

3.10 Air Quality

Many natural and human activities generate air pollutants that can affect human and environmental health. Air quality is closely tied to transportation (including motor vehicles, trucks, and buses), which is a major contributor of air pollutants in the Portland-Vancouver area. This section evaluates the long-term and temporary effects of the No-Build Alternative and the network improvements of the Modified Locally Preferred Alternative (LPA) and recommended design options for two types of air pollutants:

- Mobile source air toxics (MSAT). The Clean Air Act identifies 188 air toxics, of which MSATs are a subset. The FHWA identifies nine priority MSATs emitted by vehicles, that are to be considered in NEPA reviews. FHWA's selection of these nine priority MSATs was based on the U.S. Environmental Protection Agency's (EPA) 2007 MSAT rule which evaluated MSATs for regional-scale cancer risk and non-cancer hazards, and on EPA's 2011 National Air Toxics Assessment. These nine pollutants are also included in the Oregon Department of Environmental Quality's (DEQ) Toxic Air Contaminant Priority List.
- Criteria pollutants. These pollutants have federally established limits based on human health and environmental criteria. Exposure to elevated concentrations of criteria pollutants can contribute to respiratory and cardiovascular health impacts.

Information presented in this section is based on the Air Quality Technical Report (as listed in Appendix H), including details of the emissions analyses for MSATs and criteria pollutants.

The assessment of reasonably foreseeable effects in this section is based upon the temporal proximity parameters detailed in the Chapter 3 introduction and the air quality study area described in Section 3.10.2.

3.10.1 Changes or New Information Since 2013

The Columbia River Crossing (CRC) Selected Alternative identified in the 2011 Record of Decision (ROD), as revised by the 2012 and 2013 re-evaluations, is referred to as the CRC LPA. Over the past 10+ years since the CRC LPA was identified, the physical environment near the Interstate Bridge, community priorities, and regulations have changed, which necessitated design revisions and resulted in the proposed IBR Program Modified LPA (see Section 2.5.2). Evaluation of potential impacts associated with air quality has been updated in this Final SEIS to include:

- Updated analysis to address National Ambient Air Quality Standards (NAAQS) and other recent federal guidance, such as FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents (FHWA 2023a) and FHWA's Frequently Asked Questions for Conducting Quantitative MSAT Analysis for FHWA NEPA Documents (FHWA 2023b).
- Revised methodology based on the updated ODOT *Air Quality Manual* and WSDOT's *Air and Energy Analysis Triggers Flowchart*.
- Removed an assessment for localized carbon monoxide at congested intersections, as the region's 20-year carbon monoxide maintenance period ended in 2017. Therefore, transportation projects in the region are no longer required to demonstrate conformity.
- Updated the analysis based on updated transportation modeling data.

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- Calculated criteria pollutants using the EPA’s Motor Vehicle Emissions Simulator Model (MOVES) (version 3.1.0).¹ CRC emissions estimates were developed using EPA’s MOBILE6.2 model, which MOVES replaced.
- Deleted reference to the Portland Air Toxics Solution study, as it only projected emissions to 2017.
- Added a summary of Oregon State Toxic Air Contaminant Program, which was most recently amended in November 2021.
- Changes to the project footprint, as necessitated by changed conditions, and changes in existing land uses resulting in changes to proximity to sensitive receptors.

3.10.2 Existing Conditions

The air quality study area is shown in Figure 3.10-1. Air pollutant emissions are evaluated at the regional level, and the air quality study area extends beyond the primary study area described in the Chapter 3 introduction. Reasonably foreseeable effects on air quality were evaluated for the regional roadway network and the proposed transit alignment and facilities based on the boundaries of Oregon Metro/Southwest Washington Regional Transportation Commission 2018 Regional Transportation Plan Regional Travel Demand Model (Metro/RTC 2018 RTP RTDM), which encompasses Multnomah, Clackamas, Washington, and Clark Counties. The Oregon DEQ measures air pollutant levels with a network of air monitoring and sampling equipment at more than 40 sites throughout the state, including the air quality study area. The Washington State Department of Ecology (Ecology) does not operate many monitors in the air quality Vancouver area because the monitors operated by DEQ fulfill the federal monitoring requirements for the metropolitan area. Over the last 10 years, pollutant concentrations have trended downward, with periods of elevated PM_{2.5} and ozone concentrations corresponding to wildfire smoke events in 2017, 2020, and 2022. DEQ implements several programs that regulate emissions of air toxics and monitors ambient levels present at various locations across Oregon. DEQ uses this concentration data to develop strategies to reduce ambient levels of air toxics in the state. Section 3.2 of the Air Quality Technical Report (as listed in Appendix H) includes tables of recent monitoring data for criteria pollutants and air toxics.

Air Quality Pollutants and Standards

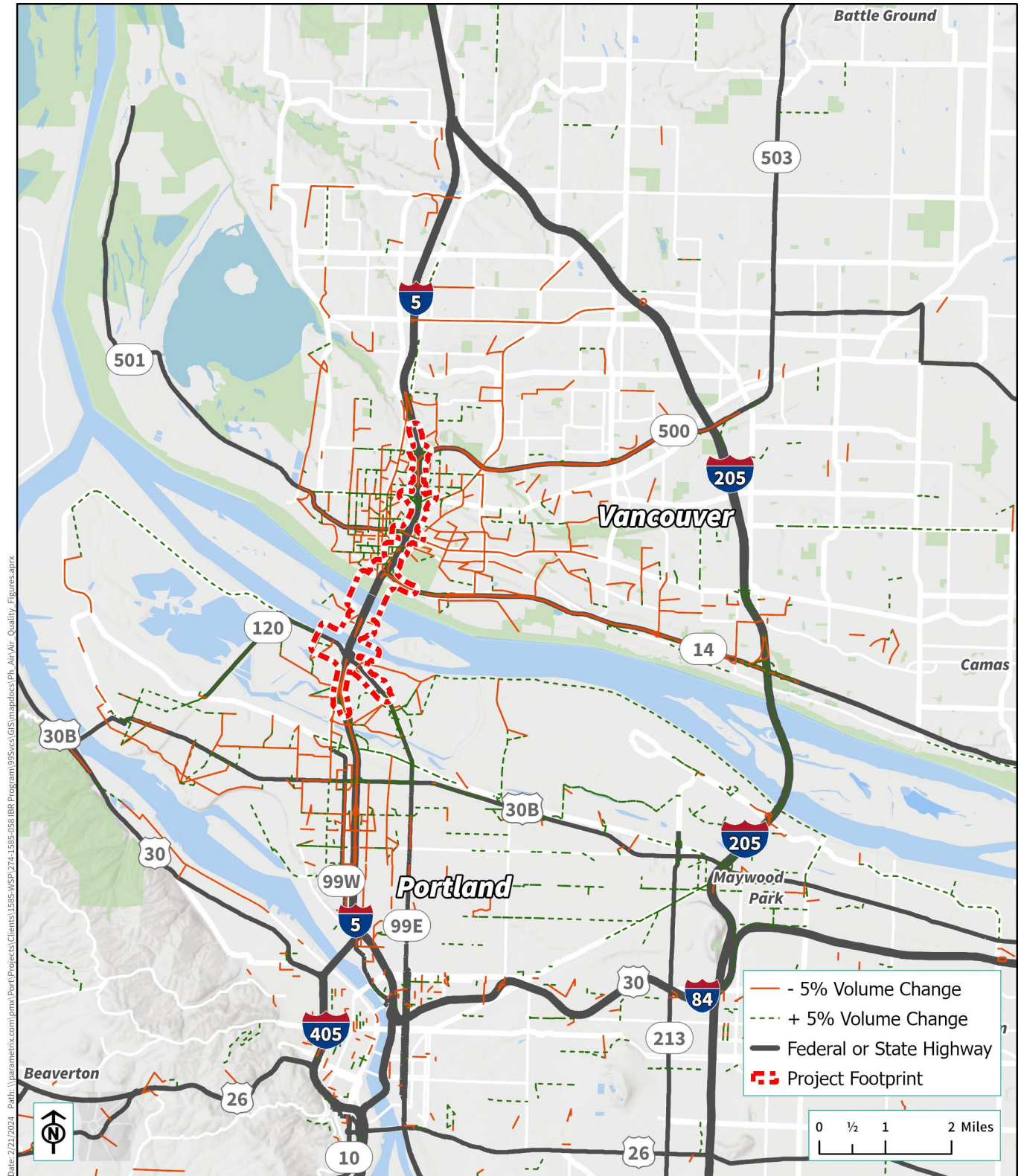
Mobile Source Air Toxics

MSAT emissions are the subset of air toxics emitted by mobile sources. The priority MSAT pollutants include benzene, 1,3-butadiene, naphthalene, polycyclic organic matter, formaldehyde, acrolein, ethylbenzene, acetaldehyde, and diesel particulates. Exposure to these pollutants over time can affect human health. Unlike criteria pollutants, MSATs do not need to meet NAAQS; rather the Clean Air Act and its amendments regulate them through fuel and tailpipe emissions standards.

The EPA’s MOVES 3.1.0 model was used to estimate the MSAT emissions (in tons per year) for existing conditions, the No-Build Alternative and the proposed Modified LPA. MOVES 3.1.0 considers all emission standards and fuel economy standards that were adopted as of March 2021 and assumes that the standards remain in effect throughout the analysis period. The analysis was performed according to FHWA guidance that recommends estimating emissions for roadway segments that are expected to have a change in volume of more than 5% compared to the No-Build Alternative. The roadway network used for the emissions analysis is shown by the roadway segments highlighted in Figure 3.10-2.

¹ As of November 2024, MOVES 5 is now the EPA's regulatory emissions modeling system. Upon release of MOVES 4 in August 2023, EPA provided a two-year grace period, meaning that MOVES 3 is still an acceptable and appropriate model for new regional emissions analyses until September 2025. The release of MOVES 5 does not affect the grace period to use MOVES 3. The air quality analysis began in 2022, which was within the grace period ending September 2025.

Figure 3.10-2. Roadway Emissions Analysis Network



Criteria Pollutants

The EPA has developed NAAQS for six criteria air pollutants. Geographic areas where pollutant concentrations exceed the NAAQS are classified as “nonattainment” areas. Areas that meet the NAAQS are classified as “attainment” areas. Previously designated nonattainment areas that are now in compliance with air quality standards are classified as “attainment” areas with a maintenance plan (commonly referred to as “maintenance areas”), because they have maintenance plans to prevent regressing air quality conditions. Areas that have fulfilled the 20-year maintenance plan requirements are no longer considered maintenance areas. A table of the current NAAQS is found in Section 3.2 of the Air Quality Technical Report (as listed in Appendix H).

The air quality study area spans four counties in the Portland and Vancouver metropolitan areas; the EPA has designated the Portland-Vancouver AQMA (a subset of the four-county region) as in attainment for all criteria pollutants. The area was previously designated as nonattainment for carbon monoxide and 1-hour ozone. As of October 2, 2017, the 20-year Carbon Monoxide Maintenance period has ended and transportation conformity requirements no longer apply. All measures and requirements contained in the Carbon Monoxide Maintenance Plan must be complied with until the EPA approves a revision to the state implementation plans; however, transportation projects are no longer subject to the transportation conformity requirements of 40 Code of Federal Regulations Part 93 subpart A.

In 2005, EPA revoked the 1-hour ozone standard. At the time, the Portland-Vancouver region was subject to an ozone maintenance plan. The maintenance plan, including regional commitments for transportation strategies to address ozone, is still in effect.

Based on the area’s current attainment status for all pollutants, a criteria pollutant analysis is not required by the transportation conformity rules (40 CFR § 93.123). This EIS for the proposed IBR Program’s Modified LPA is a Supplemental EIS to the CRC EIS, which was conducted when the region was subject to conformity. The analysis in the CRC EIS included a local CO-hot-spot and regional emissions burden analysis. In addition, air quality is a concern within the surrounding community. Therefore, a comparison of emissions between existing and future conditions was conducted for the proposed Modified LPA for public disclosure purposes. A criteria pollutant emissions analysis was performed to evaluate the change in emissions from the roadway network identified as part of the MSAT analysis methodology.

As part of Oregon’s State Implementation Plan for carbon monoxide, Transportation Control Measures (TCMs) were identified to reduce emissions by reducing vehicle use (DEQ 2004). Although transportation conformity is no longer required after the 20-year maintenance period, the following TCMs were applicable between the years of 2006 and 2017 and are examples of strategies that have been used to reduce emissions:

- **Transit Service Increase:** Regional transit service revenue hours (weighted by capacity) are increased 1% per year. The increase is assessed on the basis of a five-year rolling average of actual hours for assessments conducted between 2006 and 2017.
- **Bicycle Paths:** Jurisdictions and government agencies must program a minimum total of 28 miles of bicycle paths or trails within the Portland metropolitan area between the years 2006 and 2017. Bicycle paths must be consistent with state and regional bikeway standards. A cumulative average of 5 miles of bikeways or trails per biennium must be funded from all sources in each Metropolitan Transportation Improvement Program. Facilities subject to this TCM must be in addition to those required for expansion or reconstruction projects under Oregon Revised Statutes 366.514.

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- Pedestrian Paths: Jurisdictions and government agencies must program at least 9 miles of pedestrian paths in mixed-use centers between the years 2006 and 2017, including the funding of a cumulative average of 1.5 miles in each biennium from all sources in each Metropolitan Transportation Improvement Program. Facilities subject to this TCM must be in addition to those required for expansion or reconstruction projects under Oregon Revised Statutes 366.514, except where such expansion or reconstruction is located within a mixed-use center.

Sensitive Receptors

While air quality effects on all members of the population are evaluated, potential effects on sensitive receptors are of particular concern. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, and assisted living facilities are examples of sensitive receptors. Table 3.10-1 lists the hospitals, schools, and assisted living facilities located near the Program footprint. Many of these facilities are located in downtown Vancouver, west of the Program footprint.

Table 3.10-1. Sensitive Receptors near the Program Footprint

Facility	Address
Hospitals and other Healthcare Facilities	
Portland VA Health Care System- Vancouver	1601 E 4th Plain Blvd., Vancouver, WA 98661
Providence Esther Short - Vancouver	700 Washington St. Suite 105, Vancouver, WA 98660
ZoomCare	781 W Columbia Way, Vancouver, WA 98660
Sea Mar Community Health Center- CSNW Rose Village	2502 E 4th Plain Blvd., Vancouver, WA 98661
Schools	
Discovery Middle School	800 E 40th St., Vancouver, WA 98663
Vancouver School of Arts and Academics	3101 Main St., Vancouver, WA 98663
Washington State School for the Blind	2214 E 13th St., Vancouver, WA 98661
Hudson's Bay High School	3528, 1601 E McLoughlin Blvd., Vancouver, WA 98663
VITA Elementary School	1111 Fort Vancouver Way, Vancouver, WA 98663
Clark College	1933 Fort Vancouver Way, Vancouver, WA 98663
Assisted Living	
Rose Village Adult Care Home	3810 S St., Vancouver, WA 98663
Knights of Pythias Retirement Center	3409 Main St., Vancouver, WA 98663
The Oaks at Timberline	400 E 33rd St., Vancouver, WA 98663
The Evergreen Inn	500 Main St., Vancouver, WA 98660
The Springs at The Waterfront	655 W Columbia Way Suite 602, Vancouver, WA 98660
Van Vista	410 W 13th St., Vancouver, WA 98660

3.10.3 Long-Term Benefits and Reasonably Foreseeable Effects

The air quality study area described in Section 3.10.2 and the temporal scope described in the Chapter 3 introduction are used to assess long-term benefits and reasonably foreseeable effects to air quality. The design option combinations shown in columns 2 through 5 of Table 3.10-2 are those that would have differing effects on air quality. Table 3.10-2 summarizes the reasonably foreseeable effects on air quality of the No-Build Alternative and the Modified LPA with the single-level fixed-span (Recommended Design Option), double-deck fixed-span, two auxiliary lanes, and single-level movable-span bridge configurations design options. The air quality analysis was not sensitive to the bridge configuration design options because the Metro/RTC 2018 RTP RTDM does not consider elevation changes or non-recurring congestion from bridge lifts. Detailed analysis of the reasonably foreseeable effects is provided in the following sections with a qualitative description of potential effects from the bridge configuration design options evaluated that could not be captured by modeling tools.

No-Build Alternative

Air pollutant emissions from the regional transportation system would continue under the No-Build Alternative (Table 3.10-3 and Table 3.10-4). Although vehicle miles traveled (VMT) would increase substantially between now and 2045, emissions of most MSATs and criteria pollutants would go down because of more stringent regulation of fuels and emissions, which is true for both the No-Build Alternative and Modified LPA. Vehicles would continue to idle during bridge openings, although emissions from idling vehicles during bridge openings were not quantified as part of this analysis.

Modified LPA

Emissions from the proposed Modified LPA and design options are compared to the No-Build Alternative by evaluating the effects of changing vehicle volumes, speeds, shift to alternative modes, or rerouting.

The Modified LPA would not cause long-term adverse air quality impacts for all combinations of design options evaluated. Air pollutant emissions were estimated for the proposed Modified LPA with the single-level fixed-span bridge configuration and one auxiliary lane design options as presented in Table 3.10-3 and Table 3.10-4. Air pollutant emissions were estimated for the proposed Modified LPA with the single-level fixed-span bridge configuration and two auxiliary lanes design options as presented in Table 3.10-5 and Table 3.10-6. Differences in emissions due to the bridge configuration design options were considered qualitatively to acknowledge the potential effects of elevation and traffic queuing.

As presented in Table 3.10-3, MSAT decreases for the proposed Modified LPA, with the single-level fixed-span bridge and one auxiliary lane, relative to the 2015 baseline year range from 29% to 100%, depending on pollutant, while differences between the Modified LPA and the No-Build Alternative are relatively minor. See Section 4.1 of the Air Quality Technical Report (as listed in Appendix H) for more information on MSAT emissions. Changes in criteria pollutant emissions from the proposed Modified LPA with the single-level fixed-span bridge option and one auxiliary lane compared to existing conditions range from reductions of up to 79% to increases of up to 25%, depending on the pollutant (Table 3.10-5). Air pollutant emissions under the No-Build Alternative and the proposed Modified LPA are expected to be substantially lower in the future than under existing conditions for all pollutants evaluated, except VOC and total PM₁₀. The predicted emissions reduction would be almost entirely due to EPA regulations, fuel and engine standard improvements. Emissions reduction associated VOC and total PM₁₀ would not outpace emissions increases caused by VMT growth. Emissions for the proposed Modified LPA are less than emissions for the No-Build Alternative for all pollutants. The emissions shown for the roadway segments present the difference between the No-Build Alternative and the proposed Modified LPA—the MOVES model results are not the total roadway emissions for the entire regional air quality study area.

Table 3.10-2. Long-Term Air Quality Benefits and Effects

0 Effect	1 No-Build Alternative	2: IBR Program Recommended Design Options Modified LPA with Single-Level Fixed-Span Bridge Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	3 Modified LPA with <u>Double-Deck Fixed- Span Bridge</u> Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	4 Modified LPA with Single-Level Fixed-Span Bridge Configuration, <u>Two Auxiliary Lanes</u> , with C Street Ramps, Centered I-5, and All Five Park and Rides	5 Modified LPA with <u>Single-Level Movable- Span Bridge</u> Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides
VMT in MSAT air quality study area	3,537,900 VMT in 2045 (66% increase compared to existing conditions)	3,455,400 VMT in 2045 (62% increase compared to existing conditions)	3,455,400 VMT in 2045 (62% increase compared to existing conditions)	3,455,400 VMT in 2045 (62% increase compared to existing conditions)	3,455,400 VMT in 2045 (62% increase compared to existing conditions)
Changes in air pollutant emissions from existing conditions	Future regional emissions would be substantially lower than existing emissions for all MSATs, CO, NO _x , and PM _{2.5} . Future regional emissions of VOC would be up to 25% higher than existing conditions due to increased VMT.	Similar to No-Build Alternative (slightly lower emissions than No-Build Alternative due to reduced VMT)	The double-deck fixed-span bridge configuration design option would have similar changes in air pollutant emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option, but may slightly increase operational emissions due to the higher profile grade, which would increase acceleration and braking of vehicles crossing the bridges.	Similar to No-Build Alternative (slightly lower emissions than No-Build Alternative due to reduced VMT)	The single-level movable-span bridge configuration design option would have similar changes in air pollutant emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option, except for a minor increase in air quality pollutants due to vehicles idling during bridge openings. There would be fewer bridge openings than with the No-Build Alternative.

0 Effect	1 No-Build Alternative	2: IBR Program Recommended Design Options Modified LPA with Single-Level Fixed-Span Bridge Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	3 Modified LPA with <u>Double-Deck Fixed- Span Bridge</u> Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	4 Modified LPA with Single-Level Fixed-Span Bridge Configuration, <u>Two Auxiliary Lanes</u> , with C Street Ramps, Centered I-5, and All Five Park and Rides	5 Modified LPA with <u>Single-Level Movable- Span Bridge</u> Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides
Changes in MSAT emissions (2045) from existing conditions (2015)	<ul style="list-style-type: none"> • 1,3-Butadiene: 100% reduction • Acetaldehyde: 82% reduction • Acrolein: 89% reduction • Benzene: 69% reduction • Diesel Particulate Matter: 86% reduction • Ethylbenzene: 29% reduction • Formaldehyde: 86% reduction • Naphthalene: 83% reduction • Polycyclic Organic Matter: 93% reduction 	<ul style="list-style-type: none"> • 1,3-Butadiene: 100% reduction • Acetaldehyde: 85% reduction • Acrolein: 90% reduction • Benzene: 70% reduction • Diesel Particulate Matter: 88% reduction • Ethylbenzene: 29% reduction • Formaldehyde: 88% reduction • Naphthalene: 83% reduction • Polycyclic Organic Matter: 94% reduction 	The double-deck fixed-span bridge configuration design option would have similar changes in MSAT emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option, but may slightly increase operational emissions due to the higher profile grade, which would increase acceleration and braking of vehicles crossing the bridges.	<ul style="list-style-type: none"> • 1,3-Butadiene: 100% reduction • Acetaldehyde: 85% reduction • Acrolein: 91% reduction • Benzene: 71% reduction • Diesel Particulate Matter: 88% reduction • Ethylbenzene: 30% reduction • Formaldehyde: 89% reduction • Naphthalene: 83% reduction • Polycyclic Organic Matter: 94% reduction 	The single-level movable-span bridge configuration design option would have similar changes in MSAT emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option and Column 4 for the two auxiliary lane design option, except for a minor increase in air pollutants due to vehicles idling during bridge openings. There would be fewer bridge openings than with the No-Build Alternative.

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0 Effect	1 No-Build Alternative	2: IBR Program Recommended Design Options Modified LPA with Single-Level Fixed-Span Bridge Configuration, One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	3 Modified LPA with <u>Double-Deck Fixed-Span Bridge Configuration</u> , One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides	4 Modified LPA with Single-Level Fixed-Span Bridge Configuration, <u>Two Auxiliary Lanes</u> , with C Street Ramps, Centered I-5, and All Five Park and Rides	5 Modified LPA with <u>Single-Level Movable-Span Bridge Configuration</u> , One Auxiliary Lane, with C Street Ramps, Centered I-5, and All Five Park and Rides
Changes in regional criteria pollutant emissions	<ul style="list-style-type: none"> • CO: 61% reduction • NO₂: 75% reduction • VOCs: 26% increase • Total PM₁₀^b: 46% increase • Total PM_{2.5}^c: 39% reduction 	<ul style="list-style-type: none"> • CO: 63% reduction • NO₂: 79% reduction • VOCs: 25% increase • Total PM₁₀^b: 21% increase • Total PM_{2.5}^c: 48% reduction 	The double-deck fixed-span bridge configuration design option would have similar changes in regional criteria pollutant emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option but may slightly increase operational emissions due to the higher profile grade, which would increase acceleration and braking of vehicles crossing the bridges.	<ul style="list-style-type: none"> • CO: 63% reduction • NO₂: 79% reduction • VOCs: 25% increase • Total PM₁₀^b: 22% increase • Total PM_{2.5}^c: 49% reduction 	The single-level movable-span bridge configuration design option would have similar changes in regional criteria pollutant emissions to those described in Column 2 for the single-level fixed-span bridge configuration design option, except for a minor increase in air quality pollutants due to vehicles idling during bridge openings. There would be fewer bridge openings than with the No-Build Alternative.

Note: The underlined design options shown in columns 3 through 5 identify the specific effects on air quality for that particular design option compared to the Modified LPA with Recommended Design Options (column 2). For example, the effects of two auxiliary lanes (column 4) would occur with any other combination of the C Street ramps, I-5 alignment, bridge configuration, and park and ride design options.

a The long-term effects associated with the single-level fixed-span bridge configuration design option would be the same for all bridge types, unless otherwise specified.

b Total PM₁₀ emissions are the sum of PM₁₀ exhaust, PM₁₀ brake wear, and PM₁₀ tire wear.

c Total PM_{2.5} emissions are the sum of PM_{2.5} exhaust, PM_{2.5} brake wear, and PM_{2.5} tire wear.

CO = carbon monoxide; I-5 = Interstate 5; IBR = Interstate Bridge Replacement; LPA = Locally Preferred Alternative; MSAT = Mobile Source Air Toxics; NO₂ = nitrogen dioxide; NO_x = oxides of nitrogen; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; VMT = vehicle miles traveled

Table 3.10-3. Mobile Source Air Toxics Emissions (Tons per Year)

Pollutant	Existing (2015)	No-Build Alternative (2045)	Modified LPA (2045) ^a	Modified LPA Difference from Existing	Modified LPA Difference from No-Build Alternative
MSAT air quality Study Area Daily VMT	2,128,200	3,537,900	3,455,400	62%	-2%
1,3-Butadiene	0.7	0.0	0.0	-100%	0%
Acetaldehyde	2.4	0.4	0.4	-85%	-14%
Acrolein	0.23	0.03	0.02	-90%	-12%
Benzene	14.2	4.3	4.3	-70%	-1%
Diesel Particulate Matter	10.8	1.6	1.3	-88%	-14%
Ethylbenzene	19.0	13.5	13.4	-29%	-1%
Formaldehyde	3.61	0.51	0.45	-88%	-12%
Naphthalene	0.0003	0.0001	0.0001	-83%	-4%
Polycyclic Organic Matter	0.19	0.01	0.01	-64%	-6%

Note: Percentage differences calculated prior to rounding.

a The data for the Modified LPA applies to all design options except the two auxiliary lane option.

LPA = Locally Preferred Alternative; MSAT = Mobile Source Air Toxics; VMT = vehicle miles traveled

Table 3.10-4. Criteria Pollutant Emissions (Tons per Year)

Pollutant	Existing (2015)	No-Build Alternative (2045)	Modified LPA (2045) ^a	Modified LPA Difference from Existing	Modified LPA Difference from No-Build Alternative
MSAT Air Quality Study Area Daily VMT	2,128,200	3,537,900	3,455,400	62%	-2%
Carbon Monoxide	4,355	1,687	1,597	-63%	-5%
Nitrogen Dioxide	897	226	184	-79%	-19%
Volatile Organic Compounds	662	830	826	25%	-1%
Total PM ₁₀ ^b	46.0	67.1	55.9	21%	-17%
Total PM _{2.5} ^c	18.5	11.3	9.6	-48%	-15%

Note: Percentage differences calculated prior to rounding.

a The data for the Modified LPA applies to all design options except the two auxiliary lane option.

b Total PM₁₀ emissions are the sum of PM₁₀ exhaust, PM₁₀ brake wear, and PM₁₀ tire wear.

c Total PM_{2.5} emissions are the sum of PM_{2.5} exhaust, PM_{2.5} brake wear, and PM_{2.5} tire wear.

LPA = Locally Preferred Alternative; MSAT = Mobile Source Air Toxics; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; VMT = vehicle miles traveled

Compared to the No-Build Alternative, travel demand modeling that includes projected transit ridership and potential trip diversion to avoid tolls, showed the Modified LPA would lower emissions of MSAT and criteria pollutants by improving traffic flow and reducing VMT within the air quality study area. The Modified LPA with the single-level fixed-span bridge configuration design option (including any bridge type) or the single-level movable-span bridge configuration design option may slightly reduce operational vehicle emissions because of the lower profile grade, which would reduce acceleration and braking of vehicles crossing the bridges when compared to the Modified LPA double-deck fixed-span bridge configuration design option.

As described Section 3.4, Land Use and Economic Activity, the Modified LPA could encourage development, particularly in light-rail station areas, due to improved bicycle, pedestrian, highway, and transit access in Portland and Vancouver. Such development could generate additional traffic, which would increase air emissions; however, because the Modified LPA would provide additional transportation options such as transit and nonmotorized facilities, any increase in emissions is expected to be minor.

The Modified LPA single-level fixed-span bridge configuration and one auxiliary lane design options and the double-deck fixed-span bridge configuration design option would eliminate emissions from idling during a bridge opening. The Modified LPA with the single-level movable-span bridge configuration design option would still result in idling and emissions due to bridge openings; however, because it would have a higher vertical navigation clearance than the existing bridge, it could result in fewer bridge openings and reduced idling compared to the No-Build Alternative. Because the different bridge configuration design options would not result in meaningfully different regional VMT and speed, there would be no change to the regional travel demand model output, and no additional air quality modeling was warranted. The emissions for all bridge configuration design options are considered to be the same as discussed above for the Modified LPA with one auxiliary lane.

As discussed in 3.2, Navigation, the bridge configuration design option ultimately selected would affect navigation patterns. However, emissions from marine vessels were not evaluated because it is anticipated there would be no change in vessel idling emissions. Currently, bridge openings are scheduled as needed so vessels can pass with limited need for idling. The Modified LPA incorporating any of the bridge configuration design options or bridge type options would result in either the same or less emissions from idling vessels. It is possible that marine traffic could increase if the need for bridge openings is eliminated; while the potential increase in marine traffic was not predicted as part of this analysis, it would be anticipated that the increased marine traffic would not require a bridge opening and therefore not result in marine idling.

Compared to the proposed Modified LPA with one auxiliary lane, the analysis of the long-term effects of the proposed Modified LPA with two auxiliary lanes using the regional travel demand model shows a 1.5% reduction in pollutant emissions (Table 3.10-5 and Table 3.10-6), which is within the margin of error of the modeling tools used for the analysis.

As in the case of the bridge configuration design options and bridge type options described above, the long-term effect on air quality of the Modified LPA would be the same for any of the design options except the two auxiliary lane option (i.e., with or without the I-5 C Street ramps at the SR 14 interchange, with the centered I-5 mainline or the I-5 westward shift, and with any of the park and rides). Because design options other than the two auxiliary lane option would not result in meaningfully different regional VMT and speed, no additional air quality modeling was conducted.

Table 3.10-5. Mobile Source Air Toxics Emissions for the Modified LPA with One or Two Auxiliary Lanes (Tons per Year)^a

Pollutant	Modified LPA with One Auxiliary Lane (2045)	Modified LPA with Two Auxiliary Lanes (2045)	Difference Between Modified LPA with One and Two Auxiliary Lanes
MSAT Air Quality Study Area Daily VMT	3,455,400	3,462,400	0.2%
1,3-Butadiene	0.00	0.00	0.0%
Acetaldehyde	0.4	0.4	-0.9%
Acrolein	0.02	0.02	-0.6%
Benzene	4.3	4.3	0.0%
Diesel Particulate Matter	1.3	1.3	-0.9%
Ethylbenzene	13.4	13.4	0.0%
Formaldehyde	0.45	0.45	-0.7%
Naphthalene	0.0001	0.0001	-0.2%
Polycyclic Organic Matter	0.01	0.01	0.0%

Note: Percentage differences calculated prior to rounding.

a Data in this table apply to all design options, unless otherwise indicated.

LPA = Locally Preferred Alternative; MSAT = Mobile Source Air Toxics; VMT = vehicle miles traveled

Table 3.10-6. Criteria Pollutant Emissions for the Modified LPA with One or Two Auxiliary Lanes (Tons per Year)^a

Pollutant	Modified LPA with One Auxiliary Lane (2045)	Modified LPA with Two Auxiliary Lanes (2045)	Difference Between Modified LPA with One and Two Auxiliary Lanes
MSAT Air Quality Study Area Daily VMT	3,455,400	3,462,400	0.2%
Carbon Monoxide	1,597	1,596.1	0.0%
Nitrogen Dioxide	184	181.6	-1.4%
Volatile Organic Compounds	826	825.5	0.0%
Total PM ₁₀ ^b	55.9	55.3	-1.2%
Total PM _{2.5} ^c	9.6	9.5	-1.0%

Note: Percentage differences calculated prior to rounding.

a Data in this table apply to all design options, unless otherwise indicated.

b Total PM₁₀ emissions are the sum of PM₁₀ exhaust, PM₁₀ brake wear, and PM₁₀ tire wear.

c Total PM_{2.5} emissions are the sum of PM_{2.5} exhaust, PM_{2.5} brake wear, and PM_{2.5} tire wear.

LPA = Locally Preferred Alternative; MSAT = Mobile Source Air Toxics; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than or equal to 10 microns in diameter; VMT = vehicle miles traveled

MSAT Health Effects

Within the air quality study area, there may be localized areas where ambient concentrations of MSAT with the Modified LPA could be different from the No-Build Alternative. The magnitude and duration of potential localized concentration increases cannot be reliably quantified because of uncertainty in future emissions, weather patterns, exposure pathways, and causation of effects.

As discussed in FHWA's 2023 MSAT guidance, the information needed to credibly predict Program-specific health impacts due to changes in MSAT emissions is incomplete or unavailable. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation than by any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

Sensitive Receptors

Some occupants of hospitals, schools, assisted living facilities and other sensitive receptors are more susceptible to the adverse effects of air pollutants than the general public. All of the design options would have the same air quality effect on sensitive receptors in the area (as listed in Table 3.10-2), except the Modified LPA with I-5 westward shift would shift traffic closer to the sensitive receptors, which are located west of the Program footprint and could change localized pollutant emissions and the resulting pollutant concentrations. Because the Portland and Vancouver metropolitan areas are in attainment for NAAQS, no further analysis is necessary to confirm that the Modified LPA would not result in pollutant concentrations in excess of the NAAQS.

3.10.4 Temporary Reasonably Foreseeable Effects

The air quality study area described in Section 3.10.2 and the temporal scope described in the Chapter 3 introduction are used to assess temporary reasonably foreseeable effects to air quality.

No-Build Alternative

The No-Build Alternative would not involve construction and therefore would not result in reasonably foreseeable construction-related air quality effects.

Modified LPA

Reasonably foreseeable temporary effects on air quality would not differ among the Modified LPA design options. Construction of the proposed Modified LPA under any of the design options includes construction of the new bridges and removal of the existing Interstate Bridge. Construction-related activities would result in temporary air emissions, which could include increases in particulate matter in the form of fugitive dust (from demolition, ground clearing and preparation, grading, stockpiling of materials, on-site movement of equipment, and transportation of construction materials) and exhaust emissions from material delivery trucks, construction equipment, and workers' private vehicles. Dust emissions increase during dry weather, construction activities, or high wind conditions. Temporary impacts to air quality from construction activities would occur during the 9- to 15-year Program-wide construction period, which is expected to last from 2 to 10 years in specific locations. Although this construction duration is longer than the 5 years usually considered as temporary under transportation conformity rules (40 § CFR 93.123), these rules do not apply to areas like Portland, which are in attainment for all NAAQS. Locations of elevated emissions would likely occur directly next to the construction activities, staging areas, and material hauling routes.

At this design stage, the IBR Program has not developed detailed construction sequencing plans, which depend on funding, permitting, and other future considerations. Once these plans are developed, some areas located near concentrations of construction activity may be exposed to elevated levels of emissions. To better

understand the potential for increased air emissions near construction sites, particularly for construction activities near sensitive receptors, the IBR Program team reviewed the example of the Dan Ryan Expressway, which had similar scope to the IBR Program. During construction of the Dan Ryan Expressway, air monitoring was conducted at 27 sites—at schools, parks, public housing, and public facilities—where the population was expected to be more sensitive to air contaminants. The monitored pollutants included total dust, respirable silica, lead, asbestos, polycyclic aromatic hydrocarbons (as diesel components), PM₁₀, and PM_{2.5}. Air monitoring was conducted during the construction period (from January 2005 until October 2007) and federal air quality standards were not exceeded. The results from the Dan Ryan Expressway project indicate that the construction activities for the Modified LPA should not result in violations of air quality standards and should not pose an undue health risk to the neighboring communities, including sensitive populations. More information on the Dan Ryan Expressway project can be found in Section 5.2 of the Air Quality Technical Report (as listed in Appendix H).

3.10.5 Intentionally Left Blank

3.10.6 Avoidance, Minimization, and Mitigation Measures

ODOT, WSDOT, and all project contractors would comply with standard and regulatory mitigation measures. As construction phasing plans and mitigation measures are further developed, potential air quality impacts to sensitive receptors will be considered, particularly those due to prolonged construction emissions and/or simultaneous or sequential construction activities. Best management practices would be implemented to reduce and mitigate air quality emissions during construction, including strategies to reduce fugitive dust and reduce vehicle idling. Table 3.10-7 lists temporary avoidance and minimization measures. No long-term avoidance or minimization measures or temporary or long-term mitigation measures within control of the IBR Program were identified.

Table 3.10-7. Avoidance and Minimization Measures

Temporary or Long-Term	Impact Type	Avoidance and Minimization Measure
Temporary	Increased particulate matter and exhaust emissions during construction	<p>For construction in Washington, WSDOT will coordinate with the contractor to comply with the following standard and regulatory air quality measures during construction:</p> <ul style="list-style-type: none"> • WSDOT Standard Specifications for Road, Bridge, and Municipal Construction, Section 1.07.5(4). • Fugitive dust control best management practices set forth in the Associated General Contractors of Washington Education Foundation and Fugitive Dust Task Force pamphlet, “Guide to Handling Fugitive Dust From Construction Projects.” <hr/> <p>For construction in Oregon, ODOT will coordinate with the contractor to comply with the following standard and regulatory air quality measures during construction:</p> <ul style="list-style-type: none"> • Division 208 of OAR 340 • ODOT Standard Specifications Section 290 • The Clean Diesel Construction Standard (OAR-731-005-0800) • Oregon House Bill 2007, known as the “Clean Diesel Bill” • The City of Portland Clean Air Construction Program to reduce diesel emissions by implementing a standard set of idle reduction and diesel equipment requirements on job sites
Temporary	Emissions within communities and residential areas from construction vehicles	<p>ODOT and WSDOT will develop contract specifications that will minimize impacts to surrounding communities such as by using newer low-emitting construction equipment and electric equipment, and avoiding haul routes through residential areas when feasible.</p>

OAR = Oregon Administrative Rules; ODOT = Oregon Department of Transportation; WSDOT = Washington State Department of Transportation