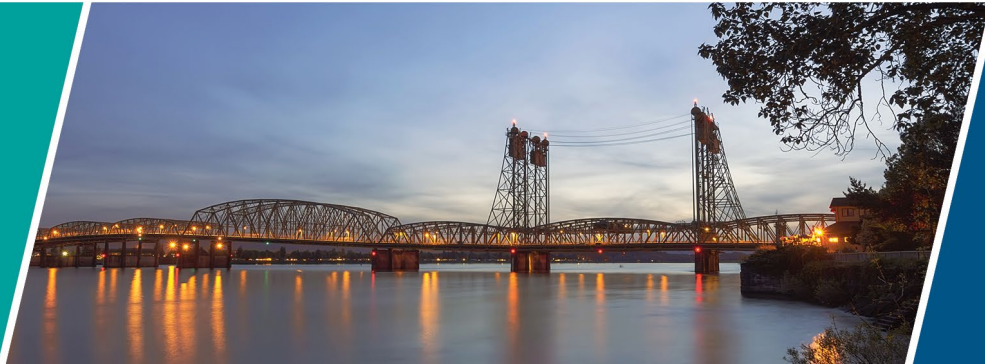




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# Environmental Justice Technical Report

September 2024

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# Environmental Justice Technical Report

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## ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ACS	American Community Survey
BLS	U.S. Bureau of Labor Statistics
BLTS	Bicycle Level of Traffic Stress
BRT	bus rapid transit
CAG	Community Advisory Group
CFR	Code of Federal Regulations
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
C-TRAN	Clark County Public Transit Benefit Area Authority
dBA	decibel (A-weighted)
EAG	Equity Advisory Group
EIS	environmental impact statement
EJ	environmental justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FSCR	Flood Safe Columbia River
FTA	Federal Transit Administration
HCT	high-capacity transit
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
I-405	Interstate 405
I-5	Interstate 5

Acronym/Abbreviation	Definition
IBR	Interstate Bridge Replacement
LOS	level of service
LPA	locally preferred alternative
LRT	light-rail transit
LRV	light-rail vehicle
MAX	Metropolitan Area Express
Metro	Oregon Metro, Portland metropolitan area planning organization
MSA	metropolitan statistical area
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OSPI	Washington Office of Superintendent of Public Instruction
OTC	Oregon Transportation Commission
OTC	Oregon Transportation Commission
PMLS	Portland Metro Levee System
PNCD	Preliminary Navigation Clearance Determination
ROD	Record of Decision
RTP	Regional Transportation Plan
SEIS	supplemental environmental impact statement
SOV	single-occupancy vehicle
SR	State Route
TriMet	Tri-County Metropolitan Transportation District
UFSWQD	Urban Flood Safety and Water Quality District
USACE	U.S. Army Corps of Engineers



<b>Acronym/Abbreviation</b>	<b>Definition</b>
USC	U.S. Code
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
VHD	vehicle hours of delay
VHT	vehicle hours of travel
VMT	vehicle miles traveled
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

## 1. PROGRAM OVERVIEW

This technical report identifies, describes, and evaluates short-term and long-term effects on low-income and minority populations—collectively referred to as environmental justice (EJ) populations—resulting from the Interstate Bridge Replacement (IBR) Program. The construction and operation of transportation infrastructure has the potential to result in permanent and temporary impacts within the Program study area. The IBR Modified Locally Preferred Alternative (LPA) would be designed to avoid and/or minimize these effects to the greatest extent possible. This report provides proposed mitigation measure for potential effects when avoidance is not feasible.

The purpose of this report is to satisfy applicable portions of the National Environmental Policy Act (NEPA) 42 United State Code (USC) 4321 “to promote efforts which will prevent or eliminate damage to the environment.” Information and potential environmental consequences described in this technical report will be used to support the Draft Supplemental Environmental Impact Statement (SEIS) for the IBR Program pursuant to 42 USC 4332.

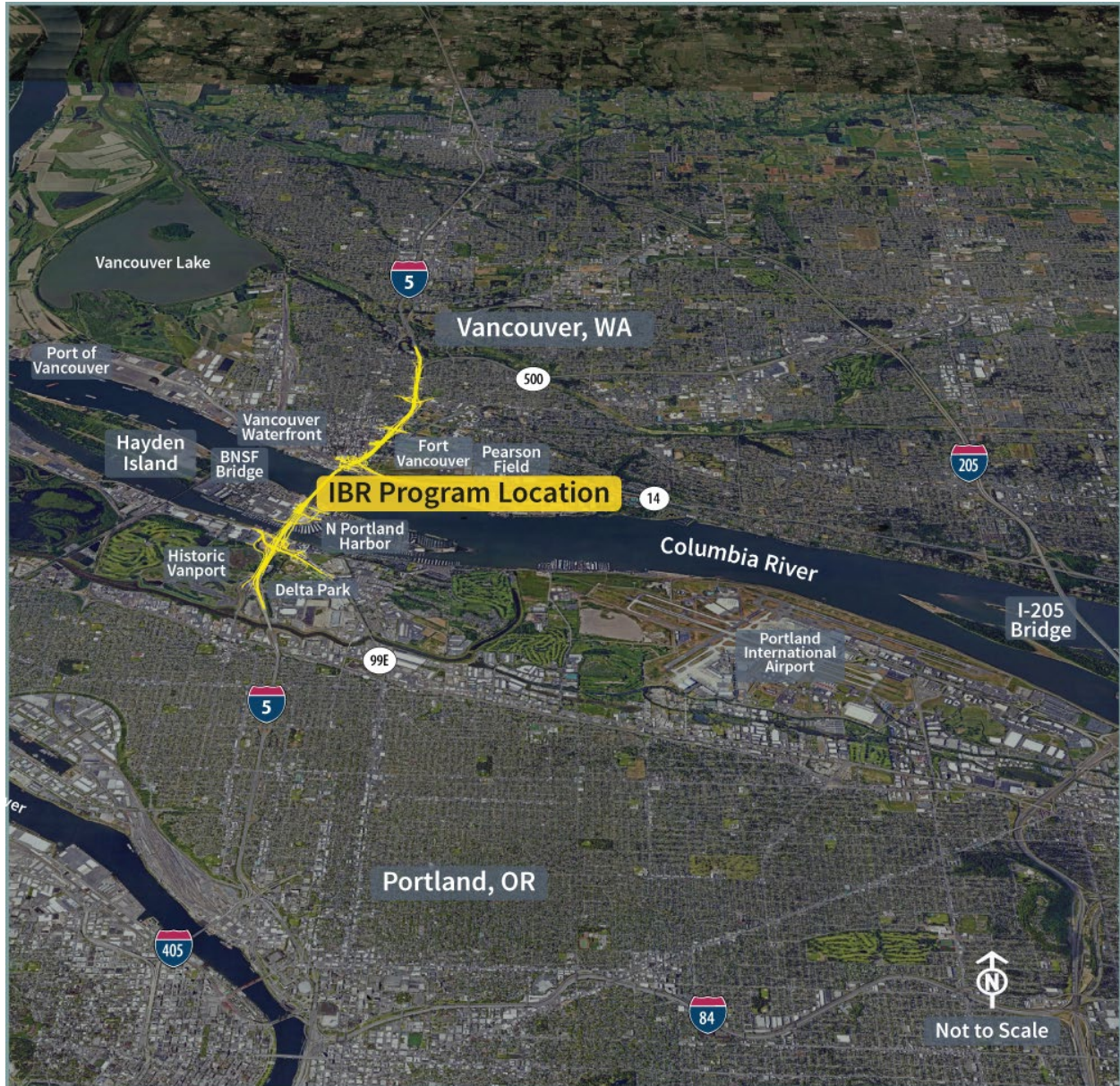
The objectives of this report are to:

- Define the Program’s study area and the methods of data collection and evaluation used for the analysis (Chapter 2).
- Describe existing demographic characteristics and community resources within the study area (Chapter 3).
- Discuss potential long-term, temporary, and indirect effects resulting from construction and operation of the Modified LPA in comparison to the No-Build Alternative (Chapters 4 through 6).
- Provide proposed avoidance and mitigation measures to help prevent, eliminate, or minimize environmental consequences from the Modified LPA (Chapter 7).

The IBR Program is a continuation of the previously suspended Columbia River Crossing (CRC) project with the same purpose to replace the aging Interstate 5 (I-5) Bridge across the Columbia River with a modern, seismically resilient multimodal structure. The proposed infrastructure improvements are located along a 5-mile stretch of the I-5 corridor that extends from approximately Victory Boulevard in Portland to State Route (SR) 500 in Vancouver as shown in Figure 1-1.

The Modified LPA is a modification of the CRC LPA, which completed the NEPA process with a signed Record of Decision (ROD) in 2011 and two re-evaluations that were completed in 2012 and 2013. The CRC project was discontinued in 2014. This Technical Report is evaluating the effects of changes in project design since the CRC ROD and re-evaluations, as well as changes in regulations, policy, and physical conditions.

Figure 1-1. IBR Program Location Overview





## 1.1 Components of the Modified LPA

The basic components of the Modified LPA include:

- A new pair of Columbia River bridges—one for northbound and one for southbound travel—built west of the existing bridge. The new bridges would each include three through lanes, safety shoulders, and one auxiliary lane (a ramp-to-ramp connection on the highway that improves interchange safety by providing drivers with more space and time to merge, diverge, and weave) in each direction. When all highway, transit, and active transportation would be moved to the new Columbia River bridges, the existing Interstate Bridge (both spans) would be removed.
  - Three bridge configurations are under consideration: (1) double-deck truss bridges with fixed spans, (2) single-level bridges with fixed spans, and (3) single-level bridges with movable spans over the primary navigation channel. The fixed-span configurations would provide up to 116 feet of vertical navigation clearance, and the movable-span configuration would provide 178 feet of vertical navigation clearance in the open position. The primary navigation channel would be relocated approximately 500 feet south (measured by channel centerline) of its existing location near the Vancouver shoreline.
  - A two auxiliary lane design option (two ramp-to-ramp lanes connecting interchanges) across the Columbia River is also being evaluated. The second auxiliary lane in each direction of I-5 would be added from approximately Interstate Avenue/Victory Boulevard to SR 500/39th Street.
- A 1.9-mile light-rail transit (LRT) extension of the current Metropolitan Area Express (MAX) Yellow Line from the Expo Center MAX Station in North Portland, where it currently ends, to a terminus near Evergreen Boulevard in Vancouver. Improvements would include new stations at Hayden Island, downtown Vancouver (Waterfront Station), and near Evergreen Boulevard (Evergreen Station), as well as revisions to the existing Expo Center MAX Station. Park and rides to serve LRT riders in Vancouver could be included near the Waterfront Station and Evergreen Station. The Tri-County Metropolitan Transportation District of Oregon (TriMet), which operates the MAX system, would also operate the Yellow Line extension.
  - Potential site options for park and rides include three sites near the Waterfront Station and two near the Evergreen Station (up to one park and ride could be built for each station location in Vancouver).
- Associated LRT improvements such as traction power substations, overhead catenary system, signal and communications support facilities, an overnight light-rail vehicle (LRV) facility at the Expo Center, 19 new LRVs, and an expanded maintenance facility at TriMet's Ruby Junction.
- Integration of local bus transit service, including bus rapid transit (BRT) and express bus routes, in addition to the proposed new LRT service.
- Wider shoulders on I-5 from Interstate Avenue/Victory Boulevard to SR 500/39th Street to accommodate express bus-on-shoulder service in each direction.
- Associated bus transit service improvements would include three additional bus bays for eight new electric double-decker buses at the Clark County Public Transit Benefit Area Authority

(C-TRAN) operations and maintenance facility (see Section 1.1.7, Transit Operating Characteristics, for more information about this service).

- Improvements to seven I-5 interchanges and I-5 mainline improvements between Interstate Avenue/ Victory Boulevard in Portland and SR 500/39th Street in Vancouver. Some adjacent local streets would be reconfigured to complement the new interchange designs, and improve local east-west connections.
  - An option that shifts the I-5 mainline up to 40 feet westward in downtown Vancouver between the SR 14 interchange and Mill Plain Boulevard interchange is being evaluated.
  - An option that eliminates the existing C Street ramps in downtown Vancouver is being evaluated.
- Six new adjacent bridges across North Portland Harbor: one on the east side of the existing I-5 North Portland Harbor bridge and five on the west side or overlapping with the existing bridge (which would be removed). The bridges would carry (from west to east) LRT tracks, southbound I-5 off-ramp to Marine Drive, southbound I-5 mainline, northbound I-5 mainline, northbound I-5 on-ramp from Marine Drive, and an arterial bridge for local traffic with a shared-use path for pedestrians and bicyclists.
- A variety of improvements for people who walk, bike, and roll throughout the study area, including a system of shared-use paths, bicycle lanes, sidewalks, enhanced wayfinding, and facility improvements to comply with the Americans with Disabilities Act. These are referred to in this document as *active transportation* improvements.
- Variable-rate tolling for motorists using the river crossing as a demand-management and financing tool.

The transportation improvements proposed for the Modified LPA and the design options are shown in Figure 1-2. The Modified LPA includes all of the components listed above. If there are differences in environmental effects or benefits between the design options, those are identified in the sections below.

Figure 1-2. Modified LPA Components



Section 1.1.1, Interstate 5 Mainline, describes the overall configuration of the I-5 mainline through the study area, and Sections 1.1.2, Portland Mainland and Hayden Island (Subarea A), through Section 1.1.5, Upper Vancouver (Subarea D), provide additional detail on four geographic subareas (A through D), which are shown on Figure 1-3. In each subarea, improvements to I-5, its interchanges, and the local roadways are described first, followed by transit and active transportation improvements. Design options are described under separate headings in the subareas in which they would be located.



Figure 1-3. Modified LPA – Geographic Subareas



Table 1-1 shows the different combinations of design options analyzed in this Technical Report. However, **any combination of design options is compatible**. In other words, any of the bridge configurations could be combined with one or two auxiliary lanes, with or without the C Street ramps, a centered or westward shift of I-5 in downtown Vancouver, and any of the park-and-ride location options. Figures in each section show both the anticipated limit of ground disturbance, which includes disturbance from temporary construction activities, and the location of permanent infrastructure elements.

Table 1-1. Modified LPA and Design Options

Design Options	Modified LPA	Modified LPA with Two Auxiliary Lanes	Modified LPA Without C Street Ramps	Modified LPA with I-5 Shifted West	Modified LPA with a Single-Level Fixed-Span Configuration	Modified LPA with a Single-Level Movable-Span Configuration
Bridge Configuration	<b>Double-deck fixed-span*</b>	Double-deck fixed-span	Double-deck fixed-span	Double-deck fixed-span	<b>Single-level fixed-span*</b>	<b>Single-level movable-span*</b>
Auxiliary Lanes	<b>One*</b>	<b>Two*</b>	One	One	One	One
C Street Ramps	<b>With C Street ramps*</b>	With C Street ramps	<b>Without C Street Ramps*</b>	With C Street ramps	With C Street ramps	With C Street ramps
I-5 Alignment	<b>Centered*</b>	Centered	Centered	<b>Shifted West*</b>	Centered	Centered
Park-and-Ride Options	<b>Waterfront:*</b> 1. Columbia Way (below I-5); 2. Columbia Street/SR 14; 3. Columbia Street/Phil Arnold Way <b>Evergreen:*</b> 1. Library Square; 2. Columbia Credit Union					

**Bold** text with an asterisk (\*) indicates which design option is different in each configuration.

### 1.1.1 Interstate 5 Mainline

Today, within the 5-mile corridor, I-5 has three 12-foot-wide through lanes in each direction, an approximately 6- to 11-foot-wide inside shoulder, and an approximately 10- to 12-foot-wide outside shoulder with the exception of the Interstate Bridge, which has approximately 2- to 3-foot-wide inside and outside shoulders. There are currently intermittent auxiliary lanes between the Victory Boulevard and Hayden Island interchanges in Oregon and between SR 14 and SR 500 in Washington.

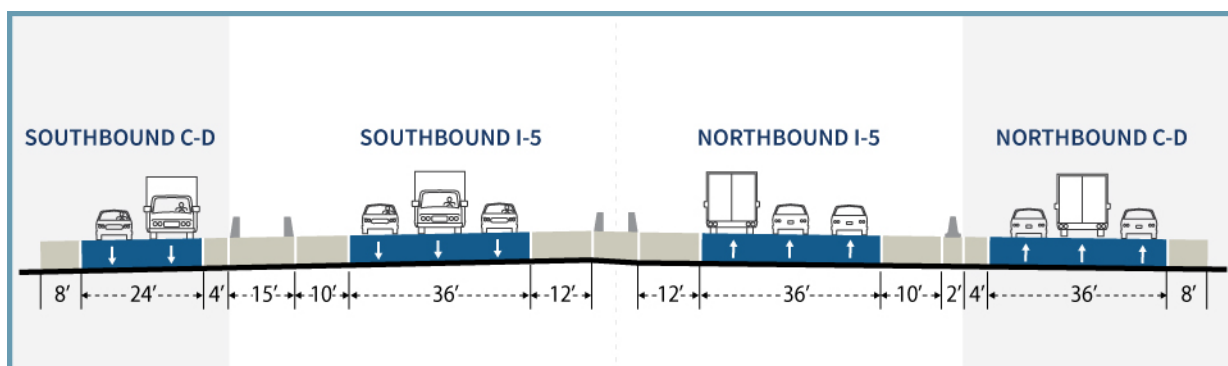
The Modified LPA would include three 12-foot through lanes from Interstate Avenue/Victory Boulevard to SR 500/39th Street and a 12-foot auxiliary lane from the Marine Drive interchange to the Mill Plain Boulevard interchange in each direction. Many of the existing auxiliary lanes on I-5 between the SR 14 and Main Street interchanges in Vancouver would remain, although they would be reconfigured. The existing auxiliary lanes between the Victory Boulevard and Hayden Island interchanges would be



replaced with changes to on- and off-ramps and interchange reconfigurations. The Modified LPA would also include wider shoulders (12-foot inside shoulders and 10- to 12-foot outside shoulders) to be consistent with ODOT and WSDOT design standards. The wider inside shoulder would be used by express bus service to bypass mainline congestion, known as “bus on shoulder” (refer to Section 1.1.7, Transit Operating Characteristics). The shoulder would be available for express bus service when general-purpose speeds are below 35 miles per hour (mph).

Figure 1-4 shows a cross section of the collector-distributor (C-D)<sup>1</sup> roadways, Figure 1-5 shows the location of the C-D roadways, and Figure 1-6 shows the proposed auxiliary lane layout. The existing Interstate Bridge over the Columbia River does not have an auxiliary lane; the Modified LPA would add one auxiliary lane in each direction across the new Columbia River bridges.

Figure 1-4. Cross Section of the Collector-Distributor Roadways



On I-5 northbound, the auxiliary lane that would begin at the on-ramp from Marine Drive would continue across the Columbia River bridge and end at the off-ramp to the C-D roadway, north of SR 14 (see Figure 1-5). The on-ramp from SR 14 westbound would join the off-ramp to the C-D roadway, forming the northbound C-D roadway between SR 14 and Fourth Plain Boulevard. The C-D roadway would provide access from I-5 northbound to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard. The C-D roadway would also provide access from SR 14 westbound to the off-ramps at Mill Plain Boulevard and Fourth Plain Boulevard, and to the on-ramp to I-5 northbound.

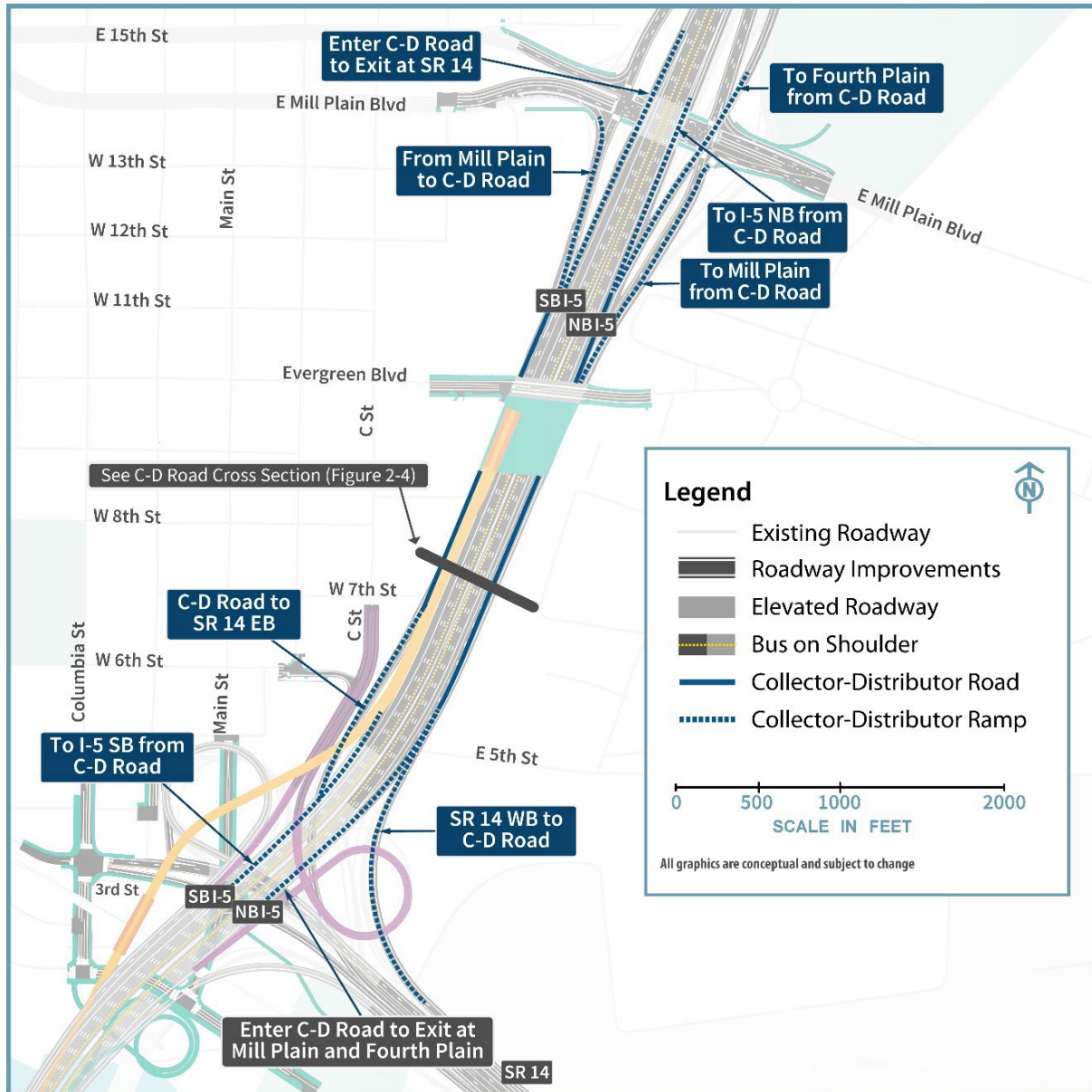
On I-5 northbound, the Modified LPA would also add one auxiliary lane beginning at the on-ramp from the C-D roadway and ending at the on-ramp from 39th Street, connecting to an existing auxiliary lane from 39th Street to the off-ramp at Main Street. Another existing auxiliary lane would remain between the on-ramp from Mill Plain Boulevard to the off-ramp to SR 500.

On I-5 southbound, the off-ramp to the C-D roadway would join the on-ramp from Mill Plain Boulevard to form a C-D roadway. The C-D roadway would provide access from I-5 southbound to the off-ramp to SR 14 eastbound and from Mill Plain Boulevard to the off-ramp to SR 14 eastbound and the on-ramp to I-5 southbound.

<sup>1</sup> A collector-distributor roadway parallels and connects the main travel lanes of a highway and frontage roads or entrance ramps.

On I-5 southbound, an auxiliary lane would begin at the on-ramp from the C-D roadway and would continue across the southbound Columbia River bridge and end at the off-ramp to Marine Drive. The combined on-ramp from SR 14 westbound and C Street would merge into this auxiliary lane.

Figure 1-5. Collector-Distributor Roadways



C-D = collector-distributor; EB = eastbound; NB = northbound; SB = southbound; WB = westbound

### 1.1.1.1 Two Auxiliary Lane Design Option

This design option would add a second 12-foot-wide auxiliary lane in each direction of I-5 with the intent to further optimize travel flow in the corridor. This second auxiliary lane is proposed from the Interstate Avenue/Victory Boulevard interchange to the SR 500/39th Street interchange.

On I-5 northbound, one auxiliary lane would begin at the combined on-ramp from Interstate Avenue and Victory Boulevard, and a second auxiliary lane would begin at the on-ramp from Marine Drive. Both auxiliary lanes would continue across the northbound Columbia River bridge, and the on-ramp from Hayden Island would merge into the second auxiliary lane on the northbound Columbia River bridge. At the off-ramp to the C-D roadway, the second auxiliary lane would end but the first auxiliary lane would continue. A second auxiliary lane would begin again at the on-ramp from Mill Plain Boulevard. The second auxiliary lane would end at the off-ramp to SR 500, and the first auxiliary lane would connect to an existing auxiliary lane at 39th Street to the off-ramp at Main Street.

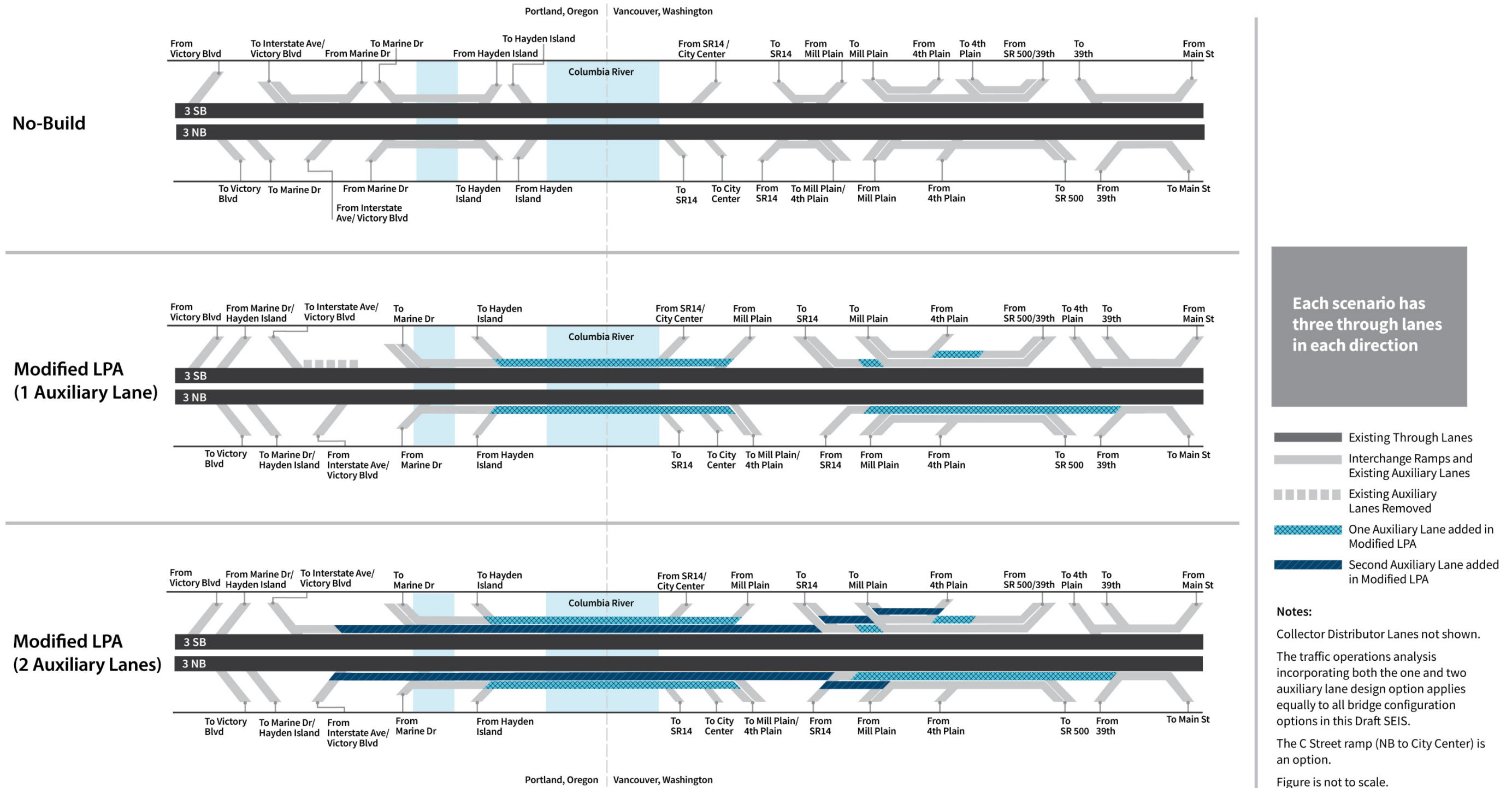
On I-5 southbound, two auxiliary lanes would begin at the on-ramp from SR 500. Between the on-ramp from Fourth Plain Boulevard and the off-ramp to Mill Plain Boulevard, one auxiliary lane would be added to the existing two auxiliary lanes. The second auxiliary lane would end at the off-ramp to the C-D roadway, but the first auxiliary lane would continue. A second auxiliary lane would begin again at the southbound I-5 on-ramp from the C-D roadway. Both auxiliary lanes would continue across the southbound Columbia River bridge, and the combined on-ramp from SR 14 westbound and C Street would merge into the second auxiliary lane on the southbound Columbia River bridge. The second auxiliary lane would end at the off-ramp to Marine Drive, and the first auxiliary lane would end at the combined off-ramp to Interstate Avenue and Victory Boulevard.

Figure 1-6 shows a comparison of the one auxiliary lane configuration and the two auxiliary lane configuration design option. Figure 1-7 shows a comparison of the footprints (i.e., the limit of permanent improvements) of the one auxiliary lane and two auxiliary lane configurations on a double-deck fixed-span bridge. For all Modified LPA bridge configurations (described in Section 1.1.3, Columbia River Bridges (Subarea B)), the footprints of the two auxiliary lane configurations differ only over the Columbia River and in downtown Vancouver. The rest of the corridor would have the same footprint. For all bridge configurations analyzed in this document, the two auxiliary lane option would add 16 feet (8 feet in each direction) in total roadway width compared to the one auxiliary lane option due to the increased shoulder widths for the one auxiliary lane option.<sup>2</sup> The traffic operations analysis incorporating both the one and two auxiliary lane design options applies equally to all bridge configurations in this Technical Report.

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<sup>2</sup> Under the one auxiliary lane option, the width of each shoulder would be approximately 14 feet to accommodate maintenance of traffic during construction. Under the two auxiliary lane option, maintenance of traffic could be accommodated with 12-foot shoulders because the additional 12-foot auxiliary lane provides adequate roadway width. The total difference in roadway width in each direction between the one auxiliary lane option and the two auxiliary lane option would be 8 feet (12-foot auxiliary lane – 2 feet from the inside shoulder – 2 feet from the outside shoulder = 8 feet).

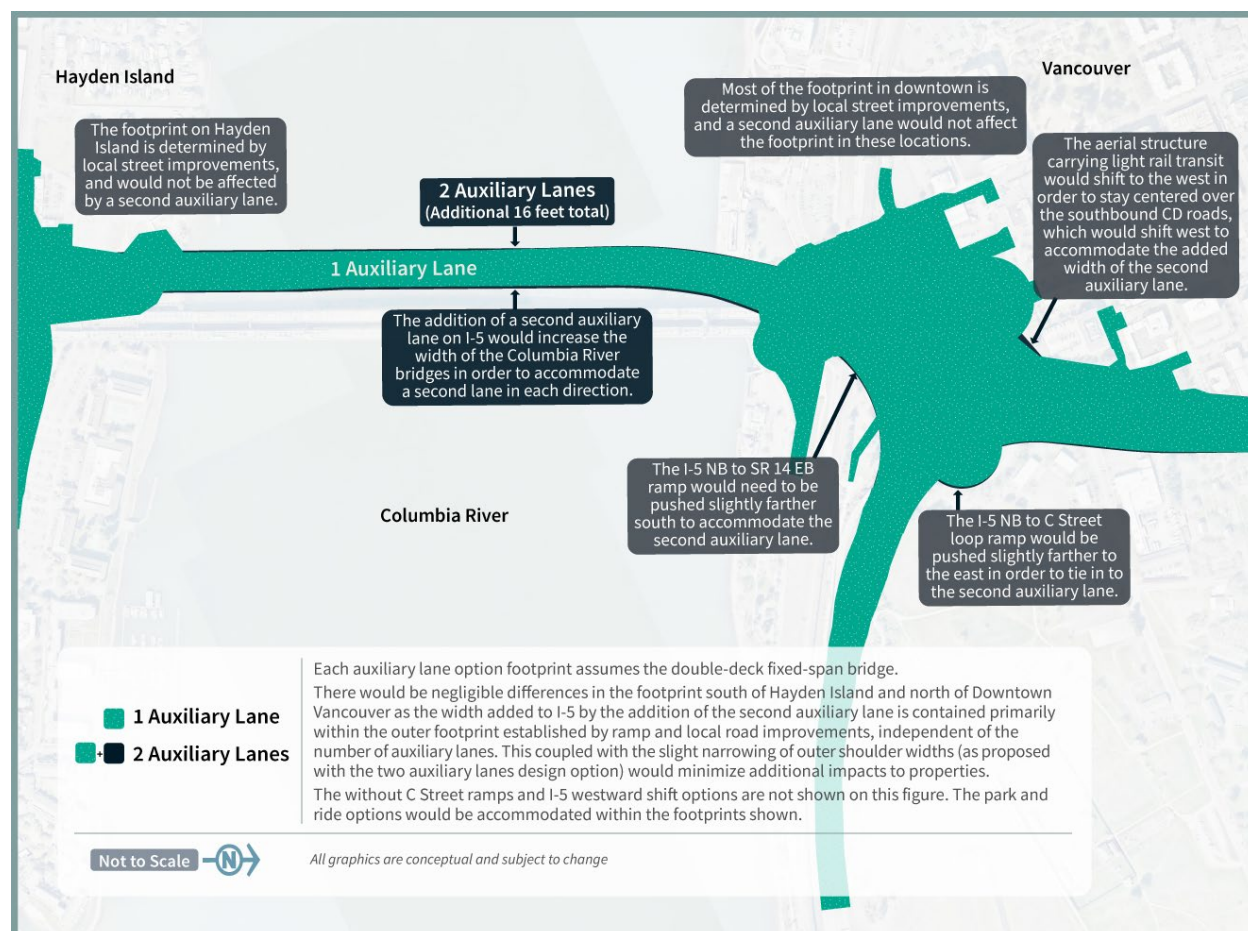
Figure 1-6. Comparison of Auxiliary Lane Configurations



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Figure 1-7. Auxiliary Lane Configuration Footprint Differences



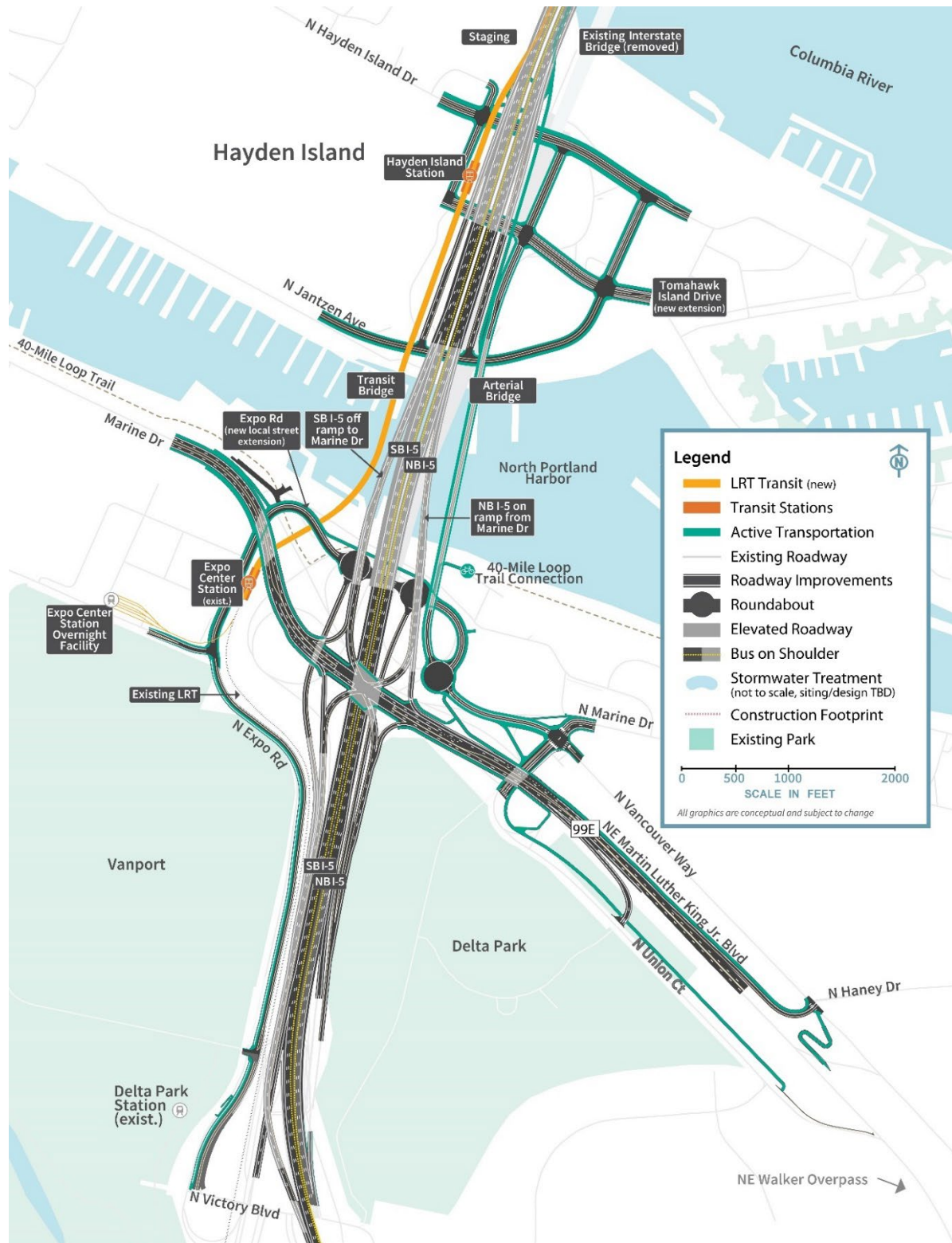
### 1.1.2 Portland Mainland and Hayden Island (Subarea A)

This section discusses the geographic Subarea A shown in Figure 1-3. See Figure 1-8 for highway and interchange improvements in Subarea A, including the North Portland Harbor bridge. Figure 1-8 illustrates the one auxiliary lane design option; please refer to Figure 1-6 and the accompanying description for how two auxiliary lanes would alter the Modified LPA’s proposed design. Refer to Figure 1-3 for an overview of the geographic subareas.

Within Subarea A, the IBR Program has the potential to alter three federally authorized levee systems:

- The Oregon Slough segment of the Peninsula Drainage District Number 1 levee (PEN 1).
- The Oregon Slough segment of the Peninsula Drainage District Number 2 levee (PEN 2).
- The PEN1/PEN2 cross levee segment of the PEN 1 levee (Cross Levee).

Figure 1-8. Portland Mainland and Hayden Island (Subarea A)



LRT = light-rail transit; NB = northbound; SB = southbound; TBD = to be determined

The levee systems are shown on Figure 1-9, and intersections with Modified LPA components are described throughout Section 1.1.2, Portland Mainland and Hayden Island (Subarea A), where appropriate. Within Subarea A, the IBR Program study area intersects with PEN 1 to the west of I-5 and with PEN 2 to the east of I-5. PEN 1 and PEN 2 include a main levee along the south side of North Portland Harbor and are part of a combination of levees and floodwalls. PEN 1 and PEN 2 are separated by the Cross Levee that is intended to isolate the two districts if one of them fails. The Cross Levee is located along the I-5 mainline embankment, except in the Marine Drive interchange area where it is located on the west edge of the existing ramp from Marine Drive to southbound I-5.<sup>3</sup>

There are two concurrent efforts underway that are planning improvements to PEN1, PEN2, and the Cross Levee to reduce flood risk:

- The U.S. Army Corps of Engineers (USACE) Portland Metro Levee System (PMLS) project.
- The Flood Safe Columbia River (FSCR) program (also known as “Levee Ready Columbia”).

The Urban Flood Safety and Water Quality District (UFSWQD)<sup>4</sup> is working with the USACE through the PMLS project, which includes improvements at PEN 1 and PEN 2 (e.g., raising these levees to elevation 38 feet North American Vertical Datum of 1988 [NAVD 88]).<sup>5</sup> Additionally, as part of the FSCR program, UFSWQD is studying raising a low spot in the Cross Levee on the southwest side of the Marine Drive interchange.

The IBR Program is in close coordination with these concurrent efforts to ensure that the IBR Program’s design efforts consider the timing and scope of the PMLS and the FSCR proposed modifications. The intersection of the IBR Program proposed actions to both the existing levee configuration and the anticipated future condition based on the proposed PMLS and FSCR projects are described below, where appropriate.

### 1.1.2.1 Highways, Interchanges, and Local Roadways

#### VICTORY BOULEVARD/INTERSTATE AVENUE INTERCHANGE AREA

The southern extent of the Modified LPA would improve two ramps at the Victory Boulevard/Interstate Avenue interchange (see Figure 1-8). The first ramp improvement would be the southbound I-5 off-ramp to Victory Boulevard/ Interstate Avenue; this off-ramp would be braided below (i.e., grade separated or pass below) the Marine Drive to the I-5 southbound on-ramp (see the Marine Drive Interchange Area section below). The other ramp improvement would lengthen the merge distance for northbound traffic entering I-5 from Victory Boulevard and from Interstate Avenue.

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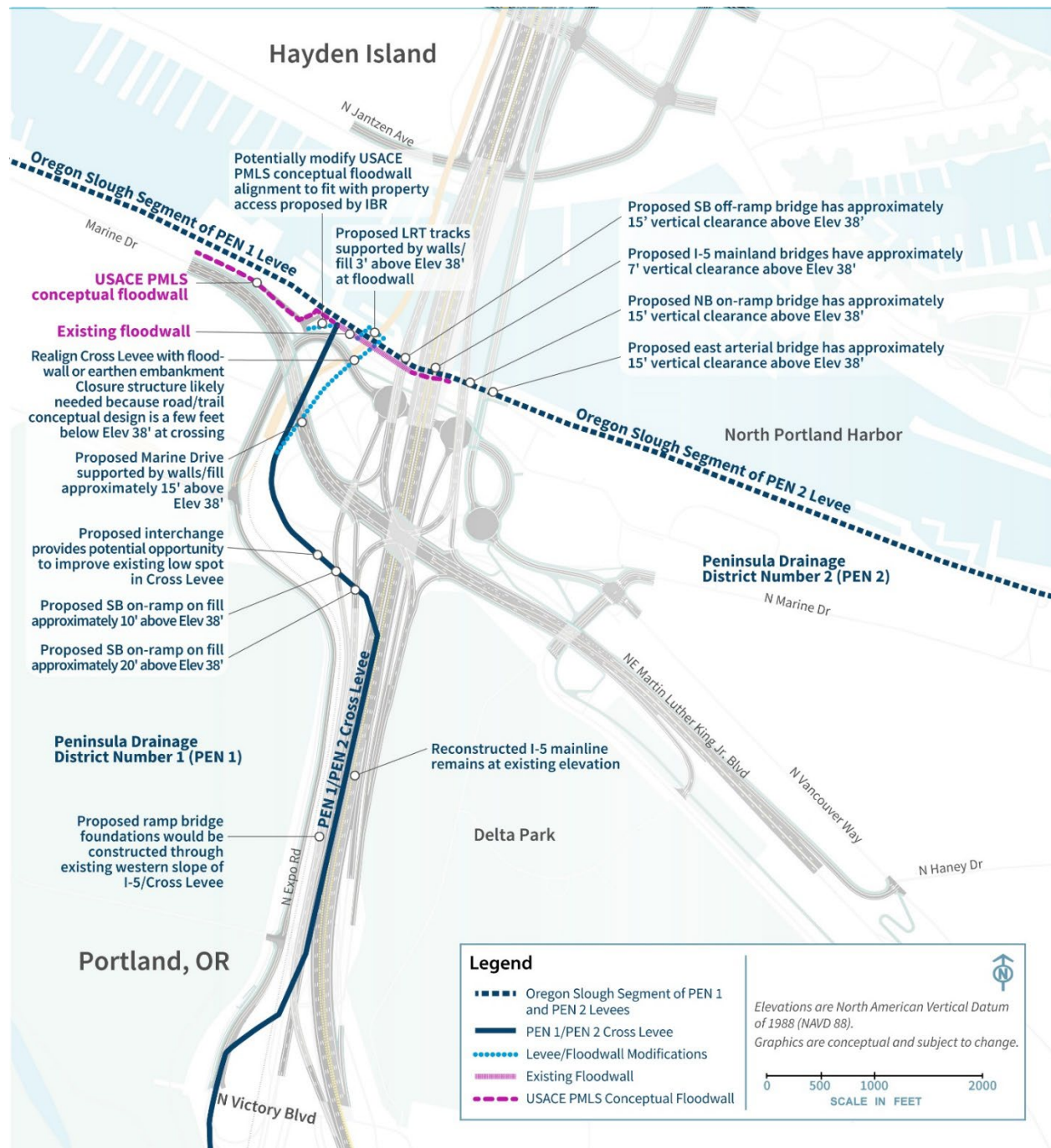
<sup>3</sup> The portion of the original Denver Avenue levee alignment within the Marine Drive interchange area is no longer considered part of the levee system by UFSWQD.

<sup>4</sup> UFSWQD includes PEN 1 and PEN 2, Urban Flood Safety and Water Quality District No. 1, and the Sandy Drainage Improvement Company.

<sup>5</sup> NAVD 88 is a vertical control datum (reference point) used by federal agencies for surveying.



Figure 1-9. Levee Systems in Subarea A





The existing I-5 mainline between Victory Boulevard/Interstate Avenue and Marine Drive is part of the Cross Levee (see Figure 1-9). The Modified LPA would require some pavement reconstruction of the mainline in this area; however, the improvements would mostly consist of pavement overlay and the profile and footprint would be similar to existing conditions.

#### MARINE DRIVE INTERCHANGE AREA

The next interchange north of the Victory Boulevard/Interstate Avenue interchange is at Marine Drive. All movements within this interchange would be reconfigured to reduce congestion for motorists entering and exiting I-5. The new configuration would be a single-point urban interchange. The new interchange would be centered over I-5 versus on the west side under existing conditions. See Figure 1-8 for the Marine Drive interchange's layout and construction footprint.

The Marine Drive to I-5 southbound on-ramp would be braided over I-5 southbound to the Victory Boulevard/Interstate Avenue off-ramp. Martin Luther King Jr. Boulevard would have a new more direct connection to I-5 northbound.

The new interchange configuration would change the westbound Marine Drive and westbound Vancouver Way connections to Martin Luther King Jr. Boulevard. An improved connection farther east of the interchange (near Haney Street) would provide access to westbound Martin Luther King Jr. Boulevard for these two streets. For eastbound travelers on Martin Luther King Jr. Boulevard exiting to Union Court, the existing loop connection would be replaced with a new connection farther east (near the access to the East Delta Park Owens Sports Complex).

Expo Road from Victory Boulevard to the Expo Center would be reconstructed with improved active transportation facilities. North of the Expo Center, Expo Road would be extended under Marine Drive and continue under I-5 to the east, connecting with Marine Drive and Vancouver Way through three new connected roundabouts. The westernmost roundabout would connect the new local street extension to I-5 southbound. The middle roundabout would connect the I-5 northbound off-ramp to the local street extension. The easternmost roundabout would connect the new local street extension to an arterial bridge crossing North Portland Harbor to Hayden Island. This roundabout would also connect the local street extension to Marine Drive and Vancouver Way.

To access Hayden Island using the arterial bridge from the east on Martin Luther King Jr. Boulevard, motorists would exit Martin Luther King Jr. Boulevard at the existing off-ramp to Vancouver Way just west of the Walker Street overpass. Then motorists would travel west on Vancouver Way, through the intersection with Marine Drive and straight through the roundabout to the arterial bridge.

From Hayden Island, motorists traveling south to Portland via Martin Luther King Jr. Boulevard would turn onto the arterial bridge southbound and travel straight through the roundabout onto Vancouver Way. At the intersection of Vancouver Way and Marine Drive, motorists would turn right onto Union Court and follow the existing road southeast to the existing on-ramp onto Martin Luther King Jr. Boulevard.

The conceptual floodwall alignment from the proposed USACE PMLS project is located on the north side of Marine Drive, near two industrial properties, with three proposed closure structures<sup>6</sup> for property access. The Modified LPA would realign Marine Drive to the south and provide access to the two industrial properties via the new local road extension from Expo Road. Therefore, the change in access for the two industrial properties could require small modifications to the floodwall alignment (a potential shift of 5 to 10 feet to the south) and closure structure locations.

Marine Drive and the two southbound on-ramps would travel over the Cross Levee approximately 10 to 20 feet above the proposed elevation of the improved levee, and they would be supported by fill and retaining walls near an existing low spot in the Cross Levee.

The I-5 southbound on-ramp from Marine Drive would continue on a new bridge structure. Although the bridge's foundation locations have not been determined yet, they would be constructed through the western slope of the Cross Levee (between the existing I-5 mainline and the existing light-rail).

#### NORTH PORTLAND HARBOR BRIDGES

To the north of the Marine Drive interchange is the Hayden Island interchange area, which is shown in Figure 1-8. I-5 crosses over the North Portland Harbor when traveling between these two interchanges. The Modified LPA proposes to replace the existing I-5 bridge spanning North Portland Harbor to improve seismic resiliency.

Six new parallel bridges would be built across the waterway under the Modified LPA: one on the east side of the existing I-5 North Portland Harbor bridge and five on the west side or overlapping the location of the existing bridge (which would be removed). From west to east, these bridges would carry:

- The LRT tracks.
- The southbound I-5 off-ramp to Marine Drive.
- The southbound I-5 mainline.
- The northbound I-5 mainline.
- The northbound I-5 on-ramp from Marine Drive.
- An arterial bridge between the Portland mainland and Hayden Island for local traffic; this bridge would also include a shared-use path for pedestrians and bicyclists.

Each of the six replacement North Portland Harbor bridges would be supported on foundations constructed of 10-foot-diameter drilled shafts. Concrete columns would rise from the drilled shafts and connect to the superstructures of the bridges. All new structures would have at least as much vertical navigation clearance over North Portland Harbor as the existing North Portland Harbor bridge.

Compared to the existing bridge, the two new I-5 mainline bridges would have a similar vertical clearance of approximately 7 feet above the proposed height of the improved levees (elevation 38 feet NAVD 88). The two ramp bridges and the arterial bridge would have approximately 15 feet of vertical clearance above the proposed height of the levees. The foundation locations for the five roadway

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<sup>6</sup> Levee closure structures are put in place at openings along the embankment/floodwall to provide flood protection during high water conditions.

bridges have not been determined at this stage of design, but some foundations could be constructed through landward or riverward levee slopes.

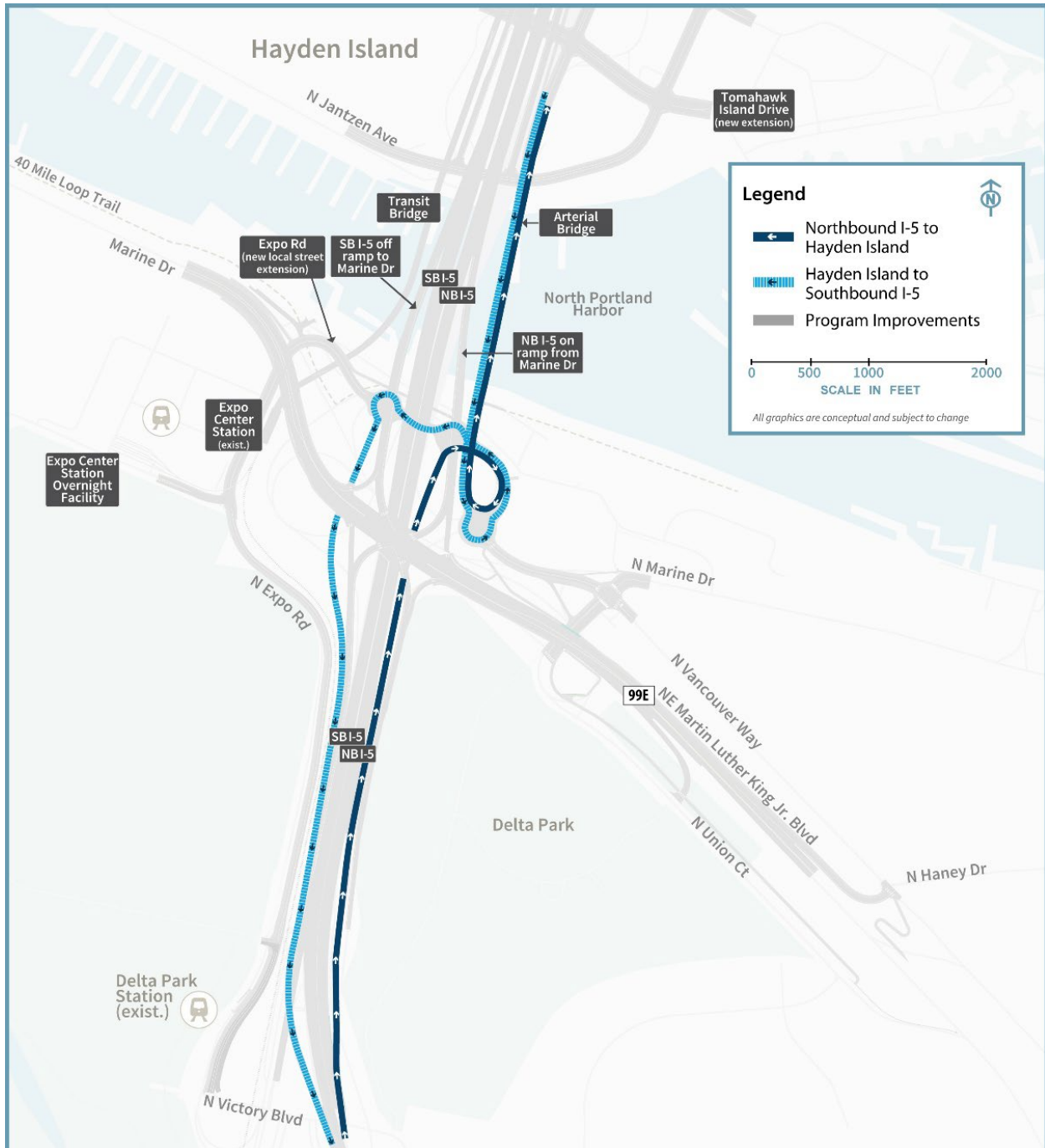
#### HAYDEN ISLAND INTERCHANGE AREA

All traffic movements for the Hayden Island interchange would be reconfigured. See Figure 1-8 for a layout and construction footprint of the Hayden Island interchange. A half-diamond interchange would be built on Hayden Island with a northbound I-5 on-ramp from Jantzen Drive and a southbound I-5 off-ramp to Jantzen Drive. This would lengthen the ramps and improve merging/diverging speeds compared to the existing substandard ramps that require acceleration and deceleration in a short distance. The I-5 mainline would be partially elevated and partially located on fill across the island.

There would not be a southbound I-5 on-ramp or northbound I-5 off-ramp on Hayden Island. Connections to Hayden Island for those movements would be via the local access (i.e., arterial) bridge connecting North Portland to Hayden Island (Figure 1-10). Vehicles traveling northbound on I-5 wanting to access Hayden Island would exit with traffic going to the Marine Drive interchange, cross under Martin Luther King Jr. Boulevard to the new roundabout at the Expo Road local street extension, travel east through this roundabout to the easternmost roundabout, and use the arterial bridge to cross North Portland Harbor. Vehicles on Hayden Island looking to enter I-5 southbound would use the arterial bridge to cross North Portland Harbor, cross under I-5 using the new Expo Road local street extension to the westernmost roundabout, cross under Marine Drive, merge with the Marine Drive southbound on-ramp, and merge with I-5 southbound south of Victory Boulevard.

Improvements to Jantzen Avenue may include additional left-turn and right-turn lanes at the interchange ramp terminals and active transportation facilities. Improvements to Hayden Island Drive would include new connections to the new arterial bridge over North Portland Harbor. The existing I-5 northbound and southbound access points from Hayden Island Drive would also be removed. A new extension of Tomahawk Island Drive would travel east-west through the middle of Hayden Island and under the I-5 interchange, thus improving connectivity across I-5 on the island.

Figure 1-10. Vehicle Circulation between Hayden Island and the Portland Mainland



NB = northbound; SB = southbound

### 1.1.2.2 Transit

A new light-rail alignment for northbound and southbound trains would be constructed within Subarea A (see Figure 1-8) to extend from the existing Expo Center MAX Station over North Portland Harbor to a new station at Hayden Island. An overnight LRV facility would be constructed on the southeast corner of the Expo Center property (see Figure 1-8) to provide storage for trains during hours when MAX is not in service. This facility is described in Section 1.1.6, Transit Support Facilities. The existing Expo Center MAX Station would be modified to remove the westernmost track and platform. Other platform modifications, including track realignment and regrading the station, are anticipated to transition to the extension alignment. This may require reconstruction of the operator break facility, signal/communication buildings, and traction power substations. Immediately north of the Expo Center MAX Station, the alignment would curve east toward I-5, pass beneath Marine Drive, cross the proposed Expo Road local street extension and the 40-Mile Loop Trail at grade, then rise over the existing levee onto a light-rail bridge to cross North Portland Harbor. On Hayden Island, proposed transit components include northbound and southbound LRT tracks over Hayden Island; the tracks would be elevated at approximately the height of the new I-5 mainline. An elevated LRT station would also be built on the island immediately west of I-5. The light-rail alignment would extend north on Hayden Island along the western edge of I-5 before transitioning onto the lower level of the new double-deck western bridge over the Columbia River (see Figure 1-8). For the single-level configurations, the light-rail alignment would extend to the outer edge of the western bridge over the Columbia River.

After crossing the new local road extension from Expo Road, the new light-rail track would cross over the main levee (see Figure 1-9). The light-rail profile is anticipated to be approximately 3 feet above the improved levees at the existing floodwall (and improved floodwall), and the tracks would be constructed on fill supported by retaining walls above the floodwall. North of the floodwall, the light-rail tracks would continue onto the new light-rail bridge over North Portland Harbor (as described above).

The Modified LPA's light-rail extension would be close to or would cross the north end of the Cross Levee. The IBR Program would realign the Cross Levee to the east of the light-rail alignment to avoid the need for a closure structure on the light-rail alignment. This realigned Cross Levee would cross the new local road extension. A closure structure may be required because the current proposed roadway is a few feet lower than the proposed elevation of the improved levee.

### 1.1.2.3 Active Transportation

In the Victory Boulevard interchange area (see Figure 1-8), active transportation facilities would be provided along Expo Road between Victory Boulevard and the Expo Center; this would provide a direct connection between the Victory Boulevard and Marine Drive interchange areas, as well as links to the Delta Park and Expo Center MAX Stations.

New shared-use path connections throughout the Marine Drive interchange area would provide access between the Bridgeton neighborhood (on the east side of I-5), Hayden Island, and the Expo Center MAX Station. There would also be connections to the existing portions of the 40-Mile Loop Trail, which runs north of Marine Drive under I-5 through the interchange area. The path would

continue along the extension of Expo Road under the interchange to the intersection of Marine Drive and Vancouver Way, where it would connect under Martin Luther King Jr. Boulevard to Delta Park.

East of the Marine Drive interchange, new shared-use paths on Martin Luther King Jr. Boulevard and on the parallel street, Union Court, would connect travelers to Marine Drive and across the arterial bridge to Hayden Island. The shared-use facilities on Martin Luther King Jr. Boulevard would provide westbound and eastbound cyclists and pedestrians with off-street crossings of the interchange and would also provide connections to both the Expo Center MAX Station and the 40-Mile Loop Trail to the west.

The new arterial bridge over North Portland Harbor would include a shared-use path for pedestrians and bicyclists (see Figure 1-8). On Hayden Island, pedestrian and bicycle facilities would be provided on Jantzen Avenue, Hayden Island Drive, and Tomahawk Island Drive. The shared-use path on the arterial bridge would continue along the arterial bridge to the south side of Tomahawk Island Drive. A parallel, elevated path from the arterial bridge would continue adjacent to I-5 across Hayden Island and cross above Tomahawk Island Drive and Hayden Island Drive to connect to the lower level of the new double-deck eastern bridge or the outer edge of the new single-level eastern bridge over the Columbia River. A ramp down to the north side of Hayden Island Drive would be provided from the elevated path.

### 1.1.3 Columbia River Bridges (Subarea B)

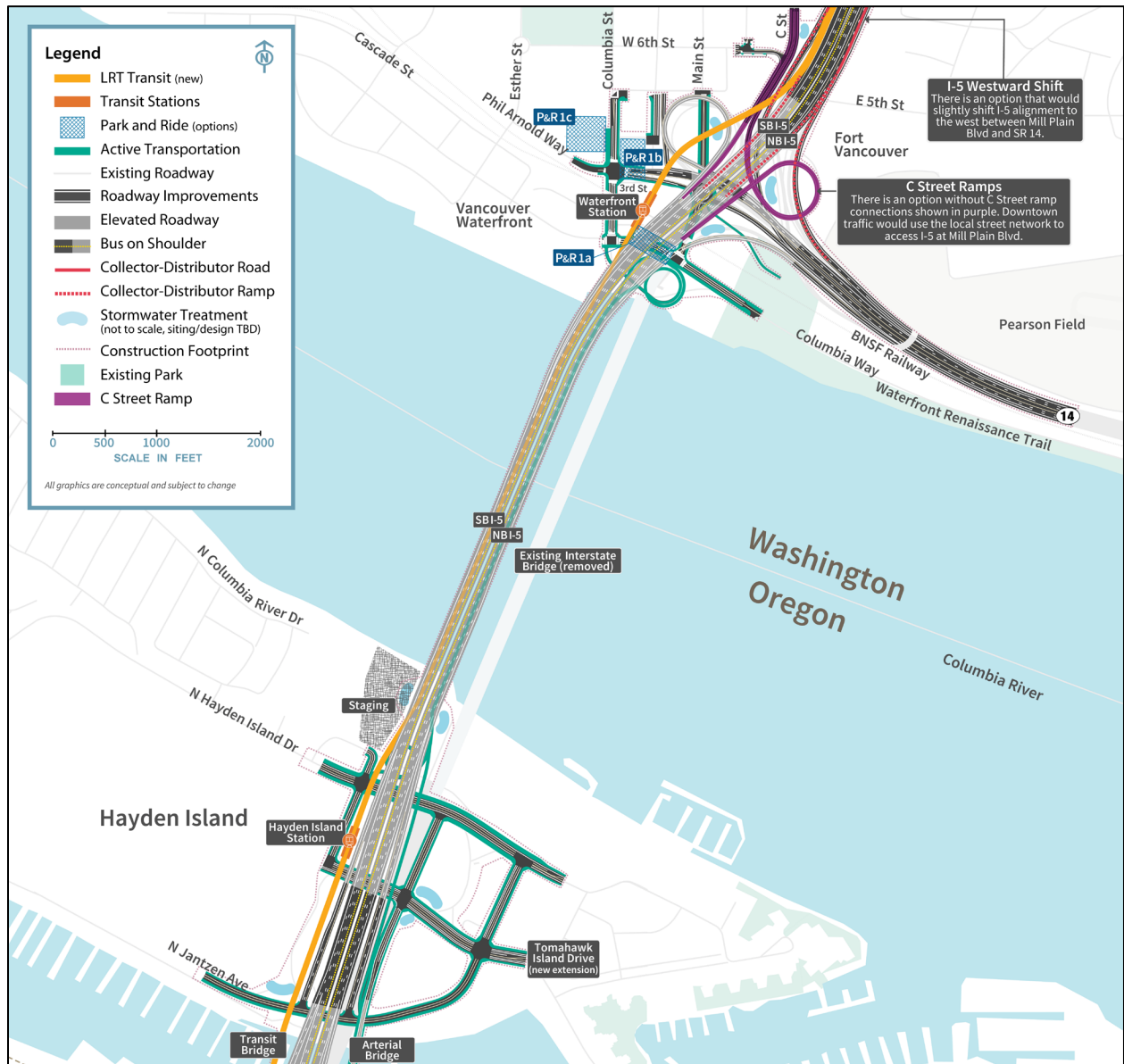
This section discusses the geographic Subarea B shown in Figure 1-3. See Figure 1-11 for highway and interchange improvements in Subarea B. Refer to Figure 1-3 for an overview of the geographic subareas.

#### 1.1.3.1 Highways, Interchanges, and Local Roadways

The two existing parallel I-5 bridges that cross the Columbia River would be replaced by two new parallel bridges, located west of the existing bridges (see Figure 1-11). The new eastern bridge would accommodate northbound highway traffic and a shared-use path. The new western bridge would carry southbound traffic and two-way light-rail tracks. Whereas the existing bridges each have three lanes with no shoulders, each of the two new bridges would be wide enough to accommodate three through lanes, one or two auxiliary lanes, and shoulders on both sides of the highway. Lanes and shoulders would be built to full design standards.



Figure 1-11. Columbia River Bridges (Subarea B)



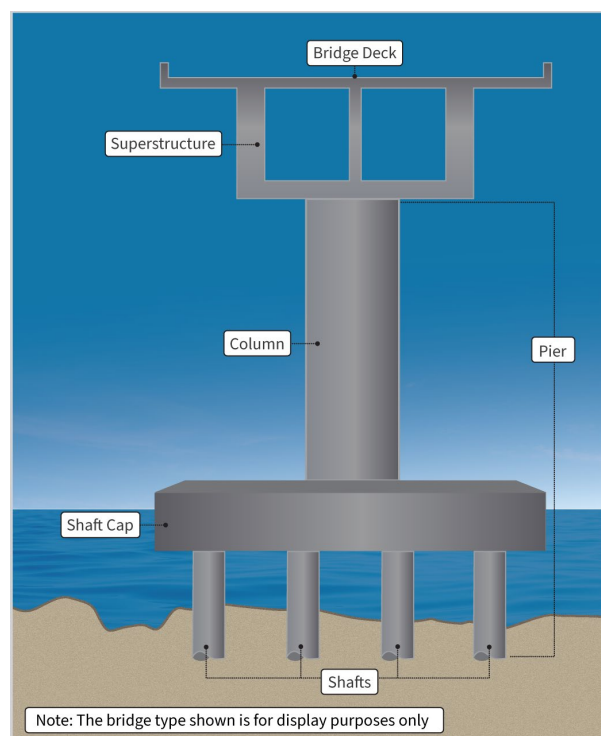
As with the existing bridge (Figure 1-13), the new Columbia River bridges would provide three navigation channels: a primary navigation channel and two barge channels (see Figure 1-14). The current location of the primary navigation channel is near the Vancouver shoreline where the existing lift spans are located. Under the Modified LPA, the primary navigation channel would be shifted south approximately 500 feet (measured by channel centerlines), and the existing center barge channel would shift north and become the north barge channel. The new primary navigation channel would be 400 feet wide (this width includes a 300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side of the authorized channel) and the two barge channels would also each be 400 feet wide.

The existing Interstate Bridge has nine in-water pier sets,<sup>7</sup> whereas the new Columbia River bridges (any bridge configuration) would be built on six in-water pier sets, plus multiple piers on land (pier locations are shown on Figure 1-14). Each in-water pier set would be supported by a foundation of drilled shafts; each group of shafts would be tied together with a concrete shaft cap. Columns or pier walls would rise from the shaft caps and connect to the superstructures of the bridges (see Figure 1-12).

## BRIDGE CONFIGURATIONS

Three bridge configurations are being considered: (1) double-deck fixed-span (with one bridge type), (2) a single-level fixed-span (with three potential bridge types), and (3) a single-level movable-span (with one bridge type). Both the double-deck and single-level fixed-span configurations would provide 116 feet of vertical navigation clearance at their respective highest spans; the same as the CRC LPA. The CRC LPA included a double-deck fixed-span bridge configuration. The single-level fixed-span configuration was developed and is being considered as part of the IBR Program in response to physical and contextual changes (i.e., design and operational considerations) since 2013 that necessitated examination of a refinement in the double-deck bridge configuration (e.g., ingress and egress of transit from the lower level of the double-deck fixed-span configuration on the north end of the southbound bridge).

Figure 1-12. Bridge Foundation Concept



<sup>7</sup> A pier set consists of the pier supporting the northbound bridge and the pier supporting the southbound bridge at a given location.



Figure 1-13. Existing Navigation Clearances of the Interstate Bridge

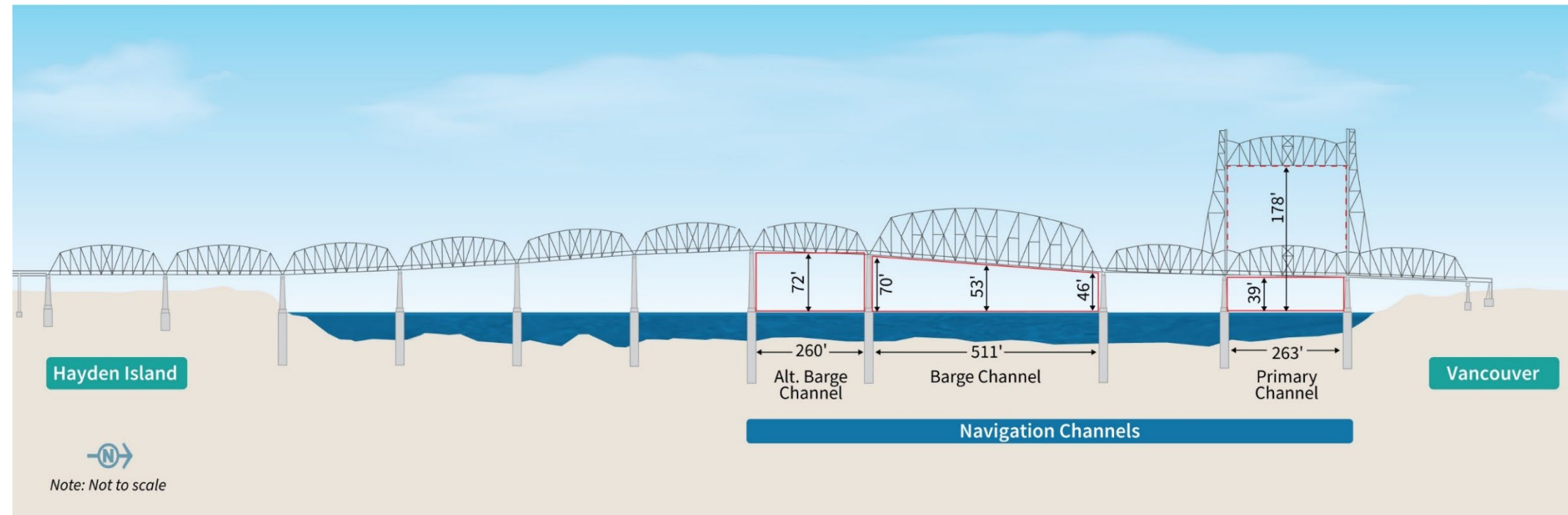
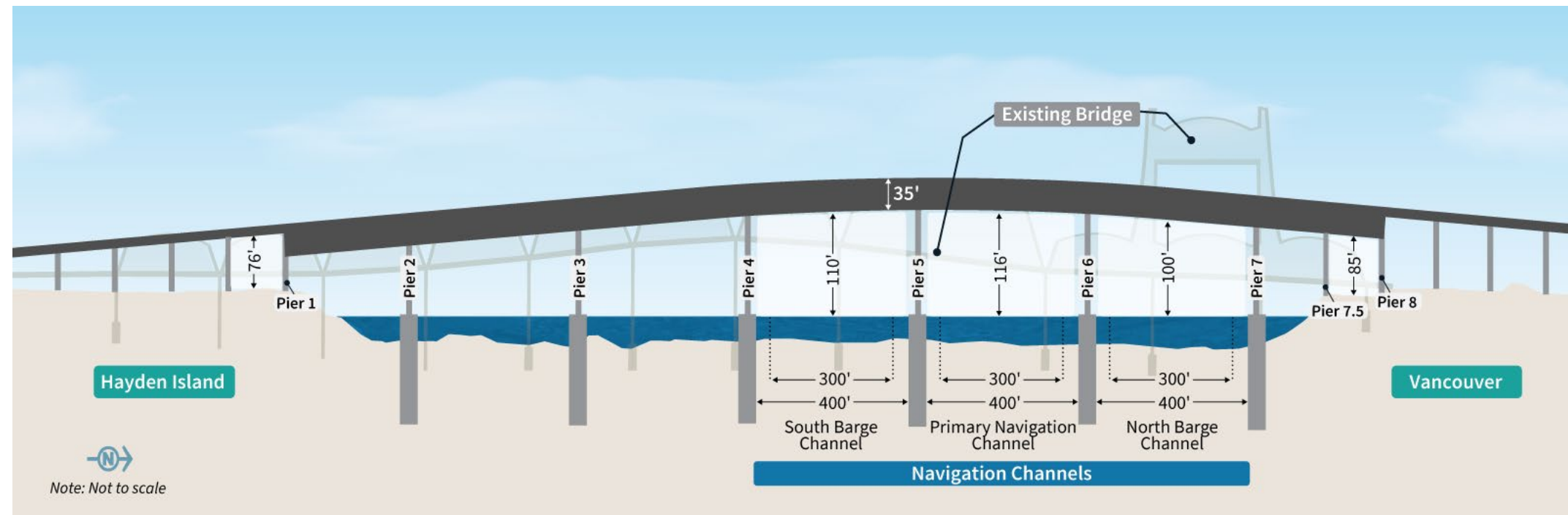


Figure 1-14. Profile and Navigation Clearances of the Proposed Modified LPA Columbia River Bridges with a Double-Deck Fixed-Span Configuration



Note: The location and widths of the proposed navigation channels would be same for all bridge configuration and bridge type options. The three navigation channels would each be 400 feet wide (this width includes a 300-foot congressionally or USACE-authorized channel (shown in dotted lines) plus a 50-foot channel maintenance buffer on each side of the authorized channel). The vertical navigation clearance would vary.

Consideration of the single-level movable-span configuration as part the IBR Program was necessitated by the U.S. Coast Guard’s (USCG) review of the Program’s navigation impacts on the Columbia River and issuance of a Preliminary Navigation Clearance Determination (PNCD) (USCG 2022). The USCG PNCD set the preliminary vertical navigation clearance recommended for the issuance of a bridge permit at 178 feet; this is the current vertical navigation clearance of the Interstate Bridge.

The IBR Program is carrying forward the three bridge configurations to address changed conditions, including changes in the USCG bridge permitting process, in order to ensure a permissible bridge configuration is within the range of options considered. The IBR Program continues to refine the details supporting navigation impacts and is coordinating closely with the USCG to determine how a fixed-span bridge may be permissible. Although the fixed-span configurations do not comply with the current USCG PNCD, they do meet the Purpose and Need and provide potential improvements to traffic (passenger vehicle and freight), transit, and active transportation operations.

Each of the bridge configurations assumes one auxiliary lane; two auxiliary lanes could be applied to any of the bridge configurations. All typical sections for the one auxiliary lane option would provide 14-foot shoulders to maintain traffic during construction of the Modified LPA and future maintenance.

### Double-Deck Fixed-Span Configuration

The double-deck fixed-span configuration would be two side-by-side, double-deck, fixed-span steel truss bridges. Figure 1-15 is an example of this configuration (this image is subject to change and is shown as a representative concept; it does not depict the final design). The double-deck fixed-span configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by aircraft using Pearson Field or Portland International Airport.

The eastern bridge would accommodate northbound highway traffic on the upper level and the shared-use path and utilities on the lower level. The western bridge would carry southbound traffic on the upper level and two-way light-rail tracks on the lower level. Each bridge deck would be 79 feet wide, with a total out-to-out width of 173 feet.<sup>8</sup>

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<sup>8</sup> “Out-to-out width” is the measurement between the outside edges of the bridge across its width at the widest point.

Figure 1-15. Conceptual Drawing of a Double-Deck Fixed-Span Configuration



Note: Visualization is looking southwest from Vancouver.

Figure 1-16 is a cross section of the two parallel double-deck bridges. Like all bridge configurations, the double-deck fixed-span configuration would have six in-water pier sets. Each pier set would require 12 in-water drilled shafts, for a total of 72 in-water drilled shafts. Each individual shaft cap would be approximately 50 feet by 85 feet. This bridge configuration would have a 3.8% maximum grade on the Oregon side of the bridge and a 4% maximum grade on the Washington side.

### Single-Level Fixed-Span Configuration

The single-level fixed-span configuration would have two side-by-side, single-level, fixed-span steel or concrete bridges. This report considers three single-level fixed-span bridge type options: a girder bridge, an extradosed bridge, and a finback bridge. The description in this section applies to all three bridge types (unless otherwise indicated). Conceptual examples of each of these options are shown on Figure 1-17. These images are subject to change and do not represent final design.

This configuration would provide 116 feet of vertical navigation clearance for river traffic using the primary navigation channel and 400 feet of horizontal navigation clearance at the primary navigation channel, as well as barge channels. This bridge height would not impede takeoffs and landings by aircraft using Pearson Field or Portland International Airport.

The eastern bridge would accommodate northbound highway traffic and the shared-use path; the bridge deck would be 104 feet wide. The western bridge would carry southbound traffic and two-way light-rail tracks; the bridge deck would be 113 feet wide. The I-5 highway, light-rail tracks, and the shared-use path would be on the same level across the two bridges, instead of being divided between two levels with the double-deck configuration. The total out-to-out width of the single-level fixed-span configuration (extradosed or finback options) would be 272 feet at its widest point, approximately 99 feet wider than the double-deck configuration. The total out-to-out width of the single-level fixed-span configuration (girder option) would be 232 feet at its widest point. Figure 1-18 shows a typical cross section of the single-level configuration. This cross section is a representative example of an extradosed or finback bridge as shown by the 10-foot-wide superstructure above the bridge deck; the girder bridge would not have the 10-foot-wide bridge columns shown on Figure 1-18.

Figure 1-16. Cross Section of the Double-Deck Fixed-Span Configuration

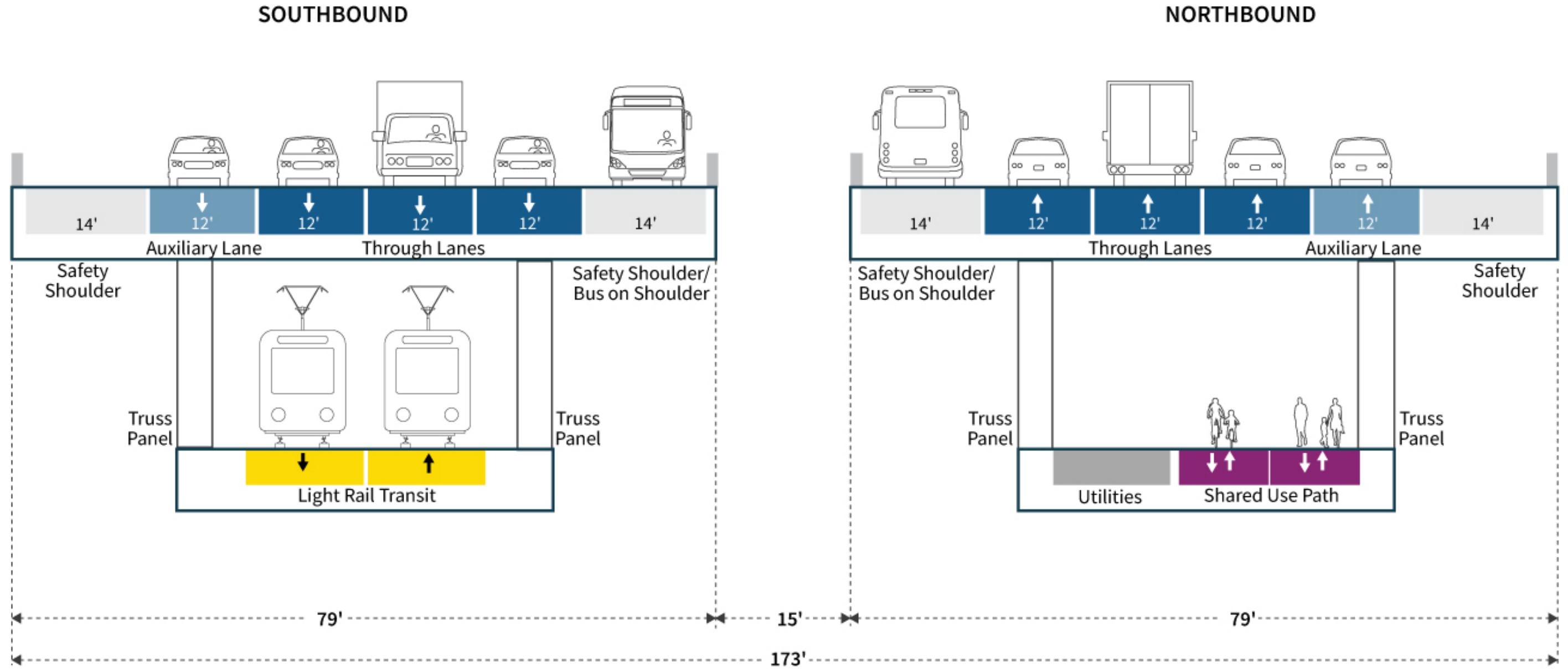




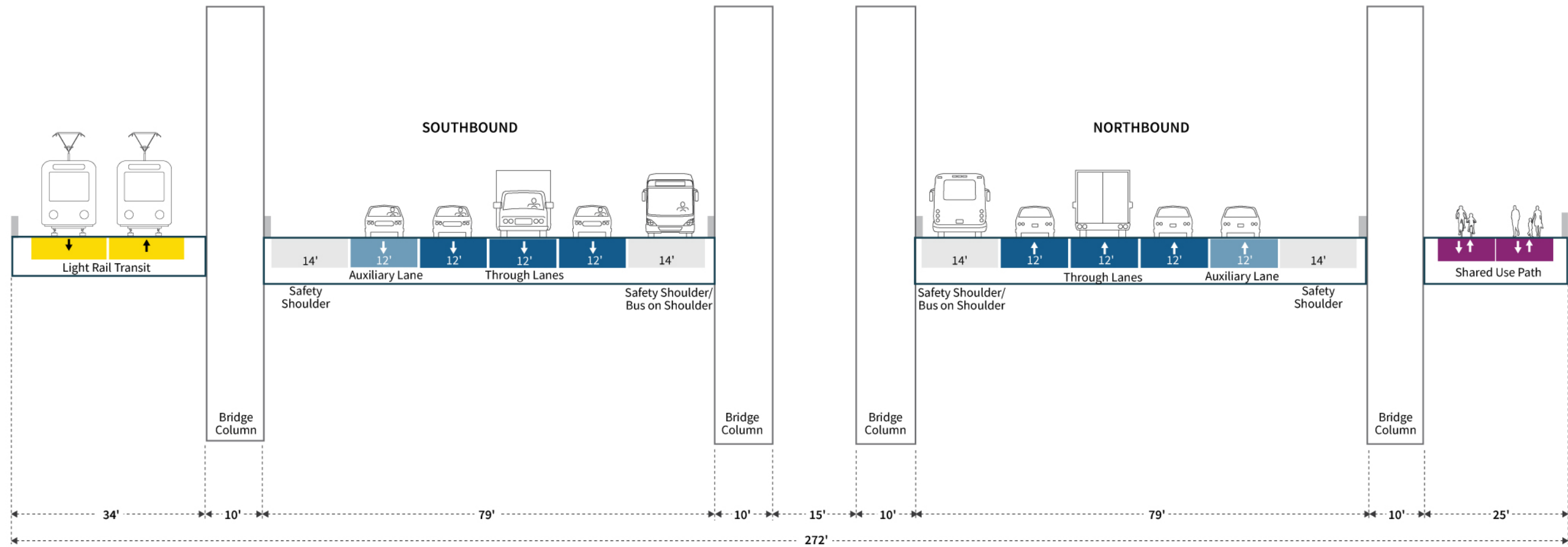
Figure 1-17. Conceptual Drawings of Single-Level Fixed-Span Bridge Types



Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southwest from Vancouver.



Figure 1-18. Cross Section of the Single-Level Fixed-Span Configuration (Extradosed or Finback Bridge Types)



Note: The cross section for a girder type bridge would be the same except that it would not have the four 10-foot bridge columns making the total out-to-out width 232 feet.

There would be six in-water pier sets with 16 in-water drilled shafts on each combined shaft cap, for a total of 96 in-water drilled shafts. The combined shaft caps for each pier set would be 50 feet by 230 feet.

This bridge configuration would have a 3% maximum grade on both the Oregon and Washington sides of the bridge.

### Single-Level Movable-Span Configuration

The single-level movable-span configuration would have two side-by-side, single-level steel girder bridges with movable spans between Piers 5 and 6. For the purpose of this report, the IBR Program assessed a vertical lift span movable-span configuration with counterweights based on the analysis in the *River Crossing Bridge Clearance Assessment Report – Movable-Span Options*, included as part of Attachment C in Appendix D, Design Options Development, Screening, and Evaluation Technical Report. A conceptual example of a vertical lift-span bridge is shown in Figure 1-19. These images are subject to change and do not represent final design.

Figure 1-19. Conceptual Drawings of Single-Level Movable-Span Configurations in the Closed and Open Positions



Note: Visualizations are for illustrative purposes only. They do not reflect property impacts or represent final design. Visualization is looking southeast (upstream) from Vancouver.

A movable span must be located on a straight and flat bridge section (i.e., without curvature and with minimal slope). To comply with these requirements, and for the bridge to maintain the highway, transit, and active transportation connections on Hayden Island and in Vancouver while minimizing property acquisitions and displacements, the movable span is proposed to be located 500 feet south of the existing lift span, between Piers 5 and 6. To accommodate this location of the movable span, the IBR Program is coordinating with USACE to obtain authorization to change the location of the primary navigation channel, which currently aligns with the Interstate Bridge lift spans near the Washington shoreline.

The single-level movable-span configuration would provide 92 feet of vertical navigation clearance over the proposed relocated primary navigation channel when the movable spans are in the closed position, with 99 feet of vertical navigation clearance available over the north barge channel. The 92-foot vertical clearance is based on achieving a straight, movable span and maintaining an acceptable grade for transit operations. In addition, it satisfies the requirement of a minimum of 72 feet of vertical navigation clearance (the existing Interstate Bridge's maximum clearance over the alternate (southernmost) barge channel when the existing lift span is in the closed position).

In the open position, the movable span would provide 178 feet of vertical navigation clearance over the proposed relocated primary navigation channel.

Similar to the fixed-span configurations, the movable span would provide 400 feet of horizontal navigation clearance for the primary navigation channel and for each of the two barge channels.

The vertical lift-span towers would be approximately 243 feet high; this is shorter than the existing lift-span towers, which are 247 feet high. This height of the vertical lift-span towers would not impede takeoffs and landings by aircraft using Portland International Airport. At Pearson Field, the Federal Aviation Administration issues obstacle departure procedures to avoid the existing Interstate Bridge lift towers; the single-level movable-span configuration would retain the same procedures.

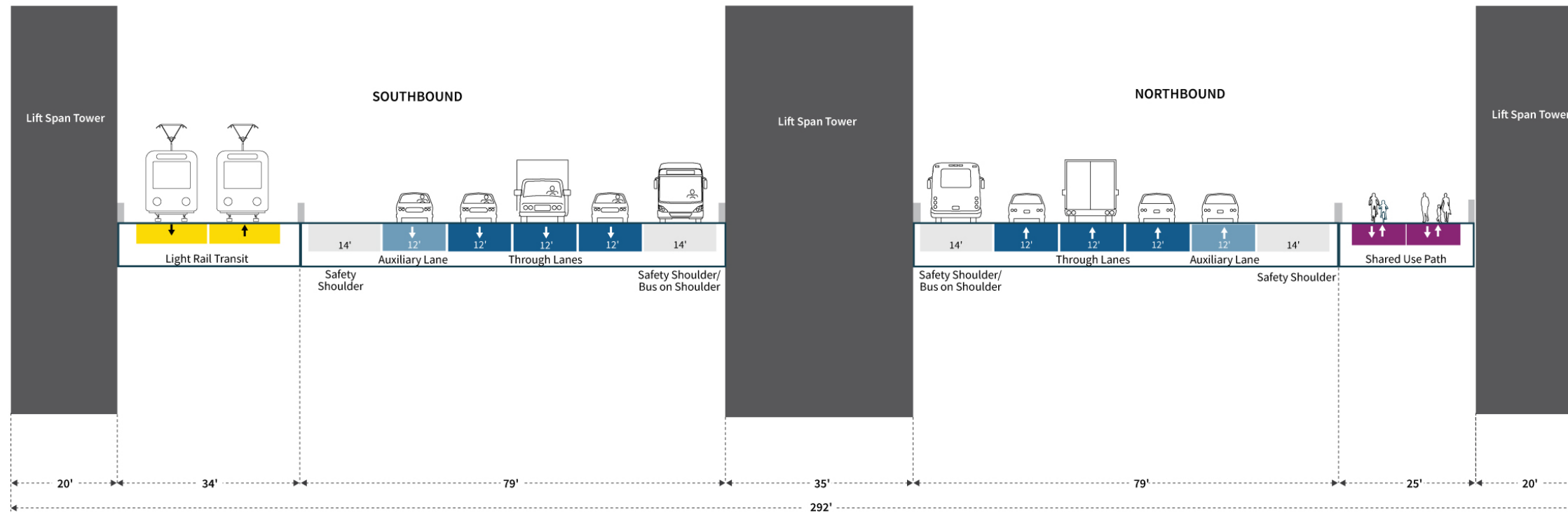
Similar to the single-level fixed-span configuration, the eastern bridge would accommodate northbound highway traffic and the shared-use path, and the western bridge would carry southbound traffic and two-way light-rail tracks. The I-5 highway, light-rail tracks, and shared-use path would be on the same level across the bridges instead of on two levels as with the double-deck configuration. Cross sections of the single-level movable-span configuration are shown in Figure 1-20; the top cross section depicts the vertical lift spans (Piers 5 and 6), and the bottom cross section depicts the fixed spans (Piers 2, 3, 4, and 7). The movable and fixed cross sections are slightly different because the movable span requires lift towers, which are not required for the other fixed spans of the bridges.

There would be six in-water pier sets and two piers on land per bridge. The vertical lift span would have 22 in-water drilled shafts each for Piers 5 and 6; the shaft caps for these piers would be 50 feet by 312 feet to accommodate the vertical lift spans. Piers 2, 3, 4, and 7 would have 16 in-water drilled shafts each; the shaft caps for these piers would be the same as for the fixed-span options (50 feet by 230 feet). The vertical lift-span configuration would have a total of 108 in-water drilled shafts.

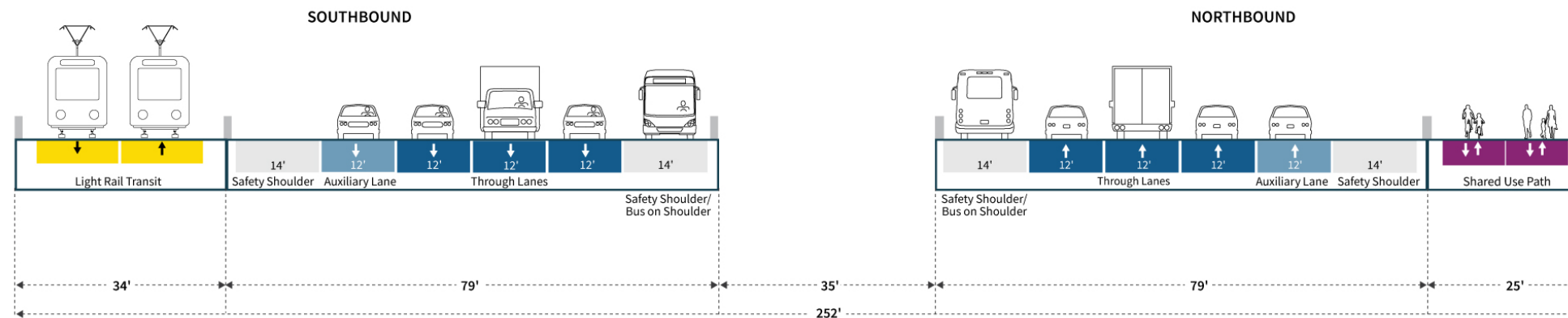
This single-level movable-span configuration would have a 3% maximum grade on the Oregon side of the bridge and a 1.5% maximum grade on the Washington side.

Figure 1-20. Cross Section of the Single-Level Movable-Span Bridge Type

**Single-level Bridge with Movable Span - Vertical Lift Span Cross-section (Piers 5 and 6)**



**Single-level Bridge with Movable Span - Fixed Spans Cross-section (Piers 2, 3, 4, and 7)**



## Summary of Bridge Configurations

This section summarizes and compares each of the bridge configurations. Table 1-2 lists the key considerations for each configuration. Figure 1-21 compares each configuration's footprint. The footprints of each configuration would differ in only three locations: over the Columbia River and at the bridge landings on Hayden Island and Vancouver. The rest of the I-5 corridor would have the same footprint. Over the Columbia River, the footprint of the double-deck fixed-span configuration would be 173 feet wide. Comparatively, the finback or extradosed bridge types of the single-level fixed-span configuration would be 272 feet wide (approximately 99 feet wider), and the single-level fixed-span configuration with a girder bridge type would be 232 feet wide (approximately 59 feet wider). The single-level movable-span configuration would be 252 feet wide (approximately 79 feet wider than the double-deck fixed-span configuration), except at Piers 5 and 6, where larger bridge foundations would require an additional 40 feet of width to support the movable span. The single-level configurations would have a wider footprint at the bridge landings on Hayden Island and Vancouver because transit and active transportation would be located adjacent to the highway, rather than below the highway in the double-deck option.

Figure 1-22 compares the basic profile of each configuration. The lower deck of the double-deck fixed-span and the single-level fixed-span configuration would have similar profiles. The single-level movable-span configuration would have a lower profile than the fixed-span configurations when the span is in the closed position.



Figure 1-21. Bridge Configuration Footprint Comparison

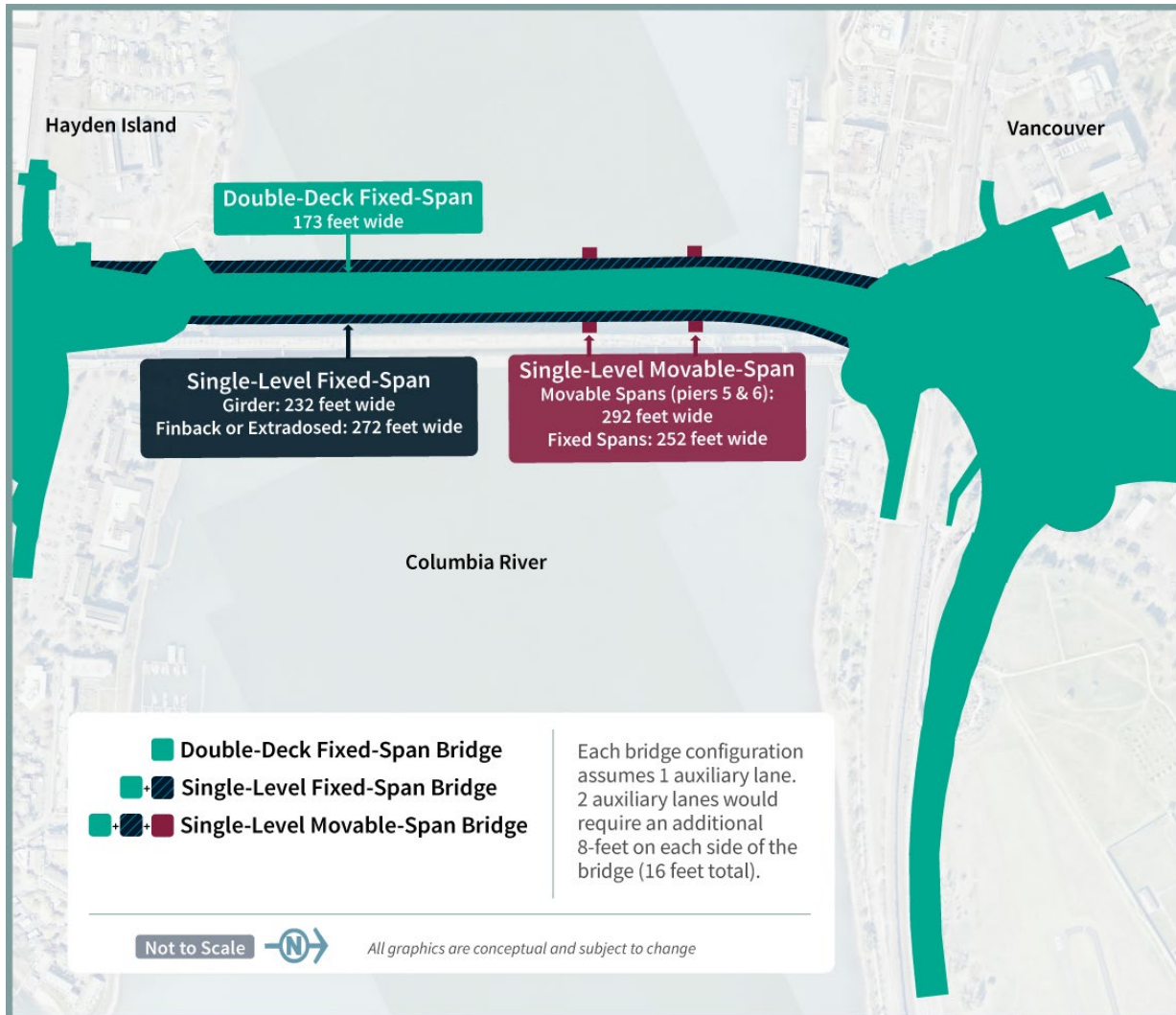
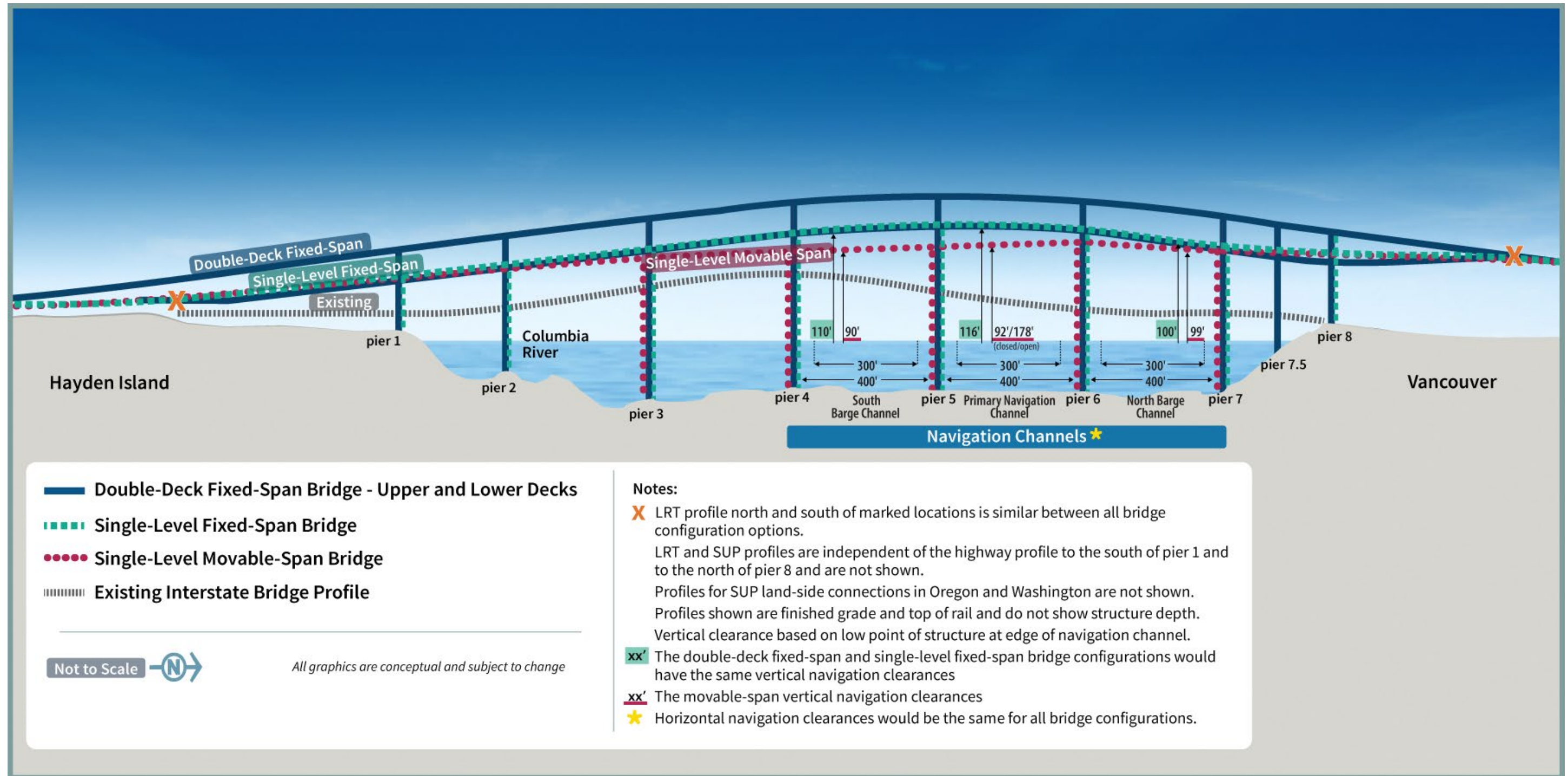


Figure 1-22. Bridge Configuration Profile Comparison



LRT = light-rail transit; SUP = shared-use path

Table 1-2. Summary of Bridge Configurations

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration <sup>a</sup>	Modified LPA with Single-Level Movable-Span Configuration
Bridge type	Steel through-truss spans.	Double-deck steel truss.	Single-level, concrete or steel girders, extradosed or finback.	Single-level, steel girders with vertical lift span.
Number of bridges	Two	Two	Two	Two
Movable-span type	Vertical lift span with counterweights.	N/A	N/A	Vertical lift span with counterweights.
Movable-span location	Adjacent to Vancouver shoreline.	N/A	N/A	Between Piers 5 and 6 (approximately 500 feet south of the existing lift span).
Lift opening restrictions	Weekday peak AM and PM highway travel periods. <sup>b</sup>	N/A	N/A	Additional restrictions to daytime bridge openings; requires future federal rulemaking process and authorization by USCG (beyond the assumed No-Build Alternative bridge restrictions for peak AM and PM highway travel periods). <sup>b</sup> Typical opening durations are assumed to be 9 to 18 minutes <sup>c</sup> for the purposes of impact analysis but would ultimately depend on various operational considerations related to vessel traffic and river and weather conditions. Additional time would also be required to stop traffic prior to opening and restart traffic after the bridge closes.

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration <sup>a</sup>	Modified LPA with Single-Level Movable-Span Configuration
Out-to-out width <sup>d</sup>	138 feet total width.	173 feet total width.	Girder: 232 feet total width. Extradosed/Finback: 272 feet total width.	<ul style="list-style-type: none"> <li>• 292 feet at the movable span.</li> <li>• 252 feet at the fixed spans.</li> </ul>
Deck widths	52 feet (SB) 52 feet (NB)	79 feet (SB) 79 feet (NB)	Girder: <ul style="list-style-type: none"> <li>• 113 feet (SB)</li> <li>• 104 feet (NB)</li> </ul> Extradosed/Finback: <ul style="list-style-type: none"> <li>• 133 feet (SB)</li> <li>• 124 feet (NB)</li> </ul>	113 feet SB fixed span. 104 feet NB fixed span.
Vertical navigation clearance	Primary navigation channel: <ul style="list-style-type: none"> <li>• 39 feet when closed.</li> <li>• 178 feet when open.</li> </ul> Barge channel: <ul style="list-style-type: none"> <li>• 46 feet to 70 feet.</li> </ul> Alternate barge channel: <ul style="list-style-type: none"> <li>• 72 feet (maximum clearance without opening).</li> </ul>	Primary navigation channel: <ul style="list-style-type: none"> <li>• 116 feet maximum.</li> </ul> North barge channel: <ul style="list-style-type: none"> <li>• 100 feet maximum.</li> </ul> South barge channel: <ul style="list-style-type: none"> <li>• 110 feet maximum.</li> </ul>	Primary navigation channel: <ul style="list-style-type: none"> <li>• 116 feet maximum.</li> </ul> North barge channel: <ul style="list-style-type: none"> <li>• 100 feet maximum.</li> </ul> South barge channel: <ul style="list-style-type: none"> <li>• 110 feet maximum.</li> </ul>	Primary navigation channel: <ul style="list-style-type: none"> <li>• Closed position: 92 feet.</li> <li>• Open position: 178 feet.</li> </ul> North barge channel: <ul style="list-style-type: none"> <li>• 99 feet maximum.</li> </ul> South barge channel: <ul style="list-style-type: none"> <li>• 90 feet maximum.</li> </ul>
Horizontal navigation clearance	263 feet for primary navigation channel. 511 feet for barge channel. 260 feet for alternate barge channel.	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).	400 feet for all navigation channels (300-foot congressionally or USACE-authorized channel plus a 50-foot channel maintenance buffer on each side).

	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration <sup>a</sup>	Modified LPA with Single-Level Movable-Span Configuration
Maximum elevation of bridge component (NAVD 88) <sup>e</sup>	247 feet at top of lift tower.	166 feet.	Girder: 137 feet. Extradosed/Finback: 179 feet at top of pylons.	243 feet at top of lift tower.
Movable span length (from center of pier to center of pier)	278 feet.	N/A	N/A	450 feet.
Number of in-water pier sets	Nine	Six	Six	Six
Number of in-water drilled shafts	N/A	72	96	108
Shaft cap sizes	N/A	50 feet by 85 feet.	50 feet by 230 feet.	Piers 2, 3, 4, and 7: 50 feet by 230 feet. Piers 5 and 6: 50 feet by 312 feet (one combined footing at each location to house tower/equipment for the lift span).
Maximum grade	5%	4% on the Washington side. 3.8% on the Oregon side.	3% on the Washington side. 3% on the Oregon side.	1.5% on the Washington side. 3% on the Oregon side.
Light-rail transit location	N/A	Below highway on SB bridge.	West of highway on SB bridge.	West of highway on SB bridge.
Express bus	Shared roadway lanes.	Inside shoulder of NB and SB (upper) bridges.	Inside shoulder of NB and SB bridges.	Inside shoulder of NB and SB bridges.



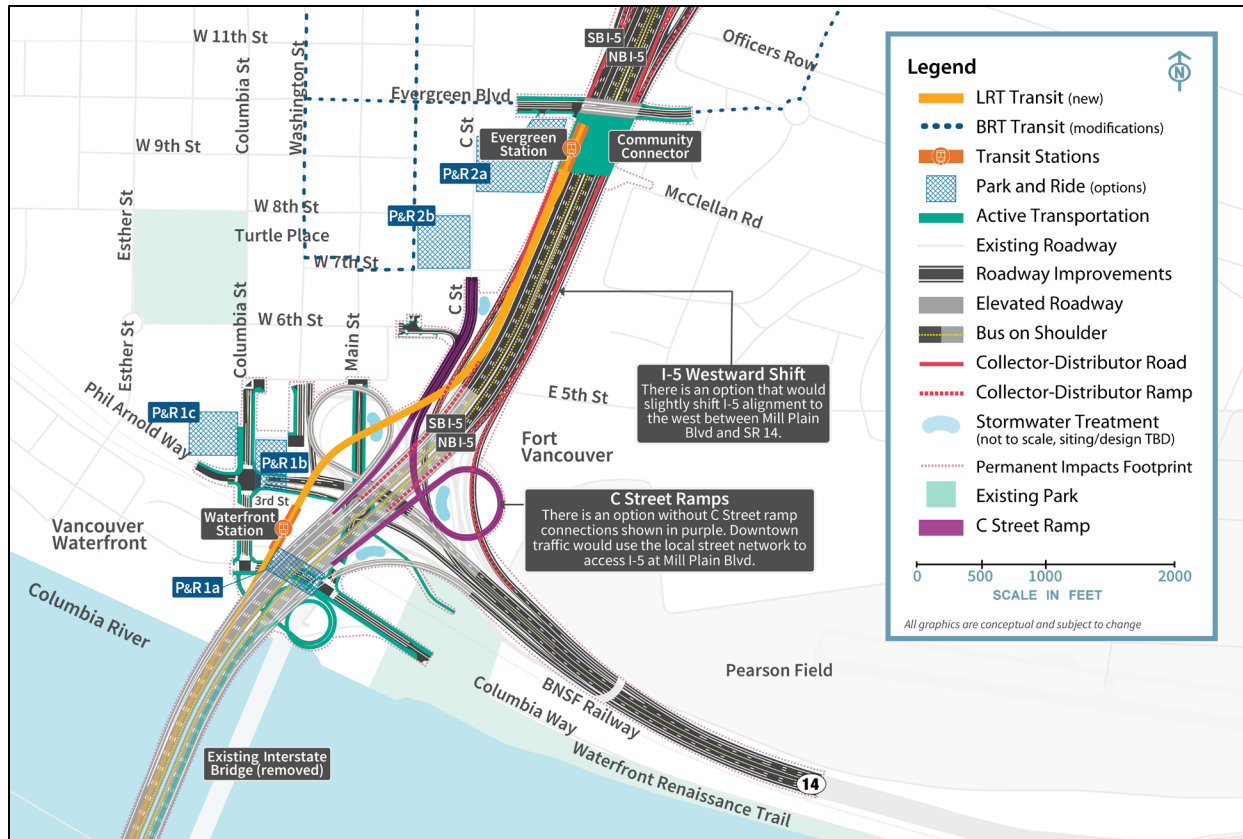
	No-Build Alternative	Modified LPA with Double-Deck Fixed-Span Configuration	Modified LPA with Single-Level Fixed-Span Configuration <sup>a</sup>	Modified LPA with Single-Level Movable-Span Configuration
Shared-use path location	Sidewalk adjacent to roadway in both directions.	Below highway on NB bridge.	East of highway on NB bridge.	East of highway on NB bridge.

- a When different bridge types are not mentioned, data applies to all bridge types under the specified bridge configuration.
  - b The No-Build Alternative assumes existing conditions that restrict bridge openings during weekday peak periods (Monday through Friday 6:30 a.m. to 9 a.m.; 2:30 p.m. to 6 p.m., excluding federal holidays). This analysis estimates the potential frequency for bridge openings for vessels requiring more than 99 feet of clearance.
  - c For the purposes of the transportation analysis (see the Transportation Technical Report), the movable-span opening time is assumed to be an average of 12 minutes.
  - d “Out-to-out width” is the measurement between the outside edges of the bridge across its width at the widest point.
  - e NAVD 88 (North American Vertical Datum of 1988) is a vertical control datum (reference point) used by federal agencies for surveying.
- NB = northbound; SB = southbound; USCG = U.S. Coast Guard

### 1.1.4 Downtown Vancouver (Subarea C)

This section discusses the geographic Subarea C shown in Figure 1-3. See Figure 1-23 for all highway and interchange improvements in Subarea C. Refer to Figure 1-3 for an overview of the geographic subareas.

Figure 1-23. Downtown Vancouver (Subarea C)



BRT = bus rapid transit; LRT = light-rail transit; NB = northbound; P&R = park and ride; SB = southbound

#### 1.1.4.1 Highways, Interchanges, and Local Roadways

North of the Columbia River bridges in downtown Vancouver, improvements are proposed to the SR 14 interchange (Figure 1-23).

##### SR 14 INTERCHANGE

The new Columbia River bridges would touch down just north of the SR 14 interchange (Figure 1-23). The function of the SR 14 interchange would remain essentially the same as it is now, although the interchange would be elevated. Direct connections between I-5 and SR 14 would be rebuilt. Access to and from downtown Vancouver would be provided as it is today, but the connection points would be

relocated. Downtown Vancouver I-5 access to and from the south would be at C Street as it is today, while downtown connections to and from SR 14 would be from Columbia Street at 3rd Street.

Main Street would be extended between 5th Street and Columbia Way. Vehicles traveling from downtown Vancouver to access SR 14 eastbound would use the new extension of Main Street to the roundabout underneath I-5. If coming from the west or south (waterfront) in downtown Vancouver, vehicles would use the Phil Arnold Way/3rd Street extension to the roundabout, then continue to SR 14 eastbound. The existing Columbia Way roadway under I-5 would be realigned to the north of its existing location and would intersect both the new Main Street extension and Columbia Street with T intersections.

In addition, the existing overcrossing of I-5 at Evergreen Boulevard would be reconstructed.

### Design Option Without C Street Ramps

Under this design option, downtown Vancouver I-5 access to and from the south would be through the Mill Plain interchange rather than C Street. There would be no eastside loop ramp from I-5 northbound to C Street and no directional ramp on the west side of I-5 from C Street to I-5 southbound. The existing eastside loop ramp would be removed. This design option has been included because of changes in local planning that necessitate consideration of design options that reduce the footprint and associated direct and temporary environmental impacts in Vancouver.

### Design Option to Shift I-5 Westward

This design option would shift the I-5 mainline and ramps approximately 40 feet to the west between SR 14 and Mill Plain Boulevard. The westward I-5 alignment shift could also be paired with the design option without C Street ramps. The inclusion of this design option is due to changes in local planning, which necessitate consideration of design options that that shifts the footprint and associated direct and temporary environmental impacts in Vancouver.

#### 1.1.4.2 Transit

### LIGHT-RAIL ALIGNMENT AND STATIONS

Under the Modified LPA, the light-rail tracks would exit the highway bridge and be on their own bridge along the west side of the I-5 mainline after crossing the Columbia River (see Figure 1-23). The light-rail bridge would cross approximately 35 feet over the BNSF Railway tracks. An elevated light-rail station near the Vancouver waterfront (Waterfront Station) would be situated near the overcrossing of the BNSF tracks between Columbia Way and 3rd Street. Access to the elevated station would be primarily by elevator as the station is situated approximately 75 feet above existing ground level. A stairwell(s) would be provided for emergency egress. The number of elevators and stairwells provided would be based on the ultimate platform configuration, station location relative to the BNSF trackway, projected ridership, and fire and life safety requirements. Passenger drop-off facilities would be located at ground level and would be coordinated with the C-TRAN bus service at this location. The elevated light-rail tracks would continue north, cross over the westbound SR 14 on-ramp and the C Street/6th Street on-ramp to southbound I-5, and then straddle the southbound I-5 C-D

roadway. Transit components in the downtown Vancouver area are similar between the two SR 14 interchange area design options discussed above.

North of the Waterfront Station, the light-rail tracks would continue to the Evergreen Station, which would be the terminus of the light-rail extension (see Figure 1-23). The light-rail tracks from downtown Vancouver to the terminus would be entirely on an elevated structure supported by single columns, where feasible, or by columns on either side of the roadway where needed. The light-rail tracks would be a minimum of 27 feet above the I-5 roadway surface. The Evergreen Station would be located at the same elevation as Evergreen Boulevard, on the proposed Community Connector, and it would provide connections to C-TRAN's existing BRT system. Passenger drop-off facilities would be near the station and would be coordinated with the C-TRAN bus service at this location.

## PARK AND RIDES

Up to two park and rides could be built in Vancouver along the light-rail alignment: one near the Waterfront Station and one near the Evergreen Station. Additional information regarding the park and rides can be found in the Transportation Technical Report.

Park and rides can expand the catchment area of public transit systems, making transit more accessible to people who live farther away from fixed-route transit service, and attracting new riders who might not have considered using public transit otherwise.

### Waterfront Station Park-and-Ride Options

There are three site options for the park and ride near the Waterfront Station (see Figure 1-23). Each would accommodate up to 570 parking spaces.

1. Columbia Way (below I-5). This park-and-ride site would be a multilevel aboveground structure located below the new Columbia River bridges, immediately north of a realigned Columbia Way.
2. Columbia Street/SR 14. This park-and-ride site would be a multilevel aboveground structure located along the east side of Columbia Street. It could span across (or over) the SR 14 westbound off-ramp to provide parking on the north and south sides of the off-ramp.
3. Columbia Street/Phil Arnold Way (Waterfront Gateway Site). This park-and-ride site would be located along the west side of Columbia Street immediately north of Phil Arnold Way. This park and ride would be developed in coordination with the City of Vancouver's Waterfront Gateway program and could be a joint-use parking facility not constructed exclusively for park-and-ride users.

### Evergreen Station Park-and-Ride Options

There are two site options for the park and ride near the Evergreen Station (see Figure 1-23).

1. Library Square. This park-and-ride site would be located along the east side of C Street and south of Evergreen Boulevard. It would accommodate up to 700 parking spaces in a multilevel belowground structure according to a future agreement on City-owned property associated with Library Square. Current design concepts suggest the park and ride most likely would be a

joint-use parking facility for park-and-ride users and patrons of other uses on the ground or upper levels as negotiated as part of future decisions.

2. Columbia Credit Union. This park-and-ride site is an existing multistory garage that is located below the Columbia Credit Union office tower along the west side of C Street between 7th Street and 8th Street. The existing parking structure currently serves the office tower above it and the Regal City Center across the street. This would be a joint-use parking facility, not for the exclusive use of park-and-ride users, that could serve as additional or overflow parking if the 700 required parking spaces cannot be accommodated elsewhere.

### 1.1.4.3 Active Transportation

Within the downtown Vancouver area, the shared-use path on the northbound (or eastern) bridge would exit the bridge at the SR 14 interchange, loop down on the east side of I-5 via a vertical spiral path, and then cross back below I-5 to the west side of I-5 to connect to the Waterfront Renaissance Trail on Columbia Street and into Columbia Way (see Figure 1-23). Access would be provided across state right of way beneath the new bridges to provide a connection between the recreational areas along the City's Columbia River waterfront east of the bridges and existing and future waterfront uses west of the bridges.

Active transportation components in the downtown Vancouver area would be similar without the C Street ramps and with the I-5 westward shift.

At Evergreen Boulevard, a community connector is proposed to be built over I-5 just south of Evergreen Boulevard and east of the Evergreen Station (see Figure 1-23). The structure is proposed to include off-street pathways for active transportation modes including pedestrians, bicyclists, and other micro-mobility modes, and public space and amenities to support the active transportation facilities. The primary intent of the Community Connector is to improve connections between downtown Vancouver on the west side of I-5 and the Vancouver National Historic Reserve on the east side.

## 1.1.5 Upper Vancouver (Subarea D)

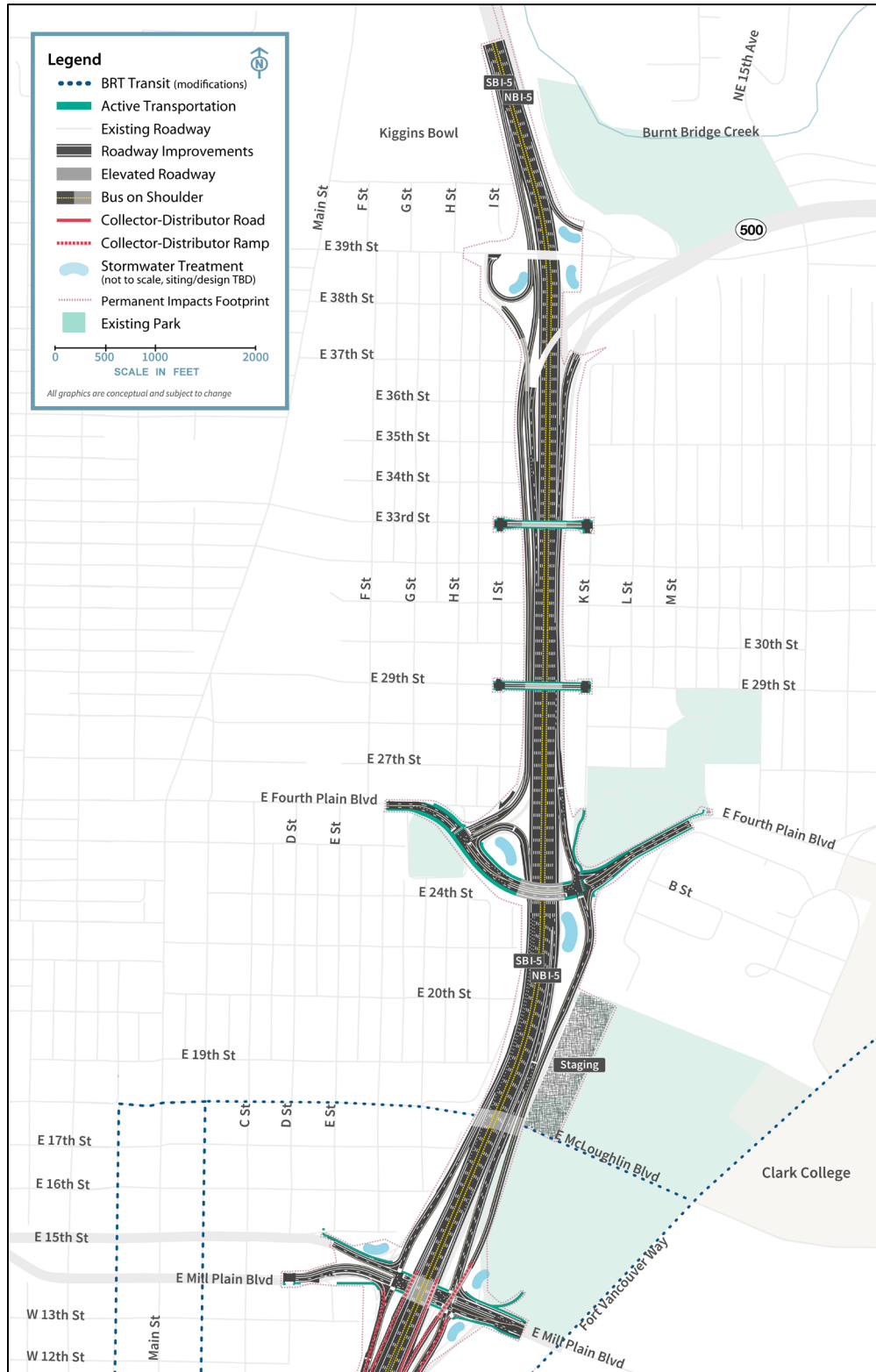
This section discusses the geographic Subarea D shown in Figure 1-3. See Figure 1-24 for all highway and interchange improvements in Subarea D. Refer to Figure 1-3 for an overview of the geographic subareas.

### 1.1.5.1 Highways, Interchanges, and Local Roadways

Within the upper Vancouver area, the IBR Program proposes improvements to three interchanges—Mill Plain, Fourth Plain, and SR 500—as described below.



Figure 1-24. Upper Vancouver (Subarea D)



BRT = bus rapid transit; TBD = to be determined

### MILL PLAIN BOULEVARD INTERCHANGE

The Mill Plain Boulevard interchange is north of the SR 14 interchange (see Figure 1-24). This interchange would be reconstructed as a tight-diamond configuration but would otherwise remain similar in function to the existing interchange. The ramp terminal intersections would be sized to accommodate high, wide heavy freight vehicles that travel between the Port of Vancouver and I-5. The off-ramp from I-5 northbound to Mill Plain Boulevard would diverge from the C-D road that would continue north, crossing over Mill Plain Boulevard, to provide access to Fourth Plain Boulevard via a C-D roadway. The off-ramp to Fourth Plain Boulevard would be reconstructed and would cross over Mill Plain Boulevard east of I-5, similar to the way it functions today.

### FOURTH PLAIN BOULEVARD INTERCHANGE

At the Fourth Plain Boulevard interchange (Figure 1-24), improvements would include reconstruction of the overpass of I-5 and the ramp terminal intersections. Northbound I-5 traffic exiting to Fourth Plain Boulevard would first exit to the northbound C-D roadway which provides off-ramp access to Fourth Plain Boulevard and Mill Plain Boulevard. The westbound SR 14 to northbound I-5 on-ramp also joins the northbound C-D roadway before continuing north past the Fourth Plain Boulevard and Mill Plain Boulevard off-ramps as an auxiliary lane. The southbound I-5 off-ramp to Fourth Plain Boulevard would be braided below the 39th Street on-ramp to southbound I-5. This change would eliminate the existing nonstandard weave between the SR 500 interchange and the off-ramp to Fourth Plain Boulevard. It would also eliminate the existing westbound SR 500 to Fourth Plain Boulevard off-ramp connection. The existing overcrossing of I-5 at 29th Street would be reconstructed to accommodate a widened I-5, provide adequate vertical clearance over I-5, and provide pedestrian and bicycle facilities.

### SR 500 INTERCHANGE

The northern terminus of the I-5 improvements would be in the SR 500 interchange area (Figure 1-24). The improvements would primarily be to connect the Modified LPA to existing ramps. The off-ramp from I-5 southbound to 39th Street would be reconstructed to establish the beginning of the braided ramp to Fourth Plain Boulevard and restore the loop ramp to 39th Street. Ramps from existing I-5 northbound to SR 500 eastbound and from 39th Street to I-5 northbound would be partially reconstructed. The existing bridges for 39th Street over I-5 and SR 500 westbound to I-5 southbound would be retained. The 39th Street to I-5 southbound on-ramp would be reconstructed and braided over (i.e., grade separated or pass over) the new I-5 southbound off-ramp to Fourth Plain Boulevard.

The existing overcrossing of I-5 at 33rd Street would also be reconstructed to accommodate a widened I-5, provide adequate vertical clearance over I-5, and provide pedestrian and bicycle facilities.

### 1.1.5.2 Transit

There would be no LRT facilities in upper Vancouver. Proposed operational changes to bus service, including I-5 bus-on-shoulder service, are described in Section 1.1.7, Transit Operating Characteristics.

### 1.1.5.3 Active Transportation

Several active transportation improvements would be made in Subarea D consistent with City of Vancouver plans and policies. At the Fourth Plain Boulevard interchange, there would be improvements to provide better bicycle and pedestrian mobility and accessibility; these include bicycle lanes, neighborhood connections, and a connection to the City of Vancouver's planned two-way cycle track on Fourth Plain Boulevard. The reconstructed overcrossings of I-5 at 29th Street and 33rd Street would provide pedestrian and bicycle facilities on those cross streets. No new active transportation facilities are proposed in the SR 500 interchange area. Active transportation improvements at the Mill Plain Boulevard interchange include buffered bicycle lanes and sidewalks, pavement markings, lighting, and signing.

## 1.1.6 Transit Support Facilities

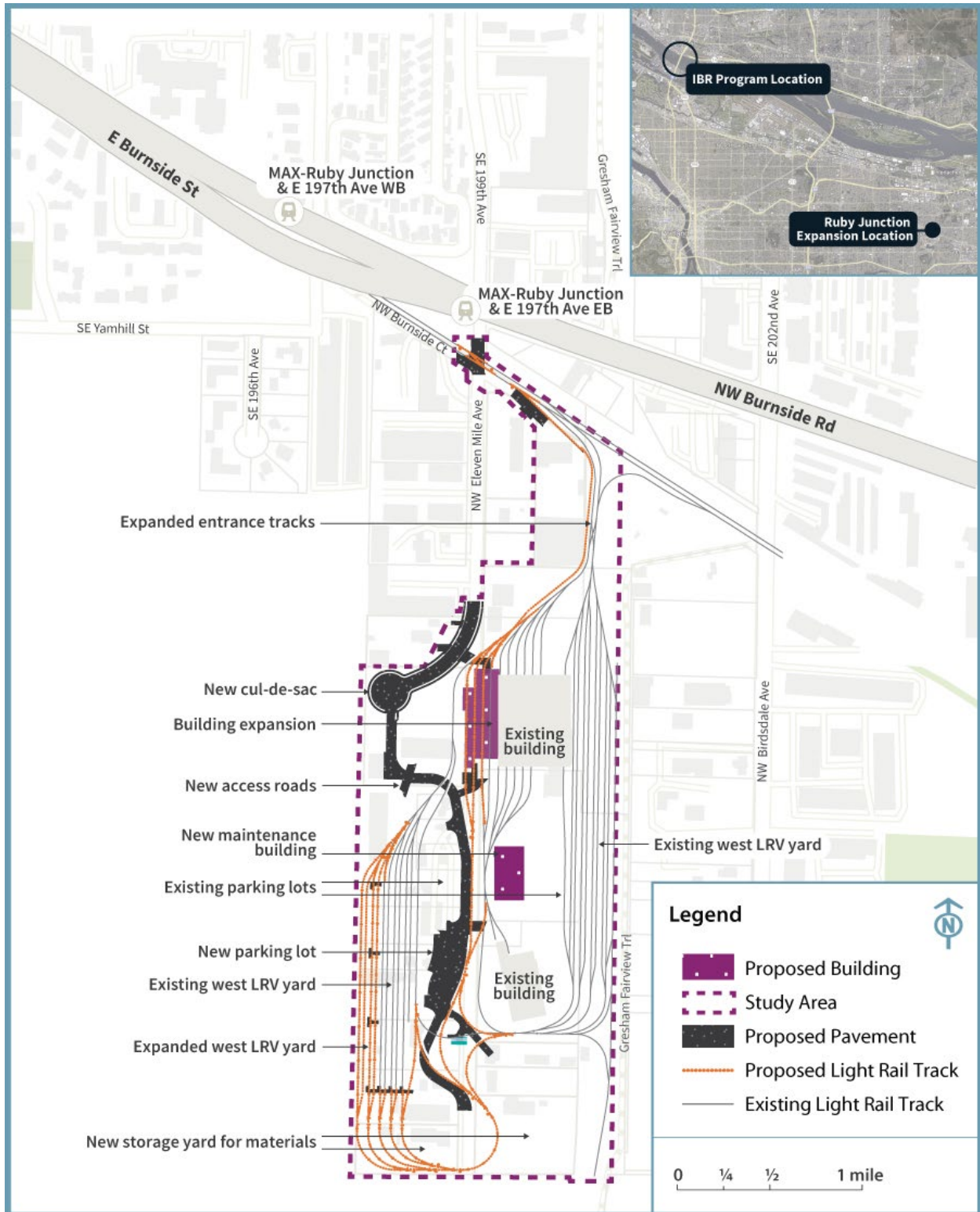
### 1.1.6.1 Ruby Junction Maintenance Facility Expansion

The TriMet Ruby Junction Maintenance Facility in Gresham, Oregon, would be expanded to accommodate the additional LRVs associated with the Modified LPA's LRT service (the Ruby Junction location relative to the study area is shown in Figure 1-25). Improvements would include additional storage for LRVs and maintenance materials and supplies, expanded LRV maintenance bays, expanded parking and employee support areas for additional personnel, and a third track at the northern entrance to Ruby Junction. Figure 1-25 shows the proposed footprint of the expansion.

The existing main building would be expanded west to provide additional maintenance bays. To make space for the building expansion, Eleven Mile Avenue would be vacated and would terminate in a new cul-de-sac west of the main building. New access roads would be constructed to maintain access to TriMet buildings south of the cul-de-sac.

The existing LRV storage yard, west of Eleven Mile Avenue, would be expanded to the west to accommodate additional storage tracks and a runaround track (a track constructed to bypass congestion in the maintenance yard). This expansion would require partial demolition of an existing TriMet building (just north of the LRV storage) and would require relocating the material storage yard to the properties just south of the south building.

Figure 1-25. Ruby Junction Maintenance Facility Study Area



EB = eastbound; LRV = light-rail vehicle; WB = westbound

All tracks in the west LRV storage yard would also be extended southward to connect to the proposed runaround track. The runaround track would connect to existing tracks near the existing south building. The connections to the runaround track would require partial demolition of an existing TriMet building plus full demolition of one existing building and partial demolition of another existing building on the private property west of the south end of Eleven Mile Avenue. The function of the existing TriMet building would either be transferred to existing modified buildings or to new replacement buildings on site.

The existing parking lot west of Eleven Mile Avenue would be expanded toward the south to provide more parking for TriMet personnel.

A third track would be needed at the north entrance to Ruby Junction to accommodate increased train volumes without decreasing service. The additional track would also reduce operational impacts during construction and maintenance outages for the yard. Constructing the third track would require reconstruction of Burnside Court east of Eleven Mile Avenue. An additional crossover would also be needed on the mainline track where it crosses Eleven Mile Avenue; it would require reconstruction of the existing track crossings for vehicles, bicycles, and pedestrians.

#### 1.1.6.2 Expo Center Overnight LRV Facility

An overnight facility for LRVs would be constructed on the southeast corner of the Expo Center property (as shown on Figure 1-8) to reduce deadheading between Ruby Junction and the northern terminus of the MAX Yellow Line extension. Deadheading occurs when LRVs travel without passengers to make the vehicles ready for service. The facility would provide a yard access track, storage tracks for approximately 10 LRVs, one building for light LRV maintenance, an operator break building, a parking lot for operators, and space for security personnel. This facility would necessitate relocation and reconstruction of the Expo Road entrance to the Expo Center (including the parking lot gates and booths). However, it would not affect existing Expo Center buildings.

The overnight facility would connect to the mainline tracks by crossing Expo Road just south of the existing Expo Center MAX Station. The connection tracks would require relocation of one or two existing LRT facilities, including a traction power substation building and potentially the existing communication building, which are both just south of the Expo Center MAX Station. Existing artwork at the station may require relocation.

#### 1.1.6.3 Additional Bus Bays at the C-TRAN Operations and Maintenance Facility

Three bus bays would be added to the C-TRAN operations and maintenance facility. These new bus bays would provide maintenance capacity for the additional express bus service on I-5 (see Section 1.1.7, Transit Operating Characteristics). Modifications to the facility would accommodate new vehicles as well as maintenance equipment.



## 1.1.7 Transit Operating Characteristics

### 1.1.7.1 LRT Operations

Nineteen new LRVs would be purchased to operate the extension of the MAX Yellow Line. These vehicles would be similar to those currently used for the TriMet MAX system. With the Modified LPA, LRT service in the new and existing portions of the Yellow Line in 2045 would operate with 6.7-minute average headways (defined as gaps between arriving transit vehicles) during the 2-hour morning peak period. Mid-day and evening headways would be 15 minutes, and late-night headways would be 30 minutes. Service would operate between the hours of approximately 5 a.m. (first southbound train leaving Evergreen Station) and 1 a.m. (last northbound train arriving at the station), which is consistent with current service on the Yellow Line. LRVs would be deadheaded at Evergreen Station before beginning service each day. A third track at this northern terminus would accommodate layovers.

### 1.1.7.2 Express Bus Service and Bus on Shoulder

C-TRAN provides bus service that connects to LRT and augments travel between Washington and Oregon with express bus service to key employment centers in Oregon. Beginning in 2022, the main express route providing service in the IBR corridor, Route 105, had two service variations. One pattern provides service between Salmon Creek and downtown Portland with a single intermediate stop at the 99th Street Transit Center, and one provides service between Salmon Creek and downtown Portland with two intermediate stops: 99th Street Transit Center and downtown Vancouver. This route currently provides weekday service with 20-minute peak and 60-minute off-peak headways.

Once the Modified LPA is constructed, C-TRAN Route 105 would be revised to provide direct service from the Salmon Creek Park and Ride and 99th Street Transit Center to downtown Portland, operating at 5-minute peak headways with no service in the off-peak. The C-TRAN Route 105 intermediate stop service through downtown Vancouver would be replaced with C-TRAN Route 101, which would provide direct service from downtown Vancouver to downtown Portland at 10-minute peak and 30-minute off-peak headways.

Two other existing C-TRAN express bus service routes would remain unchanged after completion of the Modified LPA. C-TRAN Route 190 would continue to provide service from the Andresen Park and Ride in Vancouver to Marquam Hill in Portland. This route would continue to operate on SR 500 and I-5 within the study area. Route headways would be 10 minutes in the peak periods with no off-peak service. C-TRAN Route 164 would continue to provide service from the Fisher's Landing Transit Center to downtown Portland. This route would continue to operate within the study area only in the northbound direction during PM service to use the I-5 northbound high-occupancy vehicle lane in Oregon before exiting to eastbound SR 14 in Washington. Route headways would be 10 minutes in the peak and 30 minutes in the off-peak.

C-TRAN express bus Routes 105 and 190 are currently permitted to use the existing southbound inside shoulder of I-5 from 99th Street to the Interstate Bridge in Vancouver. However, the existing shoulders are too narrow for bus-on-shoulder use in the rest of the I-5 corridor in the study area. The Modified LPA would include inside shoulders on I-5 that would be wide enough (14 feet on the Columbia River bridges and 11.5 to 12 feet elsewhere on I-5) to allow northbound and southbound buses to operate

on the shoulder, except where I-5 would have to taper to match existing inside shoulder widths at the north and south ends of the corridor. Figure 1-8, Figure 1-16, Figure 1-23, and Figure 1-24 show the potential bus-on-shoulder use over the Columbia River bridges. Bus on shoulder could operate on any of the Modified LPA bridge configurations and bridge types. Additional approvals (including a continuing control agreement), in coordination with ODOT, may be needed for buses to operate on the shoulder on the Oregon portion of I-5.

After completion of the Modified LPA, two C-TRAN express bus routes operating on I-5 through the study area would be able to use bus-on-shoulder operations to bypass congestion in the general-purpose lanes. C-TRAN Route 105 would operate on the shoulder for the full length of the study area. C-TRAN Route 190 would operate on the shoulder for the full length of the corridor except for the distance required to merge into and out of the shoulder as the route exits from and to SR 500. These two express bus routes (105 and 190) would have a combined frequency of every 3 minutes during the 2045 AM and PM peak periods. To support the increased frequency of express bus service, eight electric double-decker or articulated buses would be purchased.

If the C Street ramps were removed from the SR 14 interchange, C-TRAN Route 101 could also use bus-on-shoulder operations south of Mill Plain Boulevard; however, if the C Street ramps remained in place, Route 101 could still use bus-on-shoulder operations south of the SR 14 interchange but would need to begin merging over to the C Street exit earlier than if the C Street ramps were removed. Route 101 would operate at 10-minute peak and 30-minute off-peak headways. C-TRAN Route 164 would not be anticipated to use bus-on-shoulder operations because of the need to exit to SR 14 from northbound I-5.

### 1.1.7.3 Local Bus Route Changes

The TriMet Line 6 bus route would be changed to terminate at the Expo Center MAX Station, requiring passengers to transfer to the new LRT connection to access Hayden Island. TriMet Line 6 is anticipated to travel from Martin Luther King Jr. Boulevard through the newly configured area providing local connections to Marine Drive. It would continue west to the Expo Center MAX Station. Table 1-3 shows existing service and anticipated future changes to TriMet Line 6.

As part of the Modified LPA, several local C-TRAN bus routes would be changed to better complement the new light-rail extension. Most of these changes would reroute existing bus lines to provide a transfer opportunity near the new Evergreen Station. Table 1-3 shows existing service and anticipated future changes to C-TRAN bus routes. In addition to the changes noted in Table 1-3, other local bus route modifications would move service from Broadway to C Street. The changes shown may be somewhat different if the C Street ramps are removed.

Table 1-3. Proposed TriMet and C-TRAN Bus Route Changes

Bus Route	Existing Route	Changes with Modified LPA
TriMet Line 6	Connects Goose Hollow, Portland City Center, N/NE Portland, Jantzen Beach and Hayden Island. Within the study area, service currently runs between Delta Park MAX Station and Hayden Island via I-5.	Route would be revised to terminate at the Expo Center MAX Station. Route is anticipated to travel from Martin Luther King Jr. Boulevard through the newly configured Marine Drive area, then continue west to connect via facilities on the west side of I-5 with the Expo Center MAX Station.
C-TRAN Fourth Plain and Mill Plain bus rapid transit (The Vine)	Runs between downtown Vancouver and the Vancouver Mall Transit Center via Fourth Plain Boulevard, with a second line along Mill Plain Boulevard. In the study area, service currently runs along Washington and Broadway Streets through downtown Vancouver.	Route would be revised to begin/end near the Evergreen Station in downtown Vancouver and provide service along Evergreen Boulevard to Fort Vancouver Way, where it would travel to or from Mill Plain Boulevard or Fourth Plain Boulevard depending on clockwise/counterclockwise operations. The Fourth Plain Boulevard route would continue to serve existing Vine stations beyond Evergreen Boulevard.
C-TRAN #2 Lincoln	Connects the 99th Street Transit Center to downtown Vancouver via Lincoln and Kaufman Avenues. Within the study area, service currently runs along Washington and Broadway Streets between 7th and 15th Streets in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #25 St. Johns	Connects the 99th Street Transit Center to downtown Vancouver via St. Johns Boulevard and Fort Vancouver Way. Within the study area, service currently runs along Evergreen Boulevard, Jefferson Street/Kaufman Avenue, 15th Street, and Franklin Street in downtown Vancouver.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.
C-TRAN #30 Burton	Connects the Fisher’s Landing Transit Center with downtown Vancouver via 164th/162nd Avenues and 18th, 25th, 28th, and 39th Streets. Within the study area, service currently runs along McLoughlin Boulevard and on Washington and Broadway Streets between 8th and 15th Streets.	Route would be modified to begin/end near C Street and 9th Street in downtown Vancouver.

Bus Route	Existing Route	Changes with Modified LPA
C-TRAN #60 Delta Park Regional	Connects the Delta Park MAX station in Portland with downtown Vancouver via I-5. Within the study area, service currently runs along I-5, Mill Plain Boulevard, and Broadway Street.	Route would be discontinued.

### 1.1.8 Tolling

Tolling cars and trucks that would use the new Columbia River bridges is proposed as a method to help fund the bridge construction and future maintenance, as well as to encourage alternative mode choices for trips across the Columbia River. Federal and state laws set the authority to toll the I-5 crossing. The IBR Program plans to toll the I-5 river bridge under the federal tolling authorization program codified in 23 U.S. Code Section 129 (Section 129). Section 129 allows public agencies to impose new tolls on federal-aid interstate highways for the reconstruction or replacement of toll-free bridges or tunnels. In 2023, the Washington State Legislature authorized tolling on the Interstate Bridge, with toll rates and policies to be set by the Washington State Transportation Commission (WSTC). In Oregon, the legislature authorized tolling giving the Oregon Transportation Commission the authority to toll I-5, including the ability to set the toll rates and policies. Subsequently, the Oregon Transportation Commission (OTC) is anticipated to review and approve the I-5 tollway project application that would designate the Interstate Bridge as a “tollway project” in 2024. At the beginning of 2024, the OTC and the WSTC entered into a bi-state tolling agreement to establish a cooperative process for setting toll rates and policies. This included the formation of the I-5 Bi-State Tolling Subcommittee consisting of two commissioners each from the OTC and WSTC and tasked with developing toll rate and policy recommendations for joint consideration and adoption by each state’s commission. Additionally, the two states plan to enter into a separate agreement guiding the sharing and uses of toll revenues, including the order of uses (flow of funds) for bridge construction, debt service, and other required expenditures. WSDOT and ODOT also plan to enter into one or more agreements addressing implementation logistics, toll collection, and operations and maintenance for tolling the bi-state facility.

The Modified LPA includes a proposal to apply variable tolls on vehicles using the Columbia River bridges with the toll collected electronically in both directions. Tolls would vary by time of day with higher rates during peak travel periods and lower rates during off-peak periods. The IBR Program has evaluated multiple toll scenarios generally following two different variable toll schedules for the tolling assessment. For purposes of this NEPA analysis, the lower toll schedule was analyzed with tolls assumed to range between \$1.50 and \$3.15 (in 2026 dollars as representative of when tolling would begin) for passenger vehicles with a registered toll payment account. Medium and heavy trucks would be charged a higher toll than passenger vehicles and light trucks. Passenger vehicles and light trucks without a registered toll payment account would pay an additional \$2.00 per trip to cover the cost of identifying the vehicle owner from the license plate and invoicing the toll by mail.

The analysis assumes that tolling would commence on the existing Interstate Bridge—referred to as pre-completion tolling—starting April 1, 2026. The actual date pre-completion tolling begins would depend on when construction would begin. The traffic and tolling operations on the new Columbia

River bridges were assumed to commence by July 1, 2033. The actual date that traffic and tolling operations on the new bridges begin would depend on the actual construction completion date. During the construction period, the two commissions may consider toll-free travel overnight on the existing Interstate Bridge, as was analyzed in the Level 2 Toll Traffic and Revenue Study, for the hours between 11 p.m. and 5 a.m. This toll-free period could help avoid situations where users would be charged during lane or partial bridge closures where construction delays may apply. Once the new I-5 Columbia River bridges open, twenty-four-hour tolling would begin.

Tolls would be collected using an all-electronic toll collection system using transponder tag readers and license plate cameras mounted to structures over the roadway. Toll collection booths would not be required. Instead, motorists could obtain a transponder tag and set up a payment account that would automatically bill the account holder associated with the transponder each time the vehicle crossed the bridge. Customers without transponders, including out-of-area vehicles, would be tolled by a license plate recognition system that would bill the address of the owner registered to that vehicle's license plate. The toll system would be designed to be nationally interoperable. Transponders for tolling systems elsewhere in the country could be used to collect tolls on I-5, and drivers with an account and transponder tag associated with the Interstate Bridge could use them to pay tolls in other states for which reciprocity agreements had been developed. There would be new signage, including gantries, to inform drivers of the bridge toll. These signs would be on local roads, I-5 on-ramps, and on I-5, including locations north and south of the bridges where drivers make route decisions (e.g., I-5/I-205 junction and I-5/I-84 junction).

### 1.1.9 Transportation System- and Demand-Management Measures

Many well-coordinated transportation demand-management and system-management programs are already in place in the Portland-Vancouver metropolitan region. In most cases, the impetus for the programs comes from state regulations: Oregon's Employee Commute Options rule and Washington's Commute Trip Reduction law (described in the sidebar).

The physical and operational elements of the Modified LPA provide the greatest transportation demand-management opportunities by promoting other modes to fulfill more of the travel needs in the corridor. These include:

- Major new light-rail line in exclusive right of way, as well as express bus routes and bus routes that connect to new light-rail stations.
- I-5 inside shoulders that accommodate express buses.
- Modern bicycle and pedestrian facilities that accommodate more bicyclists and pedestrians and improve connectivity, safety, and travel time.
- Park-and-ride facilities.
- A variable toll on the new Columbia River bridges.



In addition to these fundamental elements of the Modified LPA, facilities and equipment would be implemented that could help existing or expanded transportation system management measures maximize the capacity and efficiency of the system. These include:

- Replacement or expanded variable message signs in the study area. These signs alert drivers to incidents and events, allowing them to seek alternate routes or plan to limit travel during periods of congestion.
- Replacement or expanded traveler information systems with additional traffic monitoring equipment and cameras.
- Expanded incident response capabilities, which help traffic congestion to clear more quickly following accidents, spills, or other incidents.
- Queue jumps or bypass lanes for transit vehicles where multilane approaches are provided at ramp signals for on-ramps. Locations for these features will be determined during the detailed design phase.
- Active traffic management including strategies such as ramp metering, dynamic speed limits, and transit signal priority. These strategies are intended to manage congestion by controlling traffic flow or allowing transit vehicles to enter traffic before single-occupant vehicles.

## State Laws to Reduce Commute Trips

Oregon and Washington have both adopted regulations intended to reduce the number of people commuting in single-occupancy vehicles (SOVs). Oregon's Employee Commute Options Program, created under Oregon Administrative Rule 340-242-0010, requires employers with over 100 employees in the greater Portland area to provide commute options that encourage employees to reduce auto trips to the work site. Washington's 1991 Commute Trip Reduction (CTR) Law, updated as the 2006 CTR Efficiency Act (Revised Code of Washington §70.94.521) addresses traffic congestion, air pollution, and petroleum fuel consumption. The law requires counties and cities with the greatest traffic congestion and air pollution to implement plans to reduce SOV demand. An additional provision mandates "major employers" and "employers at major worksites" to implement programs to reduce SOV use.

## 1.2 Modified LPA Construction

The following information on the construction activities and sequence follows the information prepared for the CRC LPA. Construction durations have been updated for the Modified LPA. Because the main elements of the IBR Modified LPA are similar to those in the CRC LPA (i.e., multimodal river crossings and interchange improvements), this information provides a reasonable assumption of the construction activities that would be required.

The construction of bridges over the Columbia River sets the sequencing for other Program components. Accordingly, construction of the Columbia River bridges and immediately adjacent highway connections and improvement elements would be timed early to aid the construction of other components. Demolition of the existing Interstate Bridge would take place after the new Columbia River bridges were opened to traffic.

Electronic tolling infrastructure would be constructed and operational on the existing Interstate Bridge by the start of construction on the new Columbia River bridges. The toll rates and policies for tolling (including pre-completion tolling) would be determined after a more robust analysis and public process by the OTC and WSTC (refer to Section 1.1.8, Tolling).

### 1.2.1 Construction Components and Duration

Table 1-4 provides the estimated construction durations and additional information of Modified LPA components. The estimated durations are shown as ranges to reflect the potential for Program funding to be phased over time. In addition to funding, contractor schedules, regulatory restrictions on in-water work and river navigation considerations, permits and approvals, weather, materials, and equipment could all influence construction duration and overlap of construction of certain components. Certain work below the ordinary high-water mark of the Columbia River and North Portland Harbor would be restricted to minimize impacts to species listed under the Endangered Species Act and their designated critical habitat.

Throughout construction, active transportation facilities and three lanes in each direction on I-5 (accommodating personal vehicles, freight, and buses) would remain open during peak hours, except for short intermittent restrictions and/or closures. Advanced coordination and public notice would be given for restrictions, intermittent closures, and detours for highway, local roadway, transit, and active transportation users (refer to the Transportation Technical Report, for additional information). At least one navigation channel would remain open throughout construction. Advanced coordination and notice would be given for restrictions or intermittent closures to navigation channels as required.

Table 1-4. Construction Activities and Estimated Duration

Component	Estimated Duration	Notes
Columbia River bridges	4 to 7 years	<ul style="list-style-type: none"> <li>Construction is likely to begin with the main river bridges.</li> <li>General sequence would include initial preparation and installation of foundation piles, shaft caps, pier columns, superstructure, and deck.</li> </ul>
North Portland Harbor bridges	4 to 10 years	<ul style="list-style-type: none"> <li>Construction duration for North Portland Harbor bridges is estimated to be similar to the duration for Hayden Island interchange construction. The existing North Portland Harbor bridge would be demolished in phases to accommodate traffic during construction of the new bridges.</li> </ul>
Hayden Island interchange	4 to 10 years	<ul style="list-style-type: none"> <li>Interchange construction duration would not necessarily entail continuous active construction. Hayden Island work could be broken into several contracts, which could spread work over a longer duration.</li> </ul>

Component	Estimated Duration	Notes
Marine Drive interchange	4 to 6 years	<ul style="list-style-type: none"> <li>Construction would need to be coordinated with construction of the North Portland Harbor bridges.</li> </ul>
SR 14 interchange	4 to 6 years	<ul style="list-style-type: none"> <li>Interchange would be partially constructed before any traffic could be transferred to the new Columbia River bridges.</li> </ul>
Demolition of the existing Interstate Bridge	1.5 to 2 years	<ul style="list-style-type: none"> <li>Demolition of the existing Interstate Bridge could begin only after traffic is rerouted to the new Columbia River bridges.</li> </ul>
Three interchanges north of SR 14	3 to 4 years for all three	<ul style="list-style-type: none"> <li>Construction of these interchanges could be independent from each other and from construction of the Program components to the south.</li> <li>More aggressive and costly staging could shorten this timeframe.</li> </ul>
Light-rail	4 to 6 years	<ul style="list-style-type: none"> <li>The light-rail crossing would be built with the Columbia River bridges. Light-rail construction includes all of the infrastructure associated with light-rail transit (e.g., overhead catenary system, tracks, stations, park and rides).</li> </ul>
Total construction timeline	9 to 15 years	<ul style="list-style-type: none"> <li>Funding, as well as contractor schedules, regulatory restrictions on in-water work and river navigation considerations, permits and approvals, weather, materials, and equipment, could all influence construction duration.</li> </ul>

## 1.2.2 Potential Staging Sites and Casting Yards

Equipment and materials would be staged in the study area throughout construction generally within existing or newly purchased right of way, on land vacated by existing transportation facilities (e.g., I-5 on Hayden Island), or on nearby vacant parcels. However, at least one large site would be required for construction offices, to stage the larger equipment such as cranes, and to store materials such as rebar and aggregate. Criteria for suitable sites include large, open areas for heavy machinery and material storage, waterfront access for barges (either a slip or a dock capable of handling heavy equipment and material) to convey material to the construction zone, and roadway or rail access for landside transportation of materials by truck or train.

Two potential major staging sites have been identified (see Figure 1-8 and Figure 1-23). One site is located on Hayden Island on the west side of I-5. A large portion of this parcel would be required for new right of way for the Modified LPA. The second site is in Vancouver between I-5 and Clark College. Other staging sites may be identified during the design process or by the contractor. Following construction of the Modified LPA, the staging sites could be converted for other uses.

In addition to on-land sites, some staging activities for construction of the new Columbia River and North Portland Harbor bridges would take place on the river itself. Temporary work structures, barges, barge-mounted cranes, derricks, and other construction vessels and equipment would be present on the river during most or all of the bridges' construction period. The IBR Program is working with USACE and USCG to obtain necessary clearances for these activities.

A casting or staging yard could also be required for construction of the overwater bridges if a precast concrete segmental bridge design is used. A casting yard would require access to the river for barges, a slip or a dock capable of handling heavy equipment and material, a large area suitable for a concrete batch plant and associated heavy machinery and equipment, and access to a highway or railway for delivery of materials. As with the staging sites, casting or staging yard sites may be identified as the design progresses or by the contractor and would be evaluated via a NEPA re-evaluation or supplemental NEPA document for potential environmental impacts at that time.

### 1.3 No-Build Alternative

The No-Build Alternative illustrates how transportation and environmental conditions would likely change by the year 2045 if the Modified LPA is not built. This alternative makes the same assumptions as the Modified LPA regarding population and employment growth through 2045, and it assumes that the same transportation and land use projects in the region would occur as planned.

Regional transportation projects included in the No-Build Alternative are those in the financially constrained 2018 *Regional Transportation Plan* (2018 RTP) adopted in December 2018 by the Metro Council (Metro 2018) and in March 2019 (RTC 2019) by the Southwest Washington Regional Transportation Council (RTC) Board of Directors is referred to as the 2018 RTP in this report. The 2018 RTP has a planning horizon year of 2040 and includes projects from state and local plans necessary to meet transportation needs over this time period; financially constrained means these projects have identified funding sources. The Transportation Technical Report lists the projects included in the financially constrained 2018 RTP.

The implementation of regional and local land use plans is also assumed as part of the No-Build Alternative. For the IBR Program analysis, population and employment assumptions used in the 2018 RTP were updated to 2045 in a manner consistent with regional comprehensive and land use planning. In addition to accounting for added growth, adjustments were made within Portland to reallocate the households and employment based on the most current update to Portland's comprehensive plan, which was not complete in time for inclusion in the 2018 RTP.

Other projects assumed as part of the No-Build Alternative include major development and infrastructure projects that are in the permitting stage or partway through phased development. These projects are discussed as reasonably foreseeable future actions in the Cumulative Effects Technical Report. They include the Vancouver Waterfront project, Terminal 1 development, the Renaissance Boardwalk, the Waterfront Gateway Project, improvements to the levee system, several restoration and habitat projects, and the Portland Expo Center.

In addition to population and employment growth and the implementation of local and regional plans and projects, the No-Build Alternative assumes that the existing Interstate Bridge would continue to operate as

it does today. As the bridge ages, needs for repair and maintenance would potentially increase, and the bridge would continue to be at risk of mechanical failure or damage from a seismic event.

## 1.4 Changes or New Information Since 2013

The CRC Selected Alternative identified in the 2011 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 in the study area, community priorities, and regulations have changed, which necessitated revisions to design and resulted in the IBR Modified LPA. Evaluation of potential impacts associated with environmental justice has been updated in this Draft SEIS to include:

### 1.4.1 Legal/Regulatory Changes

- On April 21, 2023, EO 14096, Revitalizing Our Nation’s Commitment to Environmental Justice for All, was signed by the Biden Administration, providing updates to the definition of EJ, a change in standard for what constitutes as an EJ effect, and an expansion of EJ communities.
- On May 14, 2021, USDOT Order 5610.2c was authorized, providing an update to the legal standard for “disproportionately high and adverse effects” on EJ populations (see Section 2.4.1).

### 1.4.2 Methods and Analysis Changes

- Updated EJ analysis methodology to identify “meaningfully greater” and high-priority EJ areas. (see Chapter 2).
- Updated demographic information to assess low-income and minority populations within the study area (see Section 2.4.1).
- Changes in project footprint related to moving the LRT alignment and stations.
- Design modifications which would reduce residential and commercial property acquisitions.
- Updated long-term, short-term, direct, indirect, and cumulative effects to low-income and minority populations resulting from the Modified LPA.
- Updated discussion of the effects to EJ populations resulting from a future IBR tolling program (see Section 4.7).

The IBR Program identified some impacts from the Modified LPA that would differ from those of the CRC LPA. Table 1-5 compares the key EJ-related impacts and benefits of the CRC LPA, as identified in the Final EIS (2011), and the IBR Modified LPA. Only the impact categories that would affect EJ populations are shown in the table. Key design changes that affect EJ impacts include replacing the full interchange on Hayden Island in the CRC LPA with a partial interchange and moving the proposed LRT alignment closer to I-5 in downtown Vancouver. The changes proposed under the Modified LPA would require a smaller design footprint, reducing the number of residential and commercial displacements in meaningfully greater and high-priority EJ areas.



Table 1-5. Comparison of Effects from the CRC LPA and the IBR Modified LPA

Type of Effect	CRC LPA Effects as Identified in the 2011 Final EIS	Modified LPA Effects Identified in this Section	Explanation of Differences
Residential Displacements	59 (Approximately 18 in meaningfully greater and high-priority EJ areas.)	<p>43 for the Modified LPA, including all design options except the I-5 Westward Shift (None in meaningfully greater and high-priority EJ areas.)</p> <p>The I-5 Westward Shift design option would shift I-5 west in downtown Vancouver, resulting in 33 residential units displaced in the Esther Short neighborhood (high-priority low-income neighborhood).</p>	Modified LPA design changes would reduce residential property acquisition, including in meaningfully greater and high-priority EJ areas, for all design options except for the I-5 westward shift.
Business Displacements	69 (Approximately 30 in meaningfully greater and high-priority EJ areas.)	<p>33 (13 in meaningfully greater and high-priority EJ areas.)</p> <p>One design option would shift I-5 west in downtown Vancouver, resulting in 3 commercial displacements at the Regal City Center complex</p>	Commercial property acquisitions in meaningfully greater and high-priority EJ areas would also decrease due to the Modified LPA's smaller footprint.
Tolling	<p>New toll would require a higher proportion of income of low-income drivers.</p> <p>Consideration of a variety of potential tolling schemes, including variable price tolls</p>	<p>New toll would require a higher proportion of income of low-income drivers.</p> <p>Toll rates and policies, including a possible low-income toll program, would be jointly set by the OTC and WSTC. Both commissions have supported the study of a low-income toll program, including how such a program could be implemented in each state. They will work together to determine how to approach this for the IBR Program.</p>	New analysis completed to understand the potential impacts of tolls on EJ populations under the Modified LPA.

Type of Effect	CRC LPA Effects as Identified in the 2011 Final EIS	Modified LPA Effects Identified in this Section	Explanation of Differences
High-Capacity Transit	The Modified LPA would bring new high-capacity transit to the I-5 corridor, including high-priority EJ neighborhoods such as Esther Short in Vancouver.	Same as CRC.	None identified.
Social and Neighborhood Effects	Displacement of Hayden Island Safeway and bottle return.	None identified.	The Safeway grocery store (including a pharmacy and bottle return) closed after the CRC project was suspended. A new Target store, replacing some of these services, was constructed outside the Modified LPA footprint.

CRC = Columbia River Crossing; N/A = not applicable; OTC = Oregon Transportation Commission; WSTC = Washington State Transportation Commission

## 2. METHODS

This chapter describes the methods used to assess direct, indirect, temporary, long-term and cumulative environmental impacts of the IBR Program on EJ populations. The assessment of environmental impacts to EJ populations is referred to broadly as the “EJ analysis.” These methods were developed to comply with federal guidelines and regulations, including NEPA, as well as local and state policies, standards, and regulations.

The study area; relevant laws and regulations; and methods for collecting data, assessing impacts, and evaluating possible mitigation measures for the Modified LPA are described below. These methods are an update to those developed for the CRC project, which completed the NEPA process with a signed ROD in 2011.

### 2.1 Legal Regulations and Standards

The EJ analysis methods conform to the following federal and state orders, laws, regulations, plans, policies, and guidance documents. The relevant regulations and standards primarily originate from the federal level, though some state and local laws or policies regarding EJ also apply to the IBR Program.

#### 2.1.1 Federal

##### 2.1.1.1 Presidential Executive Order 12898

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994) reinforces the National Environmental Policy Act of 1969 by requiring federal agencies to analyze the disproportionately high and adverse environmental effects resulting from federal actions on minority and low-income populations. EO 12898 provides that “each federal agency shall make achieving EJ part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.” EO 12898 also calls for the fair treatment and meaningful involvement of all people, which refers to proactive efforts to increase low-income and minority participation.

##### 2.1.1.2 Presidential Executive Order 14096

On April 21, 2023, EO 14096, Revitalizing Our Nation’s Commitment to Environmental Justice for All, was signed by the Biden Administration. EO 14096 directs the federal government to build upon and strengthen its commitment to deliver EJ through an updated definition of EJ, a change in the standard for what constitutes as an EJ effect, and an expansion of EJ communities. Although formal guidance on how to apply EO 14096 to NEPA projects has yet to be published, the IBR Program has sought to meet the intent of the rule through a robust EJ analysis, coordinated with an equity analysis completed as part of the Equity Technical Report.

### 2.1.1.3 U.S. Department of Transportation Order 5610.2c

The U.S. Department of Transportation (USDOT) requires full consideration of EJ principles throughout planning and decision-making processes. USDOT Order 5610.2c, U.S. Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (USDOT 2021), updates USDOT EJ procedures established by USDOT Order 5610.2a (USDOT 2012), which includes the following requirements:

- Planning and programming activities that have the potential to have “disproportionately high and adverse effects” on human health or the environment must explicitly consider the effects on minority and low-income populations (USDOT Order § 5[b][1]).
- Steps shall be taken to provide the public—including EJ populations—access to public information concerning the human health and environmental impacts of planning and programming activities (USDOT Order § 5[b][2]).

USDOT Order 5610.2c updates and clarifies certain aspects of the original order but maintains the requirements listed above, as well as the general framework and procedures for EJ evaluation in all USDOT programs, policies, and activities (USDOT 2021).

### 2.1.1.4 FHWA EJ Order 6640.23A

To comply with Executive Order 12898 and ensure nondiscrimination in federally funded projects, the Federal Highway Administration (FHWA) follows the policies and procedures established in Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (2012). Order 6640.23A updates and replaces the original Order 6640.23 (FHWA 1998).

- “It is FHWA's continuing policy to identify and prevent discriminatory effects by actively administering its programs, policies, and activities to ensure that social impacts to communities and people are recognized early and continually throughout the transportation decision-making process—from early planning through implementation. Should the potential for discrimination be discovered, action to eliminate the potential shall be taken.”
- “Under EO 12898, each Federal agency must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. FHWA will

#### Disproportionately High and Adverse Effects

A key feature of USDOT Order 5610.2c is that it establishes the legal standard for the identification of EJ impacts based on an assessment of “disproportionately high and adverse effects” of Program operation that would affect identified minority and low-income populations. As defined in USDOT Order 5610.2c, a “disproportionately high and adverse effect on minority and low-income populations” means an adverse effect that:

- (1) is predominantly borne by a minority population and/or a low-income population, or;
- (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population.”

implement this EO and the principles of DOT Order 5610.2(a) and EO 12898 by incorporating environmental justice principles in all FHWA programs, policies, and activities within the framework of existing laws, regulations, and guidance.”

#### 2.1.1.5 FHWA 2011 Guidance on Environmental Justice and NEPA

FHWA Guidance<sup>9</sup> on Environmental Justice and NEPA advises agencies on the process to address EJ during NEPA review, including that explicit consideration of potential effects on minority and low-income populations is required in NEPA documents (2011). The guidance requires EJ analyses to identify existing minority and low-income populations; explain coordination and access to information and participation; identify disproportionately high and adverse effects; and evaluate how to proceed when there are disproportionately high and adverse effects.

#### 2.1.1.6 Other Federal Regulations

All other relevant federal laws, regulations, plans, and policies are listed below:

- Presidential EO 13166 – Improving Access to Services for Persons with Limited English Proficiency (2000).
- Title 42 USC Section 4601, Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs (1970).
- USDOT, Department of Transportation: Environmental Justice Order 5610.2a (2012).

### 2.1.2 State

- Oregon Department of Environmental Quality Environmental Justice Policy, developed as a result of EO 94-25 and adopted in 1997 (DEQ 1997).
- Oregon Senate Bill 420 establishing Oregon’s 2008 Environmental Justice Law and Environmental Justice Task Force.

### 2.1.3 Local

The goals and policies within the following local comprehensive plan documents are consistent with the laws and regulations as part of this EJ analysis and provide additional context around alignment with local policies.

- City of Vancouver 2011 – 2030 Comprehensive Plan – Policy IM-13 Diversity. Adopted 2011.
- City of Portland 2035 Comprehensive Plan – Policy 2.3, Policy 2.4, Policy 8.32. Adopted 2018. Amended March 2020.
- City of Vancouver 2020 Statement Regarding Racial Equity and Racial Justice. Adopted July 6, 2020.

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<sup>9</sup> Federal Highway Administration (FHWA) Guidance on Environmental Justice and NEPA (2011). [https://www.environment.fhwa.dot.gov/env\\_topics/ej/guidance\\_ejustice-nepa.aspx](https://www.environment.fhwa.dot.gov/env_topics/ej/guidance_ejustice-nepa.aspx)



## 2.2 Defining Environmental Justice Populations

EO 12898 instructs federal agencies and recipients of federal funds to integrate EJ into agency missions and identify/address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on low-income and minority populations. Hence, the EJ analysis considers all potential impacts of the Modified LPA to determine whether the Program would result in disproportionately high and adverse effects on low-income and minority populations, which are defined as EJ populations.

The first step of the EJ analysis was to identify all EJ populations within the study area using best practices and methods consistent with FHWA guidance<sup>10</sup> and guidance sourced from the publication *Promising Practices for EJ Methodologies in NEPA* (2016), a compilation of agency approaches for incorporating EJ into environmental reviews published by the Environmental Justice Interagency Working Group. Per this guidance, a “no-threshold” analysis was conducted to identify all minority and low-income populations within the study area regardless of concentration relative to the general population, which is defined as the total population within the same study area. This analysis used 2016–2020 American Community Survey data published by the U.S. Census Bureau, analyzed at the U.S. Census block group level.

Building from the no-threshold analysis described above, a “meaningfully greater” analysis was used to identify concentrations of EJ populations relative to the average for the Portland-Vancouver region. As with the no threshold technique, this methodology is sourced from *Promising Practices for EJ Methodologies in NEPA Reviews* (EJ IWG 2016).

For the purposes of this project, low-income and minority populations 1.5 times greater than the corresponding average for the Portland-Vancouver region are considered “meaningfully greater.” Low-income and minority populations 2 times greater than the average for the Portland-Vancouver region are considered “high-priority” EJ areas<sup>11</sup>. Block groups where minority or low-income populations comprised 50% or more of the population were also considered high-priority EJ areas. The purpose of identifying meaningfully greater and high-priority EJ areas is to provide a baseline reference for the relative concentration of where minority and low-income populations exist, and where disproportionately high and adverse effects could exist. Determination of meaningfully greater and high-priority EJ areas also provides a reference for where there could be a need for additional outreach and analysis as part of the IBR Program.

The IBR Program acknowledges that demographic data providing population and household information is a valuable sampling tool and supports analyses such as the EJ analysis. There are some limitations to the use of Census data, however, and demographic data for a particular U.S. Census unit should not be the only factor used to determine disproportionality in EJ analysis. Consideration of the type, magnitude, severity, and distance of impacts in conjunction with demographic data forms a

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<sup>10</sup> Federal Highway Administration (FHWA) Guidance on Environmental Justice and NEPA (2011). [https://www.environment.fhwa.dot.gov/env\\_topics/ej/guidance\\_ejustice-nepa.aspx](https://www.environment.fhwa.dot.gov/env_topics/ej/guidance_ejustice-nepa.aspx)

<sup>11</sup> The meaningfully greater thresholds of 1.5 and 2 times the corresponding county or regional average were selected based on the regional significance of the IBR Program, such that the determination of meaningfully greater and high-priority EJ areas was relative to the broader region. These specific thresholds were also used in the Southwest Corridor Light Rail Environmental Impact Statement (2018), another regionally significant program.

more complete understanding of potential impacts, including whether impacts would be disproportionately high and adverse to EJ populations.

## 2.2.1 Minority Populations

Minority populations are defined consistent with USDOT Order 5610.2(c) and FHWA's Guidance on Environmental Justice and NEPA (2011):

- Black: a person having origins in any of the black racial groups of Africa.
- Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
- Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.
- American Indian and Alaskan Native: a person having origins in any of the original people of North America or South America (including Central America).<sup>12</sup>
- Native Hawaiian and other Pacific Islander: people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands (USDOT 2021).

Tribal governments (federally recognized tribes) are sovereign nations as recognized by the U.S. Government, and consultation with federally recognized tribes occurs through a government-to-government consultation process separate and distinct from public and community outreach and comment.

## 2.2.2 Low-Income Populations

EJ analysis conducted for the IBR Program defines low-income populations consistent with FHWA EJ guidance and the definition established in USDOT Order 5610.2c, which states that a low-income person is an individual whose median household income is at or below the U.S. Department of Health and Human Services (HHS) poverty guidelines (USDOT 2021). As of 2022, the poverty guideline for a household of four persons is \$27,750. The guidelines set by HHS are national and do not reflect distinct state and local economic realities; therefore, special attention must be paid to state and local thresholds.

The FHWA allows localities to adapt poverty thresholds to local standards per the FHWA Environmental Justice Reference Guide (FHWA 2015). Regional agencies, such as TriMet and Metro accept the regional poverty threshold to be 200% of the federal poverty level to reflect regional living costs and standards (Metro 2015; TriMet 2019). Under these regionally accepted standards, a household of four persons making \$55,500 or less would be considered low-income in 2022, as shown in Table 2-1.<sup>13</sup>

<sup>12</sup> It is important to note that not all American Indian and/or Native American populations are appropriately represented in U.S. Census data due to a history of termination, removal, and assimilation. Furthermore, tribal affiliation, citizenship, and/or sovereignty does not imply tribal ethnicity and cultural affiliation, and vice versa. Therefore, the EJ analysis recognizes that the demographic analysis based on U.S. Census data is not fully representative of American Indian and/or Native American populations within the study area.

<sup>13</sup> The average size of household in the Portland-Vancouver region is approximately 2.5. Household sizes of one and four were reported based on other recently completed NEPA environmental justice analyses that have been done in the region. For the purposes of this analysis, the federal poverty guideline for a four-person household is used.

Table 2-1. Low-Income Populations as Defined for the IBR Program EJ Analysis

Low-Income Guideline	Household of Four	Individual
Federal Poverty Level	\$27,750	\$13,590
Low-Income (200% of Federal Poverty Level)	\$55,500	\$27,180

Source: HHS 2021

For the purposes of the EJ analysis, “low-income populations” refers to any readily identifiable group of low-income persons, as defined above, and may include other populations, such as houseless individuals and families who would also be similarly impacted by the IBR Program.<sup>14</sup>

### 2.2.3 Other Populations

The following populations are not considered EJ populations under EO 12898 but may represent some proportions of EJ populations due to limited access to services and economic opportunities. Although this EJ analysis focuses on assessing potential disproportionately high and adverse impacts to low-income and minority populations, potential impacts to the following populations that live, work, or access services within the study area are also considered to the extent that potential impacts also result in disproportionately high and adverse impacts to EJ populations. Impacts to these populations specifically are discussed in more detail in the Equity Technical Report.

According to the U.S. Department of Housing and Urban Development (HUD), houseless populations are defined as individuals or families who lack a fixed, regular, and adequate nighttime residence; who have a primary nighttime residence that is in a public or private place that is not designated for regular sleeping accommodations; or who are living in a supervised publicly or privately operated shelter designated to provide temporary living arrangements (42 USC § 11302). Though houseless populations are not explicitly considered to be low-income populations, it is reasonable to assume that there is an overlap between the two.

According to HHS, individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English can be considered “limited English proficiency” populations (HHS 2000). Though limited English proficiency populations are not explicitly considered to be minority populations, it is reasonable to assume that there is overlap between the two.

Minority populations include American Indian and Alaskan persons having origins in any of the original people of North America or South America (including Central America). These populations may also belong to a federally recognized tribes, referring to American Indian or Alaska Native tribal entities recognized as having a government-to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation, and that are eligible for funding and services from the Bureau of Indian Affairs (BIA 2023). Federally recognized tribes are recognized as possessing certain inherent rights of self-governance (i.e., tribal sovereignty)

<sup>14</sup> The EJ analysis limits discussion to low-income and minority populations but acknowledges that other communities, such as houseless populations or limited-English proficiency populations, may also belong to the EJ population. The Equity Technical Report discusses populations not explicitly referenced in EO 12898.

and are entitled to receive certain federal benefits, services, and protections because of their special relationship with the United States.

## 2.3 Study Area

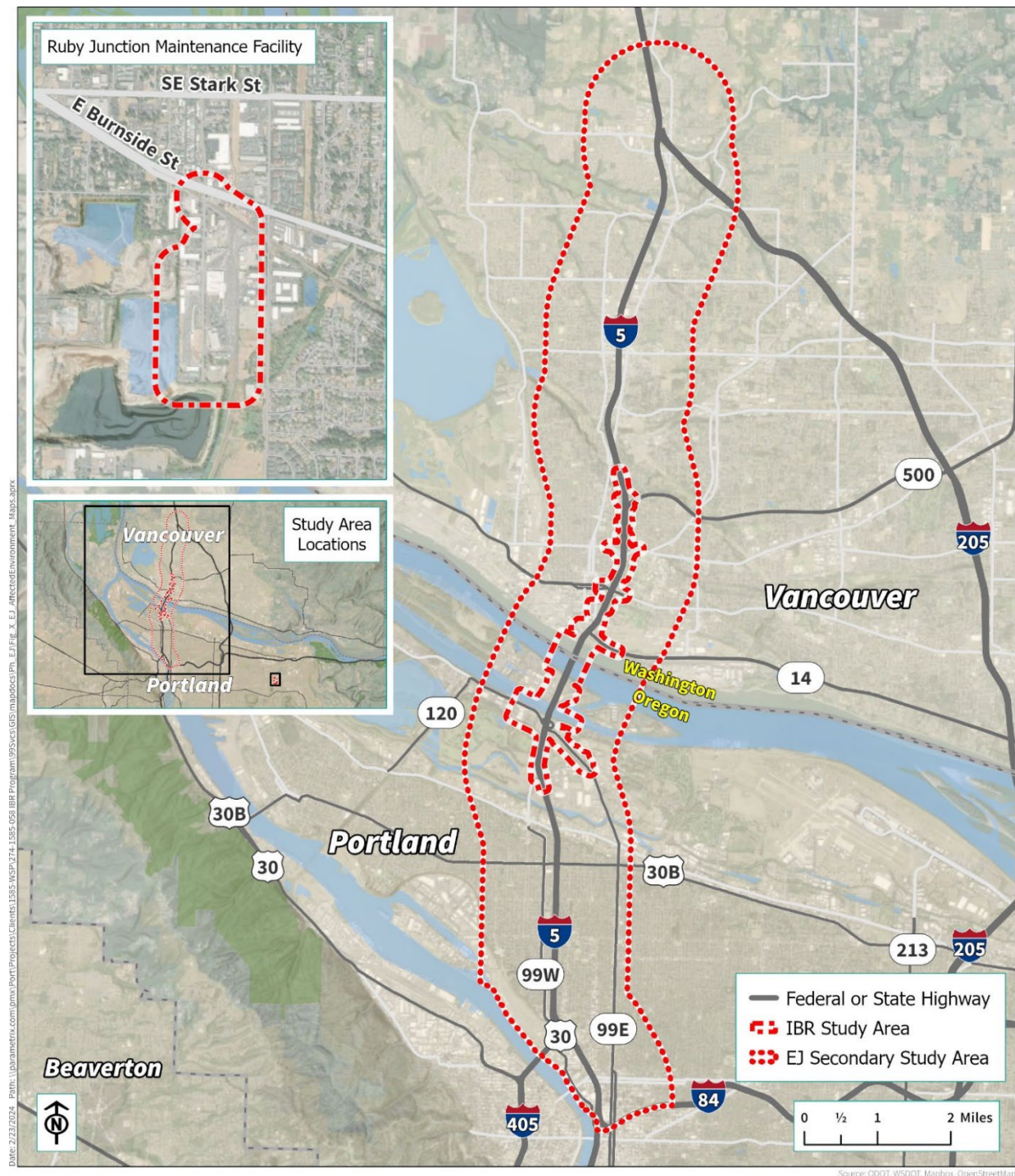
The IBR study area, also referred to as the primary study area, is a 5-mile segment of I-5 approximately between the SR 500 interchange in Washington and the I-5/Columbia Boulevard interchange in Oregon, as well as the Ruby Junction Maintenance Facility in Gresham, Oregon.

### 2.3.1 EJ Secondary Study Area

Impacts to EJ populations can extend beyond a project's limits. Therefore, the EJ analysis looked at a larger "secondary study area," which is over 15 miles long from approximately 1 mile north of the I-5/I-205 interchange in Vancouver, south to the I-5/I-84 interchange, and 1 mile both east and west of I-5. The secondary study area captures the area where both direct impacts and most indirect impacts (e.g., traffic and development changes) could occur (Figure 2-1). The intent of using the secondary study area for the EJ analysis was to account for all EJ populations that could be directly and indirectly impacted by the Modified LPA. For the EJ analysis, references to the study area refer to the secondary study area unless noted otherwise.



Figure 2-1. IBR Program Study Area





## 2.4 Data Collection Methods

The following is a list of data used to determine and describe the existing conditions for EJ population and to develop a demographic profile for populations that reside within and that travel through the study area.

### 2.4.1 Demographic Data

U.S. Census data was used as a starting point to understand populations and demographic characteristics within the study area. Census data were considered alongside supplemental data, including data from other sources and local community leaders to assess EJ populations within the study area. Data sources included:

- U.S. Census Bureau – Most recent available decennial census data and 5-year estimates from the U.S. Census Bureau American Community Survey (ACS). Most of the analysis utilizes ACS 5-Year Estimates, 2016–2020 (U.S. Census Bureau 2022a), though other relevant survey years are referenced throughout the report. For the Final SEIS, the analysis will be updated with the most recent ACS data available.
- Oregon Department of Education data on free or reduced lunch eligibility (Oregon Department of Education 2021).
- Metropolitan Portland Regional Travel Demand Model (Metro 2022).
- Washington Office of Superintendent of Public Instruction (OSPI 2021).

### 2.4.2 Spatial Data

Spatial data detailing existing, planned, and future community features (e.g., street and roadway network, geographic boundaries, parks, waterbodies, and community destinations) will be used to understand the community context within the study area. The EJ analysis will use data published by the Metro Regional Land Inventory System, Oregon Department of Transportation (ODOT) TransGIS, the Washington State Department of Transportation (WSDOT) GeoData Distribution Catalog, and local agency information from C-TRAN, TriMet, the city of Vancouver, the City of Portland, and other sources.

### 2.4.3 Community Resource Mapping

Community resources have been identified on an ongoing basis through a combination of geographic analysis and community engagement; the IBR Program team has reviewed the community resources found in the CRC program planning process, updated them to current conditions, and refined them based on Program advisory groups and community engagement. The potential community resources that could be impacted by the Program include:

- Parks and playgrounds
- Public and private schools
- Recreational facilities

- Libraries
- Community centers
- Commercial areas, such as eateries, cafés, or shopping centers
- Religious organizations
- Day care facilities
- Hospitals and healthcare facilities

## 2.5 Engagement and Coordination

Per FHWA Guidance on Environmental Justice and NEPA, EJ documentation should include a discussion of major proactive efforts to ensure meaningful opportunities for public participation, including activities to increase low-income and minority participation (FHWA 2011). Public engagement information should also include affected populations' perception of the project and steps to resolve potential controversy. Additionally, EJ documentation should describe the degree to which affected minority and/or low-income populations have been involved in decision-making related to project alternatives, impacts, and mitigation.

23 CFR 771.111 requires the provision of public involvement opportunities and meaningful access to public information for minority populations and low-income households. The IBR Program team is engaged in an ongoing public outreach campaign that offers a wide range of opportunities for public involvement throughout the environmental review process.

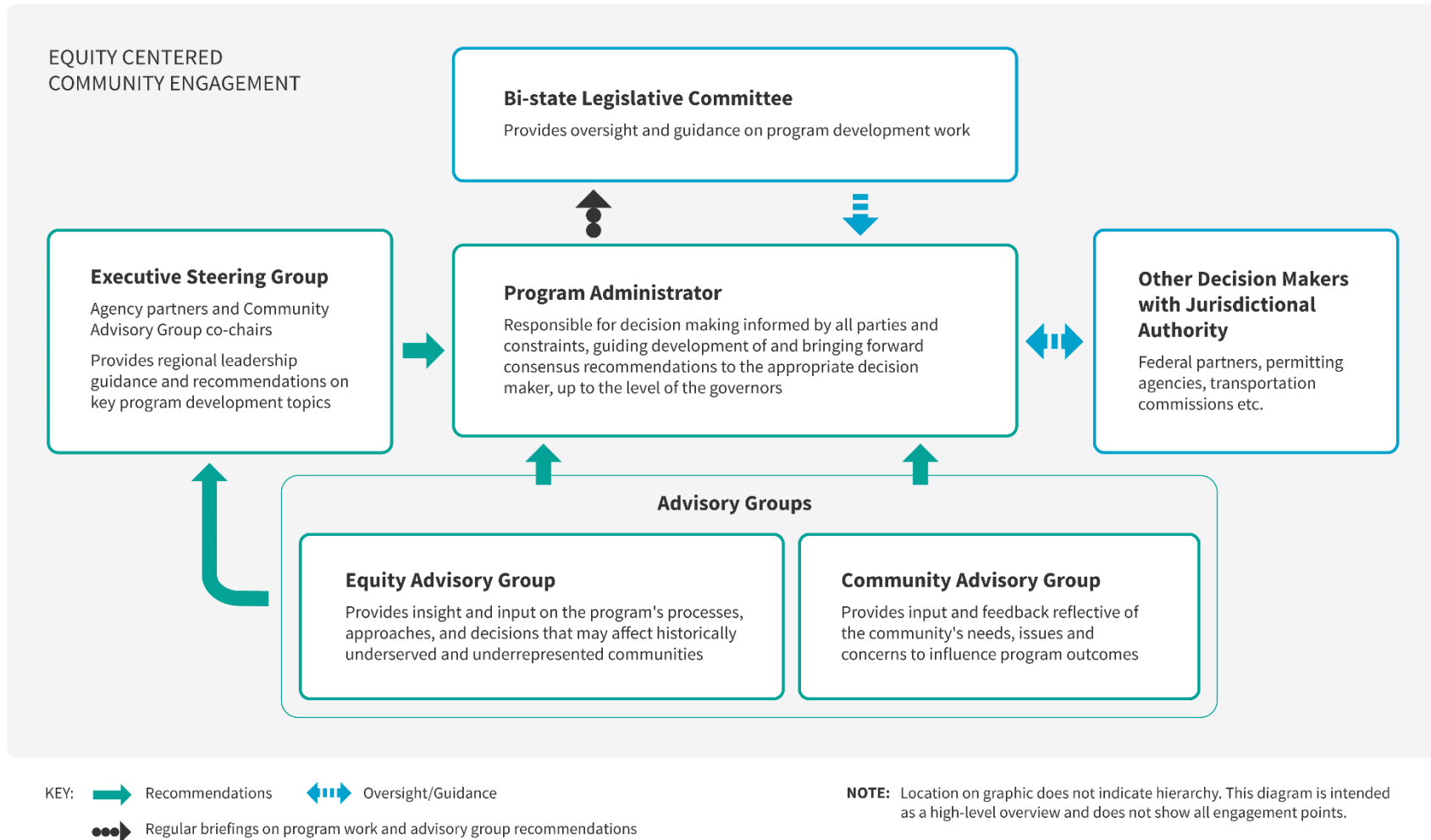
### 2.5.1 Community Advisory Group, Community Benefits Advisory Group, and Equity Advisory Group

The IBR Program has four advisory groups: the Community Advisory Group (CAG), Equity Advisory Group (EAG), Community Benefits Advisory Group, and Executive Steering Group. The majority of CAG and EAG membership is comprised of regional community members and partners who were identified and appointed to represent a diverse range of perspectives, including those of low-income and minority populations, as well as representatives from local agencies and community-at-large members. A minority of the members were selected through a public and competitive application process.

The CAG provides input and feedback reflective of community needs, issues, and concerns to influence Program outcomes, including concerns voiced by EJ communities. The EAG provides insight and input on the Program's processes, approaches, and decisions that may affect historically underserved and underrepresented communities, which include EJ communities. Both advisory groups have shaped the screening process that led to the selection of the Modified LPA. The organization of the three advisory groups is depicted in Figure 2-2.

The advisory bodies are involved in a systematic approach for continuous feedback and communication between community members and Program administrators. Input from both the CAG and EAG on this EJ analysis will inform the SEIS.

Figure 2-2. IBR Program Advisory Groups



## 2.5.2 Community Engagement Activities

### 2.5.2.1 Initial Community Engagement (2020-2021)

The IBR Program has been engaging with partner agencies, tribal governments, and community-based organizations since late 2020 and has been conducting more formal intentional community engagement since January 2021. The first community engagement milestone concluded in January 2022, as documented in the [IBR Community Engagement Report](#) (IBR 2021).

Throughout this initial community engagement period, the Program team met with and gathered feedback from residents, businesses, community-based organizations, and businesses within the study area to learn more about the communities expected to be impacted by the IBR Program. The Program team also met with organizations from the greater metropolitan area, given the regional significance of the Program. These efforts included outreach to low-income and minority populations to understand key issues within the study area. The Program team also offered translated materials and interpreter services to engage limited English proficiency populations.

From September through December 2021, the Program held a targeted period of community engagement to gather feedback around design options, which ultimately led to the selection of the Modified LPA. These activities included:

- Online open house
  - An online open house webpage was launched on October 23, 2021, to provide information regarding design options and the overall planning process towards identifying a bridge replacement solution. The online open house included a translation tool to individuals to view the open house in eight different languages to increase participation from minority populations.
  - More than 11,000 users visited the online open house between October 23 and December 10, 2022.
- Community briefings
  - Four virtual community briefings were held in November 2021 to share program information and design options. Briefings were conducted on varied days of the week and times of day—including weekday, weekend, mid-day, and evening hours—providing a wide range of accessible participation. The briefings were also advertised in eight different languages to increase participation from minority populations.
  - Ninety-one people attended the four community briefings.
- Advisory groups
  - The IBR advisory group structure is summarized in Figure 2-2. Key input from the EAG and CAG related to EJ is summarized below:
    - Emphasis on implementing an equitable tolling program.
    - Designing for human-centered accessibility, including around interchanges.
    - Focusing on connecting communities.

- Addressing air quality impacts to neighborhoods in and around the program area.
  - Exploring potential opportunities to support access to the Columbia River.
  - Improving access to cultural amenities and human services.
  - Ensuring safe, convenient access to transit.
  - Understanding and addressing potential impacts on the houseless population.
  - Anticipating how certain options could result in gentrification and displacement.
- Community-specific listening sessions
  - Four community-specific listening sessions were held in November 2022 in partnership with 10 community-based organizations that have established deep connections within EJ communities. The purpose of these sessions was to share information on design options with EJ and equity communities and to solicit feedback.
  - More than 300 community members participated in this series of listening sessions (see Table 2-2) with each focusing on one of four populations relevant to EJ: minority populations, people living with disabilities, youth and low-income populations; and people with limited English proficiency, immigrants, and refugees. The sessions on minority and low-income populations were attended by 184 people.
  - Key feedback included:
    - Strong support for equitable tolling.
    - Strong concern over mitigating environmental impacts, COVID-19, and associated job loss.
    - Support for infrastructure that promotes high-capacity transit and low-stress active transportation options.
    - Support for improving traffic conditions over the Columbia River.
    - Interest in how the Hayden Island and Marine Drive interchange would impact high-capacity transit.
    - Employment and workforce development opportunities to help minorities access jobs that result from construction of the IBR Program.

Table 2-2. Community Listening Session Participants Summary

Listening Session Topics	Number of Participants per Session
Minority Populations	55
People Living with Disabilities	30
Youth and Low-Income Populations	129
People with Limited English Proficiency, Immigrants, and Refugees	93

Source: IBR 2021.



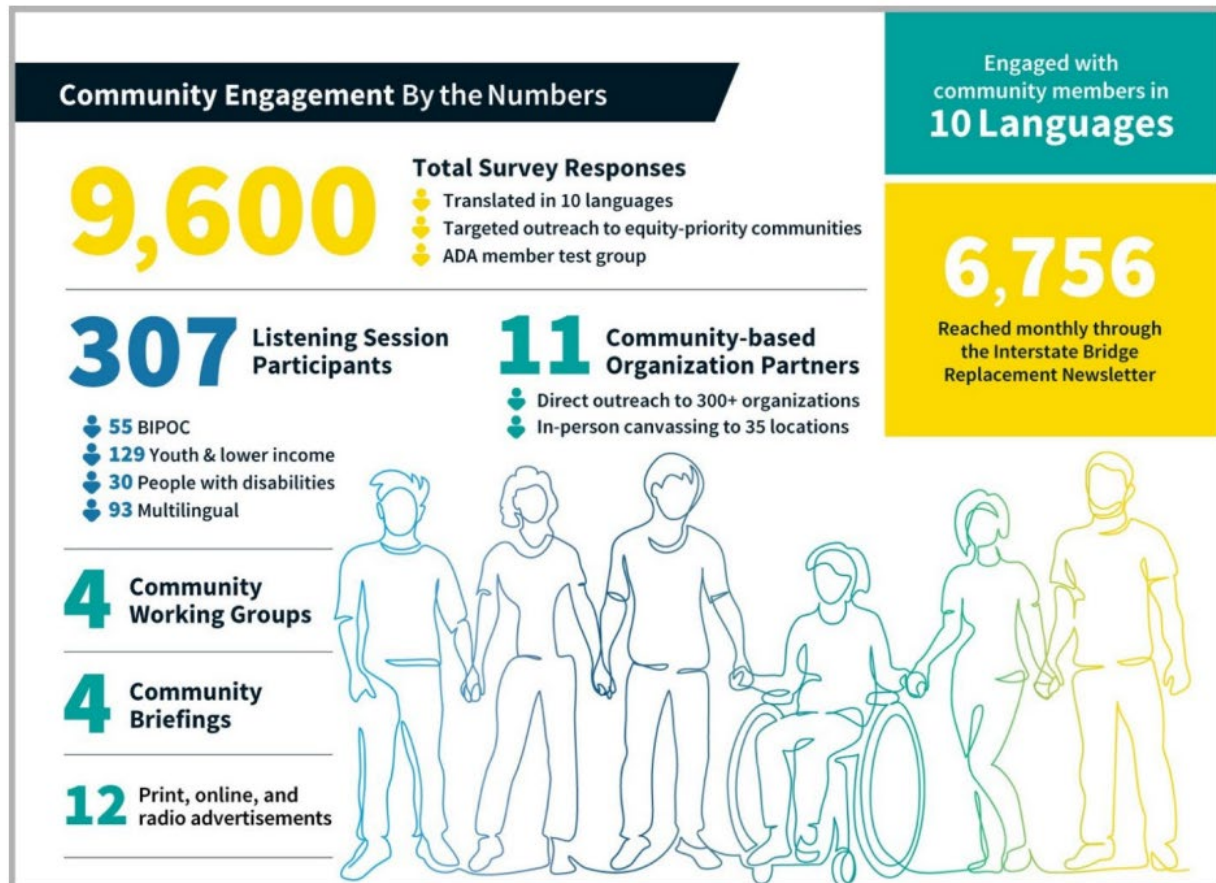
- Community working groups
  - Four community working groups (CWGs) met twice in fall 2021 to provide feedback on specific transportation issues related to the program. Groups were convened on the following topics: active transportation, multimodal commuter, Hayden Island/Marine Drive, and downtown Vancouver.
  - Each CWG included representation from a variety of age ranges, income levels, and racial/ethnic identity, including low-income and minority populations.
  - A total of 81 participants joined the CWG meetings.
- Freight leadership meeting
  - In November 2021, the program hosted a meeting with the freight leadership community to discuss regional freight priorities, share program information, and review design options. The meeting was co-hosted by the Ports of Vancouver and Portland.
- Community input survey
  - An online community input survey was held from November 12 to December 10, 2021, to gather feedback around bridge replacement design options and participant transportation habits and priorities. The survey was available to participants in 11 languages: English, Spanish, Vietnamese, Chinese (Traditional and Simplified), Korean, Russian, Romanian, Ukrainian, Somali, and Arabic.
  - The survey was extended to January 2 in an effort to capture additional feedback from EJ populations, capturing a total of 9,600 responses of which 37% were minority populations.
  - Key issues raised by EJ populations included:
    - Reducing overall trip time, ease of trip, and avoiding a toll were the top three future travel priorities for minority respondents.
    - Improving travel times for vehicles and freight and improving safety for all travelers were the top two cited reasons for bridge replacement by minority respondents.
    - Near the Vancouver Waterfront was the top transit station location cited by minority participants.
    - Strong disapproval for tolling.
- Media outreach

Through these efforts, the Program heard from low-income and minority populations, in addition to broader equity populations. Figure 2-3 is an excerpt from the 2021 Community Engagement Report and summarizes who the Program was able to hear from during this initial engagement period.

The IBR Program is consulting with 10 federally recognized Indian Tribes. Tribal governments (federally recognized tribes) are sovereign nations as recognized by the U.S. Government, and consultation with federally recognized tribes occurs through a government-to-government consultation process separate and distinct from public and community outreach and comment. The government-to-government consultation goals and process are documented in Appendix A of the Draft SEIS (Agency and Tribal Coordination).

Table 2-2 summarizes the number of people who participated in the four community listening sessions held in November 2021.

Figure 2-3. Community Engagement by the Numbers, September through December 2021



Source: IBR 2021.

### 2.5.2.2 2022 Community Engagement Efforts

Outreach efforts in 2022 focused on continued engagement to inform the development of the Modified LPA, communicate the elements being recommended by the Program, and seek regional consensus on the Modified LPA and next steps to further analyze it through the SEIS process. Following screening and evaluation of the design options and transit investments, the IBR Program developed recommendations for the key components of the Modified LPA, informed by technical and screening work along with Program partners and community feedback. Together, these key components form a comprehensive multimodal solution that addresses the Program’s Purpose and Need, meets equity and climate change objectives, and supports regional and local priorities and desired outcomes. From September through December of 2022, the IBR Program shared updates on the NEPA compliance process and path toward publishing a Draft SEIS.

#### Highlight of 2022 community engagement efforts:

- Regional consensus to move the Modified LPA into the federal environmental review process in summer 2022. This included endorsement by the board, council or commission of all eight local partner agencies, unanimous consensus from the Program’s ESG, and acknowledgment by the Bi-State Legislative Committee to move the Program forward into the next phase of work.
- The Program tabled at six in-person community events, including farmers’ markets and festivals, and had direct conversations with nearly 500 people through this engagement effort.
- Direct outreach to over 200 neighborhood associations and community-based organizations resulted in discussions with a wide variety of community members about the Modified LPA, next steps in the environmental review process, and how to provide meaningful input once the Draft SEIS is released.
- Provided informational presentations to approximately 60 organizations, including local partner agency boards, councils, and commissions, neighborhood associations, and CBOs.
- Participated in over 20 speaking opportunities at the national, regional, and local level to engage various members of the public to share the Program’s story, inform audiences of the Program’s progress, and address any concerns.
- Hosted three equity roundtable discussions: “Black Communities and their Relationships with Infrastructure,” “Why Equity Matters in Infrastructure,” and “Accessibility through Infrastructure.”
- Hosted 29 public steering and advisory group meetings, including the ESG, EAG, and CAG.
- Coordinated and hosted Program area tours for Program advisory group members

#### Key public comment themes during this effort included:

- Interest in elements of the Modified LPA and the river crossing design.
- Interest in information about upcoming opportunities for engagement.
- Comments on replacement bridge alternatives (tunnel, third bridge crossing, and retrofitting the current bridge).

#### 2.5.2.3 2023 Community Engagement Efforts

The Program’s outreach in 2023 was primarily focused on an extended effort to conduct both broad and mindful community engagement prior to the release of the Draft SEIS. The purpose of the engagement during this timeframe was to continue raising awareness about the Program and key milestones, inform community members of the Modified LPA and the elements that are being analyzed in the Draft SEIS, and prepare community members to effectively provide input during the public comment period.

Highlight of community engagement efforts in 2023 included:

- Held 18 public steering and advisory group meetings.
- Provided Program updates and presentations to over 60 organizations.
- Held two in-person neighborhood forums.
- Hosted a Disadvantaged Business Enterprise meet-and-greet event.
- Tabled at 17 community events, split between Oregon and Washington, approximately 50% of which were centered on equity priority communities. The Program was able to engage with more than 1,250 individuals at a diverse range of events.
- Participated in 16 regional and national conferences.
- Coordinated and conducted over 16 bridge or Program area tours.
- Completed a cultural resources open house.
- Conducted three equity roundtables: “Women Paving the Way,” “The Intersection of Multimodal Transportation and Equity,” and “Road to Prosperity: A Conversation About Workforce Diversity and Disadvantaged Business Enterprises.”
- Launched “office hours” beginning in August 2023, offering the opportunity for community members to sign up for an appointment (in person or virtual) to speak directly to IBR Program team members to ask questions and share their feedback.
- Formed the Community Benefits Advisory Group (CBAG) in September to develop recommendations to leverage the Program’s work to achieve the greatest positive benefit to the communities in the Program area and broader region, in alignment with the Program’s equity framework and community priorities.
- Offered a second round of small-scale, low-barrier grants to community-based organizations serving equity priority communities to extend the outreach of the Program.

### 2.5.3 Incorporating Community Feedback

Community feedback captured during this engagement period was considered and strongly influenced the selection of the Modified LPA in spring 2022, as described in this report. Identification of the Modified LPA was made based on community feedback alongside technical expertise, partner agency feedback, screening results, traffic modeling data, and this EJ analysis.

In the Spring of 2022, the Modified LPA was submitted for consideration by partner agency boards and councils and review by the bi-state legislative committee. Through the development of the IBR technical reports and associated Draft SEIS document, the Modified LPA has undergone a detailed analysis as required by the federal environmental review process. The environmental review process has documented environmental impacts, benefits, and mitigation measures associated with the Modified LPA. Through this process, key concerns to EJ populations have been documented and

considered in the development of design options, mitigation measures, and project enhancements, such as:

- Proposed equitable and/or low-income tolling policy.
- Transit station improvements in downtown Vancouver.
- Emphasis on active transportation options across the Columbia River, including transit, walking, and bicycling options.
- Emphasis on improving travel times across the river for both vehicles and transit.
- Employment and workforce development opportunities to help minorities access jobs that result from construction of the IBR program.

The IBR Program will publish the Environmental Justice Technical Report simultaneously with the Draft SEIS document. This report and the Draft SEIS will serve as an update to the previous CRC Environmental Justice Technical Report and Final EIS, and public input will be solicited to refine the identification of EJ impacts, mitigation strategies, and design elements. The Program will also solicit input on EJ impacts and mitigations from the IBR Equity, Community Benefits, and Community Advisory Groups. This future community feedback will be documented in the Final SEIS. Additional opportunities for community engagement and feedback will be provided throughout the environmental process and all stages of the IBR program.

Given that this community engagement process is not yet complete, this Environmental Justice Technical Report provides a *preliminary determination* of disproportionately high and adverse effects, subject to further refinements of the Modified LPA design options and future engagement of EJ populations. The Final SEIS will describe the *final determination* of disproportionately high and adverse effects and will describe how community feedback influenced the final determination.

## 2.6 Analysis Methods

### 2.6.1 Long-Term Impact Assessment Methods

Generally, long-term impacts were determined by evaluating the location and intensity of environmental impacts that would occur in the scenario of a fully completed and operational Modified LPA where EJ populations were identified. The impact analysis will include, and cover impacts derived from several IBR Program technical reports: Displacements and Relocations, Social and Neighborhood Effects, Land Use and Economics, Visual Resources, Air Quality, Noise and Vibration, and Transportation. Table 2-3 summarizes IBR environmental resource topics and indicates the relevant topics for the EJ analysis.



Table 2-3. IBR Environmental Resource Topics – Potential Impacts to EJ Populations

Environmental Resource Topic	IBR Reference	Potential Impact to EJ Populations?
Acquisition and Displacements	Acquisition and Displacements Technical Report	Yes.
Air Quality	Air Quality Technical Report	Yes.
Archaeology	Archaeological Resources Technical Report	Yes.
Aviation	Aviation Technical Report	No; effects evaluated were limited to protected airspace and air navigation hazards.
Climate Change	Climate Change Technical Report	No; this is a larger-scale analysis of greenhouse gas emissions and climate resiliency that is not scalable to EJ population areas.
Ecosystems	Ecosystems Technical Report	No; this analysis evaluated effects on fish, wildlife and plants.
Energy	Energy Technical Report	No; this is a larger-scale analysis of energy usage that is not scalable to EJ population areas.
Electromagnetic Fields	Electromagnetic Fields Technical Report	No; this is a larger-scale analysis of electromagnetic fields that is not scalable to EJ population areas.
Geologic Hazards	Geologic Hazards Technical Report	No; this is a larger-scale analysis of geological hazards that is not scalable to EJ population areas.
Hazardous Materials	Hazardous Materials Technical Report	No; effects evaluated were site specific, whereas EJ population areas were evaluated at a neighborhood level.
Historic Resources	Historic Built Environment Technical Report	No; this analysis evaluated historic resources within the context of historical significance under the National Historic Preservation Act Section 106.
Land Use and Economics	Land Use and Economics Technical Reports	Yes.

Environmental Resource Topic	IBR Reference	Potential Impact to EJ Populations?
Noise and Vibration	Noise and Vibration Technical Report	Yes.
Social and Neighborhood Effects	Neighborhoods and Populations Technical Report	Yes.
Public Services	Public Services Technical Report	No; this analysis evaluated effects limited to public services without decreases in services to general and EJ populations.
Transportation	Transportation Technical Report	Yes.
Tolling	Economics Technical Report	Yes.
Utilities	Utilities Technical Report	No; this analysis evaluated effects limited to utilities and potential utility relocations without impacts to service.
Visual Resources	Visual Quality Technical Report	Yes.
Water Quality and Hydrology	Water Quality and Hydrology Technical Report	No; this is a larger-scale analysis of water quality, and proposed changes would result in benefits to general and EJ populations.
Wetlands and Jurisdictional Waters	Wetlands and Other Waters Technical Report	No; this analysis evaluated wetlands and jurisdictional waters within the context of Clean Water Act Sections 401 and 404, as well as applicable state and local regulations.

The long-term impact assessment methods for each of the environmental topics relevant to the EJ analysis are summarized below:

- **Acquisitions and displacements.** The EJ analysis reviews proposed property acquisitions and displacements within census block groups<sup>15</sup> and neighborhoods in the study area to determine impacts to EJ populations. The analysis assesses whether displaced property owners belong to EJ populations and whether EJ populations within the study area would be disproportionately impacted by proposed acquisitions and displacements compared to the general population. Residential displacement demographics were verified with a displacement survey.
- **Air quality.** The EJ analysis reviews changes to air quality resulting from the Modified LPA to determine whether EJ populations would be adversely and disproportionately impacted by airborne pollutants compared to the general population. The analysis was conducted for the study area and region, and reviewed the six criteria pollutants consistent with National Ambient Air Quality Standards, including carbon monoxide, lead (Pb), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), and sulfur dioxide (SO<sub>2</sub>).
- **Archaeology.** Investigations to determine the presence of archaeological resources within the study area are underway. If such resources are found to be present, potential impacts would be reviewed to determine if they would be culturally significant to EJ populations.
- **Land use and economics.** The EJ analysis reviews the economic impact of the Program on low-income and minority populations within the study area by reviewing several economic factors, such as the potential effects of business and employee displacements, changes to land uses in block groups with high concentrations of EJ populations, and the impact of tolling. Business displacement demographics were verified with a displacement survey.
- **Noise and vibration.** Noise impacts were evaluated in block groups with high concentrations of EJ populations within the study area. The noise and vibration analysis utilizes noise sample location data and noise modeling to compare existing and future noise and vibration levels. Adverse noise impacts were evaluated to determine whether they would be predominantly borne by EJ populations within the study area as compared to the general population.
- **Social and neighborhood effects.** The EJ analysis evaluates community resource displacements and community cohesion impacts in block groups with high concentrations of EJ populations within the study area. The analysis evaluates whether adverse impacts to community resources or community cohesion caused by the Program would be predominantly borne by EJ populations within the study area compared to the general population. The EJ analysis also considers potential impacts and access changes to facilities and services used by EJ populations, including healthcare centers, community facilities, and social service providers that serve low-income and minority populations.
- **Transportation.** The EJ analysis reviews adverse long-term transportation impacts resulting from implementation of the Program. A range of impacts were considered, including construction-related and long-term changes to access, traffic impacts, public transportation

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<sup>15</sup> **Block groups** are statistical divisions of census tracts used by the U.S. Census Bureau, consisting of clusters of blocks within the same census tract. Block groups are generally defined to contain between 600 and 3,000 people and are used to present data and control block numbering.

impacts, and impacts to the nonmotorized transportation system. The analysis assesses whether these adverse transportation impacts would disproportionately burden block groups with high concentrations of EJ populations within the study area.

- **Tolling.** The EJ analysis determines the potential impact of tolling on EJ populations. The analysis utilizes two potential pricing scenarios currently being studied for the I-5 corridor, a typical commuter trip profile, and tolling prices as a percentage of median household income to determine whether adverse tolling impacts would disproportionately impact block groups with high concentrations of EJ populations within the study area.
- **Visual resources.** The EJ analysis reviews adverse impacts to views and visual resources to determine whether such impacts would disproportionately impact block groups with high concentrations of EJ populations within the study area.

The long-term impact assessment methods also account for potential benefits the IBR Program could bring to EJ communities, such as improved seismic resilience, multimodal access, and accessibility upgrades within the study area.

## 2.6.2 Temporary Impact Assessment Methods

The analysis of direct temporary impacts determines the potential disproportionately high and adverse impacts of construction and staging activities on low-income and minority populations. Short-term impacts include temporary, one-time, or short-term effects that are limited to the duration of construction. Construction phasing impacts will be referenced from other SEIS technical reports (listed above) and will be used to determine impacts to EJ populations. Key environmental resource topics that were evaluated as part of the temporary impact assessment are summarized below:

- **Acquisitions and displacements.** The EJ analysis reviews construction-related, short-term impacts to properties within the study area including full and partial acquisitions, temporary construction easements, and staging impacts. The analysis determines whether adverse property impacts would disproportionately burden block groups with high concentrations of EJ populations compared to the general population.
- **Access impacts.** The EJ analysis reviews construction-related, short-term impacts to business and residential access for all modes of transportation. The analysis determines whether adverse, short-term access impacts would disproportionately burden block groups with high concentrations of EJ populations within the study area.
- **Detours and rerouting.** The EJ analysis reviews construction-related, short-term detour and temporary rerouting impacts within the study area. The analysis determines whether adverse, short-term detour and rerouting impacts would disproportionately burden block groups with high concentrations of EJ populations compared to the general population.
- **Noise and vibration.** The EJ analysis reviews construction-related, short-term noise impacts in block groups with high concentrations of EJ populations within the study area. The analysis uses similar methods to the long-term impacts analysis and relies on noise sample data and modeling to determine whether construction-related impacts would disproportionately burden EJ populations compared to the general population.

### 2.6.3 Indirect Impact Assessment Methods

Indirect impacts are potential growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems that may result in disproportionately high and adverse impacts to low-income and minority populations. Indirect impacts are described in Chapter 6.

### 2.6.4 Cumulative Impacts

Cumulative impacts may occur when a project's effects are combined with those from past, present, and reasonably foreseeable future projects. They can also result from individually small but collectively significant actions that occur over a long period of time.

According to the Cumulative Effects Technical Report, Section 3.8.3, past projects have directly affected EJ populations in the I-5 corridor (such as the displacements associated with the 1960 construction of I-5 through North Portland). Construction of the Modified LPA would not generate a disproportionately high and adverse human health or environmental effect on an EJ community. In addition, the benefits of the Modified LPA are expected to accrue to EJ priority communities as well as the general population. Some people, including minority and low-income individuals, would be adversely affected by the Program (i.e., by property impacts and noise and traffic during construction). But in general, the Modified LPA would be likely to improve conditions (such as air pollution, poor access, and poor transit service) for populations and neighborhoods that have historically been adversely affected by other past actions.

Proposed EJ mitigations (as described in Chapter 7 of this technical report) such as assistance to offset tolling impacts and enhanced communications during construction could minimize impacts and increase benefits to EJ populations. Combined with past, present, and reasonably foreseeable future actions, the Modified LPA would have both beneficial and adverse effects on EJ populations.

### 2.6.5 Mitigation

Mitigation measures were identified to avoid, minimize, or mitigate adverse impacts resulting from the IBR Program. Mitigation measures for subjects evaluated in other technical memos, such as noise, have been proposed by technical specialists for each resource area. Partner agencies and community members will be given an opportunity to review and comment on proposed mitigation measures for potential impacts to EJ populations as part of the NEPA process. Any mitigation commitments will be dependent on regulations, feasibility, cost, effectiveness, and other considerations.

### 2.6.6 Determination of Disproportionately High and Adverse Impacts

Per U.S. DOT Order 5610.2c., determination of a "disproportionately high and adverse effect" depends on whether that effect is (1) predominantly borne by an EJ population, or (2) will be suffered by the EJ population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population. It is important to note that determination of disproportionately



high and adverse effects take into consideration the mitigation and enhancement measures that are planned for the proposed action.<sup>16</sup>

Different methodologies and approaches exist for identifying EJ populations as the first step towards determining whether an impact produces a disproportionately high and adverse effect on low-income and minority population.

The IBR EJ analysis reviewed two methodologies issued in *Promising Practices for EJ Methodologies in NEPA* (2016)—a compilation of agency approaches for incorporating EJ into environmental reviews published by the Environmental Justice Interagency Working Group (EJ IWG as established under Executive Order 12898). These methodologies were used to identify the location and concentration of EJ populations within the study area. The methodologies differ from the prior “effects guidelines” used in the CRC project EJ analysis and are generally more robust. These quantitative approaches help determine whether a census block group has a high concentration of EJ populations relative to the region.

#### 2.6.6.1 No Threshold Analysis

A “no threshold” analysis is a qualitative approach that does not employ a numerical or percentage-based threshold for qualifying census block groups as study areas for the EJ analysis; instead, this approach assesses potential EJ impacts within all census block groups within the study area, regardless of the proportion of low-income or minority populations compared to the general population. This approach assesses EJ impacts using a combination of demographic data, the location and concentration of known community facilities and services, and information learned from public and community engagement activities (EJ IWG 2016).

The primary advantage of the no threshold approach is that it reduces the potential to overlook low-income or minority communities residing within a given census block group simply because they constitute a relatively small percentage of the overall population. This approach also provides an avenue for identifying potential EJ impacts within predominantly non-minority or affluent census block groups. In a hypothetical example, a community-based organization or social service group that primarily serves EJ populations may exist within a neighborhood that otherwise has a low proportion of low-income and minority residents. In another example, census block group boundaries may not provide a clear representation of where EJ populations reside and where they access critical services. The no threshold approach reduces the potential for these kinds of misrepresentations by not relying entirely on how census boundaries are drawn or reported percentages.

#### 2.6.6.2 Meaningfully Greater Analyses

Building from the identification of all EJ populations based on the no-threshold analysis described above, additional analysis was conducted to identify concentrations of minority and low-income populations within the study area. Areas with higher concentrations of EJ populations provided a reference for where additional analysis and outreach may be needed as part of the IBR Program.

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<sup>16</sup> U.S. Department of Transportation. Final DOT Environmental Justice Order (1997).  
<https://www.transportation.gov/sites/dot.gov/files/docs/mission/transportation-policy/environmental-justice/339501/dot56102a.pdf>

A “meaningfully greater” analysis methodology was used to identify higher concentrations of EJ populations relative to the general population. As with the no threshold technique, this analysis technique is sourced from *Promising Practices for EJ Methodologies in NEPA Reviews* (EJ IWG 2016). The analysis considers EJ impacts in census block groups where levels of low-income or minority populations are meaningfully greater than corresponding county or regional averages—usually expressed in percentage ranges.

Per the guidance set forth in the EJ methodology report (EJ IWG 2016), meaningfully greater analysis uses reasonable, subjective thresholds (e.g., 10% to 20% greater than the reference community). For the purposes of this EJ analysis, low-income and minority populations 1.5 times greater than the corresponding average for the Portland-Vancouver region are considered meaningfully greater. Low-income and minority populations 2 times greater than the average for the Portland-Vancouver Region are considered high-priority EJ areas<sup>17</sup> for the purposes of this analysis. Furthermore, block groups where minority or low-income populations comprised 50% or more of the population were also considered high-priority EJ areas.<sup>18</sup>

EJ analysis conducted for the IBR Program defines low-income populations consistent with FHWA EJ guidance and the definition established in USDOT Order 5610.2c, which states that a low-income person is an individual whose median household income is at or below the HHS poverty guidelines (USDOT 2021). As of 2022, the poverty guideline for a household of four persons is \$27,750. The guidelines set by HHS are national and do not reflect distinct state and local economic realities; therefore, special attention must be paid to state and local thresholds.

## Evaluating Effects on EJ Populations

It is important to note that, while meaningfully greater and high-priority EJ areas were used as tools to help identify higher concentrations of EJ populations relative to regional averages, these thresholds were not used as the analytical or legal basis for determining whether an environmental effect is disproportionately high and adverse.

Per USDOT Order 5610.2c., determination of a "disproportionately high and adverse effect" depends on whether that effect is (1) predominantly borne by an EJ population, or (2) will be suffered by the EJ population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population.

<sup>17</sup> The meaningfully greater thresholds of 1.5 and 2 times the corresponding county or regional average were selected given the regional significance of the IBR Program, such that the determination of meaningfully greater and high-priority EJ areas was relative to the broader region. These specific thresholds were also used in the Southwest Corridor Light Rail Environmental Impact Statement (2018), another regionally significant program.

<sup>18</sup> For the purposes of this project, the 1.5 and 2 times thresholds were developed based on an interpretation of the FHWA Environmental Justice Reference Guide (FHWA 2015) that allows localities to adapt poverty thresholds to appropriate local standards. As described in Section 2.2, TriMet and Metro accept the regional poverty threshold to be 200% of the federal poverty level to better reflect regional living costs and standards (Metro, 2015; TriMet, 2019). Meaningfully greater block groups indicate areas that are substantially impoverished relative to the Portland-Vancouver region – 150% or 1.5 times below the “low-income” threshold established for the project. Block groups 200% or 2 times below are essentially the lowest-income block groups in the region. The same multipliers were applied to minority populations. Understanding these regional disparities served as one critical component for understanding the potential for disproportionately high and adverse impacts as part of the IBR Program.

The FHWA allows localities to adapt poverty thresholds to local standards per the FHWA Environmental Justice Reference Guide (FHWA 2015). Regional agencies, such as TriMet and Metro, accept the regional poverty threshold to be 200% of the federal poverty level to reflect regional living costs and standards (Metro 2015; TriMet 2019). Under these regionally accepted standards, a household of four persons making \$55,500 or less would be considered low-income in 2022, as shown in Table 2-1.<sup>19</sup>

The purpose of identifying meaningfully greater and high-priority EJ areas is to provide a baseline reference for the relative concentration of where minority and low-income populations exist, and where disproportionately high and adverse effects could occur. Determination of meaningfully greater and high-priority EJ areas also provides a reference for where there could be a need for additional outreach and analysis as part of the IBR Program. However, the determination of meaningfully greater and high-priority EJ areas was not used as the analytical or legal basis for determining disproportionately high and adverse effects on EJ populations (see “Evaluating Effects on EJ Populations” above).

As discussed above, low-income and minority populations 1.5 times greater than the corresponding regional average are considered meaningfully greater, and low-income and minority populations with 2 times the average are considered high-priority areas in the EJ analysis. Table 2-4 defines these values for the Portland-Vancouver-Hillsboro metropolitan area as defined by the U.S. Census.

Table 2-4. High-Priority and Meaningfully Greater Reference Values for EJ Areas

Reference Value	Low-Income (200% of Federal Poverty Level)	Minority
Portland-Vancouver-Hillsboro Metropolitan Average	23.7%	27.6%
Meaningfully Greater (1.5x)	41.4%	35.6%
High-Priority (2x)	55.2%	47.4%

Complete findings for the demographic analysis, including determination of low-income and minority populations, meaningfully greater block groups, and high-priority block groups, are summarized in Chapter 3, Affected Environment, under Sections 3.2.1 and 3.2.2.

<sup>19</sup> The average size of household in the Portland-Vancouver region is approximately 2.5. Household sizes of one and four were reported based on other recently completed NEPA environmental justice analyses that have been done in the region. For the purposes of this analysis, the federal poverty guideline for a four-person household is used.

### 3. AFFECTED ENVIRONMENT

This chapter describes the existing physical and social conditions of the geographic area where the direct and indirect impacts of the Program are expected to occur. The IBR study area is where direct effects of the Program would occur. Direct effects are those caused by the Program and that occur at the same time and place (40 CFR 1508.8).

The EJ secondary study area is where the indirect effects of the Program would occur. These indirect effects include impacts that would be relatively distant from the construction footprint of the bridge and could occur at a later time, such as longer-term changes to traffic patterns or economic conditions that could impact EJ populations and other communities. The EJ secondary study area reaches from the Lloyd District/I-84 in Portland, north to where the I-5 and I-205 highways merge in Washington and is inclusive of the IBR study area. It is also possible that impacts could be identified outside of the EJ secondary study area, so a regional analysis was also done. Section 3.1 reviews existing conditions in the Portland-Vancouver region, and Section 3.2 reviews existing conditions in the EJ secondary study area. The EJ secondary study area is referred to generally as the “study area” unless noted otherwise.

#### 3.1 Regional Conditions

The Portland-Vancouver region refers to the six-county metropolitan statistical area (MSA) composed of Multnomah, Washington, Clackamas, and Yamhill Counties in Oregon, and Clark and Skamania Counties in Washington. The following sections describe regional conditions for the Portland-Vancouver MSA.

##### 3.1.1 Populations, Households, and Employment

The Portland-Vancouver metropolitan area has experienced years of rapid growth and is expected to continue growing. Table 3-1 shows historical population, household, and employment data for the Portland-Vancouver metropolitan area. As of 2019, approximately 2.4 million people live in the six-county region, representing an increase of about 570,000 people between 2000 and 2019. Assuming the average rate of population growth in this period, the regional population is expected to grow to approximately 3.3 million by 2040. However, the population is projected to grow at a slightly slower rate than it has in recent years.<sup>20</sup> Under the same assumptions, the region will grow to 1.6 million households and 1.8 million jobs over the next 20 years (Metro 2015).

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<sup>20</sup> The population forecast described in this section assumes a simple annual growth rate of 1.6% projected over 21 years from the base year of 2019 for discussion purposes only. The IBR program will conduct more rigorous population forecasting and regional modeling outside of the scope of this technical report.

Table 3-1. Population, Employment, and Housing

Parameter	2000	2019	2040	Change (2000–2019)	Average Growth Per Year (2000–2019)
Population	1,874,500	2,445,761	3,267,537	30.5%	1.6%
Households	575,000	938,646	1,589,128	63.2%	3.3%
Employment <sup>a</sup>	958,000	1,291,570	1,779,783	34.8%	1.8%

Source: U.S. Census Bureau, Tables P1 and B03002 (2000, 2019).

a Employment is total salary and wage employment.

### 3.1.1.1 Employment

The economy of the Portland-Vancouver region has steadily grown over the last two decades. Table 3-2 summarizes historical and projected employment in the Portland-Vancouver region by industry sector for 2002, 2019, and 2040. Total jobs in the area increased from 897,741 jobs in 2002 to approximately 1,198,901 jobs in 2019. Assuming the same average growth rate per year between 2002 and 2019, the greater Portland-Vancouver metropolitan area is expected to employ over 1.6 million individuals by 2040 (U.S. Bureau of Labor Statistics [BLS] 2022).

From 2002 to 2019, all major industry sectors in the region experienced positive growth except for Mining, Quarrying, Oil, and Gas Extraction. The Management of Companies and Enterprises, Professional, Scientific, and Technical Services, and Health Care and Social Assistance experienced the largest annual growth rates in the region. Average annual growth rates are expected to slow between 2019 and 2040 compared to the growth experienced between 2000 and 2019. The Transportation and Warehousing industry—an industry that would directly benefit from improved regional connectivity resulting from the IBR Program—increased 35.3% from 2002 to 2019 and is expected to grow from 45,269 jobs in 2019 to 61,240 jobs in 2040 (BLS 2022).

Table 3-2. Employment by Industry

Industry	Actual 2002	Actual 2019	Change 2002–2019	Average Growth Per Year 2002–2019	Forecast 2040
Agriculture, Forestry, fishing and Hunting	12,531	15,238	21.6%	1.3%	18,530
Mining, Quarrying, and Oil and Gas Extraction	858	854	-0.5%	0.0%	850
Utilities	3,902	5,913	51.5%	3.0%	8,960
Construction	48,511	72,978	50.4%	3.0%	109,785



Industry	Actual 2002	Actual 2019	Change 2002–2019	Average Growth Per Year 2002–2019	Forecast 2040
Manufacturing	118,675	123,052	3.7%	0.2%	127,590
Wholesale Trade	53,315	55,779	4.6%	0.3%	58,357
Retail Trade	98,537	115,948	17.7%	1.0%	136,435
Transportation and Warehousing	33,463	45,269	35.3%	2.1%	61,240
Information	25,109	29,362	16.9%	1.0%	34,335
Finance and Insurance	41,573	43,550	4.8%	0.3%	45,621
Real Estate and Rental and Leasing	18,254	20,697	13.4%	0.8%	23,467
Professional, Scientific, and Technical Services	46,341	80,560	73.8%	4.3%	140,047
Management of Companies and Enterprises	19,321	41,866	116.7%	6.9%	90,718
Administration & Support, Waste Management and Remediation	52,881	69,915	32.2%	1.9%	92,436
Educational Services	74,537	101,751	36.5%	2.1%	138,901
Health Care and Social Assistance	94,474	164,142	73.7%	4.3%	285,185
Arts, Entertainment, and Recreation	13,731	20,693	50.7%	3.0%	31,185
Accommodation and Food Services	69,627	103,346	48.4%	2.8%	153,394
Other Services (Excluding Public Administration)	35,856	50,263	40.2%	2.4%	70,459
Public Administration	36,245	37,725	4.1%	0.2%	39,265
<b>Total Employment</b>	<b>897,741</b>	<b>1,198,901</b>	<b>33.5%</b>	<b>2.0%</b>	<b>1,601,089</b>

Source: BLS 2022.

According to the labor force statistics published by the BLS, minority workers account for approximately 22% of the total U.S. labor force across all industries (BLS 2020). The largest share of minority workers are employed in the health care and social assistance, retail trade, and manufacturing industries, accounting for approximately 37% of all minority workers in the U.S. There are also high concentrations of minority workers in specific occupations in the retail trade, manufacturing, and service industries. For example, minority workers account for more than 40% of workers employed in nail salons and other personal care services, taxi and limousine services, and bus service, and urban transit occupations.

### 3.1.1.2 Unemployment

Table 3-3 summarizes unemployment rates for the Portland-Vancouver region compared to statewide rates for Oregon and Washington, and the U.S. over the most recent 15-year period for which data are available (2005 through 2020), in 5-year increments. From 2005 to 2020, the average unemployment rate in the Portland-Vancouver MSA (6.3%) was slightly higher than in the U.S. (6.2%) and Washington (6.2%), but lower than in Oregon (6.7%). During the same period, the Portland-Vancouver MSA unemployment rate trended the same or higher than in Washington and the nation, but lower than Oregon. By 2015, the regional unemployment rate was lower than rates in each state and nation, aside from 2020, when unemployment in the Portland-Vancouver MSA jumped higher than the unemployment rate in Oregon. The economic recession (2008) and global pandemic (2020) likely contributed to the unemployment spikes seen in 2010 and 2020, respectively. These trends are consistent for the region, states, and nation.

Table 3-3. Unemployment Rate

Year	Portland-Vancouver MSA	Washington	Oregon	United States
2005	5.9%	5.6%	6.2%	5.1%
2010	10.1%	9.1%	10.7%	9.6%
2015	5.1%	5.4%	5.5%	5.3%
2020	7.8%	8.4%	7.6%	8.1%
15-Year Average (2005–2020)	6.3%	6.2%	6.7%	6.2%

Source: BLS 2020.

MSA = metropolitan statistical area

The most recent unemployment information (September 2021) shows a 3.9% unemployment rate for the region, a 4.7% unemployment rate for the state of Oregon, and a 4.9% unemployment rate for the state of Washington. The nation's unemployment rate for this period is 4.8%.

### 3.1.1.3 Median Household Income

Table 3-4 compares median household incomes for the Portland-Vancouver region to the states of Oregon, Washington, and the U.S. between 2016 and 2021. In 2016, the median household income of the region was approximately \$69,000—higher than Oregon, Washington, and the nation. By 2021, median household income in the Portland-Vancouver region rose to approximately \$84,000, which is greater than Oregon and the nation, but less than Washington. During the 5-year time period from 2016 to 2021, Washington’s median income increased the most (26%) and the nation’s increased the least (21%).

Table 3-4. Median Household Income

Area	2016	2021	Change
Portland-Vancouver MSA	\$68,676	\$83,943	+22%
Oregon	\$57,532	\$71,562	+24%
Washington	\$67,106	\$84,247	+26%
United States	\$57,617	\$69,717	+21%

Source: 2016 and 2021 ACS 1-Year Estimates, Table S1901 (U.S. Census Bureau 2017, 2022b).

### 3.1.1.4 Poverty

Following the Office of Management and Budget’s Statistical Policy Directive 14, the U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty (U.S. Census Bureau 2021b). If a family’s total income is less than the family’s threshold, then that family and every individual in it is considered to be in poverty. The likelihood that a household would earn below the federal poverty level increases with household size.

HHS updates poverty thresholds annually. Table 3-5 summarizes the most recent federal poverty thresholds. According to these thresholds, a one-person household earning \$13,590 or less is considered in poverty (HHS 2021).

Table 3-5. Federal Poverty Level – 2021

Number in Household	Poverty Threshold
1	\$13,590
2	\$18,310
3	\$23,030
4	\$27,750
5	\$32,470

Source: HHS 2021.

### 3.1.1.5 Low-Income Populations

Eligibility for federal programs is often determined by using a multiplier of the federal poverty level. For the purposes of the EJ analysis, “low-income populations” refer to households at 200% or less of the federal poverty level, consistent with analysis practices set by TriMet and Metro to reflect regional living costs and standards (Metro 2015; TriMet 2019).<sup>21</sup>

Table 3-6 summarizes low-income populations within the Portland-Vancouver region compared to Oregon and Washington as a whole. The percentage of low-income populations in the region (23.7%) is lower than in Washington (24.1%) and in Oregon (29.3%) (U.S. Census Bureau 2022a).

Table 3-6. Regional Low-Income Populations

Area	Low-Income Population	Low-Income Percentage
Portland-Vancouver MSA	577,759	23.7%
Oregon	1,199,723	29.3%
Washington	1,780,174	24.1%

Source: ACS 5-Year Estimates, 2016–2020, Table C17002 (U.S. Census Bureau 2022a).

### 3.1.1.6 Minority Populations

Table 3-7 summarizes minority populations within the Portland-Vancouver region compared to Oregon and Washington as a whole. The percentage of minority populations is higher in the Portland-Vancouver region (27.6%) than in Oregon (25.1%) but lower than in Washington (32.5%) (U.S. Census Bureau 2022a).

Table 3-7. Regional Minority Populations

Area	Minority Population	Minority Percentage
Portland-Vancouver MSA	682,188	27.6%
Oregon	1,047,852	25.1%
Washington	2,444,556	32.5%

Source: ACS 5-Year Estimates, 2016–2020, Table B03002 (U.S. Census Bureau 2022a).

<sup>21</sup> The FHWA allows localities to adapt poverty thresholds to local standards per the FHWA Environmental Justice Reference Guide (FHWA 2015).

Table 3-8 summarizes Portland-Vancouver region minority populations by racial and ethnic category compared to Oregon and Washington as a whole.

Table 3-8. Portland-Vancouver MSA Population by Race

Area	White Alone (Race)	Black or African American Alone (Race)	American Indian and Alaska Native Alone (Race)	Asian Alone (Race)	Native Hawaiian and Other Pacific Islander Alone (Race)	Some Other Race Alone (Race)	Two or More Races	Hispanic or Latino (Ethnicity)
Portland-Vancouver MSA	72.4%	2.7%	0.5%	6.8%	0.5%	0.3%	4.6%	12.2%
Oregon	74.9%	1.8%	0.9%	4.4%	0.4%	0.3%	4.1%	13.2%
Washington	67.5%	3.7%	1.0%	8.7%	0.7%	0.3%	5.2%	12.9%

Source: ACS 5-Year Estimates, 2016–2020, B03002 (U.S. Census Bureau 2022a).

The Portland-Vancouver region, Oregon, and Washington have relatively similar racial and ethnic proportions. Generally, the racial proportions of the Portland-Vancouver region fall between the racial and ethnic makeup of Oregon and Washington, though the Portland-Vancouver region contains a lower percentage of Hispanic or Latino residents and American Indian and Alaska Native residents than both Oregon and Washington.

### 3.1.2 Transportation Characteristics

Table 3-9 shows the means of transportation used to work in the Portland-Vancouver region. The majority of the working population in the region drove to work (77.4%), including people who drove alone or carpooled. This is followed by people who worked from home (10.4%) and used public transport (5.8%). Active transportation commuters, such as cyclists and walkers, make up 5.2% of the commuter transportation mode share (U.S. Census Bureau 2022).



Table 3-9. Means of Transportation to Work in the Portland-Vancouver MSA

Means of Transportation to Work	Mode Share
Car/Truck/Van (Alone)	68.6%
Car/Truck/Van (Carpool)	8.8%
Public Transport	5.8%
Bicycle	2.0%
Walked	3.3%
Worked from Home	10.4%
Taxicab, Motorcycle, or Other Means	1.2%

Source: ACS 5-Year Estimates 2016–2020, Table S0801 (U.S. Census Bureau 2022a).

## 3.2 Study Area Conditions

The following sections describe concentrations of EJ populations within the study area.

### 3.2.1 Minority Populations

Table 3-10 summarizes non-white, minority populations living in U.S. Census block groups within the study area (U.S. Census Bureau 2022a). Minority populations account for approximately 27.8% of the population within the study area, representing approximately 34,000 people, which is comparable to the percentage of minority populations in the Portland-Vancouver region as a whole (27.6%, Table 3-7). Within the study area, Portland block groups have a higher percentage of minority residents (31.0%) than block groups in Vancouver (25.0%).

Table 3-10. Minority Populations in the Study Area

Area	Minority Population	Percentage Minority
Portland Block Groups	18,283	31.0%
Vancouver Block Groups	16,534	25.0%
<b>Study Area Total</b>	<b>34,817</b>	<b>27.8%</b>

Source: ACS 5-Year Estimates, 2016–2020, Table B03002 (U.S. Census Bureau 2022a)

Table 3-11 summarizes minority populations within the Rockwood neighborhood in Gresham. Demographics for Gresham are reported separately to account for its distance from the study area adjacent to the Interstate Bridge, distinct community characteristics, and separate but related set of improvements under the Modified LPA (Ruby Junction Operations and Maintenance Facility).

Table 3-11. Minority Populations in the Ruby Junction Study Area

Area	Minority Population	Percentage Minority
Gresham Block Groups (Rockwood)	8,227	60.0%

Source: ACS 5-Year Estimates, 2016–2020, Table B03002 (U.S. Census Bureau 2022a)

Figure 3-1 and Figure 3-2 map the percentage of minority populations living within study area block groups for Portland and Vancouver, respectively.

Table 3-12 summarizes minority populations in the study area by race and ethnicity (U.S. Census Bureau 2022a). White residents make up the largest share (72.2%) of the total population within the study area. The second largest racial group in the study area are Hispanic or Latino populations (10.2%), followed by Black or African American populations (6.7%) and two or more races (5.8%) populations.

Comparing block groups in Portland and Vancouver, Portland is more racially diverse than Vancouver relative to its total population. Compared to Vancouver, Portland block groups within the study area have higher concentrations of Black or African American, American Indian and Alaska Native, and Asian populations. However, there are higher concentrations of Native Hawaiian and other Pacific Islander, two or more races, and Hispanic or Latino populations in Vancouver block groups within the study area compared to Portland.

Figure 3-1. Percentage Minority by Block Group – Portland

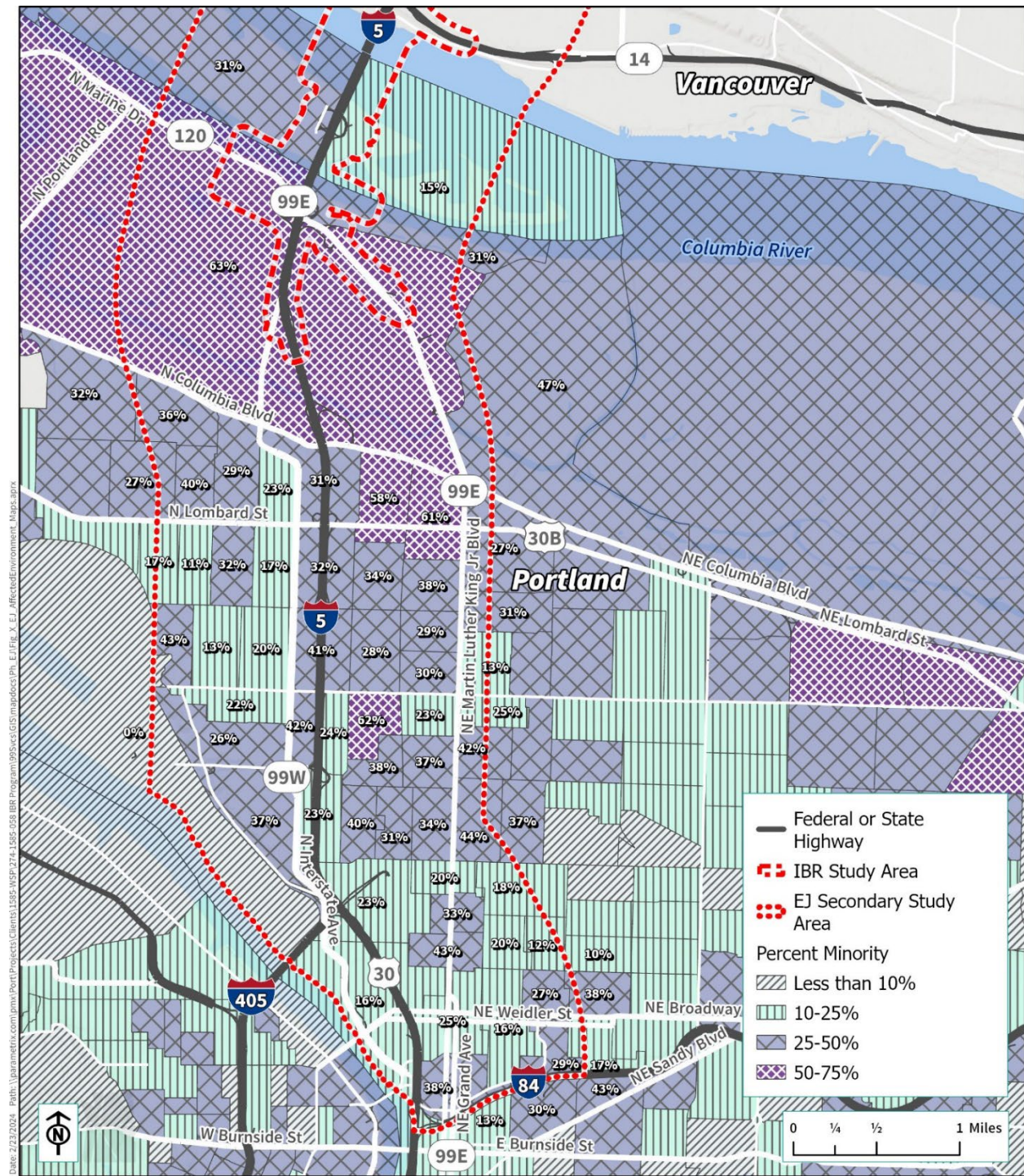




Figure 3-2. Percentage Minority by Block Group – Vancouver

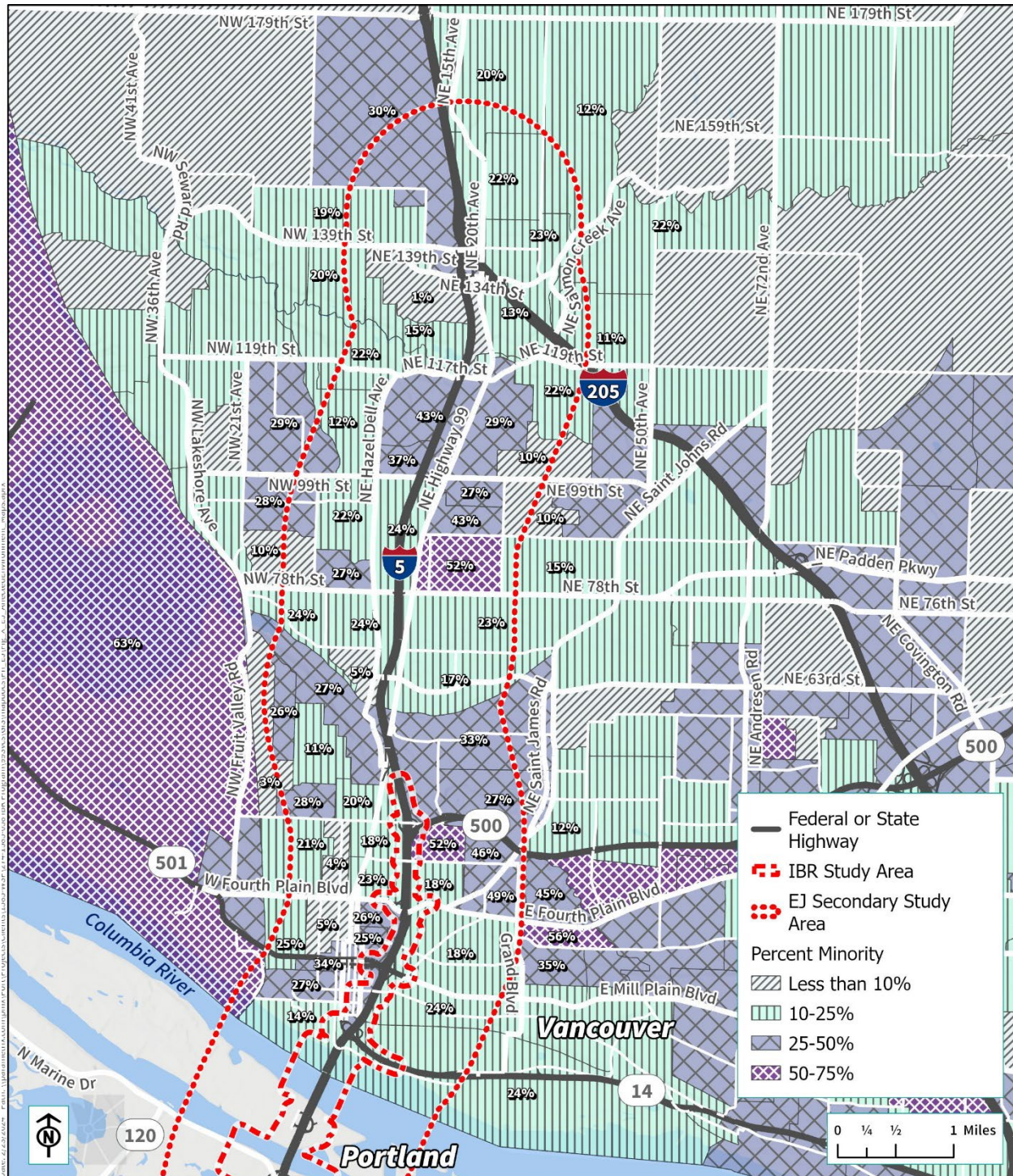


Table 3-12. Minority Populations in the Study Area by Race and Ethnicity

Area	White Alone (Race)	Black or African American Alone (Race)	American Indian and Alaska Native Alone (Race)	Asian Alone (Race)	Native Hawaiian and Other Pacific Islander Alone (Race)	Some Other Race Alone (Race)	Two or More Races	Hispanic or Latino (Ethnicity)	Non-White Total
Portland Block Groups	69.0%	11.2%	0.8%	4.4%	0.3%	0.5%	5.7%	8.1%	31.0%
Vancouver Block Groups	75.0%	2.6%	0.5%	2.8%	0.6%	0.3%	5.9%	12.2%	25.0%
<b>Study Area Total</b>	<b>72.2%</b>	<b>6.7%</b>	<b>0.7%</b>	<b>3.6%</b>	<b>0.5%</b>	<b>0.4%</b>	<b>5.8%</b>	<b>10.2%</b>	<b>27.8%</b>

Source: ACS 5-Year Estimates 2016–2020, Table B03002 (U.S. Census Bureau 2022a)

### 3.2.1.1 Meaningfully Greater and High-Priority Minority Areas

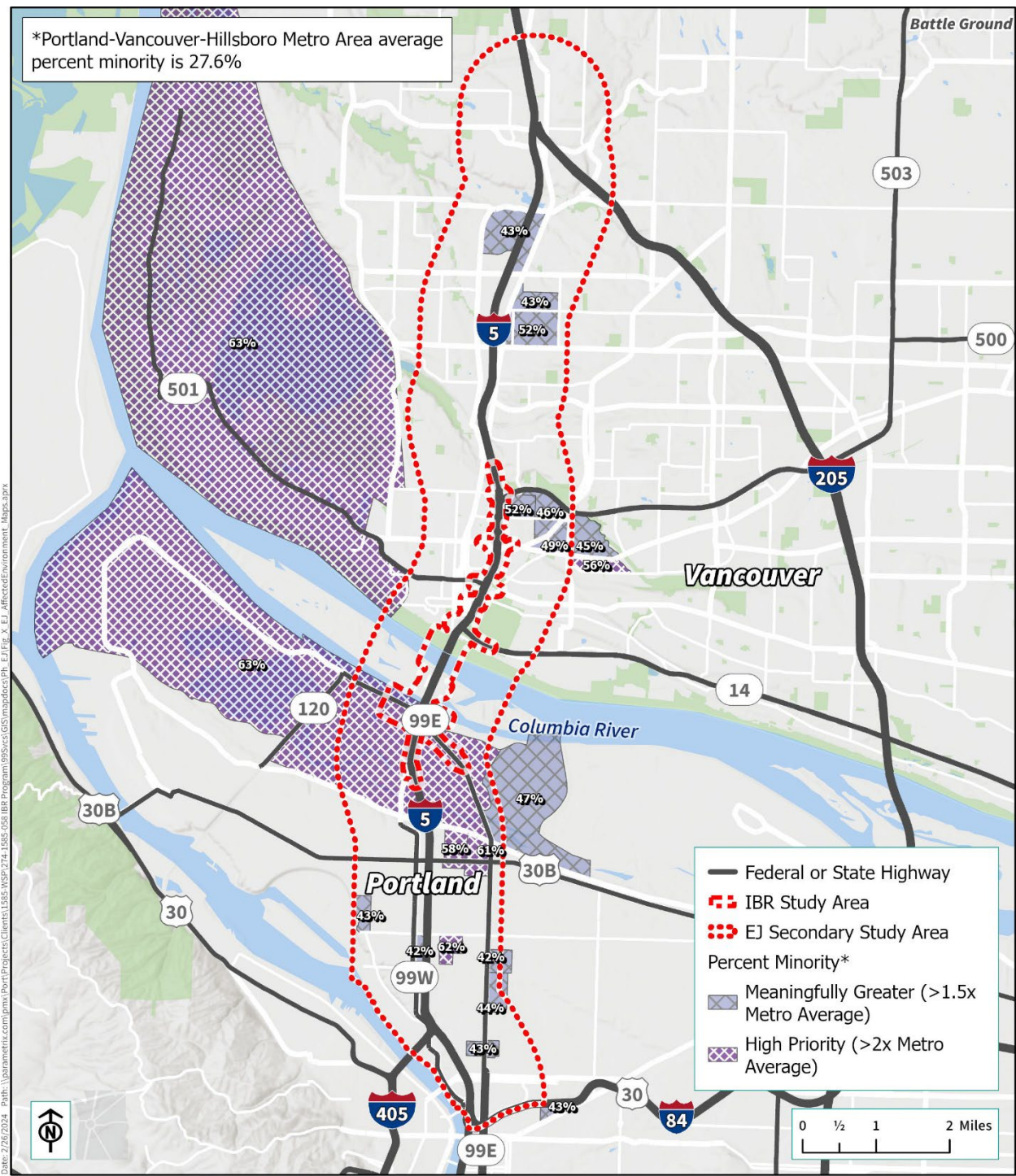
Additional analysis was done to assess block groups with meaningfully greater concentrations of minority populations compared to the Portland-Vancouver region as a whole. As discussed in Section 2.6.6.2, low-income and minority populations 1.5 times greater than the corresponding regional average are considered “meaningfully greater,” and low-income and minority populations with 2 times the average are considered high-priority areas in the EJ analysis. Minority populations represent 27.6% of the total population in the Portland-Vancouver region (Table 3-10); therefore, percentages above 41.4% are considered meaningfully greater, and percentages above 55.2% are considered high-priority. These block groups are shown in Figure 3-3.

As seen in Figure 3-3, more block groups are located east of the I-5 corridor with minority populations greater than the regional average. Also, more block groups with a greater-than-regional-average minority concentration are located in the block groups surrounding the Interstate Bridge crossing, with fewer block groups exceeding 26% minority concentration farther north and south along the I-5 corridor.

The high EJ concentration areas shown in Figure 3-3 are the areas where there could be disproportionately high and adverse impacts to minority populations. Therefore, the analysis of impacts to minorities in this report is focused on those areas. However, it is important to note that there still could be disproportionately high and adverse impacts in census block groups that do not meet the meaningfully greater thresholds; these potential impacts are still considered using the No Threshold approach described in Section 2.6.6.1.



Figure 3-3. Meaningfully Greater and High-Priority Minority Block Groups in the Study Area



### 3.2.2 Low-Income Populations

Table 3-13 summarizes low-income populations living in U.S. Census block groups within the study area (U.S. Census Bureau 2022a). Low-income populations account for 25.8% of the population within the study area, representing a population of approximately 32,000. Within the study area, Vancouver block groups have a higher percentage of low-income populations (27.1%) than block groups in Portland (24.3%), which is comparable to the percentage of low-income populations in the Portland-Vancouver region as a whole (23.7%, Table 3-6).

Table 3-13. Low-Income Populations in the Study Area

Area	Low-Income Population	Low-Income Percentage
Portland Block Groups	14,269	24.3%
Vancouver Block Groups	17,592	27.1%
<b>Study Area Total</b>	<b>31,861</b>	<b>25.8%</b>

Source: ACS 5-Year Estimates, 2016–2020, Table C17002 (U.S. Census Bureau 2022a).

Table 3-14 summarizes low-income populations within the Rockwood neighborhood in Gresham. Demographics for Gresham are reported separately to account for its distance from the study area adjacent to the Interstate Bridge, distinct community characteristics, and separate but related set of improvements under the Modified LPA (Ruby Junction Operations and Maintenance Facility).

Table 3-14. Low-Income Populations in the Ruby Junction Study Area

Area	Low-Income Population	Percentage Low-Income
Gresham Block Groups (Rockwood)	14,269	49.6%

Source: ACS 5-Year Estimates, 2016–2020, Table C17002 (U.S. Census Bureau 2022a).

Figure 3-4 and Figure 3-5 map the percentage of low-income populations living within study area block groups for Portland and Vancouver, respectively.



Figure 3-4. Low-Income Populations by Block Group – Portland

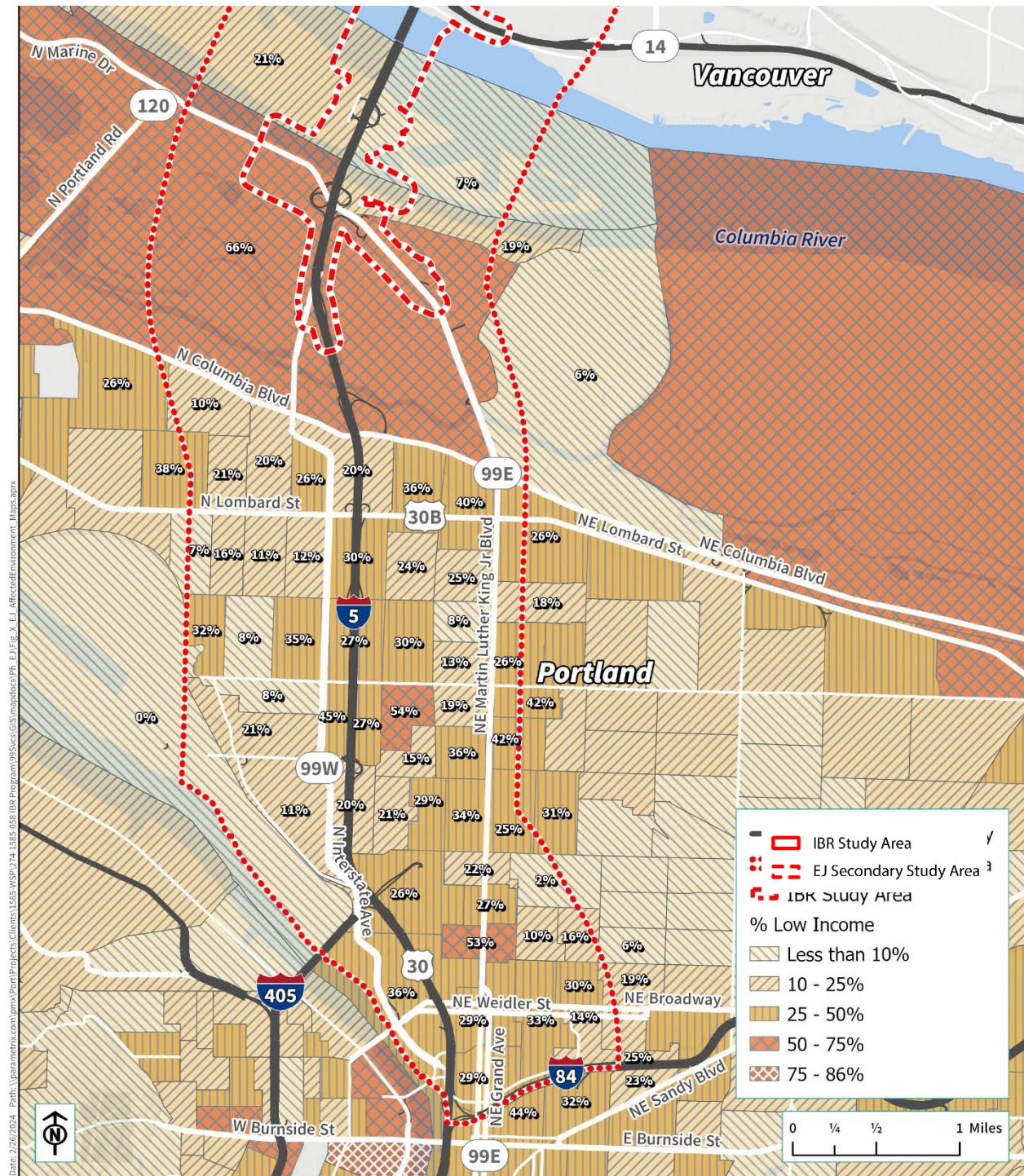






Table 3-15 shows a comparison of additional demographics for the study areas as well as the Portland-Vancouver metro area (U.S. Census Bureau 2022a). For the purpose of the EJ analysis, low-income populations refer to households earning less than 200% of the federal poverty level. The table also includes the percentage of families who earn less than 100% of the federal poverty level and median household incomes. In general, the IBR and EJ secondary study areas both have higher percentages of low-income populations and lower median household incomes than the Portland-Vancouver region.

Table 3-15. Comparison of Additional Income Demographics

Area	Families Below Federal Poverty Level	Low-Income Population	Median Household Income
IBR Study Area	5.9%	34.2%	\$56,362
EJ Secondary Study Area	7.3%	25.8%	\$73,895
Portland-Vancouver MSA	6.4%	23.7%	\$77,511

Source: ACS 5-Year Estimates, 2016–2020, Tables B17010, C17002, S1901 (U.S. Census Bureau 2022a).

### 3.2.2.1 Meaningfully Greater and High-Priority Low-Income Areas

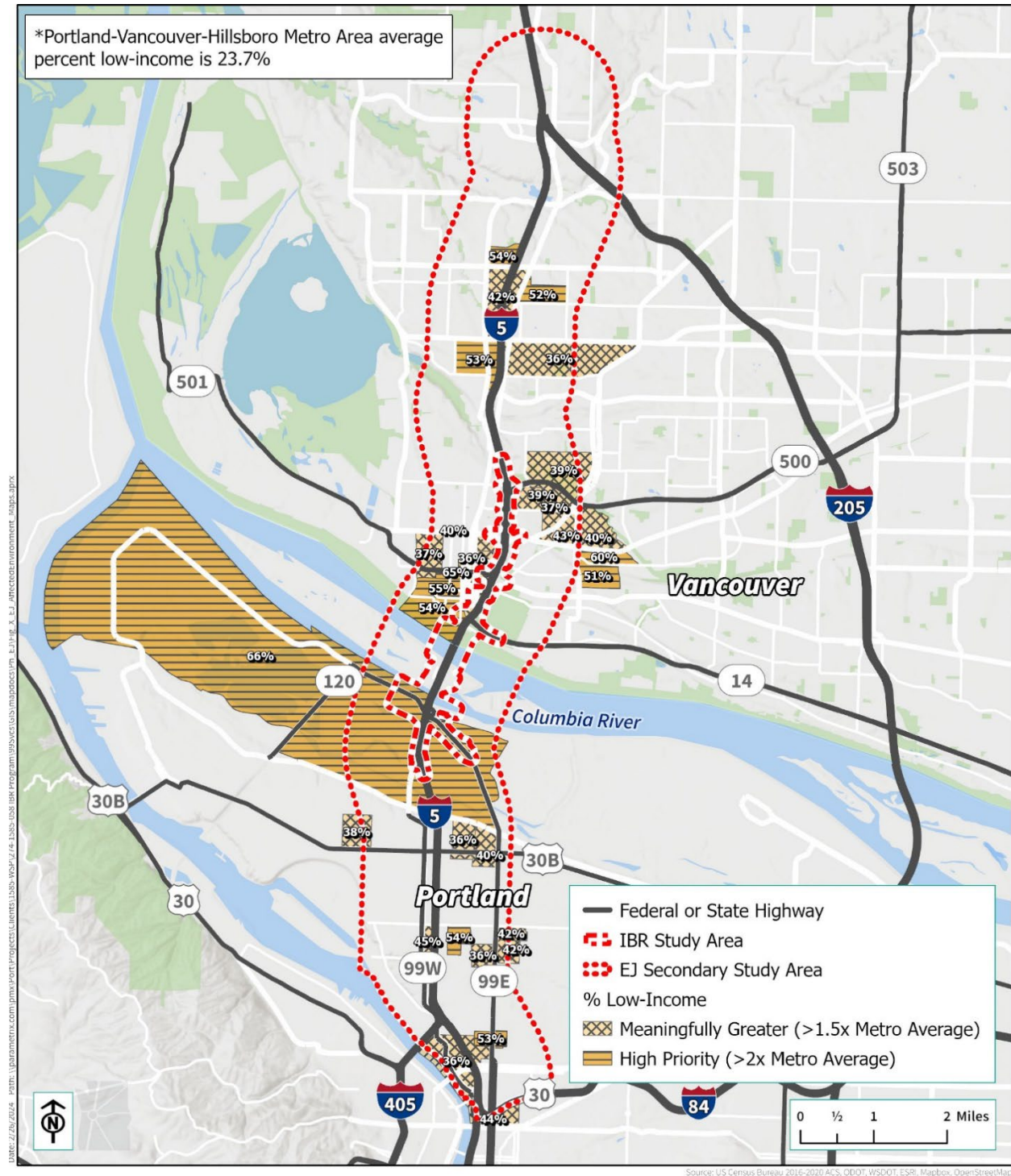
Additional analysis was done to assess block groups with meaningfully greater concentrations of minority populations compared to the Portland-Vancouver region as a whole. Low-income populations represent 23.7% of the total population in the Portland-Vancouver region (Table 3-15); therefore, percentages above 35.6% are considered meaningfully greater, and percentages above 47.4% are considered high-priority. These block groups are shown in Figure 3-6.

The high EJ concentration areas shown in Figure 3-6 are the areas where there could be disproportionately high and adverse impacts to low-income populations. Therefore, the analysis of impacts to low-income populations in this report is focused on those areas. However, it is important to note that there still could be disproportionately high and adverse impacts in census block groups that do not meet the meaningfully greater thresholds; these potential impacts are still considered using the No Threshold approach described in Section 2.6.6.1.

The IBR Program also assessed other data sources that could bring a better understanding to the needs of EJ populations within the study area. The following sections describe low-income housing locations and eligibility in subsidized and free lunch programs to bring additional understanding to low-income populations within the study area.



Figure 3-6. Meaningfully Greater and High-Priority Low-Income Block Groups in the Study Area



### 3.2.2.2 Low-Income Housing

A number of subsidized housing units, public housing projects, and other low-income housing sites are located within the study area. As shown in Figure 3-7, there are no low-income housing sites located within the Oregon portion of the study area; however, three sites are located completely within the Vancouver portions of the study area: Smith Tower, Lewis and Clark Plaza, and Evergreen Inn. These housing sites rely upon a number of different funding sources and programs, including housing vouchers, tax credits, and others.

Although the locations of low-income housing sites shown in Figure 3-7 are not entirely consistent with the locations of EJ “meaningfully greater than” and priority areas in Figure 3-6, these low-income housing sites are areas where there could be disproportionately high and adverse impacts to low-income populations. The analysis of impacts to low-income populations in this report therefore considers these areas.

### 3.2.2.3 Subsidized and Free Lunch Programs in Schools

The following section assesses eligibility in subsidized and free lunch programs at schools within the study area. The Portland Public School District and Vancouver Public Schools are the two school districts that intersect the study area. Eligibility data are used to supplement census data by capturing populations (such as children) who may be underestimated in 5-year census estimates.

#### PORTLAND SCHOOLS

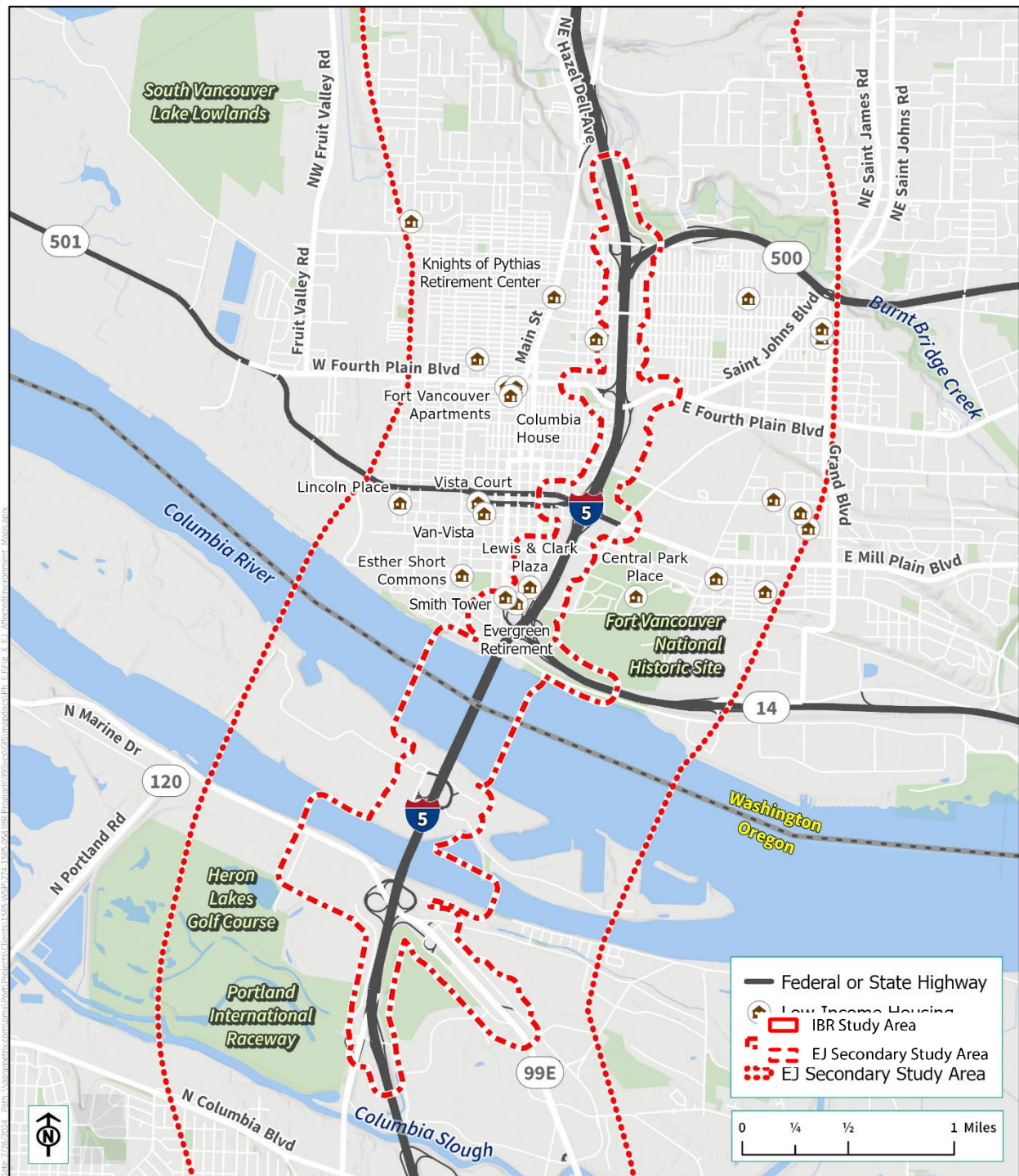
Oregon reports eligibility for free and reduced lunches together, so the percentage in this analysis reflects the combination of student eligibility for recipients of both free and reduced lunches. Table 3-16 summarizes the eligibility for free and reduced lunches in the Portland School District, Multnomah County, and Oregon. During the 2019–2020 school year, 38.3% of students in the Portland School District were eligible for free or reduced lunch programs (Oregon Department of Education 2021).

Table 3-16. Subsidized and Free Lunch Programs – Portland School District

Area	Students on Free and Reduced Lunches
Portland School District	38.3%
Multnomah County	51.7%
Oregon	52.3%

Source: Oregon Department of Education 2021.

Figure 3-7. Low-Income Housing



Source: Metro RLIS, CRL, 0101, WSU01, ESRI, Mapbox, OpenStreetMap



Several Portland schools whose districts intersect or fall within the study area have a higher percentage of students eligible for free and reduced lunch programs than the Portland School District as a whole (38.3%). For example, nearly half (47.7%) of all students at Jefferson High School, located east of I-5 between Alberta and Killingsworth Streets, are eligible for free and reduced lunch programs. Ockley Green Middle School, located just north of Ainsworth Street between Interstate Avenue and I-5, has 47.6% of students eligible for free and reduced lunch programs. Woodland Elementary School, located east of I-5 and just south of Lombard Street, has more than half (58.1%) of all students eligible for free and reduced lunch.

### VANCOUVER SCHOOLS

During the 2019–2020 school year, approximately 38.9% of students within the Vancouver School District were eligible for free lunch and approximately 8.4% were eligible for reduced price lunch (OSPI 2021).

As shown in Table 3-17, this percentage is slightly lower than the Clark County average (39.6%) and the Washington State average (39.3%). Over the same period, 8.4% of students within the Vancouver School District were on reduced lunch programs, which is slightly lower than the Clark County average of 8.5% and higher than the Washington State average of 6.5% (OSPI 2021).

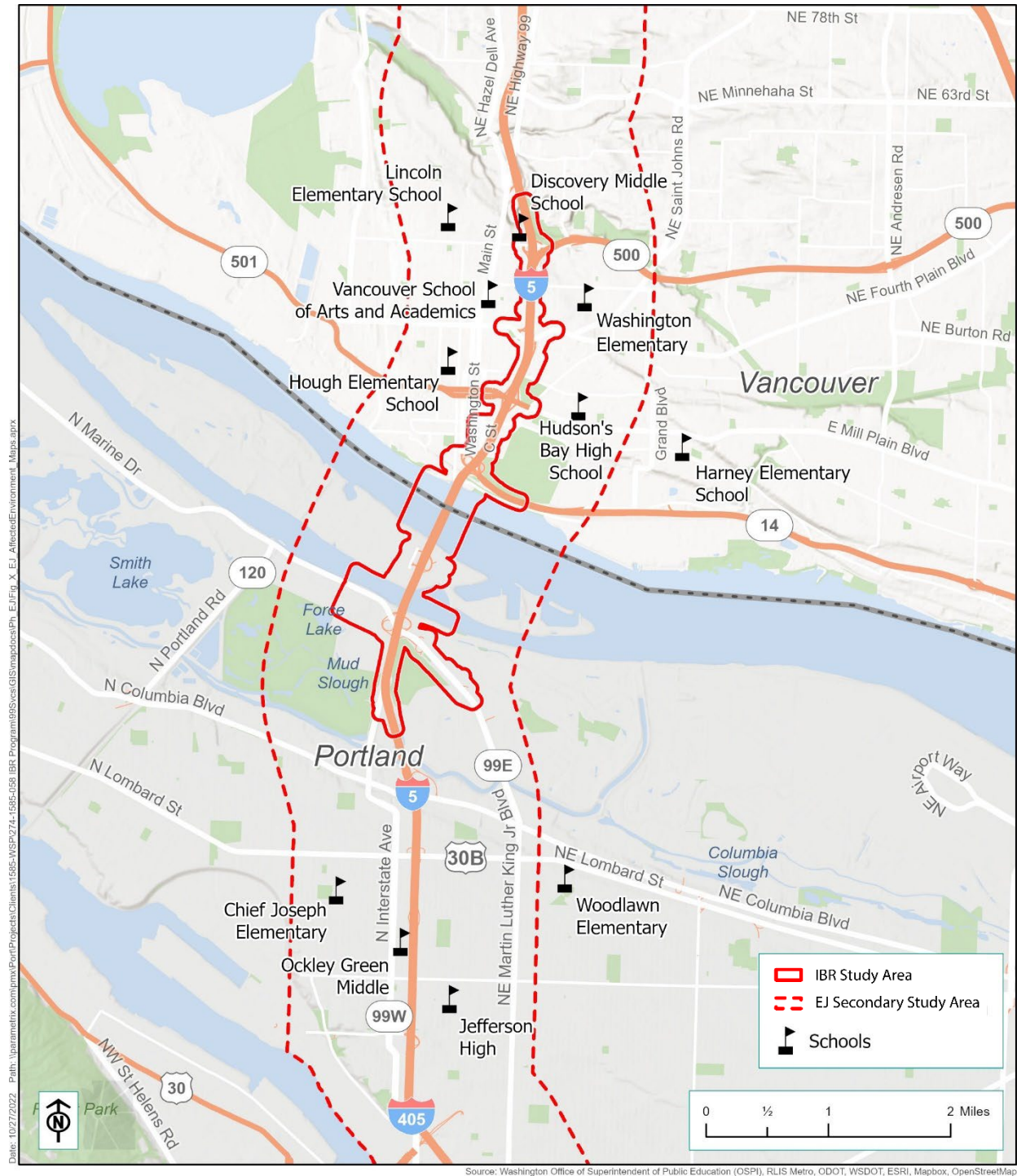
Table 3-17. Subsidized and Free Lunch Programs – Vancouver Public Schools District

Area	Students Eligible for Free Lunch	Students Eligible for Reduced Lunch
Vancouver School District	38.9%	8.4%
Clark County	39.6%	8.5%
Washington	39.3%	6.5%

Source: OSPI 2021.

Several Vancouver schools whose boundaries intersect or fall within the study area had considerably higher percentages of students on free and reduced lunch programs compared to the district as a whole (Figure 3-8). More than half (62.7%) of all students at Washington Elementary School, located east of I-5 between Fourth Plain Boulevard and SR 500, were eligible for free lunch during the 2020–2021 school year. Harney Elementary School, located east of I-5 between SR 14 and Mill Plain Boulevard, had 45.8% of students on a free lunch program, and 8.3% of students were on a reduced lunch program. Discovery Middle School, on 40th Street just west of I-5, had 55.1% of students on a free lunch program and 9.4% of students on a reduced lunch program (OSPI 2021).

Figure 3-8. Schools – Study Area





### 3.2.3 Neighborhood Characteristics

The following section describes EJ populations by neighborhoods within the study area.

As discussed in Section 2.6.6.2, low-income and minority populations 1.5 times greater than the corresponding regional average are considered “meaningfully greater,” and low-income and minority populations with 2 times the average are considered high-priority areas in the EJ analysis (Table 3-18).

Table 3-18. High Priority and Meaningfully Greater Reference Values for EJ Areas

Reference Value	Low-Income	Minority
Portland-Vancouver-Hillsboro Metropolitan Average	23.7 %	27.6%
Meaningfully Greater (1.5x)	41.4%	35.6%
High-Priority (2x)	55.2%	47.4%

The study area includes 43 neighborhoods, 19 of which are in Portland, 23 in Vancouver, and 1 in Gresham (included with Portland neighborhoods in tables below). Of the 43 neighborhoods in the study area, 10 neighborhoods contain meaningfully greater or high-priority percentages of EJ populations (either low-income or minority populations). Two of these neighborhoods are in Portland, one in Gresham, and the remaining seven are in Vancouver.

The percentage of minority residents in the study area (27.8%) is higher than that of the Portland-Vancouver region (23.7%). Both Portland and Vancouver neighborhoods have a higher percentage of low-income populations than the Portland-Vancouver region as a whole (23.7%).

Figure 3-9 displays neighborhood boundaries within the study area. Figure 3-10 shows meaningfully greater and high priority low-income block groups in the context of neighborhood boundaries. Figure 3-11 shows meaningfully greater and high priority minority block groups in the context of neighborhood boundaries. Table 3-19 and Table 3-20 show the low-income and minority populations by study area neighborhood in Oregon and Washington, respectively.

Figure 3-9. Neighborhoods in IBR Study Area

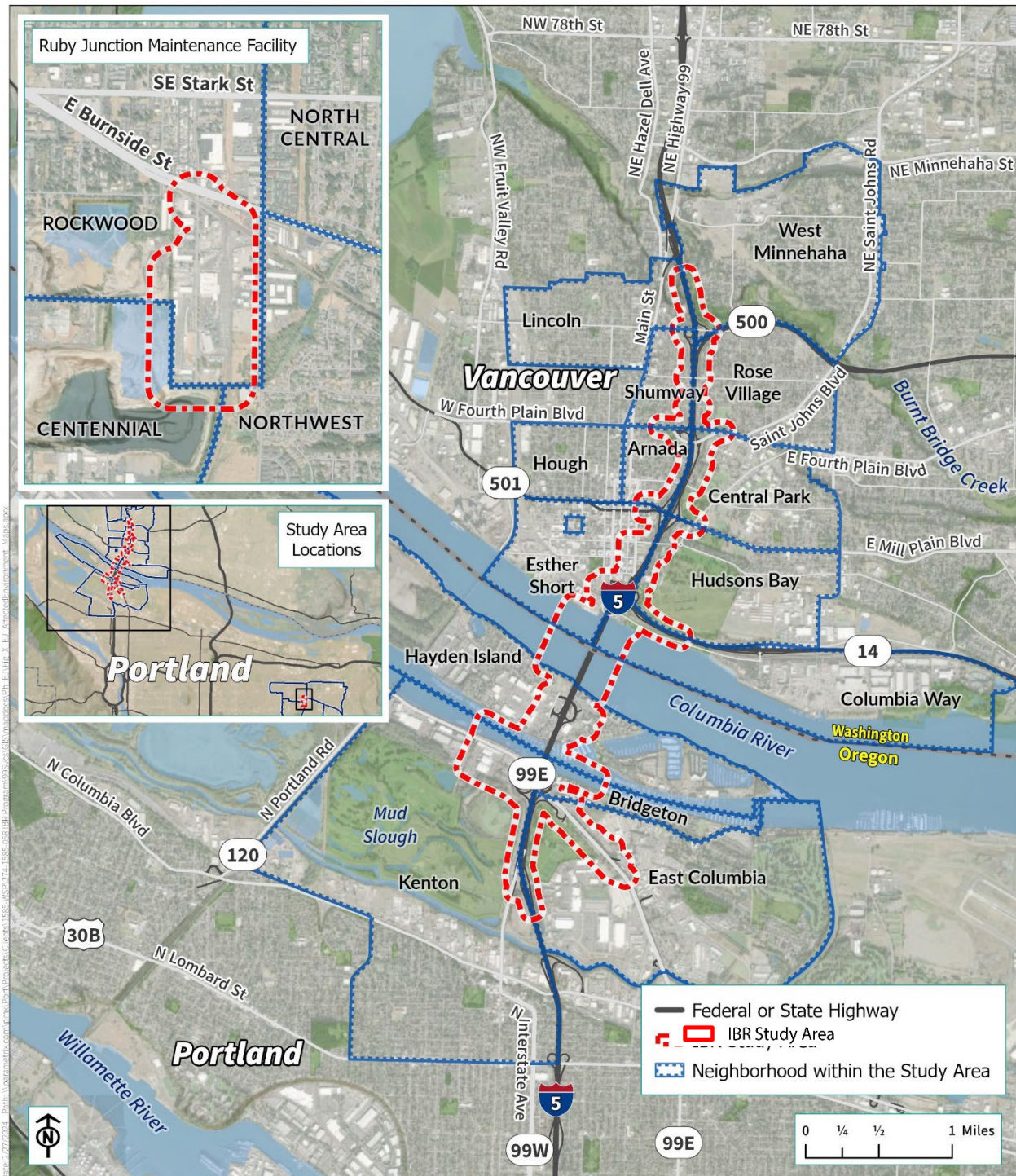




Figure 3-10. Meaningfully Greater and High Priority Minority Block Groups and Study Area Neighborhoods

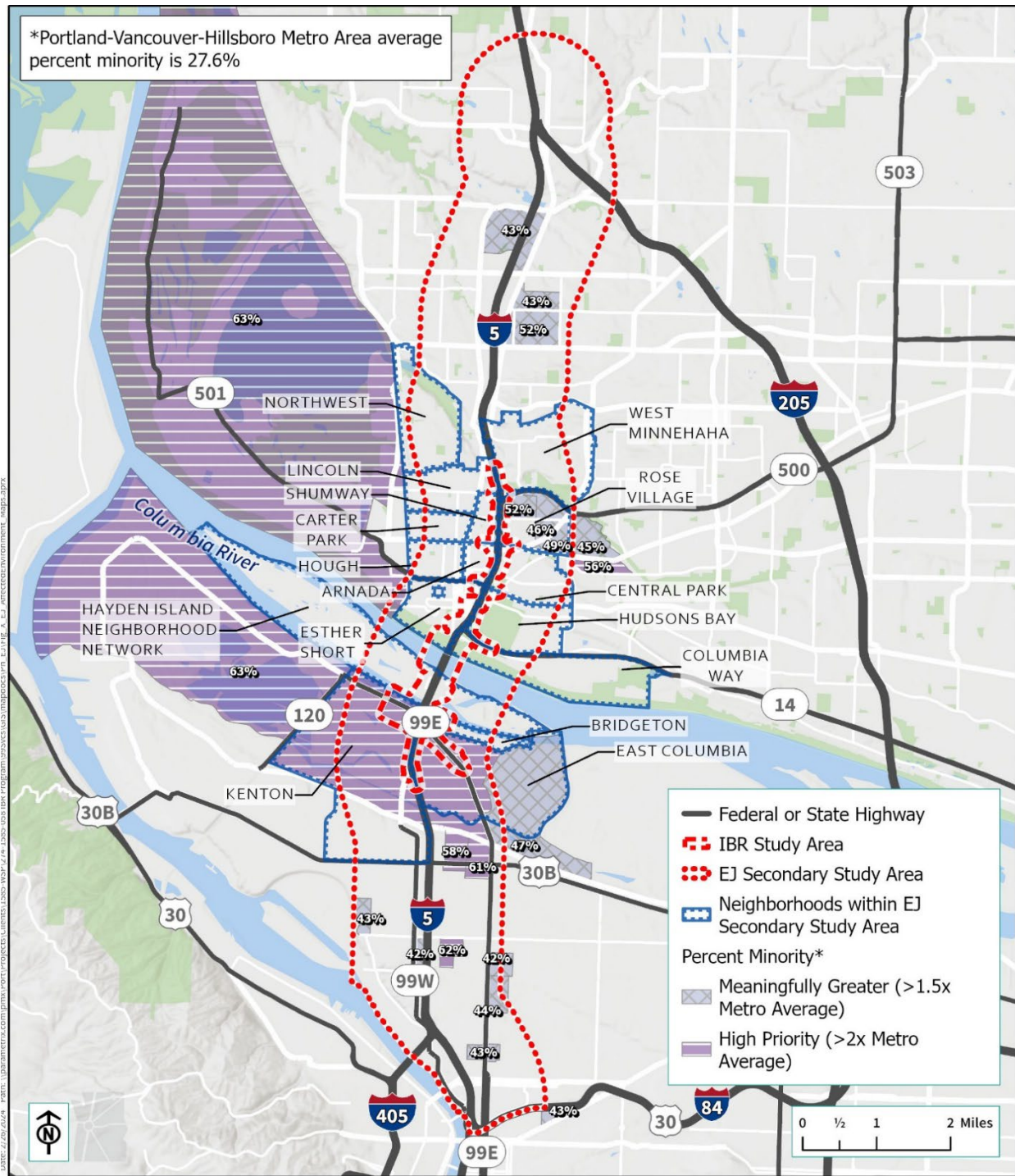


Figure 3-11. Meaningfully Greater and High Priority Low-Income Block Groups and Study Area Neighborhoods



Table 3-19. Low-Income and Minority Populations in Portland Neighborhoods Within the Study Area (Oregon)

Portland Neighborhood	Low-Income Population (<2x poverty level)	Minority (Not White Alone, Not Hispanic)	Two or More Races Not Hispanic	Hispanic or Latino	Asian Alone Not Hispanic	American Indian and Alaska Native Alone	Black or African American Not Hispanic	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone
Arbor Lodge	17.5%	23.5%	5.5%	5.9%	5.2%	0.5%	6.0%	0.4%	0.0%
Boise	26.3%	32.7%	7.1%	7.6%	4.2%	0.5%	10.6%	0.1%	2.6%
Bridgeton <sup>a</sup>	18.9%	30.6%	4.3%	3.1%	0.1%	1.9%	21.1%	0.0%	0.0%
East Columbia <sup>a</sup>	10.9%	47.3% <sup>b</sup>	5.6%	7.7%	16.2%	0.1%	16.8%	1.0%	0.0%
Eliot	32.0%	26.7%	4.8%	4.0%	3.0%	0.5%	14.2%	0.1%	0.0%
Hayden Island <sup>a</sup>	14.8%	23.5%	4.2%	15.0%	0.9%	2.1%	0.8%	0.4%	0.0%
Humboldt	30.1%	37.6%	6.2%	5.1%	4.0%	0.1%	22.1%	0.0%	0.1%
Irvington Community Association	16.6%	25.0%	3.1%	9.2%	6.0%	0.0%	6.6%	0.0%	0.1%
Kenton <sup>a</sup>	23.4%	32.4%	8.6%	11.4%	2.2%	0.6%	8.7%	0.9%	0.0%
Kerns	30.2%	24.6%	3.7%	15.4%	3.8%	0.6%	0.8%	0.0%	0.4%
King	29.6%	33.3%	5.9%	8.5%	4.5%	0.0%	14.1%	0.0%	0.3%
Lloyd District Community Association	30.3%	27.6%	5.7%	9.4%	6.3%	0.2%	5.3%	0.6%	0.0%
Northwest	19.4%	18.6%	7.7%	5.2%	2.4%	0.4%	0.7%	2.1%	0.0%



Portland Neighborhood	Low-Income Population (<2x poverty level)	Minority (Not White Alone, Not Hispanic)	Two or More Races Not Hispanic	Hispanic or Latino	Asian Alone Not Hispanic	American Indian and Alaska Native Alone	Black or African American Not Hispanic	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone
Overlook	19.7%	28.9%	4.0%	8.3%	6.0%	1.7%	8.8%	0.0%	0.2%
Piedmont	27.1%	40.6%	5.0%	12.2%	4.5%	2.1%	14.7%	0.3%	1.8%
Rockwood <sup>a</sup>	49.6% <sup>c</sup>	60.0% <sup>c</sup>	3.6%	38.7%	6.4%	1.6%	7.5%	2.1%	0.0%
Sabin Community Association	18.2%	26.4%	3.3%	16.0%	1.9%	0.1%	5.1%	0.0%	0.1%
Sullivan's Gulch	23.8%	19.5%	4.2%	7.8%	2.8%	0.6%	4.0%	0.0%	0.0%
Sunderland	12.0%	43.2% <sup>b</sup>	6.2%	6.3%	13.5%	0.2%	15.9%	0.8%	0.2%
Woodlawn	26.1%	32.0%	3.3%	2.5%	3.6%	0.0%	19.9%	0.0%	2.6%
Portland Neighborhoods	23.9%	29.5%	5.2%	8.7%	4.2%	0.6%	9.9%	0.3%	0.5%
Study Area Neighborhoods	25.7%	27.8%	4.9%	12.0%	3.9%	0.6%	5.6%	0.6%	0.3%
Portland-Vancouver MSA	23.7%	27.6%	4.6%	12.2%	6.8%	0.5%	2.7%	0.5%	0.3%

Source: ACS 5-Year Estimates, 2016–2020, Tables C17002 and B03002 (U.S. Census Bureau 2022a).

- a Neighborhood is in the study area.
- b Value is 1.5 times the regional average (Portland-Vancouver metropolitan area).
- c Value is 2 times the regional average (Portland-Vancouver metropolitan area).

Table 3-20. Low-Income and Minority Populations in Vancouver Neighborhoods Within the Study Area (Washington)

Vancouver Neighborhood	Low-Income Population (<2x poverty level)	Minority (Not White Alone Not Hispanic)	Two or More Races Not Hispanic	Hispanic or Latino	Asian Alone Not Hispanic	American Indian and Alaska Native Alone	Black or African American Not Hispanic	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone
Arnada	38.1% <sup>b</sup>	25.6%	12.0%	7.0%	1.7%	1.8%	1.5%	0.2%	1.4%
Carter Park	23.0%	15.7%	2.5%	6.4%	4.2%	0.5%	1.7%	0.3%	0.0%
Central Park <sup>a</sup>	25.8%	18.3%	2.5%	9.0%	1.5%	0.1%	6.0%	0.0%	0.3%
Columbia Way <sup>a</sup>	22.9%	23.5%	2.1%	7.6%	12.7%	0.0%	1.1%	0.0%	0.0%
Esther Short <sup>a</sup>	50.6% <sup>c</sup>	24.1%	3.8%	8.0%	2.5%	2.1%	6.1%	0.7%	0.9%
Fairgrounds	16.9%	16.5%	3.9%	6.7%	4.5%	0.3%	0.9%	0.0%	0.1%
Felida	12.6%	19.0%	3.8%	8.1%	4.4%	0.1%	1.8%	0.1%	0.7%
Fourth Plain Village	40.3% <sup>b</sup>	46.5% <sup>b</sup>	4.6%	24.9%	4.0%	1.5%	4.4%	7.2%	0.0%
Fruit Valley	44.7% <sup>b</sup>	36.8%	11.4%	18.6%	0.8%	0.2%	5.6%	0.2%	0.0%
Harney Heights	37.0% <sup>b</sup>	31.7%	5.2%	16.4%	5.2%	0.1%	4.3%	0.3%	0.2%
Hough <sup>a</sup>	30.2%	13.9%	2.4%	7.9%	1.5%	0.3%	1.8%	0.0%	0.0%
Hudson's Bay <sup>a</sup>	29.4%	23.5%	11.5%	9.2%	2.5%	0.0%	0.2%	0.0%	0.0%
Lincoln <sup>a</sup>	24.9%	20.1%	6.6%	7.4%	2.8%	0.2%	2.9%	0.0%	0.1%

Vancouver Neighborhood	Low-Income Population (<2x poverty level)	Minority (Not White Alone Not Hispanic)	Two or More Races Not Hispanic	Hispanic or Latino	Asian Alone Not Hispanic	American Indian and Alaska Native Alone	Black or African American Not Hispanic	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone
Maplewood	53.5% <sup>c</sup>	46.3% <sup>b</sup>	4.5%	34.7%	1.9%	0.2%	4.8%	0.0%	0.2%
NE Hazel Dell	28.5%	26.9%	4.1%	14.0%	3.2%	0.9%	4.2%	0.5%	0.1%
North Salmon Creek	11.8%	16.8%	2.8%	8.3%	5.3%	0.1%	0.2%	0.0%	0.0%
Pleasant Highlands	12.8%	13.7%	2.6%	2.6%	6.7%	0.0%	1.7%	0.0%	0.0%
Ramblin Creek Est./S Salmon Creek Ave. N	15.3%	13.7%	1.6%	7.3%	2.0%	0.0%	2.8%	0.0%	0.0%
Rose Village <sup>a</sup>	37.7% <sup>b</sup>	44.7% <sup>b</sup>	11.1%	28.5%	0.9%	0.6%	1.3%	2.4%	0.0%
Sherwood	24.1%	24.4%	3.5%	13.2%	4.9%	0.1%	1.9%	0.0%	0.9%
Shumway <sup>a</sup>	24.9%	20.7%	7.0%	5.4%	3.0%	0.4%	2.3%	2.3%	0.2%
West Hazel Dell	20.6%	19.6%	5.4%	10.2%	2.0%	0.4%	1.4%	0.2%	0.1%
West Minnehaha <sup>a</sup>	30.9%	30.5%	8.8%	13.8%	1.3%	0.4%	2.9%	3.3%	0.0%
Vancouver Neighborhoods	24.3%	23.1%	4.7%	11.3%	3.4%	0.4%	2.4%	0.6%	0.2%
Study Area Neighborhoods	25.7%	27.8%	4.9%	12.0%	3.9%	0.6%	5.6%	0.6%	0.3%
Portland-Vancouver MSA	23.7%	27.6%	4.6%	12.2%	6.8%	0.5%	2.7%	0.5%	0.3%

Source: ACS 2016–2020, Tables C17002 and B03002 (U.S. Census Bureau 2022a).

a Neighborhood is in the study area.

b Value is 1.5 times the regional average (Portland-Vancouver metropolitan area).

c Value is 2 times the regional average (Portland-Vancouver metropolitan area).

### 3.2.3.1 Portland Neighborhoods

The proportion of minority populations in Portland neighborhoods (29.5%) is higher than in Vancouver neighborhoods (23.1%) and the study area as a whole (27.8%). Two Portland neighborhoods have block groups with meaningfully greater percentages of minority populations: East Columbia (47.3%) and Sunderland (43.2%). The Rockwood neighborhood in Gresham represents a high-priority EJ area, with a majority minority population (60.0%).

The proportion of low-income populations in Portland neighborhoods (23.9%) is similar to that of the Portland-Vancouver metro area (23.7%) and the study area as a whole (25.7%). Rockwood in Gresham represents a high-priority percentage of low-income residents (49.6%).

### 3.2.3.2 Vancouver Neighborhoods

The proportion of minority populations in Vancouver neighborhoods (23.1%) is lower than in Portland neighborhoods (29.5%) and the study area as a whole (27.8%). Three Vancouver neighborhoods have block groups with meaningfully greater percentages of minority populations: Fourth Plain Village (4.65%), Maplewood (46.3%), and Rose Village (44.7%).

The proportion of low-income populations Vancouver neighborhoods (24.3%) is slightly higher than in Portland neighborhoods (23.9%) and the Portland-Vancouver region (23.7%) as a whole, but lower than the study area (25.7%). Five Vancouver neighborhoods have block groups with meaningfully greater percentages of low-income residents: Harney Heights (37.0%), Rose Village (37.7%), Arnada (38.1%), Fourth Plain Village (40.3%), and Fruit Valley (44.7%).

Two Vancouver neighborhoods have block groups with high-priority percentages of low-income residents: Esther Short (50.6%) and Maplewood (53.5%).

## 3.2.4 Community Resources

The IBR project team developed an initial inventory of community resources within the IBR study area and overlaid those resources on high priority and meaningfully greater EJ areas, as shown in Figure 3-3 and Figure 3-5. Figure 3-12 and Figure 3-13 below display the community resources within the study area and high priority and meaningfully greater EJ areas. Table 3-21 and Table 3-22 below list community resources within the study area that overlap with high priority or meaningfully greater EJ areas. Additional community resources will be identified on an ongoing basis as the IBR Program moves forward.



Table 3-21. Community Resources in Environmental Justice Focus Areas – Portland

Map ID	Resource Type	Resource Name	Low-Income – High Priority	Low-Income – Meaningfully Greater	Minority – High Priority	Minority – Meaningfully Greater
6	Natural Resource	Vanport Wetlands	<b>Yes</b>	No	<b>Yes</b>	No
7	Park	Dog Run	<b>Yes</b>	No	<b>Yes</b>	No
8	Park	Delta Park	<b>Yes</b>	No	<b>Yes</b>	No
9	Recreational	Portland International Raceway	<b>Yes</b>	No	<b>Yes</b>	No
10	Recreational	Portland Meadows	<b>Yes</b>	No	<b>Yes</b>	No
11	Recreational	Columbia Slough	<b>Yes</b>	No	<b>Yes</b>	No
12	Historical	Columbia Cemetery	<b>Yes</b>	No	<b>Yes</b>	No

Table 3-22. Community Resources in Environmental Justice Focus Areas – Vancouver

Map ID	Resource Type	Resource Name	Low-Income – High Priority	Low-Income – Meaningfully Greater	Minority – High Priority	Minority – Meaningfully Greater
8	Park	Arnada Park	No	<b>Yes</b>	No	No
16	Educational	Carnegie Library	No	<b>Yes</b>	No	No
17	Historical	Hidden, Lowell M. House	<b>Yes</b>	No	No	No
18	Historical	Vancouver Telephone Exchange	<b>Yes</b>	No	No	No
19	Historical	Chumasero-Smith House	<b>Yes</b>	No	No	No
20	Historical	House of Providence (Academy)	No	<b>Yes</b>	No	No
21	Historical	Langsdorf House	<b>Yes</b>	No	No	No
22	Historical	Lloyd DuBois House	<b>Yes</b>	No	No	No

Map ID	Resource Type	Resource Name	Low-Income – High Priority	Low-Income – Meaningfully Greater	Minority – High Priority	Minority – Meaningfully Greater
23	Historical	Elks Building	<b>Yes</b>	No	No	No
24	Educational	Future Library	No	<b>Yes</b>	No	No
25	Recreational	Regal Cinema	No	<b>Yes</b>	No	No
27	Historical/Park	Slocum House/Ester Short Park	<b>Yes</b>	No	No	No
28	Historical	Heritage Building	No	<b>Yes</b>	No	No
29	Historical	Evergreen Hotel	<b>Yes</b>	No	No	No
48	Shopping	Uptown Village	No	<b>Yes</b>	No	No
49	Shopping	Farmers Market	<b>Yes</b>	No	No	No
51	Community/ Recreation	Starbucks	<b>Yes</b>	No	No	No
53	Senior/Low Income	Smith Tower	<b>Yes</b>	No	No	No
57	Public Service	Vancouver Fire Department, #82	<b>Yes</b>	No	No	No
69	Park	Land Bridge	<b>Yes</b>	No	No	No
70	Park	Amphitheater at Vancouver Landing	<b>Yes</b>	No	No	No
72	Religious Institution	Saint James Catholic Church	<b>Yes</b>	No	No	No

Figure 3-12. Community Resources – Portland

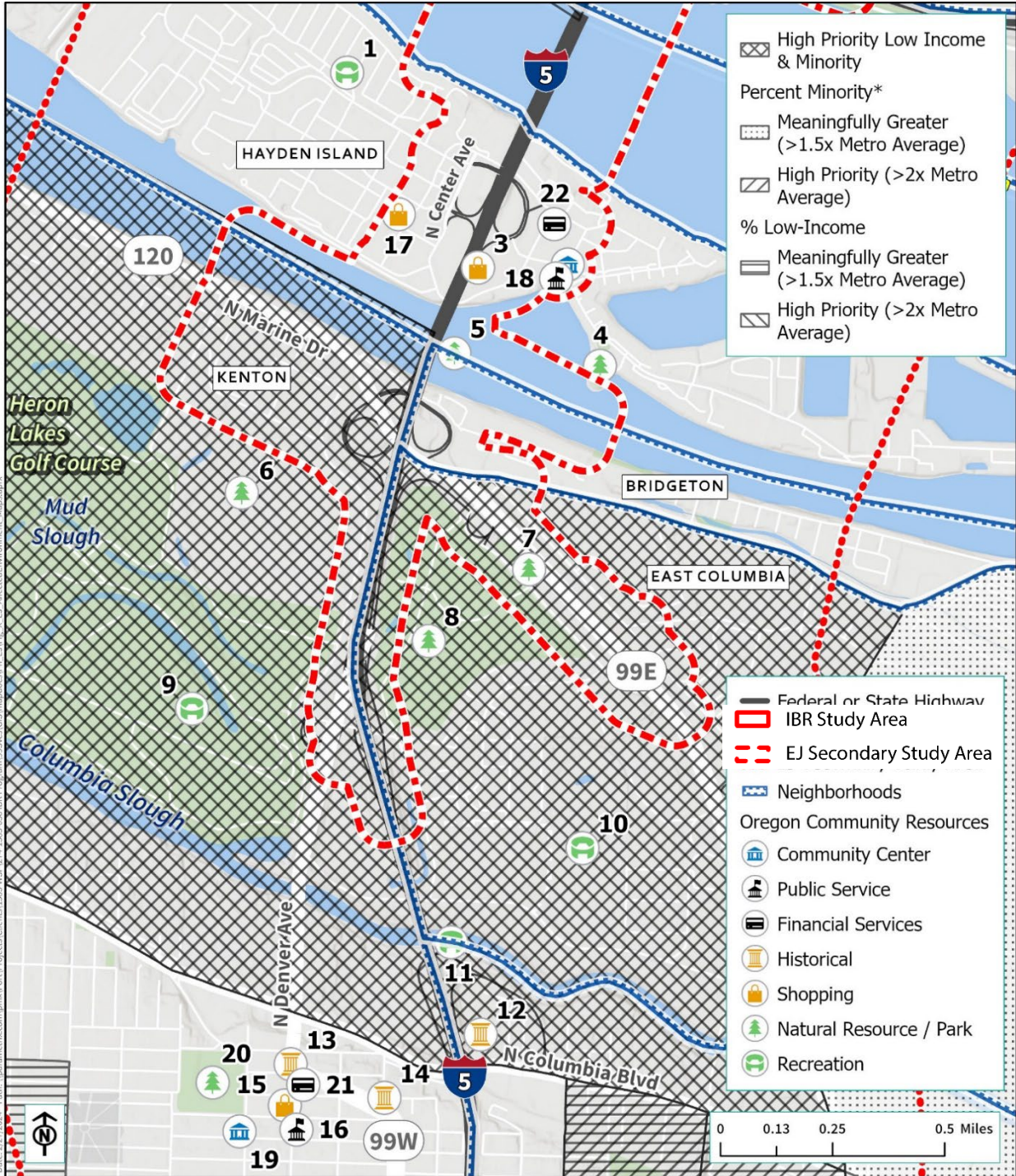
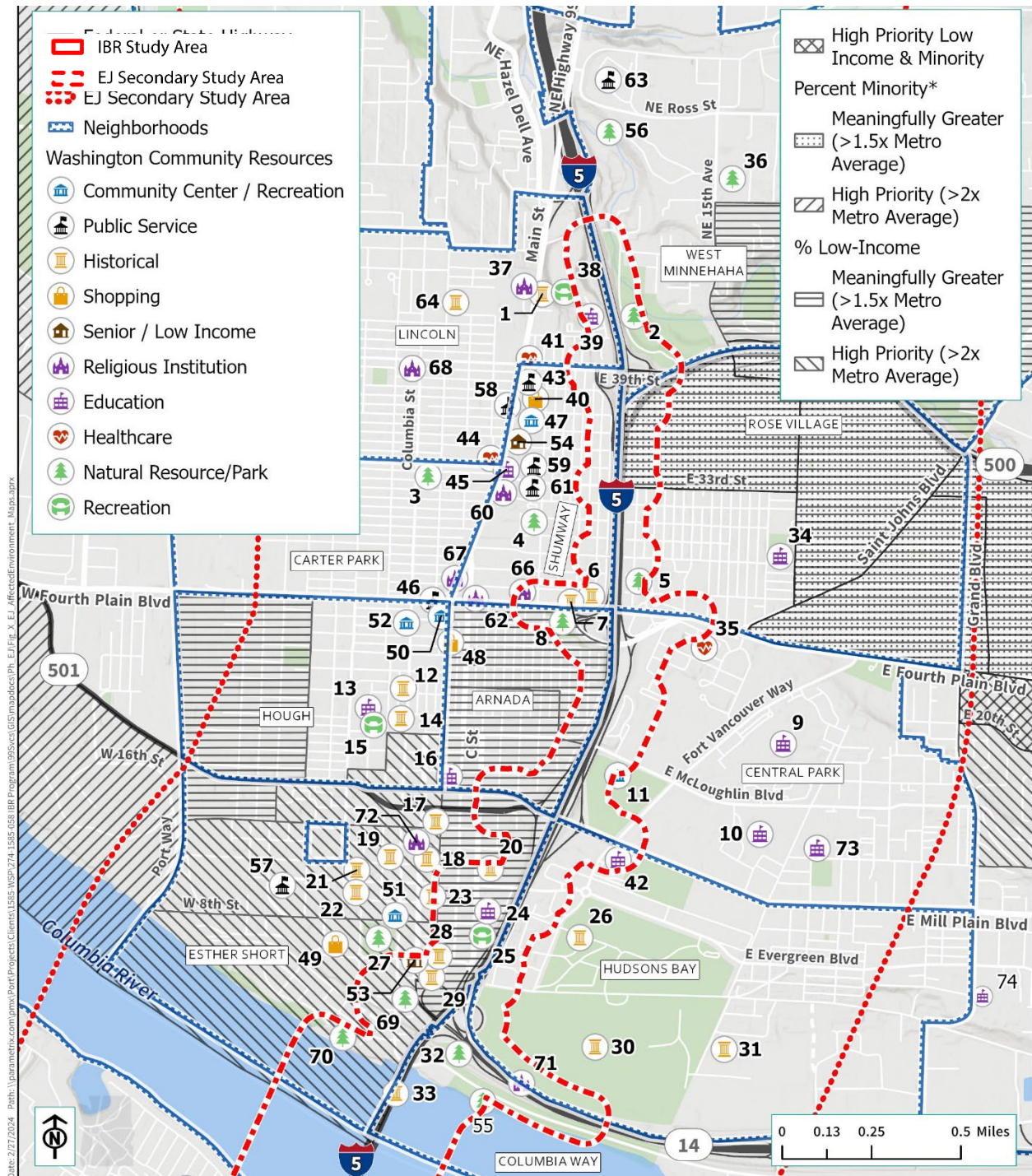




Figure 3-13. Community Resources – Vancouver



## 4. LONG-TERM EFFECTS

In general, long-term impacts were determined by evaluating the location and intensity of environmental impacts that would occur during operation of the Modified LPA in areas where EJ populations have been identified. In particular, the EJ analysis assessed whether impacts to EJ populations would be disproportionately high and adverse compared to the general population. The impact analysis included impacts derived from several IBR Program technical reports: Acquisitions, Neighborhood and Populations, Land Use, and Economics, Visual Quality, Air Quality, Noise and Vibration, and Transportation.

All environmental resource topics were reviewed in coordination with subject matter experts to assess whether the effects identified for those resources under the Modified LPA had the potential to be predominantly borne by EJ populations or could be suffered by an EJ population in a manner appreciably more severe or greater in magnitude than the non-EJ population. Environmental resource topics with the potential to result in a disproportionately high and adverse effect on EJ populations under the Modified LPA became the focus of the EJ analysis and were studied further, as described in Table 4-1. Environmental resources that would not or were unlikely to result in disproportionately high and adverse effects under the Modified LPA were not studied further.

The long-term impact assessment methods also accounted for potential benefits the IBR Program could bring to EJ communities, such as improved seismic resilience, multimodal access, and accessibility upgrades within the study area.

### 4.1 No-Build Alternative

The No-Build Alternative would avoid all direct displacement of residents, businesses, community resources, and jobs, including EJ populations. Long-term impacts for neighborhoods would include increased travel times by approximately 50% compared to existing for residents traveling within the I-5 corridor (see the Transportation Technical Report). This increase in travel times is not anticipated to impact EJ populations differently than the general population. The No-Build Alternative would not bring high-capacity transit (HCT) to Hayden Island or Vancouver. Low-income and minority populations that use transit would be unable to benefit from HCT under the No-Build Alternative. Also, the potential benefits associated with LPA's ability to generate long-term business development would not occur with the No-Build Alternative. There would be no toll for the No-Build Alternative; therefore, EJ populations would not have the expense of tolls or the need for transponders. Long-term impacts associated with the No-Build Alternative are summarized in Table 4-1.



Table 4-1. Summary of Potential Long-Term Effects for the No-Build Alternative (Compared to Existing Conditions)

Type of Impact	Long-Term Impact Summary for the No-Build Alternative
Acquisitions, Displacements, and Relocations	None (Acquisitions and Displacements Technical Report).
Air Quality	The EPA has developed National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants: carbon monoxide, lead, ozone, nitrogen dioxide, sulfur dioxide, and particulate matter. No violations of the NAAQS were shown for the No-Build Alternative within the study area (Air Quality Technical Report).
Economics	<p>Under the No-Build Alternative, economic development planned for this area may occur more slowly because business owners may be more reluctant to locate in an area with poor access and mobility for employees and customers. Freight reliability decreases as congestion spreads beyond the peak hour and into times when trucks tend to travel. Customers may elect to shop in other areas with easier access and improved mobility (Economics Technical Report).</p> <p>Regional transportation plans, as well as the numerous plans developed by the city of Vancouver, call for HCT in Vancouver, which would not be provided by the No-Build Alternative (Economics Technical Report).</p>
Noise and Vibration	None (Noise and Vibration Technical Report).
Social and Neighborhood Effects	None (Social and Neighborhoods Technical Report).
Tolling	None.
Transportation	<p>Over time, traffic and congestion on the Interstate Bridge are likely to increase, lengthening travel times and delay. Delays on the Interstate Bridge would also affect traffic and congestion in surrounding areas.</p> <p>There would be limited HCT service and no light-rail service across the Interstate Bridge under the No-Build Alternative, limiting public transportation opportunities and access for EJ populations needing to cross the bridge (Transportation Technical Report).</p>
Visual Resources	<p>The No-Build Alternative would not result in a change in visual character that would contrast with the existing scale, form, and materials within the area of visual effect. Other traffic and transit projects planned within the study area would be expected to be compatible with the existing natural, cultural, and project environments.</p> <p>However, traffic and congestion on the Interstate Bridge and in the surrounding areas would reduce the overall visual coherence of the project environment, which would be a slight decrease in the existing visual quality (Visual Resources Technical Report).</p>

Note: All data and findings in Table 4-1 are based on the relevant IBR technical reports for each corresponding environmental resource.

## 4.2 Modified LPA Summary of Project Impacts

Table 4-2 summarizes long-term impacts and benefits to EJ populations associated with the Modified LPA and all design options. A preliminary determination has been made based upon the current assessment of environmental impacts, benefits, and mitigation strategies under the No-Build Alternative as described in Table 4-2 below. Given that increased travel times under the No-Build Alternative would affect EJ populations the same as the general population, and given that all other environmental conditions would remain the same as of this writing, the No-Build Alternative would not result in a disproportionately high and adverse effect on EJ populations within the IBR study area.

Table 4-3 presents a summary of anticipated general long-term impacts and benefits to EJ populations under the Modified LPA, inclusive of key design options. EJ impacts would change according to the final design of bridge and highway improvements. These differences are discussed below relative to the major environmental resources affected by changes to design elements.

Table 4-2. Comparison of No-Build Alternative and Modified LPA Design Options

1	2	3	4	5
No-Build Alternative	Modified LPA With Double-Deck Fixed-Span Configuration, One or Two Auxiliary Lanes, with or without C Street Ramps, Centered I-5, all Park-and-Ride Site Options	Modified LPA Double-Deck Fixed-Span Configuration, One Auxiliary Lane, C Street Ramps, I-5 Westward Shift, all Park-and-Ride Site Options	Modified LPA Single-Level Fixed-Span Configuration, <sup>a</sup> One Auxiliary Lane, C Street Ramps, Centered I-5, all Park-and-Ride Site Options	Modified LPA Single-Level Movable-Span Configuration, One Auxiliary Lane, C Street Ramps, Centered I-5, all Park-and-Ride Site Options
<ul style="list-style-type: none"> <li>No displacement of residents, businesses, community resources, or jobs.</li> <li>Travel times would increase by approximately 50% compared to existing times. Would not bring high-capacity transit to Hayden Island or downtown Vancouver.</li> <li>Environmental conditions under the No-Build Alternative would affect EJ populations the same as the general population. Therefore, no disproportionately high and adverse effects have been identified.</li> </ul>	<ul style="list-style-type: none"> <li>Increased access to high-capacity transit and active transportation, and reductions in vehicle travel time. Impacts to EJ populations would be the same as to the general public.</li> <li>Increase in job access due to faster travel times. Assuming faster times resulting from a tolling scenario, tolling would result in disproportionately high and adverse effects to EJ populations.</li> <li>Residential and business displacements. Displacements high-priority and meaningfully greater EJ areas such as the Esther Short</li> </ul>	<ul style="list-style-type: none"> <li>Similar to Column 2, but would increase residential and business displacements.</li> <li>Residential and business displacements. Additional displacement of the Normandy Apartments as a result of the I-5 Westward Shift would result in disproportionately high and adverse effects to EJ populations.</li> </ul>	<ul style="list-style-type: none"> <li>Similar to Column 2, except shared-use path users would have more exposure to noise, but would also have a shorter distance to climb and would be more visible and therefore feel safer. Noise and visual impacts to EJ populations would be the same as to the general population.</li> <li>Residential and business displacements. Displacements high-priority and meaningfully greater EJ areas such as the Esther Short Neighborhood and the Rockwood Neighborhood in Gresham would result in disproportionately high</li> </ul>	<ul style="list-style-type: none"> <li>Similar to Column 2, except bridge openings could delay transit and active transportation users.</li> <li>Residential and business displacements. Displacements in high-priority and meaningfully greater EJ areas such as the Esther Short Neighborhood and the Rockwood Neighborhood in Gresham would result in disproportionately high and adverse effects to EJ populations.</li> <li>Delays to transit and active transportation users could also contribute to adverse effects to EJ populations.</li> </ul>

1	2	3	4	5
	<p>Neighborhood and the Rockwood Neighborhood in Gresham would result in disproportionately high and adverse effects to EJ populations.</p> <ul style="list-style-type: none"> <li>• Increased traffic and noise impacts from construction.</li> <li>• Improved air quality.</li> <li>• Some adverse impacts to community cohesion.</li> </ul>		<p>and adverse effects to EJ populations.</p>	

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



Table 4-3. Summary of Potential Long-Term Effects from the Modified LPA on Environmental Justice Populations<sup>22</sup>

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
<p>Acquisitions, Displacements, and Relocations</p>	<p>Full acquisition of 46 properties and partial acquisition of 132 properties, resulting in 43 residential displacements and 36 business displacements.</p> <p><b>Oregon Neighborhoods</b></p> <ul style="list-style-type: none"> <li>• 68 total acquisitions (25 full acquisitions, 43 partial acquisitions)</li> <li>• 36 residential displacements</li> <li>• 26 business displacements</li> </ul> <p>Residential displacements would occur in the Kenton and Hayden Island neighborhoods. Business displacements would occur in the Bridgeton, Kenton, Hayden Island, and Rockwood neighborhoods. Additional partial acquisitions to East Delta Park would occur in the East Columbia neighborhood. No residential or business displacements would occur in the East Columbia neighborhood.</p> <p><b>Washington Neighborhoods</b></p> <ul style="list-style-type: none"> <li>• 110 total acquisitions (21 full acquisitions, 89 partial acquisitions)</li> <li>• 7 residential displacements</li> </ul>	<p>The Modified LPA would acquire properties and displace residences and businesses in the identified high-priority and meaningfully greater EJ areas.</p> <p><b>Oregon Neighborhoods</b></p> <ul style="list-style-type: none"> <li>• East Columbia: 11 partial acquisitions of East Delta Park; no residential or business displacements; East Columbia is a meaningfully greater minority neighborhood. Partial acquisitions to East Delta Park within the East Columbia neighborhood would result in disproportionately high and adverse impacts to EJ populations.</li> <li>• Rockwood: 7 total acquisitions; 3 business displacements; Rockwood is a high-priority low-income and minority neighborhood.</li> </ul> <p><b>Washington Neighborhoods</b></p> <ul style="list-style-type: none"> <li>• Esther Short: 27 total acquisitions; 10 business displacements; Esther Short is a high-priority low-income neighborhood. Esther Short acquisitions would result in</li> </ul>	<p>None.</p>

<sup>22</sup> All data and findings in Table 4-3 are based on the relevant IBR technical reports for each corresponding environmental resource.

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<ul style="list-style-type: none"> <li>10 business displacements</li> </ul> <p><b>I-5 Westward Shift Design Option:</b> 33 additional residential displacements and 3 business displacements.</p> <p>Residential displacements would occur in the Esther Short and Shumway neighborhoods and business displacements would occur in the Esther Short neighborhood, a high-priority EJ area. Additional acquisitions would occur to Marshall Park in the Central Park neighborhood (partial), Columbia Way (partial), Hudson’s Bay (temporary), Lincoln (partial), and Rose Village (partial); none of these acquisitions would result in business or residential displacements</p> <p><b>I-5 Westward Shift Design Option:</b> One design option would shift I-5 and ramps approximately 40 feet to the west between SR 14 and Mill Plain Boulevard. The impacts or benefits to EJ populations associated with this design option would be similar to those described for I-5 with no shift, with two additional property acquisitions:</p> <ul style="list-style-type: none"> <li>Normandy Apartments, where 33 residential units would be displaced.</li> <li>Regal City Center complex, where 3 businesses would be displaced.</li> </ul>	<p>disproportionately high and adverse impacts to EJ populations.</p> <ul style="list-style-type: none"> <li>The design option that shifts I-5 westward would impact the Normandy Apartments, resulting in 33 additional residential displacements in Esther Short. Normandy Apartments displacements would result in disproportionately high and adverse impacts to EJ populations.</li> <li>Rose Village: 8 total acquisitions; no displacements; Rose Village is a meaningfully greater low-income and minority neighborhood. Rose Village acquisitions would result in disproportionately high and adverse impacts to EJ populations.</li> <li><b>I-5 Westward Shift Design Option:</b> Although the Normandy Apartments are not identified by the U.S. Department of Housing and Urban Development as a low-income housing tax credit property (HUD n.d.), the 33 residential displacements would occur within the Esther Short neighborhood, a high-priority EJ area for low-income population. As described above, Normandy Apartments and Esther Short acquisitions would result in</li> </ul>	

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
		disproportionately high and adverse impacts to EJ populations.	
Air Quality	Emissions for all Mobile Source Air Toxics and criteria pollutants are expected to be substantially lower than existing emissions, and the study area would remain in attainment for National Ambient Air Quality Standards.	No disproportionately high and adverse effects to EJ populations have been identified.	Improved air quality compared to existing conditions for all communities, including EJ populations.
Land Use and Economics	<p><b>Permanent conversion of approximately 39 acres to transportation use (not inclusive of temporary construction staging).</b> This land conversion would comprise a small portion of the total land in the Portland/Vancouver area and would not be substantial in a regional context. Converted land would be used for the extension of high-capacity transit, park and ride structures, and other transportation infrastructure, consistent with the goals and policies of adopted plans.</p> <p><b>Business/employee displacements</b> are anticipated to reduce tax revenues in Multnomah County and Clark County by approximately 0.02% and 0.3% to 0.4%, respectively.</p> <p><b>Loss of Service Industry Jobs:</b> The Modified LPA’s direct impacts to Hayden</p>	Although Hayden Island is not a meaningfully greater or high-priority EJ area, impacts to service industry workers and the conversion of property could impact low-income and minority workers in the study area. However, these land use and economic impacts would impact EJ populations the same as the general population, so no disproportionately high and adverse effects have been identified.	Increased jobs and economic development opportunities near the interstate and near transit stations for all communities, including EJ populations.

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<p>Island, and to a lesser extent to Vancouver, could have a substantial effect on wage earning opportunities for those seeking service industry employment. Some displaced businesses may choose to not relocate locally, and some employees would be displaced during construction.</p>		

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
Noise and Vibration	<p><b>Oregon Neighborhoods</b></p> <p>Increased noise levels (up to 10 dBA) at a sensitive receptor in Jantzen Beach RV Park This increase would remain below ODOT’s Noise Abatement Criteria. No increase in vibration levels at Jantzen Beach RV Park.</p> <p><b>Washington Neighborhoods</b></p> <p>Increase noise levels (up to 2 to 12 dBA) at seven residences located between E 33rd Street and E39th Street. No increase in vibration levels at residences located between E 33rd Street and E 39th Street.</p>	<p><b>Oregon Neighborhoods</b></p> <p>None; Jantzen Beach RV Park is not located in a meaningfully greater or high-priority EJ area and impacts to EJ populations would be the same as to the general population. Therefore, no disproportionately high and adverse effects to EJ populations have been identified.</p> <p><b>Washington Neighborhoods</b></p> <p>The area between E 33rd Street and E 39th Street encompasses the Rose Village neighborhood—a meaningfully greater EJ area for both low-income and minority populations. The residences that would experience a substantial noise impact may include EJ populations. Therefore, noise impacts to the Rose Village Neighborhood would result in a disproportionately high and adverse effect on EJ populations.</p>	None.
Social and Neighborhood Effects	<p>Impacts to cohesion and separation from community resources and services could result from potential residential and business displacements, changes to travel that would affect access to community resources and impacts to the visual landscape of neighborhoods.</p> <p><b>Oregon Neighborhoods</b></p>	<p><b>Oregon Neighborhoods</b></p> <p>Social and neighborhood effects on EJ populations include displacements in the Rockwood neighborhood, a high-priority EJ area for both low-income and minority populations. These displacements would result in a disproportionately high and adverse effect on EJ populations.</p>	Improved access, reliability, connectivity, and service frequency to transit for all communities, including EJ populations.



Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<ul style="list-style-type: none"> <li>• <b>Displacements:</b> Residential and/or business displacements would occur on Hayden Island, Bridgeton, Kenton, and Rockwood in Gresham.</li> <li>• No change to community resources.</li> <li>• <b>Effects on cohesion:</b> Adverse impacts to community cohesion have been identified on Hayden Island due to the high number of displacements within floating home communities.</li> </ul> <p><b>Washington Neighborhoods</b></p> <ul style="list-style-type: none"> <li>• <b>Displacements:</b> Residential and/or business displacements would occur in Central Park and Esther Short neighborhoods.</li> <li>• Effects on community resources: None identified.</li> <li>• Effects on cohesion: None identified.</li> </ul>	<p><b>Washington Neighborhoods</b></p> <p>Social and neighborhood effects on EJ populations include displacements in the Esther Short neighborhood, a high priority EJ area for low-income populations. These displacements would result in a disproportionately high and adverse effect on EJ populations.</p>	
Tolling	<p>Tolling on I-5, paired with other Program improvements such as increased transit and active transportation options, is expected to reduce travel times and improve travel reliability; however, tolls would result in higher transportation costs as a portion of household spending. Households in the region would expend an additional \$1,600 per year on transportation, representing approximately 2% of annual household income in the Portland-Vancouver</p>	<p>The cost of tolls on the Columbia River bridges would impact low-income populations disproportionately compared to the general population. Two of the toll price scenario schedules were used to study impacts to EJ populations, ranging from \$2.15 to \$3.55 (Scenario Schedule A) and \$1.50 to \$3.15 (Scenario Schedule B). For median-income households in Portland and Vancouver, the difference resulting from the new tolls would be</p>	<p>Reduced travel times and improved travel reliability, resulting in part from tolling, would benefit all communities, including EJ populations.</p>

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<p>metropolitan area.</p> <p>As described in this table under Transportation, the Modified LPA and options would not see substantial diversion to I-205 as a result of tolling. Changes in vehicle volumes on I-205 on any of the studied screenline locations during the peak period range from -3% to +12% compared to the No-Build Alternative. This is noted to point out that concerns about diversion impacts to I-205 are not warranted based on the screenline analysis.</p>	<p>relatively small for median-income households (a 2% increase from 14% to 16% of annual household income in Portland and a 3% increase from 15% to 19% of annual household income in Vancouver).</p> <p>Four-member households at or below the federal poverty level would be the most significantly impacted by a future tolling program. Since these households already spend a relatively larger proportion of household income on transportation, the effect of tolling would increase household transportation costs from 29% of total household income under No Build to 35% under the Modified LPA. Tolling impacts to households at or below the federal poverty level constitute a disproportionately high and adverse effect to EJ populations.</p> <p>Low-income households would be impacted similarly to the general population and would experience an increase in household transportation cost of approximately 3%.</p> <p>Several tribes have preemptions from tolling per treaties with the U.S. Government. For members of tribes with those preemptions, there would be no adverse effect from tolling. Several tribes consulting on IBR have requested</p>	

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
		<p>exemption from tolling on the existing Interstate Bridge and future Columbia River bridges.</p> <p>The bi-state transportation committee made up of representatives of the Oregon and Washington State Transportation Commissions would determine any tolling exemptions or discounts and are considering a low-income toll program.</p> <p>In conclusion, tolling on the future Interstate Bridge would result in a disproportionately high and adverse effect on EJ populations.</p>	
<p>Transportation</p>	<p>The Modified LPA would reduce regional VMT compared to the No-Build Alternative and provide the following changes by mode and facility type:</p> <ul style="list-style-type: none"> <li>• <b>I-5 Highway:</b> Reduce key bottlenecks along segments of I-5.</li> <li>• <b>Diversion Impacts:</b> AM and PM peak-hour screenline volumes within the study area were analyzed using the regional travel demand model to determine the relative differences in traffic volumes between the No-Build Alternative and the Modified LPA. Generally, the Modified LPA resulted in increased traffic on adjacent facilities compared to the No-Build Alternative. However, the increases are relatively</li> </ul>	<p>Changes to local traffic circulation resulting from the Evergreen Station would occur in the Esther Short neighborhood, a high-priority EJ area.</p> <p><b>Single-Level Movable-Span Configuration:</b> Disturbances to transit and active transportation resulting from bridge opening delays can negatively affect EJ populations. However, a disproportionately high and adverse effect on EJ populations is not anticipated (per FHWA and USDOT guidance), given that the impacts would be the same for all populations traveling through the study area.</p> <p><b>Design Option without C Street Ramps:</b></p>	<p>The following impacts are anticipated to benefit all travelers, including EJ populations, under the Modified LPA as compared with the No-Build Alternative:</p> <ul style="list-style-type: none"> <li>• Reduce bottleneck conditions for some I-5 segments during the AM and PM peak.</li> <li>• Faster total travel time on I-5 between I-205 north of Vancouver and the Marquam Bridge in Portland.</li> <li>• Transit, active transportation, and safety enhancements associated with the Evergreen high-capacity transit station, and the Community Connector pedestrian bridge over I-5 near Evergreen Blvd, would benefit EJ</li> </ul>

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<p>minor ranging from approximately +4% to +12%. In Vancouver, most volume increases would divert to I-5 rather than on surrounding north-south facilities, reflecting greater capacity on I-5 during the peak period with the Modified LPA compared to the No-Build Alternative. In Portland, traffic diversion under the Modified LPA during both peak and off-peak times have differences of less than 50 vehicles compared to the No-Build Alternative. Compared to the No-Build Alternative, the Modified LPA and options would not see substantial changes in vehicle volumes on I-205 on any screenline location in the peak period (-3% to + 12%). This is noted to point out that concerns about diversion impacts to I-205 are not warranted based on the analysis.</p> <ul style="list-style-type: none"> <li>• <b>Freight Mobility and Access:</b> Improved conditions on I-5 would similarly benefit freight and trucks.</li> <li>• <b>Arterials and Local Streets Impacts:</b> Changes to traffic circulation, property access, and traffic control primarily around station areas.</li> <li>• <b>Transit Impacts:</b> Extension of high-capacity transit and Express Bus across the Columbia River. Stations</li> </ul>	<p>The removal of the C Street ramps would eliminate an access and egress point for downtown Vancouver and would shift between 300 and 600 vehicles per hour to the Mill Plain Boulevard ramps and roadways during the peak hours. This could cause additional traffic in Arnada, a neighborhood with a meaningfully-greater concentration of low-income populations. However, impacts to EJ populations under this design option would be the same as for the general population. Therefore, no disproportionately high and adverse effect has been identified.</p>	<p>populations in Esther Short neighborhood.</p> <ul style="list-style-type: none"> <li>• More reliable transit service benefiting EJ populations who use transit to travel through the study area.</li> <li>• Improved Bicycle Level of Traffic Stress (BLTS) in Vancouver would improve the quality of local network connections across and around the I-5 corridor for all users, including identified EJ populations in the East Columbia and Esther Short neighborhoods.</li> <li>• In Portland, the BLTS scores of nearly all affected streets would improve to a low stress standing for all travelers, including EJ populations.</li> <li>• <b>Single-Level Movable-Span Configuration:</b> Fewer bridge openings compared to the No-Build Alternative.</li> <li>• <b>Design Option Without C Street Ramps:</b> None.</li> </ul>

Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<p>would accommodate connections with C-TRAN Vine, C-TRAN and TriMet local bus, other TriMet MAX lines, nonmotorized, and park and ride trips.</p> <ul style="list-style-type: none"> <li> <b>Active Transportation Impacts:</b> New shared-use path facilities would enhance safety and comfort of walking, biking, and rolling across the Columbia River along the rebuilt segments of highway and interchanges and new station areas.                     </li> <li> <b>Safety Impacts:</b> Forecast reduction of crashes forecast by 15 to 30 %. Changes in crash types, severities, and locations from modifications to the Columbia River bridges, I-5, ramps, and ramp terminals. In Vancouver, Bicycle Level of Traffic Stress (BLTS) scores of nearly all affected streets would improve to a low stress standing.                     </li> <li> <b>Single-Level Movable-Span Configuration:</b> The Modified LPA with a single-level movable-span configuration would continue to subject transit and active transportation users to delays during bridge openings, even though there would be fewer openings overall compared to the No-Build Alternative.                     </li> <li> <b>Design Option without C Street</b> </li> </ul>		



Environmental Resource	Long-Term Impact Summary for the Modified LPA	Impact Specific to Minority and Low-Income Populations	Benefit Specific to Minority and Low-Income Populations
	<p><b>Ramps:</b> Under this design option, downtown Vancouver I-5 access would be through the Mill Plain interchange rather than C Street. The removal of the C Street ramps could cause additional congestion in at the Mill Plain Boulevard ramps.</p>		
<p>Visual Resources</p>	<p>The scale, form, and materials of the Columbia River bridges and structures would not contrast with the existing visual character. New transit, bicycle, and pedestrian structures would be new visual elements similar in visual character to other proposed elements. New landscape views crossing the Columbia River bridges. An increase in ambient light levels may be perceptible; however, replacement lights would be designed to limit light and glare. New landscape views crossing the Columbia River bridges.</p>	<p>The downtown Vancouver and Ruby Junction landscape units include neighborhoods identified as high-priority EJ areas (Esther Short and Rose Village in Vancouver and Rockwood in Gresham). Changes to visual quality in these areas are expected to be neutral overall, given that there is an existing bridge structure with similar visual characteristics. Changes in Ruby Junction are expected to be low because the added structures and uses are consistent with existing character and uses. Therefore, no disproportionately high and adverse effect has been identified.</p>	<p>None.</p>

## 4.3 Displacements and Community Resources

The data and findings in this section are based on the Acquisitions Technical Report. Table 4-4 summarizes displacements and acquisitions within the study area. The following sections describe residential, commercial, and community resource impacts by location.

Table 4-4. Summary of Displacements and Acquisitions

Location	Full Parcel Acquisitions	Partial Acquisitions	Residential Displacements	Business Displacements
Oregon Mainland	2	20	4	7
Hayden Island	19	20	32	15
Ruby Junction	4	3	0	3
Downtown Vancouver	14	31	0	10
Upper Vancouver	7	58	7	0

### 4.3.1 Oregon Mainland

The Oregon Mainland subarea includes the Bridgeton, East Columbia, and Kenton neighborhoods. Of these, only East Columbia is a meaningfully greater EJ neighborhood (Table 4-5). No residences or community resources would be displaced in the East Columbia neighborhood.

Table 4-5. Oregon Mainland Displacements and EJ Areas

Neighborhood	Residential Displacements	Business Displacements	Low-Income – High Priority	Low-Income – Meaningfully Greater	Minority – High Priority	Minority – Meaningfully Greater
Bridgeton	0	4	No	No	No	No
East Columbia	0	0	No	No	No	Yes
Kenton	4	3	No	No	No	No
Total Displacements	4	7	N/A	N/A	N/A	N/A

The Modified LPA would not separate residents from any identified local community resources or impact the neighborhood’s community cohesion. However, the Modified LPA would impact a portion of the off-lease area associated with East Delta Park to construct a roadway connection between OR 99E and North Denver Avenue. Approximately one acre of this area would be permanently removed; this would not prevent use of the remainder of the off-lease area. Because use of the facility would remain, the reduction in size is not anticipated to impact neighborhood cohesion.

### 4.3.2 Hayden Island

Hayden Island is not in a high-priority or meaningfully greater EJ area. The Modified LPA would fully acquire 18 parcels and partially acquire 20 parcels on Hayden Island, resulting in 32 residential displacements and 13 business displacements (Table 4-6).

Table 4-6. Hayden Island Displacements and EJ Areas

Neighborhood	Residential Displacements	Business Displacements	Low-Income – High Priority	Low-Income – Meaningfully Greater	Minority – High Priority	Minority – Meaningfully Greater
Hayden Island	32	15	No	No	No	No

Property impacts to Hayden Island would result, in large part, from the realignment of I-5 over the island, as well as the reconstruction of North Jantzen and North Hayden Island Avenues and extension of North Tomahawk Island Drive. Nineteen of the 32 residential displacements on Hayden Island would be from Row 9 of the Jantzen Bay Moorage in North Portland Harbor east of I-5 where floating homes are located. The westernmost ramp access to the moorage would also be eliminated, though no floating homes would remain in this moorage following construction. The remaining 13 residential displacements on Hayden Island would occur at Rows A and B and the east side of Row C in the Jantzen Beach Moorage, Inc., located in North Portland Harbor west of I-5. Additionally, a cell phone tower located on the upland parcel associated with the Jantzen Beach Moorage would also be displaced. Although Hayden Island has not been identified as a high-priority or meaningfully greater EJ area, property impacts to the island are notable for comprising the majority of the residential impacts resulting from the Program.

Direct impacts to Hayden Island also have the potential to significantly affect wage-earning opportunities for those seeking service industry employment. The Modified LPA would displace 15 businesses on Hayden Island, with 159 employees affected. Business acquisitions would be comprised of a variety of restaurant, commercial, service, and retail establishments, and some of these displaced businesses may choose to not relocate locally. The majority of businesses that would be displaced by the Modified LPA serve mainly local clientele. There may be minimal parcels on Hayden Island that would be available to relocate displaced businesses due to the level of development on the island. ODOT would work with affected business owners to provide relocation assistance.

Even with relocation assistance, some employees may be unable to retain their jobs. In order to better assess the potential impacts to low-income populations, the project team assessed the low-paying jobs that could be lost as a result of the project. The service and sales sectors are major sources of employment for Hayden Island residents as well as for residents of Vancouver and North Portland. On the whole, food preparation and service-related employers often offer low-wage positions such as dishwashers, cooks, hosts, and counter attendants. According to the Oregon Employment Department, the 5-year average salary of food preparation and service workers within the Portland-Vancouver metro area from 2017 to 2021 was approximately \$24,000 per year (Oregon

Employment Department 2022). Wages within this range would lift all individuals and most small families above the federal poverty guidelines.

### 4.3.3 Ruby Junction Maintenance Facility Expansion

The potential construction of LRT into Vancouver would require an expanded maintenance station in Gresham. TriMet’s existing Ruby Junction maintenance base in Gresham would be expanded to support the extra light-rail service under the Modified LPA.

The Ruby Junction Maintenance Facility expansion would occur within an area of existing light industrial development in the Rockwood neighborhood. It would fully acquire four parcels and partially acquire three partials, resulting in three business displacements and no residential displacements (Table 4-7). Rockwood has nearly double the percentages of both minority and low-income residents and is considered a high-priority EJ area.

Table 4-7. Ruby Junction Displacements and EJ Areas

Neighborhood	Residential Displacements	Business Displacements	Low-Income - High Priority	Low-Income - Meaningfully Greater	Minority - High Priority	Minority - Meaningfully Greater
Rockwood	0	3	Yes	No	Yes	No

Further, the facility expansion acquisitions would impact 16 employees and decrease tax revenue by \$46,000, but it would not affect public services or community resources in the area. Visually, the facility expansion would revise the number of structures, rails, and light-rail vehicles entering or parked at the site, but the scale would look similar to the scale of existing elements.

### 4.3.4 Downtown Vancouver

Downtown Vancouver includes the Esther Short and Hudson’s Bay neighborhoods. Esther Short is a high-priority EJ area for low-income populations. The Modified LPA would fully acquire 14 parcels and partially acquire 29 parcels in Downtown Vancouver, resulting in 10 business displacements and no residential displacements (Table 4-8). Property impacts in Downtown Vancouver would be due in large part to realignments and improvements to local roads and the addition of transit infrastructure through the eastern portion of downtown.

Table 4-8. Downtown Vancouver Displacements and EJ Areas

Neighborhood	Residential Displacements	Business Displacements	Low-Income - High Priority	Low-Income - Meaningfully Greater	Minority - High Priority	Minority - Meaningfully Greater
Esther Short	0	10	Yes	No	No	No
Hudson’s Bay	0	0	No	No	No	No
Total Displacements	0	10	N/A	N/A	N/A	N/A

In Esther Short, the project would displace eight businesses, including Pacific Energy Concepts, as well as the six businesses in the office building on the southeast corner of Columbia Street and West 4th Street. Other partial property acquisitions would occur at the Old Apple Tree Park, Vancouver Police Department, Normandy Apartments, Regal Cinema complex, Providence Academy, and Marshall Park. No displacements would occur as a result of these partial acquisitions, and community resources would not be permanently affected.

Several low-income housing properties are located in Downtown Vancouver, but no residential displacements would occur as part of the project in this subarea. Additionally, the displaced businesses would not disproportionately impact EJ populations, and there would be no impacts to community resources or cohesion.

### 4.3.5 Upper Vancouver

The Modified LPA would fully acquire seven parcels and partially acquire 58 parcels in Upper Vancouver, resulting in seven residential displacements and no business displacements (Table 4-9). Permanent property impacts in Upper Vancouver would be due in large part to freeway interchange improvements and additional sound and noise walls adjacent to I-5.

Table 4-9. Upper Vancouver Displacements and EJ Areas

Neighborhood	Residential Displacements	Business Displacements	Low-Income - High Priority	Low-Income - Meaningfully Greater	Minority - High Priority	Minority - Meaningfully Greater
Arnada	0	0	No	Yes	No	No
Central Park	0	0	No	No	No	No
Hough	0	0	No	No	No	No
Lincoln	0	0	No	No	No	No



Neighborhood	Residential Displacements	Business Displacements	Low-Income - High Priority	Low-Income - Meaningfully Greater	Minority - High Priority	Minority - Meaningfully Greater
Rose Village	0	0	No	Yes	No	Yes
Shumway	7	0	No	No	No	No
West Minnehaha	0	0	No	No	No	No
Total Displacements	7	0	N/A	N/A	N/A	N/A

Most partial acquisitions would be located on residential properties on both sides of I-5 from East 26th Street to East 40th Street and are associated with noise walls and realignment of I-5 between the Fourth Plain and SR 500 interchanges. To accommodate SR 500 ramp configuration, the project would require full acquisition and displacement of seven single-family properties between East 35th Street and East 37th Street west of the freeway. Impacts to residential parcels in this subarea would affect the neighborhoods of Shumway (west of I-5) and Rose Village (east of I-5).

Shumway has similar demographics to the Vancouver neighborhoods within the study area, and it does not have meaningfully greater or high-priority percentages of EJ populations when compared to the Portland-Vancouver region as a whole. Residential displacements and partial acquisitions that would occur in this neighborhood do not represent disproportionately high and adverse impacts to EJ populations.

Rose Village has meaningfully greater percentages of both low-income and minority residents, and it has more than double the percentage of Hispanic or Latino residents as compared to the Portland-Vancouver region. Because no residential displacements would occur in this neighborhood and noise mitigation sound walls would improve noise conditions, no disproportionately high and adverse impacts to EJ populations are anticipated.

No residences would be displaced in the Lincoln or West Minnehaha neighborhoods. However, the Modified LPA would have minor impacts to the Kiggins Sports Fields/Stadium at Discovery Middle School but would not displace any structures or inhibit use of this community resource.

## 4.4 Transportation and Traffic

Transportation and traffic impacts are based on the IBR Transportation Report, which assesses the Modified LPA against both existing conditions and the No-Build Alternative for both the study area and the region.

Year 2045 forecast volumes were developed for the No-Build and Modified LPA, which includes two build alternatives. The only difference between the two build alternatives is one build alternative includes ramps that access Downtown Vancouver via C Street, and the second build alternative does not include the C Street ramps. For purposes of the EJ analysis, transportation and traffic impacts are

described generally for the Modified LPA, and only distinguish between the C Street ramp alternatives when there are potentially adverse and disproportionately high effects to EJ populations resulting from one of the Build alternatives.

Key performance measures for assessing the Modified LPA include changes to vehicle miles traveled (VMT), vehicle hours of travel (VHT), and vehicle hours of delay (VHD). Taken together, these three measures provide insight into future potential traffic volumes, speeds, and delay. These measures can also provide proxy measures to congestion given what is known about vehicle capacity of the existing bridge.

The general findings show that the Modified LPA is expected to reduce regional VMT by approximately 92,700 miles on an average weekday compared with the No-Build Alternative. Forecast VHT is also expected to decrease by 11,100 hours per average weekday regionally. The Modified LPA is also anticipated to reduce VHD by 7,000 hours per average weekday regionally. Table 4-10 summarizes these weekday daily performance measures for the region and study area and includes the total percentage change in each metric that would result from the Modified LPA.

Table 4-10. 2045 Weekday Daily Vehicle Miles of Travel, Vehicle Hours of Travel, and Vehicle Hours of Delay

Alternative	Area	VMT	VHT	VHD
No-Build Alternative	Portland Metropolitan Region	58,835,800	1,793,400	64,000
	Study Area	14,291,000	436,400	24,300
Modified LPA	Portland Metropolitan Region	58,743,200	1,782,300	57,000
	Study Area	14,211,400	424,900	17,000
Percentage Change between Modified LPA and No-Build Alternative	Regional Percentage Change	-92,700 (<-1%)	-11,100 (-1%)	-7,000 (-11%)
	Study Area Percentage Change	-79,600 (-1%)	-11,500 (-3%)	-7,300 (-30%)

Source: Metro/RTC Travel Demand Model.

VHD = vehicle hours of delay; VHT = vehicle hours of travel; VMT = vehicle miles traveled

As seen in Table 4-10, the percentage changes in VMT and VHT resulting from the Modified LPA are modest due to the magnitude of the overall totals. Within the study area these changes represent a slightly greater share of the total miles and hours. In contrast, the percentage change in VHD is more sizable, both regionally and within the study area, partly because congestion in the study area makes up a larger share of total delay within the Portland Metro region. The Modified LPA—which includes highway improvements, transit improvements, active transportation improvements, and tolling—contributes to a sizable reduction in overall vehicle trips through the Program area, which in turn

reduces VHD by approximately 11% for the region and 30% for the study area the compared to the No-Build.

The diffuse regional transportation impacts resulting from the Modified LPA are not anticipated to result in an adverse and disproportional impact to EJ populations. Instead, the modeled reductions in vehicle miles, hours, and delay are expected to yield a net benefit to regional EJ populations traveling through the study area. Any potential adverse effects resulting from the Modified LPA are more likely to be localized to specific transportation facilities or modes.<sup>23</sup>

The following sections summarize transportation and traffic impacts by transportation facilities and modes, consistent with the analysis methodology documented in the Transportation Technical Report.

#### 4.4.1 Local Traffic Impacts

Average weekday daily traffic forecasts for the year 2045 were estimated for the I-5 and I-205 bridges across the Columbia River. Metro/RTC's Regional Travel Demand Model was used to calculate an annual growth rate for the total daily traffic volume crossing the Columbia River on both the I-5 and I-205 bridges combined.

Of the 73 study intersections analyzed, 13 would not meet the applicable jurisdictional level-of-service (LOS)<sup>24</sup> standard in either the AM or PM peak hours. Of these, three intersections are in areas with meaningfully greater or high-priority EJ block groups:

- **Marine Drive/Martin Luther King Jr. Boulevard and I-5 NB/SB On-/Off-Ramps (Intersection #63) – AM, PM.** Future (2045) AM peak-hour results show that these ramps would go from a current LOS of D to F under the Modified LPA. Future (2025) PM peak-hour results show that these ramps would go from a current LOS of D to E under the Modified LPA.
- **Interstate Avenue/Denver Avenue & Schmeer Road (Intersection #71) – PM.** Future (2025) PM peak-hour results show that these ramps would go from a current LOS of A to C under the Modified LPA.
- **Columbia Boulevard and Martin Luther King Jr. Boulevard (Intersection #73) – PM.** Future (2025) PM peak-hour results show that these ramps would go from a current LOS of C to E under the Modified LPA.

Although these adverse traffic impacts are located in areas with a concentration of EJ populations, the nature of these large-scale facility impacts resulting from the Modified LPA would result in similar effects for all travelers using these facilities. Therefore, no disproportionately high and adverse effects on EJ populations resulting from arterial and local street impacts under the Modified LPA are

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<sup>23</sup> It is important to note that in this section, the purported travel time benefits to EJ populations under the Modified LPA are discussed independently from the simultaneous adverse impacts that would result from the proposed IBR tolling program. Some of the reductions in vehicle hours, travel times, and delay in the traffic model would be attributable to the implementation of a tolling program, which would make some populations pursue other means of transportation or avoid trips altogether. The EJ impacts of tolling are discussed further in Section 4.7.

<sup>24</sup> Level of service (LOS) is a term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay, and safety. Refer to the IBR Transportation Technical Report for more information.

anticipated. Mitigation options to offset adverse traffic impacts resulting from these changes to the arterial and local street system are described in Section 7.1.2.1.

#### 4.4.2 Transit Impacts

The Modified LPA would implement HCT across the Columbia River, with options for LRT and Express Bus. The proposed station locations in the Program area would accommodate connections with C-TRAN Vine, C-TRAN and TriMet local bus, TriMet MAX, nonmotorized, and automobile access trips.

*Note: C-TRAN and TriMet have identified conceptual plan or local bus service changes that could be integrated in the Modified LPA. The information provided by these agencies represents a potential condition that could meet the foreseeable transit needs of the study area. It should be noted that actual changes to regional and local bus routes would require agency approval prior to implementation.*

The Modified LPA would extend the existing TriMet Yellow Line from the Expo Center north to a new terminus near Evergreen Boulevard along I-5 in Vancouver. The proposed Evergreen LRT Station would be located in the Esther Short neighborhood—a high-priority EJ area. An overcrossing would be built above I-5 just south of Evergreen Boulevard. The overcrossing would be constructed as a public open space (referred to as the Community Connector) with pedestrian connections between the east and west sides of I-5. The light-rail terminus at the Evergreen Station would be located just west of the Community Connector.

The Yellow Line extension would operate in an exclusive transit guideway with shoulders to provide space for express bus shoulder operations. The Yellow Line LRT between downtown Portland and the Evergreen Station in Vancouver would operate at 5- to-7-minute frequencies during the 2-hour peak period and 15-minute frequencies during middays and evenings, and 30-minute frequencies during the late-night period. These transit improvements are generally anticipated to benefit low-income and minority populations residing in and around Esther Short and Downtown Vancouver.

In addition to the LRT extension, C-TRAN express bus service would be included as part of the Modified LPA with Routes 101, 105, and 190 all using bus-on-shoulder operations for the portions of their routes that run on I-5 through the Program area.

In Portland, one bus route would be modified with the introduction of the Yellow Line LRT extension north of the Expo Center to Vancouver in the Modified LPA. This is TriMet Route 6 that runs on Martin Luther King Jr. Boulevard with service to Hayden Island. Once LRT is extended north to Hayden Island, Route 6 would be truncated to end at the Expo Center LRT station. Hayden Island is anticipated to benefit from the proposed transit improvements. No other TriMet bus routes in Portland would be adjusted as part of the Modified LPA.

In Vancouver, there would be several routes with adjustments as part of the Modified LPA. These routes would be rerouted to have a terminus location in Downtown Vancouver along C Street near 9th Street to provide transfer opportunities to and from the Modified LPA transit services at the Evergreen Station. One route that would be changed as part of the Modified LPA is the Vine bus rapid transit, which would be rerouted in and out of Downtown Vancouver to serve the Evergreen Station via Evergreen and Fort Vancouver Way rather than via McLoughlin Boulevard. Again, these improvements would occur in and around Esther Short—a high-priority EJ area. Therefore, the

long-term impacts of the proposed transit improvements are anticipated to increase transit access and reliability for low-income and minority populations residing and traveling through the study area.

The Modified LPA would use Crime Prevention Through Environmental Design principles to increase public safety of transit elements including best practices for lighting, closed circuit television, fare zone enforcement, and other design standards adopted for both TriMet and C-TRAN. A fire, life, and safety committee would be assembled to review designs. Compliance will be documented through a safety and security certification process for final design and construction phases. These public safety and transit elements would benefit EJ populations throughout the study area, particularly high-priority EJ neighborhoods adjacent to proposed station improvements in North Portland and Downtown Vancouver.

Up to 32,950 daily transit riders would use the proposed transit elements of the Modified LPA. The transit elements of the Modified LPA would provide more reliable transit service benefiting EJ populations who use transit to travel through the study area. No disproportionately high or adverse effects on EJ populations resulting from transit impacts has been identified under the Modified LPA.

### 4.4.3 Active Transportation Impacts

The Modified LPA includes bicycle and pedestrian improvements to serve all ages and abilities on the Columbia River Bridge, as well as facilities to access these bridge connections. The Modified LPA proposes a shared-use path on the lower deck of the I-5 northbound bridge. The shared-use path would range from 16 to 24 feet wide and would be designed to optimize user experience, safety, comfort, and directness. The path transition from the I-5 northbound bridge down to Columbia Way in Vancouver would require extensive ramp distances to span the vertical distance at a grade that meets or exceeds ADA requirements. The design elements of the path would buffer it from vehicular traffic, noise, exposure to street debris, and stormwater. It would be a well-lit, attractive, and comfortable environment for all users. On each end of the bridge, the shared-use path would include improvements to existing and proposed network facilities and would also provide new connections that do not exist today. The path would increase active transportation access for meaningfully greater and high-priority EJ areas such as East Columbia, Kenton, and Esther Short.

Active transportation improvements included in the Modified LPA to streets crossing I-5 in Vancouver within meaningfully greater and high-priority EJ areas are described below and shown on Figure 4-1:

- The terminus of the light rail line (Evergreen Station) would be located in a high-priority EJ area (Esther Short neighborhood). Just to the east of the station would be the Community Connector – a crossing over I-5 that would include off-street pathways for active transportation modes, and public space and amenities to support the active transportation facilities. The Community Connector would address existing gaps in connectivity and neighborhood cohesion created by the past construction and presence of I-5. In addition, the existing I-5 overpass for Evergreen Boulevard would be rebuilt and would include new pedestrian and bicycle facilities to connect to existing routes. The final design of the Community Connector, light rail station, and reconstruction of the Evergreen Boulevard overpass will be coordinated to optimize the active transportation routes, transit operations, and inter-modal transfers. Together, these investments would improve the connection between downtown Vancouver and the VNHR, provide a welcoming pedestrian and bicycle



access point to the transit station from the east side of I-5, and add to the network of public spaces in a high-priority EJ area.

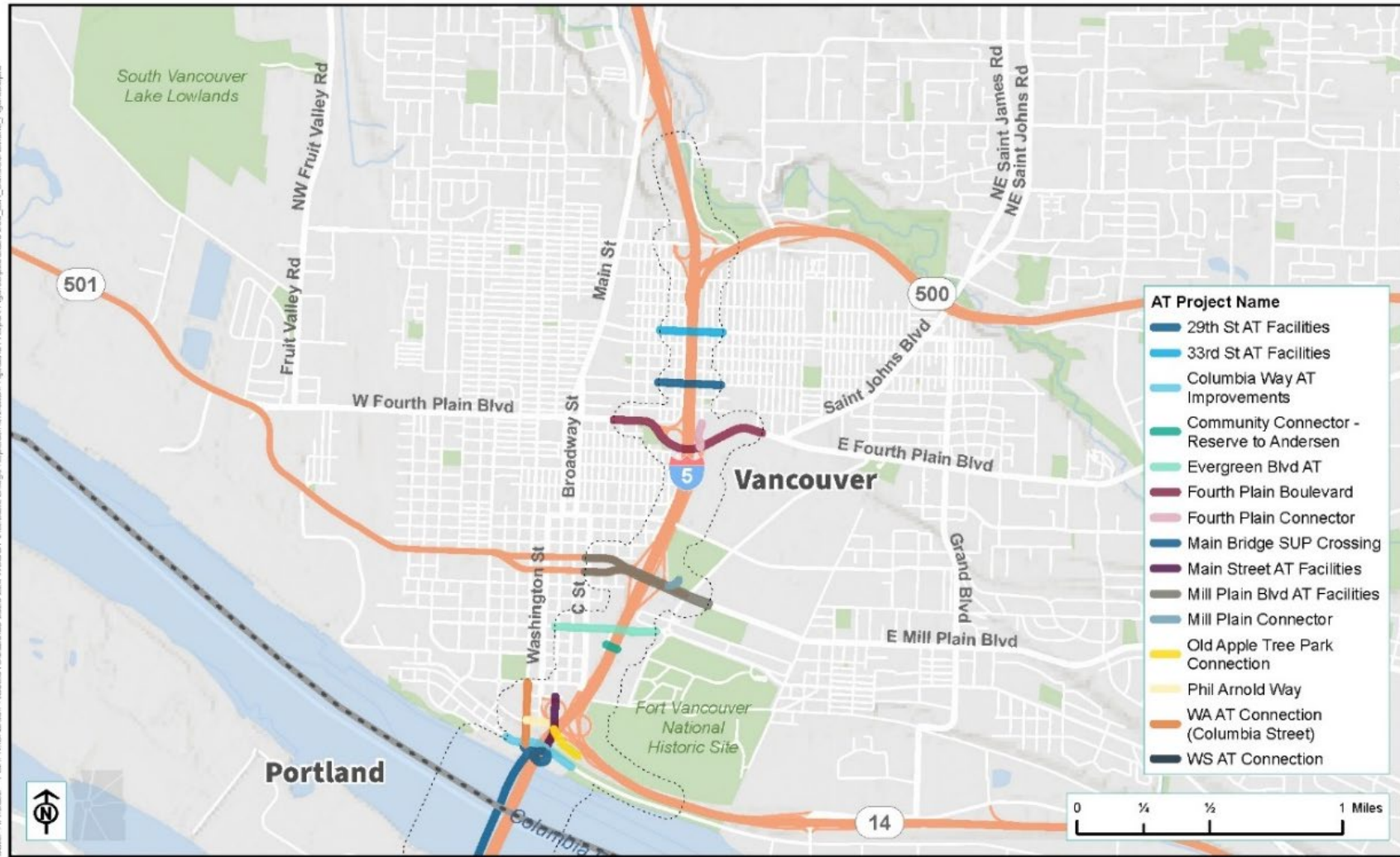
- 
- The Fourth Plain interchange would be rebuilt and would include several improvements for bicyclists and pedestrians, including bicycle facilities and sidewalks, or a shared-use path. North of Fourth Plain Boulevard, a pathway connection to K Street would provide biking and walking access to and from Rose Village and other adjacent neighborhoods. Rose Village and Fourth Plain Village are meaningfully greater EJ areas.

Active transportation improvements to streets crossing I-5 in Portland within meaningfully greater and high-priority EJ areas are described below and shown on Figure 4-2:

- In North Portland, the Modified LPA provides active transportation access to the arterial bridge via a network of shared-use paths. The circuitous path network that winds through the interchange today would be replaced entirely with new simplified path connections offering more direct, clearer navigation for path users. West of I-5, the shared-use path would travel west to an at-grade crossing of the light-rail tracks and connect to the existing Marine Drive Trail (40-Mile Loop) along North Portland Harbor. This path would also provide an important path connection to the proposed Expo Center light-rail station under Marine Drive.
- The proposed configuration of the Marine Drive interchange would be entirely grade separated with I-5, with a local road network and shared-use paths below. Parallel active transportation facilities would provide walking, biking, and rolling with multiple options to travel from one side of I-5 to the other, and for accessing the shared-use path on the North Portland Harbor bridge. These improvements would upgrade existing facilities, create new ones, and connect to local existing walking and biking networks. While the reconstructed Marine Drive would provide bicycle and pedestrian facilities through the interchange, the main east-west crossing for walking and biking trips would be along a new local street and path network below I-5 at ground level. These new facilities would connect to the existing bicycle and pedestrian networks.

The Modified LPA would also upgrade bicycle facilities in the study area by filling gaps in the bikeway and shared-use path network, widening and protecting bicycle lanes where they are replaced, and designing crossings and intersections for bicycle safety. The Modified LPA includes changes that would enhance bicycle safety and comfort where roadways and shared-use paths are constructed. The specific bicycle facility type (buffered, protected, or shared-use path) provided on local streets is not yet defined, but the Modified LPA assumes provision of bicycle facilities on local streets that result in a low stress cycling environment.

Figure 4-1. Proposed Active Transportation Projects in Modified LPA – Vancouver



Source: Alta 2022.

Figure 4-2. Proposed Active Transportation Projects in Modified LPA – Portland



Source: Alta 2022.

Bicycle Level of Traffic Stress (BLTS) was analyzed as part of the transportation analysis to determine the long-term impacts of the proposed bicycle improvements under the Modified LPA. BLTS is an approach that quantifies the amount of discomfort that bicyclists feel when they bicycle close to traffic. A BLTS score of “1” refers to a “very low stress” environment equivalent to neighborhood streets, cycle tracks, and trails; a score of “4” refers to a “high-stress” environment, equivalent to bicycling in traffic on 40+ mile-per-hour roads. Table 4-11 and Table 4-12 summarize BLTS scores for bicycle facility and crossing improvements under the Modified LPA for Vancouver and Portland, respectively.

In Vancouver and Portland, BLTS scores of most affected streets would improve to a “low stress” standing with the Modified LPA. In other cases, the Modified LPA would create entirely new cross-river bicycle connections that do not exist today. These improvements to the bicycle system would have a major effect on the quality of local network connections across and around the I-5 corridor and access to the Interstate Bridge, and are anticipated to benefit EJ populations traveling through the study area. No adverse and disproportionately high effects to EJ populations as a result of the anticipated active transportation impacts have been identified under the Modified LPA.

Table 4-11. BLTS Scores for No-Build Alternative and Modified LPA in Vancouver

Crossing Location	Existing	Modified LPA	No-Build BLTS Score	Modified LPA BLTS Score
E Columbia Way (Waterfront Renaissance Trail)	Shared use path on one side of undercrossing, striped bicycle lane on the north side	Upgrades to the shared-use path on one side of undercrossing, to coincide with Columbia Way realignment.	1	1
Phil Arnold Way (extension)	N/A – Does not currently exist	New shared-use path along south side of Phil Arnold Way extension between Columbia Street and Main Street.	N/A	2
Old Apple Tree Park Path Connection	N/A – Does not currently exist	New shared-use path connection between new Phil Arnold Way extension and Old Apple Tree Park. Connects to the Vancouver Land Bridge.	N/A	1
Community Connector	N/A – Does not currently exist	A new structure, up to approximately 250 feet wide, would provide a pedestrian and bicycle connection between 8th/Reserve Street to Anderson Street.	N/A	1



Crossing Location	Existing	Modified LPA	No-Build BLTS Score	Modified LPA BLTS Score
E Evergreen Boulevard	Striped bicycle lanes, both sides of overcrossing	Buffered/protected bike lanes, on both sides of overcrossing.	2	1
Mill Plain Boulevard	Striped bicycle lanes, both sides of undercrossing	Buffered bike lanes, both sides of undercrossing.	4	2
E McLoughlin Boulevard	Striped bicycle lanes, both sides of undercrossing	No change to existing.	2	2
E Fourth Plain Boulevard	No bicycle facility	Eastbound and westbound buffered bicycle lanes.	4	2
E 29th Street	No bicycle facility	Buffered bike lanes on both sides of overcrossing.	2	1
E 33rd Street	No bicycle facility	Buffered/protected bike lanes on both sides of overcrossing.	3	1

BLTS = bicycle level of traffic stress; N/A = not applicable

Table 4-12. BLTS Scores for No-Build Alternative and Modified LPA in Portland

Crossing Location	Existing	Modified LPA	No-Build BLTS Score	Modified LPA BLTS Score
N Victory Boulevard	None	No change.	4	4
Marine Drive	None	Protected bike lanes through the proposed single point urban interchange. This becomes a secondary east-west connection across I-5 in North Portland.	4	2
Northbound I-5 on-ramp, undercrossing of I-5	Narrow shared-use path on one side	N/A – This facility and crossing is removed in proposed interchange configuration but replaced with new N Pier 99 Street shared-use path in the build.	1	N/A
N Pier 99 Street	None	Shared-use path on north side of realigned Pier 99 Street connecting Expo Road and	2	1



Crossing Location	Existing	Modified LPA	No-Build BLTS Score	Modified LPA BLTS Score
		Vancouver Way. This becomes the primary east-west crossing of I-5 in N Portland.		
N Janzen Street	None	New shared-use path on south side of Jantzen Drive.	3	1
Tomahawk Island Drive	N/A – Does not current exist	Shared-use path or sidewalks on both sides of the street.	N/A	2
N Hayden Island Drive	Narrow striped bike lanes	Buffered/protected bike lanes or shared-use path.	1	1

BLTS = bicycle level of traffic stress; N/A = not applicable

### 4.4.4 Safety Impacts

The transportation analysis estimated yearly crash frequency for the 2045 Modified LPA. The analysis was done using hours of congestion and the individual hour crash rates during uncongested and congested time periods. The results of this analysis comparing the No-Build to the Modified LPA in the southbound and northbound directions are summarized in Table 4-13.

Table 4-13. Estimated Yearly Crash Frequency for the 2045 Modified LPA

Scenario	Hours Where I-5 is Operating at Capacity	Total Crashes
Southbound: No-Build	8	270
Southbound: Modified LPA	3	230 (15% decrease)
Northbound: No-Build	17	290
Northbound: Modified LPA	4	210 (27% decrease)

As reported in Table 4-13, the Modified LPA is forecast to reduce the number of crashes forecast to occur compared to the No-Build Alternative by 15 to 27 percent.

In addition to anticipated changes to crash frequencies based on fewer hours where I-5 is operating at capacity, crash types, severities, and locations would likely change due to improvements made to the Interstate Bridge, I-5 mainline, ramps, and ramp terminals in the Modified LPA scenario.

Improvements included in the Modified LPA that are likely to influence future safety conditions are:

- Removal of closures of the I-5 mainline at the Interstate Bridge due to bridge opening events.
- I-5 mainline lanes and shoulders built to full design standards.

- Ramp reconfigurations to remove non-standard design elements, including short merge distances and ramp weaves.
- Bicycle and pedestrian improvements along the Interstate Bridge, at ramp terminals, and across I-5, including new shared-use paths, improved crossings at ramp terminals, new connections to on-street bicycle facilities, and enhanced signage.

These changes are generally expected to improve safety for all travelers through the study area, including EJ populations. No disproportionately high or adverse effects on EJ populations resulting from impacts to safety have been identified under the Modified LPA.

## 4.5 Air Quality

The air quality analysis evaluated data and information regarding the emissions of pollutants as required by current federal regulations and state guidelines for the study area and region. Pollutant emissions for Mobile Source Air Toxics and criteria pollutants were estimated for existing conditions (2015), the Modified LPA (2045), and No-Build Alternative (2045). These estimates were developed at a regional level; because the study area is in compliance with applicable air quality standards, no air quality impact analysis was performed for smaller geographies.

For future conditions under the Modified LPA, Mobile Source Air Toxics and criteria pollutant emissions for the region are expected to decrease consistent with national trends. This is due to the implementation of fuel and engine regulations that would improve fuel efficiency (see the Air Quality Technical Report for more information). The Modified LPA would also result in no exceedances of National Ambient Air Quality Standards.

Under the Modified LPA, air quality would improve for the region. The level of available data precludes analysis of localized air quality impacts within smaller geographies, such as the meaningfully greater or high-priority EJ areas.

## 4.6 Noise and Vibration

According to the Noise and Vibration Technical Report, in Portland one or more sensitive receptors at the Jantzen Beach RV Park would experience a 10 dBA increase in noise levels, which ODOT defines as a “substantial increase” when comparing existing noise levels to future build noise levels. However, the increase at this location would still remain well below ODOT’s Noise Abatement Criteria. Jantzen Beach RV Park is not located in a meaningfully greater or high-priority EJ area.

In Vancouver, substantial noise impacts, with increases of up to 12 dBA over existing noise levels, are predicted at up to six residences located at between E 33rd Street and E 35th Street, where the Modified LPA would shift I-5 southbound on-ramps west, closer to residents. This area is within the Rose Village neighborhood, which is a meaningfully greater EJ area. Under the Modified LPA, noise levels would range from approximately 50 to 76 dBA. According to the Occupational Safety and Health Administration Occupational Noise Exposure Chart which relates decibel levels to common sounds as examples, noise levels under the Modified LPA would range between an urban residence, conversation 3 feet away, classroom chatter, and a freight train 100 feet away (Table 4-14).

Table 4-14. OSHA Occupational Noise Exposure Chart

Sound Level (dBA)	Example Setting
140	Threshold of pain
130	Jet taking off (200 feet away)
120	Operating heavy equipment
110	Night club (with music)
100	Construction site
90	Boiler room
80	Freight train (100 feet away)
70	Classroom chatter
60	Conversation (3 feet away)
50	Urban residence
40	Soft whisper (5 feet away)
30	North rim of Grand Canyon
20	Silent study room
10	N/A
0	Threshold of hearing (1000 Hz)

OSHA 2023  
 dBA = A-weighted decibel; Hz = Hertz

## 4.7 Tolling

Toll revenue would play an important role in the IBR Program by helping manage traffic congestion across the Columbia River and providing a crucial funding source for capital improvements, operations, and maintenance. The OTC and WSTC will collectively set toll rates and determine the details of related policies, including a potential low-income program, prior to the implementation of tolling. To generate initial estimates of both gross and net toll revenues, the IBR Program developed a set of seven variable-price toll rate scenarios. These seven toll rate scenarios were then further organized into two “base-case” variable toll rate schedules under the Modified LPA over a 40-year period.

For the purposes of the EJ analysis, these two base-case variable toll rate schedules were used to evaluate the potential impact of tolling on EJ populations under the Modified LPA. The base-case variable toll rate schedules are summarized in Table 4-15 below.

Table 4-15. Toll Rate Scenario Schedules under the Modified LPA

North and Southbound Toll Schedule	Variable Toll Rate Range <sup>a</sup>
Scenario A Base Toll Schedule	\$2.15 to \$3.55
Scenario B Base Toll Schedule	\$1.50 to \$3.15

a Tolls are in 2025 / Fiscal Year 2026 dollars and are assumed to escalate by 2.15% per year.

As shown in Table 4-15, the proposed toll rate schedules would have a variable toll structure, charging different toll amounts for the peak and the non-peak periods.

- Scenario A Base Toll Schedule assumes tolls ranging from \$2.15 to \$3.55 based upon time of day, expressed in FY 2026 (calendar year 2025) dollars. The minimum toll of \$2.15 is assumed all day on weekends. Since overnight tolling is not assumed to begin until the new bridge is completed, the effective weekday minimum toll between 5 a.m. and 11 p.m. is \$3.00. Once the new bridge opens, an overnight toll of \$2.15 in FY 2026 (calendar year 2025) dollars was assumed.
- Scenario B Base Toll Schedule assumes tolls ranging from \$1.50 to \$3.15 in FY 2026 (calendar year 2025) dollars, with the \$1.50 minimum applying all day on weekends. Similarly, until overnight tolling is assumed to commence on the new bridge, the effective weekday minimum toll assumption between 5 a.m. and 11 p.m. is \$2.05.
- The toll rate schedules generally assume that the toll rates would increase by 2.15% annually throughout the forecast period to keep pace with price inflation.

Variable-priced tolling schemes have the potential to reduce overall congestion and regulate traffic flows. This is because, in part, drivers with greater schedule flexibility and more sensitivity to out-of-pocket costs would choose to travel during the non-peak period to pay a lower toll, while drivers with less flexible schedules, carrying valuable or time-sensitive goods, would be less sensitive to the out-of-pocket cost of the toll and would travel during whatever period was dictated by their schedules. Depending on specific tolling schemes and transit fare structures, some of the population most sensitive to out-of-pocket costs may shift to transit.

The above toll rate schedules are intended for study purposes only, to inform financial planning, and do not represent final rates or policies. In addition to the two tolling scenarios currently being analyzed, other scenarios may be analyzed, including a potential low-income toll program. Both ODOT and WSDOT are actively studying policy frameworks and pricing options for reduced toll rates for eligible users.

Toll rates and policies will be determined jointly by the OTC and WSTC after a more robust analysis and a public process, and in a way that ensures toll revenues are sufficient to meet their required financial obligations while balancing objectives to address peak period congestion and the concerns of low-income travelers.

The application of a variable toll pricing scheme to the IBR Program would add an out-of-pocket cost to trips over the bridges and is expected to result in an overall reduction in bridge crossings for the Modified LPA with tolling, compared to the Modified LPA with no toll and the No-Build Alternative.

A toll on I-5 is expected to reduce travel times and improve travel time reliability because some drivers would avoid making a river crossing or switch to transit instead. For many, the value of time saved from reduced congestion would be greater than the out-of-pocket cost of the toll, creating a user benefit that would translate into greater efficiency and increased business productivity. This can make a location more attractive for business and residential development and improve opportunities for trade.

### 4.7.1 Burden of Tolling on EJ Populations

If not mitigated, tolling would adversely impact EJ populations (primarily low-income populations) in two principal ways: the cost of tolling and method of payment. The following sub-sections describe these potential impacts in more detail. Chapter 7 of this technical report describes recommended mitigation strategies.

#### 4.7.1.1 The Cost of Tolling

To evaluate the impact of tolling on EJ populations, the analysis compares median household income to the proportion of income spent on paying tolls. This analysis conservatively estimated that motorists would travel over the bridge twice a day for 262 working days per year<sup>25</sup> using the upper range of the variable toll rate schedules in Table 4-15 above. The estimated annual costs associated with each toll scenario are summarized in Table 4-16 below.

Table 4-16. Annual Estimated Cost of Tolling

Toll Scenario	Toll Rate	Annual Cost
Scenario A	\$3.55	\$1,860
Scenario B	\$3.15	\$1,650

Using the proposed tolling rates presented in Table 4-16, proportions were calculated for the Portland-Vancouver region and the study area, then compared to the federal poverty level (Table 4-17).

<sup>25</sup> Maximum yearly working days are based on a 1981 General Accounting Office study referenced by the U.S. Office of Personnel Management. Available at: <https://www.opm.gov/policy-data-oversight/pay-leave/pay-administration/fact-sheets/computing-hourly-rates-of-pay-using-the-2087-hour-divisor/>



Table 4-17. Tolling Analysis for Portland-Vancouver Region – Annual Estimated Cost Scenarios

Area	Median Household Income	Scenario A Proportion of Income	Scenario B Proportion of Income
Portland-Vancouver MSA	\$77,511	2.4%	2.1%
Study Area	\$83,943	2.2%	1.9%
Federal Poverty Level (four-member household)	\$27,750	6.7%	5.9%

Source: 2016–2020ACS 5-Year Estimates (U.S. Census Bureau 2022a).

The analysis above was repeated for all census block groups in the study area that have a meaningfully greater or high-priority percentage of low-income residents (1.5 times and 2 times the regional percentage, respectively). The proportion of income that would be spent on tolls for each of these block groups was compared to the proportion of income that would be spent on tolls by households at the federal poverty level, as shown in Table 4-17. Block groups where the proportion of income spent on tolls would be higher than households at the poverty level (6.7% and 5.9% for Scenarios A and B, respectively) were considered impacted. Table 4-18 shows the results for block groups in Portland, and Table 4-19 shows the results for block groups in Vancouver.

Table 4-18. Tolling Impact Analysis for Portland Block Groups – Annual Estimated Cost Scenarios

Block Group	Percent Low-Income	Median Household Income	Scenario A Proportion of Income	Scenario B Proportion of Income	Impact?
410510072023	66.2% <sup>a</sup>	\$49,621	3.7%	3.3%	No
410510034014 <sup>b</sup>	54.5% <sup>a</sup>	\$23,502 <sup>c</sup>	7.9% <sup>c</sup>	7.0% <sup>c</sup>	Yes <sup>c</sup>
410510022034	53.0% <sup>a</sup>	\$40,156	4.6%	4.1%	No
410510035011	44.8% <sup>d</sup>	\$55,469	3.4%	3.0%	No
410510021012	44.0% <sup>d</sup>	\$43,701	4.3%	3.8%	No
410510033012	42.1% <sup>d</sup>	\$41,563	4.5%	4.0%	No
410510033013	41.9% <sup>d</sup>	\$55,469	3.4%	3.0%	No
410510037011	40.1% <sup>d</sup>	\$42,852	4.3%	3.9%	No
410510039043	37.5% <sup>d</sup>	\$62,440	3.0%	2.6%	No
410510034012	36.4% <sup>d</sup>	\$106,429	1.7%	1.6%	No

Block Group	Percent Low-Income	Median Household Income	Scenario A Proportion of Income	Scenario B Proportion of Income	Impact?
410510023031	36.2% <sup>d</sup>	\$78,250	2.4%	2.1%	No
410510037014	36.2% <sup>d</sup>	\$88,368	2.1%	1.9%	No

Source: 2016–2020 ACS 5-Year Estimates (U.S. Census Bureau 2022a)

- a Value is 2 times the regional average (Portland-Vancouver metropolitan area).
- b This block group was identified as having a higher proportion of tolling costs (see numbers with footnote c) than the federal poverty level.
- c See note above.
- d Value is 1.5 times the regional average (Portland-Vancouver metropolitan area).

In Oregon, there was one block group within the study area (410510034014) that was identified as having a higher proportion of tolling costs than the federal poverty level. This block group was already identified as having a high-priority percentage of low-income residents and is located in the Humboldt neighborhood, which also has a high-priority percentage of Black or African American residents when compared to the Portland-Vancouver region (Table 3-19).

Table 4-19. Tolling Impact Analysis for Vancouver Block Groups – Annual Estimated Cost Scenarios

Block Group	Percent Low-Income	Median Household Income	Scenario A Proportion of Income	Scenario B Proportion of Income	Impact?
530110423002 <sup>a</sup>	64.6% <sup>b</sup>	\$14,800 <sup>c</sup>	12.6% <sup>c</sup>	11.1% <sup>c</sup>	Yes <sup>c</sup>
530110427002	60.1% <sup>b</sup>	\$41,000	4.5%	4.0%	No
530110424001	55.4% <sup>b</sup>	\$40,208	4.6%	4.1%	No
530110424002 <sup>a</sup>	54.3% <sup>b</sup>	\$24,432 <sup>c</sup>	7.6% <sup>c</sup>	6.8% <sup>c</sup>	Yes <sup>c</sup>
530110409044	53.9% <sup>b</sup>	\$35,313	5.3%	4.7%	No
530110410072	52.9% <sup>b</sup>	\$64,671	2.9%	2.6%	No
530110408092	51.5% <sup>b</sup>	\$45,696	4.1%	3.6%	No
530110427001	51.2% <sup>b</sup>	\$43,324	4.3%	3.8%	No
530110417002	42.6% <sup>d</sup>	\$50,915	3.7%	3.2%	No
530110410092	41.7% <sup>d</sup>	\$40,909	4.5%	4.0%	No
530110425001	40.1% <sup>d</sup>	\$56,204	3.3%	2.9%	No
530110417001	39.7% <sup>d</sup>	\$48,929	3.8%	3.4%	No

Block Group	Percent Low-Income	Median Household Income	Scenario A Proportion of Income	Scenario B Proportion of Income	Impact?
530110418002	39.3% <sup>d</sup>	\$51,875	3.6%	3.2%	No
530110410112	39.1% <sup>d</sup>	\$73,031	2.5%	2.3%	No
530110418001	37.1% <sup>d</sup>	\$49,141	3.8%	3.4%	No
530110423001	36.8% <sup>d</sup>	\$46,921	4.0%	3.5%	No
530110425002	36.4% <sup>d</sup>	\$46,500	4.0%	3.5%	No
530110410101	36.3% <sup>d</sup>	\$52,699	3.5%	3.1%	No

Source: U.S. Census Bureau 2022a, ACS 5-Year Estimates (2016–2020)

- a This block group was identified as having a higher proportion of tolling costs (see numbers with footnote c) than the federal poverty level.
- b Value is 2 times the regional average (Portland-Vancouver metropolitan area).
- c See a.
- d Value is 1.5 times the regional average (Portland-Vancouver metropolitan area).

In Vancouver, there were two block groups within the study area (530110423002 and 530110424002) that were identified as having a higher proportion of tolling costs than the federal poverty level. These block groups both have high-priority percentages of low-income residents, and they are located in the Hough and Esther Short neighborhoods. Esther Short has a high-priority percentage of Black or African American and Native American or Alaska Native residents when compared to the Portland-Vancouver region (Table 3-20).

An additional analysis was performed to evaluate the percentage of overall household income that low-income households would spend on transportation under the No-Build Alternative and the Modified LPA relative to the median household (Table 4-20). Average household incomes were compared in Portland and Vancouver for four-member households meeting the 2022 federal poverty guideline of \$27,750, and low-income households at 200% of the federal poverty guideline (\$55,500). For the purposes of this analysis, the average annual cost (\$1,755) of the two toll rate scenario schedules described in Table 4-16 was used.

Table 4-20. Tolling Impact as Percentage of Household Income Spent on Transportation

Area	Median Household Income	Percentage of Income Spent on Transportation without the Toll (No-Build)	Percentage of Income Spent on Transportation with the Toll (Modified LPA)	Percentage Change (Cost of Transportation as Percentage of Income)
Portland	\$78,476	14%	16%	+2%
Vancouver	\$67,462	16%	19%	+3%
Federal Poverty Level (four-member household)	\$27,750	29%	35%	+6%
200% Poverty (Low-Income)	\$55,500	<b>15%</b>	<b>18%</b>	<b>+3%</b>

Source: U.S. Census Bureau 2022a, ACS 5-Year Estimates (2016–2020)

Under the No-Build Alternative, the average household in Portland and Vancouver spends between 14% and 16% of total household income on transportation.

Under the Modified LPA, the percentage of total household income spent on transportation would be higher than the percentage spent under the No-Build Alternative for households at all income levels, increasing by approximately 2% in Portland and 3% in Vancouver.

- For median-income households in Portland and Vancouver, the increase in household transportation cost would be relatively small, increasing from 14% to 16% of total household income in Portland and from 16% to 19% of total household income in Vancouver. These increases would result in an average annual household transportation cost of \$12,645.
- For four-member households in Portland and Vancouver meeting the federal poverty guideline, the percentage of household income spent on transportation would be approximately twice that of median-income households. Since households at the poverty threshold already spend a relatively larger proportion of household income on transportation, the effect of tolling would be greatest on this population, with transportation costs increasing from approximately 29% of total household income under no-build alternative to 35% of total household income under the Modified LPA. Tolling costs would result in an annual household transportation expenditure of approximately \$9,803 for four-member households at or below the federal poverty level.
- Low-income households at 200% of the federal poverty guideline would experience a similar increase in household transportation cost as the general population of approximately 3%. Tolling costs would result in an annual household transportation expenditure of approximately \$10,080 for low-income households.

Under the Modified LPA, all households in the region would experience an increase in the proportion of total household income spent on transportation. The increased transportation costs of approximately 2% to 3% under the Modified LPA would result in an average transportation expenditure of approximately \$10,843 per household per year. The analysis suggests that households at or below the federal poverty guideline would be the most substantially impacted populations under a future tolling program.

#### 4.7.1.2 Method of Payment

The method of payment for a potential tolling program across the new Interstate Bridge has not been determined. Typically, highway users would either have to travel to a customer service center to set up an account, use an electronic toll collection system with transponders, or have their license plate automatically photographed and receive by mail a bill for the toll with a surcharge added. A transponder model has the potential to present a burden to low-income and minority populations due to the up-front cost of and technical requirements of purchasing and setting up a transponder.

### 4.7.2 Tolling Conclusions and Implications for the Modified LPA

This section has discussed potential impacts for tolling the bridges based on an assessment of the benefits and the specific burdens of tolling on EJ populations. Disproportionally high and adverse impacts to EJ populations as a result of tolling under the Modified LPA have been identified in some block groups.

For most low-income populations, the adverse impacts of tolling would be counterbalanced by the project benefits and options to avoid the toll:

3. There would be viable options to avoiding the toll (e.g., transit, carpooling, rerouting) for those with practicable and feasible options.
4. The benefits of improvements to trip reliability and speeds would offset the burden of the tolls.<sup>26</sup>
5. There is no evidence that the improvements funded by the toll would disproportionately benefit higher-income or non-minority populations.
6. Revenues from tolling would contribute to the completion of the project and related investments, including improvements to regional transit, walking, and bicycling infrastructure. Because low-income populations tend to use transit at a higher rate than the general population, improvements in transit speeds and reliability would contribute to offsetting the burden of the tolls.

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<sup>26</sup> While it is important to note that many low-income populations would benefit greatly from a faster, more reliable trip, environmental justice principles hold that to offset a disproportionately high and adverse effect on low-income populations, the benefit also needs to disproportionately affect low-income populations. In this case, the benefits of a faster, more reliable trip apply to all populations and not just low-income populations.



However, the project benefits and the options described above to avoid the toll are not accessible for all impacted EJ populations (or impacted members of the general population). Employment, school, and/or childcare schedules may make these alternative transportation modes impracticable for many, and some EJ populations would need to pay to drive across the bridge. Therefore, some adverse impacts would persist and mitigation would be required.

Adverse impacts resulting from tolling can be mitigated through proactive policies, such as low-income toll policy programs and equitable tolling policies and practices. Although these policies are still a work in progress as they would specifically apply to the IBR Program, WSDOT and ODOT are actively engaged in work to develop and implement equitable tolling systems, including:

- [The Oregon Tolling Program I-205 and I-5 Toll Project's Equity Framework](#) (2023). The Oregon Transportation Commission has advanced key elements of a low-income toll program – the first of its kind in the nation – that will serve low-income travelers who cannot change their travel schedules or who travel frequently on interstate facilities. The program will balance impacts to other travelers while still achieving overall program goals to reduce traffic congestion and raise revenue for transportation improvements. Key commitments include at least a 50% discount on tolls for customers in Oregon or Washington whose household income is up to 200% of the federal poverty level and exemptions for federally recognized tribes and tribal government vehicles.
- [WSDOT Low-Income Toll Program Study for I-405 & SR 167 Express Toll Lanes](#) (2021). WSDOT has developed a range of program options and evaluation metrics to assess toll discount program options to benefit equity populations. Options include percentage-based and fixed-rate discounts per trip, time-based toll credits, free toll trips, and lowering the maximum toll rate.

Based on the analysis of tolling impacts above, it is anticipated that tolling on the IBR Program would result in disproportionately high and adverse effects to some EJ populations within the region. Project benefits such as reduced travel times and tolling revenues to pay for multimodal improvements in the region would help counterbalance these adverse effects. Mitigation of disproportionately high and adverse effects would be required in the form of an equitable and/or low-income tolling program to be developed jointly by the OTC and WSTC.

## 5. TEMPORARY EFFECTS

### 5.1 No-Build Alternative

There would be no temporary effects on EJ populations under the No-Build Alternative.

### 5.2 Modified LPA

Construction of the Modified LPA is expected to last up to 15 years, impacting all modes of transportation within the IBR Program area as well as adjacent corridors. Temporary effects including road closures, detours, and construction-related delays resulting from construction-related activities and would occur throughout the IBR Program area to varying degrees.

The major construction activities and timing for the IBR Program are summarized below:

- Columbia River bridges – 4 years.
- Hayden Island and SR 14 interchanges – 1.5 to 4 years for each interchange.
- Marine Drive interchange – 3 years.
- Demolition of the existing I-5 Interstate Bridges – 1.5 years.
- Mill Plain, Fourth Plain, and SR 500/39th Street interchanges – 4 years for all three interchanges in total.
- MAX Yellow Line light-rail extension – 4 years.

Construction impacts to EJ populations could include increased congestion, reduced mobility, reduced transit service, increased response time for emergency services, and increased noise. Temporary congestion during construction may impact EJ populations in the study area and the organizations that serve them. These populations and organizations are heavily reliant on transit, whose service could be affected by construction-related congestion.

The analysis identified a potential for disproportionately high and adverse effects on EJ populations with regard to noise (specifically in the East Columbia and Esther Short neighborhoods) and transportation (as a result of transit disruptions and temporary closures of cross-river bicycle and pedestrian facilities). Disproportionately high and adverse effects on EJ populations are not anticipated for the other impact categories evaluated. Table 5-1 below summarizes these temporary impacts to minority and low-income populations associated with the Modified LPA.

Table 5-1. Summary of Potential Temporary Effects for the Modified LPA

Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
Acquisitions, Displacements, and Relocations	<p>Temporary construction easements and staging areas for each project subarea are:</p> <ul style="list-style-type: none"> <li>• Oregon Mainland: 12 parcels; 45 acres.</li> <li>• Hayden Island: 3 parcels; 13.2 acres.</li> <li>• Downtown Vancouver: 51 parcels; 6.7 acres.</li> <li>• Upper Vancouver: 20 parcels; 4.8 acres.</li> <li>• Ruby Junction Maintenance Facility Expansion: None.</li> </ul> <p>Two sites have been identified as possible major construction staging areas that could be temporarily acquired or leased:</p> <ul style="list-style-type: none"> <li>• Vacant Thunderbird Hotel site (Hayden Island): 3.5 acres. The hotel site, in addition to 13.2 acres on Hayden Island, would constitute the largest staging area for the IBR Program.</li> <li>• Former WSDOT rest area along I-5 in Vancouver: 5 acres.</li> </ul>	<p>Temporary construction easements would occur at two properties in downtown Vancouver identified as providing low-income housing: Evergreen Inn and Lewis and Clark Plaza. Downtown Vancouver includes the Esther Short neighborhood, a high-priority EJ area. No residential or business displacements would occur as a result of these temporary construction easements. Activities at the sites would consist of temporary staging for construction and equipment and other construction support activities. These temporary construction easements would result in a disproportionately high and adverse effect on EJ populations.</p>
Air Quality	<p>Short-term impacts to air quality from construction activities would occur during the construction period. Construction-related activities would result in increased 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). Dust emissions typically occur during dry weather, ground-disturbing construction activities, or high wind conditions. Air quality may also be affected by exhaust emissions from material delivery trucks, construction equipment, and workers' private vehicles.</p>	<p>The anticipated temporary air quality impacts within the study area are not expected to result in a disproportionately high and adverse effect on EJ populations because construction-related air quality impacts would be the same for EJ populations as the general population.</p>

Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
Land Use and Economics	<p>Construction has the potential to cause negative economic effects by blocking visibility and access to businesses, resulting in patrons choosing other locations for goods and services. Construction can also cause traffic delays and detours that increase travel times, increase the cost of deliveries, and make access to some locations difficult. Construction activities and temporary detours could extend the peak period traffic congestion, negatively impacting businesses whose employees commute using the I-5 corridor. Likewise, the movement of freight, goods, and services could be negatively affected if construction activities make travel times longer and/or less predictable due to increased traffic and congestion.</p>	<p>Adverse land use and economic impacts (excluding acquisitions and displacements) would not be experienced disproportionately by meaningfully greater and high-priority EJ neighborhoods within the study area compared to the general population. Similarly, freight impacts would impact EJ populations the same as the general population. Therefore, no disproportionately high and adverse temporary land use and economic impacts to low-income and minority populations have been identified.</p>
Noise and Vibration	<p>All neighborhoods in the study area could experience temporary noise and vibration increases from construction equipment and activities, particularly in areas adjacent to I-5.</p>	<p>Although the entire study area would be impacted by increased noise and vibration, some areas with higher concentrations of EJ populations could be impacted disproportionately. Particularly high levels of noise and vibration from pile driving activities are anticipated near the Interstate Bridge span. However, additional noise and vibration impacts are also anticipated within the East Columbia and Esther Short neighborhoods, which are high-priority and meaningfully greater areas. Therefore, noise and vibration impacts would result in disproportionately high and adverse effects to EJ populations in these neighborhoods.</p>

Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
Social and Neighborhood Effects	<p>Neighborhood quality and cohesion could be negatively affected throughout the construction period. All neighborhoods in the study area could experience temporary congestion, traffic detours, noise, air quality impacts, and increases in truck traffic during construction, particularly in the areas immediately adjacent to I-5. The use of temporary construction staging would minimize some of these negative impacts. The net impact of air, traffic, noise, and construction impacts would constitute social and neighborhood effects within the study area.</p>	<p>Neighborhood quality and cohesion impacts would be experienced throughout the study area, and impacts to EJ populations are anticipated to be the same as to the general population. Furthermore, the negative impacts that have been identified would be reduced through the use of construction staging. Therefore, disproportionately high and adverse effects to EJ populations have not been identified.</p>



Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
Tolling	<p>Pre-completion tolling would be implemented on the Interstate Bridge when construction begins. This tolling is expected to occur between 5 a.m. and 11 p.m.; overnight hours would not be tolled, as construction activities may reduce the number of lanes travelers could use. Pre-completion tolling would have impacts similar to those of long-term tolling for travelers except during the overnight hours.</p>	<p>I-5 is currently not tolled and there are currently no plans to toll the bridge independently of IBR. Pre-completion tolling would have similar impacts on EJ populations as long-term tolling. It is anticipated that pre-completion tolling would result in a lesser impact than long-term tolls given that pre-completion tolling would only occur between 5 a.m. and 11 p.m. EJ populations traversing the I-5 bridge during the overnight hours would not be tolled. Although the impacts resulting from pre-construction tolling would be reduced compared to long-term tolls, any tolling over I-5 would still impact low-income populations disproportionately compared to the general public. Furthermore, it is uncertain whether a low-income or equitable tolling program would be operational during construction, or if it would not be launched until post-construction. Therefore, in lieu of tolling mitigation there is a potential for pre-condition tolling to result in a greater impact to EJ populations than a long-term toll and associated low-income tolling program. Therefore, pre-completion tolling is anticipated to result in a disproportionately high and adverse effect on EJ populations travelling across I-5 during the construction period.</p>
Transportation	<p>Construction would result in temporary bridge closures, highway lane closures, bus stop relocations, light-rail station closures, partial or full temporary closures of park-and-ride facilities, and rerouting of sidewalks and bicycle lanes. Traffic diversion during construction would lead to higher traffic volumes on detour streets, which could lead to a temporary increase in collision frequency. To minimize disruptions to peak period and daytime transportation travel on I-5, some</p>	<p>Interruptions to bus and LRT service in the study area could affect EJ populations more than the general population, as low-income populations are more likely to rely on transit to get to work, school, or other essential destinations. Transit interruptions would be likely to result in detours and out-of-direction travel, particularly for cross-river trips.</p> <p>Short-term closures of cross-river bicycle and pedestrian facilities could result in an adverse and disproportionate effect on EJ populations who rely on cycling or walking to cross the</p>

Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
	<p>construction activities could occur during nighttime hours and on weekends with approval by ODOT and/or WSDOT.</p> <p>Additional impacts to transportation include:</p> <ul style="list-style-type: none"> <li>• <b>Bus Service Impacts.</b> Bus service could experience delays from increased congestion due to potential roadway or interchange closures. Buses that travel through downtown Vancouver could encounter temporary closures and reroutes as the transit guideway is installed at the north end of the light-rail transit alignment.</li> <li>• <b>TriMet MAX Impacts.</b> Construction along Expo Road and the Marine Drive interchange may require temporary relocation or closure of the TriMet MAX Yellow Line terminus station near Expo Center. These temporary relocations, closures, or schedule adjustments could occur for 4 years.</li> <li>• <b>Pedestrian and Bicycle Impacts.</b> Construction could temporarily and intermittently close or reroute sidewalks, bicycle facilities, and/or shared-use paths or reduce facility widths within construction areas. Limited opportunities would be available for active transportation crossings of I-5 and would therefore be maintained to the extent practical.</li> </ul>	<p>river. Bicycle and pedestrian facility closures on I-5 leave few options for crossing the river on foot or by bike, as the only other option would be to cross using the facilities on I-205. The distance between I-5 and I 205 may not be a practical distance to travel for some pedestrians and bicyclists, which may fully prevent cross-river trips during certain periods. Furthermore, low-income populations who rely on walking and cycling as their primary mode of transportation may have fewer resources and access to alternative transportation modes than the general population.</p> <p>Therefore, interruptions to bus, light-rail service, and cross-river bicycle and pedestrian facilities would result in a disproportionately high and adverse effect on EJ populations.</p>

Type of Impact	Temporary Impact Summary for the Modified LPA	Temporary Impact(s) Specific to Minority and Low-Income Populations
Visual Resources	<p>Construction is expected to last up to 15 years, during which views to and from the area of visual effects would be altered. Temporary effects on visual quality would result from visual distractions, high-visibility signage, and additional lighting during nighttime construction.</p> <p>Vegetation may be removed from some areas to accommodate the construction of the new bridge structures, new ramps, transit guideways, staging areas, and casting yards. Each area would be revegetated upon completion.</p>	None. Changes in views and visual character are anticipated to be the same for EJ populations as the general population.

## 6. INDIRECT EFFECTS

### 6.1 No-Build Alternative

As described in Table 4-2 above, the no build alternative would maintain the status quo with regards to the displacement of residents, businesses, community resources, and jobs. Furthermore, environmental conditions would generally remain the same as of the time of this writing, and would impact EJ populations the same as the general population. However, the No-Build Alternative would also retain worsening traffic growth and congestion patterns on I-5, with travel times are anticipated to increase by 50% in the future compared to existing times. The indirect effect of increasing travel times and congestion on I-5 could negatively affect the regional, national, and local freight routes, adversely affect the economy, increase vehicle idling and associated car emissions, and reduce access key destinations and community resources between Vancouver and Portland. Furthermore, the No-Build Alternative would not bring high-capacity transit to Hayden Island or downtown Vancouver, forgoing potential benefits to EJ populations who may depend more on transit and active transportation as their primary mode of transport compared to the general population. However, most of these indirect effects would impact EJ populations the same or similarly to the general population. Therefore, the indirect effects of the No-Build Alternative are not anticipated to result in disproportionately high and adverse effects to EJ populations.

### 6.2 Modified LPA

The areas with the highest likelihood of indirect effects from the Modified LPA are Hayden Island and downtown Vancouver, as the addition of high-capacity transit stations in these neighborhoods would have the potential to support transit-oriented development. Hayden Island has not been identified as a meaningfully greater or high-priority EJ area. The Esther Short neighborhood within downtown Vancouver has been identified as a high-priority EJ neighborhood due to its high concentration of low-income populations. It is important to note that transit-oriented redevelopment would not be undertaken by the Program; rather, the Program would facilitate redevelopment that is already provided for in community plans in anticipation of the high-capacity transit stations (see the Land Use Technical Report for further discussion of this topic). Other indirect effects could include increased noise and pollution in neighborhoods directly adjacent to the corridor, including Arnada and Rose Village, which have been identified as high priority and meaningfully greater EJ areas, respectively. Indirect effects to Esther Short, Arnada, Rose Village have the potential to result in disproportionately high and adverse effects on EJ populations residing within these neighborhoods.

Gentrification was considered as part of the analysis of indirect effects, which refers to the causal relationship between investment and redevelopment and demographic changes. As rents and property taxes increase, properties can become unaffordable for low-income property owners and tenants, who move out and are replaced by higher-income populations. Increased property values and rents in downtown Vancouver could also potentially result in the types of demographic changes that are frequently characterized as gentrification, which can be considered an indirect effect of the

IBR Program on EJ populations.<sup>27</sup> Though the Modified LPA would not on its own cause gentrification, it could help accelerate it relative to the No-Build Alternative by increasing property values directly or indirectly affected by investments resulting from the IBR Program. If low-income renters were forced to move because rents and associated costs of living increased downtown, this could result in adverse effects. However, low-income homeowners could benefit from the same rise in property values and rents.

The City of Vancouver has adopted goals and policies that support affordable housing and a mix of housing types, and the Vancouver Housing Authority works to maintain affordable units in the city through voucher programs and the development of new affordable housing units. Even if low-income renters faced adverse effects, it is not clear that such effects would be disproportionate, as rising rent levels can also displace middle income earners. Renters as a group typically move with some regularity, and the vast majority of affordable rental properties in Vancouver would not experience indirect effects from the Modified LPA.

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<sup>27</sup> There has been considerable discussion by agency reviewers about the potential for induced growth, which can be a driver for gentrification. The Land Use Technical Report concludes that adopted land use plans calling for increased population and employment density are responsible for growth – not transportation infrastructure on its own. The infrastructure proposed as part of the Modified LPA supports growth that the region has already planned to accept.



## 7. POTENTIAL AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Impacts to EJ populations would occur, as they would for many people in the study area. Many of the adverse impacts could be avoided, minimized, and mitigated. Mitigation measures refer to Program actions that will be taken to reduce environmental impacts to EJ populations as a result of the Modified LPA. Mitigation measures are distinct from statutory requirements and obligations the IBR Program must already comply with under existing law. Mitigation measures are intended to reduce any *remaining impacts* after local, state, and federal requirements, best management practices, standard specifications, and permitting requirements are met.

Discussions with service providers for EJ populations and in other public involvement forums would refine mitigation proposed for the identified adverse impacts.

### 7.1 Long-Term Effects

Mitigation for long-term effects on EJ populations includes measures that would be used to avoid, minimize, and/or mitigate impacts from each of the impact categories evaluated for this analysis (acquisitions and displacements, traffic, noise, etc.). Some of these measures are required by existing regulations or design and construction standards, while others are Program-specific. The sections below describe both regulatory and Program-specific mitigation measures for each impact category analyzed for EJ. The following is a discussion of proposed mitigation to address impacts resulting from the Modified LPA. The Program will continue to engage with EJ populations to identify impacts and benefits and to gather meaningful input on avoidance, minimization and mitigation measures to address adverse effects.

#### 7.1.1 Regulatory Requirements

The applicable regulatory requirements are listed below:

- Title 42 USC Section 4601, the Uniform Relocation Assistance and Real Property Policies Act (1970)
- Title 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise
- ORS 467.010, Chapter 340, Division 35, Noise Control Regulations

The following sub-sections describe the effect of these regulatory requirements and related state policies in more detail as they related to disproportionately high and adverse effects on EJ populations within the IBR study area.

##### 7.1.1.1 Acquisitions and Displacements

Title 42 USC Section 4601, the Uniform Relocation Assistance and Real Property Policies Act (1970), provides uniform and equitable treatment of persons displaced from their homes or businesses by federal and federally assisted programs and establishes uniform and equitable land acquisition policies for federal and federally assisted programs. These policies require that property be purchased

at fair market value and that all residential displacements be provided with replacement housing and/or relocation assistance. Federal law requires replacement housing based on the characteristics of individual households. Relocation benefit packages for residents usually include replacement housing for owners and renters, moving costs, and assistance in locating replacement housing. Relocation benefits for businesses can include moving costs, site search expenses, and business re-establishment expenses. Eligibility and terms of relocation assistance would be determined during future project planning. Discussion of the Uniform Relocation Assistance and Real Property Policies Act can also be found in the Acquisitions Technical Report.

For low-income populations or populations with special circumstances, a relocation program could include housing assistance. For example, the Washington State Department of Commerce participates in the HUD's HOME Rental Development Program, a housing block grant program used to preserve and create affordable housing for low-income households. The extent to which similar housing programs could help offset displacement impacts resulting from the Modified LPA would depend on the availability of adequate housing stock to relocate EJ populations in the same general area. Future analysis would be needed to determine the availability of adequate housing stock.

#### 7.1.1.2 Noise

FHWA requires consideration of noise abatement measures for highway projects where noise levels exceed certain thresholds. Long-term noise impacts to EJ populations were identified in the Rose Village neighborhood in Vancouver. After reviewing the locations of the predicted noise impacts, it was determined that noise walls are the only feasible form of noise abatement. The construction of noise walls is already considered a best management practice for offsetting noise and vibration impacts.

The noise analysis completed for the Supplemental Environmental Impact Statement (SEIS) proposed 18 noise walls to mitigate traffic noise impacts predicted under the Modified LPA. Noise impacts in the Rose Village neighborhood would be mitigated by Noise Wall 4, which would be located in the area east of I-5 between E 33rd Street and SR 500. Noise Wall 4 would replace an existing 4- to 8-foot-tall, approximately 200-foot-long wall located just north of the 33rd Street overcrossing and would continue along the WSDOT right of way until reaching the bridge over E 39th Street. The final decision and recommendation to include noise wall mitigation would be made during final design. As design advances, factors that affect the feasibility and cost-effectiveness of noise walls can change. In addition, should the noise-impacted residents oppose recommended noise mitigation, the mitigation measure may not be incorporated into the Modified LPA.

State requirements mandate noise and vibration monitoring. In addition to compliance with ODOT and WSDOT standard specifications for noise abatement that apply to highway construction activities, monitoring would include the following:

- Establish a complaint hotline to investigate noise complaints during construction. A construction monitoring and complaint program would help ensure that all equipment meets state, local, and manufacturer specifications for noise emissions. Equipment not meeting the standards would be removed from service until proper repairs were made and the equipment retested for compliance. This procedure would apply to all haul trucks, loaders, excavators,

and other equipment that would be used extensively at the construction sites and that would contribute to potential noise effects.

- Conduct vibration monitoring of all activities that might produce vibration levels at or above 0.5 inches per second where structures are near the construction activity. This would include pile driving, vibratory sheet installation, soil compaction, and other construction activities with the potential to cause high levels of vibration. There is no effective method to completely eliminate vibration effects from construction; however, by restricting and monitoring vibration-producing activities, vibration effects from construction can be kept to a minimum.

### 7.1.1.3 Tolling

No regulations are currently in place to offset the impacts of IBR Program tolls on low-income populations, although such regulations may be implemented in the future in support of a low-income tolling program or equitable tolling policy that would reduce or offset the economic burden of tolling on low-income and minority populations. Toll rates and policies implemented on the existing Interstate Bridge (pre-completion tolling) and the replacement Columbia River bridges under the Modified LPA (long-term tolling) would be jointly set by the OTC and the WSTC. The commissions would consider possible exemptions and discounts, which may include a low-income discount program.

Both commissions would work together to determine how to apply such exemptions and discounts to the IBR Program.

## 7.1.2 Program-Specific Mitigation

Proposed Program-specific mitigation would include an attempt to minimize relocation impacts to residences, businesses, and public facilities as the project design is refined. The Modified LPA is currently at a conceptual level of design, and key features such as the number of auxiliary lanes, bridge type, and other design elements will not be determined until later stages of design. Furthermore, input from the IBR Executive Steering Group, Equity Advisory Group, Community Advisory Group, Community Benefits Advisory Group, and the public will support the refinement of the Modified LPA. The Program will attempt to minimize relocation impacts as these design and cost refinements occur.

### 7.1.2.1 Traffic Impacts

Traffic impacts resulting from the Modified LPA are generally diffuse throughout the study area and would be experienced similarly by EJ populations as the general population. Under the Modified LPA, key bottlenecks would be reduced along segments of I-5 in both Oregon and Washington, high-capacity transit would be expanded in the region, new shared-use paths would be built, crashes would be reduced by 15% to 30%, and Bicycle Level of Traffic Stress (BLTS) would increase to a “low” stress standing, benefitting EJ populations and the general population alike.

Under the Single-Level Movable-Span Configuration, the Modified LPA with a single-level movable-span configuration would continue to subject transit and active transportation users to delays during bridge openings, even though there would be fewer openings overall compared to the No-Build

Alternative. The single-level movable span configuration would impact EJ populations the same as the general population, so no disproportionately high and adverse effects have been identified.

Under design options without the C Street Ramps, downtown Vancouver I-5 access would be through the Mill Plain interchange rather than C Street. The removal of the C Street ramps could cause additional congestion at nearby collectors and ramps, shifting between 300 to 600 vehicles per hour to the Mill Plain Boulevard ramps during peak periods. However, the removal of the ramps would impact EJ populations the same as the general population, so no disproportionately high and adverse effects have been identified.

Therefore, specific mitigation to offset, reduce, or minimize traffic impacts to EJ populations is not proposed. However, ODOT and WSDOT would monitor traffic operations and, as the need arises, pursue the following mitigation measures to benefit the general population, including EJ populations traveling through the study area:

- Monitor and adjust ramp meter rates to manage travel times, delay, and other operational performance measures consistent with ODOT and WSDOT highway procedures.
- Coordinate with local jurisdictions to adjust local street networks that could include the following actions:
  - Prohibit on-street parking during peak periods to improve vehicle flow and reduce travel delays associated with slowdowns to accommodate vehicles entering and exiting on-street parking spaces.
  - Add turn pockets at needed locations (e.g., a southbound right-turn lane at 15th and Columbia Streets in Vancouver) to improve vehicle flow and reduce travel delays associated with bottlenecks at intersections.
  - Alter traffic signal timing (e.g., for the Mill Plain Boulevard interchange signal) to maximize operational flow and reduce travel delays.

#### 7.1.2.2 Air Quality

Air pollutant emissions are expected to be substantially lower in the future than under existing conditions. Regionally, future differences between the Modified LPA and the No-Build Alternative are small enough not to be meaningful within the accuracy of the estimation methods. Long-term air quality impacts are not expected to occur as a result of the IBR Program. Therefore, no disproportionately high and adverse air quality impacts would be expected on EJ populations as a result of the Modified LPA and no specific mitigation is proposed.

#### 7.1.2.3 Business Displacements and Loss of Service Industry Jobs

In addition to compliance with the Uniform Relocation Assistance and Real Property Policies Act, the IBR Program may provide mitigation for the loss of service industry jobs under a potential future workforce agreement and/or Project Labor Agreement. This agreement would be further defined as project design and planning progress, and would cover such topics as:

- Adopting goals for involvement of minority, women-owned, emerging, and disadvantaged businesses in Program construction contracting.

- Developing workforce practices to provide experience and business opportunities for disadvantaged workers and companies, such as requiring contractors to have apprentices perform a percentage of construction labor.
- Providing job training and establishing preferences in contracting for local services.
- Implementing a monitoring and evaluation program to track these measures through final project design, construction, and operation to help ensure that the benefits of promoting participation from minority-owned businesses are realized.

#### 7.1.2.4 Tolling

Program-specific measures to minimize disproportionately high and adverse effects on EJ populations related to tolling are proposed as part of this EIS. As described in Table 4-3 above, tolling the Interstate Bridge would result in higher transportation costs as a proportion of household spending for some EJ populations. Some of the project benefits – such as increased investments in the regional transit, walking, and bicycling network – may not be accessible or practical for EJ populations with fixed schedules and employment, school, and/or childcare commitments. Although the method of payment for a potential tolling program across the new Interstate Bridge has not been determined, a transponder model has the potential to present a burden to low-income and minority populations due to the up-front cost and technical requirements of purchasing and setting up a transponder.

Program-specific mitigation measures to address disproportionately high and adverse effects on EJ populations resulting from tolling may include:

- **A Low-Income and/or Equitable Tolling Program:** If the OTC and WSTC choose to implement a low-income toll program on the existing Interstate Bridge (pre-completion tolling) and the replacement Columbia River bridges under the Modified LPA (long-term tolling), it would play a critical role in mitigating disproportionately high and adverse effects of tolling on EJ populations. Additional mitigation may be needed if and when I-205 is tolled in the future or if a regional tolling system is implemented. Both transportation commissions are actively studying low-income tolling programs, including how such a program could be implemented in each state. Key work done to date includes:
  - [The Oregon Tolling Program I-205 and I-5 Toll Project's Equity Framework](#) (2023). The Oregon Transportation Commission has advanced key elements of a low-income toll program – the first of its kind in the nation – that will serve low-income travelers who cannot change their travel schedules or who travel frequently on interstate facilities. The program will balance impacts to other travelers while still achieving overall program goals to reduce traffic congestion and raise revenue for transportation improvements. Key commitments include at least a 50% discount on tolls for customers in Oregon or Washington whose household income is up to 200% of the federal poverty level and exemptions for federally recognized tribes and tribal government vehicles.
  - [WSDOT Low-Income Toll Program Study for I-405 & SR 167 Express Toll Lanes](#) (2021). WSDOT has developed a range of program options and evaluation metrics to assess toll discount program options to benefit equity populations. Options include percentage-based and fixed-rate discounts off per trip, time-based toll credits, free toll trips, and



- lowering the maximum toll rate. Although this study was for the I-405 and SR 167 Express Toll Lanes in Washington and would not directly apply to the IBR Program, the study and its findings may influence future discussions and coordination between the OTC and WSTC regarding the future of a regional toll program.
- **Equitable Access to Technology and Information:** ODOT, WSDOT, and regional partners will provide program-specific information, such as how to obtain transponders and/or how to receive transportation assistance, particularly for low-income drivers.
    - Locate venues for acquiring transponders near lower-income neighborhoods. The IBR Program would partner with public agencies and public service providers to identify locations that are convenient for low- or lower-income neighborhoods and that are accessible by multiple modes of travel.
    - Enable populations without credit cards or checking accounts to obtain transponders by paying with cash or electronic bank transfer cards.
    - Share information with and through other public service providers, particularly those that provide direct service to EJ populations.
    - Share information about existing rideshare opportunities such as local carpool and vanpool providers or work with partners to develop new programs.
  - **Early, Inclusive, and Equitable Public Engagement:** Public engagement and outreach is proposed as a critical step to ensure that transportation users can make informed travel choices when crossing the Columbia River. Public engagement should conduct specific outreach to potentially impacted EJ populations, connect these populations to assistance resources such as a future low-income and/or equitable tolling program and other travel options, and provide transparent information about the costs and impacts to their trips resulting from a future IBR tolling program.

## 7.2 Temporary Effects

Mitigation for temporary effects on some resources that would affect EJ populations would be provided through standard construction best management practices. Best management practices applicable to the potential impacts are described in the Acquisitions Technical Report, Air Quality Technical Report, and the Visual Quality Technical Report. Mitigation for temporary effects on EJ populations is discussed below.

### 7.2.1 Acquisitions and Displacements

Temporary construction easements would occur at two properties in downtown Vancouver identified as providing low-income housing: Evergreen Inn and Lewis and Clark Plaza. These properties are located in the Esther Short neighborhood, a high-priority EJ area. No residential or business displacements would occur as a result of these temporary construction easements. Activities at the sites would consist of temporary staging for construction and equipment and other construction support activities. Given their location within an identified EJ area and their provision of affordable housing, temporary construction easements at these two sites would result in a disproportionately high and adverse effect on EJ populations.

Temporary construction easements may also occur on Hayden Island to facilitate construction of both the transit and highway alignments. The census geography comprising Hayden Island is not a meaningfully greater or high-priority EJ area. However, low-income and minority people living in the area may be affected and are considered as part of this analysis.

EJ-specific mitigation measures to offset temporary construction acquisitions and displacement impacts would be the same as those used to address impacts to the general population. These measures include increased coordination between the construction team and businesses, renters, and property owners who would be affected by temporary acquisitions to discuss details of the acquisition, such as the duration of the acquisition and the operating schedule for construction activities. Proposed mitigation measures are described in more detail in the Acquisitions Technical Report.

## 7.2.2 Transportation Impacts

Construction activity for the highway and interchanges is anticipated to result in traffic delays on I-5 during construction. Depending on schedules and phasing, such delays could have greater impact to Hayden Island residents as they have no other access to the island. The census geography comprising Hayden Island is not a meaningfully greater or high-priority EJ area. However, low-income and minority people living in the area may be affected and are considered as part of this analysis.

Temporary interruptions to bus and light-rail transit service in the study area could affect EJ populations more than the general population, as low-income populations are more likely to rely on transit to get to work, school, or other essential destinations. Transit interruptions would be likely to result in detours and out-of-direction travel, particularly for cross-river trips. These transit interruptions would result in a disproportionately high and adverse effect on EJ populations.

Short-term closures of cross-river bicycle and pedestrian facilities would also result in an adverse and disproportionate effect on EJ populations who rely on cycling or walking to cross the river. Bicycle and pedestrian facility closures on I-5 leave few options for crossing the river on foot or by bike, as the only other option would be to cross using the facilities on I-205. The distance between I-5 and I 205 may not be a practical distance to travel for some pedestrians and bicyclists, which may fully prevent cross-river trips during certain periods. Furthermore, low-income populations who rely on walking and cycling as their primary mode of transportation may have fewer resources and access to alternative transportation modes than the general population. Therefore, interruptions to traffic, bus, light-rail service, and cross-river bicycle and pedestrian facilities would result in a disproportionately high and adverse effect on EJ populations.

Mitigation measures to address temporary transportation impacts to EJ populations would be similar to those used to address impacts to the general population. Disruptions to peak period and daytime travel on I-5 are proposed to be mitigated through construction best practices, such as scheduling construction activities during nighttime hours and on weekends with approval by ODOT and/or WSDOT. Transit fare subsidies are proposed to offset impacts to transit riders, who may be more likely to belong to EJ populations; these subsidies would apply to all transit riders and not just to EJ populations. Increased public outreach and construction-period communication is proposed to adequately inform travelers of delays and provide information about practicable detours throughout

the construction period. Mitigation measures for temporary transportation impacts are discussed in more detail in the Transportation Technical Report.

### 7.2.3 Noise

The entire study area would be impacted by increased noise and vibration, although particularly high levels of noise and vibration from pile driving activities are anticipated near the Interstate Bridge span. Areas with higher concentrations of EJ populations could be impacted disproportionately compared to the general population. Temporary noise and vibration impacts have been identified within the East Columbia and Esther Short neighborhoods, which are high-priority and meaningfully greater areas. Therefore, noise and vibration impacts in these areas would result in disproportionately high and adverse effects to EJ populations.

Residents of Hayden Island are also likely to experience noise and vibration impacts due to construction equipment, vibratory compaction equipment, and pile driving during bridge construction. The census geography comprising Hayden Island is not a meaningfully greater or high-priority EJ area. However, low-income and minority people living in the area may be affected and are considered as part of this analysis. Residents living in floating homes may be particularly susceptible to noise and vibration impacts due to their close proximity to both the highway and transit alignments.

EJ-specific mitigation measures to address temporary noise and vibration impacts would be the same as the measures taken to address impacts to the general population. These measures would consist of compliance with existing federal and state noise abatement requirements<sup>28</sup> and monitoring, including the establishment of a complaint hotline to investigate noise complaints during construction, testing of construction equipment to ensure compliance with noise emission standards, and vibration monitoring of all activities that might produce vibration levels at or above 0.5 inches per second where structures are near the construction activity. There is no effective method to completely eliminate vibration effects from construction; however, by restricting and monitoring vibration-producing activities, vibration effects from construction can be kept to a minimum and reduce disproportionately high and adverse effects on EJ populations within the construction zone. Proposed mitigation measures for temporary noise and vibration impacts are described in more detail in the Noise and Vibration Technical Report.

### 7.2.4 Air Quality

Anticipated temporary air quality impacts within the study area are not expected to result in a disproportionately high and adverse impact to EJ populations because construction-related air quality impacts would be the same for EJ populations as for the general population. However, air quality may be affected on Hayden Island due to emissions from construction equipment. The census geography comprising Hayden Island is not a meaningfully greater or high-priority EJ area. However, low-income and minority people living in the area may be affected and are considered as part of this

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<sup>28</sup> Title 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise  
ORS 467.010, Chapter 340, Division 35, Noise Control Regulations  
Chapter 173-60 WAC, Maximum Environmental Noise Levels

analysis. Residents living in floating homes and the mobile home park may be particularly susceptible to air quality impacts due to their close proximity to both the highway and transit alignments. Construction impacts to air quality could be minimized through measures discussed in more detail in the Air Quality Technical Report.

## 8. SUMMARY OF IMPACTS AND PRELIMINARY DETERMINATION

Executive Order 12898 directs federal agencies to make achieving EJ part of their respective missions by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. For the IBR EJ analysis, the Modified LPA's impact to EJ populations was compared to the impact to the general population; in instances where disproportionately high and adverse impacts to EJ populations were identified (Chapter 4 and Chapter 5), mitigation measures have been proposed to minimize, reduce, or offset those impacts (Chapter 7).

Disproportionately high and adverse effects on EJ populations were evaluated using five questions based on FHWA guidance<sup>29</sup> to support a preliminary determination as to whether the IBR Program would result in disproportionately high and adverse effects on EJ populations. These questions, and the Program's responses to them, are provided below.

### **Question 1: Would the Modified LPA result in disproportionately high and adverse impacts that would be predominantly borne by a minority or low-income population?**

Yes.

- The Modified LPA would result in residential and business displacements in high-priority and meaningfully greater EJ areas such as the Esther Short neighborhood in Vancouver and the Rockwood neighborhood in Gresham. In Rockwood, EJ populations comprise more than 50% of the entire population, and displacement impacts would be disproportionately borne by minority and low-income populations.
- If the design option that shifts I-5 westward were chosen, the Modified LPA would also require full acquisition of the Normandy Apartments. This would result in an additional 33 residential displacements in the Esther Short neighborhood, a high-priority EJ area.
- As discussed in Table 4-3, the Modified LPA would result in temporary construction easements at the Evergreen Inn and the Lewis and Clark Plaza in Vancouver. These are two low-income apartment buildings providing affordable housing within the Esther Short neighborhood. Given that these apartment buildings are located in an identified EJ area and that these buildings specifically provide low-income housing to EJ populations within the study area, temporary construction easement impacts to these buildings would result in a disproportionately high and adverse effect. No residential displacements are anticipated from these temporary construction easements so these impacts would be temporary in nature.
- The tolling program associated with the Modified LPA has the potential to result in adverse and disproportionate impacts to EJ populations. While tolls would be paid by all drivers using the new bridges, the tolls would represent a greater proportion of household income for low-

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<sup>29</sup> Federal Highway Administration (FHWA) Guidance on Environmental Justice and NEPA (2011).  
[https://www.environment.fhwa.dot.gov/env\\_topics/ej/guidance\\_ejustice-nepa.aspx](https://www.environment.fhwa.dot.gov/env_topics/ej/guidance_ejustice-nepa.aspx)



income individuals than for higher-income individuals, resulting in a higher economic burden in some of the studied Census block groups.

**Question 2: Would the Modified LPA result in disproportionately high and adverse impacts on a minority or low-income population that would be appreciably more severe or greater in magnitude than the impact that would be suffered by the non-minority or non-low-income population?**

Yes.

Residential displacements and implementation of the proposed tolling program have the potential to disproportionately burden EJ populations as compared to the general population, as described in the response to Question 1.

**Question 3: Does the Modified LPA affect a resource that is especially important to a minority or low-income population? For instance, does the project affect a resource that serves an especially important social, religious, or cultural function for a minority or low-income population?**

To be determined.

Adverse effects to culturally sensitive resources may be especially important to a minority population. In September 2020, FHWA and FTA contacted 21 tribes and Native Hawaiian organizations that were originally consulted regarding the CRC project and reinitiated government-to-government consultation. In February 2022, outreach was extended to an additional 17 tribes. Through that effort, 10 federally recognized tribes expressed an interest in consulting for the IBR program.

Archaeological and ethnographic surveys are underway to determine the significance of resources present, make findings on level of effect from the Program, and identify possible strategies to avoid, minimize, or mitigate any adverse effects. If adverse effects on resources that serve especially important social, religious, or cultural functions for tribes are identified prior to completion of the Final SEIS, analysis will be updated to reflect those effects. Any finding of adverse effect under Section 106 of the National Historic Preservation Act would be mitigated in accordance with the terms of the Programmatic Agreement being developed for the IBR Program.

**Question 4: Does the Modified LPA propose mitigation?**

Yes.

Proposed mitigation is discussed in Chapter 7. Some of these mitigation strategies, such as those related to acquisition and displacement, noise and vibration, and transportation impacts are statutory requirements, best management practices, and obligations; others are Program-specific mitigation strategies to address disproportionately high and adverse effects on low-income and minority populations. Mitigation measures related to the future IBR tolling program, if advanced, will be of critical importance given the disproportionately high and adverse effect the tolling program is anticipated to have on EJ populations, especially those comprising households living at or below the federal poverty level. A low-income toll program or equitable tolling policy would be an important mitigation strategy to offset disproportionately high and adverse effects on EJ populations resulting from the future IBR tolling program. Strategies to further reduce disproportionately high and adverse

effects resulting from the potential use of tolling transponders could include public information campaigns to assist EJ populations navigate and participate in the tolling system, the use of electronic benefits transfer cards, and financial assistance programs.

It is important to note that, although the IBR Program is committed to mitigation to address disproportionately high and adverse effects on EJ populations resulting from a future IBR tolling program, the tolling program is still in a preliminary phase of planning and study. Once the structure of the tolling program has been determined, additional analysis, interagency coordination, and public involvement will be needed to define specific mitigation actions related to IBR tolling.

### **Question 5: Would EJ populations experience project benefits under the Modified LPA?**

Yes.

- EJ populations would share benefits with the general population resulting from the construction of modern, seismically resilient, and multimodal bridges across the Columbia River.
- Under the Modified LPA, EJ populations would benefit from new and reliable HCT across the Columbia River. The decrease in transit travel time and increase in transit reliability would be a benefit for all populations but may benefit EJ populations differently to the extent that they ride transit at a higher rate than those with greater access to transportation options and/or higher incomes.<sup>30</sup>
- Under the Modified LPA, EJ populations would benefit from improved travel times and increased safety on I-5, as would the general population.
- Under the Modified LPA, EJ populations would benefit from improved bicycle and pedestrian travel across the Columbia River and from bicycle and pedestrian improvements to the local street system within the study area. Improved bicycle and pedestrian travel will benefit all populations but may benefit EJ populations differently to the extent that they rely on walking or bicycling as a primary mode of transportation at a higher rate than those with greater access to transportation options and/or higher incomes.

## **8.1 Preliminary Determination**

The FHWA Guidance on Environmental Justice and NEPA (FHWA 2011), provides the following direction for determining disproportionately high and adverse effects on EJ populations:

*As per FHWA Order 6640.23A, a disproportionately high and adverse effect on a minority or low-income population means the adverse effect is predominantly borne by such population or is appreciably more severe or greater in magnitude on the minority or low-income population than the adverse effect suffered by the non-minority or non-low-income population.*

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<sup>30</sup> While it is important to note that many low-income populations would benefit greatly from a faster, more reliable trip, environmental justice principles hold that to offset a disproportionate adverse effect on low-income populations, the benefit also needs to disproportionately affect low-income populations. In this case, the benefits of a faster, more reliable trip apply to all populations and not just low-income populations.

1) *EJ considerations should be summarized in the appropriate section of the NEPA document; such as the social-economic section of the environmental consequences chapter. References to other sections in the NEPA document can be cited, as appropriate. The beneficial and adverse effects on the overall population and on minority and low-income populations, in particular, need to be addressed under the applicable topics such as: air, noise, water pollution, hazardous waste, aesthetic values, community cohesion, economic vitality, employment effects, displacement of persons or businesses, farms, accessibility, traffic congestion, relocation impacts, safety, and construction/temporary impacts, etc.*

2) *Compare the impacts on the minority and/or low-income populations with respect to the impacts on the overall population within the project area. Fair distribution of the beneficial and adverse effects of the proposed action is the desired outcome.*

*If the effects remain adverse after mitigation is considered, then a determination must be made whether those effects are disproportionately high and adverse with respect to minority and/or low-income populations. If the effects on minority and/or low-income populations are disproportionately high and adverse even with mitigation and benefits to those populations taken into account ... the NEPA document must evaluate whether there is a further practicable mitigation measure or practicable alternative that would avoid or reduce the disproportionately high and adverse effect(s).*

3) *Under NEPA, consideration must be given to mitigation (as defined in 40 CFR 1508.20) for all adverse effects regardless of the type of population affected. Discuss what measures are being considered for alternatives to avoid or mitigate the adverse effects. Follow the protocol of avoidance first, then minimization, and finally measures to offset or rectify the adverse effects. Using opportunities to enhance and increase sustainability in communities and neighborhoods is desirable. Any activity that demonstrates sensitivity to special needs should be highlighted, such as accommodations for transit dependency and/or addressing the need for translators.*

4) *If the effects remain adverse after mitigation is considered, then a determination must be made whether those effects are disproportionately high and adverse with respect to minority and/or low-income populations. If the effects on minority and/or low-income populations are disproportionately high and adverse even with mitigation and benefits to those populations taken into account, the next section must be followed.*

5) *If there are no disproportionately high and adverse effects on minority and/or low-income populations once mitigation and benefits are considered, that determination should be stated in the document and the EJ evaluation is complete. (An example of a statement of a determination of no disproportionately high and adverse effects: "Based on the above discussion and analysis, the XYZ alternative(s) will not cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23A. No further EJ analysis is required.")*

*A preliminary determination has been made based upon the current assessment of environmental impacts, benefits, and mitigation strategies under the Modified LPA as described in this section. A final determination will be made in the Final SEIS subject to future refinements to the Modified LPA design options, input obtained through public involvement, and refined mitigation measures.*

The preliminary determination finds that minority or low-income populations have been identified that would experience disproportionately high and adverse effects from the Modified LPA, even after mitigation. Therefore, in accordance with the provisions of EO 12898 and FHWA Order 6640.23A, further EJ analysis is required, as well as additional public engagement to refine potential impacts and gather public input on mitigation measures, in order to evaluate whether there is a further practicable mitigation measure or practicable alternative that would avoid or reduce the disproportionately high and adverse effect. This determination is based on the following:

- As of this writing, a number of design options under the Modified LPA are still being actively studied. The selection of preferred design options may impact the extent and magnitude of impacts, benefits, and mitigation strategies related to low-income and minority populations.
- As noted in Question 4 above, the IBR tolling program is currently in a preliminary planning stage, and more analysis is required to understand the extent of impacts to EJ populations under the Modified LPA. Therefore, mitigation to avoid, minimize, reduce, or offset disproportionately high and adverse effects on low-income and minority populations has not been fully developed. More analysis and public involvement is required to gain a more complete understanding of impacts to low-income and minority populations from potential future tolls. Updated findings related to tolling will be documented in the Final SEIS.
- Some transportation impacts, such as temporary diversion impacts during the construction period or longer-term diversion impacts resulting from the proposed future IBR tolling on the Interstate Bridge and new Columbia River bridges, require further analysis to understand EJ-specific impacts. As of this writing, the AM and PM peak-hour screenline analysis reports that diversion impacts under the Modified LPA would range between +4% to +11%, representing a relatively minor change compared to the No-Build Alternative. Furthermore, the analysis has not found that EJ high-priority or meaningfully greater areas would experience diversion impacts disproportionately or in a greater magnitude than the general population. However, this analysis will be updated as part of the Final SEIS process to continue to identify potential disproportionately high and adverse effects on EJ populations.
- The IBR Program will hold a public comment period after the Draft SEIS and associated IBR technical reports are published. This will be the first time the general public will have the opportunity to review the identified impacts, benefits, and proposed mitigation actions for EJ populations. This period will also include a robust process to engage EJ populations specifically, which will provide critical feedback on the Draft SEIS and Environmental Justice Technical Report. The IBR Equity Advisory Committee, Community Advisory Committee, and Community Benefits Advisory Group will also provide feedback on the Draft SEIS and the draft reports. All public and advisory committee feedback will be incorporated to develop the Final SEIS.

FHWA guidance provides steps on how to proceed when disproportionately high and adverse effects have been identified after project benefits and mitigation has been taken into account. Following the additional analysis and community input described in the bullets above, the Final SEIS must evaluate whether there are further practicable mitigation measures or practicable alternatives that would avoid or reduce the disproportionately high effect(s). FHWA and FTA will approve the proposed action only if it determines no such practicable measures exist, and FHWA and FTA's determination ought to be stated in the document. The Final SEIS must also describe how the impacted populations were

involved in the decision-making process. The document needs to also identify what practicable mitigation commitments have been made at the time of Final SEIS completion.

In addition, if the affected population is a minority population protected under Title VI, FHWA will not approve the proposed action unless FHWA and FTA determine that:

- There is a substantial need for the project, based on the overall public interest; and
- Alternatives that would have less adverse effects on protected populations have either:
  - Adverse social, economic, environmental, or human health impacts that are more severe;  
**or**
  - Would involve increased costs of an extraordinary magnitude.

Where appropriate, the Final SEIS document must include both of these evaluations and contain the FHWA and FTA determination on the explicit issues required within these evaluations.



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