Appendix D I-205 Toll Project Air Quality Technical Report

I-205 Toll Project

Air Quality Technical Report

February 2023

Urban Mobility STRATEGY

Oregon Department of Transportation

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Air Quality Technical Report

February 2023

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
2018 CE	2018 Categorical Exclusion for the I-205 Improvements Project
AADT	average annual daily traffic
API	area of potential impact
CAA	Clean Air Act
CE	Categorical Exclusion
C.F.R.	Code of Federal Regulations
DEQ	Oregon Department of Environmental Quality
diesel PM	diesel particulate matter
FAQ	frequently asked questions
FHWA	Federal Highway Administration
FY	Fiscal Year
HEI	Health Effects Institute
I-205	Interstate 205
I-205 Improvements Project	I-205: Stafford Road to OR 213 Improvements Project
link	roadway segment
MOVES	Motor Vehicle Emission Simulator
MP	mile post
MSAT	mobile source air toxic
NAAQS	National Ambient Air Quality Standards
O_3	ozone
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
OR	Oregon Route
Phase 1A	I-205: Phase 1A Project
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
Project	Variable rate tolls on the Abernethy and Tualatin River Bridges and the toll-funded I-205 improvements between Stafford Road and OR 213
SIP	State Implementation Plan
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
WRCC	Western Regional Climate Center

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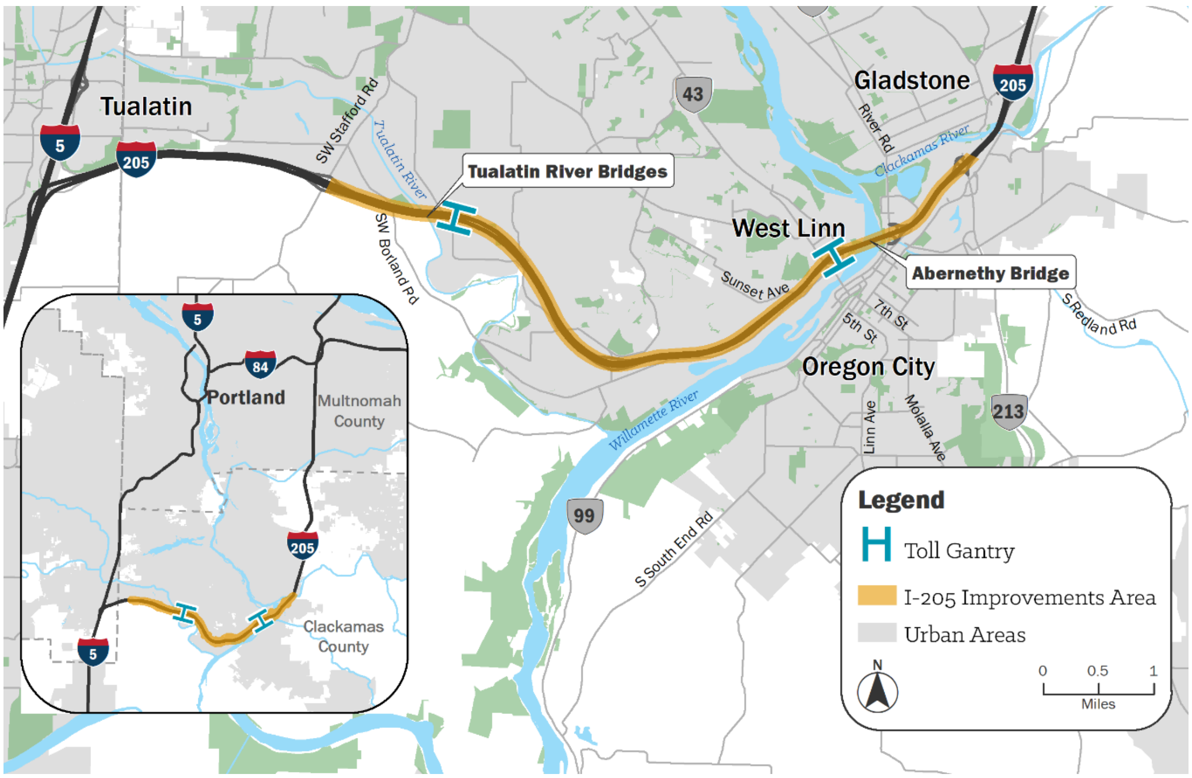
1 Introduction

This technical report supports the I-205 Toll Project Environmental Assessment developed by the Oregon Department of Transportation (ODOT) in partnership with the Federal Highway Administration (FHWA). ODOT proposes to use variable-rate tolls[1] on the Interstate 205 (I-205) Abernethy Bridge and Tualatin River Bridges to raise revenue for construction of planned improvements to I-205 from Stafford Road to Oregon Route (OR) 213, including seismic upgrades and widening, and to manage congestion. The Environmental Assessment evaluates the effects of variable rate tolls and the toll-funded I-205 improvements (together, the "Project") on the human and natural environment in accordance with the National Environmental Policy Act (NEPA). The Project area is illustrated in Figure 1-1.

Figure 1-1. Project Area



This technical report describes the existing air quality conditions, discusses impacts and benefits the Project would have on those conditions, and identifies measures to avoid, minimize, and/or mitigate adverse effects.

[1] Variable-rate tolls are fees charged to use a road or bridge that vary based on time of day and that can be used as a strategy to shift demand to less congested times of day.

2 Project Alternatives

ODOT evaluated two alternatives in the I-205 Toll Project Environmental Assessment and this technical report:

- No Build Alternative
- Build Alternative

Section 2.1 describes the previous environmental review that led up to the Environmental Assessment and associated technical analyses, and Sections 2.2 and 2.3 describe the alternatives in more detail.

2.1 Project Background and Environmental Review

Oregon House Bill 2017 identified improvements on I-205 as a priority project, known as the I-205: Stafford Road to OR 213 Improvements Project (I-205 Improvements Project). The purpose of the improvements was reducing congestion; improving mobility, travel time reliability, and safety; and providing seismic resiliency for I-205 to function effectively as a statewide north-south lifeline route after a major earthquake by widening I-205 and seismically upgrading or replacing 13 bridges. In 2018, ODOT and FHWA determined that, with respect to FHWA regulations implementing NEPA, the I-205 Improvements Project qualified as a categorical exclusion (CE) (Code of Federal Regulations [CFR] 23 771.117[d][13]). In December 2018, FHWA signed a CE Closeout Document (2018 CE) for the I-205 Improvements Project, which demonstrated that it would not involve significant environmental impacts. At that time, the potential locations for tolling on I-205 had not been determined, and tolling of I-205 was not included in any adopted long-term transportation plan;[2] therefore, tolling was not considered part of the I-205 Improvements Project nor analyzed in the 2018 CE.

After FHWA approved the 2018 CE, ODOT advanced elements of the I-205 Improvements Project as multiple phased construction packages; however, efforts to secure construction funding for the entirety of the project were unsuccessful. In 2021, Oregon House Bill 3055 provided financing options that allowed the first phase of the I-205 Improvements Project to be constructed without toll revenue[3]. This first phase, referred to as the I-205: Phase 1A Project (Phase 1A), includes reconstruction of the Abernethy Bridge with added auxiliary lanes and improvements to the adjacent interchanges at OR 43 and OR 99E. ODOT determined that toll revenue would be needed to complete the remaining construction phases of the I-205 Improvements Project as described in the 2018 CE (i.e. those not included in Phase 1A).

In May 2022, FHWA and ODOT reduced the scope of the project to include only Phase 1A and completed a NEPA re-evaluation that reduced the scope of the 2018 CE decision for the scaled back project (ODOT 2022a). Construction of Phase 1A began in summer 2022 and is estimated to be complete in 2025. The toll-funded improvements were removed from the I-205 Improvements Project and accompanying 2018 CE decision and are now included in the I-205 Toll Project. The environmental

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[2] Federal regulations require that transportation projects be formally included in state and/or regional long-term transportation plans before they receive NEPA approvals.

[3] If tolling is approved upon completion of environmental review of the I-205 Toll Project, tolls could be used to pay back loans for Phase 1A.

effects of the toll-funded improvements are analyzed in the Environmental Assessment and associated technical analyses.

2.2 No Build Alternative

NEPA regulations require an evaluation of a No Build Alternative to provide a baseline to compare with the potential effects of a Build Alternative. The No Build Alternative consists of existing transportation infrastructure and any planned improvements that would occur regardless of the Project. The No Build Alternative includes the I-205: Phase 1A Project (reconstruction of the Abernethy Bridge with added auxiliary lanes and improvements to the adjacent interchanges at OR 43 and OR 99E) as a previously approved project that would be constructed by 2025. Under the No Build Alternative, tolling would not be implemented and the toll-funded widening and seismic improvements on I-205 between Stafford Road and OR 213 would not be constructed.

2.3 Build Alternative

Under the Build Alternative, drivers of vehicles on I-205 would be assessed a toll for crossing the Abernethy Bridge (between OR 43 and OR 99E) and for crossing the Tualatin River Bridges (between Stafford Road and 10th Street). The Build Alternative includes construction of a third through lane in each direction of I-205 between the Stafford Road interchange and the OR 43 interchange, a northbound auxiliary lane between OR 99E and OR 213, toll gantries and supporting infrastructure, as well as replacement of or seismic upgrades to multiple bridges along I-205 (shown schematically in Figure 2-1).

The following sections provide a more detailed description of the Build Alternative.

2.3.1 Bridge Tolls – Abernethy and Tualatin River Bridges

Two toll gantry areas have been identified for placement of the toll gantries and supporting infrastructure, as shown in Figure 2-2. The gantries and supporting infrastructure would be located entirely within the existing I-205 right-of-way.

Figure 2-1. Schematic Diagrams of No Build and Build Alternatives

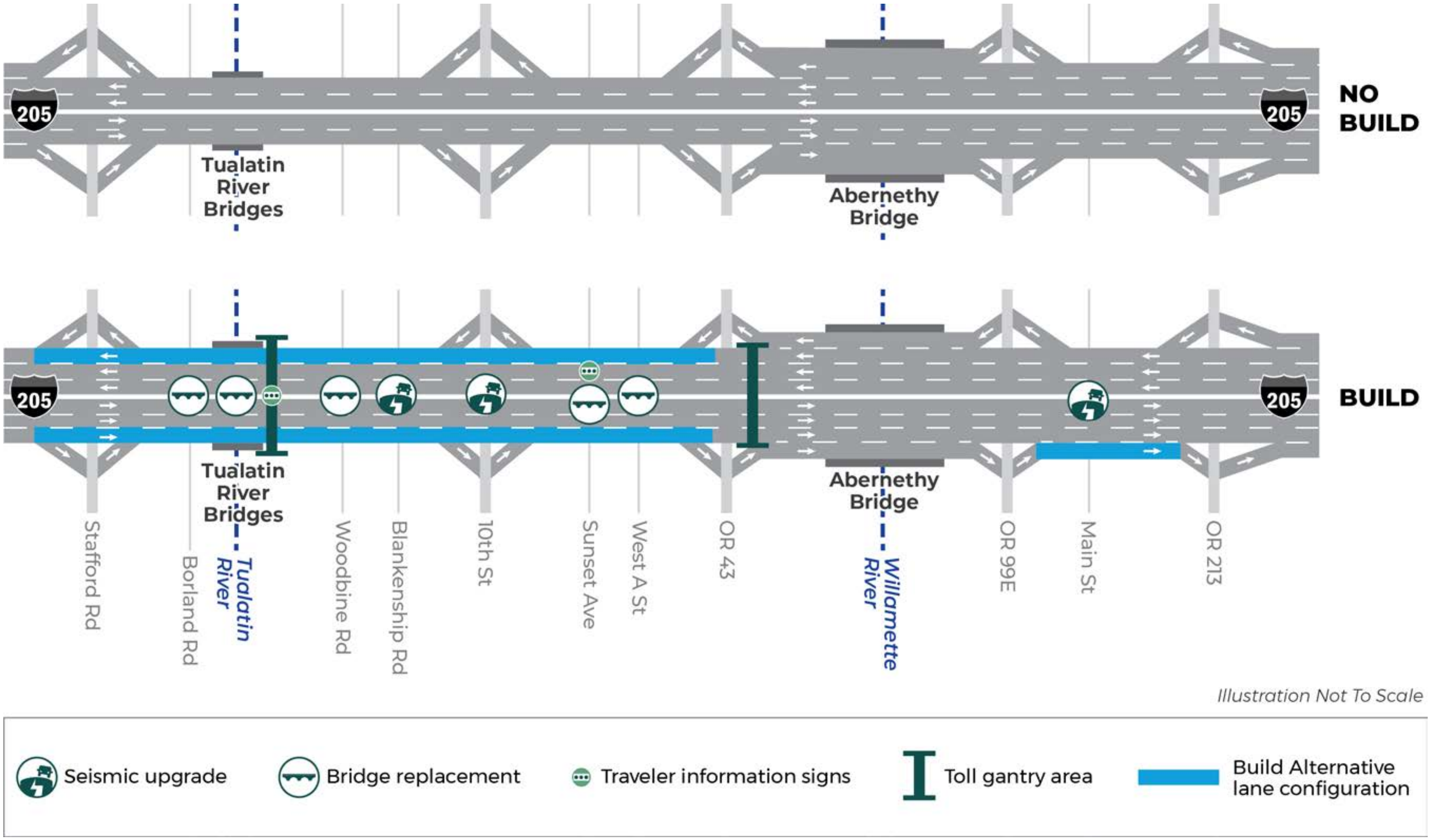
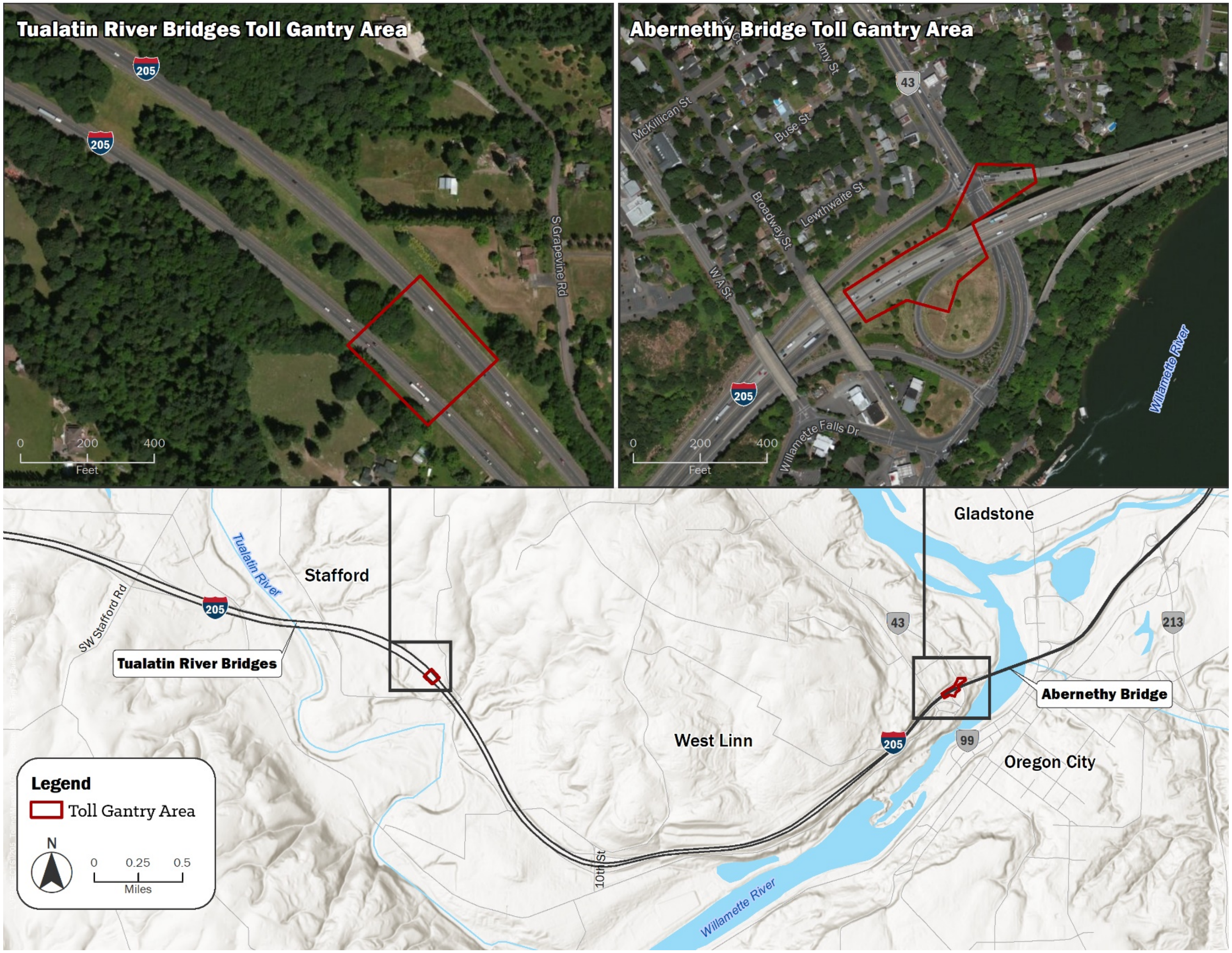


Figure 2-2. Build Alternative: Bridge Tolls – Abernethy Bridge and Tualatin River Bridges



Tolling Technology

Under the Build Alternative, tolling would consist of an all-electronic system that would automatically collect tolls from vehicles traveling on the highway, as shown in Figure 2-3. There would be no toll booths requiring drivers to stop. Rather, antennae, cameras, lights, and other sensors would be mounted on the toll gantries spanning the roadway and would either (1) read a driver's toll account transponder (a small sticker placed on the windshield), or (2) capture a picture of a vehicle's license plate and send an invoice to the registered owner of the vehicle.

Figure 2-3. Electronic Toll System

How electronic tolling works. An all-electronic system would automatically collect tolls from vehicles traveling on the highway. A transponder (a small sticker placed on the windshield) is read and connected to a prepaid account. If a vehicle doesn't have a transponder, a camera captures the car's license plate, and the registered owner is billed. This keeps traffic flowing without stopping to pay tolls.

Tolling Infrastructure

Toll gantries would consist of vertical columns on the outside of the travel lanes and a horizontal structure that would span the travel lanes to which the electronic tolling equipment would be attached. Toll gantries would be constructed of a metal framework with metal or concrete support structures. Gantries and supporting infrastructure would be designed to ensure consistency with other improvements to I-205 included in the Project. The final structure type and design would be determined during the preliminary design of the gantries and would be based on cost, aesthetics, and ease of construction. The toll gantry areas would include paved parking for service vehicles, which would typically be protected by a safety barrier or guard rail.

The toll gantry areas would include paved parking for service vehicles, which would typically be protected by a safety barrier or guard rail. In addition, it is assumed that the toll gantry structures would include catwalks to provide maintenance access to the structures without having to close travel lanes.

In addition to the toll technology mounted overhead on the gantries themselves, the gantries would require some additional toll system equipment for data processing, storage, and network operations. This equipment is generally enclosed within a small, access-controlled concrete structure, from which connections to existing ODOT data fiber and commercial power would be routed. ODOT currently operates a fiber data network with a 48-strand fiber-optic cable along the north side of I-205, to which the toll system equipment would be connected. A backup generator (typically fueled by diesel or natural gas) would be provided so the toll equipment would function during power outages. No relocation of existing utilities to accommodate construction of the gantries or any supporting infrastructure is expected.

The Abernethy Bridge toll gantry area would include three toll gantries: a mainline gantry structure that spans all highway lanes, and gantries over the northbound on-ramp and the southbound off-ramp. Each toll gantry would include a single gantry structure. The on-ramp and off-ramp gantries would likely be cantilevered structures. The Tualatin River Bridges toll gantry area would include two toll gantries: one over the mainline northbound travel lanes and one over the mainline southbound travel lanes. Each toll gantry would include a single gantry structure.

Toll Implementation

As Oregon's toll authority, the Oregon Transportation Commission will set toll rates, policies (including discounts and exemptions), and price escalation. If tolling is approved, the Oregon Transportation Commission would ultimately set toll rates at levels sufficient to meet all financial commitments, fund Project construction and maintenance, and manage congestion. The Oregon Transportation Commission is expected to finalize toll rates in 2024. ODOT could begin tolling as early as December 2024, before the completion of construction of Project improvements to I-205 under the Build Alternative.

Toll Rate Assumptions

Toll rates have not been determined and will be set by the Oregon Transportation Commission if tolling is approved. For environmental analysis and financial planning purposes, a baseline weekday variable-rate toll schedule was identified that balances the objectives of revenue generation sufficient to meet the funding target for capital construction of the I-205 improvements, and alleviating congestion on I-205 during peak travel times. The identified toll rates would provide a sustainable source of revenue for ongoing corridor operations and maintenance and for periodic repair and replacement costs. For environmental analysis and financial planning purposes, the identified baseline toll rate schedule for the year of opening varies as follows:

- During off-peak hours, toll rates are assumed to be lowest, ranging from $0.55 overnight (from 11 p.m. to 5 a.m.) to $0.65 in the midday and evening (from 10 a.m. to 1 p.m. and 8 p.m. to 11 p.m.) to cross a single bridge.
- During peak hours (6 a.m. to 9 a.m. and 3 p.m. to 7 p.m.), toll rates are assumed to be highest during peak hours, varying from $1.65 to $2.20 to cross a single bridge depending on which weekday peak hour.
- During the shoulder period hours just before and after the peak periods (5 a.m. to 6 a.m., 9 a.m. to 10 a.m., 1 p.m. to 3 p.m., 7 p.m. to 8 p.m.), toll rates are assumed to be $1.00 to cross a single bridge.

These assumed rates would apply to each bridge crossing. The rates for a through trip (i.e., crossing both the Abernethy and Tualatin River bridges) would be double the assumed toll rate for only crossing one bridge. The assumed toll rates are provided in state fiscal year (FY) 2025 dollars, indicative of the year of opening, and are assumed to escalate annually with general price inflation, conservatively assumed to be 2.15% per year.

A recent financial analysis confirmed that under the assumed baseline toll rates, there would be sufficient net toll revenues to leverage bonds that would meet the toll funding contribution target for construction of the planned I-205 improvements (ODOT 2022b).

2.3.2 Improvements to I-205

Under the Build Alternative, a 7-mile portion of I-205 would be widened between Stafford Road and OR 213, with added through lanes between Stafford Road and OR 43, and a northbound auxiliary lane from OR 99E to OR 213. Eight bridges between Stafford Road and OR 213 would be replaced or reconstructed to withstand a major seismic event. New drainage facilities would be installed in both directions of I-205.

Bridge Reconstructions and Replacements

The following bridges would be reconstructed with foundation improvements and substructure upgrades for seismic resiliency but would not be replaced:

- Northbound I-205 bridge over Blankenship Road – Mile Post (MP) 5.84
- Southbound I-205 bridge over Blankenship Road – MP 5.90

- Northbound I-205 bridge over 10th Street (West Linn) – MP 6.40
- Southbound I-205 bridge over 10th Street (West Linn) – MP 6.42
- I-205 bridge over Main Street (Oregon City) – MP 9.51

The following bridges would be replaced to meet seismic design standards and to facilitate the widening of I-205:

- Northbound I-205 bridge over SW Borland Road – MP 3.82
- Southbound I-205 bridge over SW Borland Road – MP 3.81
- Northbound I-205 bridge over the Tualatin River – MP 4.1
- Southbound I-205 bridge over the Tualatin River – MP 4.08
- Northbound I-205 bridge over Woodbine Road – MP 5.14
- Southbound I-205 bridge over Woodbine Road – MP 5.19
- Sunset Avenue (West Linn) bridge over I-205 – MP 8.28
- West A Street (West Linn) bridge over I-205 – MP 8.64

The I-205 bridges over 10th Street and Blankenship Road would be widened and raised to meet the proposed new highway grade. The I-205 bridges over the Tualatin River and SW Borland Road would be replaced on a new alignment between the existing northbound and southbound directions to accommodate construction. The I-205 bridges over Woodbine Road would be replaced on the existing alignment and raised to meet the proposed new highway grade. The Broadway Street Bridge over I-205 would be removed to enhance the function of the OR 43 interchange.

2.3.3 Construction

Construction of the Build Alternative is expected to last approximately 4 years, beginning in late 2023 with construction of toll gantries and toll-related infrastructure and continuing from 2024 through 2027 with construction of I-205 widening and seismic improvements. Most toll-related construction would be conducted alongside I-205 within the existing right-of-way. For highway widening, it is anticipated that construction would be sequenced to widen one direction of I-205 at a time, enabling traffic to be moved to a temporary alignment while the remaining widening work is completed. Construction activities would include adding temporary crossover lanes to enable access to the temporary traffic configurations during roadway widening. Staging areas for construction equipment and supplies for the Build Alternative would be located primarily in the median of I-205 in ODOT right-of-way.

3 Regulatory Framework

3.1 Criteria Pollutants

Under the Clean Air Act (CAA), the U.S. Environmental Protection Agency (USEPA) has established the National Ambient Air Quality Standards (NAAQS), which specify maximum concentrations for carbon monoxide, particulate matter less than 10 microns in size (PM_{10}), particulate matter less than 2.5 microns in size ($PM_{2.5}$), ozone, sulfur dioxide, lead, and nitrogen dioxide. These pollutants are referred to as criteria pollutants. The CAA requires periodic review of the science upon which the standards are based and the standards themselves. The standards were most recently revised in 2015. Table 3-1 provides the current NAAQS.

Section 107 of the CAA Amendments of 1977 requires that the USEPA publish a list of all geographic areas in compliance with the NAAQS, plus those not attaining the NAAQS. Areas not in NAAQS compliance are deemed nonattainment areas. Areas that have insufficient data to make a determination are deemed unclassified and are treated as being attainment areas until proven otherwise. Maintenance areas are areas that were previously designated as nonattainment for a particular pollutant but have since demonstrated compliance with the NAAQS for that pollutant. An area's designation is based on the data collected by the state monitoring network on a pollutant-by-pollutant basis. Under the CAA Amendments of 1990, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the State Implementation Plan (SIP). The SIP provides a plan for the implementation, maintenance, and enforcement of the NAAQS. Highway projects in attainment areas are considered to be in conformity with the CAA and are not required to perform detailed analysis to demonstrate compliance with the NAAQS.

3.2 Mobile Source Air Toxics

In addition to the criteria pollutants for which there are NAAQS, the USEPA also regulates air toxics. Toxic air pollutants are those pollutants known or suspected to cause cancer or other serious health effects. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Table 3-1. National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon monoxide		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead		Primary and secondary	Rolling 3-month average	0.15 $\mu g/m^3$ [1]	Not to be exceeded
Nitrogen dioxide		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and secondary	Annual	53 ppb[2]	Annual mean
Ozone		Primary and secondary	8 hours	0.070 ppm[3]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate matter	$PM_{2.5}$	Primary	Annual	12 $\mu g/m^3$	Annual mean, averaged over 3 years
		Secondary	Annual	15 $\mu g/m^3$	Annual mean, averaged over 3 years
		Primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	Primary and secondary	24 hours	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide		Primary	1 hour	75 ppb[4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA Office of Air and Radiation, https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed May 22, 2019)

[1] Final rule signed October 15, 2008. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 year, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[2] The official level of the annual nitrogen dioxide standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

[3] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards additionally remain in effect in some areas. Revocation of the previous (2008) ozone standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

[4] The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: 1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and 2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous sulfur dioxide standards (40 C.F.R. 50.4(3)). A SIP call is a USEPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

$\mu g/m^3$ = microgram per cubic meter; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$= particulate matter less than 2.5 microns in diameter; ppb = parts per billion; ppm = parts per million; SIP = State Implementation Plan

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule—Control of Hazardous Air Pollutants from Mobile Sources (72 Federal Register 8427, February 26, 2007)—and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (http://www.epa.gov/iris/). In addition, the USEPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 2011 National Air Toxics Assessment (https://www.epa.gov/national-air-toxics-assessment). These are

1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority Mobile Source Air Toxics (MSAT), the list is subject to change and may be adjusted in consideration of future USEPA rules.

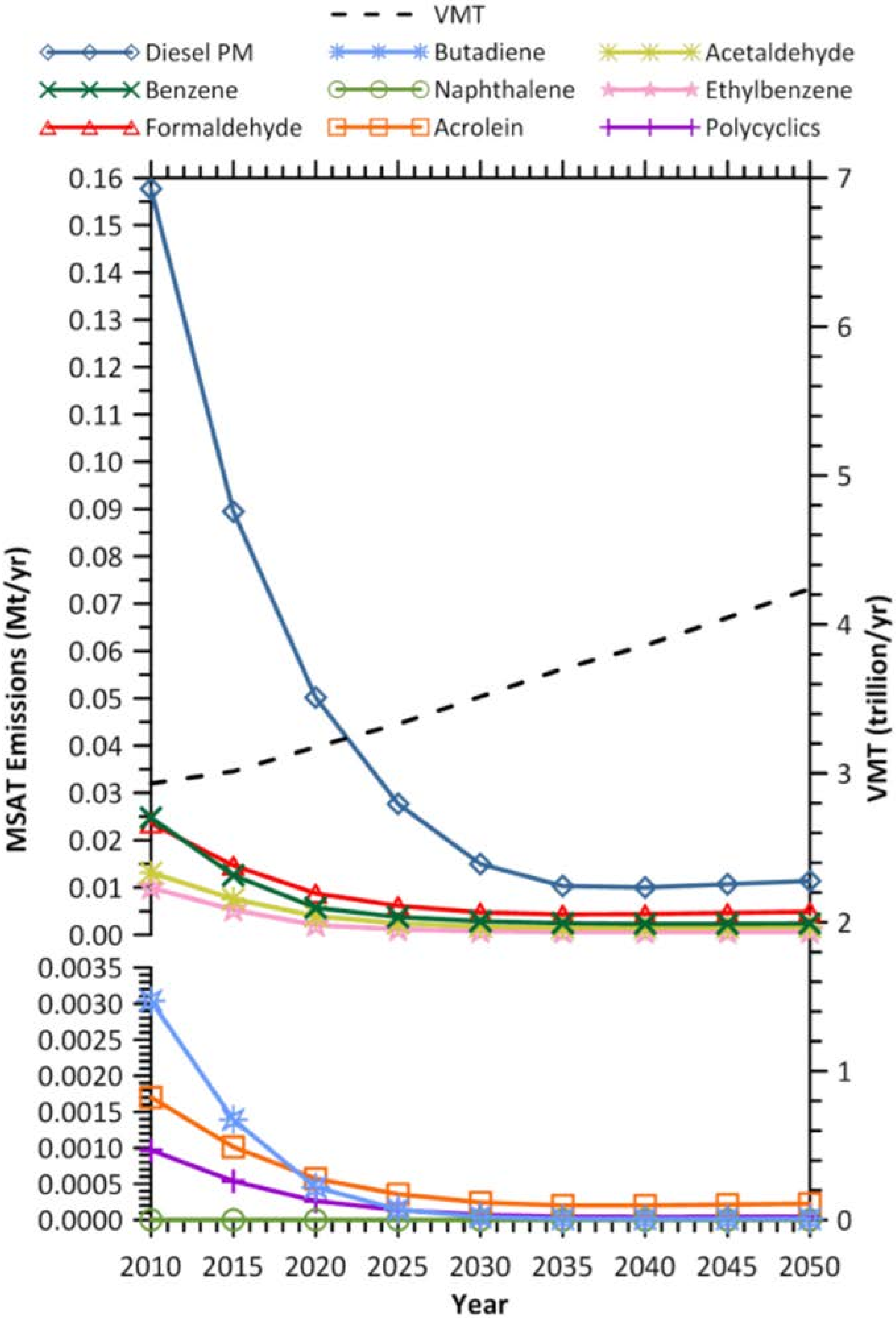
The 2007 USEPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Using USEPA's MOVES2014a model, as shown in Figure 3-1, FHWA estimates that even if vehicle miles traveled (VMT) increases by 45% from 2010 to 2050 as forecast, a combined reduction of 91% in the total annual emissions for the priority MSAT is projected for the same time period.

3.3 Oregon State Air Toxics Benchmarks

The Oregon Department of Environmental Quality (DEQ) has developed ambient benchmark concentrations for air toxics. DEQ benchmarks are not standards but are used as goals for evaluation and planning. Historically, the toxic benchmarks were set at the level representing the concentration at which an individual has a one in a million chance of developing cancer if exposed over a lifetime. The ambient benchmark concentrations for the 52 air toxics of concern in Oregon were last modified in 2019 and can be accessed on DEQ's website (Department of Environmental Quality: Oregon Air Toxics Benchmarks: Air Toxics: State of Oregon). Oregon's Air Toxics Benchmark Rules (Oregon Administrative Rule [OAR] 340-246-0090) direct DEQ to review all ambient benchmarks at least every five years.

DEQ uses the benchmarks to provide consistent health-based goals as the agency develops strategies to reduce air toxics. The benchmarks are based on concentration levels that protect the health of the state's most sensitive individuals.

Figure 3-1. National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways Using USEPA's MOVES2014a Model



Source: The Federal Highway Administration conducted USEPA MOVES2014a model runs in September 2016.

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle miles traveled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

4 Methodology

This section describes the methods used in the I-205 Toll Project Environmental Assessment analysis to evaluate air quality impacts from the Project.

4.1 Area of Potential Impact

Figure 4-1 shows the Area of Potential Impact (API) used to evaluate air quality impacts. The air quality API encompasses the roadway segments (links) that could experience changes in congestion (e.g., traffic volumes and speed) due to the Project. Toll projects have the potential to affect vehicle trips at great distances from the tolled facility because travelers may choose different routes or times of day for their vehicle trips. Analyzing a metropolitan area's entire roadway network would result in emissions estimates for many roadway links not affected by the Project, diluting the results of the analysis, and not allowing for a meaningful comparison between alternatives. The air quality analysis was limited to areas expected to experience a meaningful change in MSAT emissions based on recommendations outlined in the FHWA's *Frequently Asked Questions (FAQ) Conducting Quantitative MSAT Analysis for FHWA NEPA Documents* (referred to herein as FHWA FAQ) (FHWA 2016a).

This guidance defines a meaningful change in emissions as approximately plus or minus 10% between the future No Build Alternative and Build Alternative, and it includes recommended metrics to define the affected network and emphasizes using Project-specific knowledge and consideration of local circumstances. The air quality API was determined using link-level traffic data to compare the change in volumes on each link (roadway segment) between the 2045 No Build Alternative and the 2045 Build Alternative. The API was determined by first identifying roadway links associated with the Project plus roadway links that have a change in annual average daily traffic (AADT) of plus or minus 5% or more.

The resulting set of links was further refined based on Project-specific knowledge and circumstances. FHWA guidance acknowledges that it is possible that low-volume links far removed from the Project footprint may appear to show to change in traffic volumes that can be attributed to a modeling artifact (FHWA 2016a). To focus on the API on roadways that are expected to capture a meaningful impact on emissions, census tract boundaries were used to develop the API boundary. To the south of the Project area, census tracts were removed that were rural, had relatively lower traffic volumes, and were not part of a connected network. To the north of the Project area, census tracts were removed that were associated with the downtown Portland area because the modeled changes in traffic are not attributed to the Project, and the high traffic volumes would dilute the analysis results.

Figure 4-1. Air Quality Area of Potential Impact

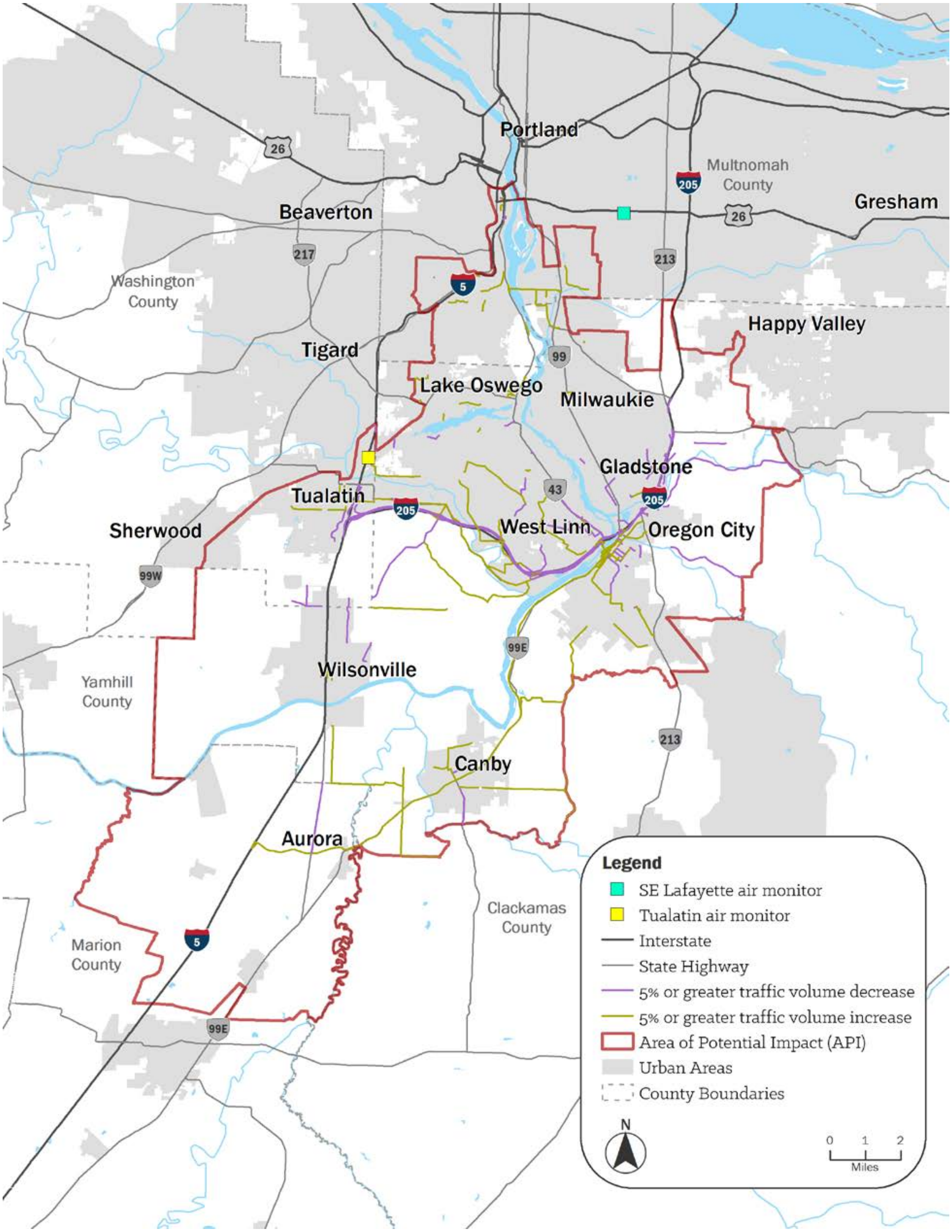
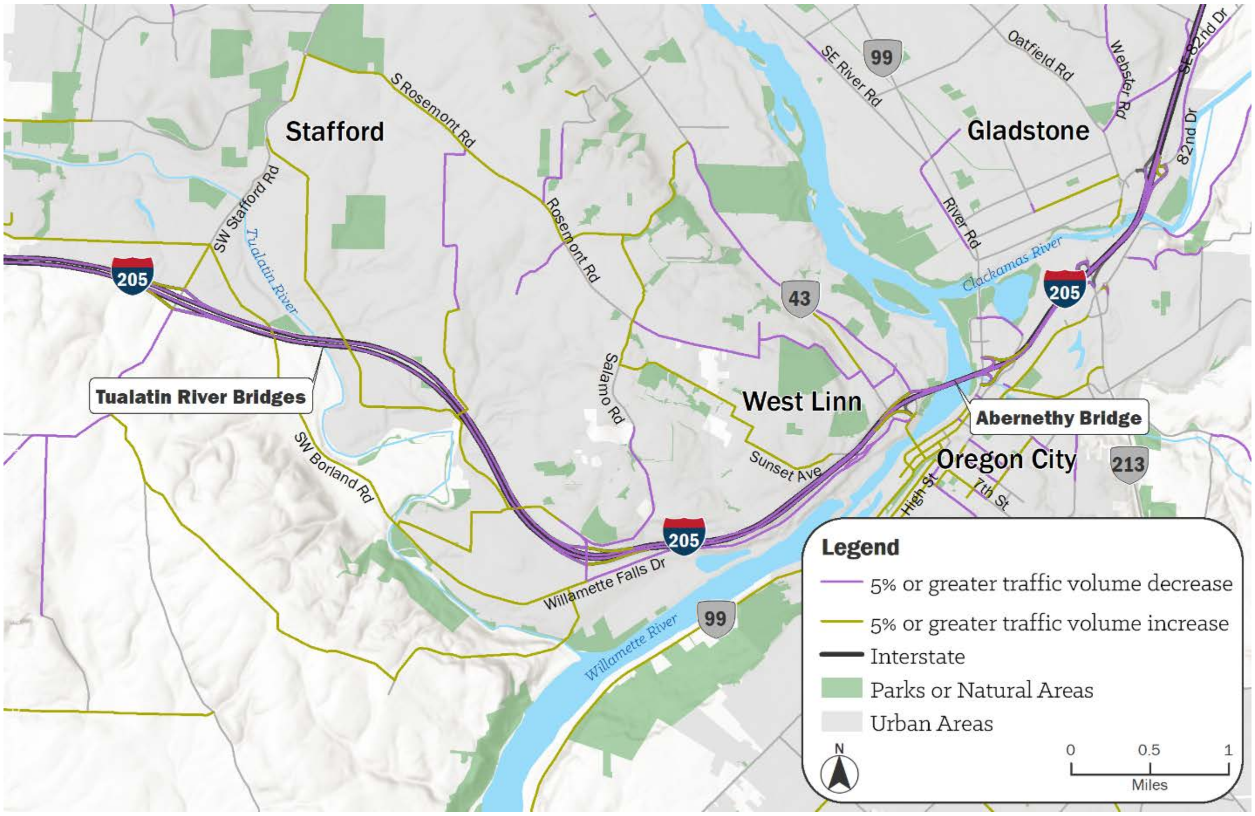


Figure 4-1 shows the API boundary, including the segments with a predicted change in AADT that were used to determine the affected network. All roadway links were considered, but only the highlighted links within the boundary were included in emissions calculations. Figure 4-2 provides a closer look at the Project study area to more clearly show individual roadway links adjacent to the study area that met or did not meet the criteria described above. Emissions from the identified roadway segments would be generated within the defined area, and pollutants would then disperse into the atmosphere where no boundary can be defined for the indirect impacts on air quality.

Figure 4-2. Roadway Links Adjacent to the Study Area



4.2 Describing the Affected Environment

4.2.1 Published Sources and Databases

Data used in the 2018 Documented Categorical Exclusion prepared for the I-205 Improvements Project was reviewed to confirm its relevancy and applicability to this study. The following is a list of the data that was used to determine and describe air quality resources/existing conditions:

- Metro regional travel demand model output
- DEQ air pollutant monitor data
- MSAT emissions trends presented in FHWA's Interim Guidance
- Metro MOtor Vehicle Emission Simulator (MOVES) input files
- DEQ MOVES input files

4.2.2 Contacts and Coordination

Air quality modeling files were requested from Metro. Metro develops MOVES input files for regional emissions analyses, and these files were supplemented with Project-specific data to complete the air quality analysis. Regional inputs were reviewed with DEQ to verify that the data was appropriate for use with the current version of MOVES. The Project data was provided by the traffic analysis team using output from the regional travel demand model that captures volume and speed changes due to the Project alternatives, described in detail in the *Transportation Technical Report*.

4.3 Effect Assessment Methods

4.3.1 Short-Term Direct Effect Assessment Methods

The analysis of direct short-term air quality effects that would occur during Project construction consists of a qualitative discussion of typical sources of pollutant emissions from the types of construction activities needed to implement the Project.

4.3.2 Long-Term Direct Effect Assessment Methods

The API is in an area designated by USEPA as in attainment for all NAAQS and therefore did not require a detailed Project-level conformity analysis to demonstrate that there would be no exceedance of the NAAQS for criteria pollutants.[4] Section 5.2 presents a summary of concentration levels at nearby pollutant monitoring sites.

The analysis includes an evaluation of projected MSAT emissions from the Build Alternative as compared to the projected emissions from the No Build Alternative in both the interim year (2027) and design year (2045).

FHWA's Interim Guidance provides an approach to analyze MSAT effects in the NEPA environmental review process for highways. The guidance also provides a recommendation for the level of analysis based on the following tier categories:

- Tier 1 – No analysis for projects without potential for meaningful MSAT effects
- Tier 2 – Qualitative analysis for projects with low potential MSAT effects
- Tier 3 – Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

Based on FHWA's recommended tiering approach, to fall into Tier 3 a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or

[4] At the request of ODOT and FHWA, analysts prepared a separate memorandum, the *I-205 Toll Project Criteria Pollutant Emissions Memorandum*, to better understand criteria pollutant emissions related to the Project.

- Create new capacity or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year; and
- Be proposed to be located in proximity to populated areas.

While the Project does not create or alter a major intermodal freight facility, and it does not create or add significant capacity to the interstate, a quantitative MSAT analysis was conducted to evaluate the Project impacts. Traffic volumes on I-205 are projected to exceed 140,000 vehicles per day (over 160,000 AADT on portions of I-205) in the design year (2045), the application of tolls has the potential to shift traffic volume from I-205 onto local roadways (diversion effects), and the Project is located near populated areas. Of particular concern for the Project is the potential to increase pollutant emissions by shifting vehicles from the highway onto local roadways with lower travel speeds and more intersections. Therefore, a quantitative analysis was performed to evaluate the changes in MSAT emissions with the Build Alternative as compared to the No Build Alternative. The quantitative analysis is consistent with the FHWA FAQ (FHWA 2016a). The result of the quantitative analysis is a set of total annual emissions of each MSAT pollutant (1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter) for the No Build Alternative and Build Alternative in each analysis year.

MSAT Study Area

The MSAT study area consists of all roadway links within the API that were determined to have the potential for meaningful changes in MSAT emissions. As described in the API section, this study area includes all segments associated with the Project, plus those segments with a change of plus or minus 5% or more in AADT. The same network of links was used for the No Build Alternative and Build Alternative and analysis years for a consistent comparison of impacts. The MSAT analysis was conducted for existing (2015) conditions and the No Build Alternative and Build Alternative for the Project's design year (2045) and an interim year (2027).

The MSAT emissions were used to evaluate the potential changes in air pollutant emissions due to the Project within the API. There may be localized areas where pollutant emissions are higher or lower under the Build Alternative than the No Build Alternative, but the emissions presented are expressed as a regional value applicable to the entire API. The *I-205 Toll Project Environmental Justice Technical Report* indicates that a majority of API residents identify as White alone, 9.7% identify as a racial minority, and 20% of residents are experiencing low-income. There are also sensitive land uses throughout the API, including schools, parks, and residential areas. The location and quantity of any potential differences in air pollutant concentrations were not calculated as part of this analysis.

Model Inputs and Options

USEPA's MOVES model version MOVES3.0.2 was used to estimate MSAT emissions from the roadway links within the API. MOVES is the USEPA's state-of-the-art tool for estimating emissions from highway vehicles. The model is based on analyses of millions of emission test results and considerable advances in USEPA's understanding of vehicle emissions. Compared to previous versions, MOVES3.0.2 incorporates the latest emissions data, applies more sophisticated calculation algorithms, accounts for new regulations including the Heavy-Duty Greenhouse Gas Phase 2 rule and the Safer Affordable Fuel Efficient Vehicles Rule, and provides an improved user interface. Table 4-1 summarizes the MOVES run specifications as recommended in the FHWA FAQ (FHWA 2016a).

Table 4-1. MOVES Run Specifications Options

MOVES Tab	Model Selections
Scale	• County Scale • Inventory Calculation Type
Time Span	• Hourly time aggregation including all months, days, and hours • Analysis years 2015, 2027, and 2045
Geographic Bounds	• Multnomah County was used to represent the region, consistent with Metro's regional emissions model
Vehicles/Equipment	• All on-road vehicle and fuel type combinations
Road Type	• Rural restricted, rural unrestricted, urban restricted, and urban unrestricted
Pollutants and Processes	• FHWA's nine priority MSAT pollutants (*1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter)* were selected, as well as any precursor pollutants needed to make the calculations. • Diesel particulate matter was represented by Primary Exhaust PM_{10}. • Processes included running exhaust, crankcase running exhaust, evaporative permeation, and evaporative fuel leaks.
Manage Input Data Sets	• Database provided by Metro were imported to account for adoption of California's Low Emission Vehicle program as well as participation in the Multi-State Zero Emission Vehicle Action Plan.
Output	• Output was in an annual and daily inventory of pollutant emissions by roadway type and vehicle type.

FHWA = Federal Highway Administration; MSAT = Mobile Source Air Toxic; MOVES = Metro Motor Vehicle Emission Simulator; PM_{10} = particulate matter less than 10 microns in diameter

MOVES input files were developed using data provided by DEQ, output from the traffic analysis, and USEPA defaults. MOVES model runs combined data representing regional conditions and Project-specific data characterizing the differences in traffic volumes and speeds. Table 4-2 summarizes specific inputs and their sources.

Table 4-2. MOVES County Data Manager Inputs

County Data Manager Tab	Data Source
Source Type Population	Oregon Department of Environmental Quality and MOVES defaults
Age Distribution	Oregon Department of Environmental Quality and MOVES defaults
Fuel	Oregon Department of Environmental Quality and MOVES defaults
Inspection/Maintenance Programs	Oregon Department of Environmental Quality
Meteorological Data	MOVES county defaults
Road Type Distribution	Created from Project data
Average Speed Distribution	Created from Project data
Vehicle Type VMT	Created from Project data

MOVES = Metro Motor Vehicle Emission Simulator; VMT = vehicle miles traveled

Although the API spans multiple counties, MOVES was run at the county scale using Multnomah County to represent the entire API, consistent with Metro's approach to regional emissions modeling. DEQ input files were modified for the Project analysis as follows:

- Source Type Population: DEQ provided the population of passenger cars, light passenger trucks, and light commercial trucks for analysis year 2019. The population of the remaining vehicle types was estimated using the ratio of MOVES default population to VMT by source type. The same population data was used for each analysis year because MOVES uses only the relative distribution in calculations for running emissions, and the absolute population was not needed.

- Age Distribution: DEQ provided the age distribution of passenger cars, light passenger trucks, and light commercial trucks for analysis year 2019. MOVES national default age distributions were used for the remaining vehicle types. This data was used with the Age Distribution Project Tool for MOVES3 to develop the age distribution for the analysis years. This tool uses data from the Energy Information Administration to estimate future fleet turnover.

- Fuel: MOVES defaults for Multnomah County were used for fuel supply, fuel usage fraction, and fuel type and technology allocations. Default fuel formulation data was adjusted as recommended by DEQ to reflect the local biodiesel formulation details. The USEPA does not provide MOVES defaults for electric vehicle use, and conservatively assumes that no electric vehicles are in the fleet. In the absence of a methodology to predict the future electric vehicle market share, no electric vehicles were considered in this emissions analysis.

- Inspection/Maintenance Programs: DEQ prepared MOVES input files characterizing required vehicle inspection/maintenance programs in the metropolitan area for analysis year 2019. These files were modified for analysis years 2027 and 2045 by adjusting the ending model years as recommended by the USEPA to assume the programs would remain in place with consistent grace periods and exemptions based on vehicle age.

- Meteorological Data: MOVES defaults for Multnomah County were used for the temperature and humidity profiles.

Link-by-link traffic data developed as part of the traffic analysis was used to create input files to demonstrate the effects of the Project for each scenario analyzed:

- Existing (2015)
- No Build Alternative and Build Alternative (2027)
- No Build Alternative and Build Alternative (2045)

The link-by-link traffic data indicated the link length and roadway type, and it included volume and average modeled speed data for every hour of an average weekday. These average weekday values were applied to all days throughout the analysis year. Volumes were provided by vehicle type and accounted for expected changes to the vehicle mix in the future with or without the Project. The data was processed for use in MOVES using the following assumptions:

- Road Type Distribution: The roadway types (also called functional class) included in the regional travel demand model were mapped to the four MOVES roadway types: rural restricted, rural unrestricted, urban restricted, and urban unrestricted. The off-network road type was not used for this analysis.

- Average Speed Distribution: The link-level traffic data was provided for each hour of an average weekday. Speeds were mapped to respective MOVES 5-mile-per-hour speed bins. In the absence of weekend speed estimates, the average weekday speed profile was applied to all days in the analysis year.

- Vehicle Type VMT: VMT from each hour was added to develop a daily VMT value for each scenario modeled. Three vehicle types provided the link-level volume data: passenger vehicle, medium truck, and heavy truck. The VMT from these three types were allocated to the 13 MOVES source types using MOVES county defaults to determine the distribution of each vehicle type. For example, the passenger vehicle VMT was divided among the appropriate MOVES source types (i.e., motorcycles, passenger cars, passenger trucks) using the percentages in the MOVES default VMT for Multnomah County.

4.3.3 Indirect Effect Assessment Methods

The air quality analysis evaluates impacts on I-205 as well as traffic rerouted onto local roadways. There would be no other indirect air quality effects from the Project.

4.3.4 Cumulative Impacts Assessment Methods

The air quality analysis considers the long-term cumulative impacts on air pollutant emissions from all traffic forecasted in the API, given future population and employment growth, future transportation projects, and expected changes in land use.

4.4 Mitigation Approach

As Section 6 demonstrates, the Project would not cause higher air pollutant emissions than the No Build Alternative; therefore, no mitigation for Project operations is proposed. Section 7 provides a description of the following requirements that would minimize short-term impacts on air quality from construction:

- OAR 340
- ODOT Standard Specifications Section 290
- Clean Air Construction Program

5 Affected Environment

This section describes existing air quality conditions and trends in the air quality API that may be affected by or benefit from the Project.

5.1 General Climatic Conditions

The API is in the Willamette River valley in northwest Oregon, within the Portland metropolitan area. Normal movement of air masses is from west to east, resulting in abundant rainfall and moderate temperatures. Continental air occasionally passes in reverse and produces the more extreme low temperatures in the western valleys. Average annual rainfall in the Willamette River valley is approximately 40 inches to 47 inches. In the summer, high temperatures in the region range from 78°F to 82°F, and the winter lows range from 33°F to 35°F (WRCC 2021).

5.2 Monitored Air Quality

DEQ measures air pollutant levels by operating a network of air monitoring and sampling equipment at more than 40 sites throughout Oregon. Table 5-1 summarizes the maximum monitored pollutant concentrations in 2020. The two monitoring sites closest to the API are the Tualatin Near-Road monitor near I-5 (about 5 miles from the proposed toll gantry areas), and the monitor on SE Lafayette Street approximately 10 miles north of the proposed toll gantry areas.

NAAQS compliance is determined based on a design value that is calculated differently for each pollutant. The maximum concentrations in the API are shown in Table 5-1. Each pollutant is discussed in more detail below.

The maximum monitored 8-hour average concentrations for CO were above the NAAQS, but DEQ determined these elevated values were due to wildfire smoke. Wildfires are considered events outside of the control of the community, and a violation can be excused by USEPA as an exceptional event. Table 5-1 includes the maximum monitored values as well as the maximum concentrations after DEQ removed data that was elevated due to forest fire. The concentrations that do not include values caused by wildfire smoke do not exceed the NAAQS.

The maximum monitored concentration of nitrogen dioxide and sulfur dioxide do not exceed the NAAQS.

The maximum monitored 8-hour average ozone concentrations exceed the NAAQS value of 0.070 ppm. An exceedance of the ozone NAAQS is determined using the annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years, as indicated in Table 3-1. Historical concentration data shows a trend of increasing ozone concentrations that are approaching a NAAQS exceedance. DEQ does not remove data affected by wildfire smoke. Since high ozone occurs in the summer months precisely when wildfire smoke impacts occur, it is very difficult to determine what the ozone level would have been without the wildfire smoke.

The maximum monitored 24-hour average concentrations for $PM_{2.5}$ were above the NAAQS, but DEQ determined these elevated values were due to wildfire smoke. As described above for CO, DEQ has determined the maximum $PM_{2.5}$ concentrations after removing values elevated by wildfire smoke. DEQ has used this process to evaluate elevated $PM_{2.5}$ concentrations from wildfire smoke in 2017 and 2018. The concentrations that do not include values caused by wildfire smoke do not exceed the NAAQS, but recent monitor values show a trend in increasing concentrations that are approaching the NAAQS.

The maximum monitored PM_{10} concentrations do not exceed the NAAQS. Diesel particulate matter is most closely represented by PM_{10} concentrations; however, reported PM_{10} concentrations include contributions from other sources (e.g., brakewear and tirewear, road dust, nearby industrial sources, and smoke).

Table 5-1. 2020 Criteria Pollutant Concentrations Near the Project Location

Monitor Location	Maximum Monitored Concentration	Pollutant (Averaging Period)	National Ambient Air Quality Standards
Tualatin-Bradbury Court Near-Road Site	14.3 ppm	Carbon monoxide (8 hours)	9 ppm
	1.0 ppm*	Carbon monoxide (8 hours)	9 ppm
SE Lafayette/5824 SE Lafayette	14.2 ppm	Carbon monoxide (8 hours)	9 ppm
	1.5 ppm*	Carbon monoxide (8 hours)	9 ppm
Tualatin-Bradbury Court Near-Road Site	30 ppb	Nitrogen dioxide (1 hour)	100 ppb
SE Lafayette/5824 SE Lafayette	30 ppb	Nitrogen dioxide (1 hour)	100 ppb
SE Lafayette/5824 SE Lafayette	0.02 ppm	Sulfur dioxide (3 hour)	0.5 ppm
Tualatin-Bradbury Court Near-Road Site	0.076 ppm	Ozone (8 hours)	0.070 ppm
SE Lafayette/5824 SE Lafayette	0.075 ppm	Ozone (8 hours)	0.070 ppm
Tualatin-Bradbury Court Near-Road Site	373 µg/m³	$PM_{2.5}$ (24 hours)	35 µg/m³
	28 µg/m³*	$PM_{2.5}$ (24 hours)	35 µg/m³
SE Lafayette/5824 SE Lafayette	334 µg/m³	$PM_{2.5}$ (24 hours)	35 µg/m³
	31 µg/m³*	$PM_{2.5}$ (24 hours)	35 µg/m³
SE Lafayette/5824 SE Lafayette	35 µg/m³	PM_{10}(24 hours)	150 µg/m³

Source: USEPA 2021a; Oregon DEQ 2021
* denotes that elevated data from wildfire smoke was removed.
µg/m³ = microgram per cubic meter; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$= particulate matter less than 2.5 microns in diameter; ppb = parts per billion; ppm = parts per million,

DEQ operates long-term air toxic monitoring stations as well as rotating annual sites that operate for a one-year period. As part of DEQ's air toxics monitoring program, 109 air toxics are measured at each monitoring site. Four monitoring sites are in the Portland metropolitan area, one of which is within the API at SE 45th Avenue and SE Harney Drive. DEQ developed ambient benchmark concentrations for 52 air toxics of concern in Oregon. Table 5-2 summarizes concentrations for each pollutant that exceeded the DEQ ambient benchmark concentration (as discussed in Section 3.1.2) at this monitoring site during its operation period of March 30, 2016, through December 9, 2017. This monitoring site most closely represents the API due to its location within the API as well as its proximity to residential areas. Table 5-2 also indicates which air toxics exceeded the ambient benchmark concentration that are also defined as a MSAT. The toxics that are not considered MSAT are not typically associated with motor vehicle emissions, and the Project is not likely to contribute to concentrations of these pollutants.

Table 5-2. Concentration of Air Toxics Near the Project Location at SE 45th Avenue and SE Harney Drive (2018)

Pollutant	Monitored Concentration	Oregon Department of Environmental Quality Benchmark	MSAT
Arsenic	0.000671 µg/m³	0.000238 µg/m³	No
Benzene	0.498 µg/m³	0.13 µg/m³	Yes
Carbon tetrachloride	0.509 µg/m³	0.2 µg/m³	No
Ethylbenzene	0.694 µg/m³	0.4 µg/m³	Yes
Naphthalene	0.04842 µg/m³	0.03 µg/m³	Yes
Acetaldehyde	1.536 µg/m³	0.45 µg/m³	Yes
Formaldehyde	1.973 µg/m³	0.2 µg/m³	Yes

Source: Oregon DEQ 2020
µg/m³ = microgram per cubic meter; MSAT = mobile source air toxic

Diesel particulate matter is considered an MSAT and has an Oregon ambient benchmark concentration. Diesel particulate matter concentrations are most closely represented by the PM_{10} monitor results in Table 5-1.

5.3 Attainment Status

The API spans Clackamas, Marion, Multnomah, Washington, and Yamhill Counties. The areas included in the API are classified as an attainment area with respect to the NAAQS. A portion of Marion County is included in the Salem CO maintenance area, but that area is not within the API.

The Portland metropolitan area was previously subject to a Carbon Monoxide Maintenance Plan. As of October 2, 2017, the 20-year planning period associated with the area's Carbon Monoxide Maintenance Plan expired (USEPA 2021b), and the area is classified as an attainment area for all criteria pollutants. The area is no longer required to demonstrate transportation conformity, but the area must remain in compliance with all measures and requirements contained in the Carbon Monoxide Maintenance Plan until the USEPA approves a revision to the state plan.

5.4 Existing MSAT Emissions

Table 5-3 summarizes estimated MSAT emissions generated from vehicle exhaust in the API during 2015.

Table 5-3. MSAT Emissions (2015)

Pollutant	2015 (tons per year)
Annual VMT	893,462,632
1,3-Butadiene	0.575
Acetaldehyde	1.918
Acrolein	0.186
Benzene	4.436
Diesel Particulate Matter	9.404
Ethylbenzene	2.436
Formaldehyde	2.952
Naphthalene	0.380
Polycyclic Organic Matter	0.149

Source: USEPA MOVES3.0.2 model
MSAT = mobile source air toxic; VMT = vehicle miles traveled

6 Environmental Consequences

6.1 No Build Alternative

The No Build Alternative represents conditions in the API if the Project were not implemented. The data used for this analysis assumes that all other transportation projects and programs in Metro's Regional Transportation Plan would be implemented as scheduled, including Phase 1A of the I-205 Improvement Project. Emissions were evaluated for the design year (2045) as well as an interim year (2027). Under the No Build Alternative, MSAT emissions in 2045 would be lower than 2027 and existing emissions. Although VMT in 2045 in the API would be more than 16% higher than it would be in 2027, MSAT emissions would decrease due to the implementation of vehicle standards, improved technology, and vehicle turnover. Modeled criteria pollutant emissions would also generally be lower in 2045 than in 2027 and under existing conditions. The one exception would be PM_{10}, for which average summer day emissions would be higher in 2045 and 2027 than under existing conditions.

6.1.1 Short-Term Effects

Under the No Build Alternative, no construction activity would occur; therefore, there would be no short-term impacts on air quality.

6.1.2 Long-Term Effects

Table 6-1 presents projected MSAT emissions for the 2027 and 2045 under the No Build Alternative for the API roadway links. MSAT emissions would be lower in 2045 than under 2027 and existing conditions, which is consistent with national trends. Although the VMT in 2045 would be over 16% higher under the No Build Alternative than it would be in 2027, MSAT emissions would be lower than under existing conditions due to implementation of fuel and engine regulations, as described in Section 3.1.2.

Table 6-1. Modeled MSAT Emissions for No Build Alternative

Pollutant	2015 (tons per year)	2027 No Build Alternative (tons per year)	2045 No Build Alternative (tons per year)
Annual VMT	893,462,632	1,051,694,624	1,222,083,927
1,3-Butadiene	0.575	0.033	< 0.01
Acetaldehyde	1.918	0.379	0.328
Acrolein	0.186	0.038	0.022
Benzene	4.436	0.985	0.707
Diesel Particulate Matter	9.404	2.084	1.246
Ethylbenzene	2.436	0.710	0.602
Formaldehyde	2.952	0.616	0.410
Naphthalene	0.380	0.062	0.027
Polycyclic Organic Matter	0.149	0.027	0.011

Source: USEPA MOVES3.0.2 model
MSAT = mobile source air toxic; VMT = vehicle miles traveled

6.2 Build Alternative

The Build Alternative analysis represents conditions in the API if the Project were implemented in addition to all other transportation projects and programs in Metro's Regional Transportation Plan, including the subsequent phases of the I-205 Improvement Projects (Phases 1B, 1C, 1D, and 2) that are dependent on toll revenue from Phase 1A. Consistent with the No Build Alternative, emissions were evaluated for the design year (2045) as well as an interim year (2027) to provide details about the expected emissions changes over time.

6.2.1 Short-Term Effects

Construction activities would cause temporary increases in particulate matter in the form of fugitive dust (from ground clearing and preparation, grading, stockpiling of materials, on-site movement of equipment, and transportation of construction materials), as well as exhaust emissions of criteria pollutants from material delivery trucks, construction equipment, and workers' private vehicles during the construction period of approximately 4 years. Construction contractors for the Project would be required to comply with Division 208 of OAR 340, which places limits on fugitive dust that causes a nuisance or violates other regulations. In addition, contractors would be required to comply with *Oregon Standard Specifications for Construction* (ODOT 2021) for air quality (Section 290.30) and to implement air pollution control measures that include vehicle and equipment idling limitations and that minimize vehicle track-out and fugitive dust. Dust emissions typically occur during dry weather, construction activities, or high wind conditions. Short-term impacts on air quality from construction activities would occur during the construction period, which is expected to last approximately 4 years.

6.2.2 Long-Term Effects

Table 6-2 summarizes MSAT emissions for the Build Alternative as compared to the No Build Alternative for 2027 and 2045. The VMT within the MSAT modeling area for the Build Alternative is projected to be 8% lower in 2027 and 5% lower in 2045 compared to the No Build Alternative for each model year. The MSAT emissions would be lower by similar amounts. Note that these percentages are based on only the links within the air quality API. The percentage difference is more pronounced than what would be seen on the regional level because it does not include all the links that would not show a change in emissions.

Table 6-2. MSAT Emissions

Pollutant	2027			2045		
	No Build Alternative (tons per year)	Build Alternative (tons per year)	Percentage Change	No Build Alternative (tons per year)	Build Alternative (tons per year)	Percentage Change
Annual VMT	1,051,694,624	965,576,193	-8%	1,222,083,927	1,162,440,219	-5%
1,3-Butadiene	0.033	0.030	-8%	0.000	0.000	0%
Acetaldehyde	0.379	0.357	-6%	0.328	0.298	-9%
Acrolein	0.038	0.036	-5%	0.022	0.020	-8%
Benzene	0.985	0.899	-9%	0.707	0.647	-8%
Diesel Particulate Matter	2.084	2.029	-3%	1.246	1.156	-7%
Ethylbenzene	0.710	0.647	-9%	0.602	0.543	-10%
Formaldehyde	0.616	0.577	-6%	0.410	0.373	-9%
Naphthalene	0.062	0.058	-7%	0.027	0.025	-8%
Polycyclic Organic Matter	0.027	0.025	-7%	0.011	0.010	-7%

Source: USEPA MOVES3.0.2 model
MSAT = mobile source air toxic; VMT = vehicle miles traveled

To better understand the overall reduction in MSAT emissions within the API with the Build Alternative relative to the No Build Alternative, analysts separated the VMT and emissions results by roadway and vehicle types. This approach helps to describe the air quality effects for highway trips rerouted to non-highway roads under the Build Alternative as compared to the No Build Alternative. The VMT values presented in Table 6-3 and Table 6-4 demonstrate that, while there would be higher non-highway VMT, this difference would be more than offset by the lower highway VMT in both model years. In addition, the higher non-highway VMT would be primarily from passenger vehicles, and non-highway VMT from heavy trucks, which generally produce greater emissions than passenger vehicles, would be lower under the Build Alternative.

Table 6-3. Daily Vehicle Miles Traveled Changes within Area of Potential Impact (2027)

Vehicle Type	No Build Alternative Highway	No Build Alternative Non-Highway	No Build Alternative Total	Build Alternative Highway	Build Alternative Non-Highway	Build Alternative Total
Passenger	1,553,978	1,190,246	**2,744,224**	1,160,118	1,332,361	**2,492,479**
Medium	29,453	10,546	**39,999**	31,214	9,924	**41,139**
Heavy	71,564	25,565	**97,129**	87,873	23,927	**111,799**
All	**1,654,995**	**1,226,357**	**2,881,352**	**1,279,205**	**1,366,212**	**2,645,417**

Source: Metro Regional Travel Demand Model

Table 6-4. Daily Vehicle Miles Traveled Changes within Area of Potential Impact (2045)

Vehicle Type	No Build Alternative Highway	No Build Alternative Non-Highway	No Build Alternative Total	Build Alternative Highway	Build Alternative Non-Highway	Build Alternative Total
Passenger	1,668,131	1,438,642	**3,106,774**	1,362,595	1,546,078	**2,908,673**
Medium	34,034	14,477	**48,513**	40,723	12,499	**53,222**
Heavy	156,628	36,261	**192,888**	191,537	31,337	**222,874**
All	**1,858,795**	**1,489,380**	**3,348,175**	**1,594,856**	**1,589,913**	**3,184,769**

Source: Metro Regional Travel Demand Model

To determine whether the MSAT emissions would follow this same trend, the analysis also separated emissions of benzene and diesel particulate matter by roadway type and vehicle type in 2027.[5] The analysts selected these two pollutants for further review because they would produce the greatest emissions of all scenarios analyzed.

As shown in Table 6-5 and Table 6-6, there would be net lower benzene and diesel particulate matter emissions under the Build Alternative compared with the No Build Alternative in 2027. The higher non-highway emissions would occur primarily because of higher passenger vehicle volumes on those roadways, with little to no change for medium and heavy trucks. The higher non-highway emissions would be more than offset by the lower highway emissions

The VMT shown in Table 6-3 and Table 6-4 indicate 22% higher heavy truck VMT on highways. However, the diesel particulate emissions from heavy trucks on highways (shown in Table 6-6) would only be 2%

[5] Only the 2027 data was used for this portion of the analysis because the emissions would be greater in 2027 than in 2045, making it more feasible to show the distribution of vehicle and roadway types.

higher under the Build Alternative because the trucks emit less pollutants when traveling in less congested conditions.

Table 6-5. Annual Benzene Emission Details (2027)

Vehicle Type	No Build Alternative Highway (tons)	No Build Alternative Non-Highway (tons)	No Build Alternative Total (tons)	Build Alternative Highway (tons)	Build Alternative Non-Highway (tons)	Build Alternative Total (tons)
Passenger	0.460	0.454	0.914	0.318	0.514	0.832
Medium	0.029	0.014	0.043	0.025	0.013	0.038
Heavy	0.020	0.009	0.029	0.019	0.009	0.028
All	**0.508**	**0.477**	**0.985**	**0.363**	**0.536**	**0.899**

Source: USEPA MOVES3.0.2 model

Table 6-6. Annual Diesel Particulate Matter Emission Details (2027)

Vehicle Type	No Build Alternative Highway (tons)	No Build Alternative Non-Highway (tons)	No Build Alternative Total (tons)	Build Alternative Highway (tons)	Build Alternative Non-Highway (tons)	Build Alternative Total (tons)
Passenger	0.24	0.23	0.46	0.16	0.26	0.42
Medium	0.11	0.05	0.16	0.10	0.05	0.15
Heavy	1.02	0.44	1.46	1.04	0.41	1.46
All	**1.37**	**0.71**	**2.08**	**1.31**	**0.72**	**2.03**

Source: USEPA MOVES3.0.2 model

Attachment A includes the emissions data for each MSAT pollutant, separated by the contribution of highway and non-highway roadway links.

MSAT Health Effects

There may be localized areas where ambient concentrations of MSAT could be different under the Build Alternative as compared to the No Build Alternative. The localized changes in MSAT concentrations would likely be most pronounced on roadway links where traffic volumes would be higher under the Build Alternative relative to the No Build Alternative due to rerouted trips. However, the magnitude and the duration of these potential differences compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT concentrations and related health impacts.

By FHWA standards, information is incomplete or unavailable to credibly predict the Project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants.

They maintain the Integrated Risk Information System, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (www.epa.gov/iris). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* (FHWA 2016b). Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious are the adverse human health effects of MSAT compounds at current environmental concentrations (HEI 2007) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts, with each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of Project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (HEI 2007). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA states that with respect to diesel engine exhaust, "the absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk" (USEPA 2003).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the CAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires the USEPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of

Columbia Circuit upheld USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (U.S. Court of Appeals 2008).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against Project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

6.2.3 Indirect Effects

The air quality analysis evaluated impacts on I-205 as well as traffic rerouted onto local roadways. No additional indirect impacts or benefits would occur under the Build Alternative.

6.3 Summary of Effects by Alternative

Table 6-7 provides a comparison of anticipated air quality impacts and benefits by alternative.

Table 6-7. Summary of Air Quality Effects by Alternative

Impacts	No Build Alternative	Build Alternative
Short-Term Effects	• None	• Short-term impacts from higher levels of fugitive dust and exhaust emissions during construction.
Long-Term Effects	• None	• 2027: Net MSAT emissions would range from 3% to 9% lower than the No Build Alternative. Highway emissions would be 4% to 30% lower, and non-highway emissions would be 1% to 13% higher than the No Build Alternative. Estimated modeled criteria pollutant emissions would be 0.3% to 7% lower than the No Build Alternative. • 2045: Net MSAT emissions would range from 7% to 10% lower than the No Build Alternative. Highway emissions would be 6% to 27% lower than the No Build Alternative, and non-highway emissions would be up to 8% higher than the No Build Alternative. Estimated modeled criteria pollutant emissions would be 0.3% to 12% lower than the No Build Alternative.
Indirect Effects	• None	• None

MSAT = mobile source air toxic

7 Avoidance, Minimization, and/or Mitigation Commitments

7.1 Short-Term Impacts

The following measures will be implemented to minimize construction impacts on air quality:

- Construction contractors will be required to comply with Division 208 of Oregon Administrative Rules (OAR) 340, which addresses visible emissions and nuisance requirements. Subsection of OAR 340-208 places limits on fugitive dust that causes a nuisance or violates other regulations. Violations of the regulations can result in enforcement action and fines. The regulation provides that the following reasonable precautions be taken to avoid dust emissions (OAR 340-208, Subsection 210):
  - Use of water or chemicals, where possible, for the control of dust during Project construction.
  - Application of water or other suitable chemicals on materials stockpiles and other surfaces that can create airborne dust.
  - Full or partial enclosure of materials stockpiles in cases where application of water or other suitable chemicals is not sufficient to prevent particulate matter from becoming airborne.
  - Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.
  - Adequate containment during sandblasting or other similar operations.
  - When in motion, always cover open-bodied trucks transporting materials likely to become airborne.
  - Prompt removal from paved areas of earth or other material that does or could become airborne.
- Contractors will be required to comply with ODOT Standard Specifications Section 290, which has requirements for environmental protection including air-pollution control measures. These control measures, which include vehicle and equipment idling limitations, are designed to minimize vehicle track-out and fugitive dust. These measures will be documented in the erosion and sediment control plan that will be required prior to Project construction. To reduce the impact of construction delays on traffic flow and resultant emissions, road or lane closures will be restricted to non-peak traffic periods when possible.
- In addition to the regulations outlined above, ODOT encourages all contractors to minimize impacts on surrounding communities by making choices that go beyond the baseline requirements. Examples include using newer low-emitting construction equipment, using electric equipment, and avoiding haul routes through residential areas.

7.2 Long-Term Impacts

Estimated air pollutant concentrations from the Build Alternative would not have an adverse effect on air quality and are projected to be lower than the No Build Alternative; therefore, no mitigation is proposed for Project operations.

8 Preparers

Table 8-1. List of Preparers

Name	Role	Education	Years of Experience
Rebecca Frohning	Air Quality Technical Lead	BS, Earth and Atmospheric Science	21
Ginette Lalonde	Air Quality QC Reviewer	BS, Civil Engineering	22

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Attachment A MSAT Emissions by Roadway Type

MSAT Emissions By Roadway Type

	2027 No Build			2027 Build			2027 Percent Change from No Build		
	Freeway	Non-Freeway	Total	Freeway	Non-Freeway	Total	Freeway	Non-Freeway	Total
Annual VMT	604,073,503	447,621,122	1,051,694,624	466,908,638	498,667,556	965,576,193	-23%	11%	-8%
CO2e Tailpipe (MT/year)	196,995	151,402	348,397	158,180	168,424	326,604	-20%	11%	-6%
CO2e Fuel Cycle (MT/year)	53,189	40,878	94,067	42,709	45,474	88,183	-20%	11%	-6%
Total CO2e (MT/year)	250,184	192,280	442,464	200,889	213,898	414,787	-20%	11%	-6%
Total Energy Consumption (MMBtu/year)	2,581,879	1,987,022	4,568,902	2,070,492	2,210,999	4,281,492	-20%	11%	-6%
1,3-Butadiene (ton/year)	0.018	0.015	0.033	0.014	0.017	0.031	-23%	11%	-8%
Acetaldehyde (ton/year)	0.226	0.157	0.383	0.193	0.168	0.361	-14%	7%	-6%
Acrolein (ton/year)	0.023	0.016	0.038	0.019	0.017	0.036	-14%	8%	-5%
Benzene (ton/year)	0.509	0.477	0.986	0.363	0.537	0.900	-29%	12%	-9%
DPM (ton/year)	1.42	0.74	2.15	1.35	0.74	2.10	-4%	1%	-3%
Ethylbenzene (ton/year)	0.36	0.35	0.71	0.25	0.39	0.65	-30%	13%	-9%
Formaldehyde (ton/year)	0.36	0.26	0.62	0.30	0.29	0.59	-17%	8%	-6%
Naphthalene (ton/year)	0.04	0.03	0.06	0.03	0.03	0.06	-20%	10%	-7%
POM (ton/year)	0.02	0.01	0.03	0.01	0.01	0.03	-20%	10%	-7%

	204**5** No Build			204**5** Build			2045 Percent Change from No Build		
	Freeway	Non-Freeway	Total	Freeway	Non-Freeway	Total	Freeway	Non-Freeway	Total
Annual VMT	678,460,037	543,623,891	1,222,083,927	582,121,818	580,318,401	1,162,440,219	-14%	7%	-5%
CO2e Tailpipe (MT/year)	209,407	155,277	364,684	185,220	164,254	349,473	-12%	6%	-4%
CO2e Fuel Cycle (MT/year)	56,540	41,925	98,465	50,009	44,348	94,358	-12%	6%	-4%
Total CO2e (MT/year)	265,946	197,202	463,149	235,229	208,602	443,831	-12%	6%	-4%
Total Energy Consumption (MMBtu/year)	2,736,034	2,036,614	4,772,647	2,417,286	2,155,179	4,572,465	-12%	6%	-4%
1,3-Butadiene (ton/year)	0.000	0.000	0.000	0.000	0.000	0.000	0%	0%	0%
Acetaldehyde (ton/year)	0.222	0.105	0.328	0.194	0.103	0.298	-13%	-2%	-9%
Acrolein (ton/year)	0.014	0.008	0.022	0.012	0.008	0.020	-14%	2%	-8%
Benzene (ton/year)	0.358	0.349	0.707	0.272	0.375	0.647	-24%	8%	-8%
DPM (ton/year)	0.971	0.275	1.246	0.912	0.244	1.156	-6%	-11%	-7%
Ethylbenzene (ton/year)	0.304	0.297	0.602	0.223	0.320	0.543	-27%	8%	-10%
Formaldehyde (ton/year)	0.257	0.153	0.410	0.217	0.156	0.373	-16%	2%	-9%
Naphthalene (ton/year)	0.014	0.013	0.027	0.011	0.014	0.025	-21%	7%	-8%
POM (ton/year)	0.006	0.005	0.011	0.005	0.005	0.010	-20%	7%	-7%