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1 **DRAFT Cumulative Effects Technical Report**

2 March 2023



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# 1 ACRONYMS AND ABBREVIATIONS

BIPOC	Black, Indigenous, and People of Color
CCRA	Vancouver City Center Redevelopment Authority
CFR	Code of Federal Regulations
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transit Benefit Area Authority
DAHP	Department of Archaeology and Historic Preservation
DEQ	Oregon Department of Environmental Quality
EAG	Equity Advisory Group
Ecology	Washington State Department of Ecology
EJ	environmental justice
EMF	electromagnetic field
FHWA	Federal Highway Administration
GHG	greenhouse gas
I-205	Interstate 205
I-5	Interstate 5
IBR	Interstate Bridge Replacement
LEED	Leadership in Energy and Environmental Design
LPA	Locally Preferred Alternative
MAX	Metropolitan Area Express
MCDD	Multnomah County Drainage District
Metro	Oregon Metro
ND	Neighborhood
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OTP	Oregon Transportation Plan
PDX	Portland International Airport
PM <sub>10</sub>	Particulate matter less than or equal to 10 microns in diameter
RMPP	Regional Mobility Pricing Project
ROD	Record of Decision
RTC	Southwest Washington Regional Transportation Commission
RTP	Regional Transportation Plan

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SR	State Route
STS	Statewide Transportation Strategy
TMDL	Total Maximum Daily Load
TriMet	Tri-County Metropolitan Transportation District of Oregon
USACE	U.S. Army Corps of Engineers
VCCV	Vancouver City Center Vision
VMT	vehicle miles travelled
WSDOT	Washington State Department of Transportation

1

## 1. PROJECT OVERVIEW

This technical report identifies, describes, and evaluates the potential cumulative effects of the Interstate Bridge Replacement (IBR) program when combined with other past, present, and future actions. The direct and indirect effects of the program on specific resources (e.g., ecosystems, neighborhoods) are identified in the resource-specific technical reports. The Modified Locally Preferred Alternative (LPA) would be designed to avoid and/or minimize these direct and indirect effects to the greatest extent possible.

This report first defines cumulative effects and outlines the approach, timeline, and geographic scope for analyzing those effects. It then summarizes the other past, present, and reasonably foreseeable actions that are part of the cumulative effects analysis. The results of the cumulative effects analysis are presented in Chapter 3 (built environment), Chapter 4 (natural environment), and Chapter 5 (cultural environment).

The IBR program's Modified LPA is a modification of the LPA for the Interstate 5 (I-5) Columbia River Crossing (CRC) project, which completed the National Environmental Policy Act (NEPA) process with a signed Record of Decision (ROD) in 2011 and two reevaluations that were completed in 2012 and 2013. The CRC project was discontinued in 2014. The IBR program's Draft Supplemental Environmental Impact Statement (SEIS) is evaluating the effects of changes in design since the CRC ROD, as well as changes in regulations, policy, and physical conditions.

*Please refer to the separate IBR Program Description file on the portal for a description of the Modified LPA, Modified LPA Construction, and the No-Build Alternative. The IBR program description will be inserted into the final version of this technical report.*

## 1 2. METHODS

### 2 2.1 Introduction

3 Cumulative effects result from the incremental effect of a proposed action when added to those of  
4 other past, present, and reasonably foreseeable future actions, regardless of the agency (federal or  
5 non-federal) or person that undertakes other such actions. Cumulative effects can result from  
6 individually minor but collectively significant actions that take place over a period of time (definitions  
7 paraphrased from 40 Code of Federal Regulations [CFR], 1508.7). The combination of effects, and  
8 resulting environmental conditions, are the focus of the cumulative effects analysis.

9 The NEPA scoping process helped to inform the extent and level of analysis that were required for  
10 each environmental resource analyzed for the IBR program. Consultations with cooperating agencies,  
11 participating agencies, and the public contributed to defining the scope and scale of the cumulative  
12 effects analysis.

13 For all technical disciplines, current and planned projects included those assumed in the regional  
14 modeling of 2045 transportation conditions. On a discipline-by-discipline basis, additional projects  
15 and trends were considered if relevant to the analysis of cumulative effects. For example, the natural  
16 environment disciplines consider the effects of increased urbanization and land use changes on the  
17 amount of natural area near the project, and the built environment disciplines consider the plans and  
18 policies adopted for the area.

### 19 2.2 Study Areas

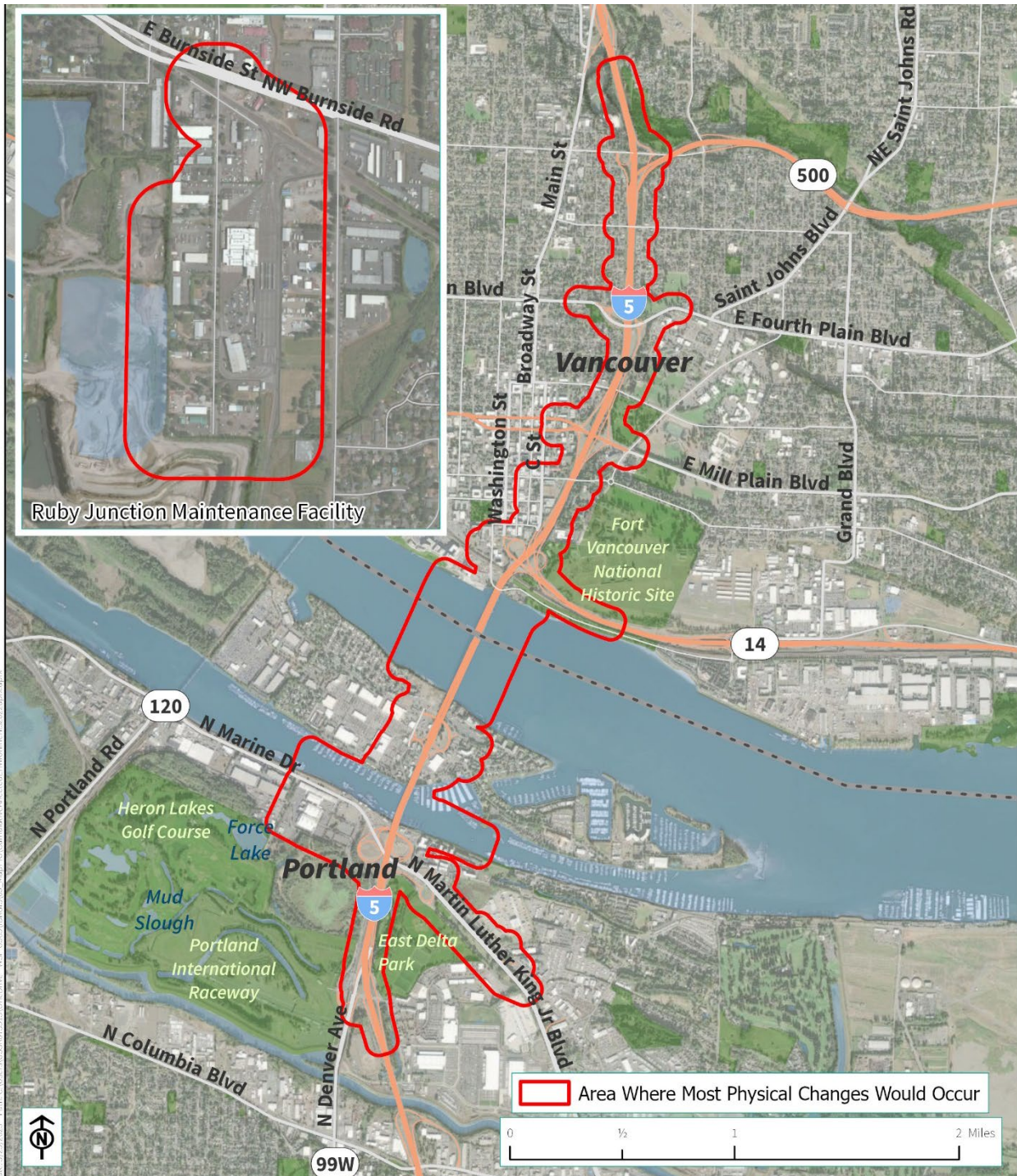
20 Each resource-specific technical report identifies a study area for evaluating effects on that particular  
21 resource (e.g., ecosystems has a different study area than acquisitions). The cumulative effects  
22 analysis uses the study area identified in the technical report when evaluating cumulative effects on  
23 that particular resource. A map of the study area for each resource can be found in the respective  
24 technical reports (IBR 2023a through IBR 2023v).

25 Several technical reports identified a common study area that runs along a 5-mile segment of I-5,  
26 between approximately State Route (SR) 500 in Washington and Columbia Boulevard in Oregon, as  
27 well as in downtown Vancouver west and east of I-5. This area (Figure 2-1) is where most physical  
28 changes associated with the program would occur (although mitigation could still occur outside of it).  
29 Other resources, such as air quality, economics, and equity, use much larger study areas.



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1 Figure 2-1. Area Where Most Physical Changes Would Occur



2

## 1 2.3 Relevant Laws and Regulations

2 The NEPA regulations issued in 1978 defined cumulative effects as the “impact on the environment  
3 which results from the incremental impact of the action when added to other past, present, and  
4 reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person  
5 undertakes such other actions.” The following is a list of federal laws and guidance were used to guide  
6 or inform the assessment of cumulative effects:

- 7 • Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500–1508).
- 8 • CEQ, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ 2005).
- 9 • CEQ, Considering Cumulative Effects Under the National Environmental Policy Act (CEQ 1997).
- 10 • Federal Highway Administration (FHWA) NEPA-implementing regulations, Environmental  
11 Impact and Related Procedures (23 CFR Part 771).

12 The Environmental Review Toolkit website maintained by the FHWA provides additional guidance on  
13 cumulative impact analysis (FHWA n.d.).

## 14 2.4 General Analytical Approach

15 The IBR program team assessed which environmental and community resources would be affected by  
16 the program and how other past, present, or reasonably foreseeable future actions may affect the  
17 same resources. In accordance with CEQ guidance, the cumulative effects analysis concentrates on  
18 resources that the IBR program is anticipated to affect and focuses on important issues of national,  
19 regional, or local significance.

20 This analysis considered past major actions; planned transportation projects; population,  
21 employment, and land use forecasts; comprehensive land use plans; and other major public and  
22 private projects that are under development or reasonably expected to occur. The temporal and  
23 geographic scales of analysis for the assessment of actions and forecasts can vary for each discipline.  
24 For some cumulative effects—namely, climate change and energy—the analysis also assesses how  
25 global trends could affect the No-Build Alternative or Modified LPA and, conversely, how each  
26 alternative could affect the climate and energy.

27 The analysis of cumulative effects for the IBR program first employed quantitative methods where  
28 applicable. The analysis is also qualitative, which allows the appropriate context to be used in  
29 considering and comparing the two alternatives, based on available data.

30 The cumulative effects analysis evaluates the change in conditions since the CRC ROD and updates  
31 the analysis to incorporate new or greater cumulative effects. The analysis followed an eight-step  
32 process, listed below, which is consistent with the Oregon Department of Transportation’s (ODOT’s)  
33 National Environmental Policy Act Environmental Impact Statement Template (ODOT 2010), chapter  
34 12 of the American Association of State Highway and Transportation Officials Practitioners Handbook  
35 (AASHTO 2016), and chapter 412 of the Washington Department of Transportation’s (WSDOT’s)  
36 Environmental Manual (WSDOT 2022).

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- 1 1. Identify the resources directly or indirectly affected by the IBR program that may have  
2 cumulative effects to consider in the analysis.
- 3 2. Define the study area and timeframe for each affected resource.
- 4 3. Describe the current health and historical context for each affected resource.
- 5 4. Identify direct and indirect impacts that may contribute to a cumulative effect.
- 6 5. Identify other historic, current, and reasonably foreseeable future actions that may affect  
7 resources.
- 8 6. Assess potential cumulative effects on each resource; determine their magnitude and  
9 significance.
- 10 7. Report the results.
- 11 8. Assess and discuss potential mitigation measures for all adverse impacts.<sup>1</sup>

## 12 2.5 Past, Present, and Reasonably Foreseeable Future Projects

13 To address cumulative effects, the program team established a temporal frame of reference for the  
14 analysis. The timeframe of reference for cumulative effects considered in this report is as follows:

- 15 • The relevant timeframe for considering past actions varies by general discipline.
  - 16 ➤ The natural environment analysis timeframe looks at broad changes beginning in the  
17 1800s.
  - 18 ➤ The cultural environment analysis timeframe begins in 15,000 before present.
  - 19 ➤ The built environment analysis timeframe starts in the early 1950s with the construction  
20 of I-5.
- 21 • The “present” is 2022.
- 22 • The “future” is 2045, the design year of the IBR program.

23 The time periods and types of projects included in the analysis are described in greater detail below.

### 24 2.5.1 Past Projects and Actions

25 Past built environment projects include transportation, urbanization, housing, and other  
26 developments that have influenced the social, economic, and natural environment in the study area.  
27 Prior to the 1917 construction of a bridge across the Columbia River in this location, ferries and other  
28 boats were used to transport people and goods between Oregon and Washington. A second bridge,  
29 currently carrying southbound I-5 traffic, was added in 1958 to provide increased capacity and to  
30 separate southbound and northbound traffic. At that time, the bridges were linked to Oregon 99, the  
31 main north/south highway. The bridges later became part of the interstate system when I-5 was  
32 opened in the study area in the early 1960s.

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<sup>1</sup> For further details on mitigation measures, see each resource-specific technical report (IBR 2023a through 2023v).





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1 Generally, it is not necessary to evaluate the impacts of individual past actions in order to describe  
 2 cumulative effects; existing conditions reflect the collective impacts of past actions. Nevertheless,  
 3 there is value in understanding how current conditions were shaped by historic actions. One example  
 4 is that past projects were not always planned and implemented with meaningful input and  
 5 communication with the public. Involving communities and understanding impacts has become an  
 6 essential part of project planning. The general past trends and major actions that have shaped the  
 7 current built, natural, and cultural environment in the study area are outlined below. These trends  
 8 and actions were identified through conversations with technical experts, members of the IBR  
 9 program’s Equity Advisory Group (EAG) and Community Advisory Group, and consulting tribes.

10 Native Americans have occupied and/or traveled through the study area for thousands of years. These  
 11 activities are no longer easily identifiable on the current natural and built environment in the study  
 12 area; however, there are numerous cultural resources in the study area associated with this time  
 13 period. In the 1800s Euro-American settlement began and expanded, and the Portland and Vancouver  
 14 area population began to dramatically increase. The following key historic events provide a basis for  
 15 analysis of past actions that have helped shape current environmental conditions; more detailed  
 16 descriptions of actions that have affected a particular resource are presented in Chapters 3, 4, and 5.

17 Table 2-1. Past Actions

Time Period	Action
Pre-1800s	Native Americans thrived for centuries on the shores of the lower Columbia River until the 19th century, when settlers brought disease and ultimately removed Indigenous peoples to reservations.
1810 to 1850	Settlement of Fort Vancouver and the Hudson Bay Company. Commercial fur trapping on the Columbia River and associated waterways developed between 1810 and the 1850s. Fur trappers from the Hudson Bay Company operating out of Fort Vancouver adopted the Siskiyou Trail as a major transport corridor between the Northern Oregon Territory and California.
1840s	Oregon’s Constitution prohibited Black people from entering or residing in the state and was later updated to exclude Chinese Americans and Japanese Americans from basic rights, including property ownership.
1846	Ferry service across the Columbia between Vancouver and Portland was established by Carl Switzler. Private ferry service between Vancouver and Portland was offered intermittently after that time by various operators. The State of Washington later began offering ferry service at other points along the Columbia in the 1930s.
1855–1885	Reservations and removal: Treaties signed that established Yakama, Umatilla, Nez Perce, and Warm Springs reservations. Additional treaties signed by other tribes were never ratified or reduced reservation land. Colville Reservation was established by executive order.



Time Period	Action
1870s to present	Congress authorized the federal navigation system on the lower Columbia River beginning in 1878, providing for a channel of 20 feet deep from the mouth of the river to the Portland area. The channel was progressively deepened to 43 feet (completed in 2010) and extended to include Vancouver upstream to the current bridge location and adding the Oregon Slough. The Vancouver to The Dalles channel was authorized in 1937 with a depth of 27 feet. Navigation is presently maintained to 17 feet upstream to Lewiston, Idaho.
1890s to present	The advent of the trolley line system in Portland and Vancouver encouraged greater urbanization and development of neighborhoods east of the Willamette in Oregon, and north to Fourth Plain Boulevard in Vancouver. The automobile was introduced in the early 1900s, and by the 1930s many middle-class families could afford cars and travel greater distances for work, shopping, or leisure. This greatly influenced the urbanization of Portland and Vancouver.
1905	<p>Pearson Field became a dirigible landing area. It was officially dedicated as Pearson Field in 1925.</p> <p><i>U.S. v Winans</i> affirms treaty fishing rights.</p>
1910 to present	Railroad construction, including a rail bridge over the Columbia River in 1910, allowed increased freight transport and increased the viability of the Port of Vancouver and Port of Portland in interstate trade. Industrialized farming, irrigation and water impoundment, and grain shipment increased.
1917	The Columbia River Interstate Bridge opened in 1917 and allowed easier transport of cargo and people between Vancouver and Portland, as well as the broader Pacific Northwest. This supported the expansion of industry and commerce in the region. In 1958, a second parallel bridge was constructed and the original 1917 bridge was converted to northbound only I-5 traffic (NPCC 2010). The opening of the bridge also included streetcar service, as well as bridge tolls. Streetcar service began in 1917 and was discontinued in 1926. Bridge tolls were first implemented to fund the construction of the bridge in 1917 and were removed in 1929, followed by the addition of tolls once again from 1960 to 1967 for the construction of the second bridge (CRC 2011).
1930s to 1970s	Several hydroelectric dams were built on the Columbia River between the 1930s and 1970s, including Bonneville, The Dalles, and John Day dams, to control flooding and provide electricity and irrigation water for the Pacific Northwest. Overfishing, construction of these dams, and other actions dramatically decreased salmon runs. This had a negative impact on the well-being of Native American tribes, for whom the salmon were a significant material and cultural resource.
1940s	Mobilization of shipyard manufacturing in support of World War II brought wartime employment in the Portland and Vancouver area to 75,000. This massive influx of workers from all over the U.S. created a housing shortage, and many nearby areas were impacted by the temporary increase in housing demand and resulting building boom.

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Time Period	Action
1942	President Roosevelt signed Executive Order 9066, which ordered the removal of Japanese Americans from the West Coast to inland internment camps. The Portland Expo Center (formerly named the Pacific International Livestock Exposition Center) was used as a temporary detention camp.
1948	The Vanport Flood occurred in 1948, when the Columbia River flooded and displaced approximately 20,000 public housing residents, including many minorities. Relocation occurred throughout the area, and the Vanport community’s residential base never recovered to the levels supported in 1948.
1950s	Post-World War II housing construction was financed through federal grants and GI loans and created a greater supply and demand of outer urban and suburban housing in both Oregon and Washington.
1958	The Vancouver-Portland Interstate Toll Bridge was constructed in 1958. This development doubled automobile capacity across the Columbia, reduced congestion, and allowed further commuting across the river. This bridge continues to carry southbound traffic today.
1953 to 1954	The Western Oregon Indian Termination Act terminated federal recognition of 60+ tribes in Oregon, including the reservations at Grand Ronde and Siletz.
1960s	Portland International Raceway and Delta Park were established on former roads and land from the Vanport community that was destroyed by floods in 1948.
1952–60s	Construction of the interstate highway system in the 1950s and early 1960s was followed by increased freight and automobile traffic. The new highway separated neighborhoods in Portland and Vancouver. Construction of the interstate highway system also increased access to downtown Vancouver.
1950s to present	Urban renewal projects and large-scale transportation projects, including construction of I-5, the Memorial Coliseum, and the Emanuel Hospital expansion, led to the displacement of low-income and minority populations, including Black Portlanders in North and Northeast Portland (City of Portland 2019).
1969 to 1974	A series of court cases upheld treaty fishing rights and held that tribes reserved a “fair and equitable share” of fish on the Columbia River.
1973 to 1990s	A shopping mall opened on Hayden Island, at the location of a former amusement park. Originally an indoor mall, the site was redeveloped as an outdoor mall in the 1990s and renamed the Jantzen Beach Center.
1973 to present	Growth management and implementation of Oregon planning laws in the 1970s have limited urban sprawl in the Portland metropolitan area.



Time Period	Action
1970s to 1990s	High tech firms settling in Beaverton, Hillsboro, and other nearby suburbs were major players in the national high tech boom of the latter 20th century, an area that became known as the Silicon Forest. As the area’s economy shifted from timber processing and sales to high tech and services, a high demand for professional workers emerged. This encouraged commuting from throughout the Portland metropolitan area, including Vancouver, which increased commuting across the Columbia.
1977	Confederated Tribes of Siletz Indians were restored to federal recognition.
1983	Confederated Tribes of Grand Ronde were restored to federal recognition.
1990	The Washington Growth Management Act passed in 1990; like the growth management and planning laws adopted by Oregon in the 1970s, this act sought to restrict unplanned urban sprawl and concentrate growth in existing urban areas.
1990s to present	An increased focus on climate change has led to calls for action in Oregon and Washington, as well as at the national level. Greenhouse gas emissions reduction targets were established at the federal, state, and local levels, with additional goals and policies identified to increase resiliency to climate-related impacts, such as drought.
2000 to 2020	The region experienced significant population growth between 2000 and 2020, with Multnomah County growing by 23% and Clark County by 46%, with most of the growth in BIPOC and/or Hispanic/Latino populations (U.S. Census Bureau 2010, 2020).
2001 to present	The Port of Portland conducted mitigation at the 90-acre Vanport Wetlands mitigation site. Efforts included the removal of invasive species, grading for improved functionality, and landscaping with native plants.
2008 to present	Beginning in 2008, the City of Vancouver worked with public and private partners to transform Vancouver’s historic waterfront area into a mixed-use area featuring office space, restaurants, shops, housing, and public spaces.
2000s to present	An increased focus on equity considerations leads to commitments at the local, state and federal level. Equity goals and policies are adopted by Oregon State, Washington State, and the Cities of Portland and Vancouver.

1 BIPOC = Black, Indigenous, and People of Color

## 2 2.5.2 Recently Constructed Projects

3 Some of the more noteworthy recent transportation and development projects in or near the study  
4 area are listed below. These projects give a sense of the recent development trends in the area.

### 5 2.5.2.1 Recent Transportation Projects

- 6 • Port of Vancouver’s West Vancouver Freight Access Project (Vancouver, west of I-5).

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- 1 • Vancouver Waterfront Renaissance Trail (Vancouver, east of I-5).
- 2 • Interstate Bridge northbound trunnion replacement (Vancouver/Portland).
- 3 • Interstate Bridge northbound active traffic management (Vancouver).
- 4 • Clark County Public Transit Benefit Area Authority (C-TRAN's) Bus on Shoulder service
- 5 (Vancouver, I-5, and Interstate 205 [I-205]).
- 6 • New metering on southbound I-5 at the 39th Street/SR 500 off ramp (Vancouver).

7 **2.5.2.2 Recent Development**

- 8 • Multifamily residential buildings along Marine Drive and N Anchor Way (Portland, east of I-5).
- 9 • Vanport wetlands restoration (Portland, west of I-5).
- 10 • Portland Meadows redevelopment (Portland, east of I-5).
- 11 • Jantzen Beach Center redevelopment (Portland, Hayden Island, west of I-5).
- 12 • Floor and Decor (Portland, Hayden Island, east of I-5).
- 13 • Vancouver Waterfront (Vancouver, west of I-5).
- 14 • Hurley Building condominium (Vancouver, west of I-5).
- 15 • New Seasons (Vancouver, west of I-5).
- 16 • West Barracks renovation (Vancouver, east of I-5).
- 17 • Vancouver Community Library (Vancouver, west of I-5).
- 18 • The Academy Phase 1 (Vancouver, west of I-5).
- 19 • Block 10 (Vancouver, west of I-5).
- 20 • Office buildings at 210 W 4th Street and 101 E 6th Street (Vancouver, west of I-5).
- 21 • Vancouver Center Condo (Vancouver, west of I-5).
- 22 • Vancouver Innovation, Technology and Arts Elementary School (Vancouver, east of I-5).

23 **2.5.3 Reasonably Foreseeable Future Projects**

24 For many resources, anticipated changes in conditions over time are linked to future changes in  
25 population, employment, transportation behavior and performance, and land use patterns. Several of  
26 the resource-specific technical reports were informed by modeling that is built upon the best  
27 available projections of 2045 population, employment, and land use changes. The regional modeling  
28 includes the transportation improvements that are reasonably expected to occur by 2045; therefore,  
29 the following analyses are already cumulative in nature: air quality, climate, energy (fuel and  
30 greenhouse gas [GHG] emissions), noise and vibration, and transportation.

31 Multiple plans contain lists of reasonably foreseeable future projects. These plans include  
32 transportation system plans, neighborhood plans, and comprehensive plans, among others.  
33 Discussions with partner agencies also provided insight into planned projects in the region.

34 The following three sections identify the list of future actions included in the cumulative effects  
35 analysis, which have been organized into three categories: (1) future transportation projects, (2) other

1 future projects (non-transportation), and (3) anticipated growth and land use changes in the region as  
2 identified in adopted state, regional, and local plans.

### 3 2.5.3.1 Future Transportation Projects

4 The list of future transportation projects included in the cumulative effects analysis is based on the  
5 transportation modeling conducted for the program (for details on the regional modeling, see  
6 Appendix A of the Transportation Technical Report (IBR 2023p). This includes a variety of projects that  
7 are assumed to be built and in place before 2045. The sources for developing the project list include  
8 Oregon Metro (Metro) Regional Transportation Plan (RTP) (Metro 2018) (including amendments) and  
9 the Southwest Washington Regional Transportation Commission (RTC) RTP (RTC 2019).

10 The basis for the identified future transportation projects is the list of projects identified as  
11 “financially constrained” by Metro and the RTC (for a complete list, see the RTPs for Metro [Metro  
12 2018] and RTC [RTC 2019]).<sup>2</sup> The financially constrained project list does not identify any major  
13 capacity improvements on I-5 near the study area. Outside of the study area, there are I-5 capacity  
14 enhancements and several major maintenance projects. Capacity improvements on I- 5 will provide  
15 additional vehicular and freight mobility and reduce travel times. The future projects will also require  
16 materials, equipment, and energy to complete and will have temporary traffic impacts associated  
17 with construction.

18 Based on discussions with partner agencies, the Regional Mobility Pricing Project (RMPP) was  
19 included in the cumulative effects analysis. While not listed in the RTPs, the RMPP is considered as  
20 reasonably foreseeable by partner agencies (an amendment to Metro’s RTP to include this project is  
21 under consideration). The RMPP would initiate congestion pricing, using variable-rate tolls, for the  
22 entire I-5 and I-205 corridor in the metropolitan area. ODOT completed the NEPA scoping phase for  
23 the RMPP in January 2023 and is now conducting NEPA analysis. The IBR program will continue to  
24 coordinate with the RMPP as tolling information is developed, including details around starting and  
25 ending points as well as toll rates.

26 The list of future transportation projects considered for the No-Build Alternative does not include the  
27 improvements proposed under the Modified LPA, and assumes that bridge tolling will not be in place.  
28 The Modified LPA assumes the same planned projects as the No-Build Alternative, with the addition of  
29 the program components, including additional auxiliary lanes, high-capacity transit extension from  
30 Expo Center in Portland to downtown Vancouver, active transportation improvements, and variable-  
31 rate tolling.

### 32 2.5.3.2 Other Future Projects

33 Other anticipated projects near the IBR program are listed below and identified on Figure 2-2. When  
34 identifying non-transportation projects that could contribute to cumulative effects, a project’s  
35 proximity to the IBR program was considered (using the area shown on Figure 2-1, where most  
36 physical changes associated with the program would occur). The list of projects was confirmed with

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<sup>2</sup> One transportation project (the Fourth Plain Safety and Mobility project) that is not listed on the financially constrained list in the RTC’s RTP was incorporated into the modeling at the request of partner agencies.



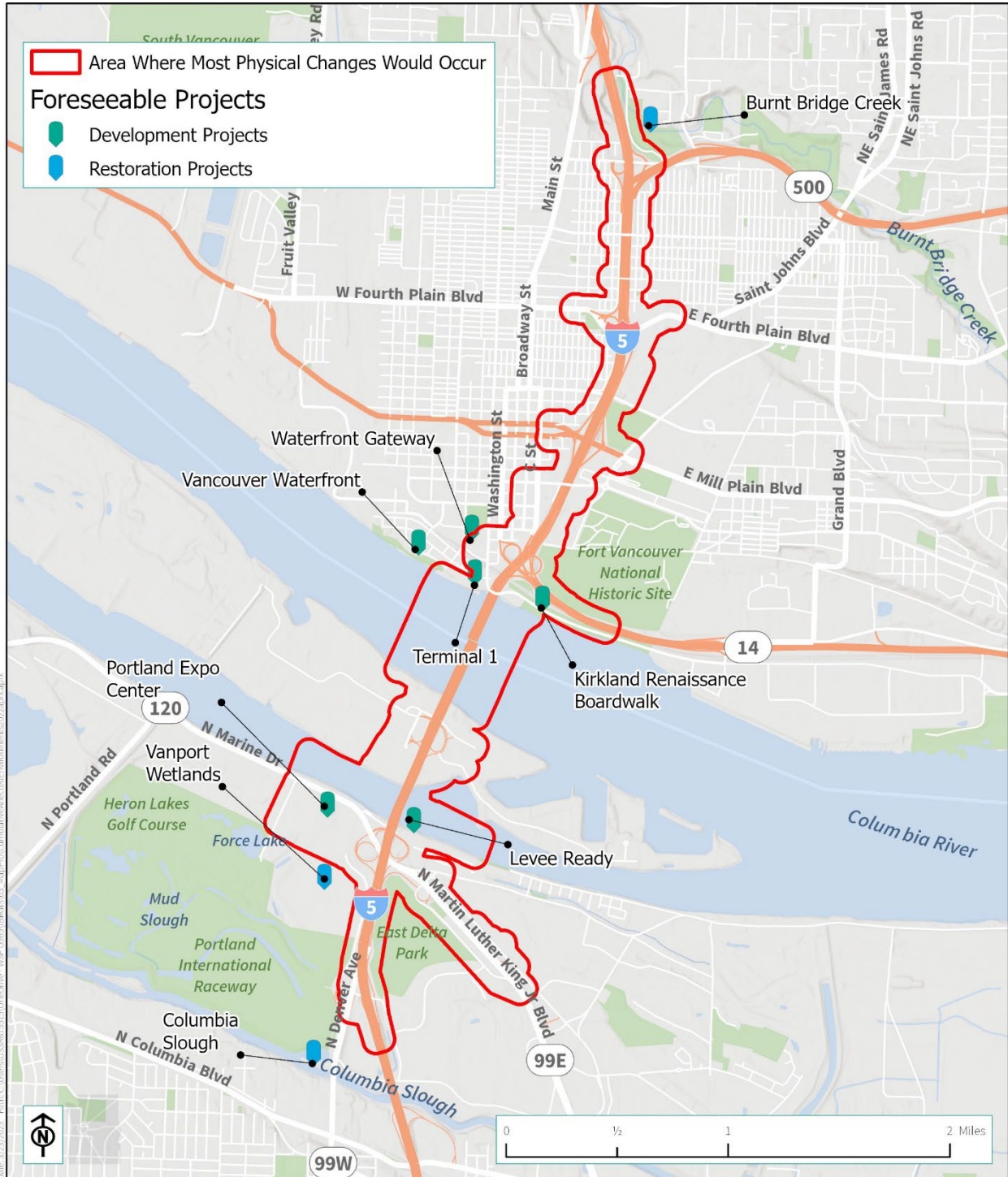
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- 1 local and regional partner agencies, and the project list will continue to be refined as individual
- 2 projects progress and additional information is obtained about other reasonably foreseeable projects.



1 Figure 2-2. Other (Non-transportation) Foreseeable Projects in the Program Vicinity



2  
3  
4

Note: No foreseeable non-transportation projects were identified near the Ruby Junction Maintenance Facility that are anticipated to contribute to cumulative effects.

- 1 **Vancouver Waterfront:** This ongoing project is a large-scale mixed-use development led by the City  
2 of Vancouver. The City completed a master plan for the 20-block, 32-acre site, which included new  
3 office and residential space, in addition to a public park and multi-use trail. The first phase of  
4 construction began in 2015, and the first buildings opened in 2018. While the City’s improvements are  
5 largely complete, private properties at the waterfront continue to be developed, including Hotel  
6 Indigo and Kirkland Tower. Temporary traffic impacts may occur during project construction, but  
7 these should conclude before the IBR program begins construction.
- 8 **Terminal 1:** The Port of Vancouver USA is developing a 10-acre property known as Terminal 1, which  
9 is located between the Vancouver Waterfront (described above) and the existing Interstate Bridge.  
10 Terminal 1 would be a mixed-use development with a hotel, office and retail space, outdoor gathering  
11 areas, and a public marketplace. Terminal 1 would also complete a missing segment of the Vancouver  
12 Waterfront Renaissance Trail, connecting the existing trail at the Vancouver Waterfront to the existing  
13 trail east of Terminal 1. The Terminal 1 master plan is certified as Leadership in Energy and  
14 Environmental Design (LEED) Neighborhood (ND) Gold by the U.S. Green Building Council, and the  
15 Port’s design standards call for all new buildings to be constructed to achieve a LEED Gold  
16 Certification or higher. Vancouver Landing, Terminal 1’s first completed project, opened in June 2022  
17 and consists of a boardwalk with green space and public seating, Renaissance Trail connections, and  
18 signage displaying historical significance of the site. Full completion of Terminal 1 construction is  
19 anticipated by 2027.
- 20 **Renaissance Boardwalk:** The Renaissance Boardwalk project is a public-private partnership between  
21 Kirkland Development and the City of Vancouver to develop a 2.3-acre plot of land directly to the east  
22 of the Interstate Bridge. The development plans include two new buildings and underground parking,  
23 with 230 apartments and retail space for 30 tenants. A public walkway along the water’s edge would  
24 be included in the development and connect to existing trails. The project would also demolish a City-  
25 owned pier (built in 1991). The development will include several efforts to meet the City’s climate  
26 goals, including meeting LEED Gold standards, using electric power for the residential units (no  
27 natural gas), and 100 charging stations for electric vehicles (Campbell 2021a, 2021b).
- 28 **Waterfront Gateway Project:** This project, run by the Vancouver City Center Redevelopment  
29 Authority (CCRA), would redevelop a 6.4-acre City-owned site in downtown Vancouver near City Hall.  
30 The CCRA selected a development team to move forward with efforts to turn the site into a mixed-use  
31 destination including office, commercial, retail, and housing uses. This project is eligible for the  
32 Affordable Housing Fund and would include 100 apartment units reserved for residents making 60%  
33 or less of the area’s median income. Initial plans call for 545 parking spaces to be located  
34 underground or at the podium levels of the buildings. The City is currently working with the developer  
35 to create a comprehensive development plan for the site.
- 36 **Portland Metro Levee System Project (Levee Ready):** The U.S. Army Corps of Engineers (USACE), in  
37 partnership with the Multnomah County Drainage District (MCDD), is planning improvements to the  
38 existing levee along the south side of the harbor (Levee Ready Columbia n.d.). In 2021, the USACE  
39 released a final feasibility report and environmental assessment that identified a recommended plan  
40 to fix the levee system. The report will be used to make a recommendation to Congress for funding.  
41 The IBR program is coordinating with the USACE and MCDD as the levee system project progresses.



1 **Restoration and Habitat Projects:** There are several planned restoration projects within the study  
2 area, as well as along habitat corridors or waterways that pass through the study area. Within the  
3 study area, restoration activities are planned along Burnt Bridge Creek in Vancouver and the  
4 Columbia Slough in Portland (Ecology 2021; Lee and Stamberger 2018). These projects are led by  
5 various agencies and organizations, including the Cities of Vancouver and Portland and the Columbia  
6 Slough Watershed Council.

7 **Portland Expo Center:** Metro owns the Portland Expo Center, which is a 53-acre employment and  
8 exhibition site located west of I-5. Following a development opportunity study, Metro recommended  
9 that the Expo Center be redeveloped into a sports and cultural complex (Metro 2023). While a future  
10 use has been recommended, project effects (and their contribution to cumulative effects) cannot be  
11 described at this time without speculation. The IBR program will continue to coordinate with Metro as  
12 the Expo Center project progresses, and the project will be included in future analysis if sufficient  
13 details become available.

#### 14 2.5.3.3 State, Regional and Local Plans

15 Several adopted state, regional, and local plans include visions of growth or change in the study area  
16 over the next 20 years. Anticipated growth and change as identified in these plans is reflected in this  
17 technical report, as the inputs were part of the regional modeling conducted for air quality (including  
18 GHG emissions), energy, noise and vibration, and transportation. For details on how projected  
19 changes in population, land use, employment, and other factors are reflected in the regional  
20 modeling, see Appendix A of the Transportation Technical Report (IBR 2023p).

#### 21 State Plans

22 The Washington Transportation Plan, developed by WSDOT, establishes a 20-year vision for the  
23 development of the statewide transportation system. This plan is based on the six transportation  
24 system policy goals established by the Washington Legislature (Revised Code of Washington  
25 47.04.280): preservation, safety, mobility, environment, stewardship, and economic vitality (WSDOT  
26 and Washington State Transportation Commission n.d.).

27 The Oregon Statewide Planning Goals encourage urbanized growth within the Portland metropolitan  
28 area. Applicable goals include (but are not limited to) Goal 2 (Land Use Planning); Goal 5 (Natural  
29 Resources, Scenic and Historic Areas, and Open Spaces); and Goal 12 (Transportation).

30 The Oregon Transportation Planning Rule requires local jurisdictions to consider changes to land use  
31 densities as a way to meet transportation needs and encourages transit and multimodal  
32 transportation systems. The Oregon Transportation Plan (OTP) is the overarching policy document  
33 among a series of plans that together form the state transportation system plan. An update to the OTP  
34 is currently underway and is scheduled for completion in 2023.

35 In 2018, the Oregon Transportation Commission adopted an amendment to incorporate the  
36 Statewide Transportation Strategy (STS) as part of the OTP. The Oregon STS is a state-level scenario  
37 planning effort that examines all aspects of the transportation system, including the movement of  
38 people and goods, and identifies a combination of strategies to reduce GHG emissions.

1 The Oregon Highway Plan (OHP) includes contextual statements and policies that may have an impact  
2 on the alternatives analysis for the IBR program (ODOT 1999). The OHP has been updated multiple  
3 times since 1999 to incorporate amendments, most recently in 2023. The OHP identifies I-5 as a major  
4 truck freight route. The OHP grants alternative standards to the Portland metropolitan area due to its  
5 established higher minimum densities, mixed-use development, and multimodal transportation  
6 options. The plan requires the adoption of Interchange Area Management Plans for all new or  
7 upgraded highway interchanges where the function of the interchange may be hindered due to  
8 changes in adjacent land uses.

## 9 **Regional Plans**

10 C-TRAN's Service Preservation Plan requires equitable service hours for local urban service,  
11 paratransit services, commuter services to Portland, and service to smaller Clark County cities. The  
12 plan includes high-capacity transit planning and its integration with other services, as well as both  
13 light rail transit and bus rapid transit improvements.

14 The RTC adopted the RTP for Clark County in 2019, which identifies future regional transportation  
15 system needs, plans, and improvements necessary to maintain mobility within and through the  
16 region, as well as access to land uses within the region. The RTP incorporates light rail as a component  
17 of the multimodal transportation system in the Vancouver metropolitan region.

18 The Metro RTP is a 25-year blueprint for the Portland metropolitan region's transportation system  
19 that is updated every five years (most recently in 2018). The RTP establishes policies and priorities for  
20 all forms of transportation and anticipates the region's current and future transportation needs.

21 Metro also has a Growth Concept, Regional Framework Plan, and Climate Smart Strategy. The Metro  
22 2040 Growth Concept encourages efficient use of land, a balanced transportation system, and other  
23 elements that will aid Portland metropolitan area cities to manage growth.

24 The Metro Regional Framework Plan (2014) includes policies to provide adequate transportation  
25 facilities to support adopted land use plans and enhance jobs, housing, and community identity. It  
26 also provides for a system of arterials and collectors to connect the central city, regional centers,  
27 industrial areas, and intermodal facilities. The Climate Smart Strategy was adopted in 2014 by Metro  
28 to reduce the region's per-capita GHG emissions from cars and light trucks at least 20% by 2035. The  
29 plan is a regional strategy to realize local visions for land use and transportation while also reducing  
30 GHG emissions.

31 Tri-County Metropolitan Transportation District of Oregon's (TriMet's) Transportation Improvement  
32 Plan utilized input from public engagement with transit riders and plan stakeholders to establish  
33 transit improvement priorities and possible funding allocations. The plan establishes a five-year  
34 roadmap for the roll-out of future services and programs to improve service in low-income  
35 communities. It also provides for planned revenue and service improvements and programs within  
36 the next two years (Fiscal Year 2021 to Fiscal Year 2023).

1 **Local Plans**

2 **Vancouver**

3 The Vancouver City Center Vision (VCCV) Plan (2007) for the Vancouver downtown area expands the  
4 city center boundary to approximately 130 city blocks, including the city center waterfront. It includes  
5 high-density residential uses, especially along the waterfront, with public access to the river's  
6 shoreline area. Other planned uses include recreation, cultural, hospitality, entertainment, and  
7 commercial uses. The plan identifies several new city blocks in the area of the existing I-5 downtown  
8 Vancouver interchange that may be available for development as a result of the IBR program.

9 The plan proposes easy access to Oregon from downtown Vancouver through high-capacity transit  
10 and a new southbound I-5 off ramp to 6th Street. It proposes easy access to the Vancouver National  
11 Historic Reserve and an integrated pedestrian, bicycle, transit, and automobile transportation system.  
12 The plan would improve downtown connectivity through a new arterial route south of the railroad  
13 berm extending from east of I-5 to Jefferson Street, connecting with Columbia, Esther, and Jefferson  
14 Streets.

15 The City of Vancouver's Comprehensive Plan (2011–2030), last updated in 2011 and currently being  
16 updated through 2025, encourages compact urban centers, transit, and supportive development  
17 regulations for areas along the defined high-capacity transit corridors identified along I-5 and SR 500.  
18 The City maintains a separate Transportation Plan that includes policy statements. The  
19 Comprehensive Plan applies to downtown Vancouver and North Vancouver.

20 The Comprehensive Plan designates future growth within the primary impact area from the Columbia  
21 River to Mill Plain Boulevard as Public Facilities, Commercial, and Open Space/Parks. Designations  
22 north of Mill Plain Boulevard within the primary impact area include Public Facilities; Urban High,  
23 Medium, and Low Density; and Commercial.

24 The Vancouver Shoreline Management Master Program (2021) includes goals and policies for physical  
25 and visual access to the shoreline, design that enhances the waterfront, an integrated trail system,  
26 good transportation networks, and strong bike and pedestrian circulation. Shoreline designations  
27 include High Intensity from the western extent of the study area to the eastern end of Fort Vancouver,  
28 with Fort Vancouver designated Urban Conservancy.

29 Other local plans in Vancouver include the Port of Vancouver Waterfront Development Master Plan,  
30 Downtown Vancouver Transportation System Plan, Central Park Plan, and Highway 99 Subarea Plan,  
31 Climate Action Framework, among others.

32 Zoning in the study area includes City Center, High and Low Density Residential, Central Park Mixed  
33 Use, and Open Space/Parks. The City of Vancouver has several zoning overlay districts within the  
34 study area. These include a Historic Preservation Overlay that preserves significant architectural  
35 character and areas within the city with cultural significance. A Noise Impact Overlay District is  
36 established along the Columbia River shoreline and extending west to the Esther Short Park  
37 neighborhood and along blocks that about I-5 up to McLoughlin Boulevard. An Office Development  
38 Overlay District protects neighborhoods from noise, light, and increased pedestrian and automotive  
39 traffic, or other community aesthetic changes. Transit Overlay Districts within the study area  
40 encourage high-density residential and commercial development along main traffic corridors. The

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1 Central Park Plan District preserves and enhances the established urban civic character of the area  
2 and its significant historical, natural, educational, recreational, public utility, and social service  
3 resources.

4 **Portland**

5 The City of Portland’s 2035 Comprehensive Plan, amended in March 2020, is built on the 2012 Portland  
6 Plan, the Climate Action Plan, and Portland’s 1980 Comprehensive Plan. The Comprehensive Plan is a  
7 long-range land use and public facility investment plan to guide future growth and physical  
8 development of the city. The plan continues the commitment to linking land use and transportation  
9 decisions. It expands the reasons for, and approaches to, improving Portland as a place that is  
10 walkable, bikeable, and transit-friendly with active main streets. There are a variety of Comprehensive  
11 Plan designations within the study area, including Open Space, Industrial Sanctuary, General  
12 Industrial, Mixed Use – Neighborhood, and Commercial Employment. Most of the areas within the  
13 study area are developed; however, further redevelopment on Hayden Island is anticipated.

14 Zoning designations in the study area include Open Space, Heavy Industrial, Commercial Mixed Use,  
15 and various Residential zones. There are several zoning overlay districts within the study area,  
16 including Environmental and Conservation overlays, which protect natural resources; Design Overlay,  
17 which preserves areas of the City with special scenic, architectural or cultural value; and Aircraft  
18 Landing Overlay, which provides safer operating conditions for aircraft in the vicinity of Portland  
19 International Airport (PDX).

20 In early 2009, the City of Portland Bureau of Planning and Sustainability published the Hayden Island  
21 Plan. The plan includes goals, objectives, proposed comprehensive plan and zoning changes, an  
22 implementation strategy, a street plan, development standards, a conservation strategy, and an  
23 affordable housing preservation strategy.

### 3. BUILT ENVIRONMENT CUMULATIVE EFFECTS

*Please note: The draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised.*

The built environment includes the following disciplines or resource areas:

- Acquisitions
- Air quality
- Aviation and navigation
- Climate
- Economics
- Electromagnetic fields
- Energy
- Equity and environmental justice
- Hazardous materials
- Land use
- Neighborhoods and population
- Noise and vibration
- Public services and utilities
- Transportation
- Visual quality and aesthetics

Key elements of the built environment in the study area are the roadway and transit network, downtown Vancouver and surrounding neighborhoods, and the neighborhoods and commercial uses on Hayden Island and North Portland near the river. Development projects considered in the analysis include large commercial developments (especially near highway interchanges), highway-oriented developments, industrial developments or redevelopment (e.g., the area between Columbia Boulevard and Columbia Slough), and housing developments near the highway or urban edge.

The temporal frame of reference for the built environment “past” for this analysis is generally from 1950, prior to the opening of I-5 through Oregon and Washington, to the present. As data allow and are relevant, some parts of the cumulative effects discussion refer back to 1917, the time of construction and opening of the first bridge across the Columbia River. The current year is 2022 and the temporal frame of reference for the “future” is generally 2045, which is the planning horizon for the program and the year to which impacts can be reliably identified (either quantitatively or qualitatively) without speculation. Long-term cumulative effects extending beyond the 2045 planning horizon that are related to the program lifecycle are considered qualitatively.

For a discussion of temporary cumulative effects on the built environment, see Section 6.

## 1 3.1 Acquisitions

2 Please see the Acquisitions Technical Report for additional information (IBR 2023a).

### 3 3.1.1 Project Effects

4 Under the No-Build Alternative, no program-related acquisition or displacement of businesses or  
5 residences would occur.

6 The following estimates for acquisitions and displacements are based on the current design of the  
7 Modified LPA, and estimates may vary depending on the preferred design alternative. Under the  
8 Modified LPA, approximately 33 acres of property would have to be permanently acquired for the  
9 construction, including construction staging locations, and long-term operation and maintenance of  
10 the program, including approximately 4.3 acres in permanent easements. An estimated total of 175  
11 parcels would be permanently affected by the Modified LPA, with 47 full acquisitions and 128 partial  
12 acquisitions. Up to 76 residences, including 35 floating homes, would need to be relocated, along with  
13 approximately 38 commercial uses and two public facilities.

14 The Modified LPA would displace up to 15 businesses on Hayden Island, which accounts for more than  
15 a quarter of all commercial displacements in Oregon and Washington. This is a notable reduction from  
16 what was anticipated during the CRC project phase, which estimated the displacement of up to 40  
17 businesses on Hayden Island. This reduction is due to the closure of many businesses in the area, as  
18 well as a reduction in the proposed footprint on Hayden Island. Future actions, such as the planned  
19 redevelopment associated with the Hayden Island Plan, would likely require the additional  
20 displacement of existing businesses on the island, while providing commercial space for the  
21 relocation of others (see the Land Use Technical Report for additional details [IBR 2023k]).

22 The Modified LPA would displace of up to 13 businesses in downtown Vancouver. This is a slight  
23 reduction from what was anticipated during the CRC project phase, which estimated the  
24 displacement of up to 17 businesses in downtown Vancouver. As with the businesses on Hayden  
25 Island, this reduction is due to the closure of businesses in the area, as well as changes in the  
26 proposed construction footprint.

27 Acquisitions and displacements have the potential to affect resources such as neighborhoods and  
28 populations (section 3.11), the economy (section 3.5), and equity and environmental justice (section  
29 3.8).

30 While there are some changes in direct and indirect impacts and/or benefits associated with the  
31 design options, these differences would not affect the conclusion (below) regarding the program's  
32 contribution to cumulative effects.

### 33 3.1.2 Effects from Other Actions (Past, Present, Future)

34 Most of the area directly affected by the IBR program is already occupied by public right of way  
35 resulting from previous transportation or other capital construction projects.



1 The original construction of I-5 during the late 1950s and early 1960s involved significant property  
2 acquisitions and displacements in Portland and Vancouver. For example, when the segment of I-5  
3 known as the Minnesota Freeway was constructed from the Rose Garden area to the Columbia River  
4 Slough in northeast Portland, it removed more than 180 dwellings and displaced more than 400  
5 residents (Kramer 2004). Construction of I-5, I-205, the Memorial Coliseum, and the Emanuel Hospital  
6 expansion collectively displaced thousands of Black Portlanders from the 1950s through the 1970s.

7 Future actions, such as the planned redevelopment associated with the Hayden Island Plan, would  
8 likely require the additional displacement or relocation of existing businesses on the island, while  
9 providing commercial space for the relocation of others. Proposed developments in Vancouver would  
10 displace additional businesses there as well (see the Land Use Technical Report for additional details  
11 [IBR 2023k]).

### 12 3.1.3 Conclusions

13 The real estate acquisitions required for the Modified LPA are high in the context of other recent  
14 actions in this vicinity, but they are relatively low for a project of this size located in an already  
15 urbanized area. At the corridor level, impacts would be substantially smaller than the acquisitions  
16 associated with the original construction of I-5 in the corridor. There would be few residential  
17 displacements in neighborhoods that were directly affected by the original construction of I-5. In  
18 Oregon, most of the displacements would be commercial properties and floating homes on Hayden  
19 Island. Similarly, in Washington, most displacements would occur for commercial properties and  
20 multifamily dwellings in downtown Vancouver.

21 Cumulative effects on the floating home community would not be much greater than the effects of the  
22 Modified LPA on the floating home community as no future projects are anticipated to require  
23 acquisitions from this community. According to historic aerial photos, it appears that the floating  
24 home moorages were developed following the original construction of I-5, so they would not have  
25 been affected by past I-5 construction. No known future projects would require additional floating  
26 home displacements. However, state and federal regulations that make it difficult to permit new  
27 moorage space would tend to reduce opportunities for relocating displaced floating homes.

28 Furthermore, cumulative effects on properties in downtown Vancouver would not be much greater  
29 than the effects of the Modified LPA on the downtown properties. The ages of properties in downtown  
30 Vancouver vary, and properties may or may not have been developed following the original  
31 construction of I-5, so they may or may not have been affected by past I-5 construction. No future  
32 projects have been identified that would result in the displacement of existing properties and the  
33 relocation of businesses in Vancouver. When combined with past, present, and foreseeable future  
34 actions, the Modified LPA would make a minor contribution to property acquisitions.

## 35 3.2 Air Quality

36 Please see the Air Quality Technical Report for additional information (IBR 2023b).

### 1 3.2.1 Project Effects

2 The air quality analysis for the IBR program is cumulative in nature as it incorporates projected  
3 increases in traffic, regional growth, and foreseeable future transportation projects. The analysis  
4 indicates that future regional air pollutant emissions from I-5 traffic exhaust would be lower than the  
5 existing conditions with or without the program. Air pollutant emissions are expected to be  
6 substantially lower in the future than under existing conditions for all pollutants evaluated except for  
7 volatile organic compounds, which will be higher, and total particulate matter less than or equal to 10  
8 microns in diameter (PM<sub>10</sub>), which would only be about 1% lower.

9 The localized changes in air pollutant concentrations are likely to be the most pronounced from  
10 roadway links where traffic volumes are expected to increase under the Modified LPA compared to the  
11 No-Build Alternative. These increases are likely due to vehicle diversion from highways to avoid  
12 tolling. However, the magnitude and duration of these potential localized concentration increases  
13 cannot be reliably quantified due to the absence of an approved methodology to forecast program-  
14 specific mobile source air toxic concentrations and related health impacts. Additionally, the region's  
15 attainment status implies that localized transportation projects are unlikely to cause an exceedance  
16 of the National Ambient Air Quality Standards.

17 While there are some changes in direct and indirect impacts and/or benefits associated with the  
18 design options, these differences would not affect the conclusion (below) regarding the program's  
19 contribution to cumulative effects.

### 20 3.2.2 Effects from Other Actions (Past, Present, Future)

21 Past and present actions affecting air quality in the study area (and region) include programs and  
22 regulations put into effect to control air pollutant emissions, as well as population growth and  
23 accompanying development leading to an increase in the number of single-occupancy and freight  
24 vehicles. Starting in the early 1970s, and more recently in the early 2000s, regulatory controls on air  
25 pollutant emissions have resulted in substantial reductions in vehicle emissions and are expected to  
26 yield additional projected vehicle emissions reductions over the next 25 to 30 years.

27 Traffic data used in the air quality analysis are based on projected land use and employment  
28 information and include expected overall growth in the region and the study area, as well as the  
29 transportation projects identified as reasonably foreseeable future actions. Non-transportation  
30 projects may increase emissions, such as general commercial and residential development in the  
31 area. The RMPP may reduce emissions through a mode shift away from single-occupancy vehicles to  
32 carpooling, public transit, or active transportation, as well as a reduction in emissions associated with  
33 congestion. This project may also contribute to cumulative effects from the expansion of public  
34 transit and active transportation networks or other projects such as the IBR program, which may  
35 result in changes to emissions and impacts to air quality.

36 Background concentrations representing the cumulative emissions of other sources in the area are  
37 included in the predicted local concentrations for carbon monoxide at intersections. Long-term  
38 monitoring has shown that air quality has improved over the years. Current and new regulations will



1 continue to reduce pollutant emissions from mobile sources and other sources in the future, and air  
2 quality should continue to improve (DEQ 2021; FHWA 2016).

### 3 3.2.3 Conclusions

4 The air quality analysis incorporates reasonably foreseeable changes in the region’s future land use,  
5 population, employment, and travel behavior, including the effects of the IBR program. For all  
6 pollutants analyzed, future 2045 emissions are projected to be lower than existing conditions under  
7 both the Modified LPA and No-Build Alternative. Regional improvements to transportation supply  
8 through increased roadway and transit capacity, active transportation networks, measures such as  
9 regulations on other source types, and the RMPP would also reduce additional future emissions and  
10 have a positive effect on air quality. Based on the emissions analysis, the cumulative effects of the  
11 Modified LPA and past, present, and foreseeable future actions would improve air quality over existing  
12 conditions. Air quality in the region would continue to be monitored by the Oregon Department of  
13 Environmental Quality (DEQ) and Washington State Department of Ecology (Ecology); this monitoring  
14 would track whether future conditions are consistent with the air emissions analysis.

## 15 3.3 Aviation and Navigation

16 Please see the IBR program’s Navigation Impact Report and Aviation Technical Report for additional  
17 information (IBR 2022, 2023c).

### 18 3.3.1 Project Effects

19 The No-Build Alternative would not affect existing aviation conditions. Under this alternative, the  
20 towers of the existing Interstate Bridge would continue to penetrate into the Pearson Field Part 77  
21 airspace. The airport currently has special departure procedures that help aircraft avoid the towers.  
22 Likewise, river navigation conditions would not be expected to change under the No-Build Alternative,  
23 and navigation would continue to be affected by the existing piers and bridge lifts. In the event that  
24 the existing lift span becomes stuck in the closed position, vessels that are unable to pass under one  
25 of the fixed spans would be unable to continue downriver or upriver of the I-5 corridor. Vessels would  
26 also be unable to complete the necessary S-curve maneuver to align with the BNSF bridge opening.<sup>3</sup>

27 The Modified LPA would have no long-term effects on aviation activities at PDX but would have some  
28 benefits on operations at Pearson Field. The Modified LPA would improve conditions for aviation at  
29 Pearson Field compared to existing conditions and the No-Build Alternative, due to the removal of the  
30 lift towers.

31 River navigation safety and security for both the main channel of the Columbia River and North  
32 Portland Harbor would be improved by the Modified LPA due to the elimination of the “S” curve

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<sup>3</sup> The primary navigation channel under the Interstate Bridge lines up with the opening in the BNSF bridge, while the alternate channels under the Interstate Bridge are located toward the center and south bank of the river, thus requiring vessels to make an S-curve maneuver between the Interstate Bridge and the BNSF bridge opening.

1 maneuver, a reduction in the number of piers, elimination of river traffic delays associated with bridge  
2 lifts, and improved seismic resiliency. The Navigation Impact Report prepared for the program found  
3 that construction of the Modified LPA (with 116 feet of vertical clearance [Columbia River Datum])  
4 would result in impacts to eight vessels/users, which could be reduced to four vessels/users through  
5 modifications of vessel operations. The IBR program would engage affected vessel owners to identify  
6 appropriate measures to reduce or avoid impacts, and these measures would be subject to future  
7 decisions and agreements between the program and affected vessel owners. These would be finalized  
8 prior to issuance of the U.S. Coast Guard bridge permit and/or construction of the Modified LPA.

9 There are some changes in impacts and/or benefits associated with the various design options.  
10 Notably, the movable span bridge would remove the vertical clearance limits for navigation  
11 associated with the Modified LPA, but would include lift span towers that would permanently  
12 penetrate the Part 77 airspace at Pearson Airfield. While there are some changes in impacts and/or  
13 benefits associated with the various design options, these differences would not affect the conclusion  
14 (below) regarding the program's contribution to cumulative effects.

### 15 3.3.2 Effects from Other Actions (Past, Present, Future)

16 Past actions that affected aviation include development in the region that penetrates the airspace of  
17 aircraft landing or departing at Pearson Field. The towers of the existing Interstate Bridge and several  
18 buildings in downtown Vancouver currently penetrate the Pearson Field Part 77 airspace. There are no  
19 known planned projects in the area that would contribute to cumulative effects on airspace.

20 Past actions that affected river navigation include authorization and construction of the federal  
21 navigation channel, construction of upstream dams and navigation locks, construction of the existing  
22 bridges over the main stem of the Columbia River and North Portland Harbor, and other bridges  
23 constructed upriver and downriver of the study area, such as the BNSF rail bridge. The federal  
24 navigation channel at and upstream of the bridge was established as a deep-draft (27 feet) navigation  
25 channel to accommodate ocean-going ships upstream to The Dalles. This shipping traffic never  
26 materialized, and the USACE currently maintains the channel to 17 feet reflecting the current traffic on  
27 the river. There are no known planned navigation projects in the area that could contribute to  
28 cumulative effects on navigation. If the USACE deepens the Vancouver to the Dalles channel to 27 feet  
29 as authorized, it could contribute to a change in the type of navigation through the study area.

30 The construction of Bonneville Dam and the navigation locks, as well as other dams and locks,  
31 allowed navigation to extend upriver to Lewiston, Idaho, on the Snake River. Navigation does not  
32 extend past the Tri-Cities on the Columbia River due to river conditions and the lack of  
33 accommodation at upriver dams. The depth of the channel, size of the locks that allow passage past  
34 the dams, and height of existing bridges across the Columbia and Snake River system limit the size of  
35 vessels that can navigate upstream past Bonneville Dam. An analysis of upriver land uses showed that  
36 there is limited potential for development that could result in different navigation on the waterway.  
37 Existing political and geographic constraints limit the areas for future water-dependent land uses,  
38 including restrictions imposed by the Columbia River Gorge National Scenic Area, topography,  
39 transportation access parallel to shorelines (SR 14, Interstate 84, and BNSF and Union Pacific  
40 railroads), and existing open spaces. Therefore, there are no known reasonably foreseeable future  
41 actions that would affect river navigation in the study area.

### 1 3.3.3 Conclusions

2 The Modified LPA would not affect aviation at PDX but would contribute to beneficial effects at  
3 Pearson Field. It is not anticipated that any of the identified future actions would contribute to  
4 cumulative effects at Pearson Field, and any future actions that could affect operations would be  
5 reviewed by the City of Vancouver and the Federal Aviation Administration to ensure compliance with  
6 their regulations.

7 While the Modified LPA would contribute to both adverse and beneficial cumulative effects on  
8 navigation due to past projects, none of the identified present or future actions would affect  
9 navigation, and as such the Modified LPA would not contribute to future cumulative effects.

## 10 3.4 Climate

11 Please see the Climate Technical Report for additional information (IBR 2023d).

### 12 3.4.1 Project Effects

13 The GHG emissions modeling prepared for the IBR program incorporates output from the  
14 transportation modeling, which includes anticipated regional growth and reasonably foreseeable  
15 future actions. As such, the results of the modeling reflect cumulative effects on annual GHG  
16 emissions in the study area. Under the No-Build Alternative and the Modified LPA, GHG emissions  
17 would continue to increase in the region compared to existing conditions, in large part due to  
18 increased vehicle miles traveled (VMT) associated with population growth and development. The  
19 Modified LPA would result in a net reduction of GHG emissions compared to the No-Build Alternative  
20 due to a decrease in congestion and vehicle idling, as well as a mode shift to public transit and active  
21 transportation, resulting in fewer VMT.

22 In addition to activities designed to minimize emissions, the Modified LPA includes features that  
23 would improve local and regional resiliency to the anticipated effects of climate change. These  
24 features include avoiding fragmentation and degradation of floodplain hydrology by sensitively  
25 locating new and modified transportation and utility project components; maximizing management  
26 of stormwater by restoring existing unused impervious paved areas to natural, permeable, and  
27 vegetated conditions during the design phase to the maximum extent practical; and ensuring that the  
28 bridge design will accommodate potential climate-change-induced effects such as larger water  
29 volumes from winter storms and more frequent snow and ice storms.

30 While there are some changes in direct and indirect impacts and/or benefits associated with the  
31 design options, these differences would not affect the conclusion (below) regarding the program's  
32 contribution to cumulative effects.

### 33 3.4.2 Effects from Other Actions (Past, Present, Future)

34 Globally, GHG concentrations have risen substantially because of human activities, and they have  
35 been a primary driver of warming. Both Ecology and the Oregon Global Warming Commission publish  
36 reports every two years measuring their states' GHG emissions and progress toward state and federal

1 goals to reduce GHG emissions. Per the most recent reports, transportation (including highway, rail,  
2 and air transport) is the greatest contributor to GHG emissions in Oregon and Washington.

3 In an effort to address the current trends in GHG emissions, particularly in the transportation sector,  
4 multiple federal, state, regional, and local regulations and policies have been enacted to guide the  
5 development and evaluation of transportation projects and local communities' management of GHG  
6 emissions. At the state level, both Oregon and Washington have enacted policies aimed at reducing  
7 GHG emissions in the transportation sector. Examples of these policies include Ecology's zero-  
8 emission vehicles policy, Oregon's Climate Protection Program, and Washington's Clean Energy  
9 Transition Act. At the local level, local jurisdictions such as the City of Portland and City of Vancouver  
10 have implemented Climate Action Plans outlining programs and strategies aimed at meeting climate  
11 goals and emissions reductions targets. The local transit agencies in the region, TriMet and C-TRAN,  
12 have also identified climate goals. Two examples are C-Trans's use of electric buses, and wind  
13 turbines serving as the primary source of energy for TriMet's trains.

14 Future actions related to the policies and plans from state, regional, and local jurisdictions have the  
15 potential to contribute to future projects that may influence the decrease in GHG emissions in the  
16 transportation and land use sectors. Policies that directly regulate the emissions of vehicles, such as a  
17 clean fuels standard, have the greatest potential to reduce GHG emissions. Additional ancillary  
18 benefits may also come from transitions to renewable energy sources in the energy sector.

### 19 3.4.3 Conclusions

20 The IBR program and agency partners considered climate change during the development and  
21 selection of design modifications for the Modified LPA. As part of its standard design, the Modified LPA  
22 has incorporated features that will provide greater resilience and function under the potential effects  
23 brought on by climate change. Compared to existing conditions, GHG emissions associated with the  
24 transportation sector are expected to decline in future years due to improvements in vehicle fuel  
25 technologies and the transition away from using gasoline and diesel fuels to power vehicles. As more  
26 and more of the vehicle fleet is composed of electric cars, the decarbonization of the electric grid in  
27 Washington and Oregon will further decrease GHG emissions associated with vehicle travel. Thus,  
28 although the annual VMT in the study area would increase by 37% under the No-Build Alternative over  
29 existing conditions, the associated GHG emissions would decrease. The Modified LPA, when combined  
30 with other past, present, and foreseeable future actions, would have a beneficial contribution to  
31 cumulative climate effects through a reduction in GHG emissions and improvements in the climate  
32 resiliency of the corridor and region.

## 33 3.5 Economics

34 Please see the Economics Technical Report for additional information (IBR 2023e).

### 35 3.5.1 Project Effects

36 Under the No-Build Alternative, no businesses would be displaced and there would be no resulting  
37 decrease in property or sales tax revenues or jobs lost. Conversely, there would be no additional  
38 employment or added sales tax associated with project construction. Economic development planned

1 for this area may occur more slowly than under the Modified LPA because business owners may be  
2 reluctant to locate in an area with poor access and mobility for employees and customers. Freight  
3 reliability decreases as congestion spreads beyond the peak hour, into times when trucks tend to  
4 travel. Customers may elect to shop in other areas with easier access and improved mobility. It is  
5 anticipated that congestion pricing would be implemented on this section of the I-5 corridor under  
6 the No-Build Alternative, as a result of the RMPP.

7 The Modified LPA would have both adverse and beneficial impacts, and the overall long-term  
8 economic effects after construction are expected to be positive. This is due to the Modified LPA's suite  
9 of highway, active transportation, and transit improvements that effectively and efficiently move  
10 people and commerce through this corridor, which serves a variety of interstate, regional, and local  
11 needs. The Modified LPA also would improve the movement of marine traffic along the Columbia  
12 River, as noted in Section 3.3. The bulk of potential negative economic impacts would result from  
13 business displacements, losses in parking, or changes in access to businesses.

14 Extending light rail transit across the Columbia River is a great improvement to the regional network  
15 and would attract some riders from their vehicles, potentially lowering VMT and the overall forecasted  
16 volumes of single-occupancy vehicles. This would extend the service life of the IBR program's highway  
17 improvements. Furthermore, transit improvements are often linked to economic development  
18 around station areas.

19 Enhanced vehicular and transit access to downtown Vancouver and across the Columbia River is  
20 expected to positively affect employers and businesses in the area. The Modified LPA could increase  
21 the attractiveness of commercial and industrial properties located in the vicinity of the interchanges  
22 by improving highway and transit access. This in turn may attract new businesses and make the  
23 location more attractive to employees. Variable tolls are likely to benefit freight-dependent  
24 businesses and businesses that rely on just-in-time deliveries because the predictability of travel  
25 would also increase. This benefit is somewhat offset by the fact that truck movements during peak  
26 periods would incur higher toll charges; however, peak freight travel times tend to fall outside the  
27 current peak periods for general-purpose traffic.

28 While there are some changes in direct and indirect impacts and/or benefits associated with the  
29 design options, these differences would not affect the conclusion (below) regarding the program's  
30 contribution to cumulative effects.

### 31 **3.5.2 Effects from Other Actions (Past, Present, Future)**

32 The I-5 corridor serves as the backbone of the region's transportation network. Many past projects  
33 have worked to solidify I-5 as the central component of the regional infrastructure, though  
34 development in recent decades has accompanied increased growth in other parts of the region. I-5 is  
35 used for freight, business, and personal travel. Freight needs are an important driver for future  
36 improvements along the I-5 corridor.

37 The Ports of Portland and Vancouver are critical to the economic growth and prosperity of the region.  
38 In order for the ports to remain competitive with other West Coast ports, efficient and cost-effective  
39 multimodal transportation systems must be available. The total annual tonnage moving through the  
40 two ports is expected to double from approximately 300 million tons in 2007 to almost 600 million

1 tons in 2040 (Cambridge Systematics 2015). This growth has implications for the transportation  
2 network as products move to, from, and within the region.

3 Similarly, economic growth in the region would increase demands along the I-5 corridor, as Metro  
4 forecasts that the number of jobs in the Portland-Vancouver Standard Metropolitan Statistical Area  
5 would increase by approximately 1.6% per year. This is slightly higher than the Oregon-area growth  
6 rate of 1.1% per year and the Washington state area growth rate of 1.0% per year (IBR 2023e).

7 Both the Metro RTP and the RTC RTP include several capacity and safety projects west of I-5 that are  
8 designed to improve safety and flow for commercial trucks traveling between I-5 and industrial areas  
9 to the west.

10 Planned improvements along Columbia Boulevard, Lombard Street, and Marine Drive would generally  
11 improve conditions for commercial trucks. Travel times for commercial trucks traveling along I-5 are  
12 expected to improve as a result of capacity projects associated with the 2015 Connecting Washington  
13 funding package, as well as additional projects north of Vancouver and south of the Expo Center, but  
14 gains would be offset by projected growth in population and employment.

### 15 3.5.3 Conclusions

16 The Modified LPA would positively contribute to other projects aimed at reducing congestion and  
17 enhancing freight mobility by further relieving congestion. Congestion relief in the study area would  
18 benefit freight traffic generated by Swan Island, the Rivergate area, the Port of Portland, and the Port  
19 of Vancouver. Incremental benefits would decrease travel times, increase mobility, and increase travel  
20 time reliability for freight vehicles.

21 The Modified LPA would enhance vehicular and transit access to and from downtown Vancouver, SR  
22 14, Evergreen Boulevard, and Mill Plain Boulevard, which would benefit employers, businesses, and  
23 economic activity. The Modified LPA would support the VCCV and the Hayden Island Plan by providing  
24 greater access and transit service.

25 Without the Modified LPA, economic development planned for the area may occur, albeit more slowly,  
26 as business owners may be more reluctant to locate in an area with restricted access caused by  
27 mobility constraints. Customers may elect to shop in other areas with lower levels of congestion and  
28 easier access. In combination with past, present, and foreseeable future actions, the Modified LPA  
29 would have a positive effect on economics.

## 30 3.6 Electromagnetic Fields

31 Please see the Electromagnetic Fields Technical Report for additional information (IBR 2023f).

### 32 3.6.1 Project Effects

33 Electromagnetic fields (EMF) are produced by power lines, electric wiring, and electric equipment and  
34 appliances, and other sources. The No-Build Alternative would not create any new sources of EMF,  
35 and future EMF exposure would likely remain similar to existing conditions.



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1 The extension of the light rail line under the Modified LPA would result in the generation of additional  
2 EMF within the study area (there would be no EMF-related impacts related to the highway  
3 components). Future levels of EMF along the extended light rail transit line would be identical to those  
4 produced in the current light rail system, since the proposed elements of the system such as power  
5 levels, substation ratings, and facility and system design would be the same as the existing  
6 Metropolitan Area Express (MAX) system. Based on EMF measurements and available data, operation  
7 of proposed segments of the MAX light rail would not generate sufficiently intense levels of EMF to  
8 cause significant exposure risks to human health.

9 Light-rail-generated EMF would be just one of many sources of EMF that make up the cumulative  
10 personal EMF field exposure. Because field strength decreases rapidly with distance from the source,  
11 cumulative EMF effects would only occur if other sources are co-located with the Modified LPA  
12 electrical infrastructure.

13 While there are some changes in direct and indirect impacts and/or benefits associated with the  
14 design options, these differences would not affect the conclusion (below) regarding the program's  
15 contribution to cumulative effects.

### 16 3.6.2 Effects from Other Actions (Past, Present, Future)

17 The existing EMF environment in the study area varies depending on location, as EMF levels are site-  
18 and time-specific. The main sources of EMF are the traction power system and traction power  
19 substations associated with the TriMet MAX light rail transit system. Future actions and trends likely to  
20 affect cumulative EMF exposure include increasing use of hybrid and electric vehicles, electronic  
21 equipment in general, and wireless devices. The frequencies and field strengths of different types of  
22 equipment vary widely. Scientists have found that EMF produce biological effects on humans and  
23 animals such as changes in the cell growth rates and intercellular communication (American Medical  
24 Association 1994). However, scientists do not agree on EMF's potential health effects because the  
25 available evidence is fragmentary, complex, and often inconclusive. The problem has been  
26 exacerbated by studies using "weak" scientific evidence, which have produced results that are  
27 contradictory to other studies (NIEHS 1991, 2002).

### 28 3.6.3 Conclusions

29 EMF is widespread throughout the general environment, and EMF levels from Portland's light rail  
30 system are well below the International Commission on Non-Ionizing Radiation Protection and  
31 American Conference of Governmental Industrial Hygienists exposure standards. Under the Modified  
32 LPA, there would be slightly increased cumulative exposure for persons riding or working on the light  
33 rail system. There is no evidence to indicate that light-rail-generated EMF would change the human  
34 health risk associated with cumulative EMF exposure. Combined with past, present, and foreseeable  
35 future actions, the Modified LPA would have a negligible effect on EMF exposure.

## 36 3.7 Energy

37 Please see the Energy Technical Report for additional information (IBR 2023g).

1 **3.7.1 Project Effects**

2 The energy analysis for the IBR program is cumulative in nature as it incorporates projected increases  
3 in traffic and regional growth and foreseeable future transportation projects. The results of the  
4 analysis showed that in 2045 conditions (under both the No-Build Alternative and the Modified LPA),  
5 energy consumption and GHG emissions are expected to be substantially lower than existing values  
6 for the region, which is consistent with national trends. Although the annual VMT in the study area  
7 would increase, GHG emissions would decrease substantially compared to baseline conditions (2015)  
8 due to the implementation of fuel and engine regulations. On a regional basis, future emissions would  
9 be similar under the No-Build Alternative and Modified LPA.

10 While there are some changes in direct and indirect impacts and/or benefits associated with the  
11 design options, these differences would not affect the conclusion (below) regarding the program’s  
12 contribution to cumulative effects.

13 **3.7.2 Effects from Other Actions (Past, Present, Future)**

14 Past actions that contributed to energy demand and use in the region include general development,  
15 such as the Vancouver Waterfront and multifamily buildings along Marine Drive, as well as population  
16 growth and transportation projects that led to an increase in the number of single-occupancy and  
17 freight vehicles. Some transportation projects, such as the expansion of C-TRAN’s bus service in  
18 Vancouver (including the introduction of bus rapid transit and electric express buses) and various  
19 improvements in TriMet’s bus and light rail system (including the extension of light rail to the Expo  
20 Center and the use of wind generated electricity for the MAX), likely reduced energy demand and use  
21 due to a mode shift from personal vehicles to public transit.

22 The future demand for energy will depend on trends in population, economic activity, energy prices,  
23 and adoption and implementation of technology. As noted above, the energy analysis is cumulative  
24 and concluded that energy consumption and GHG emissions are expected to be substantially lower  
25 than existing values for the region. The RMPP may reduce energy use through a reduction in the  
26 number of single-occupancy vehicles on the road caused by a mode shift to carpooling, public transit,  
27 and active transportation. Other planned developments—namely, Terminal 1 and the Renaissance  
28 Boardwalk development—will be designed and constructed to meet LEED Gold standards, which  
29 include requirements for reducing energy use.

30 **3.7.3 Conclusion**

31 Cumulative effects related to energy use are partially incorporated into the long-term energy demand  
32 estimates prepared for the IBR program. Those estimates are based on travel demand forecasts that  
33 factor in projected local changes in land use patterns, employment, population growth, and other  
34 programmed transportation improvements. Two factors related to the IBR program—1) the energy  
35 demand to construct the project and 2) background traffic growth in the corridor—are projected to  
36 increase petroleum demand, which will add to global oil demand. At the same time, operation of the  
37 Modified LPA is projected to lower the transportation demand for petroleum relative to the No-Build  
38 Alternative. When combined with past, present, and foreseeable future actions, the Modified LPA will  
39 have a negligible beneficial effect on energy.



## 1 3.8 Equity and Environmental Justice

2 Please see the Equity Technical Report and Environmental Justice Technical Report for additional  
3 information (IBR 2023h, 2023i).

### 4 3.8.1 Project Effects

5 The IBR program has made a commitment to the community to place equity at the center of the  
6 program, beyond legal and statutory requirements, such as the NEPA requirement to evaluate  
7 impacts to environmental justice (EJ) populations (low-income and minority populations). A  
8 foundational component of this commitment was the formation of an EAG, which developed a  
9 program-specific definition of equity and identified “equity priority communities” as those who  
10 experience and/or have experienced discrimination and exclusion based on identity or status. The  
11 communities include Black, Indigenous, and People of Color (BIPOC); people with disabilities;  
12 communities with limited English proficiency; persons with lower incomes; houseless individuals and  
13 families; immigrants and refugees; young people; and older adults.

14 The No-Build Alternative would not change the existing conditions that affect equity priority  
15 communities. There would be no acquisitions or displacements of residences or businesses. It would  
16 not provide the benefits that the Modified LPA would provide, including the extension of light rail,  
17 improvements to active transportation facilities, and improved bus service in the corridor. The current  
18 limited multimodal options hinder access to jobs and services—in particular, for segments of the  
19 population that use transit at a higher rate, including low-income individuals and people with  
20 disabilities. In addition, there would be no job creation, as associated with construction of the  
21 Modified LPA.

22 The Modified LPA would acquire right of way from residences and businesses along I-5 and the light  
23 rail transit alignment (see Section 3.1). It would displace households throughout the study area, and  
24 most of the displacements would occur in neighborhoods that have similar or lower proportions of  
25 minority and low-income populations relative to the region. Findings from the program’s EJ analysis  
26 identified property impacts in two EJ areas (Esther Short/Downtown Vancouver and Delta Park/North  
27 Portland), suggesting that these impacts are not anticipated to affect EJ populations  
28 disproportionately compared to the general population. However, the Equity Technical Report  
29 identified high concentrations of multiple equity priority communities in each area where  
30 displacements would occur. This does not necessarily mean that equity priority communities would  
31 be affected disproportionately; the characteristics of individual households will need to be assessed  
32 before this can be determined definitively. In accordance with the Uniform Act,<sup>4</sup> potentially displaced  
33 residents and businesses would be contacted and surveyed, and any displacements would be  
34 mitigated with a dedicated relocation plan.

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<sup>4</sup> Title 42 USC Section 4601, 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 acquisitions policies for federal and federally assisted programs.

1 Approximately 14 businesses on Hayden Island would be displaced, which would affect approximately  
2 130 employees. These service- and sales-sector jobs are sources of employment for low-income  
3 residents of Vancouver and North Portland. Some of these displaced businesses may choose not to  
4 relocate locally. Even with relocation assistance, some of the employees may be unable to retain their  
5 jobs; for example, an employee may have to accept a new job during the transition period of  
6 relocation.

7 For low-income populations, which are disproportionately BIPOC, the impacts of tolling, such as the  
8 share of total household income spent on transportation costs, may be disproportionate. The IBR  
9 program and EAG are looking into how this impact could be mitigated through a low-income toll  
10 program. Low-income populations would also benefit from the Modified LPA through the construction  
11 of light rail transit; increased transit frequencies; improved travel times on I-5; significantly improved  
12 bike and pedestrian facilities; and safer vehicle, bicycle, and pedestrian travel. The construction of  
13 light rail transit would provide a lower cost option than single-occupancy vehicles occupancy  
14 vehicles, which would be subject to tolls.

15 *Please note: The discussion and conclusions regarding equity and EJ will be updated as additional*  
16 *conversations occur and decisions are made regarding a low-income toll program.*

17 The Modified LPA would provide benefits to equity priority communities in terms of increased mobility  
18 and accessibility, particularly due to the high-capacity transit and active transportation elements. The  
19 decrease in transit travel time and increase in transit reliability would be a key benefit for all those  
20 traveling through the area, but particularly for low-income individuals and people with disabilities,  
21 who ride transit proportionally more than people with higher incomes or without a disability. Transit  
22 access would be improved for all equity priority communities within the study area, with a 50% or  
23 greater increase in access to jobs (compared to the No-Build Alternative). Furthermore, under the  
24 Modified LPA, air quality would improve for the region, including for meaningfully greater and high-  
25 priority EJ areas within the study area<sup>5</sup>.

26 While there are some changes in direct and indirect impacts and/or benefits associated with the  
27 design options, these differences would not affect the conclusion (below) regarding the program's  
28 contribution to cumulative effects.

### 29 3.8.2 Effects from Other Actions (Past, Present, Future)

30 EJ populations and equity priority communities in the study area have been affected by past actions  
31 that generate noise and air pollution (see Sections 3.2 and 3.11) that have displaced residents and  
32 businesses (see Section 3.1) and that have had socioeconomic impacts on these populations (see  
33 Sections 3.4 and 3.10). The Vanport Flood and subsequent displacements, in particular, had a  
34 disproportionate impact on EJ populations.

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<sup>5</sup> For purposes of the 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 with two times greater than the average for the Portland-Vancouver Region are considered “high-priority” EJ areas. These thresholds are used to determine the proportional impact of environmental effects on EJ populations compared to the general population.

1 Some past actions have also provided benefits to one or more of these populations, including  
2 improved access and mobility associated with roadway and transit improvements, programs and  
3 regulations put into place to control air pollution emissions, public housing development, and  
4 employment and training opportunities associated with commercial and educational development.  
5 Generally, the development of transit by C-TRAN and TriMet, including the MAX Yellow Line through  
6 North Portland, benefits the general population as well as communities with a higher reliance on  
7 transit, including low-income populations and people with disabilities.

8 The original construction of I-5 and I-205 through Portland had significant effects on the populations  
9 in and adjacent to the highway's path. The increased proximity of mobile source air pollutants  
10 resulting from the construction of these roadways elevated the risk of these populations to an  
11 increased incidence and severity of health problems. ODOT cleared entire blocks for development of  
12 the roadway, dividing neighborhoods, displacing residences, and affecting businesses in the historic  
13 epicenter of Portland's Black community. The construction of I-5 through Vancouver changed the city  
14 by closing 5th Street (the route heading east) and encouraging development of housing to the north of  
15 downtown. Fewer displacements occurred in Vancouver because the area was less densely developed  
16 than Portland at that time.

17 One socioeconomic impact attributed to the cumulative effect of population growth and  
18 development is an increase in the cost of living. Between 2000 and 2021, median gross rent increased  
19 52% in Portland, 48% in Multnomah County, 40% in Vancouver, and 41% in Clark County (adjusted for  
20 inflation) (U.S. Census Bureau 2000, 2021). In the same time period, median household income  
21 increased just 15% in Portland and 11% in Multnomah County, and median household income  
22 decreased 4% in Vancouver and 7% in Clark County (U.S. Census Bureau 2021). As the cost of living  
23 increases, low-income households often move farther from jobs and services to find affordable  
24 housing. This can result in longer commute times and higher transportation costs for low-income  
25 households.

26 Future actions are likely to include federal and state guidelines, such as the Uniform Relocation Act,  
27 which determine standards and procedures for providing replacement housing and relocation benefit  
28 packages. Other future transportation projects are likely to implement low-income or equitable  
29 tolling policy to subsidize or offset the economic burden of tolling on low-income and minority  
30 populations. These transportation projects may also address mitigation measures for impacts related  
31 to traffic operations, noise, and air quality.

### 32 3.8.3 Conclusions

33 Past projects directly affected equity priority communities, including EJ populations, in the I-5  
34 corridor (such as the displacements associated with the 1960 construction of I-5 through North  
35 Portland). Construction of the Modified LPA would not generate a disproportionately high and  
36 adverse human health or environmental effect on an equity priority community. In addition, the  
37 benefits of the Modified LPA are expected to accrue to equity priority communities as well as the  
38 general population. Some people, including minority and low-income individuals, would be adversely  
39 affected by the program (i.e., by displacement of businesses and residents, and noise and traffic  
40 during construction). But in general, the Modified LPA would be likely to improve conditions (such as

1 noise, air pollution, poor access, and poor transit service) for populations and neighborhoods that  
2 have historically been adversely affected by other past actions.

3 Finally, potential mitigation, as discussed in the Equity and Environmental Justice Technical Reports  
4 (e.g., transportation assistance for tolling impacts and enhanced communications), could minimize  
5 impacts and increase benefits to equity priority communities, including EJ populations. Combined  
6 with past, present, and foreseeable future actions, the Modified LPA will have both beneficial and  
7 adverse effects on equity priority communities, including EJ populations.

## 8 3.9 Hazardous Materials

9 Please see the Hazardous Materials Technical Report for additional information (IBR 2023j).

### 10 3.9.1 Project Effects

11 The study area is heavily urbanized, and many of the past and present land uses have generated,  
12 used, and/or stored hazardous materials. Hazardous material sites that are most likely to impact the  
13 program are those being acquired for right of way or near the roadway or guideway alignments.  
14 Because there would be no acquisitions or displacements under the No-Build Alternative, there is no  
15 potential for property acquisition liability. However, the potential for adverse effects from spills or  
16 releases of hazardous substances or petroleum products is higher than for the Modified LPA as the  
17 improvements identified below would not be implemented, and adverse effects on the environment  
18 could occur from the operation and maintenance of the existing stormwater conveyance and  
19 treatment facilities.

20 For the Modified LPA, disturbances of existing hazardous materials sites would result in site cleanup  
21 and could increase demand for contaminated soil disposal facilities. Construction and excavation  
22 workers or ecologic receptors could be subject to cumulative exposure to hazardous materials. It is  
23 not anticipated that the operation or maintenance of the Modified LPA would increase the occurrence  
24 or transport of hazardous materials within the study area.

25 Construction of the Modified LPA would include updated road and bridge designs, and these updates  
26 would include controls associated with the stormwater system to contain and/or better manage  
27 releases on roadways and bridges. Additional updates include improvements in roadway access and  
28 traffic safety, thereby benefitting emergency response vehicles.

29 Long-term adverse effects on human health and the environment from hazardous materials would  
30 likely be reduced because the Modified LPA would involve:

- 31 • Upgrades or enhancements to the current stormwater conveyance and treatment system,  
32 which would reduce the spread of existing residual contaminants to soil, surface water, and  
33 groundwater from stormwater runoff and infiltration.
- 34 • Likely placement of surficial caps or barriers at any sites identified with existing  
35 contamination, which would decrease likelihood of direct exposure to potential receptors.

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- 1       • Increases and enhancements of roadway and transit system capacities. This could lower the  
2       frequency of incidental spills or releases of hazardous substances associated with trucking  
3       and automotive transit.

4       While there are some changes in direct and indirect impacts and/or benefits associated with the  
5       design options, these differences would not affect the conclusion (below) regarding the program’s  
6       contribution to cumulative effects.

### 7       3.9.2       Effects from Other Actions (Past, Present, Future)

8       The evaluation of risks to the IBR program from existing hazardous materials is based on a review of  
9       past actions and their effects on existing and potential soil and groundwater contamination.

10      There may also be unknown contamination caused by past land uses and actions in the study area  
11      that pose additional risks.

12      Future unrelated development in the study area could add exposure risks, as well as provide cleanup  
13      and remediation benefits. Population and employment growth could cause increased traffic that may  
14      result in slightly more incidents of hazardous materials spills. Since 1964, several laws have been  
15      implemented that have led to improved handling of hazardous materials, reducing the amount of new  
16      hazardous materials released into the soil and groundwater. Environmental liability laws generally  
17      require identification and cleanup of hazardous materials during property transfers, which have  
18      resulted in the overall reduction of hazardous material contamination near the study area.

### 19      3.9.3       Conclusions

20      Construction of the Modified LPA would involve cleanup of some contamination associated with past  
21      releases of hazardous materials (by cleaning up existing contaminated sites that would be acquired  
22      for the program) and would reduce the risk of future contamination from highway crashes (by  
23      improving highway safety and by capturing, conveying, and treating stormwater runoff). Because any  
24      hazardous material discovered during construction would be remediated, development of the  
25      Modified LPA could result in reduced hazardous material exposure for the general public. In  
26      combination with past, present, and foreseeable future actions, the Modified LPA would make a  
27      positive contribution to cumulative effects on hazardous materials. Furthermore, these improvements  
28      are anticipated to have a cumulative beneficial impact to groundwater, human, and ecological  
29      receptors in the study area.

## 30      3.10 Land Use

31      Please see the Land Use Technical Report for additional information (IBR 2023k).

### 32      3.10.1      Project Effects

33      The No-Build Alternative would not support the principal elements of adopted growth management  
34      and community plans for the area, including goals pertaining to accepted levels of service; improved  
35      freight mobility; multimodal transportation; focused, compact development; and safety.

1 The Modified LPA is consistent with local plans and policies, which encourage investment in inner  
2 urban infrastructure, multimodal transportation, freight mobility, economic development, and  
3 compact urban development. In total, the Modified LPA would convert approximately 39 acres of land  
4 to transportation use (see Section 3.1). Although these conversions could reduce the area of land  
5 potentially available for non-transportation uses to a small extent, they would account for only a  
6 small portion of the total land in the Portland/Vancouver area and therefore would not be substantial  
7 in a regional context. Further, these changes, which would result from the extension of light rail transit  
8 and the development of parking structures and other transportation infrastructure, are consistent  
9 with the goals and policies of adopted land use and transportation plans. The greatest direct impacts  
10 on existing land uses would result from the displacement of an estimated 14 businesses on Hayden  
11 Island and, potentially, the construction of a large park-and-ride facility in downtown Vancouver,  
12 depending on the location chosen. Additional impacts are expected to result from the displacement of  
13 single-family dwellings in Upper Vancouver as well as multifamily dwellings and commercial  
14 properties in downtown Vancouver to accommodate the reconstruction of the SR 14, Mill Plain,  
15 Fourth Plan, and SR 500 interchanges; the realignment of I-5 between those interchanges; and the  
16 extension of light rail to Evergreen Station.

17 The addition of light rail stations in Hayden Island and downtown Vancouver is expected to contribute  
18 to economic development with vibrant mixed-use urban nodes. There is a moderate to high potential  
19 for transit-oriented development on Hayden Island and in the city of Vancouver (particularly the Mill  
20 Plain district). Plans adopted by the City of Portland and Metro call for the extension of light rail to  
21 Hayden Island. The Modified LPA is not expected to lead to different future land uses than would occur  
22 without the program.

23 While there are some changes in direct and indirect impacts and/or benefits associated with the  
24 design options, these differences would not affect the conclusion (below) regarding the program's  
25 contribution to cumulative effects.

### 26 3.10.2 Effects from Other Actions (Past, Present, Future)

27 Past development in the area transformed land use over time from wilderness to ever-increasing  
28 urbanization. Since the 1950s, actions affecting land use have included the construction of I-5 and  
29 other transportation projects, increasing urbanization, and new growth management regulations.  
30 Modeling also suggests that regional land use plans that channeled growth and transportation  
31 development to other parts of the region may have reduced employment growth and housing  
32 demand in the North Portland and Vancouver portions of the I-5 corridor. The lack of any major  
33 improvements to I-5 highway operations in this location since the 1960s has also allowed gradual  
34 deterioration of highway operations and safety and reliability, which in turn could further contribute  
35 to the distribution of some portion of population and employment growth to other parts of the region.

36 Land use on Hayden Island has been defined by residential development and commercial  
37 development, including the Jantzen Beach Center (a regional large-format retail shopping center) and  
38 surrounding retailers. Residential uses in the area include manufactured homes and floating homes  
39 associated with small marinas, as well as other low- to medium-density developments. The City of  
40 Portland completed a planning project for Hayden Island in 2009, which calls for redevelopment of  
41 the commercial core—transitioning from the current large-scale retail land use pattern to a more



1 urban form with more mixed uses, pedestrian-scale design, and transit orientation. The plan identifies  
2 a replacement I-bridge over the Columbia River as one element of future development on the island.

3 Vancouver’s downtown has changed greatly during the past decade. The focus of the downtown and  
4 waterfront areas has broadened from predominantly office (and some industrial) uses to tourism and  
5 recreation development, retail shopping, meeting and convention activities, housing, and  
6 entertainment. Along with revitalizing overall downtown activity, new residential opportunities and  
7 revitalization of the retail core and central waterfront have been emphasized. New office and mixed-  
8 use development has increased in the last decade, with projects such as the Vancouver Waterfront  
9 and numerous smaller projects. New and growing uses in the downtown area include eateries, bars/  
10 taverns, and personal services. These projects have value commercially, in terms of both tax revenue  
11 and providing inner urban opportunities for family-wage jobs.

12 The VCCV, adopted in 2007, continues to guide development in and around downtown Vancouver.

### 13 3.10.3 Conclusions

14 The Modified LPA would generally support the land use policies listed in Section 2.5.4, above, and be  
15 generally consistent with expected development trends. Under the Modified LPA, subsequent  
16 development would potentially be more urban in nature and focused near light rail facilities. The  
17 Modified LPA would support the intensification and mixing of land uses both on Hayden Island and in  
18 Vancouver. These changes in land use have been planned for and are consistent with adopted  
19 policies. Large transportation projects can have far-reaching effects on regional travel and land use  
20 patterns, and decreased highway travel times could have an indirect influence on land development  
21 demand near the current urban fringe. However, Portland and Vancouver have accounted for future  
22 anticipated growth in their planning documents and provide strategies, visions, and goals to guide  
23 growth and development within the area. Additionally, both Oregon and Washington have adopted  
24 statewide land use and growth management planning mechanisms to guide and control land use and  
25 development patterns. As a result, the Modified LPA is not expected to have indirect growth-inducing  
26 impacts that are contrary to the goals of applicable land use plans or create unplanned changes in  
27 existing land use patterns. See the Land Use Technical Report for additional details.

28 The Modified LPA would continue the trend of roadway development, and the more recent trend of  
29 transit development, and would balance that development with the improvement of bicycle and  
30 pedestrian infrastructure. The addition of the Community Connector at Evergreen Boulevard would  
31 further balance roadway and transit development with improved bicycle and pedestrian facilities to  
32 address existing gaps in connectivity and neighborhood cohesion created by the past construction  
33 and presence of I-5. Combined with past, present, and foreseeable future actions, the Modified LPA  
34 would have a slightly positive cumulative effect on land uses in the area.

## 35 3.11 Neighborhoods and Population

36 Please see the Draft Neighborhoods and Population Technical Report for additional information (IBR  
37 2023).

1 **3.11.1 Project Effects**

2 The No-Build Alternative would not displace any residences or businesses and would not impact  
3 community cohesion. However, traffic congestion and safety would continue to worsen, and there  
4 would be no improved access associated with the extension of light rail service and improvements to  
5 the active transportation network.

6 The largest neighborhood-related adverse impact from the Modified LPA would occur on Hayden  
7 Island, where the program would displace 32 floating homes in North Portland Harbor (see section  
8 3.1).

9 The Modified LPA would displace approximately 14 commercial/retail businesses on Hayden Island,  
10 most of which are chain restaurants directly adjacent to the current location of the highway. Although  
11 restaurants are not typically considered community resources, the loss of these businesses, if not  
12 relocated on the island or replaced by other businesses, would result in fewer dining choices on  
13 Hayden Island and could impact neighborhood cohesion. This is a notably smaller contribution to  
14 cumulative effects than the CRC project, which would have displaced approximately 40 businesses on  
15 Hayden Island, including the only grocery store and bank on the island (which have since closed).

16 Four parcels would be affected by the expansion of the maintenance center in the Rockwood  
17 neighborhood in Gresham, Oregon. Within these four parcels, one residence and three light industrial  
18 businesses would be displaced. The residence is a single-family home that is currently vacant and no  
19 longer habitable. Because of previous impacts, little neighborhood cohesion remains in the  
20 immediate area.

21 The Modified LPA would improve circulation on Hayden Island and reduce the hours of congestion in  
22 this area along I-5. Additionally, the bike and pedestrian connection to the existing Interstate Bridge,  
23 which is currently substandard and difficult to navigate, would be replaced by a new shared-use path,  
24 and a light rail transit station would serve the island. Other neighborhoods would also be affected by  
25 the Modified LPA. In the Kenton neighborhood, the Modified LPA would displace several structures  
26 around the Marine Drive interchange, including three floating homes and one single-family home on  
27 land. Three businesses would also be displaced in this area.

28 While there are some changes in direct and indirect impacts and/or benefits associated with the  
29 design options, these differences would not affect the conclusion (below) regarding the program's  
30 contribution to cumulative effects.

31 **3.11.2 Effects from Other Actions (Past, Present, Future)**

32 As described in Section 3.8, past highway development had significant effects on neighborhoods  
33 along the I-5 corridor. The development of I-5 required the acquisition of right of way and the  
34 relocation of many businesses and homes, and contributed to a loss of community cohesion. Local  
35 planning efforts serve to strategically place and design current and future transportation so as to  
36 maximize benefits and minimize negative impacts.

1 In the Rockwood neighborhood in Gresham, the original development of the Ruby Junction  
2 Maintenance Facility (opened in 1984), and subsequent expansions and improvements displaced  
3 existing uses from that site, including single-family residences.

4 The only supermarket on Hayden Island (Safeway) closed in 2018, leaving residents of Hayden Island  
5 without a full grocery store. However, groceries are available at the Target in the Jantzen Beach  
6 Shopping Center, and simple groceries are also available at the Plaid Pantry on North Hayden Island  
7 Drive. The only bank in the neighborhood, Wells Fargo on Jantzen Drive, closed in 2020. Now, financial  
8 services on Hayden Island are limited to a handful of ATMs. While past actions, such as the  
9 construction of I-5, have reduced community cohesion on Hayden Island, potential future  
10 redevelopment of the area that is less auto-oriented and more pedestrian-friendly could improve  
11 community cohesion.

### 12 3.11.3 Conclusions

13 Past projects (such as the displacements associated with the construction of I-5 through North  
14 Portland) directly impacted neighborhoods in the I-5 corridor. These neighborhoods have  
15 experienced both incremental adverse effects and improvements since then. More recent  
16 transportation projects have generally provided net benefits through improved access, pedestrian-  
17 oriented development, mitigation, and other amenities. The Modified LPA is expected to continue this  
18 more recent positive trend in the corridor. The exception would be on Hayden Island, where the  
19 Modified LPA would displace sufficient commercial and residential activities on the island to  
20 constitute an adverse impact. However, the provision of a light rail station, the connection of  
21 Tomahawk Island Drive under I-5, and the improved access and capacity of the Hayden Island  
22 interchange all may contribute to the viability and success of redevelopment plans for the island.

23 One major difference, however, between these impacts and the impacts of past actions, is that past  
24 projects were not always planned and implemented with meaningful input from and communication  
25 with the public. Involving communities and understanding impacts has become an essential part of  
26 project planning. This allows projects to reduce impacts more successfully where possible or mitigate  
27 impacts where they cannot be reduced. Providing overall benefits to Hayden Island neighborhoods  
28 would require successfully relocating displaced floating home residents, and successfully relocating  
29 or reestablishing the neighborhood-serving businesses that would be displaced during construction.  
30 When combined with past, present, and foreseeable future actions, the Modified LPA will have a  
31 slightly positive effect on neighborhoods.

## 32 3.12 Noise and Vibration

33 Please see the Noise and Vibration Technical Report for additional information (IBR 2023m).

### 34 3.12.1 Project Effects

35 The noise modeling prepared for the IBR program incorporates anticipated regional growth and  
36 foreseeable transportation projects. As such, the results of the modeling reflect cumulative effects on  
37 noise and vibration conditions in the study area. As documented in the Noise and Vibration Technical  
38 Report, the Modified LPA would contribute to existing and projected levels of noise and vibration.

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1 Design features associated with the Modified LPA, such as noise walls and the Community Connector  
2 south of East Evergreen Boulevard, may mitigate traffic noise levels that are projected.

3 While there are some changes in direct and indirect impacts and/or benefits associated with the  
4 design options, these differences would not affect the conclusion (below) regarding the program's  
5 contribution to cumulative effects.

### 6 3.12.2 Effects from Other Actions (Past, Present, Future)

7 The noise environment in the general program vicinity has long been characterized by typical urban  
8 noise sources and noise levels. Sources include traffic on I-5, SR 14, SR 500, Martin Luther King Jr.  
9 Boulevard, Marine Drive, and various arterials and other roadways. Air traffic associated with PDX and  
10 Pearson Field is also a substantial source of noise that has increased over time. Marine vessels on the  
11 river, trains on two rail lines, and industrial uses and the Portland International Raceway further add  
12 to the cumulative noise environment.

13 In the future, projected growth in both air traffic and freight rail traffic is expected to increase noise  
14 levels in the study area. If the land use plans for the City of Vancouver and Hayden Island are realized,  
15 then residential and commercial construction activities could be a substantial, intermittent source of  
16 noise over the next couple decades. Highway noise would also be expected to increase over time as  
17 population and employment growth lead to increased single-occupancy and freight vehicle trips. This  
18 projected highway noise increase is reflected in the IBR program traffic noise analysis, which is based  
19 on the region's projected increase in population and employment through 2045. Similarly, noise and  
20 vibration effects from the light rail corridor will continue to increase as rail volumes increase.

21 In the study area, there are currently an estimated 164 traffic noise impacts to noise sensitive land  
22 uses along I-5, and that number is expected to increase to 235 (under the future No-Build Alternative).  
23 Under the No-Build Alternative, no new noise walls would be constructed. Background traffic growth  
24 would cause a general increase in traffic noise levels throughout the study area.

### 25 3.12.3 Conclusions

26 Many residences and other uses in the study area, including those adjacent to I-5 and the proposed  
27 light rail transit guideway, have experienced increasing noise levels over time, resulting from steady  
28 growth in vehicle traffic, air traffic, and other urban noise sources. These receivers are expected to  
29 experience continually increasing noise levels in the future as population, employment, highway  
30 traffic, air traffic, freight rail traffic, and other sources grow. To mitigate potential program-related  
31 noise effects, mitigation measures that meet ODOT's and WSDOT's feasibility and reasonableness  
32 criteria may be recommended for inclusion in the program. Mitigation measures will consider criteria  
33 for impacts related to the program, as well as the cumulative effects of traffic noise from prior actions.  
34 When combined with past, present, and foreseeable future actions, the Modified LPA would  
35 contribute to increasing noise and vibration levels.

## 1 3.13 Public Services and Utilities

2 Please see the Public Services Technical Report and Utilities Technical Report for additional  
3 information (IBR 2023n, 2023o).

### 4 3.13.1 Project Effects

5 The No-Build Alternative would not change existing utility connections and public services, such as  
6 emergency response; however, over time both would be adversely impacted by safety issues and/or  
7 worsening congestion. The North Portland Harbor and Interstate bridges are not designed to current  
8 seismic standards and could fail and possibly collapse in the event of a catastrophic earthquake,  
9 which would disrupt both utility connections and public services. In addition, public services such as  
10 schools and libraries would continue to be hindered by limited public transit and substandard bicycle  
11 and pedestrian facilities.

12 Overall, the direct physical impacts to public services from the Modified LPA would be minor. The  
13 Modified LPA would directly impact six public service facilities: one medical center property, two  
14 school-related sites, and three “other” (non-categorized) facilities. Of these facilities, the medical  
15 facility, schools, and two of the “other” facilities would undergo limited impacts that would not affect  
16 their operations or services. The remaining facility (the FHWA’s Western Federal Lands office property)  
17 would lose some parking, landscaping, and signage under Design Option A, but, with the exception of  
18 the loss of some parking and potentially altered access routes, the operations would not be adversely  
19 affected. The Modified LPA would impact several major utilities, including water, power, gas, and  
20 communications infrastructure in Vancouver, as well as on or near the North Portland Harbor bridge.  
21 Proposed mitigation would generally consist of either protecting a utility in situ or relocating it. The  
22 goal would be to ensure that program-related changes do not impair existing overall levels of service.

23 Projected traffic congestion on local streets under the No-Build Alternative and the Modified LPA  
24 would include some intersections performing at unacceptable levels of service. Intersections with  
25 unacceptable levels of service negatively impact the mobile services of public service providers and  
26 cause delays in response times for emergency vehicles. Mitigation is proposed under the Modified LPA  
27 to reduce the number of failing intersections, which would lessen the impact to public services.

28 While there are some changes in direct and indirect impacts and/or benefits associated with the  
29 design options, these differences would not affect the conclusion (below) regarding the program’s  
30 contribution to cumulative effects.

### 31 3.13.2 Effects from Other Actions (Past, Present, Future)

32 Past population growth has incrementally increased demand on public services and utilities. It is  
33 anticipated that the primary effects from most future projects would be changes to traffic patterns  
34 and increased demand on services and utilities. These effects are mitigated via coordination with and  
35 participation from affected service providers. These providers are generally included in planning  
36 processes and have adequate time to make needed adjustments prior to changes in development  
37 patterns and the street network.

### 1 3.13.3 Conclusions

2 Adopted land use plans and projected population growth are expected to create an increased  
3 demand for public services and utilities. However, since those increases are planned, it is reasonable  
4 to assume that the public service sector and utility providers would have adequate time to plan and  
5 adjust for future conditions. The adverse effects of increased demand could be slightly exacerbated by  
6 the proposed light rail operations and express buses on the shoulders as they would decrease auto  
7 capacity on some local streets and prohibit some turning movements. Beneficial impacts from the  
8 Modified LPA would include fewer accidents on I-5 due to safety improvements and improved  
9 emergency response times on I-5 and other roadways where congestion would be decreased. When  
10 considered in combination with past, present, and foreseeable future actions, the Modified LPA would  
11 have a beneficial effect on public services and little to no effect on utilities.

## 12 3.14 Transportation

13 Please see the Transportation Technical Report for additional information (IBR 2023p).

### 14 3.14.1 Project Effects

15 The traffic and transit modeling prepared for the IBR program incorporates anticipated regional  
16 growth and foreseeable future transportation projects. As such, the results of the modeling reflect  
17 cumulative effects on transportation conditions in the study area. The Transportation Technical  
18 Report documents that the Modified LPA would reduce freight and vehicle congestion, improve safety,  
19 and improve the reliability and connectivity of active transportation and transit networks. The  
20 highway, transit, and active transportation network improvements would make the I-5 corridor more  
21 attractive to users, and the shift in traffic patterns would result in increased traffic volumes on some  
22 local roads.

23 While there are some changes in direct and indirect impacts and/or benefits associated with the  
24 design options, these differences would not affect the conclusion (below) regarding the program's  
25 contribution to cumulative effects.

### 26 3.14.2 Effects from Other Actions (Past, Present, Future)

27 Past and present actions affecting transportation in the study area (and region) include population  
28 growth and accompanying development, which have subsequently led to an increase in the number  
29 of single-occupancy and freight vehicles on roads, as well as the expansion of public transit and active  
30 transportation networks. The increase in congestion and vehicle collisions can largely be attributed to  
31 this growth. Past transportation improvements in the area include expansion and increase in service  
32 of TriMet's bus and light rail system (including the extension of light rail to the Expo Center), as well as  
33 C-TRAN's bus service (including the introduction of bus rapid transit).

34 The RMPP (currently under assessment) is anticipated to have notable effects on transportation  
35 conditions on the I-5 and I-205 corridors, with spillover effects onto other roads in the region. The  
36 introduction of congestion pricing would likely contribute to the cumulative effects of several future



1 projects, including the IBR program, that will reduce congestion and increase the use of public transit  
2 and active transportation.

3 It is likely that future growth and development will continue to drive increases in the number of  
4 vehicles, as well as expansions of the transit and active transportation systems. Planned  
5 transportation improvements in the study area (in addition to those included in the program) include  
6 the Bridgeton Trail along the shoreline of North Portland Harbor in Portland and a public walkway  
7 along Vancouver’s shoreline as part of the Renaissance Boardwalk development.

### 8 3.14.3 Conclusions

9 When the Modified LPA is considered alongside other future actions, the key drivers of transportation  
10 demand—population growth and accompanying development patterns—will continue to affect the  
11 mobility of all transportation modes (single-occupancy and freight vehicles, transit, and active  
12 transportation) in the study area and region. Improvements to transportation supply through  
13 increased roadway and transit capacity, travel demand management programs, and improved active  
14 transportation network connections will mitigate the forecasted increase in congestion and vehicle  
15 collisions. When combined with past, present, and foreseeable future actions, the Modified LPA would  
16 have a beneficial effect on transportation.

## 17 3.15 Visual Quality and Aesthetics

18 Please see the Visual Quality and Aesthetics Technical Report for additional information (IBR 2023q).

### 19 3.15.1 Project Effects

20 Natural and cultural visual elements associated with the No-Build Alternative would be expected to be  
21 compatible with the existing visual environment and would likely not change the existing visual  
22 quality or aesthetics of the study area. Project coherence would be negatively affected by increased  
23 traffic and congestion, while other planned transportation projects would be coherent with the  
24 existing environment. However, since traveling and neighboring viewers would typically not be  
25 sensitive to changes in project coherence, the overall impact on visual quality would be neutral.

26 The primary elements of the Modified LPA that affect visual quality and character are new highway  
27 bridge structures across North Portland Harbor and the Columbia River, interchanges, transit bridges,  
28 stations, park-and-ride facilities, and light rail transit guideways. The visual quality of the entire length  
29 of the corridor and all landscape units would be affected. Visual changes would occur from the  
30 following:

- 31 • The removal of the existing bridges, including the lift towers.
- 32 • Additional of the new structures across the Columbia River.
- 33 • The widened or higher ramps for reconfigured interchanges at Marine Drive, Hayden Island, SR  
34 14, Mill Plain, and SR 500.
- 35 • The effective widening of I-5 corridor due to the addition of auxiliary lanes and safety  
36 shoulders along I-5.

1 Existing roadside vegetation serves to soften the effect of the built environment within the  
2 transportation corridor. Elimination of roadside vegetation without restoration of such would reduce  
3 natural elements within the corridor.

4 Other visual changes would result from new transit stations and accompanying park-and-ride  
5 structures. While there are some changes in direct and indirect impacts and/or benefits associated  
6 with the design options, these differences would not affect the conclusion (below) regarding the  
7 program's contribution to cumulative effects.

### 8 3.15.2 Effects from Other Actions (Past, Present, Future)

9 In the Columbia River, Portland, and Vancouver areas, visual character has steadily evolved from a  
10 more natural character, through rural and agriculture, to suburban and urban. The I-5 corridor has  
11 steadily grown in development intensity and in use as a major transportation route.

12 The continued intensification of the corridor has led to a decline in the quality of many views due to  
13 obstruction of scenic or natural landscapes by buildings, walls, signage, berms and ramps, pilings,  
14 columns, bridges, and loss of vegetation. Continued decline is not inevitable if cities and the region  
15 implement well-designed, visually coherent urban design that protects scenic or important views.  
16 Existing regulations include City of Vancouver, City of Portland, Clark County, Multnomah County, and  
17 other local, regional, state, and federal agency plans containing policies that protect views and  
18 aesthetic resources.

19 Unrelated projects involving transportation, urban design, and development will be implemented and  
20 continue the transformation of the landscapes of the Columbia River, Portland, and Vancouver region.  
21 The trend has been, and is likely to continue to be, one of increasing urbanization. The following  
22 projects are being considered by various jurisdictions and agencies:

- 23 • Interchange improvements such as constructing or rebuilding highway ramps.
- 24 • Bridge upgrades, replacement, or construction.
- 25 • Local street network and regional access route improvements.
- 26 • New traffic signals, wider sidewalks, curb extensions, bike lanes, on-street parking and street  
27 trees, pedestrian crossings, and pavement reconstruction.
- 28 • Intersection realignment.
- 29 • Various urban development projects throughout downtown Vancouver.
- 30 • The redevelopment of the central Hayden Island commercial area.

### 31 3.15.3 Conclusions

32 Cumulative visual impacts are observable when the character of a place changes over time (for  
33 example, from an agricultural landscape to residential development) or when the vividness, unity, or  
34 intactness of the visual environment changes. Within the study area, visual character has steadily  
35 progressed toward a compact mixed-use urban form, progressing from a more natural character prior  
36 to the mid-1800s through rural, agricultural, and early Euro-American settlement periods. The I-5  
37 corridor has steadily grown in footprint and intensity of use as a major transportation route.

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- 1 Overall, impacts from the Modified LPA would continue and reinforce that urban transportation  
2 corridor character. In some cases, such as a light rail station, the intensification would implement  
3 adopted goals for urban vibrancy and activity centers. In other cases, such as the higher and more  
4 visually complex SR 14 interchange, visual impacts would represent a continuation of changes that  
5 are less supportive of downtown livability, human scale, and historic preservation. Lighting elements  
6 would be unified throughout the project using similar lines, colors, and styles; furthermore, light and  
7 glare impacts from fixed light sources are expected to be less than under the No-Build Alternative, as  
8 replacement lights would be designed with modern fixtures and materials that limit light spill and  
9 glare and reduce ambient light levels.
- 10 When combined with past, present, and foreseeable future actions, the Modified LPA would have a  
11 negligible effect on visual and aesthetic resources.

## 4. NATURAL ENVIRONMENT CUMULATIVE EFFECTS

*Please note: the draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised.*

This section discusses the cumulative effects on the natural environment. Local, state, and federal regulations require protection of natural areas, slowing the destruction of these habitats and mandating replacement of their functions. Where feasible, the approach for analyzing cumulative effects under the federal Endangered Species Act and other state or federal regulations, as applicable, was coordinated to develop a common area of analysis.

The natural environment includes the following resource areas:

- Ecosystems (terrestrial and aquatic habitats, and plant and animal species)
- Geology and groundwater
- Water quality and hydrology
- Wetlands and waters

Key natural resources in the vicinity of the program include Burnt Bridge Creek, the Columbia River, and the backwaters and other tributaries of the Columbia River, including the Columbia Slough. Non-transportation-related projects that are considered in the analysis include the Columbia River levee project and active habitat improvement and restoration activities on the Columbia Slough and Burnt Bridge Creek.

Historical environmental conditions within the study area were greatly influenced by the seasonal flows of the Columbia River. Historically, river volumes were highest between April and September during basinwide snowmelt, and lowest from December to February, when much of the basin's moisture can be locked up in snow and ice.

Although annual flooding affected the Oregon side of the study area much more than the Washington side, flood-control measures have been implemented that affect the entire lower Columbia River environment. Levees and river embankments were constructed in the early 1900s on both sides of the river, which isolated the majority of the floodplain from all but the highest flows. As the floodplain experienced increased development, elaborate pumping operations were implemented on the Oregon side to prevent overbank flow. Today, pumps run 9 to 10 months a year, and continuously 24 hours every day during the winter rainy period, resulting in over a billion gallons pumped per day by MCDD #1. Dams constructed in the mainstem Columbia River have effectively regulated flows, starting with completion of the Bonneville Dam in 1938.

The temporal frame of reference for the natural environment “past” will generally be from the broad changes that began in the 1800s. The temporal frame of reference for the “future” will generally be through 2045, which is the planning horizon for the regional transportation model, and the year to which impacts can be reliably identified (either quantitatively or qualitatively) without speculation.

1 Long-term cumulative effects that can be non-speculatively predicted extending beyond the 2045  
2 planning horizon that are related to project lifecycle will be considered qualitatively.

3 For a discussion of temporary cumulative effects on the natural environment, see Section 6.

## 4 4.1 Ecosystems

5 Please see the Ecosystems Technical Report for additional information (IBR 2023r).

### 6 4.1.1 Project Effects

7 Ecosystem resources within and around the study area include fish, wildlife, and plants, and their  
8 habitats. Natural habitats in the area are generally small, fragmented, and modified from their historic  
9 conditions. The No-Build Alternative would continue to contribute to an adverse effect on ecosystem  
10 resources due to the lack of sufficient stormwater treatment and disturbance during intermittent  
11 maintenance activities. A catastrophic event such as a major earthquake could affect fish and wildlife  
12 species in both the immediate vicinity of the bridges and downstream. Fish and wildlife in the  
13 immediate vicinity of the bridge at the time of the event could be directly affected by falling debris  
14 and injured or killed if struck, and fallen debris would diminish habitat suitability at the site by  
15 displacing benthic habitat. Fallen debris from the bridge could also contribute chemical contaminants  
16 to the water and result in reductions in water quality that could affect aquatic species and habitats  
17 downstream of the bridge.

18 Construction of the Modified LPA would result in temporary impacts to sensitive aquatic species and  
19 their habitats, including species of significance to consulting tribes. Long-term effects on ecosystem  
20 resources would include impacts and benefits to both aquatic and terrestrial resources. The piers  
21 associated with the new bridges would displace benthic habitats and introduce new overwater  
22 shading; however, the Modified LPA would result in a net restoration of benthic habitat due to the  
23 removal of the existing piers. The Modified LPA would create new impervious surfaces, which would  
24 generate stormwater but would also provide water quality treatment for both new and existing  
25 impervious surfaces, and would result in a significantly improved water quality condition in area  
26 waterways compared to the No-Build Alternative.

27 The Modified LPA would also result in both permanent and short-term disturbance to sensitive  
28 terrestrial habitats, including riparian buffers, trees, wetlands, and wetland buffers. These impacts  
29 would be avoided and minimized to the extent practicable, and compensatory mitigation would be  
30 provided such that the net effect of the Modified LPA would be no net loss of habitat function.

31 The Modified LPA would remove an existing peregrine falcon nest in the steel structure of the existing  
32 Interstate Bridge. Whether this would result in temporary effects, with peregrine falcons  
33 reestablishing themselves on new bridge structures, or permanent, long-term adverse effects on the  
34 overall viability of the species cannot be determined in advance. Bird nests on the bridge structures  
35 could pose aviation hazards due to bird strikes (which also adversely affect bird species). All structure  
36 types currently under consideration for the Modified LPA would reduce the areas on which birds can  
37 land and roost when compared to the existing bridges. The Modified LPA would also improve the

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1 seismic resiliency of the existing Interstate Bridge, thus reducing the likelihood of impacts to species  
2 and habitat associated with a bridge collapse.

3 Impacts to ecosystem resources would be avoided, minimized, and offset through mitigation  
4 sequencing, which requires consideration of a range of project alternatives with the intent to avoid or  
5 minimize impacts to these resources and to provide compensatory mitigation for unavoidable  
6 impacts. A compensatory mitigation approach is currently being developed in coordination with  
7 federal, state, and local regulatory agencies, tribes, and public stakeholders.

8 While there are some changes in direct and indirect impacts and/or benefits associated with the  
9 design options, these differences would not affect the conclusion (below) regarding the program’s  
10 contribution to cumulative effects.

#### 11 4.1.2 Effects from Other Actions (Past, Present, Future)

12 Native Americans lived in the region for more than 10,000 years before the arrival of Euro-American  
13 settlers. However, human populations were low in the region compared to Euro-American settlement  
14 (Aikens and Melvin 2006; Ames et al. 1998). Since approximately the mid-1800s, human population  
15 growth and development have gradually displaced and reduced the quality and quantity of wildlife  
16 habitat. As noted above, natural habitats in the area are generally small and fragmented compared to  
17 their historic conditions. Nevertheless, these areas do provide habitat for a variety of plants, terrestrial  
18 wildlife, birds, and fish, including both common species and species with special regulatory status.

19 Historically, many activities, including deforestation, urbanization, dams for hydroelectricity,  
20 irrigation and flood control, hatchery operations, and overfishing have contributed to a loss of habitat  
21 and a reduction in fish and wildlife species. These past actions have made significant changes to the  
22 health and capacity of the natural environment in the region.

23 No specific projects have been identified in or adjacent to the study area that would significantly impact  
24 habitat; however, growth and development are likely to continue to impact species present in the study  
25 area—in particular, protected fish species. While the Levee Ready project would fill a small amount (less  
26 than 0.25 acres) of ponded areas, the USACE has determined that the impact would not be significant  
27 and that no sensitive populations are anticipated to be affected (USACE and CCDD 2021).

28 Compliance with the relevant laws, regulations, policies, and codes in force at the time of such  
29 development would help minimize or mitigate the effects of such actions on resources that are  
30 important to juvenile salmonids and other aquatic species. However, even if new development has a  
31 net positive impact on these fish species, many of them would still face the possibility of extinction.

32 Federal agencies have developed a Basinwide Salmon Recovery Strategy aimed at recovering the  
33 threatened and endangered salmon and steelhead species in the Columbia River Basin, most of which  
34 travel through the study area. The recovery strategy includes changes in habitat, hydropower,  
35 hatcheries, and harvest—all factors that will have the greatest impact on species survival.

36 Recent research has also indicated that climate change has affected and will continue to affect  
37 species and to modify fish and wildlife habitat in the Pacific Northwest in multiple ways, including  
38 increased temperatures and decreases in snowpack (May et al. 2018). In August 2021, the U.S.



1 Environmental Protection Agency issued a draft Total Maximum Daily Load (TMDL) for addressing  
2 exceedances of various state and tribal criteria for temperature in the Columbia River and lower Snake  
3 River (EPA 2021). This TMDL documented that water temperature impairments are widespread,  
4 primarily due to the cumulative effects of climate change and dam impoundments. Changes include  
5 less snowfall due to warmer temperatures that, in turn, decreases snowpack and changes the flow  
6 timing, including peak flow levels, of streams and rivers, as well as an overall increase in water  
7 temperatures. It is important to note that river dams on the Columbia and Snake Rivers would  
8 manage flows in the study area, such that the flow extremes in the Columbia River would be  
9 moderated where the river flows through the study area. See Section 3.4 of this technical report for  
10 more discussion related to fish habitat impacts related to climate change.

### 11 4.1.3 Conclusions

12 The impacts to ecosystem resources that would result from the Modified LPA are relatively small and  
13 would be fully offset through avoidance, minimization, and mitigation, but historic development and  
14 expected growth throughout the region are likely to continue to impact ecosystems. The mitigation  
15 measures that are likely to occur under the Modified LPA would serve to reduce harmful effects and  
16 even improve parts of the local ecosystem relative to existing conditions. When combined with past,  
17 present, and foreseeable future actions, the Modified LPA would have a net beneficial effect on  
18 ecosystem resources.

## 19 4.2 Geology and Groundwater

20 Please see the Geology and Groundwater Technical Report for additional information (IBR 2023s).

### 21 4.2.1 Project Effects

22 The study area consists of soils with high relative earthquake hazard rating, susceptible to severe  
23 ground shaking and liquefaction during a major seismic event. The primary difference between the  
24 No-Build Alternative and the Modified LPA is that the No-Build Alternative would not include upgrades  
25 to or retrofitting of the existing bridge, whereas new infrastructure related to the Modified LPA would  
26 be built to modern seismic safety standards. As such, it is likely that the Modified LPA would better  
27 withstand a major seismic event.

28 Sensitive groundwater resources have been identified in the study area that supply municipal,  
29 commercial, and irrigation water to surrounding communities. The distribution and occurrence of  
30 groundwater resources are not anticipated to be adversely impacted by program-related activities.  
31 Compared to the No-Build Alternative, the Modified LPA would have beneficial effects on groundwater  
32 resources, due to an improvement in the management of stormwater volume and flow rates and  
33 stormwater treatment facilities. This would likely result in improved local groundwater quality for the  
34 Troutdale Sole Source Aquifer and surface water quality for drainage areas around the Columbia River  
35 and Burnt Bridge Creek.

36 The steep slopes and soils susceptible to erosion in the Burnt Bridge Creek area have been disturbed  
37 in the past from the construction of I-5 and SR 500. Unlike the No-Build Alternative, the Modified LPA  
38 would disturb these soils again with construction activities in this area.

1 Concrete construction may require more aggregate than is available through local suppliers. The  
2 construction contractor may need to transport construction material to the site from several suitable  
3 source areas throughout the region.

4 While there are some changes in direct and indirect impacts and/or benefits associated with the  
5 design options, these differences would not affect the conclusion (below) regarding the program's  
6 contribution to cumulative effects.

#### 7 4.2.2 Effects from Other Actions (Past, Present, Future)

8 Contaminants from historical commercial and industrial activities in both the city of Vancouver and  
9 the city of Portland have resulted in diminishing groundwater quality. Past activities in the study area  
10 include settlement and development of the region, clearing of native vegetation, filling of lowland  
11 areas, grading of slopes, and construction in earthquake-prone areas. Current development projects,  
12 including roads, bridges, and buildings, are being constructed under updated codes that require  
13 additional protection against earthquakes and measures to limit adverse effects in sensitive zones  
14 (such as landslide-prone areas). However, in some cases, future actions may include development and  
15 regrading that could lead to soil erosion, even with erosion control practices in place. Past actions  
16 have also resulted in contamination of groundwater. Updated construction codes help protect  
17 groundwater sources from present and future actions that could further contaminate groundwater.  
18 Several soil and groundwater remediation actions have helped and will continue to help reduce  
19 existing contaminants in groundwater.

#### 20 4.2.3 Conclusions

21 Many of the geologic effects of the Modified LPA would be beneficial and would help offset adverse  
22 geologic impacts of other past actions. The existing bridges and other I-5 structures were built before  
23 design standards addressed the impacts associated with subduction zone earthquakes, including  
24 severe liquefaction. The new bridges and other structures would substantially improve the seismic  
25 resiliency of the region. The Modified LPA could also improve groundwater quality by remediating  
26 some existing contamination and improving stormwater management and treatment; it would not  
27 contribute to past actions that have introduced contaminants to the groundwater, including the sole  
28 source aquifer.

29 The Modified LPA would disturb some steep slopes and soils susceptible to erosion that have been  
30 impacted by past actions. It would also decrease the risk of landslide and erosion in some areas by  
31 building retaining walls, improving soil stability and improving drainage.

32 Construction of the Modified LPA would require aggregate for concrete, adding to the cumulative  
33 demand of past, present, and other future construction projects. This would further decrease local  
34 supplies and lead to either this or other future projects seeking aggregate from sources outside the  
35 area. When combined with past, present, and foreseeable future actions, the Modified LPA will have a  
36 beneficial effect on geology and groundwater.

## 1 4.3 Water Quality and Hydrology

2 Please see the Water Quality and Hydrology Technical Report for additional information (IBR 2023t).

### 3 4.3.1 Project Effects

4 The No-Build Alternative would continue existing effects on water quality in the long term, including  
5 stormwater quality degradation, as most of the existing impervious area remains untreated.

6 Under the Modified LPA, construction activities, such as construction staging and casting/assembly  
7 site activities, can impact surface water quality by allowing increased erosion, disturbing the beds and  
8 banks of waterbodies, discharging construction materials and chemicals incidentally, and removing  
9 shading vegetation. An overall increase in impervious surfaces within the study area would result in  
10 increased stormwater runoff rates and volumes. Without mitigation, this would adversely affect the  
11 hydrology of waterways in the study area. The Columbia River and Columbia Slough are large, tidally  
12 influenced waterbodies, and the program-related increase in stormwater quantity would not result in  
13 a measurable increase of flows in these surface waters. Burnt Bridge Creek and Fairview Creek are  
14 smaller waterbodies and more prone to be affected by increased stormwater quantity resulting from  
15 increased impervious surfaces. However, engineered water quality facilities would also be designed to  
16 reduce the rate of runoff related to the program to these two waterbodies to pre-development  
17 conditions, as required by federal and state agencies.

18 Improvements to stormwater treatment on new and resurfaced impervious surfaces, including the  
19 new Columbia River and North Portland Harbor bridges, would result in a net improvement for water  
20 quality in the Columbia Slough, Columbia River, North Portland Harbor, Burnt Bridge Creek, and  
21 Fairview Creek, with the exception of an increase in dissolved copper levels at the Columbia Slough.  
22 Most of the runoff generated by the existing highway corridor is not treated before being discharged.

23 All new and rebuilt impervious surfaces, as well as some resurfaced and existing pavement, would be  
24 treated in accordance with current stormwater treatment standards before being discharged to  
25 receiving streams in the study area.

26 While there are some changes in direct and indirect impacts and/or benefits associated with the  
27 design options, these differences would not affect the conclusion (below) regarding the program's  
28 contribution to cumulative effects.

### 29 4.3.2 Effects from Other Actions (Past, Present, Future)

30 Historic land use changes and increasing urbanization have decreased the amount of natural areas  
31 and natural flow regimes in the study area. Flood-control measures have been implemented that  
32 affect the entire lower Columbia River environment. Levees and river embankments were constructed  
33 in the early 1900s on both sides of the river, which isolated the majority of the floodplain from all but  
34 the highest flows. Projected population and employment growth will continue to increase  
35 urbanization and the geographic extent of development. Most of the immediate study area is already  
36 developed, so future projects would mostly consist of redevelopment and would be subject to current  
37 regulations, which are more stringent and generally result in a reduction in stormwater runoff and

1 associated pollutants. The Levee Ready project would temporarily affect water quality due to  
2 construction activities, as well as an increase in impervious surface in the Columbia Slough  
3 watershed; however, the USACE has determined that these effects would be minor due to  
4 minimization measures and the limited area of impervious surface (approximately 0.5 acres) (USACE  
5 and CCDD 2021).

6 A recent decrease in upstream heavy industrial activities and the enactment of environmental laws  
7 beginning in the 1960s (such as the Clean Water Act) have resulted in addressing many known  
8 contamination sources and improving water quality in the Columbia Slough, though the water quality  
9 remains substantially impaired. In July 2005, a ROD was issued for a cleanup program developed by DEQ  
10 and the City of Portland (DEQ 2005). The Columbia Slough Sediment Program aims to remediate  
11 widespread sediment contamination through source control contamination reduction, contaminant  
12 removal by dredging “hot spots,” and long-term monitoring to ensure the program’s effectiveness (BES  
13 2006). Anticipated projects that would improve water quality in the study area include restoration  
14 activities along Burnt Bridge Creek in Vancouver and the Columbia Slough in Portland (Ecology 2021;  
15 Lee and Stamberger 2018).

16 Increased scrutiny by regulatory agencies on chemicals at much lower levels than current standards is  
17 occurring and may result in new standards. Current treatment systems and regulations do not fully  
18 address these likely new standards. However, even with new treatment systems, increased  
19 development may still lead to impaired water quality in some locations.

### 20 4.3.3 Conclusions

21 The Modified LPA is likely to reverse some of the adverse water quality and hydrology impacts  
22 associated with past actions. With new stormwater treatment and infiltration, the Modified LPA is  
23 expected to improve surface water quality, increase groundwater recharge, and help restore natural  
24 flow regimes. This will also be true of other future actions that (1) are constructed on already  
25 developed property, (2) decrease the area of untreated, pollutant generating surfaces, and (3)  
26 infiltrate treated runoff. On the other hand, future actions that convert undeveloped areas to  
27 impervious surfaces are likely to add to the adverse effects of past actions, though regulatory  
28 requirements will reduce those effects compared to historic actions. When combined with past,  
29 present, and foreseeable future actions, the Modified LPA will have a slightly positive effect on water  
30 quality and hydrology.

## 31 4.4 Wetlands and Waters

32 Please see the Wetlands and Waters Technical Report for additional information (IBR 2023u).

### 33 4.4.1 Project Effects

34 The No-Build Alternative would not result in the filling of a wetland or the fill or reduction of a wetland  
35 buffer within the study area. Untreated stormwater within the study area would continue to be  
36 discharged into wetlands and jurisdictional waters. The No-Build Alternative could also result in  
37 cumulatively increased impervious surface from development that would continue to occur along  
38 roadways in the study area.

1 The long-term effects on wetlands and waters resulting from the Modified LPA include decreased  
2 vegetated wetland buffer areas, increased impervious surface areas, and placement of fill and other  
3 alterations of waters of the states and the U.S.

4 The Modified LPA would impact approximately 0.58 acres of five wetlands in the Columbia Slough  
5 watershed. The Modified LPA would impact the buffers of eight wetlands in the study area, totaling  
6 7.39 acres, which could have an indirect effect on the wetland functions. In addition, the Modified LPA  
7 would increase the area of impervious surface in the vicinity of wetlands and decrease the distance  
8 between wetlands and roadway traffic, which could have an indirect effect on wetlands through the  
9 potential for increased stormwater flow and pollutants from stormwater.

10 The Modified LPA would include permanent bridge piers in the Columbia River and North Portland  
11 Harbor to support the replacement bridges. While the replacement bridges have a smaller in-water  
12 footprint than the existing bridges, the Modified LPA would temporarily increase the area of piers by  
13 0.29 acres over existing conditions, as the original bridges would remain in place until the  
14 replacement bridges are functional. Demolition of the existing bridge piers would remove 0.66 acres  
15 from the in-water footprint, resulting in a net restoration of approximately 0.37 acres of benthic  
16 habitat.

17 The IBR program's Habitat Mitigation Working Group has been tasked with determining appropriate  
18 mitigation sites to meet the program's regulatory and conservation commitment. To meet the  
19 regulatory requirement, at least one site or mitigation bank must be selected in Oregon and one in  
20 Washington. The conservation site (or sites) is not limited to one state or geographic location. The  
21 mitigation/conservation approach and/or sites will be selected with input from the working group and  
22 all other stakeholders involved and will be presented to the IBR program executive leadership for final  
23 approval.

24 While there are some changes in direct and indirect impacts and/or benefits associated with the  
25 design options, these differences would not affect the conclusion (below) regarding the program's  
26 contribution to cumulative effects.

#### 27 4.4.2 Effects from Other Actions (Past, Present, Future)

28 Urbanization and land use changes have led to a decrease in the acreage of wetlands in the study area  
29 since the 1800s, which is consistent with state and national trends (Morlan et al. 2010). Oregon and  
30 Washington lost an estimated 38% and 31% (respectively) of their wetlands between the 1780s and  
31 1980s (Dahl 1990). The advent of stricter federal and state protections in the 1970s–1990s led to a  
32 reduction in annual wetland loss in the Willamette Valley, but they did not stop the loss of wetlands  
33 (Morlan et al. 2010).

34 Since 1958 (the base year of I-5 construction), improvements have occurred to some wetlands near  
35 the southern portion of the study area. The Port of Portland completed a wetland restoration project  
36 at the 90-acre Vanport wetlands parcel, located immediately west of the existing highway and light  
37 rail line (maintenance of the site is ongoing). Other historic wetlands east of the highway, in the Delta  
38 Park area and on Hayden Island, have undergone increased development, draining, or filling since  
39 1964. Located just south of the study area, the Lombard to Delta Park project affected a relatively  
40 small area of wetland habitat and natural areas.

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1 Continued growth throughout the region will affect portions of the study area. The Levee Ready  
2 project is estimated to affect approximately 0.5 acres of wetlands (USACE and CCDD 2021). Some  
3 anticipated projects would improve wetlands in the program vicinity, including planned restoration  
4 projects near the Columbia Slough and the Smith and Bybee Wetlands Natural Area (Lee and  
5 Stamberger 2018).

6 Although no additional projects have been specifically identified that would impact wetlands in or  
7 near the study area, temporary and permanent impacts from future projects are likely to occur.

8 Local, state, and federal regulations require protection of wetlands and jurisdictional waters, slowing  
9 the destruction of these habitats and mandating replacement of their functions.

#### 10 4.4.3 Conclusions

11 Compared to historical conditions, there are few wetlands remaining in the study area. Mechanical  
12 methods introduced to control water flow (dikes in the program vicinity and dams on the Columbia  
13 River) have reduced the presence of wetlands in the study area. The habitat losses due to these  
14 activities are irrecoverable. The Modified LPA would neither exacerbate nor help to recover the loss of  
15 such habitats.

16 In the context of widespread urban development in the study area, the potential impacts to wetlands  
17 buffers resulting from the Modified LPA are minor. Although the affected wetlands perform important  
18 functions and are valuable due to their relative rarity, they are not of high quality. Mitigation of these  
19 impacts would replace or improve the functions to the extent possible, as close to the project as is  
20 feasible.

21 Based on the volume of flow and the existing conditions in the Columbia River, the removal and fill  
22 associated with the Modified LPA is not likely to have measurable effects on the function of the river.  
23 When combined with past, present, and foreseeable future actions, the Modified LPA would have both  
24 adverse and beneficial effects on wetlands.



## 5. CULTURAL AND RECREATIONAL ENVIRONMENT CUMULATIVE EFFECTS

*Please note: the draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised. Verb tense is consistent with what analysis/reviews will be completed at the time this report is published.*

Resources categorized as cultural and recreational environment include archaeological resources, historic resources, and parks and recreation areas. They involve issues associated with resources regulated by Section 4(f) of the U.S. Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. Tribal consultations contributed to the cultural resources technical analysis for the IBR program. Key cultural resources in the program vicinity include Fort Vancouver, recorded and anticipated archaeological sites along the Columbia River, and a variety of historic buildings and properties in the study area.

The temporal frame of reference for the “past” varies for archaeological resources, historic resources, and parks and recreation, as identified in the sections below. The temporal frame of reference for the “future” for all three resources is 2045, which is the planning horizon for the regional transportation model, and the year to which impacts can be reliably described without speculation.

The analysis examined the general adverse and beneficial effects of past development, and the cumulative effects resulting from the Modified LPA in conjunction with other past, present, and reasonably foreseeable future actions. Issues considered include past effects on cultural resources in the study area, including loss of historic resources due to development and past effects on areas used as cultural sites. The IBR program team conducted the analysis with the appropriate consultation with the Washington Department of Archaeology and Historic Preservation, Oregon State Historic Preservation Officer, tribal governments, local planners, and other stakeholders.

### 5.1 Archaeology and Cultural Resources

#### 5.1.1 Potential Effects

*Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment Technical Reports will be available in mid-2023, at which time they will be incorporated into the Cumulative Effects Technical Report.*

#### 5.1.2 Effects from Other Actions (Past, Present, Future)

*Note: This section will be updated, as appropriate, based on analysis and information from the Archaeology and Historic Built Environment Technical Reports (anticipated in summer 2023).*

Extensive development has occurred on both shores of the Columbia River in the past 200 years. Several types of historic-era development occurred within or immediately adjacent to the present I-5

1 transportation corridor, and there are indications of Native American settlements associated with  
2 those developments.

3 Since the late 19th century, diking, draining, dredging, and filling along the shores have altered the  
4 banks of the Columbia River, possibly damaging archaeological sites, or encapsulating them under fill.  
5 The Interstate Bridge transformed both Hayden Island and Vancouver. The first bridge was completed  
6 in 1917 as part of the major West Coast highway corridor (Pacific Highway 99) running from Canada to  
7 Mexico. A second bridge structure was built in 1958, and it began service as I-5 in 1964. Traffic on the  
8 route has mounted with the steady growth and development of Clark and Multnomah Counties and  
9 surrounding areas. Intensive residential, commercial, and transportation development over the past  
10 160 years has had major impacts on the cultural and historic landscape in the I-5 corridor and vicinity.  
11 In particular, the construction of I-5 and SR 14 affected the historic archaeology of the Hudson's Bay  
12 Company/Kanaka Village/U.S. Army presence in Vancouver.

13 The earliest Euro-American settlement and development in the city of Vancouver occurred in the mid  
14 1800s in the area immediately west of modern-day I-5. Historic Sanborn insurance maps indicate that  
15 the city of Vancouver had begun to spread north of 20th Street by 1907 and had reached 41st Street by  
16 1949, indicating a moderate to high likelihood of encountering buried historical archaeological  
17 deposits associated with residences and businesses dating to the early 20th-century settlement of  
18 Clark County. While the development of Vancouver formed the historic part of the archaeological  
19 record, the construction of each road, house, and trash pit potentially destroyed or disturbed  
20 evidence of Native American sites in the area.

21 While not every parcel is likely to contain significant archaeological resources, recent historical  
22 archaeological investigations demonstrate the potential for encountering archaeological resources  
23 associated with early residences, businesses, and industries in this portion of Vancouver. Based on the  
24 results of these projects, there is reason to believe that abundant and well-preserved archaeological  
25 resources are present beneath the older portions of Vancouver.

26 It is likely that 20th-century development along the I-5 corridor altered near-surface evidence of  
27 Native American occupancy and use of the area. However, geoarchaeological and geomorphological  
28 investigations in Oregon indicate that deep alluvial soils have the potential to contain evidence of the  
29 archaeological record as well as important paleoenvironmental data (CRC 2011). The proposed depth  
30 of the Modified LPA's impacts would have an incrementally greater potential to affect deeply buried  
31 resources than other past and reasonably foreseeable actions.

32 Recent transportation projects in the area of these resources include the Land Bridge pedestrian  
33 overpass and Interpretive Trail over SR 14, and the Vancouver Barracks, West Reserve Area, and other  
34 improvements planned for the Fort Vancouver National Historic Reserve.

### 35 5.1.3 Conclusions

36 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
37 *Technical Reports will be available in mid-2023, at which time they will be incorporated into the*  
38 *Cumulative Effects Technical Report.*

## 1 5.2 Historic Resources

### 2 5.2.1 Potential Effects

3 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
4 *Technical Reports will be available in mid-2023, at which time they will be incorporated into the*  
5 *Cumulative Effects Technical Report.*

### 6 5.2.2 Effects from Other Actions (Past, Present, Future)

7 *Note: This section will be updated, as appropriate, based on analysis and information from the*  
8 *Archaeology and Historic Built Environment Technical Reports (anticipated in Summer 2023).*

9 The historic resources analysis considers cumulative effects of actions beginning in 1950s, with the  
10 construction of I-5. This time period captures the substantial change in land use and historic context  
11 in the study area that occurred with I-5 construction. Construction of the highway involved the  
12 removal of several buildings that had been constructed during the early history of Vancouver, and the  
13 highway created a substantial barrier between eastern and western portions of the historic  
14 community. The 1917 bridge is designated as a historic resource on the National Register of Historic  
15 Places in both Oregon and Washington.

16 Several other substantial projects and developments have had an impact on the historic built  
17 environment in the study area, including:

- 18 • Significant population growth from 1950 to the present in Portland, Vancouver, and  
19 surrounding areas, which has put a high demand on housing in historic neighborhoods,  
20 causing new development both adjoining and within the historic sections of town, and  
21 ultimately diminishing the integrity of historic neighborhoods.
- 22 • Significant population growth from 1950 to present in Portland, Vancouver, and the  
23 surrounding areas, which has attracted urban and industrial development in the study area,  
24 changing the use and nature of the open space along the river and causing the displacement  
25 and alteration of some historic buildings.
- 26 • The completion of I-5 through Vancouver in 1954, which resulted in the demolition of large  
27 sections of the city's historic neighborhoods to access the 1917 bridge to Portland.
- 28 • Construction of the parallel bridge in 1958 (southbound), which accommodated increased  
29 traffic flow on the new highway, resulting in increased interstate traffic and commerce.
- 30 • In 1961, an urban renewal project that covered 28 blocks in downtown Vancouver and  
31 removed or altered many 19th- and early-20th-century buildings and substantially altered the  
32 setting of those remaining.
- 33 • The loss of businesses in downtown Vancouver from competition with shopping malls built at  
34 Jantzen Beach in Portland and the Vancouver Mall in the 1970s.

35 Unrelated present and future development would likely affect historic properties in the study area.  
36 For example, the Providence Academy redevelopment project, under construction at Evergreen

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- 1 Boulevard and C Street, involves the removal of several derelict historic structures and the  
2 introduction of contemporary architecture directly adjacent to the Academy (House of Providence),  
3 which is listed on the National Register of Historic Places.
- 4 In addition, historic resources that are currently vacant or underutilized may be lost through  
5 deterioration because of their current state of disrepair and the high cost of adapting them for reuse.

### 6 5.2.3 Conclusions

7 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
8 *Technical Reports will be available in mid-2023, at which time they will be incorporated into the*  
9 *Cumulative Effects Technical Report.*

## 10 5.3 Parks and Recreation Areas

11 Please see the Parks and Recreation Technical Report for additional information (IBR 2023v).

### 12 5.3.1 Project Effects

13 The parks and recreation resources analysis considers cumulative effects of actions beginning in the  
14 1950s, with the construction of I-5. The No-Build Alternative would not affect parks and recreation  
15 resources, or access to these resources, compared to existing conditions. Access to these resources  
16 would continue to be hindered by limited public transit service and substandard active transportation  
17 facilities.

18 The Modified LPA would improve access to regional recreational resources in Portland and Vancouver,  
19 including the Portland Expo Center, Portland International Raceway, East Delta Park, and Vancouver  
20 National Historic Reserve. Additionally, the Modified LPA would result in improved pedestrian and  
21 bicycle access in the area, particularly between Oregon and Washington. Trail linkages, including  
22 those in and through the Marine Drive Interchange in Portland and along the Columbia River in  
23 Vancouver, would be greatly improved.

24 The Modified LPA would not result in long-term direct effects to Waterfront Park, beyond the changes  
25 in eastern and southern views from the new Columbia River bridges, while the Columbia River  
26 Renaissance Trail, Discovery Historic Loop Trail, and Marine Drive Multi-use Trail would be realigned  
27 beneath the existing and new Columbia River bridges.

28 The largest parkland acquisitions required for the Modified LPA would be 1.4 acres from East Delta  
29 Park and 0.2 acre from Old Apple Tree Park.

30 Additional property acquisitions would be required at Kiggins Sports Fields/Stadium and Marshall  
31 Community Center, the Luepke Senior Center, and Marshall Park, though it is not expected that the  
32 recreational use of any of these facilities would be affected. The IBR program would work with the  
33 Cities of Portland and Vancouver to identify potential mitigation measures for loss of parkland and  
34 other impacts.

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1 Lastly, the Modified LPA would not adversely affect the planned Bridgeton Trail connection near the  
2 Marine Drive interchange.

3 While there are some changes in direct and indirect impacts and/or benefits associated with the  
4 design options, these differences would not affect the conclusion (below) regarding the program's  
5 contribution to cumulative effects.

### 6 5.3.2 Effects from Other Actions (Past, Present, Future)

7 Park and trail development efforts in the region have been ongoing. These efforts will be continued  
8 and are supported by current plans and programs. The impacts listed above are small in the context  
9 of local park resources and are balanced by recent investments in parks and trails elsewhere in the  
10 area (e.g., the Vancouver Waterfront Trail, open space at the Vancouver Waterfront and Terminal 1).

11 Planned park and trail development at the Portland waterfront, Hayden Island, the Vancouver  
12 Waterfront, Terminal 1, the Vancouver National Historic Reserve, and Kiggins Bowl would expand the  
13 provision of park and recreation facilities to the public. Other development could result in loss of  
14 parkland, but no reasonably foreseeable projects have been identified that are anticipated to reduce  
15 park or recreation facilities, and the extent of a potential loss is currently not known. Parks in the  
16 study area that received Land and Water Conservation Fund grant dollars are regulated by Section 6(f)  
17 protections and may only be converted out of parkland use with replacement.

### 18 5.3.3 Conclusions

19 Effects on parks resulting from the Modified LPA, considered in context of the past and planned  
20 projects (including park expansions), would be relatively minor and would not constitute a negative  
21 cumulative effect for the region. Additionally, the Modified LPA would improve access to the  
22 Vancouver Waterfront and connect parks on both the east and west sides of the bridges. This would  
23 essentially restore the once-connected waterfront that was bifurcated by the existing bridges.  
24 Because the Modified LPA would provide mitigation for any adverse effects on parks and recreation  
25 areas, it is not anticipated to contribute to cumulative adverse effects on park and recreation areas,  
26 but would contribute to beneficial cumulative effects.

## 6. TEMPORARY EFFECTS – CONSTRUCTION

Cumulative effects during construction may result when simultaneous or sequential construction projects have an additive effect to the temporary effects resulting from construction of the Modified LPA, demolition (including the removal of existing bridges), and associated activities of the proposed improvements. Simultaneous or sequential construction projects can increase congestion, create more employment opportunities, cause community and natural resource impacts, and require additional public and private spending. Construction projects that may contribute to these effects when combined with the IBR program include:

- Vancouver Waterfront
- Terminal 1
- Renaissance Boardwalk
- Waterfront Gateway Project
- Levee Ready

These projects have, or would have, their own traffic control plans, but some may influence the travel routes of commuters and freight and could place more traffic in the study area. Likewise, some of the projects are on planned haul routes and could influence the delivery of supplies and materials to the job sites for the IBR program. As more detailed plans are developed, traffic control plans would need to be developed with consideration of these projects and their timelines.

Other likely or potential construction projects in the vicinity are described in the Land Use Technical Report.

Construction activities associated with the Modified LPA have the potential to cause economic impacts by temporarily blocking visibility and access to businesses, causing traffic delays, and rerouting traffic on detours that increase travel times and make access to some locations difficult. Access restrictions or difficulties may divert customers and clients, hamper deliveries, and complicate the provision of emergency services. However, most traffic movements would remain open throughout the construction stages of the Modified LPA.

Construction of the Modified LPA could also result in increased employment and spending in the study area during construction. The extent of these effects depends on the source of project funding and the makeup of work crews used during construction. Federal or State funds that are new to a region can have a measurable economic effect on employment and income gains resulting from project construction. The federal government and the States of Oregon and Washington would provide the funds for the IBR program, resulting in some income and job benefits that would otherwise not occur.

The Modified LPA is likely to have the following effects on marine commerce:

- The duration of in-water construction is projected to be periodic over four years.



- 1       • The lift span channel would be closed for a two-month period. This channel is one of three  
2       channels available to marine commerce; during construction, efforts would be made to keep  
3       at least one channel open at all times.
- 4       • The 300-foot channel is expected to be closed for a three-month period; after this, there could  
5       be room for selected river traffic, but it would be on a case-by-case basis and require  
6       coordination to maintain safe and effective working conditions. This channel is one of three  
7       channels available to marine commerce, and efforts would be made during construction to  
8       keep at least one channel open at all times.
- 9       • Marine commerce may need an extra tow to help maneuvering during construction, which  
10      would carry an extra cost.
- 11     • Temporary river travel restrictions are anticipated under the Modified LPA as barges are used  
12      to ferry materials to and from work sites.

13 In terms of the built environment, the temporary effects from the Modified LPA, in combination with  
14 other planned projects, would cause delays and disruptions to local residents and businesses.  
15 Mitigation plans, including traffic control plans and business assistance, would reduce the negative  
16 consequences of construction, while the employment demands would result in positive economic  
17 outcomes for the region.

18 Temporary cumulative effects on the community may occur due to local traffic congestion and  
19 rerouting, as well as noise and air quality impacts, where construction under the Modified LPA  
20 overlaps with the construction of other projects in the area. The highest potential for such impacts is  
21 likely to be near the bridge landing in Vancouver and on Hayden Island, where other large projects are  
22 anticipated and where construction duration and intensity under the Modified LPA are likely to be  
23 high.

24 In terms of the natural environment and biological resources, most of the construction impacts would  
25 be localized to the extent that the extent and magnitude of any cumulative effects from other projects  
26 would be minimal. Other projects in the area, such as the Levee Ready project and Renaissance  
27 Boardwalk, could directly impact the same waters or wetlands or regulated habitats that the Modified  
28 LPA would affect. Potential temporary water quality impacts include turbidity due to sediment  
29 disturbance associated with in-water work, toxic contamination due to disturbance of hazardous  
30 sediments during in-water work, and toxic contamination due to accidental equipment leaks or spills  
31 in the vicinity of waterways in the study area. Additional short-term effects on aquatic resources could  
32 include harassment and non-lethal disturbance from in-water work; injury or disturbance due to  
33 hydroacoustic impacts associated with pile driving and fish handling; increased risk of predation due  
34 to in-water shading during construction; and potential mortality associated with hydroacoustic  
35 impacts and fish handling.

36 However, cumulative effects related to construction activities (such as underwater noise from pile  
37 driving conducted for other projects) would only be expected to occur if such activities were being  
38 conducted simultaneously and in close proximity to construction being conducted for the Modified  
39 LPA. While there are no projects that are currently known or expected to occur that would require  
40 substantial in-water construction activity in the immediate vicinity of the construction for the  
41 Modified LPA, it is possible that such a project could be proposed. Any such project would require

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- 1 federal approvals for work within the river, and would therefore need to undergo Section 7
- 2 Endangered Species Act consultation. With regards to pile driving noise, the Section 7 consultation
- 3 process would require such a project to account for its own hydroacoustic impacts and would require
- 4 development of avoidance and minimization measures to minimize these impacts. For these reasons,
- 5 it is unlikely that any project conducted concurrently with IBR program-related construction would
- 6 result in a cumulative adverse effect related to underwater noise or other construction impacts.

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