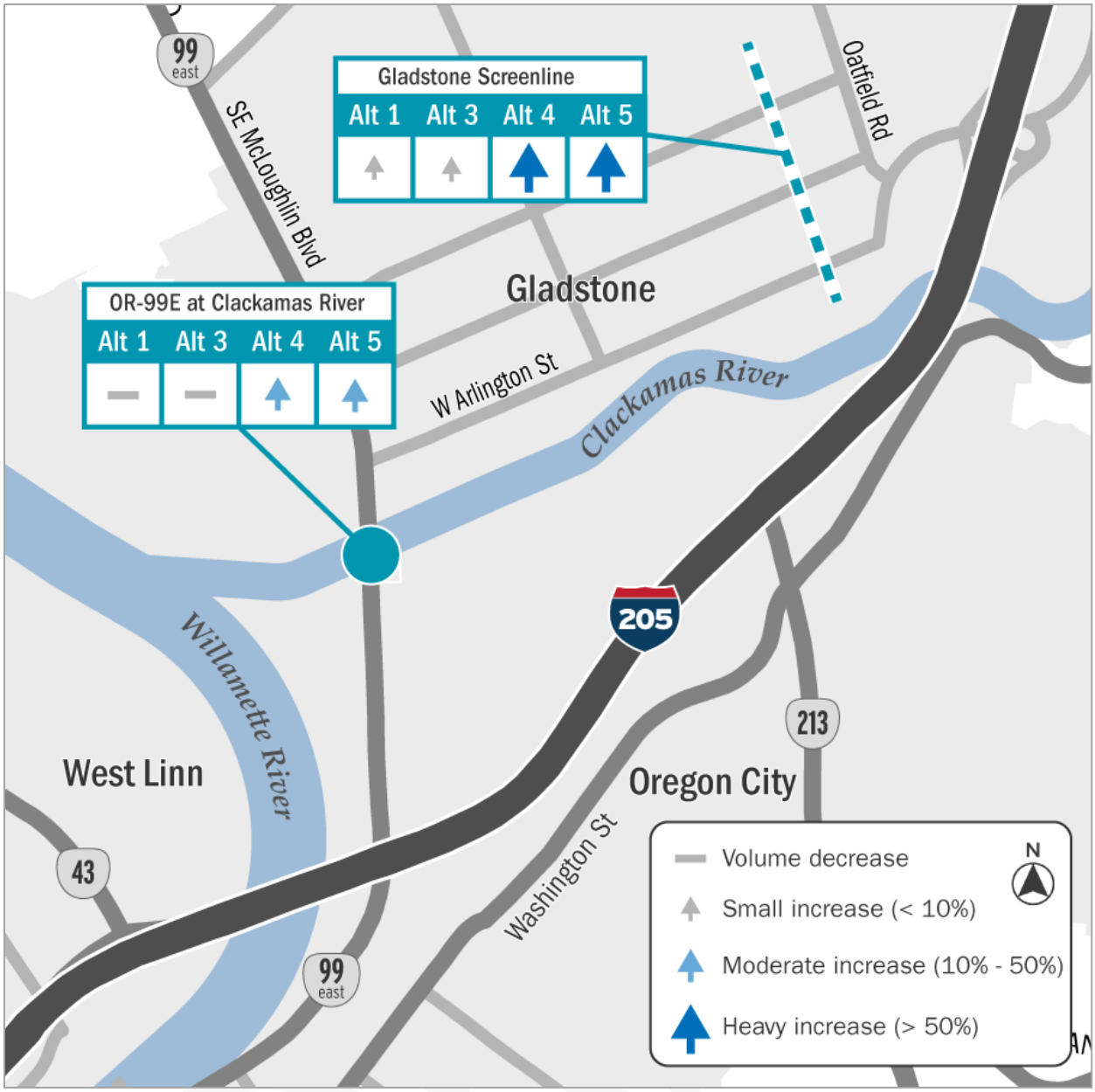

Figure 12: Gladstone Rerouting Assessment Locations

Table 16: Percentage Change in Volume in Gladstone

Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-5 to -10%	-5 to -10%	+10 to +20%	+20 to +30%
Gladstone Screenline	+5 to +10%	+2 to +5%	+70 to +80%	>+100%

3.4 Cost and Revenue

Cost and revenue performance measures for each alternative[7] are indexed relative to Alternative 1, as this was the baseline recommendation from the VPFA. Annual adjusted gross toll revenues, as well as toll collection operating and maintenance (O&M) costs, were estimated for the opening year of 2027.[8] In addition, the capital costs needed to implement tolling were estimated and similarly indexed relative to Alternative 1. Indexed values and metrics related to cost and revenue are summarized in Table 17 and discussed below. The two most critical measures for this assessment are net toll revenue and toll implementation capital costs.

Table 17: Summary of Indexed Cost and Revenue Metrics and Criteria

	Alt 1	Alt 3	Alt 4	Alt 5
Unique Toll Trips	100%	152%	183%	165%
Adjusted Gross Toll Revenues	100%	114%	126%	110%
Toll Collection O&M Costs	100%	130%	154%	136%
Net Toll Revenue	**100%**	**109%**	**118%**	**102%**
Toll Implementation Capital Costs	**100%**	**136%**	**209%**	**141%**

3.4.1 Unique toll trips

The number of unique toll trips is a key driver in estimating toll collection O&M costs. Table 17 shows the relative levels of unique trips that would be tolled for the four alternatives in 2027, indexed against Alternative 1. Alternative 4 would serves the largest number of toll trips or customers: 83 percent higher than Alternative 1.

The geographic extent of tolling across the alternatives closely correlate with the differences in unique toll trips in each alternative. Tolling in Alternatives 4 and 5 would capture all travel on I-205 between Stafford Road and OR 213, whereas toll trips for Alternative 1 only capture trips crossing the Abernethy Bridge, and Alternative 3 captures only trips crossing the Abernethy Bridge and/or the Tualatin River Bridge. As a result, the differences in unique toll trips do not directly correlate to differences in traffic volumes at any one location.

[7] Cost and revenue measures do not apply to the 2027 No Build Alternative as a basis of comparison.
[8] The toll revenue, O&M, and capital costs estimations are subject to change depending on the underlying assumptions of the regional travel demand model as well as current assumptions regarding the tolling concepts of operations.

3.4.2 Adjusted gross toll revenue

The adjusted gross toll revenue (projected for 2027) represents the potential annual toll collections minus the adjustments for the estimated revenue leakage across the alternatives.[9] Leakage refers to the percentage of trips for which tolls will not be collected and is assumed to be constant across the alternatives. The leakage varies only by the number of toll trips and the level of the associated tolls that are not collected.

3.4.3 Annual toll collection O&M costs

The indexed values for toll collection O&M costs summarized in Table 17 represent the relative differences across the four alternatives in 2027. Toll collection O&M costs include:

- Roadway toll system (RTS) toll equipment maintenance (both vendor and ODOT)
- Back office system (BOS) software operations and support
- Customer service center (CSC) operations including account management, toll bill mailings, and staffing at retail locations and call centers
- Fees for processing bank card (credit/debit) payments
- ODOT and consultant staffing, including management, marketing, accounting and administrative functions

Some of the toll collection cost components vary with the number of toll locations or the number of toll trips. As such, Alternative 4 has the highest annual toll collection O&M costs, owing to both the highest number of lanes with toll points and the highest number of unique toll trips.

3.4.4 Net toll revenue

While adjusted gross toll revenues and toll collection O&M costs are both key evaluation measures, net revenues provide an evaluation measure that combines these two measures along with roadway facility O&M costs. Roadway maintenance costs are not assumed to vary across the alternatives (and thus not evaluated separately) but are necessary to capture all the costs that would likely be paid from tolls to provide a complete assessment of relative net toll revenues.

The percentages shown in Table 17 compare 2027 annual net toll revenues across the alternatives. This net revenue measure illustrates how the revenue differences among alternatives more than offset the effect of differing operating costs, as the rank order of alternatives by net revenue matches that for adjusted gross toll revenues. Alternative 4 yields the highest net revenues, despite having the highest toll collection (and overall) O&M costs.

[9] Revenue leakage results from occasional electronic toll collection technology issues, unreadable license plates, invalid vehicle owner address for mailing a toll bill to a non-account customer, and non-payment of toll bills mailed to customers without an account

3.4.5 Toll implementation capital costs

Table 17 shows indexed capital costs for implementing tolling for each alternative. These preliminary estimates include acquiring the RTS vendor and equipment, the BOS software vendor, and CSC operations vendor. The RTS elements include gantries at each toll point, tag readers and cameras on the gantries for each lane including shoulders, fixed and dynamic messaging signage, and related telecommunications hardware and equipment, plus the RTS vendor contract procurement costs. BOS and CSC capital costs are captured in the procurement of these vendors. The differences shown are due primarily to lane system (RTS) hardware requirements according to the number of both mainline and on-ramp lanes with toll points in each direction.

3.5 Implementation and Operations

The evaluation of alternatives for tolling on I-205 also considered qualitative implementation-related criteria that includes the difficulty of implementation, flexibility for managing traffic operations, scalability to a regional toll system, and federal program eligibility. The assessment of alternatives on these criteria is provided in Table 18 below. Discussion on these assessments follow.

Table 18: Summary of Implementation Assessment

Implementation and Operations	Alt 1	Alt 3	Alt 4	Alt 5
Difficulty of implementation	Low	Low	Medium	Medium
Operational Flexibility	Low	Medium	High	Low
Scalability to a regional system	Medium	Medium	High	Low
Federal program eligibility	High	High	Medium	Medium

3.5.1 Difficulty of implementation

The project team assessed the relative effort of implementing each of the alternatives, basing it on their engineering judgement, and incorporated several factors including:

- Overall complexity of the tolling approach
- Complexity of trip-building (determining the correct toll for drivers who are in multiple toll segments in a single trip)
- Difficulty in communicating the concept with the public
- Complexity of communicating toll rates to the public

Having a "low" level of difficulty is most desirable for this evaluation. As Table 18 shows, Alternatives 1 and 3 are the least complex to deploy as single point tolls on one or two bridges along I-205, with Alternative 1 as the overall least difficult with only one single toll on the Abernethy Bridge. Note that none of the alternatives are expected to be particularly difficult to implement.

3.5.2 Operational Flexibility

Operational Flexibility refers to the system's ability to influence traffic operations and congestion on the interstate network to improve the overall efficiency of the transportation system. In general, this requires more tolling points or zones compared with alternatives with fewer. With a single tolling point, Alternative 1 can influence traffic operations in a relatively small area. Alternative 5 can influence traffic operations over a larger area; however, since only a single toll can be applied to the entire tolled area, it cannot be "fine-tuned" to specific locations, and it is possible that a toll change needed to improve traffic operations in one area could be detrimental in another. This could happen in situations where volume on one segment is too high and should be reduced while additional capacity exists on another segment in the toll zone. Alternatives 3, with two tolling points, and Alternative 4 with four tolling points would perform better in this criterion.

3.5.3 Scalability to a regional tolling system

This project is part of a larger ODOT Toll program; it is therefore necessary to have the potential to expand the tolling system to other interstate and state highways (controlled-access highways). The VPFA noted that the extension of tolling along the entirety of the I-5 and I-205 corridors and to other regional highways (e.g., I-84 and I-405) may be desirable in the future to manage congestion. Considerations for assessing this criterion include the complexity of the configuration at a regional scale and the potential of each configuration to effectively manage regional congestion.

The single-point tolling systems proposed under Alternatives 1 and 3 have a moderate level of scalability as it would be relatively easy to operate a network of single point tolls. However, it may be more difficult to effectively manage congestion and less likely to demonstrate a multi-segment toll system as originally envisioned in the VPFA. Alternative 4 has high applicability for a regional system, as segment-based tolling is already used frequently on congestion-priced express lanes and managed lanes networks in the U.S. Alternative 5 has a low level of applicability as it is unlikely a single zone would be as effective at managing congestion over a larger geographic area, and even a system based on larger multiple-zones throughout the region would limit flexibility for optimal traffic management. Operating multiple zones could be more effective at managing congestion but would be much more complex to operate relative to single point tolls or segment-based tolling. Furthermore, it could create undesired rerouting patterns concentrated near the extents of the zones.

3.5.4 Federal program eligibility

This criterion assesses the likely eligibility of each alternative under potential federal tolling authorization programs: Section 129 "mainstream tolling" authority or the Value Pricing Pilot Program (VPPP). Section 129 is an easier and more predicable process for states to undertake but has more restrictions on where and how tolling can occur. The VPPP allows for a wider range of configurations but requires discretionary approval of the U.S. Secretary of Transportation and entails a significant amount of uncertainty regarding when approval can be

expected. The assessment of alternatives with regard to federal program eligibility is based on the engineering judgement of the project team.

Section 129 allows tolling to occur on reconstructed bridges. As such, Alternatives 1 and 3, which place tolls on bridges that are to be reconstructed, are both very likely to be eligible under both Section 129 and are rated "high." Section 129 furthermore allows for some leeway in tolling on the approaches to bridges, so it is possible that Alternatives 4 and 5 would be eligible, but this would require interpretation of the relevant statutes and concurrence from the Federal Highway Administration (FHWA). All alternatives are likely eligible under the VPPP, although the FHWA would have to confirm and formally approve of any alternatives advancing under the VPPP.

4.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

All of the alternatives considered could provide a tolling system on I-205 that would both manage congestion and raise revenue. As demonstrated in this report, there are tradeoffs among the alternatives, and there is no single alternative that scores best in all criteria.

In terms of impacts to the Portland region as a whole, no alternative produces major regional impacts, particularly during congested peak hours. There are not expected to be major changes to traffic patterns away from the tolled segment of I-205 or major changes in mode choice related to tolling under 2027 modeled conditions. While limited in scale, there may be some positive changes in shifting SOV to HOV and reducing VMT and VHT in the regional transportation system.

Perhaps the largest single concern in evaluating alternatives is the effect on roadways in the vicinity of I-205 tolling due to local rerouting. While the complete effect on rerouting cannot be precisely identified by the regional model (especially when also considering the potential for shifts in the time of trips or changes in destination to avoid tolls), the influence of these factors is likely to positively affect traffic operations on I-205. Specific local congestion effects (e.g., key intersection traffic performance relative to jurisdictional mobility standards) will be assessed through the NEPA evaluation of impacts. Additional study on the effects of rerouting on local roadways will be part of subsequent analysis using the DTA modeling tool, which will provide much more detail on rerouting impacts for use in analyzing alternatives and ultimately identifying the preferred alternative.

Based on the evaluation presented in this report, the technical team's preliminary recommendation is that the following alternatives advance for further development and analysis in the NEPA process:

- **Alternative 3 (Individual tolls on the Abernethy and Tualatin River Bridges)** – This alternative is effective at managing traffic congestion on I-205 and generating revenue. It reduces the potential for a concentrated rerouting pattern resulting through Oregon City compared to Alternative 1. The segment-based approach could be scaled to other future

tolling applications in the region. Notably, Alternative 3 is likely eligible under Section 129 federal tolling authority.

- **Alternative 4 (Segment-based tolls between Stafford Road and OR 213)** – This alternative covers the greatest portion of I-205 and therefore offers the most flexibility and adaptability to manage demand on I-205. Alternative 4 retains the most users and offers motorists the option of a lower toll if they are travelling locally (entering or existing I-205 so as not to use all tolled segments). Furthermore, because of its significant coverage of the I-205 network and higher number of segments, localized rerouting effects are less concentrated on any particular route or area such as the Arch Bridge, downtown Oregon City or West Linn. With the highest potential net toll revenue of any alternative, and the greatest flexibility in application, toll rates and associated schedules can be readily developed to limit rerouting to adjacent communities and roadways. Finally, the segment-based approach of this alternative can be most readily scaled to future tolling applications in the region.

The technical team recommends that the following alternatives do not proceed to further analysis in the NEPA processes at this time:

- **Alternative 1 (Abernethy Bridge toll)** – This alternative is very simple to implement and would be eligible under Section 129 federal tolling authority; however, it performs poorly in several performance measures and potentially results in concentrated impacts to nearby roadways in Oregon City. In addition, it has the lowest net revenue potential of all the alternatives.
- **Alternative 2 (Abernethy Bridge toll, with off-bridge tolling gantries)** – Although this alternative is designed to address the rerouting effects, it is relatively undifferentiated from Alternative 1, as the regional travel demand model results indicate most rerouting would be due to circulation changes in the I-205 interchange access rather than toll avoidance by through trips getting on and off I-205 on the same trip. The general performance and outcomes are expected to be fairly similar to Alternative 1.
- **Alternative 5 (Single zone toll between Stafford Road and OR 213)** – The zone-based approach of this alternative prices through trips (that traverse the entirety of the tolled area) the same as local trips (that only traverse a portion of the tolled area), effectively underpricing longer trips and overpricing shorter trips, relative to the other Alternatives, especially Alternative 4. Alternative 5 performs well in terms of limiting regional rerouting, although it does result in some concentrated local impacts at the outer extents of the toll zone, such as in Gladstone. By making a trip within the zone the same cost regardless of trip length, through trips are incentivized to stay on I-205 do to lower costs. Conversely, there is a cost (compared to other alternatives) for some local trips that could cause congestion on adjacent facilities. While Alternative 5 performs well on through trip rerouting and regional performance due to its zone tolling approach, Alternative 4 is flexible enough to accommodate a segment-based approach that could perform similarly. Furthermore, the zone tolling approach would present a challenge for future integration with tolling on I-5 or other regional roadways.

Appendices

Appendix A. Change in Regional VMT Detail

Change in regional daily VMT relative to the baseline				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-338,000	-413,000	-463,000	-213,000
Non-Freeway	+117,000	+179,000	+185,000	+94,000
Total	-221,000	-234,000	-278,000	-119,000
Change in VMT during the a.m. peak (7 a.m. to 8 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-8,000	-11,000	-8,000	+2,000
Non-Freeway	-4,000	0	-4,000	-5,000
Total	-12,000	-11,000	-12,000	-3,000
Change in VMT during the p.m. peak (5 p.m. to 6 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-11,000	-14,000	-12,000	-1,000
Non-Freeway	-2,000	+2,000	-3,000	-3,000
Total	-13,000	-12,000	-15,000	-4,000
Change in VMT during the afternoon off-peak (2 p.m. to 3 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-30,000	-37,000	-36,000	-19,000
Non-Freeway	+15,000	+20,000	+17,000	+10,000
Total	-15,000	-17,000	-19,000	-9,000
Change in VMT during the evening off-peak (8 p.m. to 9 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-20,000	-23,000	-29,000	-16,000
Non-Freeway	+11,000	+13,000	+16,000	+9,000
Total	-9,000	-10,000	-13,000	-7,000

Appendix B. Change in Regional VHT Detail

Change in regional daily VHT				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-11,400	-13,300	-14,300	-10,200
Non-Freeway	+10,300	+8,900	+9,300	+5,000
Total	-1,100	-4,400	-5,000	-5,200
Change in regional VHT in the a.m. Peak (7 a.m. to 8 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-1,100	-1,200	-1,200	-1,000
Non-Freeway	+200	0	-200	-300
Total	-900	-1,200	-1,400	-1,300
Change in regional VHT during the p.m. Peak (5 p.m. to 6 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-1,100	-1,200	-1,200	-1,000
Non-Freeway	+300	+100	-100	-100
Total	-800	-1,100	-1,300	-1,100
Change in regional VHT during the afternoon off-peak (2 p.m. to 3 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-700	-900	-900	-600
Non-Freeway	+1,100	+1,000	+900	+600
Total	+400	+100	0	0
Change in regional VHT during the evening off-peak (8 p.m. to 9 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Freeway	-300	-400	-500	-300
Non-Freeway	+500	+500	+600	+400
Total	+200	+100	+100	+100

Appendix C. Change in I-205 Daily Vehicular Throughput Detail for 2027

Change in I-205 daily vehicular throughput				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Between Stafford Road and 10th Ave	-17%	-36%	-31%	-17%
Between 10th Ave and OR 43	-23%	-24%	-36%	-11%
Between OR 43 and OR 99E	-48%	-33%	-33%	-17%
Between OR 99E and OR 213	-28%	-19%	-40%	-30%
Change in I-205 daily vehicular throughput during the a.m. peak (7 a.m. to 8 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Between Stafford Road and 10th Ave	+3%	-15%	-3%	+4%
Between 10th Ave and OR 43	-4%	-4%	-5%	+10%
Between OR 43 and OR 99E	-30%	-16%	-12%	-1%
Between OR 99E and OR 213	-16%	-7%	-20%	-18%
Change in I-205 daily vehicular throughput during the p.m. peak (5 p.m. to 6 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Between Stafford Road and 10th Ave	-2%	-20%	-9%	-1%
Between 10th Ave and OR 43	-10%	-7%	-10%	+6%
Between OR 43 and OR 99E	-33%	-19%	-15%	-3%
Between OR 99E and OR 213	-18%	-9%	-24%	-21%
Change in I-205 daily vehicular throughput during the afternoon off-peak (2 p.m. to 3 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Between Stafford Road and 10th Ave	-29%	-55%	-42%	-26%
Between 10th Ave and OR 43	-40%	-41%	-48%	-20%
Between OR 43 and OR 99E	-60%	-45%	-42%	-25%
Between OR 99E and OR 213	-37%	-28%	-49%	-36%
Change in I-205 daily vehicular throughput during the evening off-peak (8 p.m. to 9 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Between Stafford Road and 10th Ave	-40%	-57%	-60%	-41%
Between 10th Ave and OR 43	-47%	-47%	-75%	-36%
Between OR 43 and OR 99E	-81%	-62%	-65%	-39%
Between OR 99E and OR 213	-47%	-38%	-70%	-51%

Appendix D. Change in Volume at Select I-205 Locations Detail for 2027

Daily percentage change in volume at select I-205 locations				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Rd	-10 to -20%	-20 to -30%	-20 to -30%	-10 to -20%
I-205 north of 82nd Dr	-5 to -10%	-5 to -10%	-10 to -20%	-5 to -10%
Percentage change in volume at select I-205 locations (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Rd	-2 to -5%	-5 to -10%	-2 to -5%	2 to -5%
I-205 north of 82nd Dr	-2 to -5%	-2 to -5%	-2 to -5%	0 to -2%
Percentage change in volume at select I-205 locations (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Rd	-5 to -10%	-10 to -20%	-5 to -10%	-2 to -5%
I-205 north of 82nd Dr	-5 to -10%	-2 to -5%	-5 to -10%	-2 to -5%
Percentage change in volume at select I-205 locations (2:00 to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Rd	-20 to -30%	-40 to -50%	-30 to -40%	-10 to -20%
I-205 north of 82nd Dr	-10 to -20%	-5 to -10%	-10 to -20%	-5 to -10%
Percentage change in volume at select I-205 locations (8:00 to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-205 between I-5 and Stafford Rd	-30 to -40%	-40 to -50%	-50 to -60%	-30 to -40%
I-205 north of 82nd Dr	-10 to -20%	-10 to -20%	-20 to -30%	-10 to -20%

Appendix E. Change in Volume on I-5 Detail

Daily percentage change in volume on I-5				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 east of Terwilliger Blvd	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 north of OR 217	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 north of I-205	0 to -2%	-2 to -5%	-2-5%	-2 to -5%
I-5 at Boone Bridge	-2 to -5%	-2 to -5%	-2-5%	0 to +2%
Percentage change in volume on I-5 (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 east of Terwilliger Blvd	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 north of OR 217	0 to +2%	0 to +2%	0 to +2%	0 to -2%
I-5 north of I-205	0 to -2%	-2 to -5%	0 to -2%	0 to -2%
I-5 at Boone Bridge	-2 to -5%	-2 to -5%	0 to -2%	0 to +2%
Percentage change in volume on I-5 (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 east of Terwilliger Blvd	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 north of OR 217	0 to +2%	0 to +2%	0 to +2%	0 to -2%
I-5 north of I-205	0 to -2%	-2 to -5%	0 to -2%	0 to -2%
I-5 at Boone Bridge	-2 to -5%	-2 to -5%	0 to -2%	0 to +2%
Percentage change in volume on I-5 (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 east of Terwilliger Blvd	+2 to +5%	+2 to +5%	+2 to +5%	0 to +2%
I-5 north of OR 217	+5 to +10%	+2 to +5%	+5 to +10%	+2 to +5%
I-5 north of I-205	0 to -2%	-5 to -10%	-2 to -5%	-2 to -5%
I-5 at Boone Bridge	-5 to -10%	-5 to -10%	-5 to -10%	0 to +2%
Percentage change in volume on I-5 (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
I-5 north of I-405	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-5 Marquam Bridge	+2 to +5%	+2 to +5%	+2 to +5%	+2 to +5%
I-5 east of Terwilliger Blvd	+5 to +10%	+5 to +10%	+5 to +10%	+5 to +10%
I-5 north of OR 217	+5 to +10%	+5 to +10%	+5 to +10%	+5 to +10%
I-5 north of I-205	0 to -2%	-5 to -10%	-5 to -10%	-2 to -5%
I-5 at Boone Bridge	-2 to -5%	-2 to -5%	-2 to -5%	0 to +2%

Appendix F. Change in Volume on Portland Bridges Detail

Daily percentage change in volume on regional bridges				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	+2 to +5%	+2 to +5%	+2 to +5%	<+2%
Ross Island Bridge	+2 to +5%	+2 to +5%	+2 to +5%	+2 to +5%
Sellwood Bridge	+5 to +10%	+5 to +10%	+5 to +10%	+2 to +5%
Percentage change in volume on regional bridges (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	<+2%	<+2%	<+2%	<+2%
Ross Island Bridge	<+2%	<+2%	<+2%	<+2%
Sellwood Bridge	+2 to +5%	<+2%	<+2%	<+2%
Percentage change in volume on regional bridges (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	<+2%	<+2%	<+2%	<+2%
Ross Island Bridge	<+2%	<+2%	<+2%	<+2%
Sellwood Bridge	+2 to +5%	<+2%	<+2%	<+2%
Percentage change in volume on regional bridges (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	+2 to +5%	+2 to +5%	+2 to +5%	+2 to +5%
Ross Island Bridge	+5 to +10%	+2 to +5%	+2 to +5%	+2 to +5%
Sellwood Bridge	+10 to +20%	+5 to +10%	+5 to +10%	+5 to +10%
Percentage change in volume on regional bridges (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
Downtown Portland Bridges Screenline	<+2%	<+2%	+2 to +5%	<+2%
Ross Island Bridge	+5 to +10%	+5 to +10%	+10 to +20%	+5 to +10%
Sellwood Bridge	+10 to +20%	+10 to +20%	+10 to +20%	+10 to +20%

Appendix G. Change in Volume on other Regional Highways Detail

Daily percentage change in volume on other regional highways				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
US 26 west of Skyline Blvd & Scholls Ferry Rd	0 to +2%	0 to +2%	0 to +2%	0 to +2%
OR 217 north of 99W	0 to -2%	0 to -2%	-2 to -5%	0 to -2%
OR 217 east of I-5	0 to -2%	0 to +2%	0 to +2%	0 to +2%
I-84 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%
Percentage change in volume on other regional highways (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
US 26 west of Skyline Blvd & Scholls Ferry Rd	0 to +2%	0 to +2%	0 to -2%	0 to -2%
OR 217 north of 99W	0 to -2%	0 to -2%	0 to -2%	0 to +2%
OR 217 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-84 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to -2%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%
Percentage change in volume on other regional highways (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
US 26 west of Skyline Blvd & Scholls Ferry Rd	0 to +2%	0 to +2%	0 to +2%	0 to -2%
OR 217 north of 99W	0 to -2%	0 to -2%	0 to -2%	0 to +2%
OR 217 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-84 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to -2%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%
Percentage change in volume on other regional highways (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
US 26 west of Skyline Blvd & Scholls Ferry Rd	0 to +2%	0 to +2%	0 to +2%	0 to +2%
OR 217 north of 99W	-2 to -5%	-2 to -5%	-2 to -5%	0 to -2%
OR 217 east of I-5	0 to -2%	0 to -2%	0 to -2%	0 to +2%
I-84 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%
Percentage change in volume on other regional highways (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
US 26 west of Skyline Blvd & Scholls Ferry Rd	+2 to +5%	0 to +2%	+2 to +5%	0 to +2%
OR 217 north of 99W	-2 to -5%	-2 to -5%	-2 to -5%	-2 to -5%
OR 217 east of I-5	0 to +2%	0 to +2%	0 to +2%	0 to +2%
I-84 east of I-5	+2 to +5%	+2 to +5%	+2 to +5%	+2 to +5%
I-205 north of I-84	0 to -2%	0 to -2%	0 to -2%	0 to -2%

Appendix H. Change in Volume on Roadways Near I-205 Alternatives Detail

Daily percentage change in volume on nearby roadways				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+5 to +10%	+5 to +10%	+5 to +10%	+5 to +10%
Borland Rd east of Stafford Road	-40 to -50%	+90 to +100%	+30 to +40%	+90 to +100%
Borland Rd east of SW 65th Ave	-10 to -20%	<+2%	-5 to -10%	+5 to +10%
Stafford Road south of Ek Rd	-10 to -20%	-10 to -20%	-10 to -20%	-5 to -10%
Stafford Road east of SW 65th Ave	-10 to -20%	-10 to -20%	-10 to -20%	-2 to -5%
OR 99E Downtown Canby	+30 to +40%	+30 to +40%	+20 to +30%	+2 to +5%
Percentage change in volume on nearby roadways (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+5 to +10%	<+2%	<+2%	<+2%
Borland Rd east of Stafford Road	-40 to -50%	+30 to +40%	-5 to -10%	+20 to +30%
Borland Rd east of SW 65th Ave	-10 to -20%	-2 to -5%	-5 to -10%	+10 to +20%
Stafford Road south of Ek Rd	<+2%	-5 to -10%	<+2%	-2 to -5%
Stafford Road east of SW 65th Ave	-5 to -10%	-2 to -5%	-5 to -10%	<+2%
OR 99E Downtown Canby	+10 to +20%	+10 to +20%	+2 to +5%	-5 to -10%
Percentage change in volume on nearby roadways (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+5 to +10%	+2 to +5%	<+2%	+2 to +5%
Borland Rd east of Stafford Road	-60 to -70%	+30 to +40%	<+2%	+30 to +40%
Borland Rd east of SW 65th Ave	-10 to -20%	-2 to -5%	-5 to -10%	+2 to +5%
Stafford Road south of Ek Rd	-10 to -20%	-10 to -20%	-5 to -10%	-10 to -20%
Stafford Road east of SW 65th Ave	-10 to -20%	-5 to -10%	-5 to -10%	-2 to -5%
OR 99E Downtown Canby	+10 to +20%	+10 to +20%	+5 to +10%	-2 to -5%
Percentage change in volume on nearby roadways (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+10 to +20%	+5 to +10%	+5 to +10%	+5 to +10%
Borland Rd east of Stafford Road	-40 to -50%	>+100%	+30 to +40%	>+100%
Borland Rd east of SW 65th Ave	-20 to -30%	+2 to +5%	-20 to -30%	<+2%
Stafford Road south of Ek Rd	-10 to -20%	-30 to -40%	-10 to -20%	-10 to -20%
Stafford Road east of SW 65th Ave	-10 to -20%	-10 to -20%	-10 to -20%	-5 to -10%
OR 99E Downtown Canby	+50 to +60%	+50 to +60%	+40 +50%	+5 to +10%
Percentage change in volume on nearby roadways (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Terwilliger Blvd	+10 to +20%	+10 to +20%	+10 to +20%	+10 to +20%
Borland Rd east of Stafford Road	+2 to +5%	>+100%	>+100%	>+100%
Borland Rd east of SW 65th Ave	-2 to -5%	+30 to +40%	+20 to +30%	+50 to +60%
Stafford Road south of Ek Rd	-10 to -20%	-20 to -30%	-20 to -30%	-10 to -20%
Stafford Road east of SW 65th Ave	-10 to -20%	-10 to -20%	-10 to -20%	-10 to -20%
OR 99E Downtown Canby	+50 to +60%	+50 to +60%	+40 to +50%	+5 to +10%

Appendix I. Change in Volume in Oregon City Detail

Daily percentage change in volume in Oregon City				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-5 to -10%	-5 to -10%	-5 to -10%	+5 to +10%
OR 99E Oregon City South Boundary	+20 to +30%	+20 to +30%	+10 to +20%	-5 to -10%
Oregon City Arch Bridge	+80 to +90%	+30 to +40%	+30 to +40%	+20 to +30%
Downtown Oregon City Screenline	+80 to +90%	+40 to +50%	+30 to +40%	+10 to +20%
North Oregon City Screenline	+5 to +10%	+2 to +5%	+30 to +40%	+20 to +30%
Percentage change in volume in Oregon City (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-5 to -10%	<+2%	<+2%	+5 to +10%
OR 99E Oregon City South Boundary	+10 to +20%	+10 to +20%	<+2%	-5 to -10%
Oregon City Arch Bridge	+50 to +60%	+20 to +30%	+10 to +20%	+5 to +10%
Downtown Oregon City Screenline	+50 to +60%	+20 to +30%	+10 to +20%	+5 to +10%
North Oregon City Screenline	-5 to -10%	-5 to -10%	<+2%	+2 to +5%
Percentage change in volume in Oregon City (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-5 to -10%	-2 to -5%	-2 to -5%	+5 to +10%
OR 99E Oregon City South Boundary	+10 to +20%	+10 to +20%	<+2%	-5 to -10%
Oregon City Arch Bridge	+50 to +60%	+20 to +30%	+10 to +20%	+5 to +10%
Downtown Oregon City Screenline	+50 to +60%	+20 to +30%	+10 to +20%	+2 to +5%
North Oregon City Screenline	-5 to -10%	-5 to -10%	+2 to +5%	+5 to +10%
Percentage change in volume in Oregon City (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-5 to -10%	-5 to -10%	-5 to -10%	+5 to +10%
OR 99E Oregon City South Boundary	+40 to +50%	+40 to +50%	+30 to +40%	-2 to -5%
Oregon City Arch Bridge	+90 to +100%	+40 to +50%	+30 to +40%	+30 to +40%
Downtown Oregon City Screenline	+90 to +100%	+50 to +60%	+30 to +40%	+20 to +30%
North Oregon City Screenline	+10 to 20%	+10 to 20%	+30 to +40%	+20 to +30%
Percentage change in volume in Oregon City (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 213 south of I-205 Interchange	-10 to -20%	-10 to -20%	-10 to -20%	+5 to +10%
OR 99E Oregon City South Boundary	+30 to +40%	+40 to +50%	+30 to +40%	-5 to -10%
Oregon City Arch Bridge	>+100%	+90 to +100%	+80 to +90%	+50 to +60%
Downtown Oregon City Screenline	>+100%	>100%	+90 to +100%	+40 to +50%
North Oregon City Screenline	+40 to +50%	+30 to +40%	>+100%	+70 to +80%

Appendix J. Change in Volume in West Linn Detail

Daily percentage change in volume in West Linn				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-10 to -20%	+2 to +5%	+2 to +5%	<+2%
Willamette Falls Dr east of A St	+2 to +5%	-5 to -10%	+50 to +60%	+10 to +20%
East West Linn Screenline	-20 to -30%	-10 to -20%	-5 to -10%	-10 to -20%
Sunset Ave west of Willamette Falls Dr (over I-205)	<+2%	-5 to -10%	-5 to -10%	-10 to -20%
Rosemont Rd north of Santa Anita Dr	-40 to -50%	+10 to +20%	+10 to +20%	+5 to +10%
Salamo Rd east of 10th St	+30 to +40%	-40 to -50%	-10 to -20%	-30 to -40%
Willamette Falls Dr east of 10th St	-10 to -20%	-40 to -50%	+90 to +100%	+10 to +20%
Percentage change in volume in West Linn (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-10 to -20%	-2 to -5%	-2 to -5%	-2 to -5%
Willamette Falls Dr east of A St	-10 to -20%	-10 to -20%	-2 to -5%	-5 to -10%
East West Linn Screenline	-30 to -40%	-10 to -20%	-10 to -20%	-20 to -30%
Sunset Ave west of Willamette Falls Dr (over I-205)	<+2%	+5 to +10%	+2 to +5%	<+2%
Rosemont Rd north of Santa Anita Dr	-40 to -50%	-10 to -20%	-10 to -20%	-20 to -30%
Salamo Rd east of 10th St	+30 to +40%	-30 to -40%	+2 to +5%	-40 to -50%
Willamette Falls Dr east of 10th St	-40 to -50%	-40 to -50%	-10 to -20%	-10 to -20%
Percentage change in volume in West Linn (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-5 to -10%	<+2%	<+2%	<+2%
Willamette Falls Dr east of A St	-10 to -20%	-10 to -20%	-2 to -5%	-10 to -20%
East West Linn Screenline	-20 to -30%	-10 to -20%	-10 to -20%	-20 to -30%
Sunset Ave west of Willamette Falls Dr (over I-205)	-2 to-5%	+5 to +10%	-2 to-5%	-2 to -5%
Rosemont Rd north of Santa Anita Dr	-50 to -60%	-10 to -20%	-10 to -20%	-20 to -30%
Salamo Rd east of 10th St	+60 to +70%	-30 to -40%	+5 to +10%	-20 to -30%
Willamette Falls Dr east of 10th St	-30 to -40%	-40 to-50%	-2 to-5%	-10 to -20%
Percentage change in volume in West Linn (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-10 to -20%	+2 to +5%	+2 to +5%	<+2%
Willamette Falls Dr east of A St	+30 to +40%	+10 to +20%	+50 to +60%	+20 to +30%
East West Linn Screenline	-20 to -30%	-10 to -20%	-2 to -5%	-10 to -20%
Sunset Ave west of Willamette Falls Dr (over I-205)	-2 to -5%	-5 to -10%	-10 to -20%	-10 to -20%
Rosemont Rd north of Santa Anita Dr	-50 to -60%	+20 to +30%	+10 to +20%	+5 to +10%
Salamo Rd east of 10th St	+50 to +60%	-30 to -40%	-10 to -20%	-30 to -40%
Willamette Falls Dr east of 10th St	+50 to +60%	+2 to +5%	>+100%	+60 to +70%
Percentage change in volume in West Linn (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 43 south of Glenmorrie Dr	-5 to -10%	+5 to +10%	+10 to +20%	+10 to +20%
Willamette Falls Dr east of A St	+70 to +80%	+20 to +30%	>+100%	>+100%
East West Linn Screenline	-20 to -30%	-10 to -20%	-5 to -10%	-10 to -20%
Sunset Ave west of Willamette Falls Dr (over I-205)	-2 to -5%	-10 to -20%	-10 to -20%	-10 to -20%
Rosemont Rd north of Santa Anita Dr	-10 to -20%	>+100%*	>+100%*	>+100%*
Salamo Rd east of 10th St	+10 to +20%	-60 to -70%	-60 to -70%	-60 to -70%
Willamette Falls Dr east of 10th St	>+100%*	-20 to -30%	>+100%	>+100%

* Represents less than 200 vehicle change

Appendix K. Change in Volume in Gladstone Detail

Daily percentage change in volume in Gladstone				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-5 to -10%	-5 to -10%	+10 to +20%	+20 to +30%
Gladstone Screenline	+5 to +10%	+2 to +5%	+70 to +80%	>+100%
Percentage change in volume in Gladstone (7:00 a.m. to 8:00 a.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-5 to -10%	-2 to -5%	+10 to +20%	+20 to +30%
Gladstone Screenline	+2 to +5%	<+2%	+60 to +70%	>+100%
Percentage change in volume in Gladstone (5:00 p.m. to 6:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-5 to -10%	-2 to -5%	+5 to +10%	+20 to +30%
Gladstone Screenline	+5 to +10%	+5 to +10%	+50 to +60%	>+100%
Percentage change in volume in Gladstone (2:00 p.m. to 3:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-10 to -20%	-5 to -10%	+10 to +20%	+20 to +30%
Gladstone Screenline	+10 to +20%	+2 to 5%	>+100%	>+100%
Percentage change in volume in Gladstone (8:00 p.m. to 9:00 p.m.)				
Change Relative to 2027 Baseline	Alt 1	Alt 3	Alt 4	Alt 5
OR 99E at Clackamas River	-5 to -10%	-5 to -10%	+20 to +30%	+10 to +20%
Gladstone Screenline	+2 to 5%	<+2%	+90 to +100%	+60 to +70%