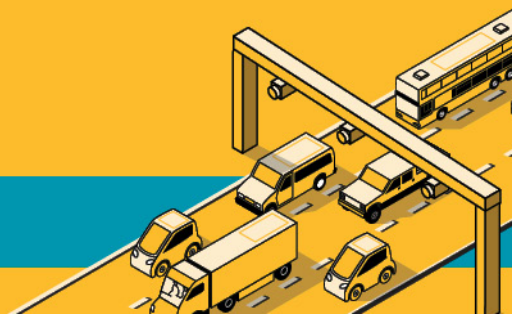


PERFORMANCE MEASURES: TRANSIT AND MULTIMODAL

At the Equity and Mobility Advisory Committee (EMAC) meeting on April 28, 2021, the EMAC participated in a joint workshop with the Transit and Multimodal Working Group (TMWG) to discuss policies, strategies, and performance measures related to tolling, transit and multimodal investments. The following document outlines the comments on performance measures and ODOT's response on how the current toll projects will address them.

NEXT STEPS

As the performance measures are updated, they immediately influence the current I-205 Toll Project. The performance measures for I-205 Toll Project will be the basis for creating performance measures for the Regional Mobility Pricing Project, which will occur in early 2022.

PERFORMANCE MEASURES

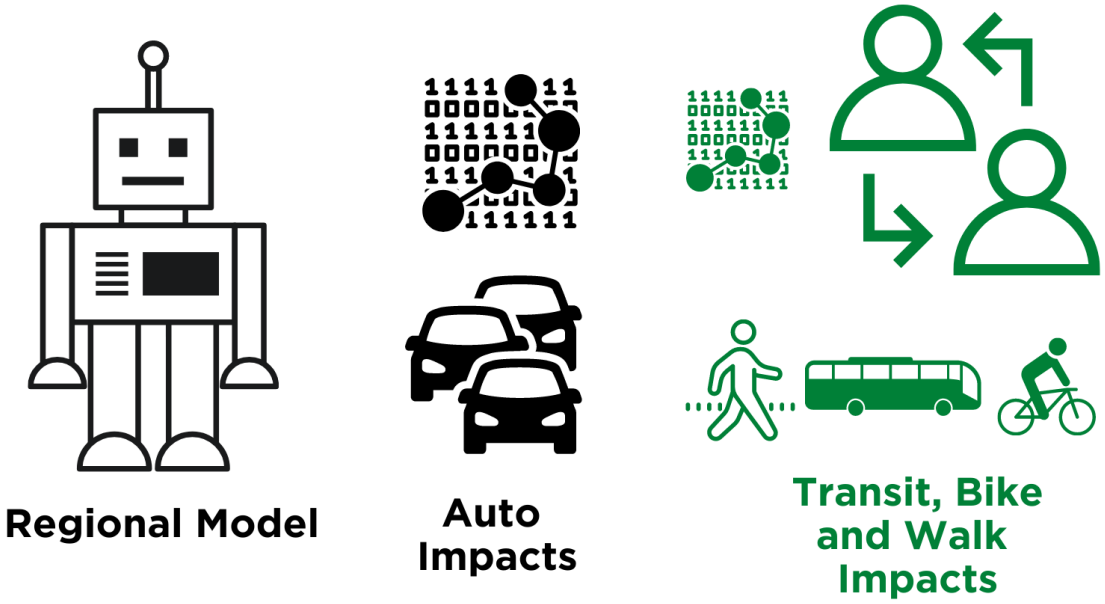
WHAT WE HEARD	WHAT WE ARE DOING ABOUT IT
Breakout mode by auto, transit, bike, and walk.	**ODOT**: Measures have been updated to be broken out by the modes. Where technical data is not available, we will ask for community engagement feedback. Additional information about how we are analyzing all modes with the same rigor is provided in this document.
Measure travel time, reliability, and feeling of safety.	**ODOT**: Measures have been added to account for level of stress for bicycle and pedestrian modes. Measures for travel time and reliability, which includes delay, have been updated to address the local area and regional system. For safety, we will look at the existing infrastructure as well as community engagement feedback. Measures have been updated to focus attention on high crash locations or corridors.
Be clear about benefits between the population and equity communities.	**ODOT**: Measures have been updated to discern the difference between the broader population and equity communities. As defined in the Oregon Toll Program's Equity Framework, equity communities include: people experiencing low-income or economic disadvantage; Black, Indigenous and People of Color (BIPOC); older adults and children; persons who speak non-English languages, especially those with limited English proficiency; persons living with a disability; and other populations and communities historically excluded and underserved by transportation projects. Additional information about how we identify impacts to discern equity is provided in this document.

PERFORMANCE MEASURES

WHAT WE HEARD	WHAT WE ARE DOING ABOUT IT
Transit should include more options than busses.	**ODOT**: Transit ridership covers fixed-route buses and trains operated by TriMet, CTRAN, SMART, ODOT, and others. Flexible route, on demand, paratransit, shuttles, vanpools, ride-hailing are included with the high occupancy vehicle travel data, along with automobiles with additional passengers, in the regional travel model. Through our surveying and Transit Multimodal Work Group, we will work to capture additional data not picked up in the regional travel model.
Measure access to health facilities and workers, and economic impacts.	**ODOT**: We will address these items in the June and July EMAC meetings about neighborhood health and safety policy, strategy, and performance measures.
Indicate the direction we want to go with performance measures.	**ODOT**: Performance measures are used to compare the tolling alternatives for burdens and benefits. They can lead to identifying potential mitigation actions or commitments. Purpose, need, goals and objectives identify project direction.

OUR PLAN TO ANALYZE BIKE, WALK, AND TRANSIT WITH THE SAME RIGOR AS AUTOS

In our pursuit to analyze all transportation modes with the same rigor, we want to be with the type of data that will be provided and acknowledge the current limitations of data analysis.

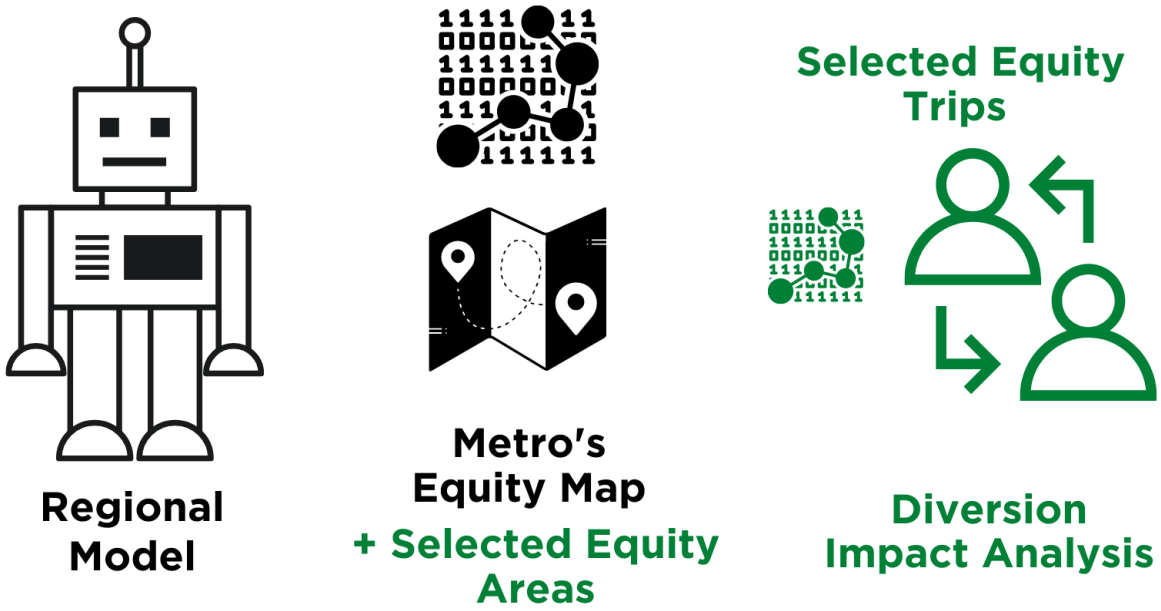


As seen in the image above, the regional travel demand model is our primary source for identifying *potential* travel pattern changes due to tolls. We will use this source to identify project impacts, which could be benefits or burdens, for automobiles as well as higher-level estimates of demand changes for transit, bike, and walk modes. In areas where we find that more automobiles will travel on local roads due to tolling, we will take a deeper dive into studying the impacts to transit, biking, walking, and other mobility services through data and community engagement.

OUR PLAN TO IDENTIFY IMPACTS AND DISCERN EQUITY

As defined the in the Oregon Toll Program's Equity Framework, "Equity acknowledges that not all people, or all communities, are starting from the same place due to historic and current systems of oppression. Equity is the effort to provide different levels of support based on an individual's or group's needs in order to achieve fairness in outcomes."

In our pursuit to discern the difference between impacts to specific groups compared to the general population, we want to be transparent with type of data that will be provided and acknowledge the current limitations of data analysis.

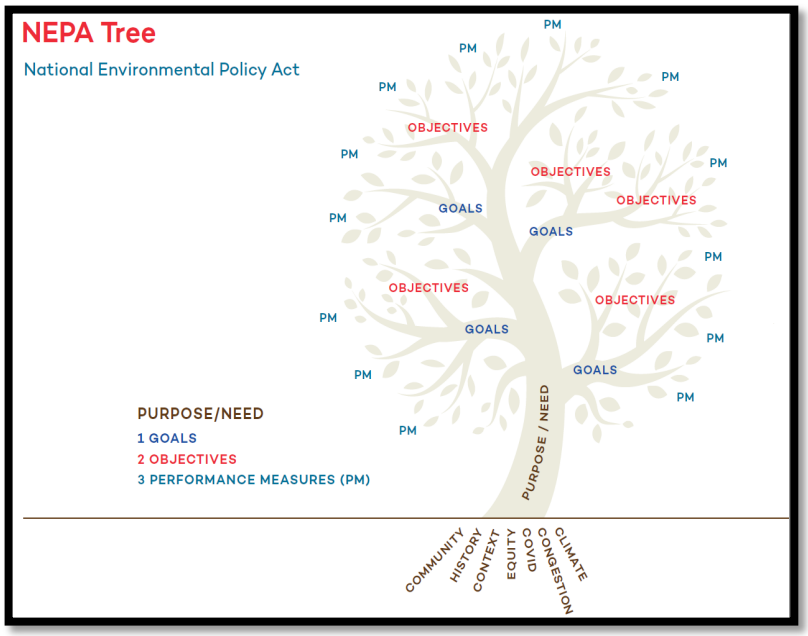


As seen in the image above, the regional travel demand model is our primary source for identifying potential travel pattern changes due to tolls. Metro's equity mapping, which includes people experiencing low income, People of Color, and limited English language proficiency households, is associated with the regional model's Transportation Analysis Zones (TAZs) system, which is explained in the glossary section of this document. In selected TAZs that represent areas with Equity Framework-identified communities, analysis will focus on the impacts.

In areas where we find more automobiles trips are due to tolling, such as diversion on local roads, we will take a deeper dive into studying the impact to Equity Framework-identified populations through data and community engagement.

DEFINITION

Performance measures identify the information needed help us understand impacts and to understand if we are meeting project goals and objectives. Information can be numerical or measured (**Quantitative**) or through interviews, questionnaires, or focus groups (**Qualitative**). In the National Environmental Policy Act (NEPA) process, performances measures emanate from purpose, need, goals, and objectives.



WHY ARE PERFORMANCE MEASURES IMPORTANT?

Performance measures are used to compare the tolling alternatives for burdens and benefits. They can lead to identifying mitigation investments.

Mitigation is a National Environmental Policy Act (NEPA) term that addresses impacts identified in the environmental analysis for a toll project. Mitigation can include a specific project or investment or be a general statement that describes how ODOT will work toward a solution in the future. Mitigation commitments are tied to the toll project environmental analysis and must be related to an identified impact.

The Oregon Toll Program seeks to advance equity, which requires that we go beyond traditional mitigation of negative impacts and focuses on benefits on equity communities. Our approach is to use the performance measures to both address baseline mitigation and inform policies and strategies to advance equity.

The following pages identify the performances measures with the **transit and multimodal measures highlighted in green**.

Equity Framework informed performance measures that go beyond what is federally required

Goal	Objective	Performance Measure	How	Tool or Data Source
Provide benefits for historically and currently excluded and underserved communities	Maximize benefits and minimize burdens associated with implementation of tolling	Identify impacts to Equity Framework-identified Communities located near roadways experiencing traffic volume changes due to the project	Quantitative: Traffic volume changes on select roadways (AM peak hour, PM peak hour, off-peak, daily) Qualitative: Community impacts	Census data mapping Maps will be overlaid with output from the traffic models identifying roadways with vehicle rerouting (AM peak hour, PM peak hour, off-peak) to qualitatively assess the Equity Framework-identified communities (low-income, minority, other historically and currently excluded and underserved) and community resources potentially affected by rerouting)
		Change in vehicle operating costs in the Portland metro area; delineate between general population and Equity Framework-identified communities	Quantitative Model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Qualitative Best professional judgement based on analysis	WSP Benefit Cost Analysis (BCA) Model and Multi-Criteria Evaluation (MCE) Toolkit (indexed scenario comparison of vehicle operating costs)
		Change in travel costs as a percentage of household income for the general population and Equity Framework-identified Communities	Quantitative Model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities	Metro travel demand model to identify number community of places one can access from a transportation analysis zone (TAZ) during peak hours within a mode-specific travel time threshold.[1] TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. Metro travel demand model to identify number of jobs one can access from a TAZ during AM peak hours within a mode-specific travel time threshold.[2] TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. For environmental justice, use TAZs identified as representative samples for Equity Framework-identified communities, which includes environmental justice populations (low income and minorities) to identify changes in access. Use representative Origin-Destination pairs to assess travel time and reliability for environmental justice populations. For social resources and communities, use TAZs identified as representative samples of Equity Framework-identified communities to identify changes in access. Use representative O-D pairs to assess travel time and reliability for other Equity Framework-identified communities.

[1] For community places, peak period travel time thresholds of 30 minutes by auto, 45 minutes by transit, 30 minutes by bike, and 20 minute walk are applied.

[2] For jobs, AM peak period travel time thresholds of 20 minutes by auto, 30 minutes by transit, 15 minutes by bike, and 20 minute walk are applied.

Goal	Objective	Performance Measure	How	Tool or Data Source
Provide benefits for historically and currently excluded and underserved communities	Support equitable and reliable access to job centers and community places, such as grocery stores, schools, and gathering places	**Change in travel time, reliability, and access by mode (auto, transit, bike, and walk) to jobs and community places; delineate between the general population and Equity Framework-identified communities**	Quantitative Community places accessible by mode (auto, transit, bike, walk); change in access will be assessed for region and Transportation Area of Potential Impact (areas possibly impacted by diversion), and model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Jobs accessible by mode (auto, transit, bike, and walk). Change in access will be assessed for region and Transportation Area of Potential Impact (areas possibly impacted by diversion), and model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Change in travel time by mode (auto, transit, bike, and walk) for sample origin to destination (O-D) pairs during average weekday peak periods and selected off-peak period times that represent Equity Framework-identified community commuting patterns Qualitative Best professional judgment for reliability based of travel time impacts and sample origin to destination (O-D) pairs	Metro travel demand model to identify number community of places one can access from a transportation analysis zone (TAZ) during peak hours within a mode-specific travel time threshold.[3] TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. Metro travel demand model to identify number of jobs one can access from a TAZ during AM peak hours within a mode-specific travel time threshold.[4] TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. For environmental justice, use TAZs identified as representative samples for Equity Framework-identified communities, which includes environmental justice populations (low income and minorities) to identify changes in access. Use representative O-D pairs to assess travel time and reliability for environmental justice populations. For social resources and communities, use TAZs identified as representative samples of Equity Framework-identified communities to identify changes in access. Use representative O-D pairs to assess travel time and reliability for other Equity Framework-identified communities.

[3] For community places, peak period travel time thresholds of 30 minutes by auto, 45 minutes by transit, 30 minutes by bike, and 20 minute walk are applied.

[4] For jobs, AM peak period travel time thresholds of 20 minutes by auto, 30 minutes by transit, 15 minutes by bike, and 20 minute walk are applied.

Goal	Objective	Performance Measure	How	Tool or Data Source
Provide benefits for historically and currently excluded and underserved communities	Support equitable and reliable access to health promoting activities (e.g. parks, trails, recreation areas) and health care facilities	Change in access to health promoting activities and health care facilities for the general population and Equity Framework-identified communities within 30-minute trip by mode (auto, transit, walk, and bicycle)	Quantitative Medical places accessibility within 30-minute drive will be assessed for region and Transportation API, and model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Mode shift from auto travel to active transportation travel modes (transit, bicycle, and pedestrian) Change in auto travel time for sample origin to destination (O-D) pairs during average weekday peak periods and selected off-peak period times that represent Equity Framework-identified community commuting patterns Qualitative Overall assessment of access to health promoting activities based on above	Metro travel demand model to identify number medical facilities (community places) one can access from a transportation analysis zone (TAZ) during peak hours within a 30-minute drive. TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. Metro travel demand model to identify daily mode shift to active transportation modes. For environmental justice, present table of change in auto travel time to health promoting activities and health care facilities for representative O-D pairs to assess the populations (low-income, minority, other historically and currently excluded and underserved) and community resources potentially affected by rerouting. For social resources and communities, present table of change in auto travel time for to health promoting activities and health care facilities for representative O-D pairs to assess the populations (other historically and currently excluded and underserved populations) and community resources potentially affected by rerouting.
	Design the toll system to support travel options for people experiencing low incomes	**Compare the benefit of mitigation, strategy, and policy commitments for people experiencing low incomes relative to the general population**	Quantitative Using selected performance measures to study proposed investments to understand where we can advance equity Qualitative Best professional judgement based on comparison of benefits of mitigations, strategies, and commitments and community engagement feedback	Consideration of the following: • Policy, strategy, or mitigation commitments to address affordability, neighborhood health and safety, transit, and multimodal transportation options • Interoperability with other transportation systems • Access to jobs and social resources • Vehicle operating costs Community engagement feedback Selected performance measures

Goal	Objective	Performance Measure	How	Tool or Data Source
Limit additional traffic diversion from tolls on I-205 to adjacent roads and neighborhoods	Design the toll system to limit rerouting from tolling	**Change in auto volumes in the region, Transportation Area of Potential Impact (areas possibly impacted by diversion), and areas where Equity Framework-identified communities live.**	Quantitative Change in vehicle miles traveled within region, Transportation API (areas possibly impacted by diversion), and model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Change in travel time during peak hours on key corridors and selected off-peak period times that represent Equity Framework-identified community commuting patterns Identify changes on key roadways or areas that are most relevant for (adjacent to) Equity Framework-identified communities, based on community mapping	Regional travel demand model for Vehicle Miles Traveled measures and analysis of Metro Equity communities and TAZs identified as representative samples for Equity Framework-identified communities Dynamic Traffic Assignment (DTA) model results for AM and PM peak hour travel times within the Transportation Area of Potential Impact. Census data maps of Equity Framework-identified communities
Limit additional traffic diversion from tolls on I-205 to adjacent roads and neighborhoods	Design the toll system to avoid and minimize impacts to quality of life factors, such as health, noise, safety, job access, travel costs, and environmental quality for local communities from traffic rerouting	**Change in the quality of life in areas impacted by diversion; delineate between the general population and Equity Framework-identified communities**	Qualitative Best professional judgement based on analysis	Consideration of the following (see other performance measures identified in this memo): • Access to health promoting activities and health care facilities • Safety • Access to jobs • Travel costs • Air quality • Census mapping of Equity Framework-identified communities For noise impacts: • Traffic noise levels modeled with Federal Highway Administration (FHWA) Traffic Noise Model (TNM) 2.5 • Traffic Data from Regional Travel Demand Model and Dynamic Traffic Assignment Model (peak hour and truck peak hour) with vehicle mix and posted speed limits. • Project design imported into FHWA TNM 2.5

Goal	Objective	Performance Measure	How	Tool or Data Source
Support safe travel regardless of mode of transportation	Enhance vehicle safety on I-205 by reducing congested conditions and increasing use of transit or higher occupancy vehicles	**Change in I-205 safety conditions, which includes frequency and/or severity of vehicular crashes , as well as mode shift**	Quantitative Estimated change in number of crashes on I-205 Change in total daily auto trips in region and Transportation Area of Potential Impact (areas possibly impacted by diversion) Analysis of crash history on I-205 (existing conditions)	Highway Safety Manual Part C Methodology for corridors MCE Toolkit (indexed scenario comparison of crashes) for region or study area Mode shift assumptions and analysis of existing conditions and proposed mitigation or strategy investments
	Support safe multimodal travel options (e.g. pedestrians, bicycles, transit, and automobiles) on roadways affected by tolling, especially in high crash corridors	**Change in roadway safety conditions by mode (transit, auto, bike, and walk) for areas impacted by diversion, especially for high crash corridors and/or locations that result in injury or death**	Quantitative Model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Qualitative Assessment of potential risks to safety for multimodal travel options based on analysis and community engagement feedback	Existing conditions for transit and multimodal elements; identify high crash corridors and locations MCE Toolkit (indexed scenario comparison of crashes).Highway Safety Manual Part C Methodology for corridors For environmental justice, use TAZs identified as representative samples for Equity Framework-identified communities, including environmental justice populations For social resources and communities, use TAZs identified as representative samples for Equity Framework-identified communities
Contribute to regional improvements in air quality and reduced contributions to climate change effects	Contribute to reduced vehicle air pollutants and greenhouse gas emissions in the Portland metro area through reducing congestion, resulting in more consistent vehicle speeds, less vehicle idling, and fewer overall motor vehicle emission hours on I-205 and on local roadways affected by tolling	Change in annual regional vehicle emissions of Mobile Source Air Toxics (MSATs) from vehicle operations	Quantitative Change in regional vehicle emissions	MOVES model (motor vehicle emissions simulator) - using 24-hour vehicle miles traveled (VMT) output by vehicle class and speed bin from the regional travel demand model
	Reduce localized air pollutants through reduced congestion and improved travel efficiency, particularly in community areas where pollutants may be concentrated due to traffic congestion	Change in annual regional energy consumptions and CO2e emissions from vehicle operations	Quantitative Change in regional vehicle energy consumption	MOVES model - using 24-hour VMT output by vehicle class and speed bin from the regional travel demand model

Goal	Objective	Performance Measure	How	Tool or Data Source
Support multimodal transportation choices	Support shifts to higher occupancy vehicles (including carpooling) and other modes of transportation (transit, walk, bike, telework)	**Change in regional person trips by single occupancy vehicles compared to other modes (transit, vanpooling, or carpooling); delineate between impact to general population and Equity Framework-identified communities**	Quantitative Change in regional person trips by mode, including high and single occupancy vehicles (HOV and SOV), transit, bike, and walk Qualitative Potential impacts to carpool, vanpool, paratransit, and shared ride modes, not explicitly broken out in regional model Potential impacts to Equity Framework-identified communities, not explicitly broken out in regional model.	Regional travel demand model Feedback from the Transit Multimodal Work Group
Support multimodal transportation choices	Support shifts to higher occupancy vehicles (including carpooling) and other modes of transportation (transit, walk, bike, telework)	**Change in level of traffic stress for bicycle and pedestrian corridors impacted by traffic volume changes due to the project**	Quantitative Roadway corridor MMLOS (level of service) or LTS (level of stress) for bicycle and pedestrian Qualitative Best professional judgement based on the impact to roadway corridors in Equity Framework-identified communities	MMLOS (level of service) calculation tool or LTS (Level of stress) bike and walk
		Identify barriers and opportunities to encourage greater use of higher occupancy vehicles and other modes of transportation for the general population and Equity Framework-identified communities	Qualitative Best professional judgement based on the analysis and community engagement	Feedback from the Transit Multimodal Work Group and community engagement

Goal	Objective	Performance Measure	How	Tool or Data Source
		Change in transit level of service and accessibility during peak periods and selected off-peak period times that represent Equity Framework-identified community commuting patterns	Quantitative Roadway corridor MMLOS (level of service) for transit Transit accessibility measures (identified in earlier performance measures) Peak hour travel times and selected off-peak period times that represent Equity Framework-identified community commuting patterns on select roadways corridors with existing or planned transit services	Regional travel demand model MMLOS (level of service) for transit users for study corridors within the Transportation Area of Potential Impact (areas possibly impacted by diversion) Dynamic Traffic Assignment (DTA) for peak hours
		Identify barriers and opportunities to improve feeling of safety and ease for transit, carpooling, and vanpools users within areas impacted by diversion; delineate between the general population and Equity Framework-identified communities	Qualitative Best professional judgement based on the analysis and community engagement	Feedback from the Transit Multimodal Work Group and community engagement

Goal	Objective	Performance Measure	How	Tool or Data Source
Support multimodal transportation choices	Collaborate with transit providers to support availability and enhancements to transit services in the I-205 corridor, especially for historically and currently excluded and underserved communities	**Change in transit level of service and accessibility during peak periods and selected off-peak period times that represent Equity Framework-identified community commuting patterns**	Quantitative Roadway corridor MMLOS (level of service) for transit Transit accessibility measures (identified in earlier performance measures) Peak hour travel times and selected off-peak period times that represent Equity Framework-identified community commuting patterns on select roadways corridors with existing or planned transit services	Regional travel demand model MMLOS (level of service) for transit users for study corridors within the Transportation Area of Potential Impact (API) Dynamic Traffic Assignment (DTA) for peak hours
Support regional economic growth	Provide for reliable and efficient regional movement of goods and people through the I-205 corridor and on local roadways affected by tolling	**Freight or commercial vehicle throughput on I-205 and nearby roadways impacted by volume changes due to toll project**	Quantitative Change in vehicle volume by vehicle type on I-205 and local roadways Identification of commercial or freight by business or job type Qualitative Best professional judgement of the impact to Equity Framework-identified populations and businesses based on the analysis and community engagement	Regional travel demand model (daily) and Dynamic Traffic Assignment (DTA) for peak hours Employment data by land use codes or other sources (e.g. NAICS) Census mapping Equity Framework-identified populations Community engagement feedback
		Vehicle travel time savings: overall and for Equity Framework-identified communities, which includes environmental justice communities	Quantitative Vehicle travel time savings by TAZ from regional model Vehicle travel time savings for an OD pair during peak hour from regional or DTA traffic model Qualitative Identify TAZs that have significant equity populations Identify OD pairs that have significant equity populations	MCE Toolkit (indexed scenario comparison) Regional travel demand model and/or DTA subarea model Select sample TAZ-level origin to destination pairs (TAZs that utilize I-205)identified as representative samples for Equity Framework-identified populations
		People throughput on I-205 segments between Stafford Road and OR 213	Quantitative: Vehicle volume by vehicle type and conversion to person trip	Regional travel demand model (daily) and DTA (peak hours)

Goal	Objective	Performance Measure	How	Tool or Data Source
Support regional economic growth	Improve regional access to jobs and employment centers, especially for historically and currently excluded and underserved communities	**Change in jobs accessible by mode (auto, transit, bike, and walk); delineate between the overall movement and access that begins or ends in areas within or adjacent to Equity Framework-identified communities or job centers**	Quantitative Job accessibility by mode (auto, transit, bike, and walk). Change in access will be assessed for region and Transportation Area of Potential Impact (areas possibly impacted by diversion), and model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities Qualitative Best professional judgment for reliability based of travel time impacts and sample origin to destination (O-D) pairs	Metro travel demand model to identify number of jobs one can access from a TAZ during AM peak hours within a mode-specific travel time threshold.[5] TAZ measures are aggregated to report average impacts for region and Transportation API, based on weighted average of households in each TAZ. For environmental justice, use TAZs identified as representative samples for Equity Framework-identified communities, which includes environmental justice populations (low income and minorities) to identify changes in access. Use representative O-D pairs to assess travel time and reliability for environmental justice populations. For social resources and communities, use TAZs identified as representative samples of Equity Framework-identified communities to identify changes in access. Use representative O-D pairs to assess travel time and reliability for other Equity Framework-identified communities.

[5] For jobs, AM peak period travel time thresholds of 20 minutes by auto, 30 minutes by transit, 15 minutes by bike, and 20 minute walk are applied.

Goal	Objective	Performance Measure	How	Tool or Data Source
Support management of congestion and travel demand	Design the toll system to improve efficient use of roadway infrastructure and improve travel reliability	**Change in vehicle miles traveled (VMT) for highway and non-highway travel in the region and Transportation Area of Potential Impact (areas possibly impacted by diversion)**	Quantitative Change in Vehicle Miles Traveled Qualitative Best professional judgement based on vehicle travel time reliability impacts informed by model results for change in travel time on sample origin to destination (O-D) pairs	Regional travel demand model and sample origin to destination (O-D) pairs
		Change in person trips by mode (auto, transit, bike, and walk) for the region; delineate between impact to general population and Equity Framework-identified communities	Quantitative Change in daily regional mode share based on the model outputs for Metro Equity groups and selected transportation area zones (TAZs) that represent areas with Equity Framework-identified communities	Regional travel demand model
Maximize integration with future toll systems	Design a toll system that can be expanded in scale, integrated with tolling on other roadways, or adapted to future toll system applications	Potential to expand system in future to a broader tolling system including other state facilities or different tolling structures	Qualitative Best professional judgement	
Maximize interoperability with other transportation systems	Design a toll system that is interoperable with other transportation systems in the region	**Potential to integrate the toll system with other transportation systems, such as transit, carpooling, vanpooling, ride-hailing, and scooter or bike sharing (e.g. TriMet Hop Pass), that could support a shared system for payment (transit wallet) or service**	Qualitative Best professional judgement based on feedback from partner mobility service providers and community engagement	Feedback from the Transit Multimodal Work Group and community engagement

Federally required analysis

Performance Measure(s)	Tool and/or Data Source
Impacts from (current or new) traffic diversion on identified business concentrations in the study area	Primary research and analysis of identified commercial corridors or concentrations, Metro Regional Travel Demand Model for diversion patterns
Changes in economic conditions (employment, labor income, economic activity) from project construction	IMPLAN economic modeling software
Changes in economic conditions (employment, labor income, economic activity) from collection and use of toll revenue	IMPLAN economic modeling software
Change in reliability, travel times, and travel costs for freight users	Dynamic Traffic Assignment Model, MCE Toolkit (indexed scenario comparison of truck segmentation of benefits, where applicable)
Monetary value of vehicle travel time savings to users	WSP Benefit Cost Analysis (BCA) Model and MCE Toolkit (indexed scenario comparison))
Monetary value of changes in safety, emissions, noise. pavement maintenance costs, and other identified impacts	WSP Benefit Cost Analysis (BCA) Model
Number of contaminated sites (low, medium, and high risk) disturbed by project constructed	Data will be collected from Federal and state environmental databases for potential sites within the API, historical and existing land uses, previously-prepared environmental reports, and review of historical data regarding land use and geologic and groundwater conditions.
Number, type, and location of historic properties (including archaeological sites) directly impacted by the project	Development footprint of the tolling gantries, associated signage, and utilities.
Number, type, and location of historic properties (including archaeological sites) indirectly impacted by the project	Information obtained from traffic model showing forecasted changes in traffic volumes that would result from tolling on roadways adjacent to historic properties.
Land area by type (vacant, open space, right-of-way) converted (temporary and permanent) from non-transportation uses to transportation improvements	GIS and/or AutoCAD output of impact and acquisition areas for permanent and temporary transportation improvements by parcel and for land use and zoning designations using RLIS.

Performance Measure(s)	Tool and/or Data Source
Change in land use character as a result of the Project	GIS and/or AutoCAD total impact areas by land use and zoning designation using RLIS.
Change in access (temporary and permanent) as a result of the Project	Location of temporary and permanent changes to access points on project design plans.
Construction easements needed and their effect on existing land uses	Project design plans showing construction easements and existing land use layer in RLIS
Changes to current and planned land uses located near roadways affected by vehicle rerouting	Current land use and zoning designations in RLIS and agency future land use maps and subarea plans outside the API along road corridors experiencing changes in traffic volumes based on Information obtained from traffic model.
Location, scale, and schedule of future development projects based on agency input	Conversation with agency planning and development review staff.
Number of sensitive noise receptors experiencing noise levels that reach the ODOT Noise Abatement Approach Criteria	Comparison of modeled traffic noise levels to ODOT Noise Abatement Approach Criteria.
Number of sensitive noise receptors experiencing noise levels that reach the ODOT Substantial Increase (10 dBA over existing noise levels)	Comparison of modeled traffic noise levels to ODOT Substantial Increase.
Anticipated construction noise levels and duration of construction noise at sensitive noise receptors	Qualitative assessment consistent with ODOT Noise Manual.
Distance of noise impact contour from future project alignment to undeveloped properties	Graphical representation of modeled Noise Abatement Approach Criteria distance for ODOT Land Use Activity Categories B and C using FHWA TNM 2.5 and graphics software.
Area of ground disturbance for project construction	Approximate locations of direct impacts from construction of toll gantries and relocated utilities will be determined from Project drawings. Additional information will be obtained from the APIs of land use and utilities and any changes that may occur.
Physical changes to park and recreation resources	Presence of park and recreation resources within the limits of construction and an assessment of short-term and long-term direct impacts to the identified resources.

Performance Measure(s)	Tool and/or Data Source
Changes to access to park and recreation resources located near roadways affected by vehicle rerouting	Information obtained from traffic model showing forecasted changes in traffic volumes that would result from tolling on roadways adjacent to park and recreation resources.
Change in intersection volume-to-capacity (v/c) ratios, level of service (LOS), delay and queuing	Synchro
Changes in LOS on I-205 between Stafford Road and OR 213	Synchro and/or Vissim
Change in travel time reliability on I-205 between Stafford Road and OR 213	MCE (indexed scenario comparison) and/or Regional Integrated Transportation Information System (RITIS).
Change in hours of congestion on I-205 between Stafford Road and OR 213	Regional travel demand model
Change in travel times on I-205 between Stafford Road and OR 213 and along other study corridors within the transportation API	Synchro and/or DTA
Regional and study area vehicle hours traveled (VHT) for freeway and non-freeway travel	Regional travel demand model
Relative effort associated with implementation	Best professional judgement
Flexibility to respond to changes in traffic conditions in the project vicinity	Best professional judgement
Eligibility under preferred federal tolling authority program	Best professional judgement
Gross toll revenue (less estimated revenue leakage)	Net Revenue Model
O&M costs associated with physical tolling infrastructure including (but not limited to): gantries, equipment cabinets, cameras, fixed signage, dynamic message signs, and telecommunications infrastructure as well as procurement of vendor services and vendor transition on a periodic basis	Net Revenue Model

Performance Measure(s)	Tool and/or Data Source
O&M costs associated with toll collections including (but not limited to): banking fees for credit card transactions, toll equipment maintenance, back-office systems support, customer service center operations, ODOT and consultant staffing, and administrative costs	Net Revenue Model
Net revenue (Adjusted gross toll revenue collected less toll O&M costs and highway O&M costs)	Net Revenue Model
Capital costs associated with implementing the physical toll infrastructure and procuring toll vendor services	Net Revenue Model
Utility relocations required due to Project construction	Existing utility locations will be identified using the ITIC program and other available sources. Use project design plans to identify any potential utility relocations
Temporary disruptions to existing electrical and communication services during construction when new utility connections for the tolling equipment are established	Use existing electrical and communication services information from ITIC and other available sources and project design plans to identify potential service disruptions
New utility lines/connections (electrical and communications) required to operate tolling equipment	Use project design plans to identify new utility lines and connections
Area of direct impacts to vegetation, wildlife, or aquatic species and their habitat	The approximate project footprint (limits of cut/fill) will be established from the project drawings, and this footprint will be overlain on the vegetation, wildlife, and aquatic species mapping to estimate an approximate quantity of direct impact to vegetation, wildlife, or aquatic species and their habitat.
Area of indirect impacts to vegetation, wildlife, or aquatic species and their habitat	The approximate project footprint (limits of cut/fill) will be established from the project drawings. Scientific Best Professional Judgement will be used to determine the extent of any indirect impacts to vegetation, wildlife, or aquatic species and their habitat.

Performance Measure(s)	Tool and/or Data Source
Change in visual quality resulting from installation of toll gantries	Visual quality will be evaluated by comparing proposed project elements to existing visual conditions and documenting how visual impacts would affect viewers. Visual impacts will be based on data and process provided in the FHWA Guidelines for visual impact assessment.
Area of wetlands/waters filled	The approximate project footprint (limits of cut/fill) will be established from the project drawings, and this footprint will be overlain on the wetlands/waters resource mapping to estimate an approximate quantity of direct wetland impact.
Area of wetlands/waters indirectly affected	The approximate project footprint (limits of cut/fill) will be established from the project drawings. Scientific Best Professional Judgement will be used to determine the extent of any indirect impacts to wetlands/water resources.

DEFINITIONS AND DESCRIPTIONS

The following table provide definitions and descriptions for technical terms referenced in the performance measures:

Definitions of technical terms

Term	Definition
24-hour VMT output	Vehicle miles traveled (VMT) in one 24-hour period. VMT means the total number of miles driven on the Portland metro area roadway network in an average weekday.
AM/PM peak hour; and off-peak	Generally, the highest traffic-volume time period in the morning and afternoon. In the Portland region, this is between 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m. Off-peak means travel that occurs outside of 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m. peak periods.
Annual toll cost estimate	Average total cost that toll users would pay in one year.
Corridor	The corridor for this project has not been specifically defined. Generally, a corridor can mean the roadway and the surrounding area, including frontage roads, on and off ramps, parallel routes, other transportation facilities (like bus stops), and adjacent land uses.
Environmental justice populations	Low-income populations and minority populations are collectively referred to as environmental justice populations by the federal government. During the National Environmental Policy Act (NEPA) process, additional populations also will be considered, such as older adults, people with limited English proficiency and people with disabilities.
Indexed scenario comparison	A comparison in which performance measures are normalized to more easily compare relative differences between alternative scenarios.
Interoperability	The ability of payment technology to transfer between systems; to pay for not only tolls in the project area, but also tolls in other regions or transit fare (e.g., TriMet).
Mode (or travel mode)	The various methods for travel. In this context, mode refers to walking (non-motorized travel), biking, driving a vehicle, riding in a vehicle as a passenger, riding transit, and truck trips.
Model	A technical tool that represents travel patterns and evaluates differences between alternative scenarios. Several models are using in the analysis of toll projects including the Metro Regional Travel Demand Model.
Origin-to-destination pairs	Refers to where a trip starts and where it ends.

Term	Definition
Social and community resources	Places that are significant to the social health of a community, for example: social service providers, community recreation centers, churches, schools, libraries, and parks.
Speed bin	Groupings of vehicle travel speeds. (e.g., 40-49mph, 50-59mph).
Transportation Analysis Zones (TAZs)	Geographical areas used in travel models to represent the travel behavior of categories of transportation system user groups. There are approximately 2,000 TAZs in the Portland region.
Toll cost range	The identified maximum and minimum that someone would pay for any given trip. With variable rate tolling, the range could change over the course of the day as well as on the distance travelled on tolled roadways.
Vehicle class	Types of vehicles included in the travel demand model roadway volumes. These include: single-occupancy vehicle (driving alone), high-occupancy vehicle (driving with at least one passenger), and various truck sizes.

Tools and data sources

Tool/Data	Description
Best professional judgment	Judgment exercised on the job as informed by the education and experience of credentialed professionals. Credentialed professionals typically hold degrees from accredited institutions, and many have professional certifications that govern ethics and practice standards, such as American Institute of Certified Planners (AICP), Professional Engineer (PE) and Professional Transportation Planners (PTP).
Census data (American Community Survey 5-year estimates)	The American Community Survey is an ongoing survey, conducted by the United States Census Bureau, that provides vital information on a yearly basis about our nation and its people. This vital information includes demographic characteristics.
Census tracts	Census tracts are small, relatively stable and consistently defined geographic areas that usually have a population between 2,500 and 8,000 persons, roughly corresponding to the size of an average American neighborhood. The minimum population of 2,500 allows for statistically significant data analysis, while the maximum population of 8,000 facilitates the ability to create useful geographic blocks. There are approximately 490 census tracts in the Portland-Vancouver metro area.
Dynamic Traffic Assignment (DTA)	This is a type of traffic model being developed for the for I-205 subarea. It refines the Regional Travel Demand Model results for the purposes of peak-hour traffic analysis near the study area. There is no direct connection to equity.

Tool/Data	Description
FHWA Traffic Noise Model Version 2.5	This is the Federal Highway Administration's most current version of a noise model. A traffic noise model helps predict the noise level of a specific roadway under various alternative scenarios.
GIS	GIS stands for geographic information system, and it is a framework for gathering, managing and analyzing data related to spatial location and geography.
Highway Safety Manual Part C Methodology	The American Association of State Highway and Transportation Officials Highway (AASHTO) produces and uses a highway safety manual. Part C of this manual defines the methods for predictive safety analysis.
MOVES model	This is the motor vehicle emissions simulator. The project team uses this tool to estimate motor vehicle emissions at the regional level.
Multi-Criteria Evaluation (MCE) toolkit	The MCE toolkit associates regional travel demand model outcomes for specific Transportation Analysis Zones with demographic data provided by the Census Bureau. This helps to give an indication of impacts on different populations and can support analyzing equity.
ODOT's MMLOS calculation tool	MMLOS stands for multimodal level of service. The Oregon Department of Transportation (ODOT) uses this tool to calculate the quality of travel by walking, biking, or transit. ODOT does not use this tool for evaluating the quality of service for people driving vehicles.
Qualitative	This refers to project team evaluations that are generally not directly tied to specific numerical measures, but rather informed by best professional judgment and informed by technical results as available.
Regional Travel Demand Model	This tool is used by Portland Metro to represent travel behavior and patterns in the region. It is a primary tool used for projecting growth in future travel demand using assumptions about expected growth in population (households) and jobs (employment).
WSP Benefit Cost Analysis (BCA) model	This is a technical analysis tool, developed and used by the project's consultant, WSP, that evaluates economic impacts including benefits and costs.

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